

Learning the rules of the game: how 'good nurses' negotiate workarounds

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Learning the rules of the game: how 'good nurses' negotiate workarounds

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Australian Institute of Health Innovation
UNSW Medicine

A thesis in fulfilment of the requirements for the degree of
Doctor of Philosophy

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Background: Electronic medication management systems (EMMS) aim to reduce medication errors. Rather than use them as prescribed by policy, nurses commonly employ workarounds. EMMS-related workarounds have been attributed to a mismatch between introduced technology and nurses' workflow. Comparatively little attention has been focused on examining nurses' enactment, explanations and experiences of using workarounds. This is a significant lacuna because nurses' contextual rationalisation is integral, I will argue, to understanding their use of workarounds.

Aims: To improve our knowledge and understanding of nurses' use of workarounds with EMMS in order to inform policy and technology development.

Methods: A qualitative study was conducted in four phases: scoping and process mapping; data collection and analysis; explanatory framework generation and member checking; and interpretation of emergent findings using existing sociological theory. The study sampled EMMS implementation stakeholders and nurses across all shifts and days of the week, from six wards in two Australian hospitals, representing two EMMS types and two models of nursing care. Data collection methods included observations, interviews and focus groups. Data analysis used a general inductive approach in which data were coded for emerging themes, framed by the research questions.

Results: While sometimes EMMS related problems offered the best explanation for workarounds, nurses used workarounds largely to circumvent perceived barriers to being, or being perceived to be, a 'good' nurse in the sense of being time-efficient, safe, patient-centred and/or a team player. Whether nurses used workarounds, and how they felt about doing so, was moderated by a number of contextual factors. The use of workarounds provoked a range of emotions, in particular, feelings of tension.

Interpretation: Nurses were motivated to use workarounds, even when doing so made them professionally vulnerable, primarily by the desire to be, or be perceived to be, a 'good' nurse. Bourdieu's concepts of *habitus*, *field* and *capital* offered useful constructs to interpret the intensity and complexity of the drivers of workarounds.

Conclusion: Technology and policy designers need to be cognisant of creating potential barriers to being a 'good' nurse. Unless they do so, problematic workarounds will continue unabated, and potentially useful workarounds will remain 'underground'.

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Dedication

Paul – “nhobbok hafna, hafna, hafna”

Bridget, Georgia and James – “I love you to the moon and back and then some”

Mum and Dad – “Thank you”

Publications and presentations arising from this research

REFEREED PUBLICATIONS

Debono, D., Greenfield, D., Travaglia, J., Long, J., Black, D., Johnson, J., & Braithwaite, J. (2013). Nurses' workarounds in acute healthcare settings: A scoping review. *BMC Health Services Research*, 13, 175. <http://www.biomedcentral.com/1472-6963/13/175>

This paper has received attention in the following ways:

Patient safety article of the month, December 2013, John C. Lincoln Health Network, Arizona Health Information Network (AZHIN), <http://azhin.org/content.php?pid=268827&sid=3276956>

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Glossary of terms

Term	Meaning
5Rs – Five Rights of medication administration	Right patient; Right drug; Right dose; Right time; Right route
6Rs – Six Rights of medication administration	Right patient; Right drug; Right dose; Right time; Right route; Right documentation
Accountable medication (DD)	“All Schedule 8 medications and or Schedule 4 Appendix D medications, as well as any non-Appendix D Schedule 4 medication directed by the Chief Executive (or delegate) of the facility to be accounted for in a register.” [1:2]
AIN	Assistant in nursing (not endorsed to administer medication)
“Batching” medication preparation	Preparation of medications for several patients at the same time
BCMA	Bar Code Medication Administration systems
“Check out” a DD medication	Two nurses (one of whom must be a registered nurse), open the DD medication cupboard, check the medication against the medication order, and reconcile the number of medications left in the DD cupboard after the medication has been removed for administration to the patient. The drug register is completed and reconciled once the medication has been administered and/or destroyed.
CNC	Clinical nurse consultant
CNE	Clinical nurse educator
CNS	Clinical nurse specialist
COW	Computer on wheels
CSO	Clinical support officer
DD cupboard	The locked cupboard in which the accountable

	drugs are kept
DD keys	One set of keys on each unit that open the locked cupboard in which the accountable drugs are kept – carried by an authorised registered nurse
EEN	Endorsed enrolled nurse (endorsed to administer medications that fall within scope of practice)
EHR	Electronic health record
eMAR	Electronic medication administration record
EMMS	Electronic medication management system
EN	Enrolled nurse
HIT	Health Information Technology
In-charge	The nurse who has been designated to be in charge of the unit on a given shift
IT	Information technology
MET call	Medical emergency team call – part of a rapid in hospital response system that is triggered when a patient exhibits signs and symptoms of clinical deterioration according to set criteria (e.g. observations breach established parameters)
Neophyte nurse	Newly graduated RN with less than one year experience post-graduation
NUM	Nurse unit manager
Observations (obs) machine	Vital signs recording machine on wheels
OMA	Overdue medication alert
PAC	Pressure area care
PACE system	Pre-arrest criteria for escalation/ The patient with acute condition for escalation (PACE) – a two-tiered trigger and response system designed to detect and treat patients with early signs and symptoms of

	clinical deterioration
PRN	Pro Re Nata (as needed) – medications prescribed to be administered as required
RN	Registered nurse
Route of medication administration (relevant for this study)	Route by which the medication is administered: oral (PO); intramuscular injection (IM); intravenous injection (IV); nebuliser (neb); per rectal (PR); subcutaneous injection (SC); sublingual (SL); topical (creams/patches)
Scheduled medication	"A medication containing a substance in the NSW Poisons List as; Schedule 2 'Pharmacy Medicine' (pharmacy 'over the counter' medication), Schedule 3 'Pharmacist Only Medicine' (pharmacist controlled 'over the counter' medication), Schedule 4 'Prescription Only Medicine' (also known as a 'restricted substance'), or, Schedule 8 'Controlled Drug' (also known as a 'drug of addiction')." [1:2]
Schedule 4 Appendix B medications	"The subset of Schedule 4 Appendix D medications which require additional requirements for the prescriptions (but not medication chart orders) to include an interval for repeat dispensing and to be retained separately at the Pharmacy Service (other than with prescriptions for Schedule 8 medications). The medications include anabolic-androgenic steroids, and amylobarbitone and pentobarbitone when packed and labelled for injection." [1:2])

Schedule 4 Appendix D medications	“The subset of Schedule 4 medications that are known to be liable to abuse or misuse, and as such require additional requirements for storage in patient care areas. The medications include benzodiazepines (except a Schedule 8 benzodiazepine), anabolic-androgenic steroids, ephedrine, phentermine, phenobarbitone, thiopentone, and amylobarbitone and pentobarbitone when packed and labelled for injection.” [1:2]
Scope of practice	Scope of practice defines the procedures, actions and processes that an individual is permitted to undertake according to their professional qualifications
A ‘Special’	Nursing assistants often hired from agencies, to observe and assist one or two patients for a shift who had been assessed to be at a high risk of falling
Unit	Ward within a hospital

Prologue

I began the PhD marathon with the hope of finding a way to help nurses not make medication errors. As a nurse, making a medication error seemed to me to be a terrifying *fait accompli* – only the consequence of the inevitable error was uncertain. I read a paper within a few weeks of the initial discussions with my supervisor, Jeffrey Braithwaite, which caused me to think my PhD unnecessary [2]. The paper described bar code medication administration (BCMA) technology that reduced the risk of wrong patient, wrong drug and wrong time administration errors, by requiring the medication-administering nurse to scan the barcode of the medication, and the barcode on the patient's identification band prior to administering the medication. An alert would signal a potential error. There was still scope for wrong route errors but even these were reduced. While prescription errors would still be possible, from where I was sitting reading about this new technology, the BCMA seemed to be the perfect solution – no need for me to find an answer and win the Nobel Prize. Before meeting with my supervisor to let him know that the solution was already available, I happened upon another paper by Ross Koppel and his colleagues (2008) that examined nurses' use of workarounds with BCMA [3]. The paper demonstrated that nurses worked around the safety mechanisms available in the BCMA. I was initially confused – I knew nurses to be professional, caring, kind, patient focused, and in many cases, like me, terrified of legal ramifications should they make a drug error. Why then would nurses workaround these safety mechanisms? At that point, for me, workarounds epitomised a threat to patient safety and I was keen to find out what factors led to nurses subverting safety mechanisms to use workarounds. If I could locate these, then perhaps workarounds could be prevented. I reflected with academic colleagues, clinicians, friends and relatives eager to deride electronic medication management systems (EMMS) workarounds as unsafe practices. As the journey continued I began to wonder whether all workarounds were 'bad' or unsafe. The healthcare literature predominantly perceived EMMS workarounds as a negative consequence of the poor fit between introduced technology and existing workflow [4]. However, the literature in disciplines other than healthcare identified workarounds as fixes, often necessary, that offered solutions and potential improvement strategies [5]. Workarounds were shared on blog sites, bulletins and journals. At this point I came across Tucker and Edmondson's (2002, 2003) research on nurses' use of first order problems to circumvent operational failures that they encountered every shift [6-8]. As I reflected on my own nursing career, I identified workarounds that I had used. However, it seemed

to me that the potential implications of working around problems to solve operational failures to deliver care were one thing, but working around policies or technology safety mechanisms designed to make medication safer was another. Given nurses' desire to "do the sick no harm" [9] and the potential to be professionally sanctioned should an adverse event occur when they had worked around policy, the factors influencing nurses to work around must be powerful and were worth investigating.

A conversation with my mother, also a nurse, in which she described workarounds with medication administration that they used in the 1950s, suggested that the factors influencing the use of workarounds with medication administration were not only powerful but spanned generations of nurses.

Patients were often ordered a volumed dose of Morph/Asp for pain (a mixture of morphine and Aspirin). It was a liquid and the morphine would be suspended on the top and the Asprin sediment would sink to the bottom of the bottle. You had to shake it well to mix it up. If you judged that someone's pain was more severe than would be lessened by the Morph/Asp but not severe enough to warrant Omnopon, a stronger analgesic, you would vary the amount that you shook the Morph/Asp bottle. If you didn't shake it at all then the volumed dose contained only the morphine on the top, if you shook it a little you mixed some of the Asprin in so the same volume didn't contain as much morphine. The amount you shook the bottle determined the concentration of morphine in the dose. In thinking that through and treating patients individually, while still following the rules you were a good nurse. Not all the nurses would have done that, some were not capable of it, they didn't have the initiative or the ability to think beyond what was set down in front of them. (Nancy Unwin: Nurse and Midwife)

While research investigating nurses' use of EMMS in Australian acute-care settings had identified that nurses used workarounds [10], to my knowledge, there were no published studies that had examined nurses' use of workarounds in relation to EMMS as the focus of the study in an Australian context. What were the workarounds nurses in Australian acute-care settings used in relation to EMMS? What were the factors in these settings that contributed to the development and proliferation of workarounds and how did the nurses themselves enact, explain and experience their own and their colleagues' use of workarounds? At that point I really wanted to

find out the reasons nurses gave for using EMMS-related workarounds and how they understood them in relation to their everyday clinical practice. I had become ambivalent about whether workarounds could be considered 'good' or 'bad' – I was ready to go into the field to find out.

Chapter 1 Introduction

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1.1 Introduction

This thesis examines organisational, cultural, professional and relational factors which influence the way in which nurses use electronic medication management systems (EMMS) and associated policies, and more specifically, work around these systems in everyday practice. Using data drawn from interviews, focus groups and sustained observation of nurses' work, it considers the way in which nurses' professional training and identity contribute to their understanding of, willingness to, and justification of workarounds associated with medication administration using EMMS. The thesis identifies that while a mismatch between EMMS and nurses' workflow accounts for some workarounds, nurses used workarounds largely to circumvent perceived barriers to being a 'good nurse'. That is, to being or being perceived to be time-efficient, safe, patient-centred and/or a team player. There were 'moderating motivations' that influenced whether and how nurses used workarounds. Their described experience of using workarounds was also moderated by a number of factors and ranged from feeling positive to feeling negative, including feeling tension about using workarounds. This thesis does not quantify or categorise the workarounds that nurses used in relation to medication administration, nor measure degrees of causality. It does not try to demonstrate that workarounds are 'good' or 'bad', 'safe' or 'unsafe'. Rather it examines how workarounds are explained and experienced by those who use them. Appreciating the significance of workarounds for nurses, from their perspective, is imperative to understanding why they use them. Grasping clinicians' conceptualisations is at the heart of apprehending healthcare improvements at the pointy end, where care is delivered. Understanding workarounds and the factors that lead to and mandate their use among nurses is essential if we are to challenge their persistence or better use them to enhance patient safety.

1.2 Background

Healthcare is considered a high-hazard industry. This is most obviously because clinicians have the potential to kill or maim their patients and clients [11]. Healthcare is also complex, fragmented and decentralised, while at the same time being unevenly regulated [11]. It is characterised by routine, highly organised and ultra-safe practices (e.g. blood product protocols) and at the same time by unpredictable, erratic and hazardous events (e.g. cardiac arrest). Clinicians are trained in silos, and then required to learn on the job at exactly the same time as they are required to display significant professional autonomy. The care process involves both long-term relationships

(e.g. chronic disease) between patients and clinicians, and acute, relatively brief interactions (e.g. outpatient and emergency department episodes) [12].

Both healthcare organisations [13, 14] and the profession of nursing [15] have been characterised as complex adaptive systems, in which nurses' work is highly uncertain, with undulating demands and barriers to delivering care. "Factors inherent to caring for patients, such as the need to respond to new information and the need to interact with the larger system of care, increase the complexity of nursing work" [16:645]. These features shape the way in which nurses practise. The 'antidote' most often applied to this system and professional complexity is the development and application of rules, policies and technologies, which seek to standardise clinicians' practice [17, 18].

Nurses continuously re-assess, re-prioritise, re-adjust and respond to constantly changing situations and demands in a system that is fraught with communication breakdowns [19-21], operational failures [22] and interruptions [16, 23-25]. An ability to adapt, predict, adjust and compensate for shortcomings and barriers in the system are characteristics of experienced and resilient employees [7], and mastery of these skills is associated with 'successful' nurses [26, 27]. In order to deliver holistic care, it has been suggested that nurses are also required to be good social problem-solvers [28].

The United States Institute of Medicine's seminal report, *To err is human: building a safer health system*, estimated that deaths due to preventable medical error exceed those by motor vehicle accidents, breast cancer or AIDS [29:11]. A systematic review concluded that nearly one in 10 patients suffer a preventable adverse event during hospitalisation [30].

To address the problem of iatrogenic harm, healthcare has drawn on approaches to safety implemented in high risk industries [31, 32] including aviation [33] and the racing industries [34]. Technologisation, team training, rules, policies and guidelines aim to improve patient safety and have proliferated in healthcare [35-37]. One approach to improve patient safety seeks to standardise practices. However, due to complexity and unpredictability, those who deliver care must be ready at any point to solve problems quickly. When coupled with a lack of resources, they need to do this resourcefully and creatively which, at times, may involve policy violations. On the one hand adherence to standardisation, rules, policies and guidelines underpin safe practice. On the other, in a single patient care moment, safe delivery of care may require clinicians to work around policies and the way a technology was intended to be used. While acknowledging the

importance of rules, policies and technology in standardising healthcare delivery and improving patient safety, it has been acknowledged that deviation is at times necessary, constitutes acts of resilience and offers a potential source of improvement [38].

Overall, there are few studies that examine the causes of safety violations, a construct overlapping with workarounds, in industries including healthcare [39]. Some studies have explored attitudes of health professionals to rule breaking in healthcare and concluded that workarounds by healthcare workers may be explained by confusion in relation to rules [35] and a perception that rules do not lend themselves well to the complexity and unpredictability of healthcare delivery [35, 40-42].

Medication error is one of the key causes of iatrogenic harm in hospitals [30]. The medication administration process, comprising numerous steps and activities [43], involves highly complex thinking and application of professional knowledge [44]. Medication administration is considered an intricate, varied and important component of nurses' work that temporally structures their entire work day [45]. Typically, doctors prescribe medications (although nurses have scope to nurse-initiate or nurse-prescribe select medications), pharmacists dispense medications and nurses endorsed to do so, administer medications. The administration stage of the medication process has been considered particularly vulnerable to error because, as it is the last step in the process, there is no further opportunity to 'catch' or detect a potential error [46]. Attempts to reduce administration errors have required nurses administering medication to follow fundamental rules of medication administration. That is, the five rights (5Rs) – right medication (check the medication against the order), right patient (use a sanctioned process to cross check approved patient identifiers on the patient against those on the medication order), right dose (check the prepared medication dose against the dose prescribed on the medication order), right route (check the prescribed route of medication administration on the medication order), at the right time (check the prescribed time of medication administration and ensure that it is not too close to the time of the previous administration) [44, 47]. A sixth 'right' (6Rs), for example right result [48] or right documentation [49], has been added in some settings. In an attempt to reduce medication errors, additional 'rights' have been added including three rights (appropriate medication for the reason), right form (e.g. tablet/suspension/ wafer), and right response (the patient is monitored for their response to the medication) [50]. Nurses are required to know the purpose, action and safe dose range of the medication they are administering. Before administering it, nurses are required to confirm that the patient is not allergic to the medication.

Additional policies require nurses to: prepare medication for one patient at a time; double check (independent check by two nurses) preparation of particular medications (e.g. Clexane); double check preparation **and** administration of particular medications (e.g. Warfarin); double check preparation, witness the administration **and** disposal of surplus medication (e.g. morphine); comply with additional requirements prior to administration of particular medications (e.g. checking haematology results, blood glucose levels, or chemotherapy checklists). Administration of some medications is further restricted to nurses approved to do so (e.g. schedule 8 medications (S8s) such as morphine).

Despite policies and guidelines governing medication administration practice, medication error rates remain high. Medication errors are believed to occur at a rate of one per day per patient [51] and in 1995 were estimated to account for 17% of adverse events recorded in Australian hospitals [52]. More recently (2013) when errors of timing are excluded clinical error rates in Australian hospitals have been estimated to occur in 15–18% of medication administrations when ward stock are used, 5–10% of administrations with individual patient supply systems in place, and in 70% of intravenous medication administration [53]. Procedural failures or clinical errors occur in 81% of medication administrations [23] and more frequently when the medication process is interrupted [23].

Several reviews have synthesised empirical evidence on factors associated with medication administration errors [e.g. 54, 55-58]. Summarised, the factors noted to contribute to medication administration error include: illegibility of prescription, improper use of abbreviations and poor communication [e.g. 59, 60]; insufficient knowledge of, or access to information about medications [e.g. 61, 62, 63]; nurse forgetfulness, distractions, fatigue and stress [e.g. 62, 64, 65, 66]; staffing levels and workload [e.g. 66, 67]; policies [e.g. 56, 68, 69]; interruptions [e.g. 23, 24, 67]; and among the elderly in particular, poly-pharmacy [70]. In addition, slips and lapses, and violations of procedures [e.g. 56, 62, 63, 71], including failure to conduct patient identification check [64], have been linked with medication administration errors. Less well explored are the role of working culture and high-level managerial decisions in medication errors [56]. There is conflicting evidence on the effect of nursing skill mix [72] and nurses' calculation skills on the incidence of medication errors – Brady and colleagues' (2009) [57] review concluded that nurses' poor calculation skills contributed to medication error but a subsequent review by Wright (2010) did not support this conclusion [73].

One approach to address the problem of medication errors in hospitals has been the introduction of EMMS. These systems seek to digitise processes, structure medication related tasks, provide information support and promote standard practice, including adherence to the 5Rs of medication administration [74]. Evidence for the impact of EMMS on medication error and adverse drug events is divided. While some studies report nurse satisfaction with barcode/electronic medication administration systems [75, 76] others report frustration with perceived shortcomings in the technology that create workflow problems and encourage deviation from prescribed or intended practice [3, 77, 78]. A significant reduction in prescribing and drug administration errors [79-82] and a positive impact on safety guideline adherence have been suggested [83, 84]. However, continued high rates of adverse drug events [85], persistent delays in medication administration [86] and a facilitation of medication errors [87] have been recorded in hospitals with Computerised Provider Order Entry (CPOE) and other computerised medication management systems. Studies have identified instances in which the introduction of technology, while preventing one form of error has created another. Juxtaposition errors, for example, occur when an incorrect choice is made from a drop down menu because of its proximity on the screen to the correct choice [88].

The introduction of any new technology is problematic. Hospital systems, which include employees, technologies and environment, are interconnected and interdependent. What happens in one work system will impact other work systems [4, 89]. The work system influences the process of care, which are "key contributors to the quality and safety of care" [90:400]. Introducing technology such as EMMS into the work system transforms it and therefore changes the process of care [91]. Researchers investigating Patient Care Information System implementation (PCIS) in the United States, The Netherlands and Australia identified similar instances in which errors were fostered rather than discouraged by new systems [92]. According to Ash, Berg and Coiera (2004), these unintended consequences "emerge when the technical system is embedded into a working organisation" [92:105] and result from "a mismatch between the functioning of the PCIS and the real-life demands of health care work" [92:105]. Socio-technical issues associated with introducing technology have been related to medication errors [93]. Changes in interpersonal relations and power structure, overuse injuries, security concerns (e.g. computers left in a logged-in state) and increased workload for physicians have been observed as some of the unintended consequences following the introduction of CPOE [88, 94]. In addition the incorporation of new systems into a workplace or organisation is usually accompanied by new policies and procedures which may leave some aspects of work

fragmented and incompatible [81]. A documented response to changes to work processes introduced by various forms of technology include adaptations [95-97] and workarounds [98].

1.3 Workarounds

In general terms workarounds can be understood as behaviours or actions implemented to circumvent a problem in order to achieve a goal, or to achieve it more easily. Workarounds, also referred to as shortcuts, deviations, situational violations, 'quick fixes', innovative solutions, 'patches' and 'temporary fixes', pervade all aspects of life. Many a social nicety, religious 'requirement', culinary feat and domestic goal have been achieved by cleverly implemented workarounds, often informally learned. In the workplace, workarounds are used to: solve problems [22, 99]; circumvent 'problematic' rules [39]; bypass workflow blocks created by safety mechanisms [3], poor workflow design [100, 101] and organisational and system issues [39]; shortcut delays [78]; backup software data applications [102]; compensate for inadequate technology [103]; patch software glitches [5]; fix spacecraft problems [104]; and offer solutions to a range of problems including staffing, equipment and supplies [16]. Websites devoted to sharing computer workarounds to specific [99] and general problems [105] testify to their acceptance and prevalence at least in relation to information technology (IT), an area in which there has been comprehensive discussion and examination of workarounds [106]. The concept of workarounds in relation to IT was initially proposed by Gasser (1986) [103]. In engineering and IT literature workarounds have been defined as an alternative path to a goal when the given path is blocked, the type of workaround reflecting the nature of the workflow block [107], or as a subversion of a task such that the user takes advantage of known weaknesses in the tool to override the "spirit but not the mechanism by which the constraint is imposed" [108:48]. Workarounds may require people to deceive the control processes that have been introduced as safety mechanisms by the technology [109]. Workarounds (e.g. 'borrowing' towels from another unit) are largely implemented to solve the problem of a specific workflow block or barrier to completing a task (e.g. not enough towels to complete the showers), rather than as a means to address underlying problems (e.g. change the weekly order of towels and contact linen suppliers) and are identified as an example of first-order problem solving [7]. This form of problem solving is encouraged in the hospital environment in which many nurses believe that a demonstration of competence involves solving common problems on their own [7]. Research has illuminated possible contributory roles of time pressure, high individual workloads and the presence of a safety net

[110], knowledge level, collective workloads and doctors' expectations [111] to the implementation of workarounds.

Within the healthcare literature, definitions of workarounds, when offered, are often ambiguous [112]. This study employs the definition of workarounds as practices that may differ from organisationally **prescribed** or **intended** procedures, that are employed to circumvent a perceived or actual hindrance to achieving a goal [113]. These "deviations, called violations or workarounds, are staff actions that do not follow explicit or implicit rules, assumptions, workflow regulations, or intentions of system designers" [3:409]. Workarounds may be used with prescribed methods, which have been introduced as requirements (e.g. policies and rules), or with guidelines, which indicate in general how work should be done [114].

Workarounds are ubiquitous and healthcare workers are touted as the "masters at work-arounds" [109:52]. The use of workarounds in healthcare has been recorded in relation to: electronic health records (EHR) [115-117]; high pressured workloads [110, 111, 118, 119]; system inefficiencies [120]; and EMMS [3, 10, 77, 78, 81, 88, 121-128]. When administering medication using BCMA for example, nurses have been observed to work around the requirement that they scan barcodes on identification bands located on the patient's body, by scanning barcodes on patient stickers on doorways or pieces of paper [3]. Considering their pervasiveness, workarounds have received relatively little research and theoretical attention in the information systems literature [129, 130] and even less attention in the healthcare literature [112]. Healthcare literature that is available on workarounds is largely descriptive with discussion of the causal consequences of workarounds speculative rather than evidence-based [112].

1.3.1 Workarounds and the EMMS

The current study focuses on workarounds in relation to EMMS. Inherent in the EMMS introduced to decrease errors are workflow blocks designed to arrest a procedure until identified safety requirements have been fulfilled. Therefore, workarounds potentially sabotage the safety effect of EMMS by allowing health professionals to circumvent those aspects of the system that are designed to prevent error. The potentially catastrophic results of a workaround cannot be underestimated and are highlighted by the death of a child following rapid infusion of a lethal medication dose, the barcode of which had not been scanned by the nurse, in an effort to save time [131].

A systematic review of the literature focusing on workarounds in health care settings noted that “because there are so few studies that have empirically studied work-arounds ... it was not possible to produce a typical quantitative review of the literature” [112:3]. Given the range of EMMS and the speed at which they have been implemented, there are relatively few studies examining EMMS workarounds.

The available literature on workarounds in healthcare falls into two categories. The first notes workarounds as a side effect or confounding variable. These studies, exploring, for example, the efficacy of EMMS, examine to different extents the presence and effect of workarounds on the utilisation of EMMS [44, 81, 123]. Practices such as changing authority delegation for medication systems [81], drug alert overrides [123] and delivery of medications to patients by administering a medication following a verbal rather than written drug order [44] have been studied and the potential effects of workarounds on patient safety hypothesised [132].

The second category focuses on workarounds as the subject of investigation. Studies examining workarounds with EMMS have identified types of workarounds [3, 77, 128, 133], probable causes of workarounds [47, 128, 134-137], offered a tool to measure workarounds [138] and hypothesised potential outcomes [3]. This category has predominantly focused on the implementation of workarounds in relation to BCMA systems. Studies have identified the following types of workarounds: pre-scanning patient medications; sticking patient barcodes to furniture, clipboards and nurses’ belt rings; ‘borrowing’ medication before it has been approved by pharmacy; documentation of drug administration later in the shift; entering digits instead of scanning patient identification bands; and pre-pouring medications [e.g. 3, 77]. Workarounds have been investigated in relation to eMAR systems, such as entry of multiple doses to obtain the ordered amount in an excessive order and double scanning pre-administration rather than pre- and post-medication administration have also been identified [128]. Probable causes including technology-related causes (software, hardware problems), task-related causes, patient-related causes (patient asleep, isolated, or busy) and time pressure [3] have been suggested. One study proposed a theoretical understanding of workaround practices requiring spontaneous, collective and collaborative action to “negotiate to enact a ‘deviation’” [139:266].

The prevailing premise in this literature is that workarounds are a response to human technology interface problems and in relation to EMMS, “nurses wouldn’t use work-arounds if the technology didn’t screw up so much” [140:26]. In most cases, the assumption (explicit or implicit) is that a

strict adherence to medication protocols is required to minimise medication error. Given the complexity of medication administration [44] and the exceptions frequently encountered during the process [137, 141], the use of highly rigid workflow systems [81, 87] increases viscosity in medication administration and, given that viscous systems are predisposed to workarounds, they thereby increase the propensity to use workarounds. Furthermore, users who feel unsupported or not sufficiently involved in the development of the systems (as has been demonstrated among nurses [142, 143]) report high levels of viscosity. Nurses' perceived lack of involvement in the development and roll-out of healthcare information technology (HIT) and on-going support may contribute to the likelihood of workarounds.

In a seminal study on workarounds in relation to BCMA systems, a taxonomy of 15 types of workarounds was proposed and their probable causes categorised (technology-related, task-related, organisational, patient-related and environmental) [3]. The structure and organisation of clinical work was identified as contributing factors in each type of workaround [3]. While a mismatch between technology and workflow along with highly viscous systems provide some explanation for workarounds, they complete only part of the puzzle. Healthcare consists of complex and dynamic relationships directed by policies and guidelines and shaped by perceived expectations and evolving political and cultural norms. As demonstrated by Braithwaite and colleagues, cultural characteristics of health services organisations are pivotal in influencing the success of formalised structural changes [144]. The impact of these factors in the development of workarounds within healthcare remains under-scrutinised. Healthcare studies have noted the role of variables such as fatigue [136], autonomy [131, 145], system failures [7, 8, 16], pressure to solve problems alone [7], desire for efficiency [44], a desire to act in the best interests of the patient [146], intra-professional relationships [71, 111] and negotiated order [147] in relation to workarounds. Image management and a desire to fit into the team have been implicated in the adoption of non-sanctioned practices by clinicians [148] and may shed light on workarounds in relation to medication administration. Under-represented in the literature are empirical examinations that focus on nurses' enactment, explanation and experience of their own and their colleagues' workarounds and the social significance for nurses of workarounds in relation to medication administration with EMMS. Also under-researched are the cultural, organisational and contextual factors that protect against, enable, maintain or propagate EMMS workarounds by nurses. This study aims to examine how nurses individually and collectively enact, explain and experience workarounds to institutionally approved systems and procedures when administering

medication using EMMS. It will take into account a range of factors, which may contribute to the development, maintenance, proliferation and normalisation of EMMS workarounds.

1.4 The case for the project and its significance

Workarounds have important implications for standardisation of practice, reliability of information available for managers to understand staff behaviour, the realisation of policy in practice, the reliability of data, and the utility of safety mechanisms. As such they have important implications for patient safety and the (in)ability of hospitals to reduce errors [149].

Workarounds are thought to support patient safety, in some cases, and, in other circumstances, undermine it. Given this dichotomy, it is not beneficial to say that all workarounds should be stopped or punished. Rather, it is important to differentiate between when workarounds are used to enhance safety, so that they can be worked into policy, and when they work to subvert safety so that strategies can be employed to reduce their use. For this kind of change to be possible, it is important to empirically identify whether nurses use workarounds, and what kind, when administering medication using EMMS. It is also necessary to understand the factors that lead to the proliferation of workarounds when using EMMS and the significance of workarounds for those who use them. That is, what do those who use workarounds think and feel before, during and after they use workarounds – how do they rationalise, perceive and experience workarounds in relation to medication administration using EMMS? In doing so, it is important to consider local perspective and context.

According to Charles Vincent (2010), local adaptations should be expected from those who work within the system. Workers using adaptations, such as workarounds, may degrade safety, but more often they enhance “safety by their anticipation and improvisation in a complex changing environment” [12:139]. Consideration of local perspective and context is necessary to better understand how and why people behave the way that they do. To illustrate, in a study examining nurses’ perceptions of risk in relation to indwelling urinary catheter use, Harrod et al. (2013), expanding on Dixon-Woods et al.’s (2013) construct of normative work [150], concluded that various factors, including perceived compatibilities between patient safety initiatives, as well as perceived benefits and risks of following them influenced how work was prioritised [151]. According to the local, or bounded, rationality principle, people’s actions, which seem reasonable and rational to them at the time, are bounded by their knowledge, goals, resources and

understanding of the situation [152]. Local rationality is instrumental to understanding behaviour within given contexts and:

People's local actions and assessments are shaped by their own self-referential perspectives, embedded in histories, rituals, interactions, beliefs, and myths both of their organisation and of themselves as individuals. [153:98]

This premise underpins both the rationale and methodology employed in this study.

Research within the field of psychology identifies the contribution of individual and group conceptualisation of an action to its enactment and continuation [154, 155]. Additionally, the role of group norms and expectations has been acknowledged as a force that shapes an individual's behaviour [156, 157]. Experts in the area of patient safety propose that in order to achieve ultra-safe healthcare, there is a need to challenge the 'norms' and traditions entrenched in healthcare, "to abandon historical and cultural precedents and beliefs that are linked to performance and autonomy" [158:166]. To do this, we need to examine what the norms are and the role they play in influencing nurses' behaviours, such as workarounds. For example, do nurses use workarounds in some situations and not others, or with some things and not others? If so, what factors are considered important or pivotal to making those decisions? In illuminating these influences, we will gain further insight into how and why nurses make decisions about their practice and in doing so, be better placed to target strategies that support nurses to deliver patient care without resorting to potentially unsafe or non-sanctioned practices. How the workers themselves perceive workarounds is important because this perception can either undermine or enable quality and safety initiatives. In better understanding nurses' use of and attitudes toward workarounds we are better positioned to anticipate, gauge, use, avoid and respond to them.

Workarounds are practices that may differ from organisationally prescribed or intended procedures, that are employed to circumvent a perceived or actual hindrance to achieving a goal. Technology used in healthcare, such as EMMS including CPOE and BCMA, has been associated with nurses' use of workarounds. Studies have identified a relationship between culture and clinicians' attitudes to the implementation of CPOE [159]. If culture affects attitude toward technology implementation, it may influence the utilisation of workarounds, thus is an important area of research.

The literature on the social dimension of workarounds and the contribution of communal, professional and cultural (ward and organisational) influences on the development of workarounds is empirically slender. This thesis will extend previous work [e.g. 3, 131, 136, 137] and shed new light on nurses' enactment, explanation and experience of their own and their colleagues' use of workarounds by examination of how nurses used EMMS in everyday practice, and in particular nurses' explanation and experience of using EMMS workarounds. The aim of the thesis is to improve our knowledge and understanding of why nurses use workarounds with EMMS in order to inform policy and technology development. The research questions, which arose from identifying gaps in the field (see Chapter 2 Literature Review), are:

Research Question 1: *Do nurses employ workarounds when using EMMS in two Australian settings?*

Research Question 2: *How do nurses enact, experience and explain their use of using EMMS workarounds?*

Research Question 3: *Can sociological theory offer a way of interpreting the emerging findings?*

The contributions that this thesis makes to the body of knowledge are substantial. They are summarised as follows:

- There is currently a paucity of research literature that considers workarounds in the healthcare setting as the focus of enquiry.
- To my knowledge this study is the first examining nurses' use of EMMS workarounds, as the focus of the research in an Australian context.
- To my knowledge this is the first study that has examined nurses' workarounds across all shifts and days of the week, in two hospitals, each with different types of EMMS, approaches to staffing and models of nursing care.
- The empirical literature on nurses' interpretation and experience of using workarounds is slender. This work adds to that literature.
- An explanatory framework was developed to explain workarounds, taking into account cultural, organisational and system factors that influenced how nurses interpreted and experienced their use of workarounds, which in turn contributes to the development, maintenance, proliferation and normalisation of EMMS workarounds.

- This thesis extends the current empirical literature on nurses' use of workarounds by illuminating the role of workarounds as a means of constructing and reinforcing nurses' identity as a good nurse.
- A further distinguishing feature is the interpretation of the emergent findings and explanatory framework of nurses' use of workarounds using a Bourdieusian framework.

There is an evident potential of workarounds to influence patient safety. In shedding light on the factors that help develop, maintain and propagate workarounds, this work can inform the development of strategies to enhance patient safety.

1.5 The research method

This qualitative study was conducted in four phases: scoping and process mapping; data collection and analysis; generation of an explanatory framework for nurses' EMMS workarounds and member checking; and interpretation of emergent findings using existing sociological theory.

The study samples EMMS implementation stakeholders and nurses from six units in two hospitals using different EMMS, across all shifts and days of the week. This was done to capture as much variation as possible, to minimise the chance of missing major phenomena that influenced nurses' enactment, explanation and experience of workarounds. The two hospitals also used different approaches to permitting access to the EMMS (access to electronic medication administration record (eMAR) for all nurses endorsed to give medication once they had attended a training session versus access to eMAR restricted to permanent staff who had completed training) and different nursing care models (team versus patient allocation).

A triangulated approach to data collection was used. Data collection methods included observation, and individual and focus group interviews. Data analysis employed the general inductive approach [160]. This approach allowed themes to emerge from the data, and framed analysis against research questions. The purpose of the fourth phase was to raise the findings to a higher level of abstraction [161] so as to access a deeper understanding and richness of meaning [162]. This phase was conducted after the data had been collected, analysed and an explanatory framework for nurses' use of EMMS workarounds generated based on concepts that emerged from the findings. The emergent findings were interpreted in light of existing sociological theory that offered explicatory power, that is, Bourdieu's field theory [163-165]). To emphasise, the study was not set up to examine nurses' use of workarounds using predefined theoretical

constructs. While guided by the research questions, as much as possible data were not 'read for' themes determined a priori [166]. Rather, in line with an interpretive tradition, in phase four a process similar to abductive reasoning was used [167], in which the researcher's reasoning moves between everyday concepts and meanings, lay accounts, wider concepts, and social science explanations [168].

1.6 The organisation of the thesis

The thesis is structured in four sections spanning eleven chapters. The first section comprises this introductory chapter and the literature review chapter that follows. In the second section of the thesis, comprising Chapter 3, the research approach will be described. Section three, comprising the six findings chapters, presents the empirical results arising from the research. These findings chapters reflect four groups of observations:

Observation One: Nurses used workarounds when administering medication using the EMMS. In line with the aim of the thesis, the findings chapters focus on **why** nurses used workarounds. Having established that nurses used workarounds when using EMMS, the findings chapters present nurses' explanations and experiences of using workarounds. I have not counted or categorised observed and described workarounds. Rather, across the findings chapters I offer examples of workarounds that were used by participants in this study.

Observation Two (Chapters 4, 5, 6 and 7): Nurses used workarounds to circumvent EMMS-related barriers to being, or being perceived to be, a good nurse: time-efficient; safe; patient-centred; and a team player (primary workarounds). Nurses sometimes used secondary workarounds to compensate for the potential barriers simultaneously created by their use of primary workarounds to being or being perceived to be: time-efficient; safe; patient-centred; and a team player. It was evident that participants sometimes chose **not** to work around.

Observation Three (Chapter 8): It was clear that there were instances when nurses used workarounds because there was no choice (e.g. technology failure) and for reasons other than to be a good nurse, that is, due to laziness, disagreement with policy, or for occupational health and safety reasons.

Observation Four (Chapter 9): 'Moderating motivations' influenced whether or not nurses used workarounds for reasons described in earlier findings chapters (e.g. unit norms, trust, seniority, medication type, professional safety). Nurses also described a range of feelings or experiences when using workarounds including tension and satisfaction. They described undertaking on-going assessment of when it was appropriate to enact or teach colleagues primary and secondary workarounds.

In the fourth and final section a synthesis of the findings will be discussed, and an emergent exploratory framework offered for nurses' use of workarounds with EMMS, that is, the good nurse framework. An interpretation of the emergent findings will be offered using a Bourdieusian framework in Chapter 10. This section and the thesis will conclude with the implications of the study, limitations and suggestions for future research, articulated in Chapter 11.

1.7 Conclusion

In this chapter I have provided a background and positioned this thesis within the context of patient safety and nurses' use of EMMS. The aims, rationale and significance of the thesis have been presented. The next chapter will synthesise and critically evaluate the available empirical literature on nurses' use of workarounds.

Chapter 2 Literature review

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2.1 Introduction

The purpose of this chapter is to: a) define workarounds and illustrate how they overlap with other constructs; b) offer an operationalised definition of workarounds; c) demonstrate how nurses' use of workarounds has been examined previously; d) synthesise what is already empirically known about nurses' use of workarounds; e) provide methodological insights in relation to the study of nurses' workarounds; and f) to identify areas in the body of published empirical evidence on nurses' use of workarounds that merit further investigation. The focus of this literature review is the research findings of studies examining nurses' use of workarounds. The chapter is based on a published literature review (Appendix 1) [113].

2.2 Defining the construct under investigation: what is a workaround?

Systematic research requires a clear and uniform definition of the construct under investigation. The published reviews of workarounds [112] and the related concept of violations [39] note the paucity of clear and uniform definitions of these related constructs [39, 112]. Workaround behaviours are observed or described actions that circumvent or temporarily 'fix' an evident or perceived workflow block in order to achieve a goal or to achieve it more easily. Table 2-1 provides examples of available definitions of workarounds, some more comprehensive than others.

Table 2.1: Example definitions of workarounds

Source	Definition
Collins Online Dictionary [accessed 31 August 2014] [169]	"A method for overcoming a problem or limitation in a program or system."
Wiktionary [accessed 31 August 2014] [170]	<ol style="list-style-type: none">1. "A means of overcoming some obstacle, especially an obstacle consisting of laws, regulations, or constraints2. (computing) A procedure or a temporary fix that bypasses a problem and allows the user to continue working until a better solution can be provided; a kluge3. (project management) An impromptu and temporary response to an unforeseen problem or risk."
Whatis?com (2005)	"A workaround is a method, sometimes used temporarily, for

Source	Definition
[171]	achieving a task or goal when the usual or planned method isn't working."
Alter (2014) [114:1044]	"A workaround is a goal-driven adaptation, improvisation, or other change to one or more aspects of an existing work system in order to overcome, bypass, or minimise the impact of obstacles, exceptions, anomalies, mishaps, established practices, management expectations, or structural constraints that are perceived as preventing that work system or its participants from achieving a desired level of efficiency, effectiveness, or other organisational or personal goals."
Halbesleben et al. (2010) [137:125]	"Workarounds are work procedures that are under-taken to bypass perceived or real barriers in work flow."
Ash et al. (2004) [92:195]	"Clever methods for getting done what the system does not let you do easily."
Kobayashi et al. (2005) [119:1561]	"Informal temporary practices for handling exceptions to normal workflow."
Koppel et al. (2008) [3:409]	"Staff actions that do not follow explicit or implicit rules, assumptions, workflow regulations, or intentions of system designers. They are nonstandard procedures typically used because of deficiencies in system or workflow design."
Morath et al. (2005) [109:52]	"Work patterns an individual or a group of individuals create to accomplish a crucial work goal within a system of dysfunctional work processes that prohibits the accomplishment of that goal or makes it difficult."

While definitions of workarounds vary (Table 2.1), the common implication is that workarounds occur when users of information systems find alternative ways of working that are outside of the intended purpose of the system [172]. They are claimed to increase when the degree of structure imposed by the system does not accommodate the complexity of the task being undertaken [173, 174], when the software is perceived to 'control' the user [108] and as a form of end user resistance [175]. Alternatively workarounds have been understood as the result of interpretive

flexibility in the design and use of IT in organisations [172] and as a response to viscosity in the workflow system, that is, a perception that the workflow system demands extra efforts that do not contribute to the end-user's goal [176].

Conceptualising workarounds has been approached from a range of disciplines, using different theoretical frameworks. Some approaches focus on the appropriateness and acceptability of technology to the development of workarounds. For example, the Theory of Reasoned Action has been applied to the Technology Acceptance Model (TAM) which holds that the way IT is used will be influenced by the perceived usefulness and ease of use [177]. However, findings of a study by Alper and colleagues (2007) did not support the use of the TAM for predicting workarounds [178]. Variations and extensions on this model such as the Unified Theory of Acceptance and Use of Technology model (UTAUT) consider the impact of task-technology fit, and the task and user context on work [177].

Workarounds are considered to be a temporary measure to solve an immediate problem, with the implication that they can be harnessed to improve the system until they are no longer needed [179]. However, workarounds often persist [180, 181] suggesting that explanations for their use may be more complicated than a linear response to a workflow block. Literature considering organisational change suggests that when workflow changes, workers search for ways of completing tasks that match the way things were done before, independent of the perception of fit between the new way and old way of doing things. It has been suggested that the more familiar people become with the system, the more likely they are to develop workarounds, increasing the variation in processes over time [177].

Workarounds have been discussed in the IT, computer science, sociology, human factors, ergonomics and healthcare literatures. Interest has been shown by those interested in social aspects of technology, some of whom have situated workarounds in relation to interactions between technology and its user [182], and increasingly with a systems-oriented perspective [114, 183, 184], with healthcare positioned as a complex sociotechnical system [185]. Sociotechnical perspectives consider the technology and the context in which the technology is embedded [186]. They consider social context, interpretation, human agency, technology and enactment as explanations for variations away from the intended use of information technology, including adaptations and workarounds [174, 183, 187]. Kobayashi et al. (2005) [119] and Azad and King (2008) [139, 147] examined the social interactions of health professionals when using

workarounds, the latter positioning workarounds as situated practices enabled by the negotiated order in hospitals. Other sociotechnical approaches draw on theories such as Actor Network Theory [188-190], and Structuration Theory [191] which consider both structure and agent (technology and human agency). Ignatiadis and Nandhakumar (2009) examined the negative impact of workarounds with an Enterprise Resource Planning (ERP) system on organisational control, through the lenses of human agency (or intentionality) and the agency of the technology (e.g. ERP) which constrained or enabled human agency [192].

Workarounds have also been suggested to be a related, but distinct, dimension of resistance to information technology. A compliance/resistance/workaround model offered by Ferneley and Sobreperéz (2006) proposes that workarounds occur for much more complex reasons than simply workers attempting to resist technology. According to this model, workarounds result from both negative and positive forms of resistance, are mediated by individual, organisational and behavioural characteristics and the perception of the viewer, and can comprise three types: harmless, essential and hindrance workarounds [175]. In a more recent comparative case study, Azad and King (2012) propose that workarounds constitute more than acts of resistance. They examined the persistent use of workarounds with an Integrated Tax Administration Computer System in an internal revenue agency and an electronic Medication Dispensing System in a hospital in a Levantine country. The authors suggested that the persistence of workarounds were due to the tension between top-down pressures from external environment and bottom-up pressures of everyday work. Bottom-up challenges of day-to-day work included: material constraints (that staff have no control over); discretion to decouple (one person has more professional clout to break the rules than another); and work ethos (e.g. patient safety above the rules). There were also top-down pressures from the extra-organisational environment, including accreditation bodies, which led to policy directives and policies being embedded in the technology. Azad and King (2012) drew on the metaphors of decoupling to describe the tension between top-down and bottom-up pressures that led to workarounds: decoupling of practice from the official rules; loose coupling of practice with the original rules; decoupling of practice from the designed computer system; and loose coupling of practice with the designed computer system [181]. Persistent workarounds supported the equilibrium, which in turn, they argued, reinforced the *status quo*, such that workarounds and the official system were able to co-exist for some time. Thus workarounds became *institutionalised* [181].

In their literature review of the causes of a related construct, violations, Alper and colleagues (2009) concluded that, based on their review of the literature, many factors contribute to violations, some of which ('situational violations') were also workarounds [39]. In real time, they suggest, these factors may come together to create situations in which people choose to violate. The authors suggested a Macro Ergonomic Framework to study violations because the causes of violations may reside at any level of the system. Recently published in 2014, Alter's process theory of workarounds, which is situated within a Work System Framework, defines workarounds in relation to processes and technologies. Alter's (2014) theory, which draws from a range of theories (e.g. the theory of planned behaviour) and concepts (improvisation and bricolage), explains changes in workarounds in relation to entire work systems in which they occur [114].

Studies have used a range of theoretical constructs to examine workarounds. The following examples, while not exhaustive, are provided by way of illustration. Espin and colleagues (2006) [110], for example, drew on three concepts from organisational and psychological theory to examine the persistence of unsafe practices including workaround behaviours: Reason's (2001) theory of 'vulnerable system syndrome' [193]; Tucker and Edmondson's (2003) concept of first and second order problem solving [7]; and Amalberti's (2001) model of practice migration [194]. Halbesleben (2010) drew on conservation of resources theory to examine the role of workarounds and exhaustion on occupational injuries among health professionals [136] and Wheeler and colleagues (2012) integrated two resource theories (Resource Based View (RBV) and Conservation of Resources Theory (COR theory)) to examine two employee-level outcomes (turnover intentions and workarounds) [195]. Others have described workarounds in relation to psychological safety [7], organisational climate, individual worker's distress, individual morale and quality of work life [71]. Five conceptual frameworks from the human factors literature guided analysis in a study conducted by Patterson, Cook and Render (2002) that identified side effects of BCMA implementation: 1) recognition-primed decision making (RPD); 2) human-automation interaction; 3) workload; 4) authority-responsibility double binds; and 5) mutual awareness [77]. Zhou and colleagues (2011) built on two theoretical concepts from Information Science and Computer Supported Cooperative Work (CSCW), boundary objects and assemblages to explain workarounds created within a CPOE system [196].

2.2.1 Workarounds and overlapping constructs

Part of the difficulty in defining workarounds is that how they are understood overlaps with similar constructs. Halbesleben et al. (2008) differentiate workarounds from similar and overlapping constructs. Shortcuts, they propose, are a specific type of workaround that occur “when time is perceived as a block, in other words, when workers believe that following the correct process will take too much time to suit their needs” [112:5]. These authors also distinguish workarounds from errors, arguing that while they lead to increased errors, workarounds are distinct from errors in terms of final outcome because while the intended outcome is never achieved with an error, it may or may not be achieved with a workaround [112]. However, if standardisation is the intended outcome, because they are not standardised practices, workarounds may themselves constitute an error. While workarounds are similar to mistakes, unlike mistakes, they are not always deficient methods chosen to complete a task and may be superior to the originally prescribed process [112]. According to Halbesleben and colleagues (2008) therefore, workarounds do not match the “deficiencies or failures in the judgemental and/or inferential process involved in the selection of an objective or in the specification of the means to achieve it” aspect of Reason’s definition of mistakes [Reason (1990) cited in: 112]. Halbesleben et al. (2008, 2013) also differentiate workarounds from job crafting and deviance [138]. Unlike deviance, they argue, the motive of workarounds in the majority of cases is “to get the work done, with the self-serving benefit a secondary gain” [112:5]. Others have described some behaviours that match the definition of workarounds as ‘rule bending’ for altruistic motives and have explained them in terms of positive deviance [197] incorporating responsible rule subversion [146]. Violations and workarounds are overlapping constructs. A violation is wilful non-compliance with rules (e.g. medication administration policies). An overlap between violations and workarounds, ‘situational violations’, occurs when rules are broken because they pose a barrier to workflow [39].

Thus workarounds have been understood as situational violations, shortcuts and, depending on motive, different types of deviations. Yet another subset includes workarounds that do not violate rules or policies. These are the workarounds that solve problems, ‘patch’ glitches, fix, or ‘make-do’, without addressing the underlying problem (e.g. first order problem solving [6, 7]). Browne and Braden (2012) have differentiated two types of workarounds: those that are ‘intuitive workarounds’, and those termed ‘problem-solving workarounds’, that require thought and communication [198]. In his proposed theory of workarounds Alter (2014) offers an inclusive

definition for organisational workarounds that encompasses aspects of several published definitions including the definition of workarounds used in this study [114] (Table 2.1).

2.2.2 The definition of workarounds used in this study

Similarly an encompassing definition was used when defining behaviours as workarounds in this study. An operational definition of workaround, which was inclusive rather than exclusive, was applied to behaviours to determine whether or not they might fit the category of workarounds (see Section 1.3).

2.3 Attitudes toward workarounds

The recurrent theme within the engineering and IT literature, in as much as they provide ‘fixes’ to glitches in the system, is that workarounds are valuable [107, 199]. However, within the healthcare literature, with the exception of a handful of studies that identify the potential for workarounds to provide innovative solutions to problems and opportunities for improvement [7, 8], workarounds are generally viewed negatively. In his book, *Understanding Patient Safety*, Robert Wachter (2008) proposed that workarounds are used by frontline staff when “safety fixes” get in the way of their perceived ability to get their jobs done. He suggested that identification of workarounds is necessary because they have the potential to create an “underground economy in unsafe practices” [200:48].

While a number of authors acknowledge that workarounds may both support and disrupt workflow [115-117], or even support patient safety [12], the dominant view in this body of literature holds that in circumventing safety mechanisms [78, 121, 127, 128], creating unexpected problems in the system [119, 120] and undermining attempts to standardise practice workarounds are undesirable, if not dangerous, and contribute to medical error and creating error prone organisations [132]. A less common view, such as that proposed by Berg (1994), holds that workarounds in healthcare should be considered inevitable because of the rigid structures imposed, particularly in the form of technology, which attempt to model clinicians’ work and encode it in rules. The model of medical work on which technology is based, assumes a positivist approach – healthcare delivery can be ‘discovered’, mapped and modelled. However, this clashes with a constructivist approach that considers the healthcare encounter to be transformative. That is, healthcare is constructed as it is delivered in light of variations in: context; available information; situations; and input from patients in the clinical encounter. The problem

and solutions are transformed and shaped by the encounter itself including interwoven organisational, clinical, clinician and patient factors [201]. Attempting to model clinician behaviour is a positivist notion that must clash with the transformative nature of everyday work [201]. Clinicians have no option but to devise a workaround when the technology does not support the clinical situation and requirements. For example, when the CPOE requires that a test be performed before allowing further tests, the clinicians will work around the requirements of the system if the test is not available. Berg (1994) argues that in medical contexts, rules and criteria are not absolute, but rather are resources for clinicians to make sense of and act upon the situation at hand. When the rule inscribed in technology is too rigid, clinicians will be forced to work around it. Berg (1994) proposes that in healthcare rules become insufficient and partially appropriate in different contexts. Thus rules, policies and technologies may not always be completely appropriate in different contexts and clinicians formulate workarounds to use the technology to deliver care [201]. Other authors also speak of the inevitability of workarounds as part of complex sociotechnical systems in which healthcare professionals 'balance' their work system given the rigidity of one or more components of that system [184]. Vincent (2010) also notes the inevitability of workarounds, suggesting that while they may compromise safety, more often than not, through anticipation and improvisation in response to complex changing environments, workarounds enhance safety [12].

2.4 What do we know about nurses' use of workarounds in healthcare based on empirical evidence?

While this thesis examines nurses' use of workarounds with EMMS, the literature review examined the available empirical literature on nurses' use of workarounds in a broader context (rather than focus on EMMS related workarounds). Nurses' use of workarounds with EMMS is a recent evolution of nurses' workaround behaviours, which have been widely recognized for some time. Contextualizing EMMS workarounds within this broader pool of knowledge was anticipated to offer insights into their use of workarounds with EMMS (e.g. the potential role of psychological safety and leadership on nurses' use of workarounds). An added benefit would be a review of the methodologies used previously for the study of nurses' use of workarounds.

I conducted a scoping review of the peer reviewed, empirical literature on nurses' use of workarounds in acute care (covering the period 1990–2012), and led the publication of the findings of that review in 2013 [113] (Appendix 1). In the remainder of this chapter, I present an

updated and summarised version of the findings of that paper, which now incorporate peer reviewed, empirical literature on nurses' use of workarounds in acute care published between 2012 and 2014. In the following section I detail the scoping method, before presenting the findings and implications, particularly in relation to this thesis.

2.5 Method

2.5.1 Scope

This review included a variety of search terms to capture empirical literature on behavioural workarounds used by nurses. The literature review used a scoping methodology because it provided a way to garner multiple perspectives on a single issue [202]. The approach used was similar to that previously employed [203]. A scoping review approach was used for several reasons: workarounds are not yet a clearly indexed concept in academic literature databases; and studies examining workarounds and violations use disparate methods that do not easily lend themselves to traditional systematic reviews and meta-analyses [204]. The scoping method involves review, analytic reinterpretation and synthesis of a broad scope of literature, but does not assess the quality of studies [205]. Given the aim of the literature review, which was to build a comprehensive picture of nurses' use of workarounds in acute healthcare settings, rather than to weigh up levels of evidence in relation to a specific question, the scoping review method was considered the most appropriate. The process is outlined in Figure 2.1.

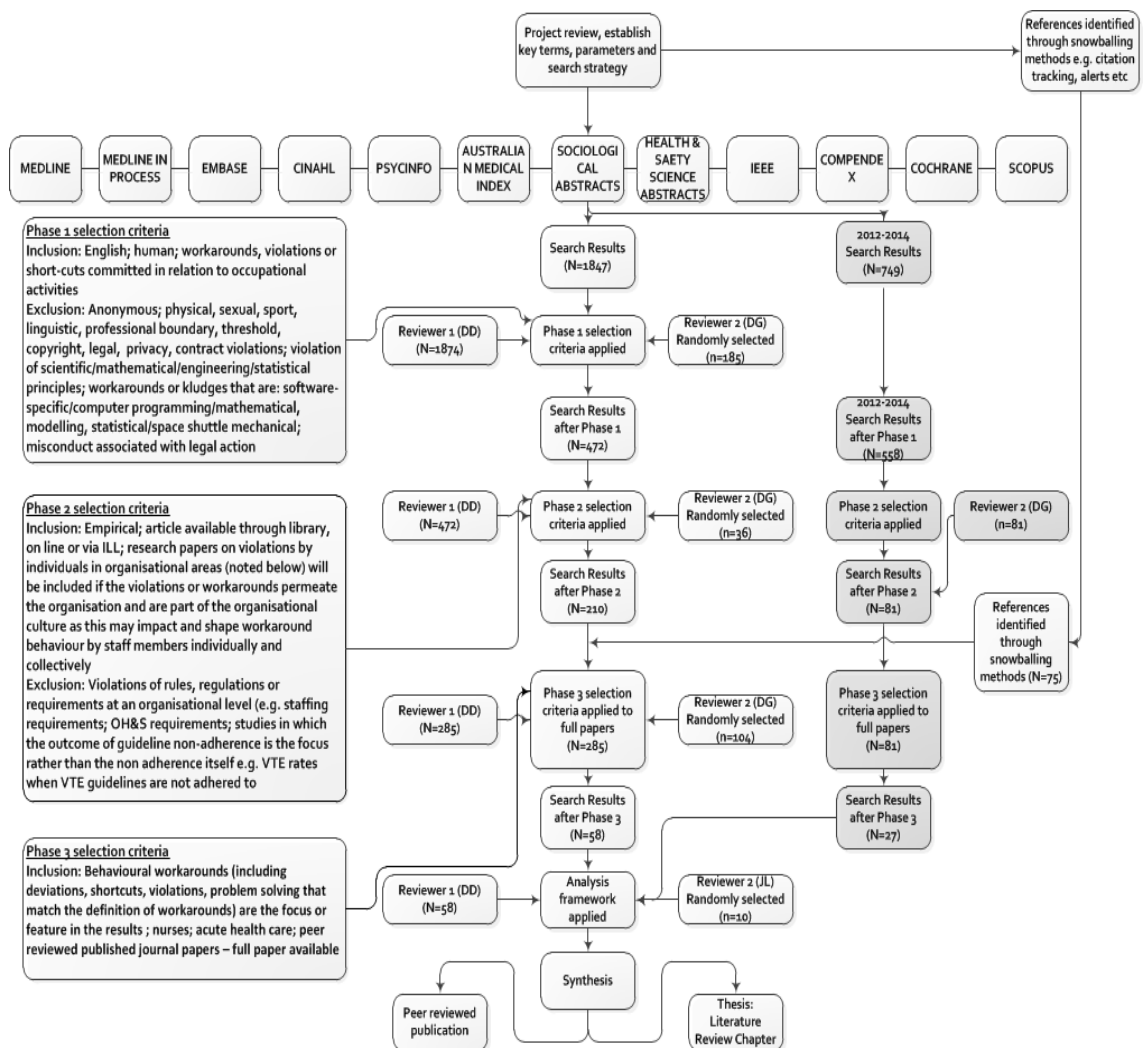
2.5.2 Search strategy

The review employed a multi-method search strategy. Systematic searches of academic databases were conducted in 2012 and updated in 2014. The snowball method and reference tracking were also used. Studies identified in this manner up until 30th July 2014 were included for analysis.

Brain-storming and mind-mapping techniques were used to determine, a priori, appropriate academic literature databases, initial search terms, limiters, inclusion and exclusion criteria. Using an iterative process involving a preliminary review of key references and discussion with experts in literature searching techniques, search strategies and terms were finalised. References in articles that met the selection criteria were searched to identify seminal articles. Papers that had cited these references were tracked [39]. Key words, controlled and uncontrolled index search terms were used. In August 2011 a specialist university librarian confirmed the

search strategy and provided expertise and advice. The academic literature databases searched included: Medline; Medline in Process; Embase; Cinahl; PsycInfo; Australian Medical Index; Sociological Abstracts; Health and Safety Science; IEEE; Compendex; Cochrane Database of Systematic Review; and Scopus. All databases were interrogated using the search terms: *workaround*/work-around*/'work around'*; and *Violation* + Safety + Rule*/Policy*. In addition, Medline, Medline in Process, Embase, Cinahl, PsycInfo, Australian Medical Index, Sociological Abstracts, and Health and Safety Science data bases were searched using the search terms: *short-cut*/shortcut**; *violation**; *problem-solving*; *'temporary fix*'*; *'informal practice*'*; *'informal interaction*'*; *'creative solution*'*; *deviation**; and *'procedural error*'* cross-tabulated with *nurs**. Search terms were subjected to standardised procedures. Truncation of the search term allowed for the search of plurals and other suffixes. Enclosing the search term within quotation marks restricted the search to the exact phrase. Limiters "human" and "English language", "NOT prison OR parole" were used when available. Following the removal of duplicate and non-English references 2,593 references remained. The selection criteria were applied over three phases as described below.

Figure 2.1 The literature review process



2.5.3 Selection criteria

In consultation with my supervisors, selection criteria were developed both a priori and by an iterative process across three phases. The selection criteria were refined at each phase to capture only those studies relevant to the aim of the review (Figure 2.1). Post-hoc development of selection criteria is an integral part of the scoping review process [203]. Phase 1 used broad selection criteria to include papers examining workarounds, violations or short-cuts committed in relation to occupational activities. Additionally, the selection criteria screened out papers examining violations that were not workarounds or related to nursing activities. Papers that were not written in English were also excluded at this stage.

The purpose of Phase 2 was to further exclude papers if they met additional screening criteria. That is, papers that examined: workarounds or violations of rules, regulations or requirements at an organisational level (e.g. staffing requirements and occupational health and safety regulations); and workarounds or non-adherence to clinical guidelines where the focus of the study was the outcome of guideline non-adherence rather than the non-adherence itself (e.g. infection rates when infection guidelines are not adhered to). An exception to these criteria were those papers that examined organisational violations or workarounds that permeate the organisation and are part of organisational culture. These were included as they may impact and shape individual and collective workaround behaviour.

Following application of selection criteria in Phases 1 and 2, there were 291 references identified by academic database searches and 75 references identified as relevant at face value via snowballing. The Phase 3 selection criteria were applied to these 366 references by examining the full papers. Papers were included if they were: peer reviewed published papers; featured and included workarounds and nurses' behaviours that matched our definition of workarounds; and involved nurses who worked in acute-care settings. A conservative approach was used and studies included rather than excluded. There were 85 papers that were eligible for inclusion in the review. There were 58 full papers that were independently examined against the selection criteria by me and a supervisor who were in agreement regarding their inclusion. In light of the agreement, I then analysed a further 27 papers.

2.5.4 Analysis and synthesis

An analysis framework developed for this review was used to interrogate all of the papers that met the selection criteria (Table 2.2). A second reviewer independently examined 10 randomly selected papers using the analysis framework. There was agreement on the extracted data. Presentation of the findings was organised by the analysis framework [206]: workarounds implemented in acute-care settings by nurses; factors contributing to the development and proliferation of workarounds; perceived impact of workarounds; and empirical evidence of nurses' conceptualisation and rationalisation of workarounds.

Table 2.2: Analysis framework

Citation
Year paper published
Year study conducted
Country
Setting
Objective
Participants
Method
Main findings and conclusions in relation to workarounds
Technology involved
Definition of workarounds
Workarounds implemented
Development and proliferation of workarounds
Perceived impact of workarounds
Conceptualisation and rationalisation of workarounds

2.6 Results

2.6.1 Key study features

More than half of the studies were published between 2008 and 2014 and nearly one third were published during the last three years, between 2012 and 2014, reflecting the increasing interest in nurses' use of workarounds in acute-care settings. Nurses' use of workarounds in acute-care settings in the USA accounted for more than half of the reviewed studies. Of the reviewed studies, five were conducted in Australia, one of which examined nurses' use of EMMS and noted nurses' use of workarounds [207]. Empirical evidence on workarounds also arises from studies conducted in acute-care settings in the United Kingdom (UK), the Netherlands, Canada, Lebanon, Japan, Sweden and Thailand (Table 2.3).

Table 2.3: Country and examples of settings in reviewed studies

Country of study		Study setting	
United States of America	[3, 44, 47, 77, 78, 90, 91, 116, 119*, 121, 122, 133-138, 151, 178*, 195, 196*, 208-219, 220*, 221*, 222*, 223-233]	Intensive Care Units	[3, 6, 7, 61, 137, 146, 178, 208, 215, 220, 228, 234]
Not specified	[74, 146]	Medical and surgical Units	[3, 6, 7, 22, 44, 61, 90, 135, 146, 207, 208, 214, 220, 221, 225, 227, 234-237]
United Kingdom	[40, 61, 101, 186, 234, 237-243]	Oncology Units	[6, 7, 22, 77, 178, 181, 186, 208, 220, 237, 243, 244]
Australia	[71, 111, 207, 235, 245]	Maternity Units	[6, 7, 22, 44, 47, 122, 146, 220]
The Netherlands	[124, 236, 244, 246, 247]	Cardiovascular Units	[6, 7, 22, 61, 74, 117, 146, 228, 235, 237, 244]
Canada	[110, 115, 117, 248, 249]	Operating Theatre	[110, 209, 220, 222, 239, 250]
Canada and United States	[6, 22]	Emergency and trauma Units	[6, 119, 210, 213, 220, 229, 232, 234, 251]
Lebanon	[139*, 181]	Mental Health Units	[101, 146, 242]
Japan	[252]	Long-term care Units	[77, 78]
Thailand	[251]	Neurology Units	[207, 211, 247]
Sweden	[250]	Paediatrics	[6, 7, 61, 74, 91, 115, 117, 122, 134, 146, 178, 181, 208, 215, 222, 226, 231, 234, 241, 248]
		Other	[61, 207, 247]
		Rural Hospitals	[47, 111]
		Veteran Affairs Medical Centres/Hospitals	[77, 78, 116, 218, 219]
		Community Hospitals	[6, 7, 22, 136, 209, 220]
		Tertiary Hospitals	[6, 44, 208]
		Teaching/University/Academic Hospitals	[6, 7, 22, 44, 77, 90, 110, 115, 117, 122, 124, 136, 139, 196, 207, 208, 211, 213, 222, 236, 237]
		Non-Academic/Non-Teaching Hospitals	[6, 61, 209, 237]

* *Authors contacted*

Study settings comprised academic, non-academic, community, tertiary, and teaching hospitals in rural and urban settings. The hospitals provided general medical, surgical, specialised paediatric and psychiatric services, and a variety of wards including, but not limited to: intensive care, medical and surgical, oncology, maternity, cardiac units, operating theatre units, emergency and trauma departments, outpatient clinics and paediatrics. A non-exhaustive list of unit types and hospitals in which the reviewed studies were conducted has been tabulated (Table 2.3). While the literature review focused on nurses, a number of the included studies also incorporated other professional groups including doctors, pharmacists, information technology staff and other hospital employees.

The most frequently used single data collection method was surveys. However, the majority of studies investigating workarounds employed a multi-method approach (Table 2.4). Interview coupled with observation offered the most frequently used multi-method combination. An unusual method of data collection recorded nurses' talk about what they were doing and thinking as they were administering medication [44].

Table 2.4: Data collection methods in reviewed studies

Method	Studies
<i>Discrete Method</i>	
Observations	[134, 210, 220, 241]
Interviews	[110, 116, 151, 219, 238, 242]
Focus group interviews	[121, 221]
Questionnaire surveys	[40, 71, 111, 136, 138, 178, 195, 208, 215-217, 233, 240, 252]
Information system data analysis	[222, 224]
<i>Multi-method</i>	
Interview (focus group and/or individual) and observation	[6, 7, 22, 61, 74, 77*, 78*, 90, 115, 117, 119, 133*, 137, 139, 146, 181, 186, 196, 209, 213, 218*, 227, 229*, 231, 232, 235, 237, 243, 248, 249*]
Interview and document analysis including medication chart review	[236, 247]
Interview, observation and document analysis (may include medication chart review)	[101, 225, 226, 239, 244, 245]
Interview, observation, focus group, survey and time and motion studies	[211]
Analysis of information system data and observation	[214]
Analysis of information system data and interview	[223]
Analysis of information system data, observation and interview	[3]
Observation and focus group	[47]
Observation, clinical intervention data and medication chart review	[234]
Observation and document analysis (may include medication chart review)	[207, 230]
Interview and collection of data from support desk and information system data	[212]
Questionnaire surveys, observations, interviews and Computer Provider Order Entry (CPOE) website review	[122]
Questionnaire surveys and observation and interviews/focus groups	[91, 251]
Questionnaire surveys and interviews/focus group	[124, 135]
Questionnaire surveys, observation and information system data analysis	[228]
Questionnaire surveys, interviews, process mapping, information system data and document analysis	[246]
Observation and journal narration	[8]
Self-recording by nurses as they gave medication and interviews	[44]
Video recording	[250]

*Observational studies that noted inclusion of 'complementary' and 'opportunistic' interviews

The term 'workaround' was defined in less than half of the reviewed studies, and most of these were published between 2009 and 2014. The wording of several definitions spoke to the negative and positive views of workarounds or a combination of both simultaneously. Positive aspects of workarounds include benefits for patients [44], increased efficiency for nurses [44] and a way for nurses to avoid harmful or unrealistic expectations [122]. Other definitions of workarounds convey a negative message with workarounds described as 'non-compliant' [139] or 'at risk, unsafe behaviours' [136].

Studies that offered definitions for violations were included when the definition incorporated elements common to the definition of a workaround or the described behaviours aligned with the definition of a workaround. This, for example, included violations when they were deemed to be necessary to complete a task (e.g. "having to break protocol") [208:410] or shortcuts [71] employed as a way of working around rules, regulations, policies, procedures and recommendations. Definitions offered for first order problem solving and deviations matched the definition of workarounds.

2.6.2 Workarounds implemented by nurses

Papers were examined for examples of behaviours that matched the operational definition of workarounds. While in most studies examples of behaviour were clearly workarounds, there were some studies in which it was necessary to consult the offered causes of the behaviour to determine whether it could be defined as a workaround. For example, not checking the identification (ID) band was defined as a workaround when a suggested barrier to accomplishing the goal of administering the medication was the time taken to check the ID band [207]. One study examined nurses working around the need to report errors by redefining errors [245].

2.6.2.1 Workaround categories

Thus, nurses' workarounds in acute-care settings were individually and/or collaboratively enacted and were responses that fell into three broad categories: technology; operational failures and work restraints; and policies, rules and regulations. They were most frequently examined in relation to technology including: BCMA features; CPOE; EHR; smart pumps for intravenous infusion; equipment; test ordering; and pharmacy dispensing. The majority of described individually enacted workarounds involve responses to technology and policy particularly in

relation to medication administration. Examples of collectively and individually enacted workarounds are provided in Table 2.5.

Table 2.5: Illustrative examples of workarounds

Factors	Selection of studies that provided examples of individually enacted workarounds	Illustrative examples of individually enacted workarounds	Selection of studies that provided examples of collaboratively enacted workarounds	Illustrative examples of a collaboratively enacted workarounds
Technology <i>Characteristics of the technology that impose workflow blocks/delays</i>	[3, 74, 77, 78, 90, 91, 101, 115-117, 121, 122, 135, 196, 212, 214, 215, 218, 219, 221-225, 227, 231, 232, 236, 237, 242, 247-249]	<ul style="list-style-type: none"> • In a study examining nurses' use of BCMA, nurses were observed to 'batch' and pre-pour medications which involves scanning medications and multiple ID bands for multiple patients before commencing medication administration [78] • In a study examining the use of a CPOE system, dead zones caused the computers to freeze so the nurses used paper lists of pertinent patient information, surgery lists, whiteboards, and other computers to enhance communication and ensure that timely care was given [122] • In a study examining the side effects of BCMA introduction, nurses were observed to work around scanning wristbands on patients by typing in the seven-digit number because it took less time than wheeling the medication cart into the patient's room, the patient was isolated, did not have a band on, or the wristband barcode did not scan reliably [77] 	[3, 74, 78, 90, 115-117, 122, 124, 139, 196, 218, 219, 221, 236, 242, 244]	<ul style="list-style-type: none"> • A study examining use of a CPRS identified a paper-based workaround in which doctors write orders on paper and get the nurses to input them in the CPRS and the doctor signs the nurse-entered orders later [116] • There were several workarounds described in a study that compared a paper-based and electronic prescribing system. For example, in the CPOE there was a similarity between the Start and Stop orders, which nurses worked around by using a STOP stamp on the paper chart to indicate that the medication should be stopped. Another workaround involved nurses writing new times for administration on the paper Kardex but not entering these new times in the CPOE because nurses were blocked from making changes to orders in the system [244] • Nurses co-signed for another nurse, using their colleague's password, during medication administration because they found the co-signing process using EMMS cumbersome [74]
Operational failures, exceptions and work restraints <i>Issues that make it difficult to complete the task: resource and</i>	[7, 8, 61, 77, 111, 116, 124, 133, 137, 146, 178, 181, 211, 212, 218, 219, 221, 226, 227, 230, 231, 233, 234, 236, 238, 251]	<ul style="list-style-type: none"> • A study examining the universal precaution practices of nurses in an ED offers several examples of workarounds including nurses re-sheathing needles to work around the distance to the disposal container and to facilitate dislodging needles from syringes; not wearing gloves to work around the perceived greater risk of needle stick injury if the gloves were 	[7, 8, 44, 116, 119, 124, 133, 137, 209, 211, 218, 219, 221, 236, 245]	<ul style="list-style-type: none"> • A study examining rework and workarounds in hospital medication administration processes reported that when nurses were unable to understand a medication order, they worked around this barrier by asking other nurses', clerks', pharmacists' opinions or make a decision without calling the physician because they did not want to bother or

Factors	Selection of studies that provided examples of individually enacted workarounds	Illustrative examples of individually enacted workarounds	Selection of studies that provided examples of collaboratively enacted workarounds	Illustrative examples of a collaboratively enacted workarounds
<i>equipment issues; time; illegibility; too much or not enough information; knowledge; others' actions</i>		<p>the wrong size [251]</p> <ul style="list-style-type: none"> • In examining the relationship between work constraints imposed on nurses and patient falls, nurses were identified to multi-task, keeping mental track of where they are up to in their list of tasks (cognitive head data). To work around the constraints of too much cognitive head data, nurses use written and mental chunking schemas (e.g. visual reminders and chunking groups of tasks) [211] • When the questions related to immunisation documentation were difficult to understand and cumbersome to complete, nurses recorded 'patient refused' which removed the questions from the nurses' task list [227] 		<p>feared repercussions from bothering the physician [137]</p> <ul style="list-style-type: none"> • A study of the relationship between nurses' work constraints and patient falls identified that nurses work around the constraints imposed by a lack of formal handover between registered nurses and assistant nurses by informal querying of the previous care nurse about fall status and use of visual cues, e.g. stickers [211]
Rules/policies/guidelines/regulations <i>Formal rules, policies, guidelines, regulations regarding delivery of care</i>	[3, 47, 61, 77, 90, 111, 122, 124, 134, 136, 137, 146, 151, 178, 196, 207, 212, 214, 217, 221, 234-238, 243, 251]	<ul style="list-style-type: none"> • A study assessing the impact of a CPOE system noted that when physicians had not yet entered medication orders in the system, nurses worked around the delay by beginning medication work based on the notes they took during medical rounds [124] • A study examining baby feeding practices by midwives in two UK hospitals identified that while feeding breast-fed babies a bottle of artificial milk was not evidence-based practice and against policy, midwives secretly gave bottles of artificial milk at night, working around espoused policy requirements by calling it a 'special' cup feed (a cup feed being acceptable to policy) [238] 	[3, 44, 74, 77, 78, 90, 110, 116, 122, 124, 139, 151, 213, 219, 229, 236, 241, 242, 244, 245, 250]	<ul style="list-style-type: none"> • The clinicians work around the policy that requires completion of an authorisation form for a restricted antibiotic to be dispensed [139] • Collaboration is needed to work around error reporting by redefining the error. For example, a nurse may be given the medication chart from the day before to fix because she/he forgot to record it on their last shift [245] • To increase efficiency and quicker access to information, ED nurses worked around privacy policies that required them to log out of a computer when not using it, protecting the privacy of the information by ensuring a nurse was always close to the open computer [229].

Legend: BCMA (barcode medication administration); CPOE (Computer Physician Order Entry); CPRS (Computerised Patient Record System); ED (Emergency Department)

2.6.3 Factors contributing to the development and proliferation of workarounds

Nurses worked around factors that were perceived to prevent or undermine care for their patients or were not considered to be in the patients' best interests. Workarounds were also employed to circumvent barriers to performing their jobs or that potentially threatened professional relationships. These factors can be categorised as organisational, work process, patient, individual clinician and relational/professional factors and have been summarised in Tables 2.6, 2.7, 2.8 and 2.9 (see Appendix 1 for the published literature review).

Table 2.6: Organisational factors that contribute to workarounds

Organisational factors contributing to workarounds	Selection of studies that provided evidence for the contribution of organisational factors to workarounds
Staffing levels, the need to manage heavy and fluctuating workloads, time and productivity pressures	[3, 6-8, 71, 91, 110, 111, 133, 151, 181, 211, 216, 217, 220, 229, 245, 247-249]
Negative organisational climate characterised by poor leadership, a lack of involvement of nurses in decision-making, few opportunities for professional development and a lack of perceived human management resources and support	[3, 6, 71, 146, 195]
Culture that supports workarounds, unsafe practices, resistance to change, and a lack of enthusiasm about IT	[7, 61, 195, 217, 242, 243]
Organisational expectations that clinicians multi-task	[110]
Lack of role clarity and ambiguity	[3, 110, 220]
Organisational processes that have not been re-	[122, 236]

Organisational factors contributing to workarounds	Selection of studies that provided evidence for the contribution of organisational factors to workarounds
engineered to fit with the implementation of technology	
Low status of nurses	[8]
Organisational guidelines and group norms that prevent visible and formal expression of emotion about patients	[213]

An organisational culture that promotes psychological safety [6, 7], executive dedication [212], supportive leadership and assistance with root cause problem solving [6, 7, 196, 212], compliance checking [212], simplifying processes and decreasing ambiguity [220] will slow the propagation of workarounds.

2.6.3.2 Work process factors

The most commonly cited causes of workarounds were mismatches between introduced technology or policies and current workflow (Table 2.7). Yang et al. (2012), for example, noted that nurses co-signed for their colleagues during medication administration because they found the co-signing process cumbersome [74]. An incongruity between nurses' mental models or frames of reference about how medication work and medication safety are enacted, and the frame of reference to medication administration and medication safety embodied in technology such as BCMA was also suggested [231].

Table 2.7: Work process factors contributing to workarounds

Work process factors contributing to workarounds	Selection of studies that provided evidence for the contribution of operational factors to workarounds
Mismatch between introduced technology and current	[3, 74, 77, 78, 90, 101, 115-117, 121,

Work process factors contributing to workarounds	Selection of studies that provided evidence for the contribution of operational factors to workarounds
workflow	122, 124, 133, 137, 139, 181, 196, 211, 212, 214, 215, 218, 219, 221, 222, 224-228, 232, 236, 237, 242, 244-247]
Resource issues: poorly stocked equipment, incomplete documentation, missing information and medications, and environmental factors	[3, 6, 7, 22, 111, 137, 209, 211, 212, 221, 234, 251]
The complexity and dynamic conditions of clinical work	[116, 119, 209, 219]
Unavailability of doctors to provide information	[111, 137, 146, 236]
Heavy workloads, time constraints or attempts to increase efficiency and navigate conflicting goals	[3, 6-8, 44, 77, 78, 116, 124, 196, 216, 218, 219, 221, 235, 247, 251]
Emergencies	[44, 110, 111, 122, 137, 208, 244, 251]
Interruptions	[77, 90, 137, 216]

2.6.3.3 Patient related factors

Pressure to deliver timely care was one of the most frequently identified motives for implementing workarounds [3, 44, 77, 124, 137, 196, 212, 235, 253]. Workarounds were also employed when rules and policies were not perceived to be in the best interest of the patient [146, 238, 245], or detracted from delivering care that accommodated specific needs of the patient [3, 77, 78, 209, 245] including: patient isolation [3, 77, 90] and availability [78, 237]; and to avoid communicating potentially negative messages to patients (e.g. wearing gowns, gloves and masks [251] and repeatedly checking patient identification [243]).

2.6.3.4 Clinician related factors

Reviewed studies identified individual clinician related factors that contributed to nurses' use of workarounds (Table 2.8). Workarounds in relation to a new electronic system, for example, were attributed to an individual's preferred sensory input or motor activity for a task: continued use of paper provided something to 'hear' (hearing the paper drop into the basket); something easy to manipulate (handheld notes); and something to 'deliver' [116, 133, 219].

Laziness is reported in one study as a contributor to circumventing a protocol [243]. However, in their study examining nurses' use of first order problem solving Tucker and Edmondson (2003) draw on observational data to specify that it is "not because nurses are uncommitted, lazy, or incompetent" [7:63]. Nurses are more likely to engage in second order problem solving, that is, to address the underlying cause of the problem, and less likely to rely on workarounds, when they are motivated and feel psychologically safe to do so [6].

Table 2.8: Clinician related factors that contribute to workarounds

Clinician related factors that contribute to workarounds	Selection of studies that provided evidence for the contribution of clinician related factors to workarounds
Fatigue and emotional exhaustion	[136, 216, 233]
High cognitive load	[116, 211, 219, 236]
Unfamiliarity with the technology or its safety features, or a perception that they are not critical or efficient	[3, 116, 219]
Unawareness of hospital policies or of the meaning, purpose or content of the policies	[87, 235, 250, 252]
When following policy was thought to be riskier than not to do so, or when nurses were not convinced that following the policy was necessary (e.g. the need for formal ID checks in neonatal ICU or with long term	[78, 151, 178, 217, 238, 251] (e.g. [78, 134, 208])

Clinician related factors that contribute to workarounds	Selection of studies that provided evidence for the contribution of clinician related factors to workarounds
patients)	
Nurses' level of seniority and maturity	[117, 245], [247]
Distress and low morale	[71]
Psychological gratification and feelings of competence when solving problems alone	[8]

2.6.3.5 Relational and professional factors

Some studies offered evidence that the enactment of workarounds was influenced by relational and professional factors. To illustrate, a study evaluating the impact of CPOE on nurse-physician communication reported that whether or not nurses acted on informal orders of the doctor was influenced by their professional relationship with the doctor and trust in them [124].

Table 2.9: Relational and professional factors that contribute to workarounds

Relational and professional related factors that contribute to workarounds	Selection of studies that provided evidence for the contribution of relational and professional related factors to workarounds
To enhance communication and coordination of tasks with colleagues	[209, 211, 216, 219, 236]
To avoid inter-professional confrontation	[6, 7, 111, 137]
To manage inter-professional etiquette or lack thereof (e.g.	[8, 77, 110, 146]

Relational and professional related factors that contribute to workarounds	Selection of studies that provided evidence for the contribution of relational and professional related factors to workarounds
nurses being logged out of BCMA while they were still using it or ignoring nurses' input about a patient's care).	
So as not to appear to be running late with medication	[231]
Emphasis on individual vigilance, efficiency and ability to solve problems	[6-8, 111, 209],
Lack of role clarity	[110]
Autonomy of clinicians	[139, 220]

There was evidence that collaboration enabled workarounds to continue and proliferate [115, 119, 124, 139, 146, 219, 245]. Enactment of workarounds relied on the willingness of others to help. According to Kobayashi et al. (2005), all involved need to be willing to work around for the workaround to be effective and those who initiate workarounds draw on their tacit knowledge of their colleagues' skills when deciding to work around [119]. Collaboration was influenced by professional relationships and trust in the physician [124]. Workarounds, described as 'situated' practices [139, 236], were enabled by collaboration and a belief that the rules were negotiable [139, 146, 245]. When facing workflow blocks, rather than necessarily asking those best equipped to correct problems, nurses ask those who are socially close how to circumvent the problem, so as to protect their reputation of competence. In doing so, workarounds are perpetuated because rather than solve the underlying problem (second order problem solving), the problem is likely to recur, leading to the use of further workarounds [7]. Workarounds were shared or passed on informally [7, 61, 115, 117, 121, 122, 221], particularly from senior to junior staff; they are observed and absorbed by other professionals and become part of the group behaviour [220]. The ambiguous nature of operational failures and the expectation that they are

part of work routine [22] and the diverse relationships between causes and workarounds also contribute to their persistence [3].

2.6.3.6 The perceived impact of workarounds

A small number of studies reported the impact of the workaround practices in terms of measured outcomes, including the estimated cost in nursing time spent on workarounds [7], the impact of safety workarounds on occupational injuries [136], and correlation with intravenous medication administration error [207]. There were no studies that measured the positive impact of workarounds for patient safety although the use of workarounds to administer medication on time, prevent falls, support patient needs, as a memory aid and to pass on information were suggested by some studies [e.g. 133, 211, 227, 238]. For the most part, studies propose potential effects of workarounds rather than provide empirical evidence for their impact. Studies were examined for evidence of potential effects of workarounds. These are grouped according to their perceived negative or positive impact in relation to patients, staff and the organisation (Table 2.10). Several studies identified that workarounds could be both positive and negative [6, 8, 22, 74, 122, 196, 236] depending on the context [221] and the expertise of those using the workarounds [115]. More studies highlighted a negative [3, 61, 71, 77, 78, 90, 121, 137, 207, 208, 212, 214-217, 220, 221, 223, 235, 237, 247, 249] rather than positive [44, 117, 146, 195, 219, 227, 229, 230, 232, 245] impact of workarounds.

Table 2.10: The potential effects of workarounds in acute-care settings for patients, staff and organisation

	Patient	Staff	Organisation
Positive effects	<ul style="list-style-type: none"> Care is delivered according to the patient's specific needs [44, 245]. For example, 'batching' care so that the patient can get a good night's sleep; giving medications early so that they won't be four hours late [245] Circumvent barriers to delivering care [44, 139] Annotating printed paper patient information sheets rather than only viewing information in EHR, enables clinicians to acquaint themselves more with the patients [117] Workarounds assisted communication about dose specific information to nurses on following shifts [230] 	<ul style="list-style-type: none"> Decrease stress for manager and other staff [245] Increase efficiency and support work [218, 229] Clinicians were actively involved in adapting the EMR to make the system work in their context – workarounds were considered part of the end-user design process [232] 	<ul style="list-style-type: none"> Workarounds may lead to better rules [146] Provide excellent information for improvement efforts [196, 219, 227]
Negative effects	<ul style="list-style-type: none"> Decrease patient safety by increasing the potential for error [3, 61, 71, 77, 78, 90, 121, 124, 137, 196, 207, 208, 212, 214-217, 220, 221, 226, 235-237, 243, 246, 247] Do not accurately reflect patient care delivery (e.g. charting a medication earlier than it was given) [77, 78, 137, 236] Decrease surveillance of patients [209] Staff work without necessary equipment [209] Loss of information about patients [122, 124, 213, 218, 219] Create new pathways to error [219] 	<ul style="list-style-type: none"> Make staff vulnerable to retribution [40, 44, 111, 146, 240] Time consuming, erode staff time and energy or increase cognitive effort [6, 119, 124, 196, 209, 236] Increase the risk of occupational injuries [136] Informal teaching of workarounds is problematic because there is no clarity about what clinicians are being taught [117] Decrease efficiency [74, 249] 	<ul style="list-style-type: none"> Prevent organisational learning and improvement by hiding problems and practices that are occurring in real time [6-8, 22, 78, 139, 209, 246] Create problems elsewhere in the system and can lead to other workarounds [3, 7, 8, 119, 220, 236] Directly or indirectly cost hospitals money [7, 8, 22] Contribute to a culture of unsafe practices [61, 220] Potentiate security breaches (e.g. nurses borrowing access codes and posting them for easy viewing) [221]
Both positive and negative effects	<ul style="list-style-type: none"> In some instances workarounds enhance patient care but they can also potentiate patient harm [3, 8, 122, 221, 236] Workarounds fix problems so that patient care can continue but in not addressing the underlying problem similar problems may recur in relation to patient care [6, 22] While one workaround may prevent medication errors (e.g. using 	<ul style="list-style-type: none"> Workarounds may ease and accelerate performance but increase workload [236] Help with the coordination of work and reduce cognitive load by providing solutions to recurring problems but lead to unstable, unavailable or unreliable work protocols [119] 	<ul style="list-style-type: none"> Allow the use of CPOE but hide opportunities for redesign and improvement [246] Allow the system to continue functioning but may lead to widespread instability [119]

Patient	Staff	Organisation
<p>a STOP stamp on the paper medication chart to indicate that a medication has been ceased because the stop and the start orders in the CPOE look very similar), other workarounds using the same system increase error risk (e.g. recording actual administration times on paper medication chart but not in the CPOE) [124, 236, 244]</p> <ul style="list-style-type: none"> • Informal handover of information to work around the lack of formal communication channels reduced falls but may create gaps in passed on patient information [211] • Deviations are linked with good patient outcomes (innovations) and bad patient outcomes (errors) [210] 	<ul style="list-style-type: none"> • Fix problems so that patient care can continue but in not addressing the underlying problem similar problems will occur again requiring staff to address them again [6, 7] • Workarounds may circumvent problematic EPR-mediated communication between staff but may also create confusion if the workaround is not explained [115] • Documentation workarounds of free text responses were useful and convenient but required extra effort [223] 	

2.6.4 Nurses' conceptualisation and rationalisation of workarounds

Few of the reviewed studies explicitly examined nurses' conceptualisations or rationalisations of their own and their colleagues' workaround behaviours (including rule subversion, first order problem solving, deviations, violations, or error re-definition) [6, 7, 22, 40, 110, 111, 122, 146, 196, 208, 217, 221, 238-240, 245]. While some nurses reported workarounds as necessary to deliver care, or in the best interest of the patient [7, 22, 44, 77, 78, 111, 116, 121, 122, 139, 146, 209, 213, 219, 221, 238, 245], workarounds were also identified as unsafe in particular contexts [217, 221]. Some nurses perceived workarounds to be professionally risky [110, 111, 146, 238].

Workarounds were justified by autonomy of practice [220] and rationalised in some studies as acceptable: when deemed not to jeopardise patient safety [61, 217, 221]; in emergency situations [3, 44, 111, 122, 245]; when the nurse is familiar with the patient [78, 235, 243]; when the doctors' response was predictable [146]; and when the workaround behaviour fell within the scope of the nurse's knowledge and skill [111, 146]. However, nurses also reported that workarounds threatened professional ideals and quality of care [217, 239] and for some nursing leaders workarounds were considered to be malpractice [196].

The perceived relationship between workaround behaviours and competency was sometimes contradictory. Rules were perceived as flexible and working around them for the sake of the patient was linked with perceived proficiency and satisfaction [7, 146] and "the ability to circumvent problems validated nurses' confidence in their competency and professionalism" [8:129]. Part of being a good nurse was the ability to use one's judgement to work around the rules for the benefit of the patient, but to do so risked one's professional reputation [146]. As unsanctioned practices, workarounds may be viewed poorly by colleagues [238, 239] and were not considered acceptable behaviour for mediocre [146] and casual or non-permanent nurses [245]. Expertise and how critically ill the patient was influenced the number and type of deviations from standard protocols in a critical care environment [210].

One study provided evidence that nurses perceived workarounds and breaking protocol, both terms for violations, as different concepts [178]. The findings of two studies examining attitudes to patient care behaviours that complied, violated or improvised in relation to protocols, revealed that violations and improvisations were also understood to be conceptually different. According to

these studies, healthcare workers and the public viewed violations as inappropriate regardless of patient outcome. Attitudes to improvisations were influenced by outcome for the patient [40, 240]. Thus nurses perceived that improvisations were acceptable if the outcome for the patient was good. Violations on the other hand were viewed as inappropriate regardless of outcome [40, 240].

2.7 Discussion

Although the literature examining nurses' use of workarounds has increased since 2008, there are still relatively few peer reviewed studies examining nurses' workaround behaviours as a primary focus. This is surprising given their ubiquity in healthcare. The majority of studies that have examined nurses' use of workarounds were conducted in the USA. There was considerable heterogeneity in the aims, methods, settings and focus of the reviewed studies. Some studies observed the frequency and causes of workarounds and categorised them. Other studies examined professionals' attitudes to circumvention of rules. Few studies examined the effect of workaround behaviours in terms of measured outcomes [112]. Workaround behaviours, for example, have been shown to consume organisational resources [7], impact on health professionals' occupational health and safety [136] and patient medication safety [207]. However, for the most part, the consequences of workarounds are a matter of speculation rather than based empirically [112]. The effect of workarounds on other microsystems [119, 236] is often unseen, making it difficult to harness and quantify their impact.

Contributing to the relatively underdeveloped body of healthcare research focused on workarounds, given their influence on patient safety, is the difficulty in investigating them. This underlies the use of multiple rather than single research approaches to uncover workarounds' interwoven processes and characteristics [3]. While survey questionnaires have been employed, the primary methods used in the reviewed studies included a combination of observation and interviews, which are resource intensive. In addition, the possibility for such research to identify glitches or deficiencies in technology and workers 'breaking' rules is fraught with potential implications, that is, financial, legal and political [254].

Workarounds continue to be ill-defined [112]. The lack of clarity may reflect the uncertainty about how workarounds are conceptualised in clinical settings and by researchers. For example, some authors suggest that workarounds lead to potential errors [74, 237], while others propose that the workarounds are the error [110, 216]. Importantly, there is lack of clarity in how nurses themselves differentiate workarounds from related constructs [178]. Contributing to the confusion

is that some workarounds are viewed as normal practice, with clinicians being unaware that they are in fact workarounds. Furthermore, at times informal workarounds become sanctioned practices [236]. Imprecision in how workarounds are defined and reported poses challenges for researchers and those who would synthesise the evidence.

Workarounds both threaten and support patient care [255]. Overall workarounds are reported negatively, with claims that their use: destabilises patient safety [3, 137, 215, 222]; undermines standardisation [139, 220]; increases physical and cognitive workload [7, 196, 209]; hides actual practice and opportunities for improvement thus preventing organisational learning [6-8, 22, 77, 78, 121]; and creates further problems and workarounds [7, 8, 119, 139, 209, 236]. However, workarounds are also described as mindful behaviours [195], at times enabling delivery of care. They are said to provide opportunities for improvement [236] and both compromise and promote patient safety [117, 236]. The potential pathways of workarounds to innovation and excellence and the connection of workarounds with resilience are being recognised increasingly [256-259].

Studies demonstrate that workarounds are individually and collectively enacted. When enacted as a collective process, they rely heavily on: a shared view that rules are flexible [139, 146, 245]; a tacit agreement to enact a workaround [110, 111, 139, 146, 245]; and an understanding of who will and will not workaround [119]. There were suggestions nurses viewed problem solving as part of nursing and perceived that an ability to do so alone demonstrated competency [7, 8]. They reported a sense of gratification at being able to solve problems individually, protect patients and deliver care [7, 8]. There is evidence that nurses justify working around rules and policies for the benefit of the patient [146, 238, 245]. However, the importance of adhering to protocols was considered by other nurses to be central to a professional approach to patient care [239]. Introducing technology incites ambiguity in practice and changes the meaning of nursing work [260] which may undermine confidence and threaten a professional's image.

There is some evidence, from a small number of studies, that group norms [6, 61, 121, 245], local and organisational leadership [6, 7, 196, 212], professional structures [7, 8, 119] and relationships [124] and others' expectations [6, 7, 111, 119, 139, 146] influence the implementation of workarounds. Despite the collegial nature of nursing work and the demonstrated effect of organisational and local culture on clinicians' behaviour and attitudes [159, 261, 262], the influence of social networks, relationships, expectations and local and organisational culture on the enactment and proliferation of workarounds is under-investigated.

This scoping review identifies gaps in the literature, which offer opportunities for future research. There were no studies identified in this literature review that examined nurses' use of EMMS workarounds, as a focus, in Australian acute-care settings. There were few studies that explored the significance of workarounds for nurses – their explanation and experience of using workarounds with EMMS. As nurses comprise the majority of the healthcare workforce, it is important to understand the use of workarounds in this population. Understanding nurses' behaviour and their perception of workaround behaviours is at the heart of understanding how to improve healthcare at the bedside, where care is delivered.

Further studies are needed that investigate: nurses' workarounds as a primary focus; nurses' explanations and described experience of using workarounds *in situ*; the influence of team and organisational cultures on the enactment and proliferation of workarounds; and workaround behaviours and measured patient outcomes. There is also a gap in theoretical interpretation of emergent findings on nurses' workarounds, with the choice of theory being informed by the emergent findings themselves, rather than decided *a priori*. This process allows access to deep understanding and richness of meaning [162].

This thesis addresses identified gaps in the literature to provide empirical evidence to improve our knowledge and understanding of why nurses use workarounds with EMMS in order to inform policy and technology development. The research questions were therefore articulated to meet these aims:

Research Question 1: *Do nurses employ workarounds when using EMMS in two Australian settings?*

Research Question 2: *How do nurses enact, experience and explain their use of using EMMS workarounds?*

Research Question 3: *Can sociological theory offer a way of interpreting the emerging findings?*

2.7.1 Limitations of the literature review

This review examined empirical peer reviewed studies written in English. A limitation of literature reviews is that imposed by research and publication timelines, which create a lag between those studies included in the review and new published information. While every attempt was made to

capture all published papers in this area using systematic and comprehensive search strategies, some may have been missed.

The main challenge in studies of this type is that workaround behaviours are difficult to delineate from other behaviours [112]. An operational definition of workarounds was applied to behaviours described in the reviewed studies and was inclusive rather than exclusive in selecting papers for review. It is possible that some workaround behaviours were missed. Alternatively it is possible that some behaviours that may not be workaround behaviours were included. In order to ameliorate this effect an additional reviewer independently cross-examined randomly selected studies in phases one and two and all of the studies in phase three.

2.8 Conclusion

Workarounds both enable yet potentially compromise patient care and safety. They provide, and hide, information about clinicians' work. They are individually and collectively enacted. This literature review suggests that while there is some evidence that group norms, local and organisational culture, image management and collegiality influence the development, implementation and maintenance of workarounds, further examination of these factors is warranted. Traditional approaches to evaluating the implementation of technology have focused on interface issues rather than potential conflicts between the users' mental models and the way the device works [186].

This thesis adds to the body of published empirical evidence on nurses' use of workarounds with EMMS. It examines the significance of EMMS workarounds for nurses. That is, how nurses themselves explain and experience their own and their colleagues' use of workarounds with EMMS in an Australian context. In doing so, it provides another jigsaw piece to help us understand the overall puzzle of patient safety. The next chapter describes and justifies the study design and choice of data collection and analysis methods. Six findings chapters that describe the enactment, explanations and experience of EMMS workarounds for participants in this study follow. The discussion chapter provides an interpretation of the findings, positions them in relation to current published empirical literature, and demonstrates how this thesis contributes to the body of knowledge on nurses' use of EMMS workarounds. The concluding chapter offers implications for policy, practice and future research.

Chapter 3 Research strategy, design and methods

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At every point in our research – in our observing, our interpreting, our reporting, and everything else we do as researchers – we inject a host of assumptions. These are assumptions about human knowledge and assumptions about realities encountered in our human world. Such assumptions shape for us the meaning of research questions, the purposiveness of research methodologies, and the interpretability of research findings. [263:17]

3.1 Introduction

The eMAR is an electronic version of the medication administration record (MAR) traditionally recorded on paper. In hospitals, the eMAR provides a framework for prescribing and administering medications, as well as a permanent and legal (electronic) record of the details of medications administered to a patient. The appearance and operational features of eMARs differ depending on the vendor, and legal and facility requirements (described later in this chapter). In this study, the eMAR could be accessed via desktop computers or via laptops mounted on trolleys with wheels (computer on wheels or 'COWs') and the term EMMS is used to include the software (eMAR) and hardware (desktop computers and COWs) used by nurses when administering medications.

The focus of this study is the workarounds used by nurses in relation to the medication administration process, including associated policies (such as the five, six or even nine 'rights' outlined in Chapter 1). While acknowledging that nurses' medication work is inseparable from their other work [45], making it difficult to distinguish a beginning and end to the process, this study examined nurses' use of workarounds specifically with EMMS, beginning when the nurse logged into the EMMS to administer medication to a patient and ending when he or she logged off from the EMMS.

3.2 Declared assumptions

Patchwork quilts offer a metaphor for scientific enquiry and have been used by researchers to describe the collection, analysis and presentation of qualitative data [264, 265]. The backing of the quilt – the research questions, holds the quilt together [264]. Each patch (data piece) can provide rich and textured information and offer a glimpse of sections of the entire quilt. The quilting process involves selecting particular patches and analysing them to understand how they fit with other patches to construct a quilt. The process involves arranging and rearranging the

patches, collecting more patches when sections of the quilt are thin, and quilting them in a rigorous way. The quilter influences the way in which the patches are cut, arranged and quilted to form the final quilt. The choices made about which material the patches are cut from, how they are cut and how they are arranged and quilted together is influenced by the designer's (researcher's) experiences and assumptions and their interactions with the materials (participants and data). There are many possible variations and methods of arranging the patches – each of which produces a different, but equally credible, quilt, and even more methods of quilting them to ensure a cohesive whole.

In presenting the quilt, explanations and justifications must be available for the choice of each patch, instructions on how each patch was placed in relation to its neighbouring piece of material, and a clear link between the choice of material pieces, the way they are sewn together, the completed quilt and the story it tells. Like a patchwork quilt, the research process and choices made within it are influenced by what we think is knowable and how it can be known. Constructionism is the view that:

all knowledge, and therefore all meaningful reality as such, is contingent upon human practices, being constructed in and out of interaction between human beings and their world, and developed and transmitted within an essentially social context. [263:42]

It is the paradigm underpinning this thesis. That is, the research process is informed and shaped by my assumptions, perspectives, experiences and values. The driver of the research process, the research questions, reflects an epistemic stance; what I as a researcher think can be known and how I think it can be known. The research process constructs and is constructed by the mental models, experiences and expectations of me, as the researcher, in conjunction with the participants, and by the context in which the research is conducted. The version of constructionism that I apply assumes that there is a discoverable 'truth', but that there are different aspects or components to that 'truth', which are contextual and constructed through the social interactions between humans. These factors influence the choice of research questions, research design and the way the research is implemented [266]. What can be uncovered about workarounds will be shaped by the context in which it is examined, but not limited by it. The research process will 'construct' the facet of workarounds unearthed but 'not construct' the reality of workarounds. The version of constructionism that underpins this research also assumes that, for the most part, research participants are able to access and explain what they think. It also

assumes that the 'appearance' they give their explanation is as informative as the explanation itself. In observing what people say and do, how they explain things to each other and to the researcher, changes in the content and way of describing the construct under investigation, depending on whether they are being observed, interviewed alone or collectively, provide insight into how participants rationalise, perceive and experience that construct.

3.3 Research design/strategy

3.3.1 The research approach

The study aim and questions require an approach that allows identification of the central and supplementary processes operating in the communal world of nursing work. Because grounded theory "... deals with what is actually going on, not what ought to go on" [267:14], it offers an ideal approach for this study. Grounded theory method "generates inductively based theoretical explanations of social and psychosocial processes" [268:1357] rather than testing deductions generated from a priori assumptions. However, while the approach used in this study was based on grounded theory, it differed from it in that all of the data were collected before the explanatory framework was generated.

In addition to being informed by the principles and approaches of grounded theory, this research is based on the general inductive approach for analysing qualitative data [160]. This approach is consistent with Strauss and Corbin's (1998) conceptualisation of grounded theory as allowing the theory to emerge from the data, but the emergent theories are tested against questions outlined by the researcher about the topic at hand. The general inductive analysis approach aims to condense extensive and varied data; establish clear transparent and defensible links between the research objectives and findings that emerge from the data; and develop a theory to explain "the underlying structure of experiences or processes evident in the data" [160:237].

Drawing on both these approaches, grounded theory and general inductive analysis, within a context of social constructionism, brings the thesis closer to a constrained form of theoretical and methodological bricolage [269, 270], echoing the patchwork analogy in requiring a researcher who:

uses imagination as well as existing knowledge to piece together a diversity of raw materials, objects, methods, philosophies, or ideas that are at hand (as opposed to

being accessed from outside one's immediate environment) in producing a coherent, new structure (conceptual or concrete) to address a problem. [271:318]

To this approach I add one qualification: the study does not claim to read the mind of nurses or access their unspoken motivations for using workarounds. Rather, the study is designed to gather data on what nurses do or say and to build a theory that offers possibly useful and new explanations of nurses' workarounds.

An ethnographic study using a multi-method triangulated approach to data collection was used. Some workarounds involve non-compliance with rules, policies and expected, or sanctioned, behaviour. The perceived, potential and actual ramifications for staff of non-compliance make it a challenging area to study. Because of the sensitive nature of the research topic, more than one research approach was needed [3]. Ethnographic method allows for the 'unmasking' of the 'complexities' of clinical work [272] and in this study involved observation, focus groups, interviews, process mapping and document analysis as the tools of investigation [273].

3.3.2 The study overview

An overview of the study is provided in Figure 3.1. This empirical research was conducted in two large, metropolitan teaching hospitals in Sydney, Australia. The study had four phases.

The purpose of phase one was one of scoping, context setting and to create the research tools. In this first phase, a literature review was undertaken; a scoping exercise was conducted with colleagues with expertise in health services research and/or clinical experience, using focus group and individual discussion method; and process maps for medication administration were developed, based on my nursing experience, EMMS-related policy document analysis and by undertaking the EMMS training conducted at each hospital. To check that the language and approach I had used in the development of the process maps was current and appropriate for each site, contextual discussions were held with staff involved in the implementation and use of EMMS.

This led into the second phase, which included data collection, analysis and generation of a preliminary explanatory framework for nurses' workarounds with EMMS in these settings. The purposes of the observational component of phase two were: 1) to observe whether or not the nurses used workarounds, and 2) the context within which nurses used or did not use

workarounds. This phase included concurrent, informal 'formative' member checking of emerging ideas.

The third phase of the study comprised feedback sessions that included group discussion and an interview. The purpose of this member-checking phase was to confirm or disconfirm the proposed explanatory framework of nurses' use of workarounds with EMMS.

A fourth phase in which the emergent findings were abstracted to a higher level [161] was included so as to access a deeper understanding and richness of meaning [162], and interpretation of social processes underpinning the findings [274]. After the data had been collected, analysed and an explanatory framework generated and member checked, the emergent findings were interpreted in light of existing sociological theory that offered explicatory power (Bourdieu's field theory) [163].

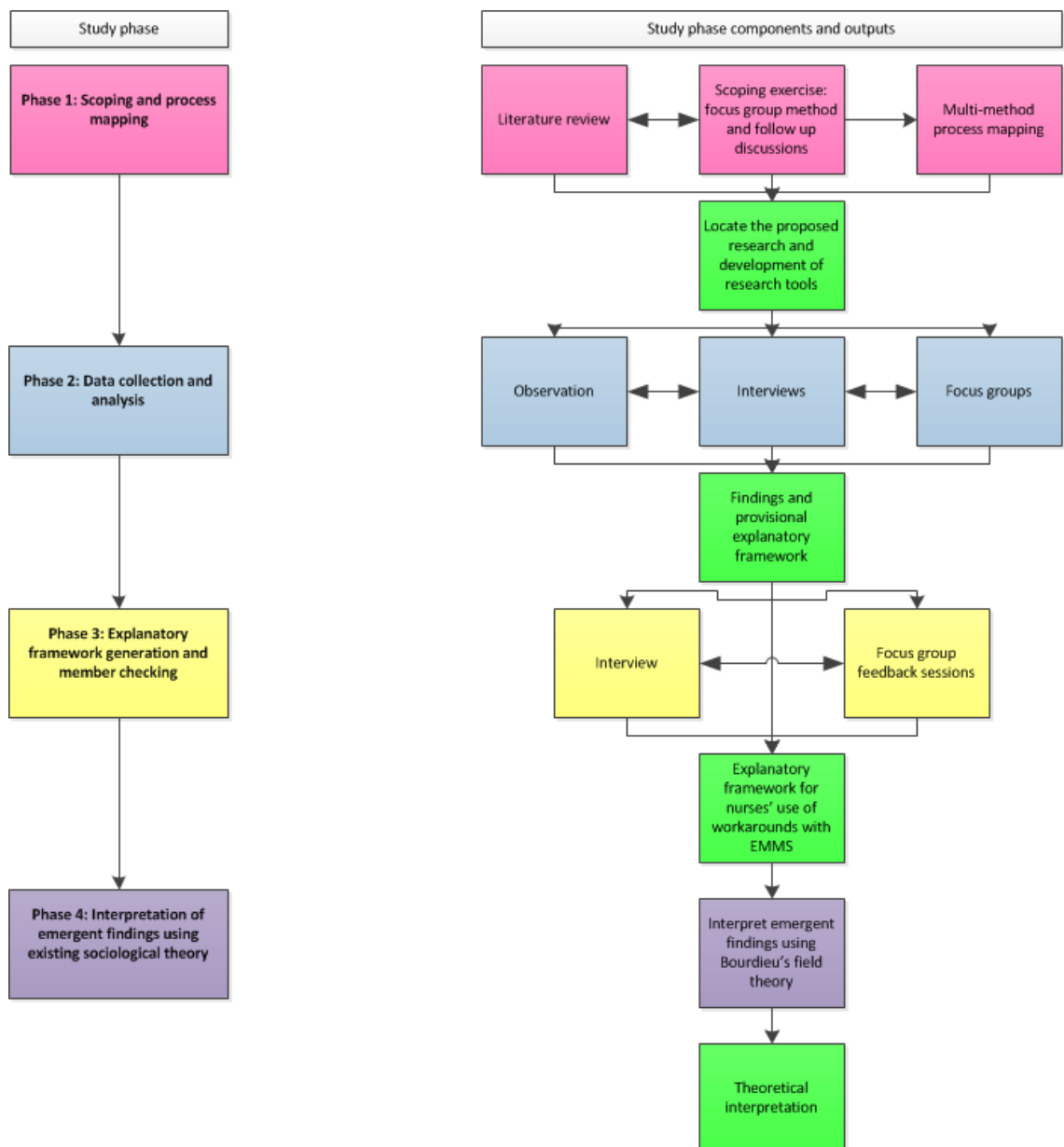


Figure 3.1 Diagram presenting an overview of the study

The aims, settings, participants, data collection and analysis methods, and proposed outcome for each phase and components are detailed in Table 3.1. More detailed descriptions, including strategies utilised to ensure rigour, and ethical issues follow.

Table 3.1 Detailed overview of the research plan

Phase	Component	Aim/ strategy	Participants/ setting/ data sources	Data analysis method	Output
Phase one: Scoping, context setting and research tool development	1.1 Literature review (Chapter 2)	<ul style="list-style-type: none"> • To examine the academic literature on workarounds • To identify what is known about nurses' use of workarounds • To identify gaps in the empirical healthcare literature on nurses' use of workarounds • To establish the conceptual and comparative basis for the study • To identify valid methods to collect data on workarounds with the medication administration process 	<ul style="list-style-type: none"> • Peer reviewed journals 	Content and thematic analysis	Location of the proposed research and development of research tools
	1.2 Scoping exercise: focus group and informal discussion method	<ul style="list-style-type: none"> • To garner conceptualisations of workarounds used in healthcare settings from research colleagues with health services research expertise and/or clinical experience 	<ul style="list-style-type: none"> • Discussion with colleagues who were researchers with expertise in health services research at the University of New South Wales 	Content and thematic analysis	

Phase	Component	Aim/ strategy	Participants/ setting/ data sources	Data analysis method	Output
	1.3 Multi-method process mapping	<ul style="list-style-type: none"> To create a process map for the 'gold standard' for medication administration in each hospital via participation in in-service training on use of EMMS, review of policy documents on EMMS and contextual discussions with stakeholders with expertise in EMMS 	<ul style="list-style-type: none"> Experts on EMMS Policy documents on medication administration with EMMS Contextual information 	Content analysis Process analysis	
Phase two: Data gathering and analysis	2.1 Observation	<ul style="list-style-type: none"> To observe <i>in situ</i> clinical practice and the 'lay of the land' in the research settings To identify normative activities, behaviours, interactions, attitudes, communication and cohesiveness in each of the research settings To identify how medication administration is operationalised To identify workarounds in relation to medication administration To identify contextual, individual, social, cultural, patient-related and organisational factors related to nurses' enactment, explanation and experience of workarounds To identify nurses' enactment, explanation and experience of workaround practices in relation to medication administration To identify key informants to participate in focus groups and interviews On-going formative member checking 	<ul style="list-style-type: none"> Staff working in participating research sites Medical units and surgical unit across two hospitals Medication administration, staff interactions, organisational factors, staff explanations of workarounds, contextual information, activities, behaviours, attitudes and communication 	General inductive analysis approach Process analysis to identify workarounds	Study findings and provisional explanatory framework of nurses' workarounds with EMMS

Phase	Component	Aim/ strategy	Participants/ setting/ data sources	Data analysis method	Output
	2.2 Interviews and focus groups	<ul style="list-style-type: none"> To identify how individual nurses rationalise, perceive and experience their own and their colleagues' use of workarounds To identify the collective explanation and experience of the use of workarounds 	<ul style="list-style-type: none"> Nurses in the research settings Stakeholders involved in the implementation of EMMS in the research settings 	General inductive analysis approach	
Phase three: Formal member checking and generation of an explanatory framework of nurses use of EMMS workarounds	3.1 Interview, feedback sessions and seminar presentation	<ul style="list-style-type: none"> To member check the provisional explanatory framework of nurses' use of workarounds with EMMS 	<ul style="list-style-type: none"> Nurses in the research settings Discussions with colleagues 	Comparative thematic analysis	An explanatory framework of nurses' use of workarounds with EMMS
Phase four: Interpretation of emergent findings using existing sociological theory	Theoretical interpretation	<ul style="list-style-type: none"> To interpret the emergent findings using existing theory so as to take the results to a higher level of abstraction and to offer a deeper explanation of the emergent findings 	<ul style="list-style-type: none"> The emergent findings and explanatory framework of nurses' use of workarounds with EMMS 	Interpretation	Theoretical interpretation of the emergent findings

3.4 Phase One

Phase one comprised three components: a literature review; a scoping exercise with colleagues with health services research expertise and/or clinical experience; and multi-method process mapping. The purposes of this phase were to: establish the conceptual and comparative basis for the study; examine how workarounds are reported in the broader and more specifically healthcare literature; identify valid and reliable methods for examining medication administration; and establish the context, and to develop a 'gold standard' map of the medication administration process in participating hospitals. The findings of this phase informed data collection and analysis in the following phases. Tools for use in the subsequent phases of the study were developed during this initial phase.

3.4.1 Literature review

A review of the broader and specifically healthcare literature was conducted to ascertain the empirical evidence and 'accumulated knowledge' [275: 66] available on workarounds, particularly in relation to EMMS (Chapter 2). The literature review addressed: how workarounds are understood and conceptualised; how EMMS workarounds have been situated in the literature; gaps in the literature on workarounds in relation to EMMS; and valid methods for collecting data on the medication administration process [113].

3.4.2 Scoping exercise

The scoping exercise was conducted with colleagues with health services research and/or clinical experience (medicine, nursing and allied health) in the Australian Institute of Health Innovation at the University of New South Wales. Group discussion was used to explore the group's interpretation of workarounds used in healthcare settings. This group discussion and follow up informal conversations provided insights and illustrations that helped refine the scope and direction for the study. These collegial discussions coupled with the literature review also helped develop the definition for a workaround used in this study and the selection of data collection methods.

3.4.3 Multi-method process mapping: creating a process map of the 'gold standard' of medication administration for each hospital

A process map provides a visual representation of the sequence of steps and activities in a

process [276]. Maps of the prescribed medication administration process using EMMS were developed for each of the participating sites, that is, a 'gold standard' medication administration process map. The process maps for medication administration developed for each site facilitated identification of workarounds and where in the medication administration process workarounds occurred. Formulation of the process maps was informed by document analysis of New South Wales (NSW) Health and local hospital policy documentation on medication administration¹ [1], and by participation in in-service training on the use of eMAR at each hospital in May and August 2011 (at Hospital A) and in February 2012 at Hospital B. The duration of the training sessions was approximately one hour. I also drew on my experience as a registered nurse. Discussions with EMMS implementation experts about contextual information, my interpretation of policy documentation, and 'checking the language', allowed for the development of appropriate process maps at both hospital sites. These discussions ensured that my interpretation of the policy documents and the language I used in the process maps for each site were accurate at the time of data collection.

The process map at Hospital A was structured by a clinical orientation and the component process maps were based on route of administration: oral; injectable (intravenous, subcutaneous, or intramuscular); and topical or other (Appendix 2). There were five iterations of the medication administration process map; the clinical information systems team members approved the final version.

A regulatory orientation underpinned the structure of the process map for Hospital B, with component process maps differentiated according to medication administration requiring a witness, a co-signer, or neither a witness nor a co-signer. The Area Health Service (AHS) policy directive outlining the additional processes required to record the administration of medication via all possible routes using an eMAR contained in a flow diagram, which was the basis for the medication administration process map developed for Hospital B (Appendix 3). Contextual discussions and in-service training on the use of eMAR highlighted slight discrepancies between the policy document and the then recommended practice. This was because the policy document was written in light of the functions available in the EMMS system but before the eMAR went live in the hospital. When it did so, there were steps in the directive that did not match the workflow and as a result were no longer recommended or taught at the time of the study. The policy

¹ Citations of hospital specific documentation have not been included as they will identify the participating hospitals

directive was due for revision in 2013. The process map reflected recommended practice and the final version (seventh iteration) was approved by two EMMS implementation stakeholders at Hospital B.

3.5 Phase Two

Phase two was conducted in six units in two participating hospitals. The findings from this phase formed the basis of generation of the preliminary findings and provisional explanatory framework that were member checked in phase three.

The following sections situate the study in the broad political context in which it occurred, outlining the description and rationale for the: selected study settings; research participants and sampling strategies; research methodology; data collection and analysis methods; and strategies to ensure rigour. Issues related to ethics will then be described.

3.5.1 Historical and political context

It is important to situate the study settings and information systems within the broader historical and political contexts within which they are located. Before describing the research settings I provide a brief description of the field at the time of the study.

Just prior to the commencement of data collection, a state government driven health reform led to a change in the management and administration structure of the provision of healthcare in NSW. Following January 1, 2011, the eight Area Health Services (AHSs) that had previously been responsible for the management, administration and provision of healthcare, were divided to form 15 Local Health Districts (LHDs), two specialist networks (Sydney Children's Hospital Network and Justice and Forensic Mental Health), and a third network, the public health services operated by St Vincent's Hospital, one of the largest non-government healthcare providers in Australia. These structural organisational reporting changes did not impact the work of the nurses at the local level during the time of data collection. They are reported to provide the context within which the study was conducted.

In 2005, a 16-year old girl died in a Sydney hospital after being hit in the head with a golf ball. Her death raised questions about the quality of acute care in NSW hospitals and led to a coronial inquest. Deputy State Coroner Mr Carl Milanovich, who presided over the inquest, called for a statewide commission of inquiry to examine the standard of care in acute healthcare services in

NSW [277]. This inquiry, conducted in 2008 by Peter Garling SC, occurred three years prior to the commencement of the study and led to the release of two reports that are contextually relevant [278, 279]. Recommendation 51 of *The Final Report of the Special Commission of Inquiry: Acute Care in NSW Public Hospitals* (The Garling Report) (Box 1), and NSW Government's Department of Health's response to that recommendation in its response document, *Caring Together: The Health Action Plan for NSW* (Box 2) outlined the need for statewide phased implementation of IT, including medication management, in NSW acute care within a specified timeframe. The study settings had implemented the medication management component of the EMMS within this broad political context.

Box 3.1: Recommendation 51, *The Final Report of the Special Commission of Inquiry: Acute Care in NSW Public Hospitals* [278:47]

http://www.dpc.nsw.gov.au/__data/assets/pdf_file/0003/34194/Overview_-_Special_Commission_Of_Inquiry_Into_Acute_Care_Services_In_New_South_Wales_Public_Hospitals.pdf

Box 3.1 has been removed due to Copyright restrictions.

Box 3.2: *Caring Together: The Health Action Plan for NSW – Response to Recommendation 51* [279:28]

http://www0.health.nsw.gov.au/pubs/2009/caring_together_hap.html

Box 3.2 has been removed due to Copyright restrictions.

3.5.2 Research setting

Data were collected at two tertiary, teaching hospitals in NSW, Australia between May 2011 and March 2014. In each hospital EMMS was used. Two hospitals were selected to capture potential organisational influences on nurses' enactment, explanation and experience of workarounds. The type of EMMS differed between hospitals, thus allowing for exploration of system-specific effects on the enactment, explanation and experience of workarounds. Three wards that used EMMS were selected at each of the two participating hospitals. The decision to sample from two hospitals using different EMMS, the number and type of units, models of nursing care, nurses, days and shifts was to maximise variation [280]. It aimed to capture as much variation as possible to minimise the chance of missing major phenomena that influence nurses' enactment, explanation and experience of workarounds. This study does not try to establish an effect size, nor does it make claims about the impact of the variance.

3.5.3 Hospital settings

Hospital A and Hospital B² are both large metropolitan teaching hospitals, with over 300 beds, are affiliated with universities in Sydney, Australia. They were 'centres of excellence', and are nationally and internationally recognised leaders in a range of specialty and subspecialty services. The study hospitals differed in governance structure. Importantly for this study, the EMMS and the model of nursing care differed between hospitals.

3.5.4 Study sites: A1, A2, A3, B1, B2, and B3

Research was conducted in three 34-bed (A1, A2, and A3) and three 26 or 28-bed units (B1, B2, and B3): four medical units specialising in aged care, one medical subspecialty unit and one

² The hospitals have been given pseudonyms to protect their identity

surgical unit. The staff mix varied between wards. Table 3.2 provides an overview of the number of staff by position on the roster and available Computers on Wheels (COWs) for each unit.

Table 3.2: Total number of nurses (on the roster by position) and COWs by research site

Unit	NUM or A/NUM	CNE	CNC	CNS	RN	New Grad	EEN	EN	AIN	COWs available
A1	1	2	2	0	15	5	8	1	10	8
A2	1	1	1	8	19	6	7	0	0	8
A3	1	1	1	5	38	6	3	0	0	10
B1	1	2	0	1	16	4	4	2	4	5
B2	1	1	0	3	16	4	3	1	0	5
B3	1	1	0	3	11	3	5	3	0	6
Total	6	8	4	20	115	28	30	7	14	42

Key: Nursing unit managers (NUM), Clinical Nurse Educators (CNE), Clinical Nurse Consultants (CNC), Clinical Nurse Specialists (CNS), Registered Nurses who had more than one year's experience as a registered nurse (RN), Registered Nurses who had less than one year's experience as a registered nurse (NewGrad), Enrolled Nurses who were endorsed to administer medications – Endorsed Enrolled Nurses (EEN), Enrolled Nurses not endorsed to administer medication (EN), Assistants in Nursing not endorsed to administer medication (AIN)

On all units, oral medications prescribed by a doctor were dispensed by the pharmacy, and stored in the locked top drawer of a patient's bedside locker (with the exception of accountable medications, such as S4D, S8s, medications requiring refrigeration and injectable medications). Nurses endorsed to administer medications had a key to this drawer. Medication administration times tended to be grouped, such that there were times when medication administration work was heavier than at others (medication rounds). While there were several visible medication round times, on all participating units, the period of highest medication administration was in the morning after handover. At this time, the requirement for COWs was greatest. The medication administration demands varied between the units. For example, there was a higher concentration of intravenous medication administrations in Units A2 and A3 than the other units at the time of the study. The EMMS was used on all units, the number of COWs available on each unit ranged between five and ten (Table 3.2).

On all units medication rooms were centrally located with a pin code or swipe card access. The medication rooms at Hospital A were approximately twice the size of those at Hospital B. Medications stored in the medication room included ward stock, medications for injection and medications requiring refrigeration. A metal locked cupboard (DD cupboard) housing the

Scheduled medications (e.g. Schedule 8 and Schedule 4D medications) was mounted on one wall of the medication room. The burgundy coloured A4 size drug register books for these medications were located in close vicinity to the DD cupboard. The keys to the DD cupboard (DD keys or 'the keys') in each unit were on a red ribbon or cord carried each shift by a registered nurse, permanently employed on the ward and usually a senior member of staff. Each unit differed in the processes it used to allocate the DD keys and by which the person with 'the keys' was summoned to open and 'check out' the DD medication with another nurse. Options included a doorbell, paging system, or physically searching for the nurse with 'the keys'. 'Checking out' a DD medication required both nurses to check the medication order, reconcile the medication count, witness preparation, administration and appropriate discarding of residual medication not administered, and to sign and witness the register and the medication order once the medication was administered. There were legislated responsibilities in relation to the administration of S8 and S4D medications according to the nurse's scope of practice.

Another feature common to all units was a physical layout that precluded visibility of sections of the unit such that nurses may be unaware of how busy their colleagues were in other sections of the unit. In all study sites, there were single-, two- and four-bedded rooms. The single rooms were often used for patients requiring isolation to prevent cross infection or for palliation.

On all units, handrails ran the length of the walls at waist height. Wall mounted clocks and framed pictures, curtained beds, 'clutter' including an assortment of equipment on wheels (linen trolleys, IV poles, bedside trolleys, COWs, weighing machines, shower trolleys, notes trolleys, wheel chairs, and dressing trolleys), sinks, numerous hand sanitiser dispensers with laminated reminders of the need for hand hygiene, sharps containers, laminated signs stuck on almost every wall, and enormous windows that encouraged natural lighting during the day were common characteristics on all units. At Hospital B, nurses took their breaks in staff rooms on each unit. At Hospital A the nurses tended to leave the units for meal breaks.

The nursing handover process differed between units and shifts. For example, in one unit the handover from night to morning shift and from afternoon to night shift was digitally recorded during the shift and the recording listened to by the oncoming shift in the main office on the ward. On that unit, the shift team leader delivered the morning to afternoon shift face-to-face in a smaller meeting room. This was followed by individual handover from nurse to nurse on allocated patients. Other units structured the format for handover processes differently.

3.5.5 Models of nursing care and staffing

The participating units in this study used two different models of nursing care – a shared cared (team) model and a patient allocation model of care [281]. At Hospital A nurses who were allocated particular patients were responsible for ensuring their care was delivered during their shift. At Hospital B a team of nurses under a team leader, was responsible for caring for a group of patients.

During the study period, staff shortages at Hospital A were addressed predominantly with overtime, agency and casual pool nurses. At Hospital B, nurses were 'called out' to work on other wards to cover staff shortages and overtime and agency staff were not commonly seen during the time of the study.

3.5.6 Technological context: eMARs and the EMMS

The use of IT in Australian acute-care settings is increasing. In an acute-care context, eMARs, provide a record of a patient's ordered and administered medications. As with the paper chart, medications are typically ordered by a doctor. Medication prescribing support may be available to varying degrees depending on the software design features. Within their scope of practice, nurses may initiate specified medication orders in the eMAR.

The two hospitals were selected because they have implemented different types of EMMS, allowing exploration of the potential role of features of the eMAR in nurses' use of workarounds. There were similarities and differences in the administration policies for, and user interface and features of, the eMARs between the study sites.

3.5.6.1 *Electronic medication management systems used*

iSoft MedChart is an electronic medication management system, including ePrescribing, pharmacy review and medication administration, developed with the software developer Hatrix and purpose designed for the hospital in which it was implemented (Box 3.3). The EMMS was rolled out across the Hospital over five years, commencing with a pilot in 2005. Over this time, the system has changed responsively to shortfalls and barriers to use that had been identified. At the time of the study there was one unit in which the EMMS had not been implemented.

Box 3.3 has been removed due to Copyright restrictions.

The alternative EMMS comprises a medication management module of the *Cerner Millennium* clinical information system using PowerChart for electronic ordering, administration and pharmacist review (Box 3.4). The medication management module was designed for a US approach to medication administration. At the time of the study all medications were able to be ordered using the eMAR except Heparin infusions. Features of the EMMS had been enhanced since implementation. At the time of the study, this version of the EMMS had been implemented in the aged-care wards only of the relevant hospital. The rest of the hospital used paper medication administration records.

Box 3.4 has been removed due to Copyright restrictions.

3.5.6.2 Similarities in accessing and using the eMARs at both sites

To access the eMARs used in both participating study sites, nurses were granted a username and password that enabled them to log in to the EMMS and to open and use the eMAR. The username and password was their electronic signature. Access to the eMAR provided access to eMARs of all patients in the hospital who had an eMAR. At both sites, medications were 'available for administration' for one hour either side of the prescribed administration time. An overdue medication alert (OMA) signalled when a medication was an hour overdue. To administer a medication, the nurse logged in to the eMAR and selected the ward, the patient and the medication. Nurses signed off the medication in the eMAR once it had been successfully administered. If medications were not administered, they could be recorded in the eMAR as 'withheld', 'delayed' or 'not given' with a reason entered. The time that administration was confirmed in the eMAR was recorded as the time the medication was administered unless the administration time was manually changed. The electronic signature provided a record of who administered the medication. When medications had been administered the nurse logged out of the system.

The eMARs at both hospitals allowed access to clinical and medication information at the point of care. Portable tablets on which the eMAR had been loaded were made available when the eMAR was rolled out at one of the study hospitals, but were not in use at the time of the study. The EMMS at both sites comprised the eMAR and computers on which it could be accessed including the COWs (Box 3.5).

Box 3.5: Images of Computer on wheels (COWs)



Differences between the features of the eMAR that are relevant to this study are tabulated in Table 3.3. This is not an exhaustive list; rather it highlights those features that are identified as relevant.

Table 3.3: Differences between site-specific eMAR features identified as relevant to this study

Feature	Hospital A	Hospital B
Access to eMAR	All nurses endorsed to administer medication, including agency and casual staff, following training at the commencement of a shift	Only permanent staff and selected casual staff who regularly worked on wards using EMMS after completing training sessions
Concurrent access by multiple users to the same eMAR	No – when one user opened the eMAR, it was blocked to other users	Yes – several users were able to log in and be active in the same eMAR at the same time
Blocks at administration based on scope of practice	Users were blocked from confirming medication administration in the eMAR for medications they were not endorsed to administer. For example, Endorsed Enrolled Nurses (EEN) were able to log in to the eMAR but not confirm the medication administration of subcutaneous Heparin	No blocks
Automatic log out time	Shorter than ten minutes	Longer than ten minutes
Required fields for checking nurses to complete when checking medication (co-signing or 'checking' which is different from medication administration requiring witnessing)	The nurse witnessing the administration of injections (intravenous, subcutaneous, intramuscular) needed to enter a username and password for the administration to be recorded as completed in the eMAR	The administering nurse typed the name of the checking nurse in the Comment Box – the checking nurse was not required to enter any information
Pharmacist instructions	At Hospital A a purple triangle indicated pharmacist instructions that were required to be read. It was necessary that nurses confirm that the pharmacist's instructions had been accessed and read in order to proceed with the medication administration	It was not necessary to confirm that pharmacist instructions had been accessed and read to proceed
Additional required fields to proceed to record administration	A reason needed to be entered when withholding a medication	A reason needed to be entered when withholding a medication. The pulse rate for Digoxin and blood glucose level (BGL) for insulin needed to be recorded for the administration of these medications to be completed in the eMAR
Functionality to manage intravenous therapy	No	Yes
Insulin	Paper-based medication charts also existed for insulin. The EMMS alerted the nurses that there was an insulin order on a paper chart, "Insulin Paper Chart exists for this patient", so nurses need to mark that the insulin has been administered on the electronic chart and on the paper chart	Insulin was ordered in the eMAR; there was no paper chart for insulin in the wards that used EMMS

Feature	Hospital A	Hospital B
Visibility of overdue medication alert (OMA)	Visible next to the names of patients with medications that were overdue at the step of the process when the ward was selected in the eMAR	Not visible until the individual patient's eMAR was opened

3.5.6.3 *Statewide medication administration policies and the eMAR*

At the time of the study, policies guiding medication administration in NSW hospitals were provided in the Medication Handling in NSW Public Hospitals policy document [1]. Included in the document were policies that outlined who was authorised to administer medications and principles for safe medication administration to be observed for every medication occasion. For example, observance of the principle that one medication be prepared and administered for one patient at a time [1]. Ensuring compliance with the 'rights of medication administration' required the eMAR (in this study on the COW) to be taken to the patient so that their allergy status and identification information on identification bands could be checked against that on their eMAR. Medications were to be confirmed as administered in the eMAR only after the medication had been successfully administered. At both hospitals, medications that required a **witnessed** administration necessitated both the administering and witnessing nurses to accompany the eMAR to the patient to observe the medication being administered. Following administration, the witness was obligated to enter their username and password in the medication order. The medication would then be confirmed as administered and the nurse who was logged in to the system was recorded as the administering nurse, the other nurse as the witness. Endorsed enrolled nurses were not permitted to administer Schedule 8 (S8) medications. Nurses were only permitted to use their own username and log in. If a nurse needed to leave the eMAR unattended, they were required to log off or switch users.

3.5.7 Hospital medication administration policy differences identified as relevant to this study

There were some hospital-based differences in medication administration policy requirements that were relevant to this study. At one hospital, for medications requiring a co-signature or 'check', the nurses responsible for checking injectable medications were required to check the 5Rs at the bedside with the administering nurse. At the other hospital, they were required to check the 5Rs at the eMAR, but not required to attend the bedside to check the 5Rs. Therefore, a behaviour defined as a workaround at one hospital may not be a workaround at the other because of the differences in local policy.

3.5.8 Selecting a research methodology

3.5.8.1 *A qualitative approach to research*

Qualitative research has been used historically to explore, explain or describe [282]. A qualitative research approach enables the examination of complex processes and the context in which behaviour occurs, allowing generation of rich descriptions of participants' experiences and behaviours [283]. It was used in this study to uncover workarounds, informal, often clandestine behaviours, and the meaning they have for those who enact them. It was therefore imperative that workarounds were examined in the field in which they occurred. I encouraged nurses' input and ideas on the topic to, as much as possible, construct a substantive theory of workarounds that reflected their voice, their explanation and experience. As data were collected, issues emerged, particularly those that were apparently salient for the nurses, or that surprised me, and influenced on-going data collection. Sometimes this involved participants offering an insight or clarification that was unanticipated. On-going reflection heightened my awareness of ideas that were forming, finding new threads of inquiry.

3.5.8.2 *The ethnographic research design*

Workarounds are a form of articulation work and hidden from formal accounts of what nurses do. Articulation work is:

work that gets things back 'on track' in the face of the unexpected, and modifies action to accommodate unanticipated contingencies. The important thing about articulation work is that it is invisible to rationalised models of work. [284:10]

In addition, workarounds are non-sanctioned practices that may involve 'going off policy', and so are not willingly shared outside the profession as they comprise 'secret nurses' business'. Nurses may interpret what they are doing differently from others [216], and being so used to fixing problems, may not conceptualise the fixes they use as workarounds, nor consider them important to mention. Thus, it was important to observe work behaviours and possible workarounds, as they were implemented. Given their status as articulation work, ethnography offered the best approach to study workarounds:

Ethnographic research with its emphasis on the importance of paying attention not only to what people say they do, but also to what they can be observed to do has been instrumental in providing in depth analysis of the often underspecified and

sometimes unstated characteristics of articulation work. The unremarkable, taken for granted character of much of what people do has made ethnographic inquiry indispensable in uncovering the 'machinery' of articulation work—the things people do to integrate and connect people, artifacts, and information. [285:379]

Several assumptions and principles underlie the traditional and normative view of ethnography that made it the most appropriate methodology to actualise the objectives of this study. Rather than evaluate the efficacy of workarounds, the study aimed to identify that workarounds occurred and to illuminate nurses' rationalisations, perceptions and experiences of using workarounds. Ethnography assumes that: first-hand experience of the world one is studying is essential to understanding it; observed activities must be understood in relation to the broader context within which they occur. Ethnography provides:

an analytic account of events and activities as they occur, without attempting to evaluate the efficacy of people's practices ... ethnography is committed to understanding the world from the perspective of the people studied, describing their activities in terms relevant and meaningful to them. [285:374]

Prolonged immersion in the field enabled me to: observe workarounds that may have been hidden were I only there for a short period; understand the cultural and contextual interplay that influenced the use of workarounds; and, I believe, gain the trust and acceptance of participants to facilitate open discussion about workarounds. In particular, observing entire night-duty shifts proved powerful in gaining nurses' acceptance and willingness to participate in the study.

3.5.9 Research participants and sampling strategy

This study used non-probabilistic, purposive sampling; a deliberately non-random sampling method [286]. This method was used to sample a group with particular characteristics and, in this study, allowed for the selection of participants with experience and knowledge about the use of EMMS [286, 287]. Participants needed to meet one of the following criteria: 1) nurses who used EMMS; or 2) staff directly involved in the implementation of EMMS in the study settings. I collected demographic information (Appendix 4) to capture variations such as years of experience and length of time working in the unit that might influence nurses' enactment, explanation and experience of workarounds.

The majority of participants in this study were nurses who use EMMS. They include nursing unit managers (NUM), clinical nurse educators (CNE), clinical nurse consultants (CNC), clinical nurse specialists (CNS), registered nurses who had more than one year's experience as a registered nurse (RN), registered nurses who had less than one year's experience as a registered nurse (NewGrad), and Enrolled Nurses who were endorsed to administer medications – Endorsed Enrolled Nurses (EEN). Novice and experienced nurses were included to capture how workarounds were passed on and to explore whether nursing experience influenced nurses' explanations and experience of workarounds. Permanent pool staff provided valuable insights into the culture and workaround practices in different wards. There were two nurses who declined to participate in the study. Later, one of those nurses approached me and asked if they could participate.

There were some participants who were interviewed (individual or focus group) because of their involvement in the implementation of the EMMS in the study hospitals. 'EMMS stakeholder' participants (N=7) were not nurses working in the participating units but were involved in the implementation and on-going support of the EMMS in their hospital settings. They were interviewed individually or collectively for their perspectives on the implementation and on-going use of the EMMS, and awareness of nurses' use of workarounds with the EMMS.

There were 60 nurses and four EMMS implementation stakeholders from Hospital A and 46 nurses and three EMMS implementation stakeholders from Hospital B who participated in this study. The majority of participants were full-time registered nurses with more than one year experience (Table 3.4). Most participants were interviewed, shadowed, or participated in a focus group rather than a combination of these activities.

Table 3.4: Participation numbers of nurses by unit, role and gender

Hospital	Unit	Registered Nurse (RN*) Employment Status (F/T; P/T; Casual)#		Neophyte Registered Nurse (NG_RN*)		EEN (Endorsed Enrolled Nurse)	
		Female	Male	Female	Male	Female	Male
A (N=60)	A1 (n=26)	12 (8 F/T; 2 P/T; 1 casual pool; 1 not specified)	5 (5 F/T)	2 (2 F/T)	2 (2 F/T)	3 (2 F/T; 1 P/T)	2 (2 P/T)

Hospital	Unit	Registered Nurse (RN*) Employment Status (F/T; P/T; Casual)#		Neophyte Registered Nurse (NG_RN*)		EEN (Endorsed Enrolled Nurse)	
		Female	Male	Female	Male	Female	Male
	A2 (n=20)	8 (6 F/T; 1 P/T; 1 Casual)	8 (1 Casual; 7 F/T)	1 (1 F/T)	1 (1 F/T)	0	2 (1 F/T; 1 P/T)
	A3 (n=14)	7 (7 F/T)	2 (2 F/T)	3 (3 F/T)	1 (1 F/T)	0	1 (1 F/T)
	B (N=46)						
	B1 (n= 15)	5 (2 P/T; 3 F/T)	5 (5 F/T)	4 (4 F/T)	0	1 (1 F/T)	0
	B2 (n=17)	11 (10 F/T; 1 P/T)	2 (2 F/T)	3 (3 F/T)	0	1 (1 P/T)	0
	B3 (n= 14)	8 (4 F/T; 4 P/T)	1 (1 F/T)	1 (1 F/T)	1 (1 F/T)	3 (3 P/T)	0

RN* – included Nursing Unit Manager (NUM), Clinical Nurse Consultant (CNC), CNE, CNS

RN_NG* – Neophyte nurse (newly graduated RN with less than one year experience post-graduation)

#F/T – Employed Full Time; P/T = Employed Part Time; Casual = Employed by the hospital on casual basis

Table 3.5: Highest qualification attained by participants using EMMS in practice

Hospital	Not specified	EEN cert	RN and or RM Cert	Degree	Grad Cert	Grad Dip	Masters
A	3 (RNs)	8	4	27	5	6	7
B	0	5	3	24	3	4	7

Table 3.6: Participants' years of experience in current unit (range, mean and median values)

Hospital	Unit	Registered Nurse (RN*)		Neophyte Registered Nurse (NG_RN*)		EEN (Endorsed Enrolled Nurse)	
		Mean (years)	Median (years)	Mean (weeks or months)	Median (weeks or months)	Mean (years)	Median (years)
		Range (years)		Range (months)		Range (years)	
A	A1	5.5	5	4.5 months	4.5 months	7.2	4

Hospital	Unit	Registered Nurse (RN*)		Neophyte Registered Nurse (NG_RN*)		EEN (Endorsed Enrolled Nurse)	
		Mean (years)	Median (years)	Mean (weeks or months)	Median (weeks or months)	Mean (years)	Median (years)
		Range (years)		Range (months)		Range (years)	
		1–21 years		3–6 months		2–22 years	
(N=60)	(n=26)	7	5	5 months	5 months	10.5	10.5
	A2 (n=20)	8 weeks – 25 years		4–6 months		10–11 years	
	A3 (n=14)	2.5	3	3.5 months	3.5 months	5	5
		8 weeks – 5 years		3–4 months		5 years	
	B1 (n= 15)	8	6.5	10 weeks	7 weeks	6	6
		2 months – 22 years		2 weeks – 8 months		6 years	
B (N=47)	B2 (n=17)	9	8	3 months	2 months	10	10
		1–30 years		2–6 months		10 years	
	B3 (n= 15)	9	7	2 months	2 months	4	4
		4–12 years		2 months		3–6 years	

3.5.9.1 Shift selection

With the exception of a small number of studies [e.g. 77, 232, 241], the majority of research on medication administration has been restricted to day and evening shifts on weekdays [3, 23, 80, 227]. To maximise variation and capture variables that might lead to differences, this study included morning, evening and night shifts, on both weekdays and weekends. Given the temporal influence, and inseparability, of medication work from nurses' other work [45], the study examined nurses' use of workarounds with EMMS in the context of nurses' work across a shift, and as much as possible; observation of nurses' work was conducted for complete shifts.

The selection of type and number of shifts across which observation occurred was informed by several considerations. First, as noted previously, nurses explained that workarounds, which were generally non-sanctioned practices, were potentially linked with organisational retribution. Therefore, it was considered important that observations were conducted on more than one, and if possible several, of each shift (morning, evening, or night), on each the unit, so as to minimise the potential for the participant to be identifiable. Second, observations were conducted, as much as possible, across a whole shift in order to: capture maximum variation; not miss patterns or particular periods when workarounds occurred; and be in a position to note factors that occurred

during any part of the shift that might have influenced nurses' use of workarounds with EMMS during medication administration. For some of these shifts, particularly night shift, observation frequently involved long periods of quietly observing the nurses doing paper work, writing notes, updating charts, intermittent conversations with their colleagues, and sporadic bursts of intense activity. On these shifts there were long periods when few field notes were taken. For other observed shifts the nurses were extremely busy all shift and numerous field notes were scribed.

3.5.10 Selecting data collection methods

3.5.10.1 Observation

Ethnographic field observation is an approach that allows study of a complex system, such as *in situ* use of an electronic medical record, from its socio-technical influences in the larger organisation down through problems at the computer interface level. [218:439]

Observation as a method of enquiry seeks to construct an understanding of what is occurring in a given setting. It has been employed in a range of studies and contexts [288] including the examination of medication administration [3, 4, 68, 78, 80, 81, 94, 128, 137, 289-291].

The purposes of the observational component of phase two were: 1) to observe whether or not the nurses used workarounds, and 2) the context within which nurses used (or did not use) workarounds. Because the use of workarounds is context dependent, direct observations were used to – “understand conditions and work processes surrounding workarounds” [133:e60]. This method negated the need to rely on nurses' memory of the situation within which they utilised workaround practices [290]. Observation has been shown to be both valid and reliable [292] and well accepted by nurses [293], which is important so as not to disturb their workflow and to avoid resistance to the research inquiry.

A comprehensive note-taking strategy was employed to collect observational data. Rather than focusing solely on predetermined events, such as immediate and visible workflow barriers to medication administration, observation of activities occurring in a given time or interview were systematically documented [294]. Omissions of expected events were also noted. In recording the mundane, the striking and omissions, I was able to explore the contrasts and make explicit why certain cases were considered salient [294]. I was aware that my nursing experience would influence what I thought interesting and what I took for granted. A list of areas to note, facilitated

my logging of events other than those implicitly considered noteworthy, I used Spradley's (1980) list of generalised 'concerns' to guide my note taking and recording of field observations [294, 295]. This list included: the physical space; the people involved; the physical objects; the single activities that people performed; the sets of related activities that people performed; the sequencing of activities over time; the goals of the activities; and the expressed feelings [294:78] (Appendix 5). Medication administration was observed in light of the developed process maps, for the respective sites, for 'gold standard' medication administration process.

3.5.10.2 Observation – non-shadow

The process of ethnographic observation has been described as a funnel with initial observation being relatively unfocussed moving to more focused observation as the researcher becomes more familiar with the setting and 'lay of the land' [295]. In this study, the purpose of observation that did not include shadowing a nurse was to focus on contextual factors to build a picture of the normative operating behaviours, assumptions, attitudes, interactions, and beliefs in the six study locations. This type of observation was used in the initial stages of data collection on each unit. I typically located myself near a nurses' station so that I could capture as much 'corridor' and nurses' station activity as possible. This allowed me to better understand 'how things are done around here' and provided opportunity for the nurses and other staff to get used to me being on the unit, to build rapport and to ask questions or provide information. Observation focused on individual and interactive behaviour, communication (verbal, non-verbal and written), handling of artefacts (the medication system, the notes, and equipment), rituals, use of symbols and symbolic behaviour, and personal and physical interaction. I checked with participants how they understood and explained observed activities, conversations and interactions. This was accomplished: when the participants asked me if I had any questions; during the shift, as close to the observations as possible, when it was not interrupting the participants' work; at the end of the shift; during interviews; or at the most opportune time when I next saw the participants. This was to assist the examination of how the nurses made sense of what they do. In so doing the process contributed to a description of the characteristics of each setting, events and reasons for behaviour from the perspective of the participants [296]. Most of the non-shadow observations were conducted for an entire shift. However, there were some shifts when this was not possible and part of a shift was observed. I observed (non-shadow) entire shifts or part thereof on 18 mornings, 11 evening and one night shift (Table 3.7). The duration of each shift for the nursing staff was eight hours (morning and evening shifts) to 10 hours (night shift). During that time, I took a short break from observation for at least 15 minutes approximately every two hours.

Observation time over a shift ranged between two and a half hours and seven and a half hours with an average of five and a half hours observation each shift (median = five and a half hours).

Table 3.7: Non-shadow observations by ward and number of shifts or part thereof

Unit	Morning Shift	Evening Shift	Night Shift	Total
A1	4	2	1*	7
A2	3	1*	0	4
A3	3	3	0	6
B1	3	2	0	5
B2	2	1*	0	3
B3	3	2	0	5
Total	18	11	1*	30

* (When coupled with shifts while shadow observations were conducted, n > 1)

3.5.10.3 Shadowing observation

I have differentiated *shadowing observation* from *non-shadowing observation* to identify shifts during which I shadowed a nurse, particularly as they conducted medication administration and medication-related work. The purpose of the shadowing observation component of the study aimed to identify the occurrence of workarounds in the medication administration process (or when workarounds did not occur), the contextual factors in which those workarounds were embedded and the ways in which nurses approached their own, and reacted to their colleagues', use of workarounds. Guidelines for organising and conducting observation of nurse interaction with the EMMS in this study have been informed by previous research [289] (Appendix 6). I shadowed the nurses during medication administration and for other activities that did not involve patient personal care. This included, for example, interactions with computers, ordering and replacing stock, discussions with other staff, and handover. I collected information on contextual factors such as the layout of the ward and the patient to staff ratio. I observed the patterns of activity over time and interaction and communication between staff. I observed the medication administration process, particularly observing the sequence of process steps and how nurses used the electronic medication management system. The 'gold standard' process map highlighted many variations in the medication administration process. Clarification of rationales for variations in the medication administration process were observed or sought from the participants to identify whether the behaviour matched the definition of a workaround used in this study.

Nurses that I observed were asked to pretend as much as possible that I was not there. Prior to observing medication administration activities, I reminded the participant that I was not observing the medication labels so was not checking for medication errors nor was I an additional check or safety net, rather that I was observing the steps of the medication administration process. A Serious Error Protocol, developed by Westbrook et al. (2010) [23] (Appendix 7) was employed if concerned that an error in the medication process had the potential to cause serious harm to the patient. There were no instances in which I was aware that this occurred during the study.

There were some shifts during which I did not observe the entire shift due to circumstances (for example, nurse availability for an interview). I shadowed nurses for entire shifts or part thereof on 26 morning, 24 evening and 11 night shifts (Table 3.8). The duration of each shift for the nursing staff was eight hours (morning and evening shifts) to 10 hours (night shift). For the most part, I timed my breaks from observation with when the nurses went on their breaks, or when they were attending to patients' personal cares. Observation time over a shift ranged between three hours and nine hours twenty minutes with an average of six and a half hours observation each shift (median = six hours fifty minutes).

Table 3.8: Shadow observations by ward and number of shifts or part thereof

Unit	Morning Shift	Evening Shift	Night Shift	Total
A1	4	4	1*	9
A2	5	6	2	13
A3	3	3	2	8
B1	4	4	2	10
B2	6	3	2	11
B3	4	4	2	10
Total	26	24	11	61

* (When coupled with shifts while non-shadow observations were conducted, $n > 1$)

Informal discussion about the way nurses used the EMMS in their daily work occurred when they had completed medication administration and were free to explain without interrupting their work. At times nurses whom I was not shadowing approached me offering insights and experiences in relation to EMMS use.

Individual and collective interviews were conducted through the data collection period (see next section). This enabled me to explore and clarify emerging themes, which then informed on-going observation. Continuing to be guided by Spradley's (1980) strategies (Appendix 5), data gained from the interviews allowed for the observations to be partially shaped by the nurses' perceptions

of what was important for them. For example, during initial observation in Hospital A, it became evident that the icon indicating that medications were overdue, an overdue medication alert (OMA), created an emotional response in those interacting with the EMMS. Interviews and focus groups provided the opportunity to explore these observed reactions and to guide subsequent observation. When I asked about variations in practice I generalised specific examples that I had observed – e.g. *“I notice that most of the time nurses take the laptop to the bed but sometimes they don’t. Are there things that happen or reasons why there is that variation? Is it sometimes more important to take the laptop to the bed than others?”*

3.5.10.4 Interviews and focus groups

Interviews and focus groups were conducted with participants to explore the inferred driving mental constructs behind, and meanings attributed to, their own and others’ medication administration behaviours, including workarounds. Participants’ perceptions of the nature of workarounds, factors that influence their development and maintenance, and their attitudes towards them were clarified. Interviews were employed to identify how individual nurses rationalise, perceive and experience their own and their colleagues’ use of workarounds. There were 45 nurses and one EMMS implementation stakeholder who were interviewed individually as a part of this study (Table 3.9)

Table 3.9: Interview participants by role

Ward	Role					
	NUM	CNE	CNC	RN	EEN	Total
A1	1	2	1	4	1	9
A2	1	1	1	8	1	12
A3	1	1	0	3	1	6
B1	1	2	0	4	1	8
B2	1	1	0	2	1	5
B3	1	1	0	2	1	5
Totals	6	8	2	23	6	45

* RN included neophyte registered nurses, senior registered nurses, and clinical nurse specialists

The collective explanation and experience of the use of workarounds were unearthed through focus group discussion. This method uses group interaction to facilitate generation of ideas [e.g. 297, 298] and explore perceptions not available in individual interviews [288, 299, 300]. There were six focus groups conducted during the study. The composition of each of the focus groups is provided in Table 3.10.

Table 3.10: Composition of focus groups (group interviews) by professional role

Focus group details		Participants professional role and numbers	
ID Number*	Number of participants	Role	Number of participants
ID 1	5	RN Neophyte RN	3 2
ID_2 – EMMS Implementation Stakeholders	2	RN Pharmacist	1 1
ID_3	4	RN Neophyte RN	2 2
ID_4	6	RN Neophyte RN EEN	4 1 1
ID_5 – EMMS Implementation Stakeholders	4	Clinical Information Systems Manager Clinical Information System Trainer and Support/Clinical Registered Nurse Clinical Information System Trainer and Support/Clinical Nurse Consultant	1 2 1
ID_6	3	RN EEN	2 1
ID_8	6	RN Neophyte RN EEN	4 1 1

* Focus groups were randomly assigned ID numbers between 1 and 10

These methods have been used in previous studies examining aspects of medication administration [3, 4, 76, 77, 81, 94, 128, 286, 301]. Interviews and focus groups were conducted onsite in participating hospitals, predominantly during times allocated for staff in-services and before shifts commenced or after shifts ended. Rooms that allowed for confidential discussion free from interruptions were selected. With the exception of two individual interviews, the individual and group interviews were digitally recorded to ensure that the views and related experiences of the participants were captured accurately. Recording the focus groups enabled me to focus on facilitating the interview rather than on writing notes. The interview and focus group questions were exploratory in nature (Appendices 8 and 9). Broad, open-ended and non-leading questions were employed to ameliorate any effect of my preconceived ideas [302] and to facilitate exploration of issues as they surfaced. Open-ended questions have been shown to

measure salient concerns of people [303] without dictating or suggesting what information should be included [304]. The interview began with a general line of inquiry and became more specific to workarounds and quality and safety as the interview progressed. The interviewer explored inductively responses that were key to the inquiry [305]. Non-verbal cues provided a picture of what was not verbalised but still communicated. Guidelines for organising and conducting focus groups in this study are outlined in Appendix 10. Interviews lasted between 15 and 89 minutes (mean=34 minutes; median=31 minutes). The duration of focus groups with nurses ranged between 37 and 51 minutes (mean=42 minutes; median=41 minutes). The mean duration of focus group discussions with EMMS implementation stakeholders was 97 minutes. Interviews with 44 participants were digitally recorded; two were hand scribed in real time. Interviews with 39 participants were transcribed verbatim from the digitally recorded interviews. Comprehensive targeted transcription was conducted from five of the digitally recorded interviews. Focus group interviews conducted in phase two were digitally recorded. There were six focus group interviews transcribed verbatim. Comprehensive targeted transcription was conducted from one of the digitally recorded focus group interviews.

3.6 Phase Three

The purpose of the third phase was to member check, via feedback sessions utilising focus group and individual discussion, that the emerging explanatory framework of workarounds was a reasonable explanatory framework for their lived experience and significance of workarounds [306]. Member checking involves taking the interpretations of the findings back to the participants so that they can confirm or disconfirm the interpretations. It is considered “the most crucial technique for establishing credibility” [307:314].

Sandelowski (1993) notes an on-going dilemma for qualitative researchers who seek to establish validity by assuming that validity rests on reliability or on repeatability. Informal concurrent member checking was used in this study not to demonstrate repeatability, or to check accuracy of recorded transcripts. Rather, Sandelowski’s description of concurrent member checking mirrors the process used in this study:

Researchers informally engage in member validation every time they seek clarification for or elaboration of meaning and intention from the people they interview or observe, or check out their evolving interpretations of the data they collect. [308:4]

That is, as I had thoughts and ideas throughout the data collection period, I asked what the nurses thought about them [306].

During this component, substantiation of the provisional explanatory framework of workarounds was ascertained. I presented my preliminary findings and provisional explanatory framework on workarounds at three group and one individual feedback sessions, the latter to a nurse who was identified as a key informant [309, 310], during phase two of the data collection. Participants were asked to provide feedback on the provisional findings and explanatory framework of workarounds. I took notes on their feedback and analysed them to assess the 'goodness of fit' of the developing explanatory framework. Participants were extremely positive that the provisional explanatory framework explained their experience of workarounds, with one of the nurses commenting, "*You've nailed it*". In light of the feedback from these sessions, I revisited the analysed themes and identified that 'knowledgeable and competent' categories of the 'good nurse' concept, were subsumed across the categories relating to the good nurse concept rather than as individual categories. The member-checking group sessions conducted in phase three were not digitally recorded; notes from these were hand scribed during the group sessions. The member-checking interview conducted in phase three was digitally recorded and transcribed.

3.6.1 The corpus of data

The corpus of data comprised: field notes from observational data collected on 91 shifts or part thereof; interviews with 46 participants (45 nurses and one EMMS implementation stakeholder); seven focus groups (five with nurses (n=5; 4; 6; 3; and 6) and two with EMMS implementation stakeholders (n=4; and 2)); notes from member-checking sessions (two group and one interview).

Table 3.11: Corpus of data

Data source	Activities
Observations	91 shifts or part thereof
Interviews	46 participants
Focus groups	7 focus groups
Member checking	3 (2 feedback focus group sessions and 1 interview)

3.6.2 Reflective journal

I included reflective comments in my field notes and made summary and reflection notes following a day of data collection activities. These included reflection on things I found puzzling,

interesting (and why I found them interesting), frustrating and surprising and how they contributed to my understanding of workarounds. I often recorded these reflections digitally, iPhone secured, while driving home following shifts of observation.

3.6.3 Data analysis

3.6.3.1 *The analysis approach*

The study employed the general inductive approach to qualitative data analysis [160]. This hybrid approach, consistent with that described by Rubin and Rubin (2005) [311] and Miles and Huberman (1994) [283], employed both inductive analysis, which “allows the theory to emerge from the data” [312:12] to develop a model or framework based on development of key themes and processes arising from the data, and deductive analysis, which framed the analysis against the research questions. That is:

Although the findings are influenced by the evaluation objectives or questions outlined by the researcher, the findings arise directly from the analysis of the raw data, not from a priori expectations or models. The evaluation objectives provide a focus or domain of relevance for conducting the analysis, not a set of expectations about specific findings. [160:239]

In keeping with a general inductive approach to analysis [160], this study employed an amalgam coding model, which blended “grounded” coding for themes and concepts that arise from the data, and “responsive formal coding,” which focused on coding for themes and concepts related to the research question rather than line by line coding [311]. Following is the operational approach to data analysis that I used.

3.6.3.2 *The analysis method*

3.6.3.2.1 *Step 1: Recon/surveying the lay of the land/initial thoughts*

I read through the transcripts and field notes, making notes on patterns, thoughts and ideas. The reflections I had made during data collection also informed my reading of the data. The transcribed interview data were uploaded in QSR NVIVO 10 software to assist with data management during the analysis process.

3.6.3.2.2 *Step 2: Defining codes*

Coding the data for workarounds

As the topic of the research was nurses' use of workarounds, I examined the data for behaviours that matched the definition of workarounds as practices that may differ from organisationally prescribed or intended procedures that were employed to circumvent a perceived or actual hindrance to achieving a goal or to achieve it more readily [113]. When detecting workarounds, it was necessary to compare observed or described behaviour with the ideal process (step by step), identify the goal of the behaviour and the perceived workflow hindrance. In most cases, the outcome of the entire process as well as each process step constituted a goal. For example, when administering medication, nurses must complete the 'five rights' of medication administration. This includes a formal identification check. The formal identification check is one step in the process to administer medication. Therefore, if the goal is the administration of the medication and the identification check is perceived to comprise a time barrier, not formally checking the patient's identification works around the time barrier so as to administer the medication more quickly. In this case, not checking the identification is the workaround. However, achieving a formal identification check may also constitute a goal. In that case, a workaround would circumvent a perceived barrier to achieve the goal of checking the identification. Therefore, the workaround would constitute an alternative way of checking the patient identification, such as using the bed number, or writing the patient's medical record number on a piece of paper. When considered as a discrete goal, each process step may attract different workarounds. Having coded for workarounds, I then examined the data for themes that helped me understand how nurses rationalise, perceive and experience the identified workarounds using the following approach.

Coding the data for other codes

Once a workaround was identified, relevant sections of the data transcripts were read through several times, and segments of text, and sometimes paragraphs, labelled to identify and define content-driven codes. The codes were developed by interrogating the data at a descriptive level; that is: what is happening here?; what is important?; what is going on?; what are people doing?; what is the person saying?; what do these actions and statements take for granted?; how do structure and context serve to support, maintain, impede or change these actions and statements? [313:38]; and what are the actions and interactions including movement, sequence, and change in response to changes in context or conditions [312:167] in light of the research questions? The process was iterative: as new codes were identified they were added to the coding scheme and the previously coded data revisited in light of the new codes. Multiple codes were appropriate for some sections of data. I found this phase to require immense discipline so

as to stay close to descriptions of the data and not infer meaning based on my knowledge of the rest of the data set. In addition to the interview data, I was intimately familiar with the observational data, had been immersed in the field and had engaged in on-going reflection and discussion throughout the data collection and transcription process. I talked through coding examples with members of the research team and an expert in coding qualitative data and the use of the NVIVO software. Examples of code definitions used during this stage of coding are provided in Appendix 11.

3.6.3.2.3 Step 3: Revise and iteratively refine

I grouped sections of text that seemed to be 'about the same thing' (themes) in relation to workarounds. Having identified that some themes fitted together to form patterns, or categories, I explored how they were related to each other and ultimately how I could interpret them in light of my research questions. While coding, I used the Annotation feature of NVIVO to note insights, reflections and potential relationships with other themes. These annotations were useful when forming categories and developing more abstract concepts and contributed to an audit trail (sample from one code provided in Appendix 12). The relationship between categories and concepts has been described as a reciprocal one. Concepts arise from categories that they define and category members "exemplify or illustrate the concepts that unite them into a category" [314:119]. When developing concepts, I tested the category members to assess whether they illustrated the concept. If they did not, the category was narrowed so as to achieve a better match with the concept. Alternatively, categories may have expanded and blended with other categories. For example, 'being a team nurse' and 'being trustworthy' were categories that merged to illustrate the good nurse concept. Mind mapping was helpful at this point to analyse how categories might be conceptually related (Appendices 13 and 14).

Once the interview data were coded for themes, and categories identified, I adopted a more focused approach. At this point, I coded the observational field notes and focus-group data for categories that had been identified in the interviews. The purpose of this process was to question, 'thicken' and build a better understanding of the concepts. I also stayed open for new categories. I used an Excel spreadsheet, with each of the categories allocated a column. An additional column titled "other" was included, in which to locate new ideas that did not fit into the current system of coding.

3.7 Phase Four

The study was not set up to examine nurses' use of workarounds using predefined theoretical constructs. The purpose of phase four was to present a higher level of abstraction of the results, to move beyond pure description of the data and allow "interpretation of the social processes underpinning the findings" [274:7] through interpretation and theoretical explanation of the emergent study findings using existent theory. This approach aligns with that adopted by other qualitative studies in which results have been interpreted using theoretical constructs selected after the data has been collected and analysed, rather than before [166]. This approach is consistent with Charles Peirce's (1958) process of abduction, a process during which a concept is offered that is capable of explaining the empirical data, as a step toward offering a satisfying explanation or theory [167].

When it became evident that Bourdieu's field theory offered relevant and useful constructs with which to interpret the emergent study findings and explanatory framework of nurses' use of workarounds with EMMS, I returned to examine the healthcare literature for studies that offered illustrative examples of how Bourdieu's theoretical constructs have been used to explain nursing practice. In one case study, for example, Petit-dit-Dariel and colleagues (in press Sept 2014), used Bourdieu's theory of practice to explain nurse educators' responses and motivations to use information and communication technologies (ICT) in a university setting [315]. While Bourdieu's work has also been drawn on to explain interactions between power and nursing practices [316-318], professional development and competence [319, 320], and nursing-student experience [321, 322], it has not been used to explain nurses' use of workarounds.

The applicability of Bourdieu's field theory in interpreting the inductively developed explanatory framework for nurses' use of workarounds was an emergent finding following data collection and analysis. Therefore, background information on, and justification for, the use of Bourdieu's theoretical constructs relevant to the interpretation of the findings of this study will be provided in the Discussion chapter (Chapter 10).

3.8 Validity and verification

Qualitative researchers choose from a variety of methods to ensure the validity of their data and inferences drawn from them so as to demonstrate the credibility of their studies. Concepts of credibility, dependability and transferability describing aspects of trustworthiness of research

findings are intertwined and interrelated [323]. While there are multiple perspectives on, and terms used in relation to, determining and ensuring validity in qualitative research, there is a general consensus that researchers need to demonstrate the credibility of their inquiry. A variety of procedures are commonly used to establish validity in qualitative studies [324]. The methods chosen are determined by the lens or viewpoint used by the researcher to establish validity (lens of the researcher, the participants in the study, or external reviewers) and the researcher's paradigm assumptions (post-positivist, constructivist, or critical) [324].

Senge et al.'s (1994) ladder of inference [325] explains that while we pay attention to some information, we ignore other information. Our mental models influence the information we select, the way in which we interpret it and the conclusions that we draw from it. Validity strategies that I have adopted in this research helped me to be aware of my mental models, and to examine how they influenced the inferences and conclusions I drew from the data. These methods included reflexivity, peer debriefing, searching for disconfirming evidence, and triangulation (lens of the researcher) [324]. I also used a variety of other strategies to establish the credibility of my research, including clear exposition of methods of data collection and analysis, audit trail and peer review (lens of people external to the study); and prolonged engagement, persistent observation and member checking (lens of the study participants) [324].

There is no reason to believe that the findings are isolated to these research participants, particularly given efforts to capture maximum variation. However, the language used to report the findings attempts to consistently reflect that generalisability cannot be assumed. For example, "participants in this study described Z". Broad statements like "nurses identify Z", should be interpreted as "nurses interviewed in this study identified Z".

The study did not attempt to capture participants' private thoughts and does not claim to interpret their motivations. I have tried as much as possible to be clear that I am reporting what nurses articulated or patterns of behaviour that were captured in the time and context of the study. Therefore, I have chosen to use statements such as "participants reported that it was important to be Y" rather than participants thought X or felt Y. When social and contextual factors that are relevant to constructing an explanation of nurses' explanation or experience of workarounds were visible, I described these across the different contexts.

3.8.1 Reflexivity

To increase the integrity and trustworthiness of qualitative research, researchers need to evaluate the potential effect of their own attitudes, experiences, expectations and role as researchers on data collection and analysis [326:351]. Reflexivity is “an attitude of attending systematically to the context of knowledge construction, especially to the effect of the researcher, at every step of the research process” [327:484]. Reflexivity involves identifying motives, experiences, perspectives and beliefs and the influence of those on all aspects of the research process.

As identified in the Prologue, my motive to undertake this research was to understand why nurses used workarounds given their potential to lead to medication errors. Aware that my view of workarounds was likely to lean towards being negative, I took active steps to ameliorate and document the potential effect of that attitude on the research process. At times, particularly in the initial stages of data collection, I felt uncomfortable recording workarounds. I quickly became aware of my umbilical tie to the nursing profession and the accompanying desire to keep ‘secret nurses’ business’ secret, to not report workarounds that circumvented policies. There were several strategies that I engaged to address these issues. On-going reflection, journalling and peer debriefing helped me become aware of my mental models. I made note that I was feeling uncomfortable. As the data collection and on-going analysis progressed, my attitude to recording nurses’ use of workarounds changed. Concurrent reflection and debriefing with my supervisors and colleagues helped me to question my assumptions and acknowledge their role during the analysis and write up phases of the study.

3.8.2 Triangulation

The goal of triangulation is to capture different aspects of the subject of enquiry, to examine it from different perspectives [328]. Methods of triangulation include data, investigator, theory, methodological and environmental [328]. In this study, I used methodological (observation, interview and focus-group methods) and environmental triangulation (different hospitals, units, days of the week and shifts). According to Patton (2002), rather than weaken the evidence, inconsistencies identified by triangulation afford opportunity to develop a richer, deeper understanding of workarounds [329].

3.8.3 Clear exposition of methods of data collection and analysis and disconfirming evidence

I have clearly articulated the methods used to collect and analyse data so that the process and my contribution as the research tool is transparent. When analysing the data, I specifically looked for evidence in the data that confirmed or disconfirmed the developing themes, categories and concepts. Disconfirming evidence “provides further support of the account’s credibility because reality, according to constructivists, is multiple and complex” [324:127]. Disconfirming evidence is presented in the findings chapters.

3.8.4 Peer debriefing and review

Formal annual PhD progress meetings during the period of PhD candidature provided opportunities for experts familiar with the research process and topic to review the study. The methodology and emerging findings were subjected to peer review: presented at conferences and meetings, and included in academic publications.

3.8.5 Rich, thick description

Much ethnographic research provides detailed descriptions of the setting [e.g. 330]. I have provided as much detail as possible to prove credibility. I have used rich, thick description [324] to provide many perspectives and examples to illustrate the conceptual findings on workarounds.

3.8.6 Prolonged engagement and persistent observation

Prolonged engagement in the field and persistent observation enabled participants to become familiar with my presence such that I could ‘fade into the background’. As they became more used to my being there, nurses were less likely to change their activities, including workarounds, as a result of my presence. Prolonged engagement also enabled me to engage and give voice to those participants who were shy and therefore less likely to be heard had I restricted my time *in situ*. Time to reflect on interview and observational data in real time and to observe for contradictory instances allowed me to develop an in-depth understanding of nurses’ workarounds [324].

3.8.7 Member checking

Member checking comprised phase three of the study. Member checking [307] via feedback sessions utilising focus group and individual discussion was used to assess the goodness of fit of the developing explanatory framework of workarounds.

3.9 Ethics

3.9.1 Ethics approval

Ethics approval was granted by a Lead Human Research Ethics Committee (HREC) (HREC/10/XXX/116) with site-specific ethics approvals gained from the Research Office at each of the participating hospitals. The University of New South Wales HREC was a ratifying HREC. On-going discussions with supervisors and colleagues were used to keep me alert for potential ethical issues throughout the study. I structure this section addressing key ethical considerations in conducting this research using the framework of presentation offered by Goodwin (2006) [331].

3.9.2 Anonymity

Difficulties maintaining anonymity when conducting qualitative research have been identified [332]. Data were analysed and reported at a collective rather than individual level. In this study, the following strategies were used to promote anonymity. The hospitals and wards were given pseudonyms and were not referred to by name beyond supervision and research team meetings. When reporting the research, citations of hospital specific policies have not been included, and identifying information on HREC approval and study documentation has been obscured. When participants enquired, I explained that I was not able to reveal the names of the other units or hospitals participating in the study. Including more than one setting, several units from each setting and numerous nurses from each unit in the study across different shifts and days of the week was used to help mask "the identity of the individuals who generated the data" [331:55]. When collecting data, participants' names were not used in field notes. They were differentiated using randomly allocated numbers between one and 200. The order of the allocated number did not reflect the order of data collection. Dates were removed from all collected data. Interviews were de-identified during transcription and the audio files deleted once transcribed. The title of the participant is not included in illustrative data excerpts and quotes that used unusual terminology that might identify an individual were not included. Quotes that were representative, rather than unusual, were used for illustrative purposes.

3.9.2.1 Editing raw data and assigning gender when reporting findings

I have minimally edited raw data to remove identifying features such as names, times and dates. I have also used synonyms for words that were particular to individuals, thereby linking the data to them. (An example would be that 'some folk' would be changed to 'some people'.) I have removed filler words such as 'um', 'ah', 'mm' that do not add meaning to the content. Italics are used to denote participants' speech. Quotes recorded by hand in field notes during observations are enclosed in single quotation marks (' ') to identify that while accurate, at times they may not be absolutely verbatim. I have randomly assigned identification numbers to focus groups, interviews, observation and participants, and randomly assigned gender to the participants in this thesis to minimise the chance that they will be identifiable.

3.9.3 Confidentiality

In qualitative research there is a risk of conflating confidentiality and anonymity, and researchers are urged to be clear with participants about the types of outputs expected from the study [331]. This information was included in the Participant Information Statement (PIS) and explained at the time of consent. I explained that while data would be de-identified, illustrative quotes might be included verbatim. I also reminded participants regularly during each period of observation that I was collecting data. My nursing background equipped me for dealing with confidential information. Informal discussion during breaks and overheard confidential conversations were not included in the data or discussed. Data were stored securely and de-identified.

3.9.4 Informed consent

Several information sessions were held prior to commencing data collection on each unit. These were held after or before group handover at shift change to maximise the number of staff I presented to. All participants were taken through the PIS and consented to participate (Appendix 16). They were given a copy of the PIS and signed consent form to keep. I confirmed before commencing focus groups, interviews and observations that the participants had been taken through the PIS. I regularly re-established consent with participants [333]. Prior to observations, I reconfirmed, "*Are you sure you are happy to have me watch you work and make notes?*" and at regular intervals during observation offered the option to stop to participants, saying, "*I am happy to stop observing if this no longer suits you?*" It was also imperative that I was observant for verbal and nonverbal cues that may indicate that the nurse being observed was becoming uncomfortable about being observed. There were two nurses who initially indicated that they did

not want to participate. One later approached me and asked if they could join the study. This individual was taken through the consent process. No data were collected from the other nurse.

3.9.5 Ethical practice

Ethical practice is a process that requires on-going negotiation, reflection and assessment of the context as the research unfolds [331]. The unpredictability of clinical work meant that I needed to ensure that interviews and focus groups were conducted at times that were least intrusive, for example during times set aside for staff in-services, before a shift started or after it finished. Accessing 'the field' was conducted in a respectful manner (Appendices 5 and 11) and I visibly valued the participants' time and input. The requirement to follow a 'Serious Error Protocol' has been discussed previously. As with other studies, there was minimal observer interaction with the patient and I observed nurses administering medications to patients contingent on the patients' verbal consent after either the nurse or I had explained my presence to them [4, 8]. The focus of the observation was the nurses' behaviour, not that of the patient. I did not observe medication administrations in situations that might compromise patients' privacy [8:126] and if isolated, I did not enter the room, observing medication administration rather, where possible, from outside the room.

3.10 Examples of nurses' workarounds observed and described in this study

When detecting workarounds, it was necessary to compare observed or described behaviour with the ideal process (step by step), and identify the goal of the behaviour and the perceived workflow hindrance. In most cases, the outcome of the entire process as well as each process step constituted a goal. When considered as a discrete goal, each process step potentially attracted different workarounds.

Workarounds were employed when using EMMS to administer medication (thus addressing Research Question 1). These workarounds were potentially used alone or in combination with other workarounds. This resulted in what initially appeared to be considerable variability in the workarounds. However, patterns emerged in the combinations of workarounds that could be understood through nurses' enactment, explanations and experiences of workarounds and will be presented in the six findings chapters.

The variation in the observed workarounds can be captured by combining each of these described process step workarounds with none, one or multiple combinations of the other process step

workarounds. The workarounds presented in Tables 3.12 are not an exhaustive list of all workarounds observed in this study. They are not offered as an audit or for the purposes of categorisation. Rather, they are provided as illustrative examples of observed workarounds, combinations of which inform the following six findings chapters.

Table 3.12: Examples of observed workarounds

The way EMMS was intended to be used	Observed workarounds
Responsive eMAR (on the COW) taken to the bedside to enable the 5/6Rs when administering medication	The eMAR was accessed via the COW left in the corridor or on the desktop computer when preparing, checking and administering medication
	The bedside medication drawer was taken to the COW shelf when the COW was parked in the corridor
	The medications for administration were memorised without eMAR at bedside
	Medications were administered from a printed record of the eMAR and signed off in the eMAR before or after administration
<i>Related secondary workarounds when the COW was not taken to the bedside [these workarounds were also potentially primary workarounds depending on the goal of the workaround]</i>	Workarounds used to confirm patient identification: patient identification details were memorised, physical markers such as bed numbers or patient names written on Alco wipes or the bottom of kidney dishes additive labels or pieces of paper put in the medication cups or kidney dishes, the patient sticker in the bedside folder used to cross check the information on the patient's identification band, familiarity with the patient and the patient response to being addressed by name was used as a form of identification check
	Patient allergy information was memorised
	The medications for administration were memorised without eMAR at bedside
	Medications were administered using a printout of the eMAR
eMAR signed off at time of administration	The medication was signed off prior to administration

	The medication was administered prior to it being 'available for administration' in the eMAR and signed off later when it became available in the eMAR
<i>Related secondary workarounds when the medications were signed off prior to administration</i>	Informal communication with colleagues about medication administration
	Medication administration history checked in the eMAR at the point of medication administration at bedside
	Medication was administered before it became 'available for administration' in the EMMS and signed off in the EMMS when it later became 'available for administration'
<i>Related secondary workarounds when the medications were administered early</i>	Doctors entered STAT medication orders when the nurse could not override the prescribed time for a daily medication
	Informal communication with colleagues about medication administration
The overdue medication alert used to highlight when a medication was late	Medications were 'delayed' in the eMAR to remove the visible overdue medication alert (OMA) if they were more than one hour overdue
Each patient's medications are prepared and administered individually	Medications prepared for more than one patient at a time ('batching')
<i>Related secondary workarounds when the medications were prepared for more than one patient at a time</i>	Physical markers such as bed numbers or patient names written on Alco wipes, the bottom of kidney dishes, additive labels or pieces of paper put in the medication cups or kidney dishes
	Second medication cup was put on top of first medication cup to minimise the risk that the medications would fall and become mixed up with those of another patient

Two nurses required to check the 5/6Rs at the bedside together and witness administration of certain medications and eMAR signed at the time of administration	The nurse who administered the medication was not accompanied to the bedside and medication was signed as administered by both the checking and administering nurse at the preparation and checking step of the medication administration process
'Checking' nurse required to check the medication against the eMAR	The medication was checked without the eMAR by relying on familiarity with the patient or their trust of the administering nurse
The administering nurse should be logged into the eMAR	The nurse recorded as the checking or witnessing nurse in the eMAR administered the medication
Some medications could be nurse-initiated using the EMMS when required	Doctors entered STAT medication orders in the eMAR when the nurse did not know how to nurse-initiate the medication in the eMAR
Medications should only be administered from unexpired prescription orders	Medications administered from an active electronic order that was believed to have legally expired
Single patient eMAR open at a time	Nurses opened multiple eMARS at a time (Hospital B)
Medications administered should be dispensed by the hospital pharmacy and stored in patient's locked bedside medication drawer (Not applicable for DD medications, medications for injection and medications requiring refrigeration)	Nurses 'borrowed' medication from the patient's home stock or from other patients or units
Medications only stored in medication room or	Medications stored on the COW shelves, nurses' station drawers and nurses' pockets

locked bedside drawers	
Medications administered only by nurses endorsed to do so	Medications were given to AINs or relatives, or left on the bedside locker

3.11 Conclusion

In this chapter, I provided the rationale for this ethnographic study examining nurses' enactment, explanation and experience of workarounds with EMMS in two Australian hospitals. The context for the study, the data collection and analysis methods as well as the methods to promote validity and ethical rigour have been explained. In the following six chapters, I will present the findings of this study.

The findings chapters present nurses' enactment, explanations and experiences of using workarounds. The first four findings chapters outline nurses' use of EMMS workarounds to enact, or to be perceived to enact, good nurse characteristics: time efficient (Chapter 4); safe (Chapter 5); patient-centred (Chapter 6); and a team player (Chapter 7). In these chapters, I elucidate the nursing characteristic that is the focus of the chapter, the good nurse characteristic, and how the characteristic was constructed and reinforced to be important for nurses in this study. The ways in which the EMMS supported and created barriers to achieving the good nurse characteristic are presented. Nurses' use of workarounds to achieve, or to be perceived to achieve, the good nurse characteristic are then described.

The structure of the final two findings chapters differs from the first four findings chapters. The fifth findings chapter (Chapter 8) offers reasons other than to be, or to be perceived to be, a good nurse as drivers for nurses use of workarounds with EMMS. The final findings chapter (Chapter 9) outlines 'moderating motivations' that influenced whether or not nurses chose to use workarounds, nurses' experiences of using workarounds and factors influencing the propagation of workarounds.

Chapter 4 Being a time efficient nurse

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4.1 Introduction

To understand whether and why nurses may use workarounds (Research Questions 1 and 2), we need to understand the potential goal of the workarounds. The importance of the goal is situated within local rationality. This rationality is collectively and individually constructed and reinforced through various mechanisms. Why and how achievement of the goal is reinforced as important and how the EMMS supported and challenged nurses achieving that goal are discussed. Therefore, Chapters 4, 5, 6 and 7 begin by explaining the priority placed on a broader nursing goal before detailing how nurses' use of workarounds helps them to enact these goals.

This findings chapter (Chapter 4) presents the importance of achieving the goal of being, or being perceived to be, time efficient (Sections 4.2 and 4.3). The mechanisms by which the importance of being time efficient is reinforced are described in Section 4.4. The ways in which the EMMS supported and challenged nurses achieving, or being perceived to achieve, the goal of time efficiency is explained in Section 4.5. In Section 4.6, I present how nurses enact and explain their use of workarounds to achieve the goal of being, or being perceived to be, time efficient. In doing so, this chapter addresses Research Question 1 (Do nurses employ workarounds when using EMMS in an Australian setting?) and Research Question 2 (How do nurses enact, experience and explain their use of workarounds?).

Time-efficient nurses were described as those who managed time pressures to complete work in a timely manner so as to efficiently and effectively deliver patient care. They were 'prepared' for unexpected events and did not routinely leave tasks for their colleagues to complete. The impetus to use a workaround as a mechanism for being, or being perceived to be, time-efficient was linked to a range of factors, including: how time structured nurses' work; the pressure to complete nursing tasks within a given time frame; and the link between being time-efficient and being a 'good nurse'. The chapter highlights a disconnect between the ideal clinical world and the everyday experience of using EMMS in relation to time. This chapter therefore exposes how the importance of managing time, or being seen to manage time, was linked with the development and proliferation of workarounds.

4.2 The importance of time at the clinical coalface

The passing of time on the hospital wards I observed was marked by an unrelenting flow of people, materials and care processes. This included meal trolleys, blood trolleys, observation rounds, doctors' rounds, medication-administration rounds, visiting hours and shift changes.

Although hospitals operated 24 hours a day, services were not equally accessible across a 24-hour time span or seven days a week. Pharmacy, occupational therapy, speech therapy, physiotherapy, the kitchen and rehabilitation gymnasiums operated in a limited time frame. Patient showers, daily dressings, rehabilitation activities, ward rounds, venepuncture rounds, operations and 'tests' predominantly occurred in the morning. Quality and safety initiatives, such as 'Home for Brunch'³, aimed to discharge patients early and transfers of most non-urgent patients between healthcare facilities were scheduled in the morning. Within any 24 hour period, there were predictable cycles in the number and type of staff rostered to work on the wards. An increased number of nurses in the unit signalled shift change. Shift times were non-negotiable, although I regularly observed nurses leaving well after the official time a shift ended. Nursing handover began promptly and participants frequently described the importance of timely handover. When handover started late, nurses explained that they ran behind time from the beginning of the shift. Negative comments made about the previous shift when handover started late or went on too long sent an unspoken message about the importance of handover beginning on time and being kept to an 'appropriate length'.

I observed a routine to the business of nursing, a rhythm and a pattern of work that was known, understood and shared by the nurses and by the patients experiencing longer hospital stays. Meal breaks also operated to structure nurses' work. The imperative to take 'tea' breaks to meet nurses' physiological needs was balanced with the pressure to complete tasks and the need to find a colleague to 'cover' patients during their break. Nurses made decisions about whether to complete tasks before or after they 'went for a break', depending on patients' needs. Often they needed to schedule tasks requiring another nurse, such as a medication witness, according to meal breaks. The latter was particularly pertinent to a patient-allocation model of nursing care.

³ Quality and Safety Initiative at Hospital A that aimed to discharge patients in the morning rather than the afternoon or evening

The two nurses discuss the order of tea breaks and the timing. Nurse_25 looks at the EMMS to see whether she has any medications due at 6 o'clock. She asks the other nurse if she wants to go at 5 because she only has one IV [intravenous] medication and a nebulizer due then. The dinner breaks have been organised according to the medication times. (Field Notes: Observation_25_PM)

The pressure of time for nurses was particularly emphasised by two persistent types of comments made across units and hospital settings. The first was the repeated emphasis on the benefit of saving seconds and minutes.

I guess every second you save becomes minutes and becomes hours, so maybe you tend to do more things than before and faster. (Interview: Nurse_40)

I suppose the minutes you take soon add up. (Interview: Nurse_73)

The second type of comments articulated relief when nurses had time to finally go to the toilet. There were multiple times when I heard the nurses say they were 'busting to go'. This contrasted with the usual office conversation that I was used to.

When she tries to co-sign in the EMMS, the computer freezes because someone else has logged in and opened the patient eMAR – the two nurses work out who it is and go to see them. Once she has been able to sign the medication off in the eMAR Nurse_103 exclaims: 'And now finally I get to go to the toilet'. (Field Notes: Observation_103_PM)

The emergency team has been on the ward attending to a patient who is very sick. One of the nurses caring for the patient has been caught up helping the team:

17:54 – ... one of the nurses briskly walks past me - 'I have been holding on for the last 30 min – I gotta go to the toilet!!!' (Field Notes: Observation_104_PM)

4.3 The pressure to be time efficient

For most nurses, time represented the major challenge to their professionalism. Nurses frequently articulated a concern about being 'behind time' and not managing or not being perceived to manage time well enough to deliver patient care efficiently. This concern was confirmed with observational data.

Nurses described a tension between 'nursing as a 24 hour job', and the evident expectations and pressure that particular tasks be completed within sanctioned time frames. Ubiquitous indicators of organisational mandates to complete tasks within a prescribed time included unit corridor lights that turned off automatically at 21:00 and on again at 06:00, reinforcing the importance the organisation placed on good time management – nursing cares should be completed and patients settled for the night by 21:00. The nurses themselves informally sanctioned an expectation that nurses complete tasks within a given time frame. The informal peer pressure for nurses to complete shift-associated tasks was captured in the following interview discussion, in which the participant, describing the importance of good time management for nurses, explained the importance of completion of shift-associated tasks and the link between not doing so and developing a reputation for being 'lazy'.

There are particular tasks that are associated with a shift: showers in the morning, central line dressings, wound care and all that sort of stuff ... I say as a joke that it is a 24-hour shift but I know – I watch how the different levels of nursing – the very seniors and how they perform and they have got all of their tasks done for the day, and I know that if some of those more junior members of staff don't complete all of their tasks, it's not necessarily talked about but there is this undercurrent that begins about 'they are a bit lazy, they are a bit slow'. (Interview: Nurse_50)

4.3.1 Pressure to administer medications on time

Participants described the importance of managing time well for their patients' benefit in several ways. Some medications, such as insulin, were time critical and could not be given late. Both the need to adhere to the doctors' orders and clinical needs created pressure to administer the medications within a given time frame.

I think as far as the task is concerned, they see it as important and it needs to be done [on time] because it's driven two ways. One, it's a prescription that needs to be administered at, for example, eight o'clock but also the clinical need as well. Anyone that might be diabetic and so on so, those things need to be addressed at the right time and generally that's meal times. So we've got the hospital timetable into which we've got to fit so it's driven somewhat, not just as a mind-set but also within the hospital timetable. So the breakfast arrives, the patients know they're to have their insulin at mealtime and so on. (Interview: Nurse_36)

Other medications needed to be administered within an hour of the prescribed time to ensure therapeutic drug levels were maintained, or that timed blood tests accurately accounted for medication administered. Juggling and balancing the timing of administration of multiple intravenous medications, some of which were incompatible with each other, with concurrent infusion of blood products created additional pressure to be time efficient with medication administration.

4.3.1.1 *Ripple effect of delayed medications for patients*

Some medications did not need to be administered at a particular time for clinical reasons, but delayed administration could still have indirect, ripple, effects on patient care. Participants explained that if they were behind with the medications, other clinical tasks would be delayed and patients may then miss, for example, tests or rehabilitation programs. Missed rehabilitation sessions impacted how the patient felt for the day and how soon they could be discharged. Alternatively, as is illustrated in the observational excerpt below, patients collected for appointments may have missed medications if the medication round was delayed:

07:55 – Having just administered insulin to the patient in bed 9, Nurse_111 is summoned by a ‘help’ to the patient in the next room (bed 7) who needs to go to the toilet. Leaving the COW parked near bed 9, the nurse ‘runs’ to get the portable oxygen and commode chair, and takes both to bed 7. She quickly changes the source of oxygen from the wall oxygen outlet to the portable oxygen cylinder, transfers the patient to the commode chair, secures the portable oxygen cylinder, and pushes the patient on the commode to the toilet. The buzzer still rings, another chimes in. Nurse_111 leaves the patient in the toilet and walks briskly to bed 5 to answer the buzzer – pulls the curtain. The person in the bathroom (bed 7) calls out – nurse calls back ‘hang on a minute, coming’. Pulls back the curtains around patient 5’s bed, takes off the gloves and washes her hands – calls out to patient 7, asking if she is OK as she goes to bed 6 – semi runs to the pan room, returns with a vomit bowl, passes it to the patient in bed 6 and then goes to the bathroom to get the patient from bed 7. She pushes the commode chair to bed 7, the commode chair seems to be taking some effort to push, helps the patient off the commode chair and sits the patient from bed 7 in a chair next to the bed, gives her some water and helps her as she drinks it. The COW remains logged in next to bed 9, the medications have been administered but not confirmed in the eMAR – she explains later that she

left the COW in the room as a signal to her team members that she was doing the medications in that room. She returns to the COW, groans that the patient in bed 10 has left for the dental appointment without having been given her meds, clicks on the meds she gave to Bed 9 earlier – enters BGL and types the name of the nurse who checked the insulin in the comment section – refreshes the screen. (Field Notes: Observation_111_AM)

4.4 The relationship between time efficiency and being a good nurse

The importance nurses placed upon being 'time efficient' and how that was constructed as a characteristic of a good nurse was also coupled with the perception of being able to 'manage'. Nurses explained that not coping with their designated workload was construed as 'failure'. Being a good nurse was not isolated to nursing, it was also linked with being a good person. This link, illustrated in the following excerpt, underscores the importance nurses in this study placed on being, or being perceived to be, time efficient – and therefore a good nurse.

10:00 – At the nurses' station, Nurse_53 talks with me about why she thinks nurses are unlikely to ask for help. She explains that nurses shame each other into doing certain things. Nurses in the wards know that they will be talked about if they want more staff because things take time. She tells me that other nurses say 'she can't cope' and that this message is what nurses try to avoid. 'If we can't cope, as a nurse we have failed.' Nurse_53 explains that there is a pressure not to look like you can't cope and she rationalises that nurses will cut corners and develop shortcuts so that they look like they can cope – they can get their work done and be efficient and be a good nurse. She says that they judge each other if they jump up and down about things even if it is for the benefit of the patient. She offers examples like pushing that they need a 'Special'⁴ because the patient will fall or that they need more staff. If the nurse won't take no for an answer, he or she gets a reputation around the traps as a troublemaker and then they say, 'RN X is on, she can't cope, so she needs a 'Special''. They also use manipulation ... 'and butter you up so you feel like you can't say no'. As a result, nurses take shortcuts or cut corners to get it all done because,

⁴ Nursing assistants were hired from agencies, to observe and assist for a shift for one or two patients who had been assessed to be at a high risk of falling.

she says, in reality the expectations are unrealistic. 'You have to or you can't get it all done.' Nurse_50 contributes to the conversation and says of nurses: 'If you criticise our practice, we feel you are criticising us personally'. (Field Notes: Observation_50_AM)

A number of participants emphasised that a 'good' nurse was time efficient or had good time management, and they linked efficiency to being diligent. In the first of the following excerpts, the first characteristic Nurse_39 uses to describe a 'good' nurse is to be on time. In the second excerpt from observational field notes, the nurse is described as 'good' in relation to having achieved tasks and completing patient cares. In the final excerpt the nurse reminisces on the old school, linking good nursing care and time management.

A good nurse, you're on time, you're consistent, you take time to read your instructions, you give your drugs properly, you know what they're for. Well, at least have an idea of what they're for and, if not, you know where to look up. But it's okay if you don't know because then you can just ask someone else. Also having the confidence to ask someone would probably make a good nurse. (Interview: Nurse_39)

*16:40 – When one of the new grads left the ward having completed a morning shift, the exchange between the staff included comments like: 'he was really **good** today, he organised the discharges, contacted the nursing home and completed patient cares'. (Field Notes: Observation_80_PM)*

In a nostalgic but definite tone an older nurse states simply that 'the old school teaches good nursing care and time management.' (Field Notes: Observation_101_AM)

An efficient nurse was described as being one who managed time well, juggled competing demands and completed all of their nursing care tasks on time. Descriptions about accomplishing tasks in a timely manner were often interspersed with positive terms such as “organised”, “good”, “experienced”, “competent” and having time-management “skills”. In addition, good nurses were depicted as able to reorganise their time when interrupted and not respond negatively to time pressure.

But she won't actually forget what she is doing, I don't know how she does it – she is just a super-nurse, she knows what she is doing and she can readjust her time.
(Interview: Nurse_06)

For the most part, therefore, being an efficient nurse was demonstrated by completing work within specified timeframes; making time to manage the unexpected; and not handing on tasks to the next shift. The last will be explored further in the chapter about being a team player.

4.4.1 Reinforcing the importance of being time-efficient

The importance of being time-efficient to being a good nurse was reinforced in both formal and informal ways. Formal reinforcement strategies included performance management programs for 'struggling' nurses that focused on improving time-management skills. One aspect of performance assessment involved demonstration of development of these skills. One monitoring method used was the Overdue Medication Alert (OMA) feature of the EMMS (red clock or red box symbols) that highlighted when medications were late. The implementation of an EMMS with restricted time frames during which medications were 'available for administration' offered organisational reinforcement of the importance of timely medication administration.

There were processes in place to support neophyte nurses as they learned to manage their time. As neophyte nurses demonstrated that they were managing their time better, they were monitored less by senior staff. In one of the units, exhibiting time management was rewarded with increased responsibility for additional tasks, including medication administration.

4.4.2 Nurses judged their own practices in terms of time efficiency

Mostly participants noted that nurses used 'work done' and 'work left undone' as a basis of their judgment of each other in relation to being good. It was evident that participants also judged themselves and were concerned that their colleagues would not judge them as a good nurse if they did not manage their time well or ran late with their medications (signalled by the OMA).

You compare yourself with how well you are doing and you think, I am not doing it to their level and you kind of want to run before you can walk. (Interview: Nurse_06)

Whereas they [the junior staff] don't, they are so aware of their time, so if they see Jane Doe doing something in 10 minutes which takes them, like 15, 20, they think, 'crap I'm doing something wrong', you know. (Interview: Nurse_39)

However, there were participants who reported that they did not judge themselves or their colleagues on the basis of being behind time. For some nurses, the unpredictability of clinical work offered a satisfactory explanation. Qualifications to these assertions emphasised that while they adopted this attitude to colleagues, they were less lenient with themselves.

*I know a lot of people get really anxious about them if they are overdue, but I have worked here long enough to know that you can't get everything done on time.
(Interview: Nurse_15)*

4.4.3 Nurses judged each other's time efficiency

Nurses were also heard to make comments about their colleagues being slow. Some participants recounted that nurses who were quicker were asked to administer medications over those who were not. Given the importance of medication work, this judgement informally reprimanded the nurse overlooked for the role.

There are some people who do not have good time management at all and it is usually the new staff, not all new staff, but new staff. So you will just go ahead and give the meds and get them to do something else. It doesn't help them but when you've got time constraints yourself it's just a matter of I've got to get the work done, and that is it. (Interview: Nurse_62)

When asked if their colleagues' judgement might influence nurses' use of workarounds, Nurse_39 identified that the fear created by the reputation that 'nurses eat their young' was enough to influence nurses, particularly neophyte nurses, to use workarounds to get tasks done – even though they may not actually be checked on. Nurses who were slow because they took time to read a box risked being considered a bad nurse:

39: Yeah I think it may influence, it may be a reason why you might get things started an hour and a half early. Maybe they don't want to think they're bad nurses because they take time to read a box a little bit more than most people should.

F: Do you think that nurses are affected by what other nurses think?

39: I think so, I think they do crash into peer pressure a lot and they do care what other people think. I mean everyone's separate, everyone's different but I do think, especially for the juniors. I know we're renowned for eating our young and being so

mean to them. I think even the juniors, they're a lot more anxious they want to get it done before anyone else, before anyone else has to check on them even though we might not even check. (Interview: Nurse_39)

The informal construction and reinforcement of the importance of managing time that Nurse_39 alludes to in the previous excerpt was demonstrated powerfully in this study by the induction of neophyte nurses. During my time of observation, there were units where neophyte nurses (new grads) had commenced at the same time⁵. The following journal entry reflection was made towards the end of my observation on one of the units. Rather than summarise the narrative of the journal entry, I provide it by way of explanation. The journal entry is followed by a summary, including field note excerpts from another unit. Both examples illustrate informal mechanisms, signposted in Nurse_39's interview excerpt, that are used by nurses to reinforce that good nurses are timely.

I have observed over three weeks on this ward that the two new grads have been treated quite differently as the time went by. One is very 'rule abiding' – she takes a long time doing medication rounds because she checks every detail, looks for additional information and is meticulously vigilant. Because she takes longer doing medication rounds, other tasks are slower in getting done. Senior staff made comments about not letting her do 'busier' medication rounds until she has demonstrated that she can manage her time to get other tasks done. The other new grad is much faster and is then given more opportunities that build and reinforce her skills – the difference between the two new grads is emphasised. The new grad who is quicker and gets all of her tasks done – not struggling with time management – is offered the opportunity to give handover (a privilege on this ward) and to give IV medications, do electrocardiograms (ECGs) etc. I observed examples of the 'slower' new grad questioning the practices that she has seen some of the nurses doing (some of which are workarounds). While it is not overt, it is very interesting to watch the apparent 'favoured' new grad given more opportunities than the other – which reinforce that one is a better nurse than the other and in fact may serve to make one of them more competent than the other. (Journal Entry: Date De-identified)

⁵ Reminder: Participants randomly assigned gender for the purposes of de-identification

On another unit there were also two neophyte nurses, NG1 and NG2, who exhibited different practices and time-management skills. NG1 was 'spoken to' and 'spoken of' using positive terms that praised her work, specifically in relation to showing initiative and efficiency. NG2's time management and level of initiative received negative comments with her attention to detail challenged as too time consuming. The following are summary excerpts from field note observations.

09:22 – NG2 who was identified as slow with medications, was chastised for being late to go to breaks ... As the NUM walks past NG2, she asks where she is up to and then talks about her time management and spending too much time with one patient.

10:30 – NG1 walks past with three kidney dishes each with IV medications checked and drawn up with bed numbers written on the bottom of each kidney dish.

13:30 – There is discussion at the desk between two nurses about NG2. The RN is complaining that NG2 has not completed 'this and that'. I have observed during the shift that NG2 has not stopped working – she cleans the equipment as it is brought out of the isolation rooms, and the COW after each patient. (Field Notes: Observation_50_AM)

During the time I was on the ward, I observed that while NG1 adopted some of the practices used by the more senior nurses, such as preparing and checking IVI medications for several patients at a time, NG2 tended not to. For example, I observed NG2 wipe down the COW shelf each time a medication drawer had been put on it and check each patient's ID and allergy band before administering medication. NG2 self-recriminated that her medication administration was slower than that of colleagues.

NG2 uses similar practices to other nurses in as much as she takes the drawer of medications to the COW and dispenses the medications. However, she differs in practice from the other nurses I have observed. NG2 wipes the COW down when she has brought the drawer to the COW shelf. NG2 checks the allergy tab for every patient and checks their ID band and says the medications and dose out aloud, visibly checking the medication bottle and the dose against the order on the screen several times. When NG2 asks a team mate if all of the medications are done, she replies that they are. NG2 explains to me that this is what usually happens – that by

the time she has done two or three patients' meds, the other nurse has done the rest of the patients' meds. 'I am slow'. NG2 also explains that sometimes some nurses don't take the bottle or packet of medications to the screen of the COW to check because it takes time and so they are quicker but that she always likes to check.

11:45 – Scrolling down to look for medications due at 12 o'clock, NG2 identifies that they have all been administered except for the two rooms she is doing – 'I don't know how other people do them so quickly'. (Field Notes: Observation_79_AM)

There were two units in which censorship for not completing tasks within a shift was not as salient as it was in the other four. In one of these units, participants explained that in their unit the nurses were aware that 'things' happen during a shift that made them late. This was forgivable as long as it did not become a habit. In the other unit, while not tolerating late medications as 'acceptable', the nurses tended to not speak about missed or late medications as personal failures but as a reflection of the business and contextual demands of a shift. OMAs were identified predominantly as reminders and signals that colleagues may need assistance.

4.4.4 The importance of being prepared or anticipating events

Managing patient flow contributed to time pressure in relation to nurses' medication work. Nurses emphasised that anticipating and preparing for potential admissions created time pressure that they incorporated into their work. In addition, nurses reported needing to be prepared to manage unpredictable events. Nurses continuously prioritised and reprioritised, ready to manage the unexpected, as patients' demands and needs changed. Nurses accommodated unplanned events as if they were part of everyday activities. These events had the potential to make them late with medication administration.

12:00 – The ward seems relatively calm. All of a sudden there are buzzers going, a patient has chest pain, the doctor has been paged, phone is ringing – this little crescendo where nurses have to be in several places at once seems to have come from nowhere. In the midst of this emergency, another patient complains that they did not receive a meal – the nurse logs on to the computer at the staff station to order a meal and then rings the kitchen to ask for the meal to be sent to the patient. (Field Notes: Observation_75_AM)

So as not to compromise care for all patients and run behind time, nurses explained that it was vital that they had made time for these events. Good time management was tightly coupled with getting tasks done ahead of time. The idea of 'being prepared' was considered to be different from that of managing the pressure of time, and was one of the distinctions nurses made when differentiating neophyte and senior nurses – neophyte nurses manage their tasks one at a time but the senior staff knew how to 'make time' to accommodate instances when nurses needed to stop what they were doing and attend to the event immediately.

A group of nurses sitting at the nurses' station explain that most nurses will look at the 12 o'clock meds, make sure they have everything ready, so that as soon as it clicks over at 11 o'clock and the system will let you give them, they start the medications. They explain that it depends on how busy they are, and whom they are working with, that 'some are hopeless', and so they need to start earlier. Also they need to get the medications done as soon as they can because there are so many things that might happen that make them late – 'You only need a patient to fall or a MET call and then all of the medications will be so late.' – One nurse gives an example, the others are nodding in agreement – she relates that they had a MET call at 07:10 in the morning and it went until 8:30 and then she was still doing the 07:00 meds at 10:00. The group of nurses tell me that it happens all the time – the unexpected things. One nurse explains that – just when you think it is a really lovely, quiet shift, something will happen and if you leave your medications to give them on time, then you will be really late. (Field Notes: Observation_208_AM)

4.5 Medication administration, the EMMS and being time efficient

The EMMS was reported to have changed the emphasis on time efficiency. Participants denoted medication administration as 'important nurses' work'. This designation was reinforced by the EMMS. Limitations in access to the EMMS reduced the number of nurses available to administer medication and set them apart from other nurses. The EMMS made some aspects of medication work quicker and easier while making other aspects slower and more difficult. The EMMS regulated the timeframe in which medications were 'available for administration' in the system, thus structuring the way nurses planned their time across a shift. By making nurses' medication work more auditable and visible to a wider audience, the EMMS stressed the importance of timely medication administration.

4.5.1 The EMMS forced times when medications could be administered

Participants disclosed that EMMS had changed the way nurses interacted with the medication orders. Medications were not 'available' in the system for administration until one hour prior to them being due and were signalled to be overdue one hour after the administration time. The purpose in signing off administration of a medication with paper medication charts had been to record that a medication had been administered. A 10:00 am medication administered at 08:30 am was signed off when administered, without necessarily adjusting the time on the medication chart. The nurses explained that the communication aspect of this activity was not that it was administered at 08:30 hours but that the 10:00 am dose **had** been administered. That is, when nurses picked up the medication chart for Patient Smith they could see that the 10:00 am medication had already been administered that morning and therefore they did not need to administer it. However, the EMMS logged the exact time that the medication was signed off as administered.

We're much more conscious now of when we're giving medications. Because on paper, if it said 12 o'clock you could give it at 10, no one would know the difference. Now with electronic signing that you do, you get an hour before, an hour after, but you can force it. (Interview: Nurse_27)

4.5.2 Medication administration: key and important nurses' work

It was evident that for some participants, medication administration was considered to be important, or even the key part of nurses' work, "because the medications take priority before any clinical stuff is done" (Nurse_29), with non-medication work referred to as the little things – "they can do the little things while you get the medication done" (Nurse_06). Introduction of the EMMS was identified as having increased the perceived importance of medication work over other clinical care for some nurses.

With the COW they think that they look like more important, more important people. Yeah, more superior maybe. That's why the young ones really like to hold onto the COW. The bedside nursing, they don't like it that much. (Interview: Nurse_30)

On one unit, the importance of medication work was reflected in the introduction of a title for those nurses who could administer medications – Medicators. Discussions about shift staffing and skill mix included reference to the number of Medicators available for the shift.

Well usually we've got Medicators who are the RNs and EENs that are allocated a batch number [of patients], and they give [medications to] those numbers. So everyone that are RNs and EENs are allocated patient loads, everyone gives medications. (Interview: Nurse_43)

Okay so every Medicator has their own laptop hopefully. (Interview: Nurse_17)

In some units, locally implemented restrictions were imposed such that even nurses who had access to administer medications using the EMMS were permitted to administer medications only after they had demonstrated that they could be trusted to manage their time efficiently.

4.5.3 The EMMS signalled nurses were late with medications

One of the major differences that I observed between hospitals was the reaction of nurses overall at each hospital to the system specific OMAs. That is, the nurses at Hospital A demonstrated and described a more emotional response to the OMA than did the nurses at Hospital B. At Hospital A, there were observable unit differences in nurses' response to the OMAs.

At Hospital A, the OMA was immediately visible next to the patient's name when the unit was selected in the EMMS. The patient allocation at Hospital A was recorded in the staffing book, left open on the desk in the main office in the centre of the unit, the 'flight deck' of the ward where doctors, nurses, allied health, and specialists congregated across the shift. In some units the nurses' names and allocated patients' bed numbers were also written on white boards, and updated each shift. This offered permanent and transient signposts, immediately visible to anyone entering the main office, to the nurse responsible for overdue medications, easily identifiable in the EMMS.

For the most part, the nurses at Hospital A expressed negative responses to the OMA, seeing it as a signal that they were "*not coping*", "*lazy*", "*not attending to the patient*", or "*doing something wrong*". Nurses explained that when they were late with medication, formal reprimand was unlikely. However, the OMA highlighted their tardiness thereby creating time pressure. Nurses described a sense of frustration, stress, irritation, worry and failure at having let the patient down by being late with their medications. The following excerpts are included to illustrate a range of described emotions the OMA evoked.

96: I was beside myself when I saw that clock. I'd failed. When I first came – 'No, No' – I thought. I was really, really stressed because I wasn't getting through the medication by nine o'clock but that was because I saw the clock. (Focus Group: Nurses_ID_4)

When you actually see the clocks it just reminds you that you should have attended to that medication, that patient's medication. It doesn't – it just reminds you really, so you try and – when you see all these clocks – I also think because all these clocks come up so perhaps you think I'd better do this because now – not only for the patients but also my colleagues might think I've been ducking out for a cigarette or coffee. No, that's just a joke ... They might think oh – or they might even come and see the clocks and come and help. What happens also – they can see the clocks – they might think I was running behind or 'can we give you a hand?' – so that's another way of seeing the clocks, because some staff might think, 'I'll go and give him a hand; he must be delayed or must be running late.' It can work in benefit too, as well ... I guess it also can say to you – 'why am I running late or am I not attending to this patient?' It might make you feel a bit anxious because you'll see these clocks and you know other people can see the clocks too and you might think – you're worried that you might be having the perception that you're not attending to your patients straight away. (Interview: Nurse_34)

Nurses were concerned that the OMA was actively used to observe their work. Although they indicated that seeing the red clocks against their patients made them anxious too, senior staff in charge of a shift, or who had a formal educative role, said that that they found the overdue alerts useful to gauge how staff were managing their workload.

It's also good for the In-charge – I use it when I'm in charge. I know a lot of people do, just to see how everyone's going. This person's obviously all up to date and someone else might be a little bit behind, so it's a good visual for you to go and check. (Interview: Nurse_46)

Among the participants in this study, the type of collective response appeared to be different between wards. In one of the participating units, at Hospital A, the majority of nurses described

the benefits of the OMA as a way of reminding them that a medication had not been given or was late. Avoiding the OMA was an impetus to give medications on time.

Well I think it's really good but you don't want to see the red clock. So you have to make sure you give your medication on time. (Interview: Nurse_45)

Very good because it reminds you of medications that haven't been given and it just really stands in your face. With paper charts you know, sometimes you may come on a shift and you may think that it has been signed but it hasn't and especially night shift sometimes and medications haven't been given like 10 o'clock medications, we've been busy and we get night staff to do it and they can see it hasn't been given very, very clearly because it will have a red clock ... It is very clear with the clock that it hasn't been given, or delayed and you need to give it. (Interview: Nurse_55)

The following participant articulates the connection between the culture of a ward, the overdue alert and being a 'good' or 'bad' nurse. Unit-specific responses described previously offer support for Nurse_40's suggestion that the unit culture shaped responses to the OMA.

40: Yeah, the clock is just a prompt to tell you it's late but...

F: Does anybody else see the clock? Like other people can see?

40: Everyone. Everyone who goes into the account.

F: Right, so they know – like you – if I'm looking after these people I know that other people can see that those clocks...

40: Yeah, everyone can see it.

F: Yeah, do you think that has any effect?

40: No, because it's put into the culture where the clock doesn't mean you're a bad nurse, it just means it's due and it's still waiting. (Interview: Nurse_40)

At Hospital B, in order for a clinician to see the OMA for a medication, the individual patient's eMAR had to be opened. It was therefore not immediately visible to anyone who logged into the EMMS. The OMA being less evident was coupled with a team model of nursing care in which all members of the team endorsed to administer medication were responsible for administration

(diffused responsibility). This differed from the patient allocation model of nursing (as used in Hospital A) in which individual nurses were responsible for ensuring the medications had been administered to the patients allocated to them for the shift. With the team approach to nursing care, the nurse responsible for administering medications (and therefore who was late with medications) was not formally identifiable prior to medication administration, rather, this was negotiated informally and continuously between the team members, depending on what was happening at the time medications were due.

For the most part, participants at Hospital B also described the OMA as a reminder that medications had not been given. Nurses at Hospital B explained that they were unlikely to open individual medication charts to look at what their colleagues were doing. At the same time, senior nurses at that hospital used the OMA, particularly at the end of a shift, to check that medications had been administered. Unlike nurses at Hospital A, those at Hospital B rarely referred to the OMA and displayed little emotive response. As a result, there is less to report.

I like it because it's readable. It's going red when it's overdue or you just forgot about it, or if we don't have any stock in the ward, it goes red. It means that you didn't give it – gives the nurses a warning. (Interview: Nurse_42)

4.5.4 The EMMS slowed and expedited medication work

4.5.4.1 Restricted access to EMMS slowed medication work

In addition to accentuating medication work as important, restricted access to the EMMS or to administration of certain medications in the EMMS was described to impact nurses' time efficiency at Hospital B in two ways. Reducing the number of nurses available to administer medications increased the time pressure on the few nurses who could administer medications. Additional time was then said to be needed to 'manage' the attitudes of those nurses who could not access the EMMS to administer medication.

4.5.4.2 EMMS equipment and technology impacted time efficiency

Nurses also noted how aspects of the EMMS system had negatively affected the time spent on medication work. The physical properties and availability of equipment, the specific features of the technology such as internet connectivity and battery life, the additional steps in the medication administration process and familiarity or lack thereof with the EMMS were barriers to efficiency. An increased number of interruptions also contributed to slowing medication rounds.

34: I think a lot of it is down to the actual equipment; the fact that it keeps on closing down when you're halfway through medication. It takes so long to restart itself and that can take a lot of time when we're quite busy anyway. The actual process is good, but it's that – a lot of it's down to the actual equipment itself not functioning properly.

F: So it's a time factor?

34: A time factor. It's just that the equipment just goes off automatically suddenly without even telling us.

F: What do you do when that happens?

34: We just have to recharge it again and that can take quite a long time to go through the processes.

81: There have been occasions when this has happened and we've had to actually print out all the patient's medications and it's taken so long that by the time they've done that it's probably come on again, but it's been a very great waste of time.

F: So there are some frustrations then from the actual...

34: Equipment.

81: The equipment. (Focus Group: Nurses_ID_8)

COWs were reported to be cumbersome and difficult to manoeuvre. Limited space and competing equipment made pushing the COWs into the medication rooms or to the bedside difficult and therefore more time consuming. In addition to slowing medication administration, when computers shut down or logged out, information that had been entered until that point was lost.

You've got the physical component of having to take this, drive this trolley, where to put this trolley in the room. It only lasts a while before it logs out so you can't be taking someone to the toilet or whatever, it'll log out and you've got to log back in and you'll have lost everything if you've clicked anything. (Interview: Nurse_03)

Waiting for COWs to be available for use during peak medication times was also reported to impact time management. Doctors' rounds were often conducted at the same time as the morning medication round when the demand for COWs was the highest.

We only have six laptops on the ward. Or is it seven? Seven now. When the pain team do a round they take a laptop with them. Or if a doctor does a round he can take the laptop, so that reduces the amount. That's part of the problem. Also in the treatment room, trying to get six laptops in at once is hard to do. (Interview: Nurse_67)

The EMMS was often described to slow down nurses' work because of the time taken for the pages to load. Although the delay between screens was not long, Nurse_04 emphasised the importance of every step adding additional minutes to the medication round.

You were having a delay in-between each screen – I mean not long, we're talking 10, 20 seconds – but if you've got a couple of steps to do, it adds a couple of minutes each medication round. (Interview: Nurse_04)

The additional process steps involved in confirming a medication as administered, refused, withheld or delayed or un-charting a medication administration because a patient vomited the medication was reported to have added time to the medication administration process. The steps involved in nurses initiating medication such as Panadol was also considered to affect time efficiency. As highlighted previously, it was considered important to save every second.

34: Perhaps there is too many checks, like you go to check off Panadol, you go through all these different systems to get to the end of it. Perhaps there's one or two too many checks on the system.

F: That takes time?

34: Well, it doesn't really take too much time, but I suppose, on a ward like this, every minute or second really counts. (Interview: Nurse_34)

4.5.4.3 EMMS enforced policies and impacted time efficiency

Features of the EMMS were designed to enforce compliance with policies that were in existence prior to the introduction of the EMMS. Complying with EMMS-specific policy directives that had not

applied to paper charts, were said to be additionally time consuming. An example of this kind of directive required users to close, lock, or sign off from the eMAR every time they moved away from it.

Another thing is you need to sign off all the time when you walk away from the computer and then you have to sign back on. That's time consuming. (Interview: Nurse_30)

4.5.5 The EMMS: made medication work quicker

Participants were also able to recount instances when the EMMS had made medication work quicker. Time was saved by not having to search for missing medication charts and improved legibility reduced the time nurses spent deciphering illegible handwriting and chasing up doctors for clarification.

The ability of doctors to access the eMAR remotely and to order medication reduced the time spent following up on medication orders. Access to information at the point of care, and the ease with which they could access all of the patients' medication information was identified to save time. Once again, there is the articulated concept that every minute counts – for the benefit of the patient.

40: Which is – which makes it more convenient because it's more accessible. If a doctor is holding on to a clinical chart, with the med chart, you don't have to wait any more. At the same time I think with the electronic system everything – all your resources are there. The MIMs, the drug information sheet is right there with one click. You don't have to look for the book – one book that's shared among the whole ward any more. So every nurse that's administering drugs has a reference to themselves in other words on the system. So everyone can click at the same time into the system. Yeah, information is more accessible, it's faster. So I don't know if that's more time efficient and I guess every second you save becomes minutes and becomes hours, so maybe you tend to do more things than before and faster I guess.

F: Okay. Yeah.

40: If we do things faster for patients that enhances their treatment. (Interview: Nurse_40)

Accessing medication records for all of the patients on the unit from one computer meant that nurses were able to organise their medications and the nurse in charge of the shift was able to check the medication charts of all of the patients more quickly. This freed up time to assist patients and colleagues at the bedside.

So a positive is that the nurse in charge can immediately see if anything hasn't been given, if anything's been missed, like we talked before about STAT. So that's a real positive. Instead of if you just think about they're in charge, going around to see those 34 bedsides and find those charts. First of all, do you think the In-charge would have done that? Possibly not. Think of the time that would have taken. That would have taken half-an-hour and when you went to 34 bedsides, you would have got 64 questions. But if you sat there, logged in, looked at the chart, it's quite phenomenal. So therefore it's decreasing time wasted and therefore you've got more time to assist one another and more time bedside. (Interview: Nurse_21)

Observing for a shift rather than focusing on medication rounds, enabled me to see the nurse use the eMAR to help them organise their time. Nurses checked all of their patients' eMARs at the commencement of their shift, often during handover. This was facilitated by the EMMS as all of the patients' medication administration records were accessible from one location. Pre-medication work involved activities such as checking pathology results, allergies and Pharmacists' instructions. These preparatory actions enabled nurses to complete the medication round more quickly.

4.6 Using workarounds to manage time or to be perceived to manage time

For nurses in this study, being time efficient was an important quality. Possession of this quality was demonstrated by completion of patient care tasks within formally and informally sanctioned time frames. Ubiquitous organisational and professional pressures and competing demands presented hindrances to nurses being time efficient or being perceived to be time efficient. Medication administration was considered to be an important component of nurses' work and therefore, nurses argued, it was imperative that it was completed or perceived to be completed within sanctioned time frames. EMMS at times both supported and/or undermined this imperative.

The participants in this study used workarounds to circumvent perceived hindrances that were described to slow completion of tasks and delivery of care. That is, nurses used workarounds to

be, or be perceived to be, time efficient with medication administration. At times, nurses emphasised the altruistic 'noble' goal of the workaround – for the patient's benefit directly or by supporting their colleagues (to be examined later in Chapter 7 – Being a team nurse). This included using workarounds to complete tasks immediately so that nurses would have time to care for patients during periods of intense business (e.g. 06:00 hours) or in the case of an unplanned event such as a patient fall, a Medical Emergency Team (MET) call or a new admission.

Workarounds were used to avoid being seen to have poor time management. For some workarounds no exact motivation was given – they were justified simply as being faster or easier (and so quicker). It is probable that these workarounds could be explained in relation to facilitating the efficient delivery of timely care. Mostly nurses' described motivations for using workarounds and goals they intended to achieve as not being mutually exclusive.

According to nurses in this study, the EMMS (including equipment, technology, program features and associated policies) both challenged and facilitated timely completion of medication administration. For the most part, while differing in various physical and operational characteristics, the EMMS created similar types of challenges to time efficiency across sites. The types of workarounds used to circumvent these common challenges were equally similar.

There were some EMMS-specific features that produced setting-specific barriers to being time efficient. This educed some variation in the use of workarounds between hospital settings.

While participants revealed that being time efficient was an important characteristic for nurses, there were other qualities that were considered important to being a good nurse. These qualities will be examined in following chapters and include being safe, patient centred and a team player. It was clear that in some instances, workarounds that nurses used to be time efficient supported other good nurse characteristics. It was evident that in some circumstances, workarounds employed to be time efficient undermined other good nurse characteristics. On those occasions, nurses described employing additional workarounds to compensate – secondary workarounds.

There were numerous occasions in which nurses disclosed feelings of conflict or tension in relation to using workarounds to be time efficient. On the one hand nurses portrayed some workarounds as an acceptable variation in medication administration practice that was part of delivering care in the 'real world'. Other workarounds were considered to be less than ideal

practice but unavoidable to deliver timely care in a clinical setting that was far from the ideal version held by those who promulgated policies. Personal emotional conflict was created by the need to use workarounds to breach this chasm. These perspectives will be considered in more detail in Chapter 9 when 'moderating motivations', nurses' expressed emotions toward and teaching workarounds will be examined. One constant was that for the participants, their experiences and use of workarounds need to be read in the context of time pressures and competing demands that were highlighted by participants' repeated mantra that "every second counts".

4.6.1.1 Using workarounds to increase efficiency of care

Nurses argued that to deliver care efficiently, workarounds were inevitable. They asserted repeatedly that it was not possible to address the number of competing demands and complete all of the required tasks within the available time. The tension they expressed was that in order to have enough time to meet both the needs of the patients and the requirements imposed by the organisation, nurses used workarounds.

Nurse_76 tells me that they don't always do things by the book here – she says that this shift is really busy – they came back from tea to a death with a new nurse who doesn't know the process, and a new grad. Nurse_76 explains that while she has a patient load there is also other paper work that needs to be done – they just don't have time to follow every step exactly – 'the medications wouldn't be given'. (Field Notes: Observation_76_PM)

In the following interview excerpt, Nurse_50 explained that workarounds reflected a trade-off so as to deliver timely care. There is an expressed assumption that nurses would not engage in activities that were detrimental to patients, thus workarounds were rationalised on the basis that if they were harmful, nurses would not use them.

*To tick all the boxes and cross all the 'T's we **need** to have workarounds. The bureaucracy is such that they have us doing so much paperwork but with the expectation that the care is not going to decrease. The typifying thing of a patient being shaved is a good example, how can you expect someone to ... we talk about this in meetings, food charts, bowel charts, the amount of paper work you have to do **and** also care for the patient and actually understand what their care needs are – give the meds, do all these things – and you have to, workarounds aren't necessarily*

a bad thing. They can't be, otherwise we wouldn't be doing it. Otherwise we would be very prescriptive and you have got to 'get from Peter to pay Paul' well this is how you have to function. (Interview: Nurse 50)

4.6.2 Using workarounds to manage time pressures caused by staffing levels

Staffing levels, skill mix and patient-to-nurse ratio contributed to the use of workarounds to save time. When the number of patients the nurse was required to administer medications to or patient load was high, nurses reported that they were more likely to use workarounds to ensure the medications were administered within prescribed time frames.

There were between hospital differences in the way additional nurses were sourced to fill gaps in the roster. At Hospital A, nurses worked overtime shifts. Nurses who worked overtime were familiar with the patients, including medication requirements, and the process of medication administration using EMMS. Hospital A also employed casual pool and agency nurses who were able to administer medications using the EMMS, once, having completed a training session, they were given a username and password to use the EMMS.

At Hospital B, the use of overtime was not observed, and agency nurses were rarely seen. Rather, nurses were 'called out' from their own units to work on other units, often where there were shortages of nurses who could use the EMMS. The 'called out' nurse was then sometimes replaced on their own unit with a nurse who could not use the EMMS. This reduced the number of nurses available to administer medication, increasing the medication load and pressure to administer medications within prescribed time frames. In the following interview excerpt, the participant described being 'called out' to be one of only two nurses on the unit able to use the EMMS, and another time to be the only nurse able to administer medications on a shift – a situation that would almost inevitably require her to work around some policy requirements to administer medications.

It has definitely had a positive impact. I can read the order. The paracetamol alerts are also safer. BUT there is an impact because only certain people can use them [EMMS]. I was working a shift as the only permanent person on. So there were only two on a shift that could do medications which has a huge impact on the number of medications done by one person. One shift I was called out to [de-identified unit] as they didn't have anyone who could give medications using the computer. So I was

called out to give all of the medications on that ward for that shift. (Interview: Nurse_26)

4.6.3 Using workarounds to save time searching for missing medications

When medications were unavailable on the unit for an early medication round, nurses described rescheduling the time of administration for those medications to when the pharmacy department was open. Doing so worked around the time taken to source the medication from another unit and the need to remember (and the potential to forget) to get the medication.

Usually when you reschedule it's for after because you either don't have stock so you – I just usually do it two hours later because that's when pharmacy gets it to you eventually. (Interview: Nurse_39)

Nurses were observed on numerous occasions, during medication rounds, opening medication drawers in bedside lockers to find that empty boxes of medications had not been replaced and needed to be retrieved from the medication room, adding time to the medication round. Paracetamol and aperients were commonly prescribed medications that were often missing from the patients' bedside medication drawers. To work around the extra time that it took to go to the medication room, participants borrowed medications from other patients' drawers. They also stored commonly prescribed medications, including Panadol and aperients, on the COW shelves or carried them in their pockets or nurses' waist packs.

21:00 – Nurse_71 notes the Panadol due at 22:00 is available for administration in the EMMS. She takes the blister pack from her pocket and leaves the laptop at the desk in the corridor. She goes to Bed 11 and administers the Panadol and returns to the laptop and selects the medication order and then confirms it as administered. (Field Notes: Observation_Nurse_71_PM)

4.6.4 Using workarounds to save time caused by interruptions

Nurses explained that the COWs were a beacon for interruptions, which had an impact on time management not only because nurses stopped the medication round to respond to the patient but because for those at Hospital A, when they did so, the EMMS logged out. Time was then spent logging back in and re-entering information that had been lost. Nurses also described the safety implications of being interrupted, which will be explored in the next chapter.

81: But these are elderly – you can be a target when you're in there with that little trolley because they won't let you continue with it. You're about to administer to one patient – 'Nurse, nurse, I want this, I want that' – you know. (Focus Group: Nurses_ID_8)

Interruptions were also reported by nurses to create increased potential for error thereby undermining patient safety. They described working around the potential for being interrupted by not 'dispensing' the medications at the bedside. Given the importance nurses afforded working around interruptions to diminish potential for error, strategies to work around interruptions will be examined in the next chapter on using workarounds to enact patient safety.

4.6.5 Using workarounds when infection control policies cost time

According to infection control policies, non-disposable equipment required for use with other patients should either not enter the isolation room or be cleaned with detergent and disinfected prior to leaving the room. Many nurses reported that hospital policy dictated that the COW was not to be taken into an isolation room – the logic is clear: COWs were non-disposable equipment to be used with other patients and therefore should not enter the isolation room or be cleaned and disinfected prior to leaving the room; there was not enough time to clean and disinfect COWs (and the wheels did not lend themselves to cleaning); therefore, COWs should not be taken into isolation rooms. To work around the time taken to clean the COW after it had been in an isolated room, nurses left the COW at the doorway to the room. However, observational data suggested that this workaround also cost time when nurses introduced additional steps, going back and forth between the COW and the medication drawer.

With the patients [who were] isolated we had to – we'd take the laptop to the outside of the room and go back and forth to the room, look at the laptop, get instructions, go into the room, take the medication to the laptop without contaminating it, then dispense it separately in front of the laptop. (Interview: Nurse_34)

Some nurses explained that the goal of not taking the COW into the isolation room was to save time needed to clean it afterwards; others explained that they used this workaround for the purposes of patient safety, to limit cross infection. This will be examined in more detail in Chapter 5.

4.6.6 Using workarounds when the patient was slow at taking their medications

Nurses reported that when patients were very slow taking their medications they felt conflicted. On the one hand, they were conscious of time pressure, and mounting competing demands, yet they did not want to rush the patients. When the EMMS had a short log out time, nurses described feeling additional pressure when patients were slow.

To work around the time it would take to stay with the patient while they took their medications, participants described preparing the medication and then asking the AIN to administer the medication. When patients were slow taking medication, nurses worked around being logged off by confirming the medications as administered in the eMAR before administering them.

03: Nurses must adhere to the same process of a paper chart. The five rights, don't sign the medication off until you've witnessed that patient taking it. I know that's not going to happen throughout the hospital because people will cut corners. Even we've done a lot of work on this ward to make sure that nurses don't leave medications by the patient's bedside but I'm sure that happens throughout the hospital because having worked in hospitals all my life you can see that happens. If you go around the wards you can see medications sitting there. Obviously ... that's very dangerous.

F: What are the sorts of things that you think cause that?

03: Rushing, rushing around, having a heavy workload, having patients that take it very slow, the communication is possibly a problem. Maybe having an AIN there who said once again look I've put the medications there, can you make sure the person takes the medication when we know that's not ideal because whoever administers the medication, dispenses the medication must give the medication. (Interview: Nurse_03)

4.6.7 Using 'batching workarounds' to save time

Nursing work was observed to be far from linear or sequential and nurses were frequently observed and described juggling competing demands. Many of the medication administration policies were based on a sequential medication administration process. For example, a principle to be observed, specified in a statewide policy directive, required that nurses prepare and

administer medications for one patient at a time.⁶ By limiting the window within which each medication was 'available for administration' to two hours, the EMMS limited the time frame for nurses to attend to medication tasks sequentially.

One of the mechanisms nurses used to manage the competing demands was to 'batch' or prepare medications with similar preparation process steps together. This was heavily influenced by whether or not the medication administration needed to be checked or witnessed. In both study sites and in all settings, participants were observed to work around preparing and checking medications for one patient at a time by preparing several patients' medications simultaneously. It was emphasised that it would not be possible to deliver any other care than medications – and these would not be on time – if nurses did not work around this policy.

Nurses also explained that when they were really busy, preparing medications for all of the patients at the same time was not only quicker but also safer. In the following excerpt, Nurse_111 reported that usually in the morning she took the COW to the bedside because there were so many medications to remember. However, if it was really, really busy, so that she could get all of the medications administered on time, she prepared the medications for all of her patients away from the bedside, marking which medication pot was for which patient. She then administered them. In the excerpt two secondary workarounds were employed in the interest of patient safety. First, rather than rely on her memory, the nurse marked which medication pot was for which patient by including a piece of paper marked with the bed number, to identify the patient, in the medication pot. The nurse then placed one medication pot on top of another, to minimise the risk of medications (and patient identifier) falling out.

Nurse_111 explains the reason for the workarounds I observed her using during the medication round – For the 08:00 meds, there are so many that she wouldn't be able to remember them all so she takes the COW to the bedside, gets the medication drawer out and puts it on the shelf – 'it's for patient safety, I can only remember so many at a time.' ... 'But if it is really, really busy then I have another time management strategy. I put the meds in the med cup and put another cup on top of it – I put on something, like a piece of paper or Alco wipe, what the bed number is, so that I know,

⁶ Principle to be observed: NSW Health Policy Directive - Document Number: PD2007_077: p. 52

and I line the med cups up and then take them to the patients one after another so that I can get them all done.' (Field Notes: Observation_111_AM)

4.6.8 Using workarounds to circumvent scope of practice restrictions that cost time

According to The NSW Health Medication Handling Policy [1] nurses could administer medications if they had appropriate qualification and training. RNs and EENs were qualified to administer medication. In relation to medication administration, the scope of practice of EENs differed from that of RNs, that is:

Enrolled nurses who have completed a Nurses and Midwives Board of NSW accredited medication course (termed endorsed enrolled nurses) may administer Schedule 4 medication, including Schedule 4 Appendix D medication, via all routes, in addition to unscheduled, Schedule 2 and Schedule 3 medication. This extension of the role of the enrolled nurse does not permit the administration of Schedule 8 medication. [1:50]

At the time of this study there were hospital-specific additional limitations to the medications EENs were endorsed to administer. For example, while endorsed to administer subcutaneous Clexane, EENs at Hospital A were not endorsed to administer subcutaneous Heparin. Nurses explained that the EEN-restrictions associated with some medications cost time and impacted their time efficiency. Nurses described working around these restrictions to save time for both the checking and administering nurses. The nurse endorsed to administer the medication logged into the EMMS, confirmed the medication as administered in the EMMS, and checked the medication with the EEN, who then administered it to the patient. Participants reported that they also worked around these restrictions for the purposes of patient safety and to be a team player, which will be examined in Chapters 5 and 7. In the excerpt below, Nurse_61 rationalised the scope of practice workarounds because not to do so caused delays. However, the nurse was clearly conflicted about sharing this workaround and referred to it as *"giving things that they shouldn't"*. Nurses' described feelings about using workarounds will be elaborated in Chapter 9.

61: The EENs as well. There's certain things that they can and can't give. They get blocked from giving some medications. In that case, they have to come and find one of us – an RN – to log in. They can check it with us but they can't be seen as the one to administer it on [EMMS name].

F: Do they administer it?

61: Nine times out of – things like the EENs can give Clexane but they can't give Heparin, yet Heparin can be reversed and Clexane can't. So it's just there are things like that. Most of the EENs here will give – I wonder if I should say this – but they will give ...

F: There is no name on this.

61: They will give things that they shouldn't ... So that just go to – that affects their routine then, because they're then waiting for us to come and do something for them that might be stopping them from doing something else. So it holds them back in their patient care. Most of the EENs here will – are happy to – once they've had it checked by one of us, they're happy to administer it. (Interview: Nurse_61)

4.6.9 Using workarounds to avoid being logged out of the EMMS

Nurses were observed and described confirming medication as administered in the EMMS prior to administering it to avoid the time cost of being logged out of the EMMS. This was particularly problematic for nurses at Hospital A. Being logged out before the medication administration had been confirmed in the eMAR 'lost' the information that the nurses had entered up until that point. Time was then needed to log in again and re-enter the information.

09:10 – CONTINUING the medication administration of 08:00 medications for bed 14: female; allergies; 8 oral medications (1 S8); 1 subcutaneous; Nurse_44 has not looked after this patient before.

Nurse_44 logs back into the EMMS and selects the ward, patient 14 and the medications for administration. Nurse_44 unlocks the bedside drawer and takes out the medications for administration. He checks them against the eMAR on the screen and puts them in the medication cup. Nurse_44 has already been through and looked at the blue triangle instructions for all of the medications prior to commencing the medication round. As he puts the medications in the medication cup he clicks the blue triangle icon and clicks on "Instructions read" and closes it quickly without reading the instructions, (I observed him read them earlier prior to starting the medication round). While he is checking the medications against the eMAR on the screen, patient 14

talks to Nurse_44 telling him about her bowel activity and the difficulty she had getting off to sleep. Nurse_44 completed the five rights at the bedside check before administering the medication to the patient. Nurse_44 confirms the medications as administered in the eMAR. A medication is ordered for patient 14 but there are none in her medication drawer so Nurse_44 takes some from patient 13's medication drawer. The EMMS times out again and won't log back in again. This is exactly the same spot that this happened on the ward the other evening when I was shadowing. Nurse_44 is getting very frustrated and then when he does manage to log back in, the doctors have logged into the patient's eMAR so he can't get back into the eMAR to finish the medication administration for patient 14. Nurse_44 dispenses the medication into medication cup. He needs to get the Heparin checked and walks extremely quickly up the corridor to the medication room gets a nurse to check the Heparin and crushes the medications. 09:13 – when Nurse_44 tries to select and check the Heparin and the oral medications that needed crushing, the EMMS times out again. Nurse_44 gets subcutaneous injection that he has put in a kidney dish and takes it to another nurse to check. She walks to the COW with Nurse_44 who logs in and checks it against the medication order on the eMAR. They check the five rights and then the checking nurse enters her username and password in EMMS and confirms that the medication as having been administered. Nurse_44 then administers the injection and later explains to me that they signed it off and confirmed it as given in eMAR before he actually administered it because the laptop kept logging off. (Field Notes: Observation_44_AM)

According to some participants, secondary workarounds were used as additional safety steps. For example, having signed off the medication in the EMMS, because it was no longer easily visible, at the bedside, prior to administration, Nurse_100 hovered the cursor over the information icon next to the medication name as a safety check and confirmed with the patient that they had been receiving the medication.

At 19:40, in the medication room, using the EMMS on the COW, Nurse_100 prepares oral medications putting the tablets in a syringe with the plunger removed because there are no medication cups – she also checks a Heparin dose for patient 33 – another nurse co-signs and Nurse_100 confirms the medications as administered in the EMMS. The tablets in the syringe and the drawn up Heparin are put in a kidney

dish on the shelf of the COW and Nurse_100 pushes the COW to bed 33. On the way, she makes a telephone call to [de-identified ward] to tell them that the bed is ready for the patient to be transferred – she continues to bed 33 where she plugs the COW in. Nurse_100 checks the patient ID and allergy status by asking the patient. She hovers the cursor over the 'i' next to the medication and explains aloud that it says 'administered by me a second ago so I know that it is administered by me and the right patient'. She checks with the patient by asking if he has been getting a needle twice a day – when patient 33 affirms that he has, Nurse_100 administers the medication. (Field Notes: Observation_100_PM)

4.6.10 Using workarounds to circumvent EMMS-related barriers to efficiency

Participants identified time challenges that were caused by specific characteristics of the EMMS that facilitated workarounds to save time. Nurses explained that when the laptop was slow, they would administer medication and sign if off in the eMAR using a faster desktop computer. At Hospital B, rather than return to the Patient List screen to select the next patient's eMAR, nurses used the arrow at the top of the screen to navigate between patients' eMARs. To reduce the time spent typing in a comment in a required field, nurses at both hospitals reported entering a space or full stop.

They have – people work a way round it. Which has made it a lot quicker for some; but I had to give something the other day – nurse initiated – and if you haven't used it in a while you forget how to do it. Those that use it can work out that you just change it a different way and you can put in a space, and then also that you've – you can – yes ... So there's certain ways you can do it, in that if you put a certain symbol or something in there the computer will read it. It's like a way to get round it. (Interview: Nurse_67)

Reported shortcomings of the COWs including short battery lives, poor screen lighting, broken keyboards, heaviness and lack of availability of COWs were described to add time to the medication administration round. Nurses frequently used the word 'dragging' in relation to the COW and described not pushing the COW to the bedside to give medications because it slowed them down. When, at peak medication administration times, there were not enough COWs available, or there were too many COWs in the small medication room, nurses were supposed to wait until a COW became available or the medication room was less crowded. To avoid waiting or

the time costs when computer batteries died, or the system logged out, participants described a variety of workarounds to avoid being delayed including using desktop computers at the nurses' stations and in the medication room or leaving the COW plugged in in the corridor outside the patients' rooms. Nurses acknowledged that not taking the COW to the bedside undermined aspects of patient safety and fostered secondary workarounds to support safe care. For example, when they considered that the patient was ordered more medications than they could remember, nurses described writing the medication names on a piece of paper, printing out the medication order, or taking extra care and being systematic. Participants reported using secondary workarounds to formally check identification when they did not take the COW to the bedside.

F: When there are no laptops or if they are not available, what do you do?

24: The only thing you can do is – I wonder if I have got any evidence in my locker – on the back of my handover sheet write down the numbers; write down the drugs; tick them off and go out there.

F: Where do you tick them off? At the desk?

24: At the desk, yeah. ... I couldn't get another laptop because they were all in use. It was the morning round, so that is when I did write down everything. As I say, I'm not superman.

F: So that is when you write it down. If it was in the evening and it was only a couple, then you would go from the desk?

24: Yeah. (Interview: Nurse_24)

4.6.11 Working around 'the clocks' to be perceived to be time efficient

As previously outlined, participants often identified the OMA feature at Hospital A as a symbol of failure because it highlighted that the nurse was running behind time. Nurses described using workarounds to remove the OMA. For example, some nurses 'delayed' the medication in the eMAR so that when others logged on they did not know that the medication was late. The fear of looking lazy contributed to the development of this particular workaround.

Or if you haven't had a chance – like for example, the medication isn't available. The clock is there and the medication hasn't come up. You've run out of that different type

of medication. So instead of leaving the clock there, and the next – if I'm coming on and I see that there, my first thing – she's getting too lazy to give it. Or has it always missed it or things like that. But if you put in 'Delay', 'medication unavailable'
(Interview: Nurse_43)

Nurse_56 also described how to 'go around the system' to get rid of the clocks – by withholding a medication. However, in the following excerpt Nurse_56 ascribed a negative virtue to the workaround, conceptualising it as dishonest, an attempt to cover up what was not done.

56: The red clocks, for me, it would be very upsetting if I forget to give something that I see a red clock. But then again, I guess you can always get rid of that red clock. That's – you can go around the system.

F: How do you do that?

56: For instance, if you get a red clock, you could always – if you see you're not going to have time to give those tablets, you could always go to the computer and 'Withhold'. You can withhold the tablet or you can say, patient not on the ward. So there's a lot of things that you can really give a reason why was that tablet late. But I guess people don't – I think nursing, they don't really like. So I think – I don't know what it is. I think because of the job, you need to be honest all the time. So you don't seem to lie or go a relative bullshit just to cover up what you didn't do. So you just did the red clock, who cares? You didn't have time to give it in an hour. Well, you've got to give it in an hour and 10 minutes or an hour and five minutes. I don't think they bother people a lot. (Interview: Nurse_56)

4.6.12 Using workarounds to circumvent witnessing and checking policies that cost time

Legislation required that S8 medication administration was witnessed by a medical officer, RN, EEN or accredited EN (witnessing policy). Hospital policies also required that administration of S4D medications were witnessed. The administering nurse and the witness were required to check the five/six rights of medication administration together. The witness was required to be present during the entire procedure from removal of the medication from the storage unit (DD cupboard), through preparation and discarding of unused portions of the medication, recording the medication transaction in the drug register book, the transfer, and administration of the

medication to the patient. The administering nurse was required to be logged in to the eMAR and the witness to enter their username and password. NSW Health Policy required that administration of Warfarin was also checked.

Administration of other medications required two nurses to check the five/six rights of medication administration together (checking policy). Medication administration of intravenous, subcutaneous and intramuscular medications, for example, required two nurses to verify the patient identification, allergies and medication order on the eMAR. At Hospital A, both the administering and the checking nurse were required to go to the bedside to check the patient identification against the eMAR and, in the case of intravenous medication infusion, to confirm that the rate of infusion was correct. The administering nurse logged on to the eMAR and the checking nurse entered their username and password as a record that they had checked the medication. At Hospital B, the checking policy required two nurses to verify the patient identification, allergies and medication order on the eMAR but the checking nurse was not required to go to the bedside. The nurse administering the medication, logged onto the eMAR, typed the name of the person who checked the medication in the COMMENTS box in the medication order.

Nurses explained that in an ideal world there would be enough staff to allow them to always follow these policies every time. However, in reality this was not the case, and staff said that enacting the policies was too time consuming and “*not viable*”.

It's very time consuming. We have someone with the keys, we have a lot of S4s and S8s, so it's very likely you're going to have three to four patients on MS Contin or Oxycontin. To go to the S8 cupboard, check one out, go to the bed with two people, give it, go back to the S8 cupboard it's just, it's not viable. So what we do is that we get, if you know you have two or three people on it, you do them all at once. Now most nurses will take a second person to the bedside with them and will actually go through, okay this is Mrs Smith, we're giving them Clexane, oh sorry, we're giving them Oxycontin 10. I also again notice that people will put Alcowipes in little pots so we know which one's which.” (Interview: Nurse_27)

Increased medication loads compounded the situation. For example, during a shift, individual patients may be prescribed, in addition to other medications, multiple (up to ten) medications requiring witnessing or checking. Given the number of available staff, the number of medications, the patients and the other tasks that needed to be completed, nurses disclosed that there was not

enough time for two nurses to go to the bedside for every single injection and scheduled medication administration. Doing so, they suggested, would negatively impact patient care, with medications due at 10:00 am actually being administered at 3:00 pm.

56: Hmmm you're supposed to. Even when you change an IV bag you're supposed to change and you're supposed to have someone there to check if you're putting the right amount that they're supposed to run. So everything you do is supposed to be two, checked by two.

F: Okay and would the latter be, because you were just saying about one is a legal requirement. Is the other policy or they're both the same level of ...

60: If it's going intravenously yeah they're treated like an S8.

F: Okay alright so in those circumstances again as you know I'm interested in the reason why, so it's the time factor in that one isn't it, that you just don't have the resource to take two people to the bed every – yeah?

56: It's time, it's all about time.

F: Okay and any other ...

56: Government policies are too complicated. It just creates more and more and more.

F: More and more policies?

56: Yeah as long as it's – it's all too easy for people to sit down and invent all these policies when they don't even know what it is to give a drug or how long they're going to take.

60: The policy doesn't match the timeframe we have.

56: Yeah so you've got four patients or five patients and there's so much to do in your shift and you've got all these policies behind you. So what do you do? You look after patients or you follow the policies? So it's all too good in court because they create those policies because they need to look good – once if anything goes to court they can say but we have this policy that they should follow. But saying that, it doesn't

mean that we have enough people to follow those policies. (Focus Group: Nurses_ID_6)

Using workarounds to circumvent witnessing and checking policies was influenced largely by how busy the nurses were or how busy they were expecting they might be later in the shift. The availability of the COWs at busy medication times had also influenced the use of this workaround. Nurse_45 illuminated that not wanting to lose possession of a COW during busy medication times had influenced whether nurses worked around at the checking or witnessing and administration sign off steps of the process.

45: ... Also checking – because you don't – I suppose in paper chart when you do the checking you really go with the nurse, whereas this one, because everyone is much more on – you check this, you sign, you logged in and you sign, then you turn your back and that's it.

F: Then it's done. Whereas with the paper ...

45: With the paper chart you can say, 'come with me, let's do it'. Because one nurse doesn't want to lose his laptop, so then ...

F: Otherwise you'd be taking two laptops to the bed, okay.

45: Exactly. So if I'm checking it with you, you check it, you looked at it, you signed it but you did not actually go with me to the patient because if you leave your laptop someone will take it. So that's another thing too. So then it became like this is mine, this is mine and that's yours. (Interview: Nurse_45)

At Hospital B, where the local policy for checking medications for injection that were not DDs did not require the checking nurse to accompany the administering nurse to the bedside, or the checking nurse to enter a user name and password, workarounds were also used to speed up the process for medications that required checking by another nurse. Nurses prepared medications for several patients to be checked at the same time (e.g. a 'bunch of Clexanes'). The administering nurse took the medications to the checking nurse. As a patient's eMAR could be opened by more than one user at the same time, and because it was possible to open the eMARs of more than one patient on one computer at the same time, rather than close the eMAR they were working from when they were asked to check the medication, checking nurses opened

the eMARs of the patients whose medications they needed to check on top of the eMAR they were working from.

20:05 – 20:12: Bed 8; 3 oral medications due

Nurse_104 asks patient 8 whether or not she has had her bowels open. She goes to the bedside, opens the drawer. She then pushes the sphygmometer that is next to the bed out of the room and returns to the COW. She looks at the screen and pulls the COW to the bedside, checks the patient's name and MRN on the screen and ID band and gets the medication from the bedside locker. She calls RN X who is passing and she asks him to check a Heparin. He joins her at the COW at the end of bed 8. Nurse_104 selects 'Patient List', selects patient 6 and the eMAR opens on the screen in front of the eMAR for Patient. RN X looks at the Heparin, looks at the order on the screen, and looks at the name at the top of the screen. He turns and looks at the name on top of bed 8 where Nurse_104 was in the process preparing medication. He says 'no?' Nurse_104 responds pointing at bed 6, diagonally opposite, and says 'it's for her'. She takes the kidney dish to bed 6 and leaves it on the bedside table and goes back to bed 8. She checks the medications on the COW shelf that she had retrieved from the bedside drawer before checking the Heparin for patient 6, against the eMAR on the screen and administers them to the patient. Nurse_104 selects the medications and signs off (✓) (for two medications) – she selects the aperient order, and in the grey box ticks 'not given' she selects – from the drop down list – 'refused Dr notified' and deletes the 'Dr notified' then signs off (✓) that medication. She scrolls down through the eMAR for patient 8 checking for other medications available for administration. There are none – she closes patient 8's eMAR and pushes the COW to bed 6. (Field Notes: Observation_104_PM)

Opening one eMAR over the top of an already opened eMAR was actively discouraged having led to medication errors in the past. One nurse explained the problems that arose:

For instance they will open up two – not two charts, but one chart is open and another patient is up there too, so if you click on that person, that person's chart opens out. So I'll give you an example of what happened, – the nurses were standing at bed 3, and another person came and said 'can you check this' – for the patient in say bed 8, so what this girl did is she opened up that person's to check the subcut injection and then

got mixed up, got distracted and somehow or other the subcut that should have been given to the lady in bed 8 was given to the lady in bed 3. (Interview: Nurse_29)

Nurses used another workaround related to checking medications to save time. The administering nurses were observed to take the medication for injection to the checking nurse and ask them to check, for example, “Clexane for Mr Smith in bed 6”. The checking nurse checked the medication, saying, for example, “Yes, it is Clexane, I gave it to Mr Smith last night, he has been on that for a while now”. To save time, the checking nurses did not always check the medication order. Rather, they relied on their knowledge and memory of the medication the patient had been prescribed. This workaround was facilitated at Hospital B because the checking nurse was not required to physically enter their user name and password.

4.6.12.1 Not using workarounds to circumvent checking and witnessing policies

There was one study unit where nurses were not observed to work around the witnessing policy. In that study unit, B1, a process had been introduced for administration of medications that required a witness. Two nurses together would then complete a medication ‘round’ dedicated to administration of scheduled medications. At each patient, they completed the 5Rs and the appropriate documentation in the drug register books once the medication had been administered. When the ‘round’ had been completed, a final reconciliation was conducted as the scheduled medications were returned to the DD cupboard. A dedicated Warfarin medication round followed the same process without the scheduled medication specific process steps.

4.6.13 Using workarounds when unfamiliarity with the EMMS cost time

There were instances where nurses were unfamiliar with features of the EMMS, because they were new, agency staff or had not recently used a particular feature of the EMMS. Unfamiliarity with how to use the EMMS cost individual nurses and their colleagues’ time. There were several types of workarounds that nurses used to salvage time. In the focus group excerpt following, staff described the cost in time to teach a colleague how to use the system. They reflected collectively that it cost the whole team time. Nurses worked around the time constraints by administering medications for their colleagues who were slow.

81: We do have a lot of pool nurses here as well and they may come with a full knowledge of [EMMS name], or they may just have been trained downstairs before they come up and therefore sometimes you really – well, you’ve had it where you’ve

had to really train somebody you're working with and you've ended up having to do the medication round for that person in addition to your own. A lovely person, but she had only just been briefly sort of glossed over before she came up here and she really didn't know [EMMS name] at all.

93: That's right.

F: So then that influences your work as well?

93: Yeah, exactly.

81: She was taking so long, because she really didn't know what – she'd got no priority because she didn't know whether to give the IVs first or whatever and it was a very bad shift, that was, yeah. (Focus Group_ID_8)

Other participants described workarounds such as passing on information informally when they did not know how to complete a task in the eMAR. Because the nurses were busy, they did not have time to find out how to un-chart a medication that had been recorded in the eMAR as administered. Rather than spend the time learning how to fix the problem, the nurses informally passed on the information in handover.

Several nurses revealed that they found it difficult to nurse initiate medications using the EMMS. In the following excerpt, having spent considerable time trying to order a nurse initiated medication in the EMMS, Nurse_98 asked the doctor to order a STAT dose of the medication.

22:45 – Nurse_98 administered Mylanta but when she attempted to order the nurse initiated medication in the eMAR, she was not able to confirm the medication as having been administered in the system. She tried several different methods but to no avail. She telephoned a nurse on another ward and asked her if she would talk her through the process. She still was not able to administer the medication in the eMAR ... she was told that the doctor was currently in the other unit – the doctor was asked if he would mind coming to order a stat dose of the medication – which he did. (Field Notes: Observation_98_Night Shift).

4.6.14 Using workarounds to administer medication early 'to be prepared'

One of the most frequently offered reasons for using workarounds was to create space in time for the unpredictable events. Nurses repeatedly explained that as per the NSW Health logo advertising careers in nursing and midwifery, "No two days are ever the same" [334]. Therefore, nurses used workarounds not only to manage immediate demands but also to have completed tasks so that there would be 'spare' time to manage unexpected events. Nurses explained that giving medications early resolved the tension between what the organisation expected that nurses would be able to do within explicit timeframes and what could feasibly be achieved.

As he is confirming the Nilstat as administered in the eMAR, the nurse tells me that he administered it earlier. He explains that some medications like Nilstat are administered opportunistically when the patient is awake because you never know what will happen. When they wake in the morning there are so many things that could stop them giving the medications. (Field Notes: Observation_60[1]_Night Shift)

Five of the evening nurses were sitting at the nurses' station. It had been a quiet shift and they have finished their report writing and medications for the evening. I asked why nurses' medication practices varied and why nurses used workarounds when using the EMMS even when it seemed like a quiet shift. The explanation that they offered linked to a need to be ready to cope with unexpected events that was frequently mentioned by participants.

One nurse says, 'we need to create space in case we get a new admission or someone falls or something happens.' I ask whether the variations happen when it is not busy – some of the nurses say 'yes' and some say 'no'. One of the nurses explains that 'some nurses are stuck in their ways and are always working as if something is about to go wrong or is about to happen.' (Field Notes: Observation_89_PM)

The notion of using workarounds to manage the business, to not 'look bad' and to create leeway or room to deliver timely care in the face of unexpected events is captured in the following interview excerpt:

39: It's not that you don't get everything done because it's very rare that you don't get everything done, maybe Monday with a case conference. But it is more of the fact that it does look bad if a doctor looks on the screen and says, oh well there's all these red

ones and you're still down here with this patient. A second is, because you never know what's going to happen. So you wait, you save time. Say you're going to give the eight o'clock medications, it's like oh sweet, I'll just wait till eight and you're sitting there, waiting having a cuppa, waiting and then someone has a MET call and you're like crap. Then you're here till 9:30, and you're giving everyone 8s, 10s, God-knows, just throwing it altogether. In that aspect it probably makes it more dangerous because you're rushing. I find it a lot easier and it just saves a lot of effort in the long run, I think if something does happen, if you get it done beforehand, like an hour beforehand in the time frame.

F: Okay, so the cost saving when people say, we need to do it quickly it's about saving, almost like creating a space ...

39: Yeah, it's creating time for something to happen. (Interview: Nurse_39)

Nurses described that to be prepared they dispensed medications early and left them in the patient's locked bedside drawer until they became 'available for administration' in the EMMS. In the interview excerpt below, Nurse_31 explained the practice of preparing all of the medications at one time and then locking them in the patient's drawer until they were available to be administered in the EMMS. She described another workaround to 'be prepared' in which medications were administered early and signed off later, and commented that this practice was 'not very good'.

31: I know other people, I've heard, I don't agree with that, they will just give it to – the medication lined up, dispensed, or medication in the cup. Line up the 8 o'clock medication – so they just get a laptop into the drug room and they put it [the medication] into the little cup, and according to the time, the scheduled time, and they lock them in the drawer, and once it hits 7 o'clock, they give it and then wait until the time, the clock hits 8 or 7, when it becomes available (in the EMMS – demonstrated with a green dot). Then they start to click it off, just sitting at station just clicking them all off.

F: And they've already given them?

31: There have already been given like a half an hour ago. Which I don't agree with that. (Interview: Nurse_31)

While the nurses communicated informally with each other that a medication had been administered early but not yet signed off, they did not always bring the administration time forward in the eMAR. Rather, they waited to sign it off when it became available in the system.

4.6.15 Using workarounds to improve time efficiency supported other good nurse characteristics

Some nurses explained that they used workarounds to save time so that they could enact another good nurse characteristic, for example: to make time to check a medication that was complex and that they had not given before (safe nurse); so that they could spend more time taking the patient to the shower/feeding them according to a patient-driven rather than organisation-drive timeframe (patient-centred nurse); or have more time available to help or not pass on tasks to the next shift (team nurse). The use of workarounds to save time to enable other good nurse characteristics will be examined in the following chapters.

4.6.16 Using workarounds to improve time efficiency compromised other good nurse characteristics

Nurses also reported using workarounds to be time efficient that compromised other good nurse characteristics. In some cases, nurses employed secondary workarounds to compensate. Participants reported that preparing more than one patient's medications at a time ('batching') was necessary to work around time restrictions (primary workaround). They clearly identified which medication was for which patient by marking the medication cup or kidney dish or tucking it into the patient folder as an extra safety measure (secondary workaround).

4.7 Conclusion

Time is an important contextual variable at the clinical coalface. The importance of managing competing demands to deliver timely patient care is linked with nurses' descriptions of being a good nurse. Nurses in this study strived **to be or to be perceived to be** good nurses. The significance of being time efficient and being a good nurse was established and strengthened by formal and informal mechanisms. Medication administration was an important part of nurses' work. In addition to supporting and challenging medication work, the EMMS had made the timely completion of medication administration, (or 'failure' to do so) more visible than it was with the paper MAR. Nurses used workarounds to circumvent hindrances to completing medication administration efficiently. They also worked around potential signals that they were not time

efficient. Workarounds to be time efficient both supported and undermined other good nurse characteristics. Secondary workarounds were employed to compensate for the latter. The next chapter examines the importance of safety in nurses' use of workarounds in medication administration using the EMMS.

Chapter 5 Being a safe nurse

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5.1 Introduction

The focus of the previous chapter was nurses' use of workarounds in order to be, or to be perceived to be, time efficient. In that chapter, it was clear that some of the workarounds that nurses used to be time efficient potentially undermined patient safety – opening one eMAR over the top of another, for example. Conversely, other workarounds potentially enhanced patient safety by ensuring timely delivery of patient care. This chapter focuses on the importance of delivering safe care. Initially I explain how being safe was constructed and reinforced to be important for nurses (Sections 5.1 and 5.2). The ways in which the EMMS supported and challenged nurses achieving patient safety is explained in Section 5.3. In Sections 5.4, 5.5 and 5.6, I present how and why nurses used or chose not to use workarounds to achieve the goal of patient safety. This chapter addresses Research Question 1 (Do nurses employ workarounds when using EMMS in an Australian setting?) and Research Question 2 (How do nurses enact, experience and explain their use of workarounds?).

5.2 The importance of patient safety at the clinical coalface

Patient safety featured as an important construct in this study. This was made evident by a high concentration of references to safety and risk in participants' discourse; in governance structures such as medication safety committees; and artefacts across all study sites. The investment in the development and implementation of the EMMS, including attention to on-going improvements and support, attested to the hospitals' concern to improve, or be seen to improve, patient safety. That I was given permission to conduct this research and the extent of support I received from participants and the organisations demonstrate the importance of patient safety and quality improvement – both enacted and perceived to be enacted.

I noted in passing the laminated pieces of A4 paper stuck above beds (Falls Risk, Fluid Restriction, Fasting, Nil By Mouth), the handrails that ran the length of the walls and numerous yellow sharps containers, sinks and rubbish bins. 'Slip Hazard' portable, yellow, plastic, triangular signs identified the passage of the cleaners and spills. Isolation rooms were immediately identifiable by laminated cards instructing visitors to check with a nurse before entering and the trolleys loaded with gloves and gowns or aprons parked at the room's entrance. The medication room was accessed via swipe or pinned key code and the top drawer in patients' bedside lockers, dedicated for patient-specific medication storage, were locked. There were COWs, desktop

computers, emergency trolleys, and vital signs recorders visible on participating units. All of these artefacts underscored the importance of patient, and staff, safety.

There was a visible culture of quality improvement with an evident emphasis on patient safety across all sites. Units developed and implemented quality improvement strategies with the ultimate aim of improving patient safety. Unit-specific quality improvement initiatives that I observed included, but were not limited to: orange bedside folders to identify patients with diabetes; hand sanitiser dispensers mounted on the COWs; and 'COW boxes' that contained medication administration equipment.

Across the units, nurse-initiated process improvement strategies were evident. Immediately apparent were heterogenic strategies to improve the DD round and DD key retrieval processes, including a doorbell, paging, and nominating two nurses on the shift to carry the keys. In most units these were bottom-up initiatives with the exception of one unit in which the process for DD medication rounds had been initially introduced and enforced by the NUM and had been absorbed into unit culture. In the units where strategies had been devised, agency and pool staff were orientated to the process particular to the unit and nurses spoke about the processes related to DD key retrieval and checking in ways that identified them as distinguishing characteristics of their unit.

Participants revealed that audits were conducted regularly at both hospitals – by accreditation organisations, the hospitals and the units themselves. Feedback of the results of audits was printed and visibly located at different places in each unit. The audits included, but were not limited to: completion of required information in the drug registers; whether medication drawers were locked; and compliance rates of conversion from paper medication charts to the eMAR. In some units, there were locally conducted audits, with the results displayed for staff to see.

Everyone has a key to the drawer and so once they get in the system and they open the drawer then they give the medication at the bedside doing that. Hopefully they lock the drawer ... [we do] audits on it and the compliance has not ever been 100 per cent. (Interview: Nurse_03)

Initiatives such as 'April Falls Day' and the 'Red Dot Mobility Program' aimed to reduce the number of patient falls. I regularly noted that there were 'Specials' with patients. These nursing

assistants were hired from agencies to observe and assist one or two patients for a shift who had been assessed to be at a high risk of falling.

There were innumerable laminated signs advertising patient safety information. For example, in one medication room, two laminated signs were stuck on the wall to remind nurses of the importance of checking patient identification information. One sign recapped 'six rights' of medication administration. The wording on another sign, captured below, presented a ditty to reinforce the importance of checking patient identification:

Musical beds! Patient FLOW! Our patients are always on the go. Use patient name and not bed number. To avoid a medication blunder! (Field Notes: Observation_119_PM)

In some of the participating units, I observed laminated signs on the lids of selected COW laptops reminding readers of the importance of not interrupting nurses who were doing medication rounds. According to the nurses, the signs had little impact on the degree to which they were interrupted.

On the lid of the laptop on two of the COWs is a picture of a woman screaming and then a lot of writing about the importance of not interrupting the nurse doing the medications – one of the nurses laughs about the sign – 'it doesn't do anything: they always interrupt anyway'. (Field Notes: Observation_219_AM)

International Nurses' Day 2011 and 2012, celebrated on Florence Nightingale's birthday, were marked with festive activities including cakes, presentations and awards in the hospitals. Participants were clearly committed to Florence Nightingale's axiom that 'the very first requirement in a hospital is that it should do the sick no harm' [9]. The following field note excerpt offers an illustration of how senior nurses informally emphasised the significance of doing 'the sick no harm'. The excerpt also highlights that in some instances, being time efficient by having the medications prepared and ready to be administered, and helping out the team by staying at work when they were short staffed, were not considered as important, in this context, as protecting the patients from potential infection.

21:30 – Handover starts promptly. The evening In-charge hands over to the night staff in the nurses' staff room from a handover sheet. There are three night-duty staff around the table, the evening In-charge sits next to one wall, not at the table with the

night-duty staff. Unusually, some of the night staff are running late, and arrive as handover progresses. Handover finishes at 21:50. Before the night In-charge has allocated patients to the night staff, one of the evening shift nurses puts his head in through the door and says that he is sick and needs to leave. He stands at the door and tells the night staff about one of his patients. He explains that the medication is prepared and when it is due for administration. He explains that 'one is going through now', and the next one is prepared. The night-duty In-charge does not turn to look at him. He has entered the room behind her. Judging by the look on her face she is not impressed – she says calmly 'go home and take care of yourself'. The other nurses all look at each other, the tension is palpable. There is further handover about a PACE call ... the In-charge nurse expresses frustration to the other nurses about the evening nurse who was sick and stayed because they were short staffed. She exclaims, 'he needed to go home when he is sick – we have patients with low immunity'. (Field Notes: Observation_69[2]_Night shift)

'Safety' featured heavily in nurses' discussions and explanations about how and why they used particular clinical practices. Nurses often made comments that linked being an experienced nurse with enacting patient safety. Neophyte nurses revealed that they trusted the practices of their senior colleagues as being safe. In the following excerpt, Nurse_06 attributed virtuous characteristics to seniority including being reliable, dependable, trustworthy and safe.

I honestly do just trust the senior nurses a lot more. I know they're not infallible, and they are only human, but my instinct tells me that they have got a lot more experience and they are reliable and dependable. If they had been doing it wrong this entire time, they wouldn't be doing that practice, they would be caught up already ... Yeah, but if it is someone else coming to me, I kind of rely on them to know when it is safe, especially if it is a senior nurse. (Interview: Nurse_06)

5.3 Pressure to be a safe nurse when administering medications

There were identified differences between the units in some of the strategies used to enforce particular medication administration practices. For example, as described in Chapter 4, one of the participating units, B1, had introduced a unique process to ensure 'safe' practice for administration of medications that required a witness. Other restrictions included the requirement for registered nurses to be supervised while they administered IV medications until they had

demonstrated that they were 'safe'. Participants also identified that in some units, medication safety policies were enforced more strictly than in others.

One of the nurses, describing variations in the way nurses administer medications, explains that on one of the wards, the NUM is really strict and the nurses have to take the computer to the bedside and face it so that they can read the screen every time – that's how it is supposed to be done, she says, but that NUM is really strict. (Field Notes: Observation_208_AM)

Other nurses described checking colleagues' work or allocating less complex patients to those who they thought were less safe. Safety was a team and individual responsibility:

02:10 – Nurse_69 explained that in these situations, they were supposed to let 'them' (the less competent) have some complex patients rather than buffer them all the time but she said that – you can't, that she worries, and so she always gives them the patients she knows they can manage. The complex, hard ones then fall on the same people. She tells me that sometimes the patients will say, 'they don't want X or Y because they don't like the way they do this – they don't feel safe'. (Field Notes: Observation_69_Night Shift)

The concern with safe practice and patient well-being was not restricted to work hours. One nurse described checking patients' identification bands while dozing off at home. I heard other nurses talk with each other about how they had spent nights wondering how patients were.

I wake up and not even that, sometimes I'll be half awake and I'll be checking someone's arm band – and they'll wake me up and say what are you doing (laughing) and I'm like – sorry. It invades you really bad. (Interview: Nurse_06)

5.4 The relationship between policy, the EMMS and medication safety

5.4.1 Policy and safety

Participants recognised that the purpose of policies was to keep patients safe. There was agreement that some policies, including policies governing the administration process of cytotoxic medications, supported patient safety, and strictly adhering to these policies was considered essential. Participants noted repeatedly, however, that sometimes there was a discord between

policies, safe care in the 'ideal' world and patient safety in the 'real' world. There were some policies and directives that participants identified were potentially detrimental to patient safety because they did not account for clinical workflow.

Nurse_103, complained about the practice of moving a patient from the Emergency Department before a bed was ready in the receiving unit. She says that decisions are made, and policies and rules are handed down, by people who do not work on the wards – and complains that that is 'dangerous' (Field Notes: Observation_103_PM.)

Nurses frequently suggested that: there were too many policies; there was not enough time to follow all of the policies and deliver patient care (see Chapter 4); time spent following numerous policies detracted from time spent with patients, and therefore patient safety; policies were changed so frequently that they were often unsure which iteration was current (note the inconsistent reference to the 5Rs or the 6Rs of medication administration in the excerpts across the findings chapters); and following a policy, such as the medication administration policy, did not guarantee patient safety. Rather, mindfulness, flexibility, careful attention and an ability to 'think outside the square' were characteristics that were said to be necessary to enact patient safety. Following a policy alone was not enough to protect the patients from harm or a 'near miss'. In as much as EMMS promoted mindlessness, they did not support patient safety.

Nurse_71 tells me that it is not possible to get everything done if all policies are followed and that there are some nurses who can follow every step precisely, the Five Rs, and still make a mistake and then others who don't and never make a mistake. She reiterates that following the policies exactly doesn't stop nurses making mistakes. (Field Notes: Observation_71_PM)

It was suggested that nurses who were preoccupied with following policy displayed a reduced sense of accountability – the policy only required the nurse to complete X – and diminished ability to think laterally, to see the bigger picture, which was said to detract from safe patient care. The following excerpt offers a concrete example to illustrate this view. In the following excerpt the participant noted that rather than just follow the 6Rs, nurses needed to be actively mindful, they needed to know who their patient was, why they were in hospital, what the medications were for and why the patient would be ordered the medications in the doses ordered.

One of the nurses narrated an event that had happened some time before when a patient had been ordered medications that were not for them. She explained that the medication order was correct, the 6Rs were correct, so following them was not the answer. She recounted that it wasn't until one of the nurses, thought – who is this patient, what is wrong with them, why are they here, why are they having these meds? thought again – WHY ARE THEY HAVING THESE MEDS? Nurse_69 elaborated that she constantly asked herself those same questions when administering medication and stressed that this approach was more important for patient safety than mindlessly following the 6Rs. She emphasised that you should do both (question and follow the 6Rs) but that if she was distracted from asking the questions, then she was more likely to make a mistake. (Field Notes: Observation_69_Night Shift)

5.4.2 Medication administration, the EMMS and patient safety

5.4.2.1 The EMMS was introduced to make nurses practise safely

Participants suggested that the EMMS had been introduced in part because of unsafe medication administration practices. That is, EMMS would not have been necessary if nurses had followed 'ideal' safe medication practice. In the following interview excerpt, Nurse_20 expressed that while he considered that standardisation was not always ideal in clinical practice, the EMMS has been introduced to force standardisation because some nurses need to be made to practise safely. Nurse_34 recognised that the EMMS required nurses to follow correct practice – implying that they were not good prior to the introduction of the EMMS.

I think the whole idea is that generally with an electronic system you take away some of that. Perhaps you ... standardise and whatever. I'm not necessarily sure that that's 100 per cent a good thing. However, I'm well aware that the world is full of idiots, you know and junior staff – there are plenty of people who have Master's degrees and PhDs who are clinical idiots. (Interview: Nurse_20)

5.4.2.2 EMMS improving quality and safety of medication administration

Mostly nurses talked about the positive effect of the EMMS on quality and safety. They commented that the potential for medication error due to illegibility of orders had dramatically reduced and noted that point-of-care access to medication and clinical information enhanced

medication safety. Features of the eMAR that allowed communication between providers about medications, alerts and reminders were also reported to enhance patient safety.

One of the nurses says that she likes the EMMS because, with the computer system, the doctors can't 'mumble'. She explained that with the paper order, they could write it in bad writing if they were not really sure – 'now they can't rely on the nurses to decipher the order'. (Field Notes: Observation_70_Night Shift)

Participants suggested that by making medication work more easily auditable, the EMMS had positively impacted quality and safety. Several participants related medication incidents that had led to improvements in the EMMS. The auditability features of the EMMS had facilitated investigation of those incidents.

But if ever there's an audit for any reason it's all – again it's all backed up by the time of the administration when the thing's actually signed electronically, so that a document can be raised with every patient – every dose of administration for all their drugs during their hospitalisation whilst in this – under this electronic system. So I've found that that's been very helpful on a number of occasions where there has been an enquiry. In fact one was an HCCC [Health Care Complaints Commission] enquiry and it proved very, very supportive. So I think the nurses know that so they feel more confident in their practice. (Interview: Nurse_36)

One of the ways in which nurses identified that the EMMS contributed to patient safety was by not letting them forget that medications had not been administered. At both hospitals, nurses talked about the OMA 'flashing' to signal that a medication was overdue. This was interesting because I did not observe the OMA to 'flash' at either hospital. One nurse explained that the EMMS made him more relaxed because it would not let him miss medications and because the EMMS guided practice. Others identified this reliance on the EMMS as potentially undermining patient safety (see following section).

So I find it, for me, it makes me feel more relaxed. I know the [EMMS name] will always tell me what I'm doing. (Interview: Nurse_34)

5.4.2.3 EMMS challenging quality and safety of medication administration

At the same time, the EMMS was described as having the potential to introduce new errors. At both hospitals, I was told about medication errors that had occurred with the EMMS and the

subsequent ramifications. In addition to the content of the stories, the process of sharing and retelling these 'war stories' served to reinforce the importance of being a safe nurse.

Participants explained that the EMMS made medication orders accessible for patients who were physically located in another ward from that on which a nurse might be working. Several participants reported a medication error in which a nurse had administered medications from an eMAR of a patient on another ward to a patient in the ward where they were working. In addition, two participants, one at each hospital, described, with some angst, their own experiences of near miss medication errors that occurred because they had opened the eMAR of a patient on another ward, and dispensed the medications. A 'near miss' rather than a medication error had occurred in both instances because the medications in the patients' bedside drawer did not match those on the eMAR, alerting the nurses to a potential problem. The nurses were shaken by the experience.

31: And also when you're busy, that's one thing I think really needs to be improved, say I'm working [A1] ward today but I can still log onto [A7] ward to see the patients' notes. Because once I almost made a fatal mistake. Because it was busy and I clicked the wrong [tab] you know next to [A1] ward is [A7] ward – we thought we were clicking [A7] ward because it is tiny ... and here I had got it [the COW] to the patient's bedside and I was actually logged onto the wrong patient who is in [A1] ward in bed 12 and I was physically in [A7] ward, Bed 12 [the same bed in a different ward – different patient] and I didn't realize that because they are all male, elderly – until I opened the medication drawer and saw that the medication in the drawer didn't match the medication on the chart. Because the patient was still having a nap I hadn't really checked the patient. What I should have done was to check the name card also. Sometimes there isn't a name card – I'm not looking for an excuse but that's happened. And to realise – wooah I almost, almost, at that point made a mistake – so I thought if they can say that each nurse working on this ward can only log into this ward – not other ward. Now in any corner of the hospital you can log onto other people's ward, just by mistake. And mistakenly give it [another patient's medication]. So that's a thing that needs to be improved. Almost, almost ... [extremely concerned, anxious tone]. (Interview: Nurse_31)

53: I had the same patient I was looking after was the same patient in the same bed on another ward and when I flicked the chart up and I was checking this patient's

drug and got them loaded on the MAR got the patient was in the bathroom. I still didn't click and then moved to the next patient to save some time and discovered that this patient's on – where's his insulin or whatever, this is ridiculous, and then by looking I thought 'oh my God I'm in the wrong ward' but I had the right patient the first time around and the second time it clicked because I had obviously just flicked on a number and not paid attention to the name. I became aware of my mistake. It could have been quite disastrous because I hadn't given the first patient the medication. So I can see how ... Same bed.

F: Different wards?

53: Different ward. You have a multiple – like I have multiple wards so I have to be conscious – I'm in ward [de identified], I'm in ward [de identified]. I have heard of that happen somebody else signing off drugs on someone else's ward which hadn't been given ... it could have been disastrous ... Yeah it was a near miss. So that kind of thing but it was a wake-up call. I hope I never come across that again [her tone is a mixture of dread and relief]. (Interview: Nurse_53)

The feature of the eMAR at Hospital B that allowed more than one person to open and be active in the same patient's eMAR at the same time and to have more than one patient's eMAR open on their computer screen at a time (Chapter 4 (4.6.12)) introduced a new challenge to medication safety. Participants identified that, given the team model of nursing care they used, it was possible for two members of the same patient-care team to administer medication to the same patient. Situations were described in which, while medications were being administered at the bedside using one computer, a doctor using a desktop computer ceased the medication. When the nurses went to sign it off, the medication had disappeared from the eMAR.

Another thing is because with the computer everybody can access it from other terminal when you're doing something, other people probably changed something already. But with the paper chart, you are the one holding it, then no one can change an order, not unless they take it from your hand. ... What happened was the doctor ceased the medication on the other terminal. I was giving out the medication and gave it to the patient, was going to sign the order and then find out the order is not there anymore. Then because the doctor on the other terminal has already ceased the

order, then I need to ask the doctor to re-chart another dose because it's already been given. (Interview: Nurse_30)

At the time of the study, not all units had implemented the EMMS across the study hospitals. Nurses identified potential risks to patient safety if paper and electronic medication orders co-existed. The potential confusion created when medications had to be administered off a printout of the eMAR when the system crashed, or during the transfer of patients to units that did not use EMMS were also identified as challenges to quality and safety.

The nurses reported that the prescribed times for medication administration were not always appropriate or safe in the hospital context. For example, if breakfast arrived at 07:00, a prescribed medication administration time of 08:00 was not appropriate for medications that needed to be given an hour before food.

The short log-out time at Hospital A was considered to potentially undermine quality and safety. Participants explained that if they had only dispensed some of the ordered medications when they were logged out prior to entering the final confirmation, there was a risk of medication error if they forgot what had already been dispensed into the medication cup.

The nurse explains that one shortfall of the EMMS is that when the computer logs out or dies and they are half way through the medication chart, they have to log back in and start all over again. She said that if there were some of the medications in the cup, they needed to remember or visually identify which ones were in the cup. If they were not sure they had to throw all the medications out and start again. (Field Notes: Observation_106_AM)

Some participants identified nurses' 'mindless reliance' on the EMMS as infallible as a potential challenge to patient safety. It was suggested that nurses were less likely to question an order or that the computer had been updated in line with new information, such as patient bed transfers, than they were with paper charts.

65: They rely on the idea that technology is going to be right, they still don't make the connection that they're humans using a system that is set up by humans, so they think that they've come to the bedside and – that is the patient. And there have been incidents, a fair while ago now, where we have had wrong patients given medications because they've just clicked on the bed number, not clearly looked at the patient

name and the patient has been moved and it hasn't updated on the system, so they don't do the full checks because they think that the computer is in line.

F: Would that be different though with paper?

65: I think that we were more – the fact that it was a physical – you were more vigilant that it was hand written and that it's not some other mega mind telling you what to do that's fallible. (Interview: Nurse_65)

Several participants related a medication incident that resulted from a doctor using a workaround when prescribing an intravenous antibiotic. At the time of the incident, it was not possible to prescribe variable doses in that eMAR. The doctor worked around withholding the medication order, when blood results indicated that it should not be administered, by prescribing a nonsensically small dose. Participants explained that because they noted the medication had been signed as administered in the EMMS, and because they trusted the EMMS, nurses checked and administered the medication. The following excerpt refers to this incident.

I think because people rely on the fact that the computers – they think that it's a living organism, it's not what someone has put into it – like, 'Oh well, the computer says to do it, so it's right, the computer's right'. There was an incident a few months ago on another ward where it was relating to Vancomycin and to ensure that Vancomycin levels are checked and it has been withheld, they have to on the [EMMS name] prescribe the minimum dose so on another ward they prescribed 0.1mg of Vancomycin – so there were a lot of system faults that happened but over five days the patient was being administered 0.1mg of Vancomycin, which was being countersigned by two RNs every day for about five days and their rationale was because it was prescribed, no one questioned it, it was prescribed. They think the safety is in there [in the computer]. (Interview: Nurse_65)

5.5 Using workarounds to support patient safety

5.5.1 Using workarounds with EMMS to limit the spread of infection

In the preceding chapter, nurses described working around infection-control policies to save time. However, they also reported using workarounds to keep patients safe from cross infection. When there were four patients on the unit at the same time with MROs (multi resistant organism)

infections, they were isolated in a four-bedded room with a dedicated COW. Doing so worked around the potential for the COW to act as a vector for cross infection and the nurses having to memorise medication information between a COW parked at the doorway and the medication in the bedside drawer.

When a COW could not be dedicated for use with only isolated patients, to decrease the risk of cross infection, nurses conveyed working around the requirement that the COW be taken to the bedside. They reported using the COW at the doorway, using the computer at the desk or in the medication room to administer medications. Nurses described an on-going need to weigh up the risks of workarounds against those of spreading infection for individual patients and other patients in the unit. Participants reported that considerations such as how well they knew the patient, the reason the patient was isolated – immunosuppressed and/or infectious – and the type of medication to be administered influenced whether they used workarounds and if so, the secondary workarounds that were employed. These ‘moderating motivations’ will be described in more detail in Chapter 9.

A nurse justifies why she left the COW at the door, explaining that you have to weigh up the risks – risking spread of MRSA [Methicillin-Resistant Staphylococcus Aureus] and VRE [Vancomycin Resistant Enterococcus] versus not following the 5Rs of giving medication. (Field Notes: Observation_204_AM)

Participants recognised that the above workarounds could increase the risk of a medication error, even as it decreased the risk of cross infection, and depicted a variety of secondary workarounds that they deployed to check the medications in the bedside drawer and the patient identification information against the eMAR. Secondary workarounds included: writing medication names on pieces of paper; preparing medications that were ward stock in the medication room; identifying the medication cup with a bed number or patient identification details written on paper; and memorising the medications and the patient details from the eMAR to the patient. Other participants printed off the eMAR and took the printout into the isolated room to administer medications from the bedside drawer and to check the patient identification. The printout was thrown in the bin in the patient’s room, so it did not leave the room. The medications were then signed off in the eMAR outside the room. Nurses were observed to work around taking the COW to the bedside to check the medications by taking the medication drawer to the COW shelf. They then wiped down the shelf afterwards, which, they said, was more effective than cleaning the

entire COW including the wheels. Some nurses asked a colleague to stand at the door and call out the information from the eMAR while they prepared the medication from the bedside drawer and cross checked the patient identification. I observed this, particularly with administration of DDs:

13:10 – One of the nurses identifies that there is a real problem when patients are isolated, especially with something like Norovirus, which requires the nurses to completely gown, mask, glove etc before they go into the room. She explains that the nurses work out all sorts of ingenious ways to get the medications given. They leave the computer at the door, ‘duck out, rip the gloves off and put on clean ones to scroll down their order to see what we need to get from the drawer – so we have one set of gloves for getting the medication out of the drawer and another to touch the computer at the door’. Some nurses write the MRN on a piece of paper and take that to the patient to use as an ID check – she says ‘what if you write it down wrongly’ – some write the medications on a piece of paper, take it to the drawer and get the medications from the patient’s drawer. Some sing out to the patient while they are at the computer and ask them their name and then take the medication to the patient – either bringing the medication from the drawer to the computer to check against the order – or not. Some memorise the medications that the patient is on and get them from the drawer. She says that sometimes she will call out and ask another nurse who is near the computer to read out the MRN so that she doesn’t have to take off the gown and gloves and then put it all on again – ‘but I don’t do that all the time’. (Field Notes: Observation_208_AM)

While unusual, there were a few participants who did not leave the COW outside the patient’s room. They took the COW into the isolated rooms instead, because they felt it was not safe to leave it outside.

Yes, because most of the – just the regular meds are kept in their bedside drawer. So how do you – how can you check out 10 of those without the computer with you? Whether they are infectious or not – So ... That’s why I take it in. I’m sure there are people that don’t, but it’s not really safe to not take it with you. (Interview: Nurse_174)

5.5.2 Using workarounds to avoid interruptions to reduce the risk of error

The observational data were replete with examples of interruptions when nurses were preparing and administering medications. In the previous chapter, I gave examples of nurses who described using workarounds to avoid being interrupted because interruptions cost time. Nurses also stressed that they were more likely to make an error if interrupted. Some nurses explained that interruptions during medication rounds had always been a part of nursing. Others suggested that the COWs made them a target for interruptions during medication administration.

Nurse_71 tells me that the patients don't appreciate how long each medication takes to confirm. She explains that you need to go through so many screens and boxes and ticks – 'and patients think that because it is a computer it will be quick so they interrupt while you are waiting to go to the next screen to check – the interruptions are more now', since EMMS was introduced. (Field Notes: Observation_71_PM)

Nurses used workarounds such as confirming medication as administered in the eMAR before administering it to the patient to reduce the risk of medication error. Participants explained that they signed the medication as administered in the eMAR so that when they were interrupted, they were able to keep track of which medications they had dispensed into the medication cup. As they dispensed the medication into the cup, they confirmed them as administered in the eMAR.

Many nurses rationalised not taking the COW to the bedside to avoid interruptions because interruptions compromised patient safety. Instead, nurses prepared medications for administration at the computer in the medication room.

I get all the medications I can from the drug room, that's kind of the way I do it. I always go to the drug room and try and get all the medications I can there, and then what I need to at the bedside, just because it saves me getting confused. But the more I'm at the bedside, patients start asking questions, and that's kind of when you lose your thoughts. So I'd rather look at the doses in the drug room where it's quiet, rather than at the bedside where other patients are, can you come and then you – I think most of the laptops have a sign on the back, saying not to interrupt. (Interview: Nurse_91)

Other participants described preparing medications at the COW in the corridor rather than at the patient's bedside. In the following interview excerpt, Nurse_120 highlighted that by not taking the

COW to the bedside, she was able to systematically dispense the medication for one patient at a time. Participants reported using secondary workarounds to ensure that safety was not compromised in other ways. These secondary workarounds were implemented to check the patient identification information against that in the eMAR. The workarounds that Nurse_120 described were not unique to her. Other participants worked around a formal identification check by gauging patients' responses, checking the name on the medication and above the bed.

Sometimes I don't want to take the computer in next to some of the patients because they interrupt you, for example they want to go to the toilet ... so you are more likely to make errors and get delayed. In those situations, I have the computer in the hallway outside the room. I start with the first bed. I take the medication drawer out from their bedside locker to the computer and as I put each medication in the cup, I tick it off on the computer to know where I am up to ... I do them one by one [the patients' medications]. I give the medication straight away as soon as I have put them all in the medication cup. I only have that patient on my mind, only his drugs and only his drawer. That is a protective way ...

... I check the patient's label on the medication and the order, look at the name on the board above their bed and I talk with them using their name. I also talk to them about the medication and I judge their response. If when I say 'Mrs Jones?', 'your Digoxin' and she says 'yes' and then 'yes' – that's a 'go'. (Interview: Nurse_120)

In the following excerpt, a group of senior nurses discussed how, due to neophyte nurses' lack of experience and increased potential for error, they encouraged them to take the medication drawer to the COW in the corridor rather than taking the COW to the bedside. These senior nurses argued that when staff were inexperienced, the risk of making an error when distracted was higher than the risk of making an error due to not formally checking the patient identification information.

One of the senior nurses in the group explains why she takes the drawer of medications to the COW in the corridor – she says that she can calmly concentrate on medications and then take them to the patient at the same time as locking up the drawer. Another senior nurse contributed that she believed that it was safer for the new nurses to follow that practice so that they are not distracted ... They said that the interruptions, spread of infection, dead batteries, and nowhere to move the COW pose

greater risk of causing an error than do the workarounds such as memorising the MRN. (Field Notes: Observation_75_AM)

Their colleagues frequently interrupted nurses during medication administration. While participants conveyed the need to use workarounds to avoid being interrupted by patients, they did not ascribe using workarounds to reduce interruptions by colleagues.

5.5.3 Using workarounds to improve concentration

Closely related to the need to avoid interruptions was the perceived need to focus. The following data excerpt suggests that participants used workarounds such as preparing and signing off medications at the desktop computer rather than at the COW to focus and concentrate. The screen on the desktop computer was larger so was perceived to be easier to concentrate on when there were other distractions.

21:15: I observed Nurse_76 prepare and sign off medications using the computer in the medication room. She explains that when it is really busy she is more likely to look at eMAR on computer in the medication room or at the staff station and put the medications into cups for patients there and then go directly to the patient, back to the computer in medication room or at the nurses' desk, sign the medication off and then move to the next patient. This is because at the desk or in the medication room, there is just the individual patient's eMAR with no interruptions and no distractions and the screen is bigger – this is especially the case if there are a lot of other things on her mind like new admissions, organising their diets, meals or in the case of a patient death – ensuring the doctor, family, ADN [Assistant Director of Nursing] and bed manager have been notified, patient's mattress order cancelled and the paper work completed. (Field Notes: Observation_76_PM)

5.5.4 Using workarounds to compensate for being tired and less likely to remember

Participants reported using workarounds to compensate for being tired and less likely to remember. As such, tiredness constituted the barrier to safe medication administration that workarounds circumvented. Tiredness as a 'moderating motivation', which influenced whether or not nurses used workarounds in given contexts, will be discussed Chapter 9. Nurse_72 described using the following workaround to compensate for being tired and less likely to remember. Rather than waiting to administer the medication in the eMAR after the patient had taken it, nurses

confirmed them as administered in the eMAR when they put them in the medication cup. Some nurses explained that when they had used the paper MAR, they had noted with a dot the medications they had put in the medication cup and signed the order once the patient had taken the medication.

Nurse_72 explains that if the patient has a lot of medications and she is tired she will click them off as she puts them in the cup. She explains that today she did not do it like that because she had a good sleep, and she can remember all of the meds – that is they work around, they put the medications in cup and click them off as administered to keep track of where they are up to when they need to e.g. lots of meds, tired etc. (Field Notes: Observation_Nurse_72_AM)

5.5.5 Using workarounds to avoid double dosing

At Hospital B, where it was possible for more than one person to open and be active in the same patient's eMAR at the same time, and where a team model of nursing care was used, nurses explained that they confirmed medication as administered in the eMAR before administering it in case they were called away between administering the medication to the patient and signing it off in the eMAR. Signing off the medication in the eMAR signalled to their colleagues that the medication had been administered. Participants in the following focus group excerpt described a possible scenario in which patients could potentially receive the same medication from two nurses in the same team. They also emphasised the importance of informal communication between team members to prevent double dosing.

116: The other thing – you have to be very careful to communicate because sometimes one nurse is starting at one side and the other at the other end – or whoever doing the medication ... You're doing the medication and somebody giving ... I mean if you don't click and you're just going to do something, it can be a chance that somebody says 'Oh, it wasn't given'.

116: Double med, yes.

114: Double med, yes.

110: It does some mistake. Also people say that can be ...

06: It's a huge problem because, obviously, you can access it from any number of computers. If you've just gone to for some reason – someone's about to fall on the floor – then you haven't clicked it off immediately, then someone could come in and think 'Oh, it's not given'.

114: Or if you're planning to give it and you don't refresh it, and someone's given it just when you're about to give it – you were going to get it or something and they've given it and clicked it off. Then you come back, but it hasn't ... disappeared –

110: ... hasn't gone down.

114: Yes, it doesn't show that it's been given unless you refresh. So then you could ...

06: It needs to automatically refresh. Every three minutes it should automatically refresh, but they don't have that. (Focus Group: Nurses_ID_3)

When patients' paper medication-administration record was transferred to an electronic one, there was a potential overlap between paper and electronic MARs. Medications that appeared to be 'available for administration' in the eMAR may have been administered and signed off in the paper MAR. Nurses used workarounds to avoid double dosing. They entered the dose as 'withheld' or administered in the eMAR and typed in a comment to explain.

An antibiotic was ordered on the paper chart and the nurse signed it off ... When the medication order was transferred to the EMMS, the same medication was available for administration in the eMAR. The nurse selected the medication and withheld it. She typed in the comment 'already signed off in paper chart'. (Field Notes: Observation_106)

5.5.6 Using workarounds to make time for the purposes of patient safety

As described previously, participants repeatedly reported that workarounds were used with the intended goal of enhancing patient safety by saving time. It was evident that participants frequently judged whether a workaround in a given context would be better and safer for the patient than not working around. Nurse_71, for example, explained that she might use a workaround to save time on a familiar and less complex task so that she had more time to available to spend on a more complex or unfamiliar task.

19:15 – Having just observed her administer medication to a patient after addressing them by name but not checking their ID band, Nurse_71 explains that she will be quick with some things, such as she might jump the ID check on a patient who has been here for months who she has addressed by name, because she knows that she has an infusion to start in a minute and 'it's a new and complicated medication that I know nothing about. So I know I will need more time to devote to that. There is only a certain amount of time, so I am constantly prioritising what gets allocated the most time.' (Field Notes: Observation_Nurse_71_PM)

Ideally, preparation, checking and administration of the medication would be conducted for one patient at a time and at the time of administration. I observed nurses checking medications earlier in the shift. They explained that it was so that the checking nurse would be available to assist patients during times when there was a greater likelihood of an incident, or detection of patient demise. In the following excerpt, Nurse_68 revealed that, while not ideal, this workaround was safer for patients because it allowed a nurse to be available to attend to their needs rather than have all of the nurses caught up with the medication round.

Nurse_68 explains the checking process they use as better and safer but not how they should do it. She tells me that they cannot physically do it the way it should be done with the number of nurses. She goes on to say that when they do the observations, they always find someone with a low or high blood pressure or temperature. Someone who is really sick, at least one, then they have to concentrate on them. She says that for that sick patient it will be better not to have all the nurses tied up doing medications but to be able to care for them. (Field Notes: Observation_68_Night Shift)

5.5.7 Using workarounds to avoid colleagues making mistakes

Nurses reported complicity in workarounds enacted by colleagues to enhance patient safety. In the following excerpt, Nurse_06 explained that rather than intensify the pressure on a colleague, thereby increasing the risk of error, she complied with the workaround of checking the ampoule without viewing the eMAR. Nurse_06 specified that this workaround was enabled because she trusted the nurses who were experienced. (Nurses' use of workarounds to be a team player and demonstrate trust will be examined in Chapters 7 and 9.)

Yeah, but if it is someone else coming to me, I kind of rely on them to know when it is safe, especially if it is a senior nurse. I say – 'OK, I see that Heparin, OK got it, it's for bed such and such. Ok – yeh.' And different nurses, it is not just different nurses, it is if they are running low on time. Like sometimes, for example, the nurse I was working with today. She usually will check the order with me and check the drug but then sometimes she will come in just with the Heparin and say 'check this' and so I am kind of aware that – oh I know why she didn't do that, it's because she's running out of time, I'm not going to say, 'Oh hang on a minute, I'm just going to check this' ... It is like some people you can stop them and they'll be alright with it because they can readjust but then others, they get flustered really easily so you can't overburden them all the time ... once I know that I am working with someone who is a stress head and they don't want too many things at once, that puts me under stress and I start feeling stressed and that leads to increased errors. (Interview: Nurse_06)

Nurses used workarounds to complete medication rounds more quickly to protect patients from colleagues who they perceived were too slow or incompetent. Nurse_111 explained that when it was very busy, she did not take the COW to the bedside. Rather she systematically worked through the eMARs and prepared several patients' medications. Medication pots were marked with patient bed numbers to identify who the medications were for. This enabled her to dispense the medications quickly, and without being interrupted, particularly when she identified that she was safer and quicker than her team colleague.

*I asked Nurse_111 what she meant by the qualification that she changed whether she used the workarounds she had described depending on who she was working with. I assumed she meant that if it was an educator or a NUM she might not work around. So I asked whether she meant that her strategy changed depending on whom you are working with, if they were strict. Nurse_111 leant forward and whispered that she didn't like to say it but that it depended on how competent or slow they were. If they were not competent or they were too slow, she used the fastest way so **she** could get the medications done – the reason was so that the nurse she perceived to be incompetent did not give the medications. (Field Notes: Observation_Nurse_111_AM)*

Some participants reported that if a colleague had administered a medication but forgotten to sign it off in the eMAR, having ascertained that the medication had been administered, they

'administered' it in the eMAR under their log in and typed the name of the nurse who actually administered the medication and an explanation in the comments section of the medication order. This workaround was enacted to circumvent the potential that having seen the overdue alert, a nurse might administer the medication or bring the next dose forward.

5.5.8 Using workarounds to circumvent the disconnect between delivering care 24 hours a day and restricted opening hours of hospital departments

While the study hospitals provided care 24 hours a day, as outlined in Chapter 4, some services had restricted hours, including the pharmacy departments. When patients were admitted on weekends or after hours and were prescribed medications that were not ward stock, nurses described spending considerable time working around the problem to source these medications so that they could be administered on time. Workarounds included borrowing medications from other patients in the same unit and from other units. Participants emphasised the benefits of knowing staff on other wards and reciprocity in supporting this type of workaround. At a unit level, while usually aware of which patients were on similar medications for the purposes of borrowing, the electronic medication system could assist nurses to identify other patients on the same medication, thereby focusing the medication drawers to be searched.

The nurse explains that 'bartering, horse-trading' goes on between wards for meds when meds run out and the patient really needs them. The protocol is that you call the after-hours pharmacist if you need e.g. for restricted antibiotics. But if the patient is really sick, you will find it without going through the hospital after-hours pharmacist ... 'The wards you ring depends on what you need. The Pool staff know which wards have which drugs because they move around the wards. It is best not to ask where it came from, sometimes so you don't have to lie about where it came from.' (Field notes: Observation_202_Night shift)

5.5.9 Using workarounds to avoid administering medications at unsafe times

Rescheduling medications was considered by participants to be a workaround enabled by the EMMS. Rather than withhold the medication, or give it at an inappropriate time, participants described rescheduling the time for medication administration as safer for the patients. Nurse_89, for example, described the benefits of being able to reschedule an antihypertensive, if a patient's

blood pressure was low, to a time when the doctors would be in the unit. Rescheduling the medication kept it on the agenda for discussion.

Nurse_89 explains that rather than withhold the antihypertensive, you reschedule it to 10:00 when the doctors are here, so the nurses will check the BP again before giving it and can let the doctors know – that way the nurses can wait until the doctors have an opinion on it. (Field Notes: Observation_89_PM)

When prescribed times for medication administration were considered inappropriate or unsafe, nurses implemented workarounds to administer the medication at a safer time. If the medication was not time-specific, nurses administered medications early and signed off in the EMMS at a later time; *"I'll sometimes give it at the – what I'd think is the correct time and then sign it later and maybe change it later on."* (Interview: Nurse_57). Alternatively, they overrode the system to give the medication at an appropriate time. When bringing a medication forward required additional process steps several participants explained a secondary workaround that they employed to save time – they entered a full stop instead of a reason, particularly when they perceived the reason to be obvious.

When medications were most safely administered after the prescribed time, rather than confirm the medications in the eMAR after they were administered, nurses confirmed the medication as administered in the eMAR and asked the patient to take it at a later time that was safer, such as with meals. Nurse_69, for example, left the medication with the patient in bed 34, having signed it off in the eMAR. She told the patient that she was *'going to give you some tablets that I want you to take with breakfast because it is gentler on your tummy'*. (Field Notes: Observation_69_Night Shift)

There was evident tension in the decision to change the timing of medications. On the one hand, nurses considered that if it was in the patient's best interests to administer medication early, they would override the system, but because the medication was being administered at the 'wrong time', it was technically considered a medication error: as one nurse stated, *"Though technically giving things at the wrong time is a medication error."* (Interview: Nurse_27)

There were instances when nurses explained that it was not safe to change the medication-administration times. For example, they reported that it was not safe to administer time-specific medications, including Panadol, early.

5.5.10 Using workarounds to administer medications quickly for patient safety

Nurses described instances where they administered medications before they had been entered into the EMMS for the purposes of patient safety. For example, workarounds were used during patient cardiac arrest. Rather than enter the information into the eMAR at the time of the event, doctors prescribed the medications in the eMAR immediately afterwards. While acknowledging that in these situations, the need for speed necessitated the workaround, participants expressed concern for their professional safety and followed the doctors up to ensure that the medication was ordered in the eMAR.

I have actually once given a medication that wasn't written up at the time but I asked the doctors to write it up – well to put it on the computer for me, but it was an emergency at the time, so I had to give it. But I made sure that I followed up very quickly after that to get them to write it and it was a drug that had to be checked anyway, so I made sure that the person who was with me heard the order as well.
(Interview: Nurse_62)

5.5.11 Using workarounds to circumvent problems with the EMMS for patient safety

Workarounds to practice safely were often influenced by the EMMS interface. For example, at Hospital B, several nurses used the cursor arrow to keep track of which medications had been put into the medication cup. As they moved through the eMAR, they hovered the cursor over the next medication to be administered.

07:18 – Nurse_39 has logged into the EMMS on the COW outside room 25–26. At the Patient List, she selects patient 26. She brings the medication drawer from bed 26's locker and puts it on the COW shelf. As she moves the cursor down the medication record on the EMMS screen, Nurse_39 takes the oral medications from the drawer and puts them in the medication cup. She uses the cursor to identify which medication she is up to. Once all of the medications have been put into the medication cup, Nurse_39 takes the medication cup containing the tablets to the patient in bed 26.
(Field Notes: Observation_39_AM)

Nurses reported that if the COW created a falls risk for elderly patients, they did not take the COW to the bedside. In those situations, nurses took the patients' bedside medication drawers to the COW parked in the corridor.

The trolley. If no – if they find out it's too much equipment, too many furnishings in the room and it's high risk for a fall for the patients, they can leave it outside and get the drawer. Just take the single drawer, put it on the COW and dispense the medication, put it back, check their MRN number and go to the patient and give it. (Interview: Nurse_42)

One participant explained that when she was looking after patients in two rooms, she parked the COW at the doorway rather than at each patient's bedside so that she could keep an eye on patients in both rooms. Nurse_26 described using secondary workarounds to check the patient's identity – she memorised the MRN and familiarity with the patient's medications. She took each patient's medication drawer to the COW to dispense the medication, observing the patients in the other room as she did so.

If I need to work two rooms, I leave it [the COW] in the doorway of one room so that I can keep an eye on patients in both rooms at the same time ... I memorise the MRN number. I also know what the patient is on and what is wrong with them so I know if the medications in the drawer are not relevant – if they are not the right medications ... I get the medication drawer from the bedside and check right medication, right bed, right patient, right route, right dose. (Interview: Nurse_26)

5.5.12 Using workarounds to avoid unsafe outcomes related to scope of practice

Nurses reported potential challenges to patient safety that they attributed to scope of practice limitations. Participants explained that relying on someone else to administer medications to 'their' patients undermined safe patient care. These restrictions risked the medications being delayed, or not given. Furthermore, participants argued that as the nurse caring for the patient was more aware of their clinical state, it was safer for them to administer the medication than a nurse who was not. The act of chasing up the nurses was also identified to potentially undermine teamwork (Chapter 7).

17:08 – Nurse_101 explains that there are some medications that EENs are not allowed to give but that this is inconsistent between hospitals and that there does not appear to be a good reason for it. For example, in this hospital, EENs cannot administer Heparin but they can administer Clexane. That Insulin cannot be administered by an EEN is policy. Nurse_101 tells me that if nurses followed all the

*rules everything would slow down, they would have to wait for an RN for so many meds – it would all slow down – they wouldn't get their work done and things would be missed. Nurse_101 tells me of times when she would ask an RN to do this but they might forget because they have their own patients – then she had to chase them. 'It is **my** responsibility.' ... Nurse_101 recounts that when she first started, she did everything exactly by the book but then she realised that her patients were suffering because of it. She had told someone who assured her that they would administer it but they forgot, they were busy and then she had to chase and then the medication wasn't given – she claims it is **her** responsibility because it is **her** patient and chasing the RN sets up an unpleasant scene. (Field Notes: Observation_101_PM)*

5.6 Not using workarounds to keep patients safe

Nurses described a range of factors that influenced whether they used workarounds to enact patient safety. Factors included the business of the unit, how familiar they were with the patient, the type of medication, who they were working with, and individual factors including tiredness, confidence, and level of experience. These 'moderating motivations' will be considered in more detail in Chapter 9. According to senior nurses, some workarounds were safe and others were not. There was a consensus that inexperienced nurses were unaware of the nuances associated with when, and where, and with which medications workarounds could be employed safely. The collective conceptualisation of who could and who should not use workarounds will also be described in Chapter 9. The following interview excerpt has been included to illustrate one of the ways in which experienced nurses reinforced the distinction between who had the knowledge to use workarounds safely and who did not. It also illuminated the role of the experienced staff in passing that knowledge on, and in reinforcing that 'good nurses' were not 'sloppy'.

They are a new nurse, they're aware that they're probably a bit slower, they try and take a bit of a shortcut, they thought, 'Oh well, I bolus most things, I'll do this', didn't check and ... she wrote 'Not available, the IV administration book wasn't available, not complete'. I just went, 'You've put that in your IMMS. Do you understand what you've done wrong?' She was like 'Oh yeah'. I said, 'It makes you look really sloppy because there's a reference manual available all the time online. There's MIMS online. There's actually two; there's one in the system and there's MIMS online. Because it's a COW, every computer's got the intranet, so there's no excuse for it.' 'Oh yeah, well' [she

mimics the blasé tone the neophyte nurse had used]. And she checked it with another new grad because she wasn't sure of the practice, so she slipped through ... I was a bit shocked. In the end she cried but she just – her attitude was like – because I said, 'Do you understand how serious this is? It's a very serious drug. You don't bolus Gentamycin, Vancomycin, it is a 'mycin' – instantly, I'd be like bing, bing, bing'. She just kept going 'Oh, oh' well' [she mimics the blasé tone the neophyte nurse had used]. In the end, I made her cry because I kept going, 'Do you understand, do you understand?' (Interview: Nurse_50)

5.7 Never using workarounds for patient safety

There were some participants whom I observed who did not use workarounds when administering medication. Some nurses identified that it was never safe to use workarounds in relation to medication administration – not for the patient or for the nurses. A detailed discussion of the tension between workarounds and nurses' professional safety will be explored in Chapter 9 which reports on motivations for, and feelings about, workarounds.

F: Do you think it is ever OK to work around the system? Are there sometimes when you think it's OK and sometimes when it is not or some people who ...

38: (interrupts me) NO – anyone who has made a medication error ever in their career would go – bang – look at the stress that was related to that – ah you just go – never ever do I want that to happen again! So – no, especially if you're someone who's also trying to reflect best practice to others, and we are a teaching hospital, so you always want to reflect best practice to the students whether they be uni students who are on the ward, whether they be new grads or even post new grads and they are just new starters on the ward. And we also have nurses from overseas who are very new to the system, so you always want to try to reflect best practice. So everyone is working from the same criteria and that is for their safety and, of course, for the safety of the patient.

F: So no workarounds?

38: No, no, no. (Interview: Nurse_38)

5.8 Conclusion

Patient safety featured as an important construct for nurses in this study. The significance of patient safety to being a good nurse, with its literal and figurative sources in Florence Nightingale, the founder of modern nursing, was strengthened by formal and informal mechanisms. Many participants proposed that mindful, flexible nursing practice supported patient safety – and tended to act *in situ* in ways commensurate with those principles. They suggested that by promoting mindless nursing, mandating policy adherence and the EMMS undermined patient safety.

The EMMS both supported and challenged patient safety. Nurses used workarounds to circumvent perceived challenges so as to administer medications safely. Workarounds to enact safety both supported and undermined other good nurse characteristics. Secondary workarounds were employed to compensate for the latter. Nurses explained that the variation in workarounds that they used reflected the fluidity of challenges to patient safety across a shift – they constantly weighed up what was safest for the patient. In some contexts, nurses explained it was never safe to use workarounds. The next chapter examines the importance of delivering patient-centred care in nurses' use of workarounds when using the EMMS.

Chapter 6 Being a patient-centred nurse

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6.1 Introduction

The focus of the previous chapter was nurses' use of workarounds with EMMS to enhance patient safety. This chapter focuses on EMMS-related workarounds that nurses described to deliver patient-centred care, which has been defined by the Australian Commission on Quality and Safety in Healthcare as:

health care that is respectful of, and responsive to, the preferences, needs and values of patients and consumers. The widely accepted dimensions of patient-centred care are respect, emotional support, physical comfort, information and communication, continuity and transition, care coordination, involvement of family and carers, and access to care. [335:7]

Initially, I explain how being patient-centred was constructed and reinforced as important for nurses (Section 6.1). The chapter then discusses the impact of EMMS on nurses' ability to deliver patient-centred care (Section 6.2). In Sections 6.3 and 6.4, I present how nurses enact and explain their use of workarounds to achieve patient-centred care (again addressing Research Question 1 and Research Question 2).

6.2 The importance of patient-centred care at the clinical coalface

Concerns about patient-centred care expressed by study participants were related primarily to ensuring that the skill mix of staff was able to provide effective and efficient care. This included being able to: provide 'good' care; maximise patients' opportunities to sleep; attend to personal hygiene so that patients felt 'better'; minimise symptoms of pain and nausea; respond to patients' preferences for times and routes of medication administrations; minimise emotional distress to patients; and make patients feel significant.

6.2.1 Weaving the strands of patient-centred care

Participants worked to deliver care that was respectful of, and responsive to, the preferences and needs of their patients. Protecting the dignity of their patients was expressed to be of utmost importance and participants spoke with disdain when they offered examples in which nurses had not protected patients' dignity. Nurses also described their role in implementing patient-centred care designed by other healthcare professionals and as conduits of information between patients and their carers and healthcare professionals. The following field note excerpt offers a description of the nurse's role in patient-centred care from a nurse's perspective:

We get to be with the beautiful focus of all of our efforts [the patient]. I find that such a privilege. At the centre of the complexity of the patient's day, we get to implement all the strands of care. For example the dietician says, 'Let's try this diet and supplements'; and the doctor says, 'Let's try this therapy'. So you implement a food chart and you do their mouthwash and their mouth care, which can save their lives by preventing infection. The doctors put this on [the eMAR name] but the nurse needs to sit with the exhausted patient helping them to do their mouthwash. It can save their lives. They are not alone; you are with them in this hole of hell. We make sure that they have their anti-nausea meds before dinner and we make sure that the right food actually comes. We set them up and maximise the window of opportunity when we can get this food into them. It is up to the nurse to actualise and realise all of the orders and to document if they did make a difference or didn't, as well as delivering the nursing care. (Field Notes: Observation_69_Night Shift)

6.2.2 Managing staff skill mix to enable patient-centred care

Delivery of patient-centred care required adequate numbers of skilled staff and was enhanced when nurses were familiar with the patients. Where possible, to promote continuity, nurses were allocated the same patients they had looked after on the previous shift. In units where overtime was offered to nurses to fill gaps in the roster, they swapped shifts and personal appointments aiming to ensure adequate skill mix and to cover shifts with nurses who knew the patients.

The allocation staff were having a harder time filling the morning roster than the evening roster tomorrow so after changing an appointment (personal) scheduled for the next day (so that she is free to work in the morning), the nurse in charge checks with Nurse_60 that he is happy to be in charge the next evening – she cautions that he has to come in because the other staff are junior. Now that she is available to work the morning, one of the nurses on this evening who was rostered on for tomorrow morning can do overtime tonight (double shift). I have observed this type of organisation and juggling and phone calls, to try to fill the gaps with overtime staff with the right skill mix, on many shifts. (Field Notes: Observation_60_PM)

6.2.3 Managing noise and time for patient-centred care

Nurses discussed the importance of sleep for patients' emotional and physical wellbeing. During observation of a night shift, one of the nurses handed me an information brochure for patients and visitors, '*Respecting Patient Privacy and Dignity in NSW Health*' [336], an initiative of *Caring Together: the Health Action Plan for NSW* [279] released by NSW Government in response to the *Garling Report* [278]. The section '*Managing noise for patient comfort*' in this brochure highlighted the need for nurses to minimise noise at night to promote patients' sleep. Nurses demonstrated enacting this directive by the use of: whispered voices; use of torchlights; soft footedness; and the gentleness with which trolleys were pushed and curtains pulled back across the 12 night shifts observed.

00:10 – There is an unusual sound, it is very quiet but there is definitely an unusual sound. Nurse_69 leaves the desk and goes to the four-bedroom where she very quietly tries to isolate the sound. She goes in behind the curtain and quietly pushes the obs machine (vital signs recording machine on wheels) with her. She whispers to the patient that she would like to do his observations. She identifies the unusual noise as the sound of teeth grinding. The obs machine makes more sound than the nurse does whispering to the patient ... I can hear the sound of snoring ... I can hear a nebulizer start and Nurse_69 comes out from behind the curtain with an armful of sheets and blankets, a kidney dish and the obs machine. 00:36 it is so quiet that I can hear the sound of a folder along the corridor being opened – the ring binder – and closed. (Field Notes: Observation_69[1]_Night Shift)

The beds of confused and agitated patients were parked near the nurses' stations during the night. The nurses did this to reduce both their distress and the noise for other patients in four-bedded rooms.

22:48 – The patient in a bed is wheeled to the corridor ... close to the nurses' station, where it is reasonably lit. The 'Special' and two of the nurses are with the patient who is trying to climb out of bed ... Nurse_52 explains that they have moved the patient into the corridor because she yells and is waking the other patients up. She also explains that she has just read the notes of the other three patients who share the same room – they have been complaining to day staff because they haven't been

getting any sleep. As this patient is disturbing the other three patients in the room, she says, they don't really have an option. (Field Notes: Observation_52_Night Shift)

Participants stressed the importance of managing time efficiently to minimise disturbance of patients during the night. Senior nurses encouraged their junior colleagues to be attentive to the timing and sequencing of medications and infusions so that they could be completed during waking hours. The following excerpt from field notes on a morning shift highlights that nurses were mindful of the impact of medications across the whole day on the potential for the patient to get a good night's sleep.

One of the senior nurses encourages a more junior colleague to not 'dally', to 'get to it', to get the blood-product infusion going because the patient had more to be infused as well as intravenous medication – if it was not started soon, the patient would be awake all night. (Field Notes: Observation_207_AM)

6.2.4 Attending carefully to 'matters of hygiene': a sign of patient-centred care

There were some aspects of care that were emphasised as important in relation to patient-centred care. That is, the individual needs of the patients, the experience of the nurses, the norms and mores of the unit, the expressed expectations of leaders, and the ethos of the organisation mediated completion of certain tasks identified as important to patient-centred care. For example, male patients should be shaved and groomed each day because this made them feel better. To not deliver this care was to have failed as a nurse.

That is their perception that the quality of care ... some of them believe that the patient feels better ... some nurses feel very strongly that if they don't shave their patients they have failed, they feel terrible, they're a bad nurse. (Interview: Nurse_50)

The expressed expectations of nursing leaders reinforced what was good nursing care:

The NUM comes into handover and whispers something to the CNE while handover continues. After handover has been completed, the nurses are gently reminded that 'matters of hygiene' are important and that Mr X has not had a shave for two days. The nurses agreed this was an important matter. (Field Notes: Observation_212_PM)

Nurses' criticism and praise of each other's work highlighted what they believed were important characteristics of good patient care. Praise was often coupled with inclusion in activities such as shared meal breaks:

10:55 – At the nurses' station, one of the RNs this morning congratulated one of the ENs in a warm and enthusiastic voice – that she had done a great job – he (the patient) looked really good this morning. He was showered, washed, shaved and sitting out in a chair. It was noted that personal care had been taken for this patient and this was praised. This was a good thing ... The praise was public – it could be heard by the other nurses the patients and the visitors – it said to everyone that this RN thought that attention to personal care, having the patients looking shaved, clean, showered and out of bed, was important. (Field Notes: Observation_39_AM)

6.3 Medication administration, the EMMS and patient-centred care

6.3.1 Features of the EMMS supported patient-centred care

There were features of the EMMS that were portrayed as supporting patient-centred care. Nurses described the advantages of point-of-care access to information such as MIMs Online and pharmacists' instructions in being able to involve patients in their own care, by educating them and carers about their medications. The feature in the eMAR that allowed nurses to enter comments assisted communication about patient preferences in relation to medication administration.

43: There's instructions there from other nurses that have given it before, in terms of the best way to give this to the patient. Because some of our patients, they're cognitively impaired and sometimes there's one nurse who will think of one way to best give this medication. That may be, for example, just to wait for the family member to come in. Or maybe wait and give it with sweets, or give it with – as a liquid form. So they can add that on, and then it will always pop up. So the next one who doesn't know – who don't normally deal with the patient, can – so it's a continuation of care. So it's a good thing. (Interview: Nurse_43)

Another feature of the EMMS enabled doctors to prescribe patients' medications while not on the unit. Nurses explained that because doctors could prescribe medications in a patient's eMAR

when physically located elsewhere in the hospital, the time patients had to wait for medications had been reduced, thereby facilitating patient-centred, that is timely, care.

6.3.2 Features of the EMMS introduced challenges to delivering patient-centred care

Nurses also described aspects of the EMMS that challenged patient-centred care. The COWs were cumbersome and noisy. At night, the laptop screens cast a light that was bright against the darkness. Nurses explained that these characteristics of the COW challenged their attempts to manage noise and light for patient comfort and, in some circumstances, increased patient agitation.

I can't go individually at night time into everyone's room dragging a COW in the middle of the night, you know two or three in the morning. It's noisy, you've got the screens going. (Interview: Nurse_53)

As discussed in previous chapters, default times for medication administration did not always accommodate the comfort, or needs, of the patient. At Hospital A, a feature of the EMMS blocked administration of medications for 24 hours from the prescribed administration time when they were ordered for administration once daily. According to the participants, this challenged patient-centred care because patients did not have the same flexibility to choose the time at which they took their night sedation as they did at home. For example, if a patient had been prescribed night sedation at 23:00 hours one evening, it was unavailable for administration until the same time the next evening. This was often later than the patient wanted to go to sleep.

Sometimes it's like Temazepam, but I think it's about the system. Say if you gave it the night before at one o'clock in the morning, but the patient had said once a day dose but the patient wants it at 11 o'clock or 10 o'clock, it won't allow you to do that. (Interview: Nurse_73)

At Hospital A, only one user could be active in a patient's eMAR at a time. Participants recounted times when this delayed patients from receiving medication when they requested it.

6.4 Using workarounds to deliver patient-centred care

Nurses used workarounds to deliver patient-centred care and promote patients' emotional wellbeing. They rationalised that in some instances workarounds were necessary to ensure that

patients were able to sleep, to minimise pain and nausea, to prevent further agitation, and to administer medications at times and in ways that were most appropriate for the patient. Workarounds were justified as a result of, and in order to, promote a personal relationship with patients – nurses knew who they were, rather than their being just a number.

I emphasised to Nurse_60 that I was really interested in the reasons nurses gave for using workarounds. Pointing to a different finger as he made each point, Nurse_60 summarised that on night duty they did not want to wake the patients; the patients have pain so there is some urgency; they would not get their work finished; the patients would suffer; they have a familiarity with the patient, they are on a first name basis both of them – the patient and staff. (Field Notes: Observation_60_Night Shift)

6.4.1 Using workarounds to avoid medications being missed or refused

At Hospital B, participants reported instances in which they administered medications from a medication order that they believed had expired because it was in the best interests of the patient. This workaround was facilitated by a 'soft stop', which allowed the medication to continue to be available for administration in the eMAR. An hourglass icon signalled that the medication order had "expired". Some nurses described feeling anxious because it was important for the patient that they administered the medication, but to do so worked around the policy, making the nurse professionally vulnerable.

29: The other disadvantage with electronic is that the paper chart is valid for seven days and there is no way that you can sign – it is finished, you can't sign. Unfortunately with the electronic, they call it a 'soft stop', so it can go on. So if the doctors don't look at it and renew the charts, it will just go on.

F: Because they are then kind of faced with this dilemma, aren't they?

*29: Yes, they are giving a medication that is kind of expired, especially narcotics. And you can't **not** give the medication. And you then have to write every day 'renew your chart, renew your chart'. (Interview: Nurse_29)*

In the example below, two nurses were needed to complete the medication-administration record in the EMMS. When the EMMS timed out, both nurses agreed to administer the Heparin in the interests of time and for the sake of the patient and to sign it off in the eMAR later in the shift.

19:11 – Medication Event 6: Bed 14; Female; 1 subcutaneous medication due

Nurse_32 tries to open the medication order for patient 14. However, the system would not let her access the medication order. It 'timed over'; it did not log out, it just didn't go anywhere, there was a blank screen. 'For goodness sake, what are you holding me up for?' one nurse comments. Both Nurse_32 and Nurse Z tried several times to open the medication order. They plug the laptop in, they log out, they try to log back into [EMMS name] (initially Nurse Z tried to log in and nothing happened so then Nurse_32 tried to log back in. Again nothing happened – there was a blank screen). Nurse Z exclaims that they will have to give it because the patient needs it and that she was getting further and further behind in her work – they decide to administer it and sign it off later when the system is working again. (Field Notes: Observation_32_PM)

Nurses devised workarounds to circumvent barriers to medication administration created by prescribed route and availability of medications. For example, if a patient was unable to tolerate a medication in liquid form, but would take the same dose in tablet form, a nurse explained she would administer the medication as a tablet rather than follow the prescribed 'route' in the eMAR order. The medication administration was accompanied by entering an alert in the eMAR for pharmacy and medical review and documentation in the patient's notes.

Nurses described workarounds that they used to accommodate patients' preferences for how they took their medication and from whom. These preferences were depicted to sometimes be fluid and unpredictable. Some patients preferred to take medication, for example, from family members and became agitated if the nurse tried to administer it.

41: So I have to get the meds out, give them to the son, she won't take them off me and then the son will give me what she doesn't take and then I go and click off what is taken.

F: Right?

41: So I check them as if I'm signing them out without having to tick the boxes and then whatever the son returns to me I just go back and put refused and then I go back and click off what's given, because she'll either spit them out at you or she'll take the whole lot.

F: Okay. So that's a workaround?

41: Yeah, and you can't get around that with this particular patient. I have to double check I've got the right stuff and the patient will say no to meds and oh, my mother won't take this or she won't take that or she'll – and sometimes you've got to offer it in two different forms; like phenytoin comes in liquids and tablets; sometimes she likes the liquid, sometimes she likes the tablet, so I offer both and I say you can only give her one and then he'll come back with the liquid phenytoin and she took the tablet, so I discard the liquid, and then she'll have the liquid that night, then I've got to discard the tablets. (Focus Group_Nurse_ID_8)

When patients were admitted to hospital, they were usually asked to return their medications to their home. This reduced the risk that patients might take their own medications as well as those administered by nurses. When the strength of the ward stock medication required the patient to take a large number of tablets, Nurse_103 described working around the usual requirement that only hospital-supplied medications be administered by asking the patient to take her own.

There has been a patient admitted this evening who has been ordered 80mg of a medication – there are only 10mg tablets on the unit – Nurse_103 says that they will ask the patient to take her own tablet, which is an 80mg tablet, rather than ask her to take eight of the hospital tablets – until stock arrives from pharmacy. (Field Notes: Observation_103_PM)

Nurses explained that rather than selecting 'Refused' in the eMAR when a patient refused analgesia, they selected 'Delayed' so that the medication was still available for administration should the patient change their minds. The reason that the medication had been 'delayed' was communicated informally to other nurses. When non-ward stock medication was needed urgently, a described workaround employed at Hospital A to speed up the delivery of the medication to the unit was to ask the pharmacy to review the medication and then within the review request message to request more medication:

27: Keflex is not ward stock, and you're actually on the screen that says Keflex 500 milligrams due 8 o'clock and then you sign it the first time, there's actually a second tab. If you go to the second tab you can actually force it to be ordered, but it doesn't work for ward stock, only what's for non-ward stock, and it generates a list for the

pharmacist in the morning. So if you want it straight away, it's not fast enough, but if you want it for, so if I look and I see there's only two Keflex and I'm only going to get through half of tomorrow, I can actually tick a box and write a little message. ... Now look, I don't know if it's still there but there was a problem that unless the pharmacist has reviewed the medication, you couldn't do that. But I think there was a workaround that you could tick the box and ask them to review it. Then when you asked them to review it, you'd write a note, 'no stock available'.

F: So for all intents and purposes, the alert is "needs review", but then within that would be the message we need more stock?

27: Yeah. (Interview: Nurse_27)

6.4.2 Using workarounds to administer medication at the most suitable time for patients

When patients asked if they could delay, until they were ready, taking a medication that the nurse had already dispensed into a medication cup, the nurses worked around the need to throw the medication out and re-dispense it, by locking it in the bedside drawer. One nurse explained that when she did this, she left the eMAR open at the medication order so she would remember to get the medication out of the locked bedside drawer.

17:03 – Nurse_85 unplugs the COW and pushes it to the four-bedded room at the back of the ward. She manoeuvres the COW to bed 6. Nurse_85 looks at the screen and repeats the MRN to herself as she takes the medication in a medication cup to the patient in bed 6. The patient doesn't want to take it now, so Nurse_85 locks the medication cup with the medication in it in the bedside drawer ... 17:17 – Nurse_85 pushes the COW back out to the vestibule between the two back four-bedded rooms, near the nurses' desk. She plugs it in and clicks on to each eMAR to check that all of the medications for her patients have been done. All have been administered except the medication she left in the drawer for Patient 6. Nurse_85 goes back to the Patient List and selects the patient in bed 6. She leaves it open on the MAR for bed 6. She explains that this is to remind herself that the medication still has to be given ... 17:26 – Nurse_85 walks back to the COW, looks at the eMAR open on the screen and exclaims 'Oh yes, the antibiotic'. She goes to bed 6, unlocks the medication drawer,

gives the medication cup to the patient's visitor, his daughter, who is sitting next to the bed and says that the medications are to have with dinner. She goes back to the COW, selects the medication on the open eMAR for the patient in bed 6 and ticks it as administered (✓) and refreshes the screen. (Field Notes: Observation_85_PM)

When prescribed times for medication administration were considered to be inappropriate, nurses described using workarounds to consider patient's individual needs. A misalignment between patient-centeredness and medication timing, for example, was when diuretic medications ordered twice daily would interfere with patients' sleep if given in the evening. Administration of a diuretic in the evening, nurses explained, would cause the patient to 'wee all night', an additional side effect being an increased risk of the patient falling when getting up during the night. Nurses rescheduled aperients or diuretics so that patients were able to go to the toilet when they wanted to rather than during the night. Alternatively, they used a variety of workarounds to administer medication early and sign off later when the medication was 'available'. They also used informal communication to pass on that medication had been administered.

81: You'll find that some of the different doctors put things differently. They'll chart Lasix at eight in the morning and eight at night or ridiculous times like that, when the patient is going to be weeing all night. The other thing they will do is chart potassium at eight o'clock; it's much better given immediately after meals or with food. Various medications are much better given with food, so some of mine I do give just after dinner because then they've had it with their food, as they're supposed to. There are quite a few tablets they just don't chart as they should. Like one example is metoclopramide before meals, but they chart it at sort of eight o'clock at night. Silly things like this. (Focus Group: Nurses_ID_8)

Nurses worked around barriers to responding quickly to patients' medication needs, particularly when the patient was in pain or vomiting. If a computer was unavailable, or they could not log in, participants administered medication and signed it off afterwards. While enacted to deliver patient-centred care, the workaround was acknowledged to potentially compromise patient safety:

You tend to find ways around that. Again it comes to that old school thing of going, well I'd rather the patient get the medication than wait for the computer. So I'm sure

there are ways you just give the medication and then backdate it and stuff, which in itself makes it, in some respects, a less safe practice because you're actually unable to record straight away or that sort of thing. (Interview: Nurse_20)

Alternatively, if the nurses knew the patient, and the medication was one that could be nurse-initiated, and met the patient's immediate need, they administered the medication and subsequently checked the eMAR to sign it off. Nurses also worked around delays to administering medication when patients were in pain, by borrowing medication from another patient or by nurse-initiating an alternate pain relief:

Well, there are other alternatives. There are nursing-initiated options, even though the patient supply hasn't come. We might have the supply, we can get it from another ward or we can initiate an alternative pain relief. (Interview: Nurse_40)

At Hospital A, where only one user could be active in a patient's eMAR at a time, nurses worked around the barrier to getting medication to the patient when someone else was logged into the patient's eMAR. Nurse_105, for example, indicated that because the patient needed analgesia immediately, she used a workaround to circumvent the block presented by the software for the benefit of the patient. She checked the medication against the medication-administration history, administered it to the patient and signed it off later when she could log in. The workaround was initiated after balancing the pros and cons.

11:30 – Nurse_105 tells me that she had two medications due for one of the patients but could not open the medication page because the doctor was logged in. She went into the Summary medication chart, which gives the medication-administration history, but she cannot sign off the medication as administered in the eMAR. Nurse_105 explains that she can administer the medications and then sign them off later when the doctor has logged out. She justifies that without one medication the patient won't eat and the other medication can be nurse-initiated anyway. Nurse_105 tells me that she uses [EMMS name] to remind her what hasn't been signed off, so if she administers it when she can't get in, at the end of the shift she can see if it hasn't been signed off and can sign off then. Nurse_105 says that it is better than forgetting to give it – because you can't fix that. (Field Notes: Observation_105_AM)

Nurses described administering medications early as a result of their clinical assessment of the patient. Administering medications and entering them in the system later achieved this, as did rescheduling the medication in the eMAR. When doing so required a comment to be entered participants related that a common secondary workaround was to press the space bar or enter a full stop.

F: Can you tell me about how you work around the system to get medication to the patients? Is there any time that there is a thing that makes it difficult that you need to work around?

73: Yes sometimes it's pain relief, when you can genuinely see someone's in pain and they need [analgesia] and you think to yourself, 'Okay the Endone due in half an hour's time.' It's a six hourly dose, yet it can be given four hourly and you can bring it forward by clicking on admin and bringing it on that way. Maybe sometimes an antiemetic because it's usually the same reason: it's due in the next eight hourly interval, where you think, 'Okay I'll give them the opposite'. They've had Ondansetron – that hasn't worked. I'll try Maxalon or something like that. It's only a matter of half an hour or something like that, if it's anything it gives you more than that or something that you think it's usually – because our ward it's really pain related or blood pressure sometimes. It's usually sometimes giving their AM eight o'clock ones a little bit earlier if they're on night duty and they've got really high blood pressure in the morning, you think well I'll give that a bit earlier to see what that does and bring it down that way. (Interview: Nurse_73)

Participants regularly discussed the imperative for good time management and juggling different intravenous medications and infusions to complete medication tasks so that patients were not disturbed during the night. When blood transfusion was in progress, for example, regular observations were required. Nurses also described rescheduling medications to administer them together, not waking patients for some medications, or administering medications early to promote patients' sleep.

19:50 – The patient in bed 18 has returned from gate leave. As Nurse_119 administers his medications for 20:00, he tells her that he is really tired. She responds that he has one more medication ordered for 22:00, she can administer it at 21:00 and then he can settle and rest. At 20:52, Nurse_119 checks [EMMS Name] – the

antibiotic is due at 22:00 so will not be available for administration in the eMAR until 21:00. Nurse_119 checks what time the medication was last administered by checking the Scheduled tab – as it was given over nine hours ago and is ordered twice daily, she brings the administration time forward in the eMAR and comments that with a paper chart you wouldn't change the time – you would just give it but it would look like it had been given at 22:00. (Field Notes: Observation_119_PM)

At Hospital A, a feature of the eMAR when patients were ordered night sedation daily was a 24 hour lock-out period during which the medication was not available in the eMAR for administration. For example, when a patient was prescribed a sleeping tablet at 23:00 hours on Monday evening and they requested to have it at 21:00 hours the following evening, participants revealed that rather than make the patient wait, the nurse administered the medication early, signed it off and backdated it in the eMAR.

Another strategy employed was to check the previously recorded time of administration in the drug register book before administering the medication. The importance of this secondary workaround was reinforced with new staff. An alternative workaround that nurses said they used was to ask the doctor to prescribe a stat dose. According to the participants, this had a potentially negative effect of making the doctor annoyed.

27: Yeah, but sometimes it depends how they chart it. You can't override it and we either have to get – we're naughty, I've seen RNs give it, because it's all documented in the red books anyway. It's not a problem.

F: So they give it and then wait?

27: Then they wait until the lockout comes out, and then when you actually go in to give it, you just backdate to the time ... Yeah, and I noticed if you can't back time it, people will write, was given at such and such a time. Otherwise we get the doctors to give us a stat order, which annoys the doctors.

F: Then you've got a stat order and another order I'm guessing?

Nurse_27: Yes.

F: So then that works around to another problem because then you have to fix the standing order.

27: The good thing about sedation is that we know it's only given once a night, and most of our staff I'd say will look and see it's been given before. I know that when I teach new grads, I always tell them to check the book. (Interview: Nurse_27)

While participants explained that these workarounds delivered care that was responsive to patients' needs, the workarounds were not sanctioned and therefore made the nurses professionally vulnerable to getting into trouble for not following sanctioned practices. This will be examined in more detail in Chapter 9.

6.4.3 Using workarounds to promote patients' sleep

Participants considered that sleep was essential for patients' wellbeing. There were several strategies that nurses used to work around challenges to patients' getting sleep including signing off the medications as administered and leaving them at the bedside for the patient to take when they woke and not taking the COW to the bedside.

07:46 – The patient in bed 15 is still asleep. The nurse selects four meds in the eMAR (2 oral, 1 patch and 1 TED Stockings). She quietly gets the oral medications out of the bedside drawer, checks them against the eMAR and leaves them on bedside locker – confirms all the medications as administered in the eMAR. She does not wake the patient as she pushes the COW softly away from the bedside. (Field Notes: Observation_15_AM)

Nurses stated that most of the time they did not take the COW to the bedside during the night because the noise from pushing the COW, potentially bumping into things in the dark, and the brightness of the screen woke the patients. This was particularly the case in the rooms where there were four patients. The bright screen light might wake and confuse the patients

Sometimes you leave it then too because there's no real point grabbing your clunky machine waking everyone up, as you're dragging it down the hallway, to park it, to have the bright light shining and you confuse patients, that's why they wake up. (Interview: Nurse_39)

During the night when there were usually few medications, nurses predominantly used the desktop computer or the computer in the medication room to prepare the medication and administer it in the eMAR. They often prepared medications for several patients at a time rather

than for one at a time. Nurses acknowledged that it was common practice, but were reluctant to state openly that they used workarounds.

I think that mostly the thing is they will all pre, everyone will deny it, but they'll all pre-dispense everything and label it all ready to go into the room so that they are not disturbing the patients. But also to prevent pushing the [EMMS name] in there because of the noise, the fact that the bulk of the trolleys is going to hit into the walls no matter what, or the bed. And just the noise of it as well. (Interview: Nurse_65)

Nurses described secondary workarounds employed to verify patient identity when they did not take the COW to the bedside. These included: writing identity information on a piece of paper or kidney dish; memorising the patient medical-record number; relying on familiarity with the patient and their medications; and using the bed number, or the name above the bed, to cross check patient identity. One nurse offered an alternative workaround that was used during the night to avoid waking patients. He printed off the medication orders and took those instead of the COW. The medication was confirmed as administered in the eMAR either before or after administration.

6.4.4 Using workarounds to support relationships with patients

Before administering medication, nurses were required to check the patient's identification band and, if applicable, allergy band, to formally verify the patient's identity and allergy status. While nurses were observed to take the COW to the bedside, they were often seen to use workarounds to check the patients' identification information. Participants did not always formally verify patients' allergy status, particularly when the patients were familiar to them. When patients had been in the unit for an extended period of time, Nurse_33 suggested that it was inappropriate to formally check their allergy status for every medication administration.

I know this patient. Now on the screen I've got all his details, all his or her details, whether she's got some allergies. Like you might have seen with bed 1. Now, she has been known to me for the last three or four months. I know she's allergic to Lasix. Now every time if I ask her what's she allergic to, what's she allergic to, what's she allergic to, I mean it's more than three or four months that she's been with us. Now to me, instead it's not appropriate to ask her what's she allergic to. I know she was allergic to Lasix. (Interview: Nurse_33)

The rationale for identity-check workarounds spoke to the significance that nurses attributed to

familiarity and knowing one's patients personally. These workarounds were suggested to be universally normalised nursing practises.

Once you have had a relationship with a patient for a few days, the whole thing about checking armbands goes out the door. And I think that that is across the board in every hospital. There then is this presumption – 'Well I know this patient, I've known them now for 12, 24 hours. I believe that is Mrs Smith in bed 12.' Whether or not they can tell you or not ... That would be a generic workaround on every ward, in every hospital in every country in the world: that once you have known someone for I wouldn't even say 12 hours, once you've cared for them for four hours – you've called, 'Hi Mavis. How are you?', you know that patient therefore you don't necessarily check their arm band. (Interview: Nurse_50)

Nurses encouraged a trusting, caring relationship with patients that incorporated familiarity – *they have a familiarity with the patient, they are on a first name basis both of them – the patient and staff (Field Notes: Observation_60[2]_Night Shift)*. The nurses were observed to ask patients about their families, their lives and revisited previous topics of conversation that interested patients: *"So you know I'll know Mrs [de-identified]. I know her very well. I'll know all her children, that kind of thing" (Interview: Nurse_53)*.

I was told that nurses feared that frequent checking of their identification bands would make patients feel that they were unimportant because the nurse had forgotten who they were, and made the nurse feel 'stupid'. Frequent identification checks were said to make some patients angry and to increase agitation in others who were confused.

6.4.5 Using workarounds to minimise patients' agitation when administering medication

Taking the COW to the patient was also identified as a challenge to medication administration when patients were confused. The following excerpt illustrates the importance of teamwork to facilitate the workaround used to administer a medication in a way that minimised patient distress.

An RN and an AIN are walking along the corridor with one of the patients who they say is confused and wandering. The RN is holding a kidney dish. The RN later tells me that this is when medication laptops on trolleys don't work. The RN explains that you need to take the syringe of medication to the patient, you need to follow the

patient, and that you can't follow him pulling the laptop with you. According to the RN, sometimes they need to play 'bad cop', which makes the other nurse, e.g. the EN (Enrolled Nurse), the 'good cop'. Then and if the patient won't take the medication from the RN, they will sometimes take it from the EN. Then the RN has to give it to the EN to give and they watch them give it. (Field Notes: Observation_41_Night Shift)

6.5 Not using workarounds that would have facilitated a patient's sleep

There were some instances where nurses explained that they would not work around and would take the COW to the bedside at night even if it made the patients 'cranky'. Nurse_34 expounded that it would be too risky to not take the COW to the bedside particularly for S4D and S8 medications.

Oh yes, we do. I take the laptops in, because it's got bedside lights too; especially on night shift because it would be too dangerous or too risky to dispense it from the desktop and then to do other things, so I always take it in. There isn't many medications at night time. ... Because it's night time and you can't get a good light – you put the whole room lights on, you get lots of cranky patients. Or then if you just go to the bedside lamp, it's not really a very good light to... If it's an S4 and S8 then, obviously, you would go there and do what you have to do, even if you make them cranky. (Interview: Nurse_34)

There were some situations in which nurses chose not to work around policy to administer medications even when it might appear to be in the patient's interest to do so. When a patient was ordered chemotherapy, for example, a protocol was required, and before the nurse could commence the therapy, two nurses completed a checklist to ensure that all of the required blood work and tests had been checked by the doctors. The chemotherapy could not commence without a protocol, and not until all of the requirements of the protocol had been met. If the chemotherapy was started late in the evening, then with each passing day, it would run later and later into the night. Given the necessity for sleep, commencing chemotherapy late was not ideal for the patient. When it was argued that to delay chemotherapy was not in the patient's best interests, but there was no protocol or required tests had not been completed, nurses did not work around the policy requirements, although they were visibly torn and concerned about delaying the chemotherapy.

6.6 Conclusion

Delivering care in a way that was responsive to, and catered for, patient's individual needs was important to nurses in this study. Nurses were instrumental in actualising care directives from other health professionals with the patient at the centre. What was seen to constitute and demonstrate good patient-centred care varied depending on patient's needs, the unit mores and leadership expectations. Prompt attention to relief of symptoms such as nausea and pain, maximising opportunities for patients to get a good night's sleep and catering for patients' specific needs and choices when administering medication were highlighted in relation to patient-centred care. The introduction of the EMMS had both facilitated and challenged nurses' delivery of patient-centred care. Participants described their use of workarounds as a strategy to circumvent some of these challenges. Implementation of workarounds with an aim of enabling patient-centred care potentially undermined other characteristics, such as safety, that nurses identified as important. To compensate, nurses reported engaging secondary workarounds. There were, however, situations where the threat to safety was such that nurses did not use workarounds. The next chapter examines the importance of being a team player in nurses' use of workarounds in medication administration using the EMMS.

Chapter 7 Being a team nurse

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7.1 Introduction

The focus of the previous chapter was nurses' use of workarounds with EMMS to deliver patient-centred care. This chapter concentrates on EMMS related workarounds that nurses used to be a team player and to support the performance of the nursing team. Initially I explain how being a team player was constructed and reinforced to be important for nurses (Sections 7.1 and 7.2). The chapter highlights a disconnection between the ideal clinical world and the everyday experience of using EMMS in relation to being a team nurse (Section 7.3). Nurses' enactment, explanation and experience of workarounds, in order to be a team nurse, are then examined (Section 7.4).

7.2 The importance of teams and teamwork at the clinical coalface

Teamwork in healthcare has been defined as a:

dynamic process involving two or more healthcare professionals with complementary backgrounds and skills, sharing common health goals and exercising concerted physical and mental effort in assessing, planning, or evaluating patient care. [337:232]

Teamwork also defines "those behaviours that facilitate effective team member interaction" [338:i51]. In this study teamwork emerged as an important construct. Structures, artefacts and processes supported the formation of teams and encouraged participants to identify and organise into teams at organisational, unit and 'within unit', levels. Uniforms clearly branded participants as belonging to a particular organisational team – Hospital A, Hospital B, a university or an agency supplying staff to the hospital. Within each hospital team, the service provider teams were also recognisable by their uniforms – nursing team, physiotherapy team, internal transport team, domestic team – or lack thereof – medical team: no uniform with stethoscope; social work team: no uniform and no stethoscope.

During fieldwork, I reflected on the power of the uniform in supporting professional identity to individually and collectively **act** and **be** a nurse and part of a nursing team. The following journal entry captures one aspect of that reflection:

At morning handover – at 07:00 – a CNE brought in a bag of chocolate rabbits – everyone had one, and several people offered me one – I declined, as it was too early for me. I was reminded that shift work does funny things to what is 'normal'. Is it usual

*to eat chocolate at 07:00? I used to – the hospital is a ‘world unto thine own’ – like a little universe on its own, in some areas, operating under slightly different norms and rules from the ‘outside’ world ... when I wore that nurses’ uniform, I could do things that I would not or could not necessarily do outside the hospital. I could eat chocolate at 07:00, clean up vomit, not cringe at cleaning someone else’s faeces, teach a new nurse to ‘lay out’ a dead body, suction sputum etc, things that I could not do were I out of uniform. Now, without the uniform, the smell of human faeces in the morning, especially when the breakfast trolley comes onto the ward with the strong smell of scrambled eggs and toast, is nearly enough to make me ‘heave’, and, I could never clean up adult vomit without a uniform on, even back when I was nursing. Was it just the uniform that shaped that thinking and behaviour – does it create a stronger sense of belonging, does it influence behaviour that further creates a bigger divide between ‘us and them’? The uniform symbolises identity as a nurse, it signifies shared experience that both simultaneously **expects** and **enables** action so that one has the ‘right’ to wear the uniform. Without saying a word, the uniform symbolises experiences shared only by other nurses. (Research Journal: Reflection_28th May 2011)*

Within the participating hospitals, teams formed around particular specialties such as the surgical team, the medical team or the infectious diseases team. The model of care used in both hospitals supported a team approach to patient care. This model separated patients according to their medical problems and admitted them to units that specialised in those areas. When there were no beds available in the appropriate specialty unit, patients were admitted to another unit. They were considered to be an ‘outlier’ on that unit. While units operated as individual specialty teams, collectively they were part of the hospital team – with a focus on finding a bed for a patient that needed to be admitted.

The nursing after-hours manager rings and the In-charge nurse asks: ‘what have you got for me?’ There is a discussion about the need for a bed and the story behind it – transport had arrived to transfer a patient to a nursing home and the patient had refused to move and there was another patient who needed the bed. The In-charge nurse responds, that as the manager is obviously desperate for a bed, he would see if he could charm one of the patients to move from the bed they were currently in [a single room] to another bed on the unit [a four bedded room] so that they could

accommodate a new admission – ‘I’ll ring you back.’ (Field Notes: Observation_77_PM)

Within these unit teams, even smaller specialist-affiliated teams were distinguishable. The nurses wrote non-urgent task requests for doctors on clip-board lists that were separated according to the medical team responsible for the patient’s medical care. In one unit colour was used to visually differentiate patient information according to the specialist team who were responsible for the medical care of each patient (red team, green team, blue team).

Each specialist and their team have been assigned a colour, and patient-related information is differentiated with the use of team-specific colour. The names of the patients are written in team-specific colours on the unit’s patient white board which lists information such as the patient name, bed number, specialist name, date of admission etc. The colours are coded according to which specialist’s team is looking after the patient ... The progress notes are in white folders and in the plastic cover on the front of each folder is a coloured piece of paper – the colour of the paper also correlates with the specialist’s team. On the spine of the patient’s notes folder, is a piece of paper with the patient’s name and consultant’s name and the border of the piece of paper is the same colour as the piece of paper in the front of the folder – the colour allocated to the patient’s specialist’s team. (Field Notes: Observation_200_AM)

Nurses also demonstrated teamwork across units. For example, they described borrowing medications and equipment from other units and reported mechanisms by which they attempted to manage patient flow when there were reduced numbers of staff on specific units, such as trying not to transfer patients between units during meal breaks.

Nurse_77 described a ‘holding pattern’ at dinner breaks – an unwritten understanding between wards that nurses don’t transfer patients at dinnertime as only half the staff are on the ward. (Field Notes: Observation_77_PM)

Units in the participating hospitals were encouraged to identify as teams. Participants referred to those who worked on the unit as ‘our nurses’, ‘our clinical support officer’, ‘our ward clerk’ and ‘our ward assistant’. Incentives were awarded to unit (teams) to applaud achievements and events such as the bed-making race, a part of International Nurses’ Day celebrations, encouraged units to compete in teams. Nurses contrasted how things were done on **our** unit (how **we** do it

here) with how **they** did things on **that** unit. There were reciprocal relationships between the culture of the unit and their modus operandi that supported the team approach to manage specific demands of delivering care in each unit. For the most part, across both hospitals, pool staff and nurses said that when they worked on other units they adopted the practices used by the nurses in those units because each nursing team had worked out their own way of doing things that worked for them, given the type and specific needs of patients on their units.

One of the pool nurses explains that when you work on different wards you play by their rules. Some wards have a slightly different way of doing things, different preferences – the nurses get used to how it is done on the ward. Sometimes that's because of the type of work and patients – they need to do it a certain way to get everything done – the nurses who always work on the ward have worked out the best way. (Field Notes: Observation_57_PM)

Within a unit, there were many ways in which participants aligned as teams. Within a shift, nurses working on the same unit divided into teams. If a shared care or team model of patient care was used, these teams comprised several nurses working together with an appointed team leader. In units where a patient allocation model was adopted, there was a shift team leader or appointed In-charge nurse who was often allocated the DD keys. In these units smaller teams within a 'shift team' may have comprised loosely coupled dyads, in which nurses 'covered' each other's patients during meal breaks and assisted each other with delivering care; or a team comprised of a nurse who could give medications and one who could not. The experience and seniority of the nurses on a shift, and ability to access the EMMS, influenced the formation of the shift teams. Neophyte nurses were frequently denoted as 'new grads' or 'teaspoons'. The more experienced registered nurses were often referred to as 'RNs' or addressed as 'Sister'. An In-charge nurse often implied ownership of the staff on a shift describing the staffing as follows: "*I have three RNs, two new grads, and one EEN*". Senior nurses described the role of the In-charge to manage the shift team taking into account the experience of each team member.

There's one designated In-charge for an evening shift, but when it comes to break time, we have to make sure there's a minimum of two RNs left on the ward. We have to look at their skills and their – you wouldn't leave two new grads by themselves on the ward, for instance, so you need to balance that out. Usually there would be an unwritten law that a senior-ish staff member would stay behind and swap ranks with

whoever's in charge ... But as an In-charge – and I've certainly encountered it on occasions – you do have to look at your skill mix as a whole. If it's not possible for you to go on first or second, you have to accommodate. If it means you just get a quick sandwich in the corridor or whatever, that's what you do. That's obviously worst-case scenario, but it's happened before and you just have to adapt to that. (Interview: Nurse_61)

There were group activities within units that some nurses joined in. These included coffee runs, social activities outside work evidenced by displayed photographs, and groups of nurses who attended the Hospital Ball (visible lists of names for tables). On each unit, there were nurses who participated in conversations about out of work activities, and others who did not. There were nurses who took their breaks together and others who did not.

Delivering patient care was observed to be heavily reliant on teamwork. Physically heavy work including showers and pressure area care necessitated that nurses work together. To deliver safe, patient-centred care in a timely manner (established as important to nurses in the previous chapters), nurses needed to work as a team, to ask for and offer help to colleagues.

19:33 – There are several nurses in the medication room. The In-charge swipes in and says with a theatrical tone: 'Brothers and sisters can we help Sister [de-identified first name]? His patient is going to theatre and then to ICU.' One of the nurses instantly responds – that she will do his meds for him. (Field Notes: Observation_100_PM)

The efficiency with which individual nurses completed their work had flow-on effects for the rest of their team. For example, when nurses were late to take their meal breaks, other nurses in the team were postponed going for a break. As discussed in Chapter 4, delays had implications for how nurses managed their work load, particularly given the time frames medications were 'available for administration' in the EMMS.

09:43 – Nurse_79 goes to the medication room to get analgesia for the patient in bed 20. A senior nurse is in the medication room. Nurse_79 asks to have the DD keys to get the analgesia. The senior nurse tells Nurse_79 to go to tea because she is twenty minutes late, which will make all the other nurses' tea breaks late. She tells Nurse_79

that she will administer the analgesia. There are several nurses within hearing distance. (Field Notes: Observation_79_AM)

7.3 Characteristics of good team members and good team work

Participants in this study described 'being a team player' and facilitating the contribution of other team members to the overall functioning of the team as positive attributes. Participants said they were pleased when the team on their shift was good, particularly if it was very busy; *'thank goodness I am on with good people this shift.'* (Field Notes: Observation_112_PM).

Nurses portrayed good team members as those who were able to anticipate what needed to be done and who did it, and who communicated well with the rest of the team. Nurses who demonstrated these characteristics: helped colleagues; did not pass patient-care tasks on to colleagues; and communicated with their colleagues to facilitate patient care.

A good team player anticipates what team members will need and what tasks need to be completed and will be prepared to be able to assist with that. (Interview: Nurse_50)

7.3.1 Good team nurses worked hard and helped their colleagues

Nurses who worked hard were welcomed as team members. There was shared communication between nurses, verbal and non-verbal, about whether colleagues were good team members. Good team players managed their time well so as to be available to assist their colleagues and communicate with doctors about the patients they were looking after. Conversely, inefficiency and tardiness were seen as detracting from nurses' contribution to team work:

One of the nurses discloses that when she was an enrolled nurse and when she first became a registered nurse she knew how to get in and work. She explained that she worked so hard and the registered nurses would say at the beginning of a shift that they 'would have her', because she was really good, because she could work. This reinforces observations that I have made across the wards – when nurses look at the staffing book, point to the names of particular nurses and roll their eyes, and depending on who else was rostered on, comment on what sort of shift they may expect. Some of the pool staff have been greeted exuberantly and there have been comments about whether they are any good. (Field Notes: Observation_50_AM)

As well as praising colleagues who offered assistance, nurses regularly disparaged those who did not. Nurse_56 described tempering whether or not they offered to assist a colleague according to whether offers of assistance would be reciprocated. To gain assistance when needed, the nurse had to be a team player.

By 09:20 the beds in the section I am observing have all been made and the equipment has been located where it should be. Nurse_56 asks another nurse if they need a hand – 'no, all good' – Nurse_56 responds that he will go and ask another nurse but adds – 'not the others – they never offer to help me – if you offer to help me, I'll help you but if you don't ever offer, why should I help them?' The nurse he is saying this to agrees. (Field Notes: Observation_56_AM)

Participants described ways of teaching neophyte nurses, that it was important to contribute their fair share when part of a team. In the following excerpt a senior nurse revealed that to encourage them to contribute to the team, neophyte nurses were forced to take responsibility for the basic care needs (e.g. feeding, toileting, pressure area care, mouth care) for all of the patients in a room.

The new grads, also they like to do it on the computer too. But sometimes I just let them do certain patients because I don't want them to be on the computer all the time and then I'll assign a room for them to do all the basic care. They have to be responsible for that room. They just have to have a fair share. (Interview: Nurse_30)

Nurses used a variety of methods to sanction their colleagues who were perceived to be lacking diligence and who were not helping colleagues. One method used patient allocation. Specific patients were allocated to force colleagues to work harder and nurses were observed to choose not to be allocated to the same team as colleagues whom they thought to be lazy and not very good.

14:00: There are four nurses at the staff station ... I ask why the ward is sometimes divided into two sections and at others into more. I was offered many possible reasons. A summary of the collective response follows: If there are enough staff who are good and can manage patient load the patients are divided so that they have their own patients. If there is someone on who doesn't like to work, they are also allocated their own patients so that they are forced to work ... If there are people on who don't

like to work with others, they are allocated like this (points at the allocation white board where the names have been allocated for the afternoon) so that they can be separated rather than have to work in a team when they don't want to work with that person. (Field Notes: Observation_39_AM)

7.3.2 Good team nurses did not pass tasks on to their colleagues

Nurses revealed that an important component of being a team player was to encroach as little as possible on their colleagues' time when delivering their allocated patients' care. Administration of some medications required nurses to check the preparation and/or administration of the medication together. Nurses described how they structured their work around the availability of their colleagues to help them with medication work. When they needed to ask their colleagues to co-sign medication in the eMAR, nurses often described it in terms of impinging on their colleagues for their benefit in the first instance. Nurses stressed that when necessary to enlist the assistance of a colleague, they minimised demand by having everything ready. For example, nurses explained that they wrote up the drug register before they summoned the nurse with the DD keys to come to the medication room.

Oh when you need a co-sign. So anything that requires a second signature, but that would be no different with a paper chart. You almost require, you need someone else there and then you are asking someone else to put down what they are doing to come with you for your benefit – for you and your patient's benefit. So you are asking someone else to put their work on hold. (Interview: Nurse_38)

Nurse_101 writes up the DD book and pushes the bell to summon the RN with 'the keys'. While we wait, Nurse_101 explains that you would only push the bell in the medication room to get a check for the DDs, not for IV meds or Clexane. He tells me that would be lazy, that you need to go and find a person – you don't make your colleagues do more than they have to do to help you. (Field Notes: Observation_101_PM)

When nurses were unable to complete tasks that were beyond their scope of practice, or that they did not know how to do, they offered to trade tasks with colleagues who could. Doing so meant that they did not add to their colleagues' workload.

10:05 – An EEN asks Nurse_105 for help because there were several dressings that the EEN cannot do. She offers to wash one of Nurse_105's allocated patients in lieu of Nurse_105 doing the dressings. (Field Notes: Observation_105_AM)

Participants explained the importance of managing time efficiently so as not to hold up the colleagues they were working with or the nurses on the next shift. In the following excerpt, Nurse_06 reported that she felt pressured because of the staff shortages and heavy workload, and as a result was concerned that she might make an error:

Sometimes our staffing isn't very good, we might only have one or two RNs on each side and that is really difficult. And that is more than a one to four ratio, obviously, and it is super difficult and you are under time constraints and you don't have an AIN, or something, so you can't feed them while giving the medication, and you end up just getting confused ... So for me, that's happened before, where I've been under too much pressure from staffing and you kind of forget who you are giving what to ... from then on it was more like just acknowledging my status as a new grad, and I shouldn't have to feel the pressures on me, it's more so on the senior nurses than it is on me, but you also feel bad for the senior nurses that you have to work with because you feel like you're letting them down, you're holding them back. (Interview: Nurse_06)

Participants noted that nurses did not want to pass tasks on to the next shift. To do so caused them to be "behind from the get go" (Field Notes: Observation_60[2]_Night Shift). When giving handover, participants were repeatedly observed to apologise if tasks had not been completed during their shift.

Because as a nurse, especially in the morning shift, you hate the medication being given late, you hate to give to other, the afternoon staff – although we always say nursing is 24-hour – I don't know, it's not just me, I think everybody has this obsession. When they have to hand over something to the afternoon staff to do, there's a medication delay, everybody sounds so apologetic – 'I'm sorry', you know, 'it's not being done'. (Interview: Nurse_31)

Informal mechanisms, including peer pressure, reinforced that good team nurses did not leave tasks for the next shift to do. By way of illustration, I have included the following excerpt, which summarises a heated, but constrained, discussion that occurred at the nurses' station when one

nurse accused a colleague of having not completed tasks on another shift. There was a clear message for all who heard the exchange, and for others who would hear of the exchange, that to leave tasks unfinished was regarded negatively. There was no reference, by either of the nurses involved, to the circumstances or reasons why the tasks may not have been completed.

13:50 – At the nurses' station, there is a very heated and quite loud discussion between one of the morning nurses and one of the afternoon nurses. The morning nurse had accused the afternoon nurse of not getting everything done when last in charge of a shift, and of leaving tasks to the next shift. The afternoon nurse demands 'what sort of things didn't I do – tell me?' It is quite tense. There are two other nurses at the nurses' station, the ward clerk and the CSO. They do not look away, leave or join in. (Field Notes: Observation_210_AM)

In addition to overt reprimands for not completing tasks, as illustrated above, the importance of pulling one's weight was reinforced informally. Deriding nurses, in their absence, for leaving work for their colleagues affirmed that to do so was 'unacceptable'.

21: 50 – At the end of handover the night shift nurses go out to the nurses' station. One of the evening nurses talks with the night duty In-charge quietly using a conspiratorial tone – she is talking about another nurse as the reason why they haven't given some of the evening analgesic, and complains that she had to give it for her. The evening nurse explains that her colleague, who has gone home, has not done what she should have, and as a result, she has had to do the work for her – "it is unacceptable" ... I have been aware of a fair bit of covert conversations at the staff station. The nurses talk about other nurses, with nods and raised eyebrows. It is usually in relation to work is not being done, messy work area, or poor time management. (Field Notes: Observation_68_Night shift)

Participants, agreeing that teamwork was desirable, identified potential challenges to teamwork. At Hospital A, the patient call bells were routed to pagers that the nurses carried for the shift. Without the audible sound of the call bells, nurses were unaware of the demand in number and frequency of patient calls on their colleagues. Some nurses suggested that the layout of the units challenged teamwork. There were observed and reported examples of nurses who were frantic in one section being annoyed with colleagues in another section for not offering to help. The latter apologised that they had had no idea how busy their colleagues were. Participants explained that

because of the unit layout, they might not see half of the patients, particularly those in another section of the unit, during a shift. During one shift, I observed the emergency team was on the unit for a sick patient, and nurses on the other side of the unit were unaware of their presence:

10:10 – One of the nurses comments to the other with a smile, as she looks at the pager on her hip, that the patients haven't called her all morning and now they all want her. She heads down the corridor and into a four bedded room – she calls out with an urgent tone 'can I have some help please' – another nurse responds to her call and she asks her to get the oxygen – the patient is on the floor in the bathroom. There is a palpable tension as several nurses briskly move toward the bathroom at the entrance to the four-bedded room. The NUM leaves the ward round which continues on and joins the other nurses converging on the bathroom – the NUM then re-joins the ward round. The morning tea trolley loaded with coffee, tea, biscuits etc is being pushed down the corridor. Two security guards, not part of the emergency, amble down the corridor. The ward round, including several doctors, continues to move down the corridor as Nurse_15 pushes the emergency trolley to the bathroom where the patient is on the floor. She parks it and primes an IV line. Another nurse moves the cleaning equipment, the mop and bucket, away from the door and says to the cleaner, 'do you maybe want to come back to this room? We are a little busy.' The nurses move quickly and calmly, speaking gently and quietly to each other and the patient. One nurse carries the blue glucometer box, another reads the ECG printout. A team of people in navy blue scrub uniforms run into the ward carrying equipment. The Patslide⁷ is resting against the door. The NUM walking past with the specialist checks in again and then continues up the corridor. A doctor further down the corridor pushes a COW and the coffee trolley continues to be pushed from room to room. I am watching from a distance, keen not to add another person to the growing crowd at the entrance to the bathroom. 10:38 – Nurse_15 has the DD keys and as she swipes into the medication room she is joined by another nurse who is working on the other side of the ward – she looks at Nurse_15 in a bemused way and as she looks at the emergency team asks 'what?' – Nurse_15 explains quickly what has happened to a

⁷ Patslide – a non-flexible plastic board, approximately 1.5 metres in length, that is used to assist in the transfer of a patient from one bed/trolley to another

surprised nurse who was unaware on the other side of the ward that anything untoward was happening. (Field Notes: Observation_15_AM)

7.4 Medication administration, the EMMS and teamwork

There were some features of the EMMS that supported teamwork and others that had introduced challenges to teamwork. The introduction of the EMMS was said to have affected participants' teamwork by: altering access to the medication administration record; enforcing scope of practice limitations to medication administration 'sign off' in the EMMS; increasing physical demands and time taken to administer medications; and increasing the ease with which medication administration could be audited.

7.4.1 Features of the EMMS that supported teamwork

Nurses working in units with a shared care model of patient care, where more than one nurse could access the eMAR simultaneously, explained that the EMMS had increased communication between team members. Frequent communication during medication rounds was described as essential to avoid double-dosing errors. In as much as increased communication benefited teamwork, the EMMS could therefore be said to have supported teamwork.

There is a much greater need for constant communication. With the paper chart only one of us would have had it [and so only one of us would have got it ready]. So it has changed practice in that there is a greater need to double check all the time whether a medication has been given. (Interview: Nurse_26)

A feature in the eMAR allowed nurses to enter comments about why medications had been withheld or delayed. Nurses described the positive effects of facilitated communication on team relations with doctors. Previously, they said, doctors had been angered when medications were not administered. They were less so now that the nurses could provide information about why the medication had not been given.

So, there is provision for the nurse to actually explain why something wasn't done or why something was withheld and it's recorded on the system. Whereas previously they used to find themselves on the receiving end of the wrath of the doctors, particularly surgeons – historically surgeons – who say, 'why wasn't this given?' Now there's no need to explain because it's all transparent. (Interview: Nurse_36)

There were features of the eMAR that supported teamwork by facilitating workarounds. These will be explored later in this chapter.

7.4.2 Features of the EMMS that challenged teamwork

There were features of the EMMS that challenged teamwork. Limitations on who could access the eMAR changed the dynamics of how teams operated and required nurses without access to the EMMS to request information from those who could. At Hospital B where access to the EMMS was limited to permanent unit staff, participants explained that some nurses who were unable to access the eMAR to administer medications became angry and difficult to work with. Nurses who showered and recorded patients' observations said that as they could not see the medication record, they were not able to assess and plan care in relation to whether or not medications had been administered without asking a nurse who could access the eMAR for that information. For example, they had to ask their colleagues to look at the eMAR to see when analgesia had last been administered to a patient before they showered them. This added to the workload of their colleagues and encroached on their time. At Hospital B, participants explained that some nurses who were unable to access the eMAR and give medications became angry and difficult to work with.

Participants felt that the EMMS had changed teamwork communication between doctors and nurses about some medication orders. Nurses suggested, for example, that doctors were less likely to inform nurses about STAT medication orders in the eMAR than they had been with the paper MAR.

21: At times, I find possibly STAT medication can get misplaced – not the actual medication but the order.

F: And that's different from when it was on paper?

21: Yeah. It is different because nine times out of 10, if a doctor had written a STAT medication, they would tell you and they would actually physically hand the med chart to you. Now they may say look, the STAT medication has being charted for Bed 9 and then they'll just physically walk away. You go yeah, no worries, but you've got nine or 10 other things on your mind and that's how it can be overlooked. (Interview: Nurse_21)

Participants described EMMS-related changes to teamwork dynamics between doctors and nurses regarding medication orders that needed to be entered in the eMAR following emergencies. During critical situations, medications were administered without having been ordered in the eMAR. Following the critical event, the medications were ordered in the eMAR by the doctor and signed off by the administering nurse. Participants reported discord between doctors and nurses when doctors delayed ordering the medications in the eMAR.

The number of COWs available for use influenced team dynamics. Nurses reported that during busy medication times, the COW they were using was frequently taken. At Hospital A, they also described being logged out of the eMAR by colleagues from other disciplines (i.e. doctors and pharmacists). Nurses said that when they were logged out of the eMAR, the information they had entered to that point was lost. While nurses joked about secretly swapping COWs, it was considered poor etiquette to take a COW that was in use by a team member, or to override a colleague who was logged in to a particular medication chart.

*... you can always override someone. But then it becomes – if you did override someone, then you think about okay, am I insulting them or something like that?
(Interview: Nurse_43)*

*That thing which you override but you wouldn't want to override it at that point of time.
It isn't etiquette to knock someone out. (Interview: Nurse_03)*

7.5 Using workarounds to support teamwork

7.5.1 Using workarounds to help a colleague

Participants were observed to use workarounds that enabled them to help colleagues. For example, in the following excerpt, Nurse_102 locked the kidney dish, containing medication that had been prepared and signed off in the eMAR, in the patient's top drawer so that she did not have to stay with the COW. This freed her up to assist a colleague.

19:58 – Nurse_102 says that she is going to do the medications for the casual nurse who is snowed under, having had three admissions ... the casual nurse comes out from behind a curtain, thanks them and asks if she could have a hand to attend to a patient's back and pad change – she says apologetically that she tried but couldn't do it alone. Nurse_102 agrees to help – she explains that she will lock the kidney dish

with the Clexane and the Panadol in the patient's drawer as the patient is not in her bed and she doesn't want to leave it on the COW when she is in behind the curtain. She says that she will administer it later because it has been signed off already in the EMMS. (Field Notes: Observation_102_PM)

Nurses described using workarounds to assist colleagues who had poor time management. This was so that their team members would not be behind in their work.

03:58 – Nurse_60 comments that sometimes, one or two nurses, have poor time management. Then when those who have not managed their time well are running around at the end of the shift asking for help or doing stuff in a rush he wonders why they couldn't have spread all the work out over the shift instead of leaving it all to the end. Nurse_60 tells me that nurses are then forced to cut corners and do shortcuts because they can't let their colleagues be behind. (Field Notes: Observations_60[1]_Night Shift)

7.5.2 Using workarounds so as not to impinge on team members' time

Nurses used workarounds to reduce the time their colleagues spent on tasks. Participants explained that when they were the 'administering nurse', rather than bother their colleagues repeatedly to check medications, they worked around the policy that they prepare medications for one patient at a time, and checked medications for several patients at the same time, at a time when their colleague was available. Nurses explained that this workaround was facilitated by the EMMS because rather than having to carry medication charts for several patients, they could flick between patients' eMARs at the same computer. When they were using an EMMS with a short log out time, nurses described using an additional workaround. Nurses confirmed the medication as administered in the eMAR at the time it was checked rather than after it was administered. Doing so saved the co-signer's information so that should the EMMS log off, the administering nurse did not have to bother their colleague again to re-enter their username and password.

Nurse_106 explains that as she was on the Pool she can see that every ward has a slightly different expectation of how nurses approach medication rounds. When she was new she did it all by the book – then she said that she realised how annoying they found her because they had to keep going for every single patient, every single time. She said she soon learnt. She goes on that there are times when she thinks it is

taken too far and describes one ward, where while she was at lunch, the In-charge prepared all her medications and put them in kidney dishes within the charts so that when she got back from lunch the nurse said 'there you are, I've got your meds ready'. Initially she thought, teamwork. But then – 'ooh I am not comfortable – that is how they do it on that ward where it is really busy'. (Field notes: Observation_106_AM)

In addition, when they were the 'checking nurse', participants explained that when their colleagues were busy and stressed, they worked around potentially over-burdening them by not demanding that they accompany them to the bedside to witness administration, or visualise the eMAR. Nurses described complying with collegial workarounds because they did not want to appear to be disrespectful, or not a team member, by challenging or encroaching on a colleague's time. To do so, they said, could make it difficult to work on the unit. Some medications required two nurses to check the five rights of medication administration together (and at Hospital A both nurses were also required to check the patient's identity against the eMAR at the bedside). On some occasions, the administering nurse asked a colleague to check the medication without the eMAR. If their colleague was very busy or stressed, rather than ask them to wait while they found and checked the eMAR, they checked the medication as requested. They described relying on their knowledge of what the patient was ordered, their memory of having administered it the patient previously to work around. In summary, the goal was to not add pressure to a co-worker.

Nurses noted that whether or not they used this workaround was influenced by whether or not they trusted their colleagues or patients. The role of trust in moderating whether or not nurses used workarounds will be explored in Chapter 9.

And if they are busy, you will be imposing on them. Sometimes like myself like I'm busy and I just want to rush towards my patient, and I know that you trust me and I trust you it's like a kind of mutual, mutual respect there. Still it shouldn't as far as policy is concerned and ideally shouldn't. But in reality and that's where we are. (Interview: Nurse_31)

Nurse_06 illustrated participants' described tendency to conform to using workarounds when working on units that did so. It also highlighted that while operating as a team, nurses frequently referred to patients as **my** patient or **your** patient. The nurse who was allocated to administer the

medication, or who was the most senior, often directed whether or not a workaround was implemented. Nurses were less likely to question a collegial workaround if it was not **their** patient.

F: So if, if you were on the ward that worked around things do you think it is more likely that that would be what you would do?

06: For me yes! Even sometimes when it's just a subconscious thing, I am not thinking – 'oh they are not doing that so I won't do that', it's more subconscious, like if you're not doing what they are doing then you are doing something wrong. ... And you'll be like, 'Okay. I will just do whatever you are saying because you think you're right, and I have to work here.' So it is that kind of situation. ... but in her situation, even when I gave her a rationale for what I was doing, she said, 'no this is my patient and I want it done this way.' So you would be a bit worried about saying, no I won't give it at all then. You would be like, I will get into trouble if I kick up a fuss – yeh. (Interview: Nurse_06)

Nurses described working around scope of practice limitations to be a team player, to look after their own patients rather than ask a colleague to do so. This collegial workaround required both nurses to be complicit. One nurse signed off as administering the medication in the eMAR, the other as witnessing it. In reality, the nurse recorded as having checked the medication in the eMAR administered it. There was an expressed awareness in the following excerpt that in executing this workaround, the nurse was vulnerable to professional retribution. This will be examined further in the chapter on nurses' feelings about workarounds.

Quite often I say, are you happy for me to give this? Most of the time they are. If not, then I can quite easily hand that job away and put further responsibility on the RN. I guess that is maybe why our RNs get paid more. But I am a team player. Looking after my own patients, giving them their own medications, I feel confident and comfortable doing it. But I do realise, Your Honour, I could be in trouble. (Interview_Nurse_24)

Nurses reported that some of their colleagues refused to work around policy. While they admired them, they were said to be unpopular because by not using workarounds they slowed their teammates down. In the following excerpt, Nurse_31 is referring to a nurse who other participants also depicted as someone who would not use workarounds.

31: *Some do [refuse to work around policy]. There is one on this ward. You might interview this nurse. As a result they are not popular.*

F: *Because they make everyone go with them?*

31: *People say they made our life difficult, but will somehow I respect that, yeh, I think if everybody takes this as a matter of fact, I think it would be easier. But the frustrating thing is that sometimes I'm really, really in a rush and you are really, really in a rush, and I don't want to bring a computer to go to your bedside, and you have to go to my bedside – it just doesn't, the whole workload, it doesn't allow it, it doesn't encourage that. So oftentimes I fall back to whatever is you know is more, whatever helps the job gets done. (Interview: Nurse_31)*

7.5.3 Using workarounds so the whole team gets its work completed

Nurses explained that they altered how they did their medication rounds to facilitate the work of their team members. For example, Nurse_77 explained that knowing that there would be a rush and lots of people in the medication room at 20:00, he administered medications early so that he could leave the medication room clear, as one less person in there was better for everyone.

Participants revealed that at times they worked around the policy that required both the administering and checking nurse to witness the medication administration, because to do so would impact the whole team. This workaround involved getting groups of patients medications checked at the same time to avoid having to log in and out and in and out: *"we try to get them all selected while the RN with the DD keys is in the room so as **not to inconvenience them and also so that they can organise their time**"* (Nurse_60). I observed a workaround that I have labelled the 'team dance workaround' because the process mimicked a choreographed, progressive dance. The steps were known by the ward team and appeared to facilitate the checking, counting, witnessing and administration of S8 and S4D medications. The medication was signed off as administered in the medication room computer rather than after the medication was administered. This enabled the holder of the DD keys to remain at the DD cupboard and check the DD medications for the next nurse's patients, who was then followed by the next nurse and so on. The nurses explained that the process was quicker and easier and enhanced the workflow for the whole team. Had one of the nurses said that they wanted the person at the DD cupboard to accompany them to the bedside, it would have changed the dance, the other nurses

would have had to wait until they returned, which would have delayed the medication round for all nurses on the team. I observed that regular pool staff often participated in this 'team dance workaround'. On one of the units the 'team dance workaround' was interrupted and the nurses complained that the disruption made them feel that they were being 'checked' and that it slowed them down.

A nurse comes into the medication room and asks for a check. The In-charge says 'yep, but I am doing everything by the book, I'm going to the bed too. It's terrible the way we do things here – I'm going to change the way I do things.' Later in the shift, two of the nurses complain to each other about the way the In-charge has changed the way they normally do these medications needing checks, because it takes longer and feels like she is checking up on them. (Field Notes: Observation_107_PM)

Some nurses described feeling compelled rather than happy to comply with the 'team dance workaround', particularly if they were holding the DD keys. They reported that while this workaround supported the nursing team to administer medications in a timely manner, the EMMS records did not reflect reality, and one nurse, who was logged into the EMMS in the medication room, appeared to have administered medications to half of the unit.

7.5.4 Using workarounds to support relationships with team members

Participants reported using workarounds to manage team relationships and to avoid creating conflict. There were some participants who explained that whether or not they acquiesced to workarounds was influenced by the personality of their colleague and the need to avoid conflict. Nurses elucidated that when there was a potential that a colleague would become irritated or annoyed if they were asked to accompany them to the bedside to check the five rights of medication administration they worked around this requirement. This involved signing off the medication as administered in the eMAR prior to administration and not checking the five rights at the bedside. Nurse_31 related that when working with agency staff, she was more likely to go to the bedside to witness medication administration because there was not the same pressure to use workarounds to manage interpersonal team relationships.

For the agency [nurse] it's nice easy you don't have to explain so much and you don't have to worry about interpersonal relationships as well because they're 'agency'. You're just nice and polite and professional and they appreciate that. And often there

are times you just say, 'you know it's for your sake it's for my sake let's go together'. ... whereas with regular staff sometimes you know their personality and they get annoyed ... you have to be aware of the colleague relationships ... With some colleagues ... they give you the feeling, they are not aggressive towards you, but they are just, they just get annoyed easily. You see them, you know, get jumpy, and you're thinking you should go [to the patient with them] and then they just rush out the door, everything's rush, rush, and you just feel, I feel, like if I say that [I want to go to the bedside with them], it will probably be taken wrongly ... So with the people, I don't think that I can, unless I really have a very deep trust and I'll go and say, 'OK let's go together. I know this patient and last time this patient was a bit funny – let's go and make sure he's taking it.' When you say that, your colleague, kind of doesn't take it personally. Still funny some people do take it personally. Like it is – you want to come with me, you don't trust me? Although we know it's policy. Yes some, but I think not all the time -- you can feel just through interaction, you can feel it. (Interview: Nurse_31)

7.5.5 Using workarounds to manage the challenges of teamwork with other healthcare professionals

Interactions with other clinicians impacted nurses' use of EMMS and their use of workarounds. Nurses described strategies that they used to manage poor etiquette. Ideally nurses would be able to: complete their medication rounds uninterrupted; maintain continuity with the COW they were using for the medication round; and access patients' electronic medication administration records throughout the medication round. However, in reality, the times doctors accessed medication administration charts in the EMMS frequently overlapped with the time nurses were doing medication administration rounds. Nurses complained that the COWs they were using were often 'hijacked' by doctors while they were still completing the medication round. At Hospital A an individual patient's electronic medication administration record could be opened by only one person at a time. Thus during periods when both nurses and doctors were accessing electronic medication administration records, nurses complained that they were logged out by their team members from other disciplines. Participants explained that when there were not enough COWs, rather than take one that someone else was using, or to work around a potential argument with the doctors about a COW, they signed off medications at the desktop computers at the nurses' station or in the medication room. One participant reported writing the medications on a piece of paper, administering them and signing them off when the eMAR was available. The workaround

was depicted as necessary to administer medication but created tension for the nurse who described it as possibly illegal:

81: I have even done something that is possibly illegal – and don't put my name on it – I've even written down – I've got the computer at the desk and written down the next patient's medications and the dosage and then gone into the room and given those ... Because I don't know how long it's going to be before I'm getting my computer back, yeah. (Focus Group: Nurses_ID_8)

The excerpt below describes an observed event in which several doctors, commencing a morning round, intercepted a COW that a nurse was using for a medication round. Nurse_88 indicated that she signed off the medication in the eMAR before she administered it. This workaround circumvented the need to ask for the COW to be returned, because she had already signed the medication off. By working around the need to re-enter the information when the doctors logged her out, she also saved time ('time efficient nurse') and reduced the risk of error of forgetting what she had withheld, delayed or dispensed to the medication cup ('safe nurse').

08:52 – Four doctors approach the bed, they greet the patient and then they interrupt the medication administration to ask Nurse_88 how the patient is. Nurse_88 gives a brief response and then leaves the room to get an eye ointment from the fridge in the medication room ... The doctors start pushing the COW away from the bedside. One doctor asks if I am using it and I reply that I am not but that the nurses are. The doctor looks at me puzzled and continues pushing the COW away ... Nurse_88 comes back into the room looking for the laptop – I ask her if this has happened before. She tells me that it happens all the time and this is why, when it is ward rounds, she sometimes confirms the medications before the patient has taken them. She says that otherwise when she is with the patient giving the meds the doctors might take it and then she has to start all over again. (Field Notes: Observation_88_AM)

Nurse_45 highlighted a perceived power differential between nurses, doctors and pharmacists in relation to being logged out of the eMAR. There was a sense that although it was possible to override doctors and pharmacists so as to be able to administer medication, this was not appropriate (although Nurse_115 described doing so and being reprimanded). Nurse_45 explained that nurses waited or worked around being logged out by administering the medication from the administration history and entering the information again when the doctors or

pharmacists have logged off.

45: They just override it so you lose all your work.

F: So do you do anything about that?

45: Not really. So what I do is normally just go back to administration history and it will show the time and the date that I give it so I can still go through my medication, I can still administer my medication correctly and properly. So it's just time consuming, now I have to go back all over again and it's like the doctor... Then we go and talk to them, we tell them, you just override me and I'm just doing my medication, oh sorry I thought you left it. (Interview: Nurse_45)

7.6 Conclusion

Being a team player and facilitating teamwork were important constructs for nurses in this study. Physical and regulatory constraints required nurses to organise and work in loosely or tightly coupled teams. The introduction of the EMMS had both facilitated and challenged nurses being team players. Participants described their use of workarounds as a strategy to support teamwork. Implementation of workarounds to support teamwork potentially undermined other characteristics, such as safety, that nurses identified as important. To compensate, nurses reported engaging secondary workarounds. There were, however, situations in which some nurses did not use workarounds to be a team player. From the perspective of frontline nurses, being and working as a team player was linked not only with delivery of patient care but also with professional safety. The next chapter examines nurses' explanations of using workarounds that were not about being a 'good nurse'.

Chapter 8 Workarounds that were not about being a 'good nurse'

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8.1 Introduction

The previous four chapters have described reasons nurses offered for, and observations of, *in situ* behaviours related to their use of workarounds, all of which were aimed at being a 'good nurse': being time efficient, delivering safe and patient-centred care and being a team player. They were also observed to use workarounds (Research Question 1) for other reasons which were not primarily motivated by being a good nurse. These included workarounds reported as: unavoidable (Section 8.2); employed to circumvent work health and safety issues (Section 8.3); being easier (Section 8.4) and when nurses were unaware of policies or thought policies not to be applicable (Sections 8.5 and 8.6) (Research Question 2).

8.2 'Unavoidable' workarounds: "Because I have to"

There were workarounds that were labelled as 'unavoidable'. These included those situations where it was not possible to administer medications without using workarounds: when the equipment was broken; the EMMS went down; there were interruptions to internet connectivity; the patient was transferred to a unit that did not use EMMS and there were not enough staff with access to the eMAR.

8.2.1 Using workarounds when the COW equipment was broken

When the COW equipment was broken, the laptops would not log on, or the keyboards were missing keys, nurses reported workarounds that they used to enable them to administer medication. The most frequently described workaround response to broken COW equipment was to use desktop computers to administer medications. As illustrated in the following interview excerpt, finding another COW instead of reporting or fixing broken equipment was considered to be 'working around' the problem of broken equipment:

19: No, it's the keypad. So someone said oh, I can't use my log in because I can't press B or whatever it was. I'm going – how long has this been going on and you don't say anything? So we got that fixed. The other day a mouse wasn't working and they just left it. Then fix that. Yeah, they're just not saying anything, just putting up with it. I'm thinking, yet about other things we jump up and down about, I'm going – no one mentioned it. It's odd.

F: Yeah. So those situations, I wonder what they do?

19: Well, they've just been working around it, because it was...

F: Yeah, so how do they do that though?

19: Oh yeah, we'll go to another laptop. (Interview: Nurse_19)

8.2.2 Using workarounds when the EMMS went down

Nurses at both hospitals reported that when the EMMS went down an organisationally sanctioned workaround was used to administer medication. Participants printed off the medication orders, administered medications from the printed MAR and reconciled the eMAR when the EMMS came back on line. While one participant described this type of workaround as safe and 'ordered', others conceptualised the process as horrendous, chaotic, time consuming, annoying and unsafe.

53: It's horrendous. Again that's another thing that won't happen during the week, it always happens on a weekend and I've been here on a couple of occasions but on one occasion where we had to go the full hog with it. So not only did we print out multitudes of the whole admission for their medications, whatever they'd been on, it comes up and then you'll sit there with highlighters and it's really quite dangerous and you're highlighting what you would be giving. It's morning, seven o'clock, that one, that one, that one and then you have to race to the patient with your papers, multitudes of paper charts to try figure out which ones these ones are. It is confusing and it's really time consuming and ... you are using hundreds and hundreds – because some people have been here for a month. That's a lot of medications that they've put on and taken off whatever all the PRNs – it all comes through. (Interview: Nurse_53)

8.2.3 Using workarounds because of limited internet connectivity

Participants were observed to use workarounds and reported that when there was a loss of wireless connectivity, precluding them from taking a working eMAR to the patient's bedside, they checked medications and signed them off in the eMAR outside the patient's room. Nurses employed secondary workarounds to check medication and patient identification. Workarounds included printing off patients' eMARs and memorising or writing down medication and patient identification information for comparison at the bedside. When limited internet connectivity

resulted in the EMMS logging the nurse off, participants were observed to confirm the medication as administered prior to administering it and not take the COW to the bedside. Nurses also worked around limited connectivity across the unit by printing off the medication orders and administering medications from the printouts at the bedside, later reconciling them in the eMAR.

16:52 – 17:02 - Med Admin Event 2: female; Bed 14; 2 topical (eye-drops) due

Nurse_86 pushes the COW out of the four-bedded room and down the corridor into the two-bedded room; 13 and 14. He greets the patients. He selects patient 14 in EMMS ... The computer logs out and will not reconnect (it is the same as what happens each time I have shadowed nurses in this room). Nurse_86 goes to find another COW – all are in use. He pulls the COW out of the room and logs back in to the EMMS ... He selects the eye-drop order and clicks on a purple triangle and reads the instructions. He leaves the COW in the corridor, and tells me that he is not taking it to the bed because he does not want it to logout. He gets some gloves, goes into the room administers the eye drop to the patient in bed 14 (has to help her lay back a bit and put her head back), Nurse_86 talks to the patient before and while he administers the eye-drops – takes the gloves off – and returns to the computer in the corridor and confirms the medication as administered in the eMAR. (Field Notes: Observation_86_PM)

8.2.4 Using workarounds to circumvent COW and space barriers

There were some features of the EMMS, which made medication administration more difficult, including their physical properties. During busy medication times I observed crowded medication rooms, as several nurses tried to fit their COWs into the medication room at the same time. When this was physically not possible there were frequently COWs lined up at the door and nurses waited their turn or retrieved the medications they needed from the medication room, prepared them using the COW shelves or dressing trolleys, often ‘swapping a check’ (swapping COWs to check medication orders for their colleagues). On a couple of occasions I observed nurses take medication to a COW lined up outside a medication room, peer at the eMAR with a puzzled look before they realised that they had returned to the wrong COW, and that the one with the eMAR open that they had been working from was the next COW in the line. I observed nurses bump into a COW on several occasions. A number of nurses were observed and described working around these limitations. The physical properties of the EMMS equipment made their use cumbersome in

some circumstances. Nurses described how trying to fit a number of COWs in small medication rooms created space and ventilation issues which they worked around by using the computer in the medication room. According to Nurse_43, this was not ideal practice:

Sometimes if you have two or three – even two laptops in there, it can be quite crowded. It's a small area, and the area is – just sometimes the ventilation isn't as good. Again – and the computer in that room, the one that's plugged into the wall, it's in the mainframe. So again the response is a lot quicker. You're sort of pushing this thing and navigating yourself into that little room, and then competing with spaces within that room. Some people prefer it if they just log out, go back – go to the mainframe, get the medication and do that. They're not meant to do that, but that's one of the reasons why people do that. (Interview: Nurse_43)

The COWs competed for space with the other equipment in the patients' rooms and the lives of the laptop batteries were reported to be short. Nurses explained that in these instances, when space was restricted, it was not possible to push the COW into the room.

Also with the clunkiness, when we have bed bound patients in small rooms, or even four bedded bays, sometimes they keep a stretcher next to them, if they're going in and out. That also restricts your space because there's not a lot of room around here. Then sometimes when you have the four wheel walkers and someone's got a four wheel walker, another guy's got an A-frame and another's one got a four arm support frame, you just can't mobilise around that. (Interview: Nurse_39)

In order to work around space restrictions and the need to plug the COW in at every bedside, some nurses left the COW plugged-in in the corridor when dispensing medications. Nurses often employed secondary workarounds to deal with the challenges created by space limitations – they took the medication drawer to the COW, scribed or memorised medication details and patient identifiers.

It is very hard to bring the computer into the bedside – not only the matter of the size of the computer, but the battery is not good enough sometimes, the battery will run out. So sometimes I bring in the paper rather than the computer. To be honest, I am very careful not to make a mistake but you know ... (Interview: Nurse_16)

8.2.5 Using workarounds to bridge the gap between paper MAR and eMAR

When patients were transferred to wards without EMMS, or when they went for tests and procedures, part of the transfer documentation was a print out of the eMAR. The nurses highlighted the medications and the next time they were due for administration.

10:14 – The NUM has done the paper work to transfer a patient to another ward that does not have EMMS – the nurses have to print off the medication orders and include them in the patient's notes for transfer – the last update was several days ago so the NUM rings the contact for EMMS support to try to get it fixed – there are several instructions and different things they have to do – 'I hate wasting time like this, as if I have nothing better to do with my time' – Once they have the printout they highlight the medications and then the scheduled administration time for the next time they are due. It is 10:43 before all of the medications have been highlighted (nearly half an hour for one patient to have their medication orders printed and highlighted before they can be transferred – and the NUM does not have a patient load). (Field Notes: Observation_72_AM)

8.2.6 Using workarounds because of staffing issues

At one hospital, during night shifts, the nurses on the study units were required to go to other units to cover for meal breaks. As access to the eMAR was limited to endorsed nurses, workarounds were employed to ensure medication could be administered when there was only one nurse who could access the EMMS on the unit. Both nurses checked the medications, often for several patients, prior to meal break relief:

One of the nurses explains to me that there is a problem on night duty when a nurse is off sick and is not replaced with a nurse who can use the EMMS. The nurses on this ward relieve meal breaks on the other wards during the night – so that there is someone on the ward who can use the EMMS. This may leave only one nurse on the ward who can use the EMMS. If patients require medications that require checking during that time, the nurses workaround the unavailability of a colleague to check by checking the medications for those patients earlier in the shift. They are then left in kidney dishes with the bed number written on the bottom or on a piece of paper to

identify that they have been checked and which patient they are for. (Field Notes: Observation_202_PM)

8.3 Using workarounds to circumvent work health and safety risks

Some nurses reported that EMMS barriers also posed work health and safety risks including back injury. They related incidents in which COWs had toppled over, causing nurses to trip or hitting them. Nurse_33 described the potential risks of the older style COWs:

So one of the things is the risk of injury when you carry the COWs around, so you can injure yourself because of the heaviness. You can hit someone else too. I mean, you can injure someone else too. So those COWs are a bit difficult to carry around the ward. (Interview: Nurse_33)

Rather than manoeuvre the heavy COW to the bedside, or bend down to peer at the screen, nurses worked around risks to staff health and safety by administering medications from desktop computers.

24: You've got three focuses. You've got the laptop; you've got to look into a drawer; and you've got to give it to the patient. Or you are going back between the drawer and the laptop, the drawer and the laptop, the drawer and the laptop. You don't want to stick a laptop in front of patients. It's quite hard to manoeuvre. It's an obstacle ...

F: So one of your issues is that your focus has to change?

24: Different heights too. I'm going from there to there to there. If it was in drawers, I don't have to bend down that far. So that is a real issue, which is why sometimes I go off policy and sit down and check something off at the desktop. I can remember things are not completed yet and I run out and give it to the patient, because depending on what time of day it is, especially in the evening shifts, medication administration settles down. (Interview: Nurse_24)

8.4 Using workarounds because of laziness or convenience

In previous chapters the use of workarounds so as not to appear lazy (e.g. delaying medication in the EMMS to remove the OMA) was described. However, a small number of participants attributed workarounds to nurses 'actually' being lazy. Nurses often referred to a combination of

reasons that contributed to their use of workarounds. They also described overlying factors that moderated whether or not they employed workarounds and how they felt about using the workarounds that were driven by good nurse and non-good nurse motivations. Moderating factors and feelings, which will be presented in the next chapter, are introduced in the following interview excerpt. Nurse_55 attributed not taking the COW to the bedside to laziness. Nurse_55 and other participants in this study reported that competency played a role and influenced how nurses felt about workarounds. While they were comfortable with experienced nurses using workarounds, they were not happy to see neophyte nurses and less competent staff doing so.

No we should all be using it the same, definitely, we should all be taking it to the bedside as you would do with any other drug chart, you would check it at the bedside. Look, make sure it is the same patient, we should all be using it the same way. I think it is just laziness probably, that applies to me I am sure, or competency, if you know what you are doing, some people might not need the drug chart with them. Like for example the new grads, ideally they should probably take it with them more compared to the more senior staff possibly just because they know the drugs and they know maybe what they are doing a little bit more. (Interview: Nurse_55)

Participants also described situations in which nurses worked around prescribed medication administration times to administer medications early for their own convenience. This was coupled with secondary workarounds such as signing the medication off in the eMAR later, when the medication was due, and informally notifying colleagues that the medication had been administered. Nurses explained that the secondary workarounds were necessary for the purposes of patient safety (to avoid double-dosing), because 'it did not look good', and because giving a medication early was considered to be illegal by some nurses.

8.5 Using workarounds because 'I do not know the policy'

At both hospitals there were nurses who were unsure about medication administration policy requirements and, therefore, were unaware or unable to identify when they worked around them. The following interview excerpts illustrate divergent understandings of whether the hospital policy required two nurses to check together for specified medication routes the rights of medication administration at the patient. I have included an example of both views from each hospital:

Hospital A

No you don't need to take two to the bedside for the IVs, you just need to get a second checker to check the actual drug and sign it off, and then you can just do it yourself. (Interview: Nurse_15)

F: Because it's IV are you still both meant to go?

65: You are supposed to still both go and then if it is through the burette and it's gravity, still supposed to check that the rate is right, calculate the rate and ensure that either this drip rate is fine or what has been programmed into the Gemini is correct. (Interview: Nurse_65)

Hospital B

I think not with subcuts [subcutaneous] – subcut sort of injections, we really – I don't know if that's a protocol rule or not, I don't think so, but you do have to make sure that you're giving the right patient, so obviously you need to eyeball the patient that you're giving it to and not just the chart because that's when you know I thought it was bed nine now I gave it to bed 10. (Interview: Nurse_53)

F: So with the checking, so say you and I are checking an IV antibiotic or something, do we both need to go the bed or do we just check it together?

50: No, we just check it together with the IV stuff and then you write in comments, there's a comments tab that comes up and you write – personally for me, whenever I give a subcut [subcutaneous], Heparin or any subcut [subcutaneous], any IVs, I write checked by RN [de-identified] (Interview: Nurse_50)

Nurses also described using workarounds because they thought that policy was more demanding than it actually was. So as not to work around **imagined** policy requirements, nurses worked around **actual** policy requirements. For example, at Hospital B, the administering nurse was required to type the name of the checking nurse in the comment box of the eMAR. Several nurses, particularly in one unit, reported an assumed, rather than actual, requirement that the 'checking nurse' type their own name into the comment box. In order not to work around this assumed requirement, nurses worked around actual policy requirements, for example, they did not sign off medications in the eMAR until the 'checking nurse' had typed in their name in the comment box.

Earlier in the shift, Nurse_104 had taken an IV antibiotic to the In-charge nurse to check. The In-charge nurse had been logged into the EMMS at another computer and had opened the eMAR of the patient on the computer she was using and checked the medication against the order. Nurse_104 did not type in the name of the In-charge nurse as having checked the medication in the eMAR – but waited for her to be free to type in her own name in the comment box in the medication order. As it had not been signed off as administered, at 17:10 there was a red box next to the medication order indicating that the medication had not been administered and was overdue. (Field Notes: Observation_104_PM)

8.6 Using workarounds because 'I disagree with the policy'

Nurses thought some of the policy requirements were nonsensical or not applicable within their work context. There was a sense that policies were worked around at all levels of the organisation. For the nurses at the clinical coalface one of the justifications for using workarounds was that the policies were designed by people, often nurses, who had 'crossed over' and who no longer had an understanding of what the reality was for nurses delivering care.

... we all have that little bit of defiance too about all the policy makers and they are actually sitting in an office on the other side of Sydney so far removed from the coalface – so yes I'll pay it token homage but really what happens at the coalface is two completely different things and there very much is that disconnect – does that make sense? ... A typifying thing of nursing is that nursing is schismed into three groups. There's the education group – so it's the perception of what uni teaches people, so you go off to uni, you become an academic. And in some respects there is an underlying thing – 'they're not really good nurses that's why they've gone down that pathway'. There's the nurses at the clinical coalface, who stay there for 100 years, and most of them are good nurses – not always – there are some who are shockers. Then there's the managerial nurses, where you're almost betraying because you are jumping on the party line, you want to follow the party script, toe the party line and write the policies that really have no practical application. And I think that's the thing about the defiance, if there's no practical application for nurses in regard to the policy there will always be the workarounds and we don't recognise that, no one is there going 'um hang on this doesn't work for nurses' – so we have to do X,

Y and Z to get around it. So we still give it lip service but really we're doing a very different practice. (Interview: Nurse_50)

Participants at Hospital A recounted that while EENs were not endorsed to administer subcutaneous Heparin, which could be reversed if an error were to occur, for example, they were permitted to administer subcutaneous Clexane, which could not be reversed. While some nurses reported they would not work around the policies even though they thought them to be 'ridiculous', others reported and were observed to work around policies that they thought did not make sense.

8.7 Conclusion

Participants were observed and described using workarounds, when administering medication for reasons other than to be a good nurse. EMMS technology and equipment, staffing issues and inconsistent use of EMMS across all hospital departments and units created barriers to administering medication that led to 'unavoidable' workarounds. Workarounds to manage work health and safety risks, because of laziness and a lack of knowledge or disagreement with policy, were not motivated by a concern about patients, and were also grouped as workarounds that were not related to being a good nurse. Secondary workarounds were employed to compensate when workarounds undermined patient safety. This chapter introduced the notion that whether nurses used workarounds for virtuous or non-virtuous reasons, and how they felt about using workarounds, were moderated by factors such as the level of competency of the nurse who used the workaround. This will be examined in the next chapter on 'moderating motivations' and feelings about workarounds.

Chapter 9 'Moderating motivations', feelings about using workarounds and teaching workarounds

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9.1 Introduction

The previous five findings chapters have described observations of workarounds and reasons nurses offered for using workarounds: some related to being a 'good nurse' and some did not. This chapter focuses on Research Question 2 by examining factors that influenced nurses' motivation to use workarounds, and their feelings about, and experiences when, using workarounds. The chapter concludes with a discussion of how the use of workarounds has been passed down through the nursing 'generations'.

9.2 'Moderating motivations' to workaround

Participants described additional factors that influenced their use of any kind of workaround, whether their goal was to be a good nurse, or something else. For the purposes of this section, these will be referred to as 'moderating motivations' to distinguish them from the good nurse and non-good nurse motivations described in previous chapters. For example, nurses reported that while they might be time efficient or enhance teamwork, some workarounds undermined patient safety, compromised staff integrity and subverted nurses' professional safety.

9.2.1 Ward management and resources influenced the use of workarounds

In some study units, Nurse Unit Manager (NUM) driven interventions had reduced the need for specific workarounds. For example, the purchase of additional COWs was approved by the NUM on one unit, so that all nurses had access to a COW at peak medication times. In this unit, there were few nurses who reported the need to use desktop computers during peak medication times to be time efficient or to protect team relationships.

A commonly observed interruption during medication administration involved nurses leaving the COWs, with the eMAR open, to go to collect missing equipment (e.g. mortar and pestle, medicine cups, cannula flushes). To work around threats to time efficiency caused by the need to log in and out (policy requirement when leaving a COW unattended), nurses did not log out of the eMAR when they left the COW. In one unit, in order to reduce the need to leave the COW (and therefore reduce the frequency of this type of workaround), additional mortar and pestles had been purchased and purpose-designed COW boxes containing frequently required medication-administration supplies (spoons, medication cups, IV flushes etc) had been made for each COW.

In contrast, in some units nurses described, with frustration, that there was no point trying to get problems 'fixed'. Repeated unsuccessful attempts to find a resolution to workflow barriers, or a culture of working around barriers rather than solving them, was linked with described workarounds.

24: I think I am the only person that actually reports these things ... Once a fortnight I pick up a laptop that is like that; unless it is the same one going – no one does anything about it.

F: What do you do when that happens?

24: I get really angry on the inside. I take it to [de-identified], because I am running out of time now, because I've got to find another laptop. That is when there are six or seven nurses out there and doctors and all that. So I've got to go round and steal one or take one from behind someone's back; do silly little things like that.

...

F: When there are no laptops or if they are not available, what do you do?

24: The only thing you can do is – I wonder if I have got any evidence in my locker – on the back of my hand or a sheet write down the numbers; write down the drugs; tick them off and go out there.

F: Where do you tick them off? At the desk?

24: At the desk, yeah. (Interview: Nurse_24)

9.2.2 Shift and unit leadership influenced the use of workarounds

The attitude of the nurse in charge of the shift or the NUM influenced whether nurses used workarounds, particularly in relation to checking and witnessing medication administration. According to one of the nurses who worked across many units, "*whoever is in charge sets the tone for how it's done*" (Nurse_77). Another participant explained that when she checked out S8 medications with nurses on her shift, they waited for her because they understood that her expectation was that they would wait. As described in Chapter 7 concerning teamwork, their

colleagues did not always favourably receive decisions by the In-charge to not employ workarounds.

02:09 – Nurse_69 and I, standing in the medication room, discuss various medication administration practices. I ask when it is necessary for two nurses to go to the bedside. Nurse_69 says that it should always happen with S8s – she might get out schedule 8s for three patients. And then, depending on the level of pain, she will go to the patient with the most pain first. The nurses go to the patients with their S8s and wait and she will go around to each patient and do a full ID check. She says they wait because they know she will check. 'I wish that I had time to do the same for the S4s, but I don't. We just wouldn't get the other important care done.' Nurse_69 explains that in the private hospitals, S4s are on the shelves – S8s are more dangerous to the patients, that's why they check and go to the bedside. She says that they take the laptop to the bedside except when it's an isolated patient. In that case, they use the red folder with the MRN as a check and usually leave the laptop at the door. (Field Notes: Observation_69[1]_Night Shift)

As described in Chapter 4, one NUM had introduced a medication 'round' dedicated to the administration of S8s, S4Ds and warfarin. Two nurses undertook the medication round and at each patient both nurses attended to the rights of medication administration and completed specific drug-register documentation requirements. Nurses on this unit were infrequently observed to use workarounds when administering medications that required a witness.

Nurses on other units said that they were less likely to use workarounds on units where the NUM was 'strict'. Senior staff who kept the neophyte nurses in line and behaving in a professional way were considered in general a good thing, but risked being considered harsh – *"but then they are seen as harsh and bullies"* (Nurse_60). In both hospitals, participants recommended that, given my research topic, I should spend some time on specific units (e.g. Units L or T), where it was known that nurses followed policies exactly, or highlighted that nurses on a particular unit were less likely to use workarounds. The number of times nurses volunteered this recommendation, and suggested the same unit, spoke to a collective knowledge and shared understanding of unit-specific norms relating to the use of workarounds. Senior staff were also said to control the spread of workarounds.

Nurse_111 explains that one unit (Unit T) is completely different in the way it is run: – only the senior staff administer medications, especially IV medications, and the keys are not given to staff who have been called in – even to those nurses who are from other units in the hospital (permanent). There are lots of rules there – even how they write their notes, they have to use certain headings. When they do the S8s – two senior staff go around together and do the whole lot – ‘we don’t like doing it like that’. She goes on to explain that she is capable of writing a report, doesn’t need someone to tell her how to do it, and that the new grads are registered, so should be able to carry the keys. I observed that the nurses on that unit rarely went home before 22:00 even if on an early shift the next day – sometimes they had their bags ready to go, but waited. (Field Notes: Observation_111_AM)

In one unit, the NUM had introduced a blanket workaround. Nurses on that unit worked around the potential of compromising a patient’s airway by not administering a frequently ordered aperient to any patient because it caused thickened fluids to become thin. The NUM requested that until a resolution could be found, no patient on the unit, whether they had swallowing difficulties or not, be administered that aperient. The nurses worked around following medication orders for this aperient by withholding it and then nurse initiating a medication order for an alternative aperient.

9.2.3 The culture of the units influenced the use of workarounds

At both hospitals, participants identified units where it was not acceptable practice to work around policy with EMMS. Several casual pool nurses, who worked across different units, described unit norms that impeded workarounds. While some participants described these units with admiration, others were less positive. For example, participants explained that the nurses on Unit L worked through their meal breaks and went home late because they did not use workarounds. Whether or not work was left to the next shift was influenced by the culture of the unit. As described in Chapter 4, there were some units in which nurses said that they were concerned that they would be judged as lazy for being late with medication or for not completing work. Nurses on these units more frequently reported using workarounds in order to be, or to appear to be, time efficient.

Nurse_101 contrasts this ward with another ward, Unit L, a ward that has been frequently offered by way of contrast during the study. Nurse_101 describes Unit L as strict, with a teaching method that works by ‘putting the fear in you’ – they are very

different, they follow all the rules. I asked how the nurses managed to get all of their work done given that Nurse_101 had said that you would never finish all of your work if you followed all of the rules. Nurse_101 explained that the nurses on Unit L worked into their meal breaks and they don't finish on time. 'Here we believe that nursing is a 24-hour job and so long as you don't make a habit of it, things can be left to the next shift. Very rarely do I leave things, but it happens. Here we've got each other's backs, like this afternoon I told the new grad to go home and I would do her obs. On some wards they would make you stay until it was all done.' (Field Notes: Observation _101_PM)

Unit norms were also linked with a propensity for nurses to use workarounds. For example, nurses new to the unit and casual nurses were observed to join the team dance workaround described in Chapter 7. Participants described adopting local workarounds when working on other units so as not to disrupt the way teams on those units worked.

In one focus group, EMMS implementation stakeholders, from a vantage point of observing the implementation of the EMMS across the units, also noted the contribution of power brokers to unit culture and their influence on compliance with, and attitude toward, the EMMS and EMMS-related policies:

11: Yeah, and it very much depends on where the powerbrokers within the team sit – if you have got the 'group leaders' – the leaders of the pack if you like, that everybody looks up to, if they are quite positive about the change, it can be smoother implementation. If you have got somebody very strong in the group who is really quite negative or a fence sitter, it just is a little bit more problematic to support that change because you might have somebody that sits at the top of the tree who is really anti. You might have somebody who is less respected within the group who loves that and thinks that is really great but they don't have the strength of voice. (Focus Group: EMMS implementation stakeholders_ID_5)

9.2.4 Confidence in nursing skills influenced the use of workarounds

Nurses described using workarounds when they were confident about their competence and nursing skills. For example, when making decisions about whether or not to work around taking the COW to the bedside (e.g. to be time efficient; safe; patient-centred; a team player; or because

it was easier), participants disclosed that a nurse's confidence and competence were moderating factors. Participants also noted that nurses who did not have experience, were liable to make mistakes or did not follow basic medication rules should not use workarounds. However, those who had more experience were more likely to use workarounds, particularly when it was busy.

F: Do you think there are times when it is okay to work around the system and other times when it is not okay? I think from what you were saying before, when there are lots and lots of medications, that it is not a good idea.

24: Yeah, that is one of them.

F: Anything else?

24: It is if you yourself don't have the experience, or if you don't follow basic drug-administration rules; if you are liable to make mistakes. I don't want to sound infallible ...

F: Any other types of workarounds? Are all workarounds okay? When is it not okay?

24: When there are certain instructions – if you do drug administration and your knowledge of drugs is poor, it would be a good idea to take it with you, because it does have warnings on it; and how you should do things. But once you do things a number of times, you do learn to remember it. Like, the right doses – 100 millilitres over an hour or two hours, depending on what the drug is; if you have got to mix it up with saline and not water and those sorts of things. With experience, you get to know it. It's when your knowledge is not great; if you are fairly new to the whole thing.

F: Then it is not okay to work around the system?

24: Yeah. Until you have more knowledge. It is something that is valid, isn't it, knowledge. You can't measure it, but it is there. I do know a lot of things about drugs, but new nurses don't. (Interview: Nurse_24)

9.2.5 The shift, time and how busy it was influenced the use of workarounds

Nurses described variations in workarounds depending on the time, shift and competing demands. As outlined in previous chapters, nurses explained that shift-dependent workarounds

were motivated to promote patients' sleep, avoid interruptions, be time efficient and support teamwork. Participants frequently reported that during the night, when there were not many medications, when they were able to focus more and when they did not want to wake the patients, they would not take the COW to the bedside. However, for the early morning medications, when they were tired and there was more chance of being distracted, they took the COW to the bedside.

03:35 – The nurse explains that when they have to give meds during the night, they never take the laptop to the bed unless there is a patient with the same name in the same room. Nurse_41 tells me that after 5 AM they never go to any patient with medications without the laptop because the risk of making a mistake is too high. 'I am tired and I get interrupted all the time, there are patients wandering around. It is not worth it, the Nurses Board won't care if you are tired.' (Field Notes: Observation_41_Night Shift)

While many nurses described using workarounds to avoid interruptions for the first medication round of the morning shift (they prepared medications for multiple patients in the medication room to avoid interruptions), they also recounted that they were more likely to take the COW to the bedside for this medication round as there were more medications than they could remember and more distractions. A secondary workaround, marking the medication pots, was used to identify which medications were for which patients.

F: Are there some times when you think, 'No I wouldn't work around in that instance?'

06: Actually yes, in the mornings when it is really busy, I'll think there are too many people around, there is too much going on, I'm going to forget from a computer to the patient what I am doing, so I will actually move the trolley. If I ever get that sense that things are too busy and I'm forgetting what I'm doing, I'll immediately move the trolley into the room to the bedside. But no, it doesn't even matter what drug it is. (Interview: Nurse_06)

9.2.6 Number and type of medications influenced the use of workarounds

When recounting working around taking the COW to the bedside to be time efficient, safe, patient-centred or because it was easier, nurses reported that when there were too many medications to remember, they would either not work around or would use secondary

workarounds to protect against a medication error. The number and type of medications moderated whether or not nurses used this workaround.

Yes, if I have got lots of meds, I will always take the COW with me because I can't remember them. And if it is one or two medications and I know what they are, I won't take it with me. I will just tick them outside the room, or I will tick it at the desk computer and then I'll go straight to the computer and give it to them. (Interview: Nurse_55)

9.2.6.1 'Simple and safe' versus 'complex and dangerous' medications

Participants described whether or not they would use particular workarounds based on distinctions they made between medications according to how 'dangerous' they perceived them to be. Some medications were described to be safer than others. Nurses explained that they were more likely to use workarounds in relation to 'safer' medications than they were with more 'dangerous' or 'tricky' medications.

The 'simple and safe' medications referred primarily to medications that could be nurse-initiated, were perceived not to be dangerous or medications that most people would have at home. For example, participants reported that TwoCal®, a high-calorie nutrition supplement, was prescribed in the eMAR to remind nurses to remind the patients to take it regularly, rather than because it had to be administered at a particular time. Thus administration of some prescribed 'medications' was reported to require less focus than others. When justifying working around the need to wake patients during the night, nurses appealed to whether the medication was a 'simple' medication as a basis for whether or not to wake the patient.

If they're sleeping – if it's a simple medication like Panadol – we'd be reluctant to wake them up for that because if you wake them up they could be disturbed the whole night. They wouldn't appreciate it just to be woken up. If it's a special medication, we would generally wake them up. (Interview: Nurse_34)

Some nurses also explained that they based decisions about whether or not they worked around taking the COW to the bedside on the type of medication. Dispensing medication before viewing the eMAR was observed at both hospitals and justified by nurses because it was a medication that could be nurse-initiated.

I mean it's okay to work around the system when you're in a hurry. And there's silly things, like if you want to chart a Panadol and it hasn't been charted; you have to – you can nurse initiate it. You can work around it to get to that if it's just a Panadol. Yes, there are times when it's like that, but I think people have adapted to the system that they've got. That's why there's a lot of people trying to work round it, to make it quicker. I don't think it's good to – obviously, it's not good to work round when there's patient safety involved. (Interview: Nurse_67)

Nurses worked around the time spent retrieving frequently ordered medications from the medication room by storing them on the COWs. The type of medication influenced which medications were left on the COWs; I frequently observed medications described by participants as 'simple' medications on COW shelves.

Alternatively, the complexity and perceived patient safety risk associated with administration of other medications deterred workarounds. Participants felt that adhering to some policies clearly kept patients safe; others were less obviously effective (Chapter 5). Nurses identified that protocols that obviously protected patient safety should not be worked around (e.g. chemotherapy protocols). Following these policies was described as important for both patient and nurse safety (physical protection from the risk of cytotoxic spills and professional protection). When the medications were perceived to be unusual, complex, tricky or dangerous, nurses reported that they were less likely to work around the requirement that they take the COW to the bedside:

*F: I'm interested in what factors influence whether people vary, or how they use the electronic systems. So would there be any times where you would say absolutely not, no way, I **will** take this COW to the patient?*

39: That would be instances obviously of blood, Heparins, when you get Heparin infusions, when you have things like magnesium infusions – anything tricky. Anything that you need to check the order and you've got to make sure. Because the way it's written, sometimes, as I told you before, you've got to go and you've got to surf there and you've got to wait for it to either appear or you've got to go into extra details. (Interview: Nurse_39)

Nurses revealed that they were also less likely to work around the requirement that the checking nurse visualise the eMAR with unusual doses or doses that required calculation (e.g. half a vial of

an antibiotic). They were also observed to less frequently prepare medications for more than one patient at a time or to sign them off as administered prior to administration with these types of medications.

There were specific medications, including chemotherapy, that were considered risky and policies directing administration were not worked around. The following data excerpt is an example of nurses choosing not to work around protocols that guided administration of medications because they were considered risky.

55: Maybe the type of medication – if it is an important, not an important, a strong medication, a dangerous medication, something that is not just simple like Panadol, that is a very simple medication. But if it's a type of medication I would go to the bedside and really double check with the patient that that is them and that's the drug I am giving them.

F: So that would be like something like chemo?

55: Definitely, definitely chemo. Definitely chemo. Oral chemotherapy as well. I try to do it with S4s and S8s, but sometimes you just don't because you've checked it in there and you know it already. With chemotherapy, it is always two nurses and the laptop [EMMS name] with the patient. Some of the cardiac drugs maybe, Cyclosporin for example, that's an IV. I would always check that with the patient, making sure that's the right drug I am giving to the right patient. But oral drugs – maybe ones I don't know as well, I would look them up. (Interview: Nurse_55)

9.2.7 'Who was watching' influenced the use of workarounds

Whether or not nurses used workarounds was influenced by who was watching them. When there were educators or 'management' on the floor, participants explained that they were more likely to take the COW to the bedside and that both the checking and administering nurse would go together to witness medication administration. Nurses' propensity to follow the policy when management and educators were observing was linked with their concerns about professional safety, which will be presented later in this chapter.

06: No, unless it's the educator and I am doing something with her – then I will definitely bring it [the COW] in [to the bedside]. (Interview: Nurse_06)

F: Now you were saying before about sometimes people go – we were talking about checking out DDs and my understanding just from what you were saying about one person checking them all out is that they don't go with them to the bed?

04: No, they're supposed to but that very rarely happens.

F: Most of the time – okay. Are there times when they do?

*04: Yes ... Sometimes with newer staff they would. Particularly if I happen to be in the med room, I'll see them going together. If there's management around on the ward.
(Interview: Nurse_04)*

I observed some participants suggest to their colleagues that they do the check 'properly' with a meaningful glance in my direction. This behaviour was particularly evident in relation to the administration of S8 and S4D medications. The nurses in the following excerpt were overtly following the rules for my benefit. In the excerpt, the nurses report openly that they sometimes work around the requirement that two nurses witness medication administration.

08:20 – Medication admin event – bed 14: female; allergies; 8 oral medications (1 DD); 1 subcutaneous Heparin; Nurse_44 has not looked after this patient before. Nurse_44 logs into the EMMS while he is pushing the COW to the medication room, he pushes it in front of him or to the side. Nurse_44 says that he will administer the medications for bed 14 first, because she is being discharged so need to give hers first, and because the patient in bed 13 had been really sick, but had settled now so he would not disturb her. Nurse_44 swipes in to the medication room. There are already two nurses in the medication room, both with COWs. He pushes his COW into the room. Nurse_44 stocks his COW with Movicol, Panadol, medication cups, a kidney dish with equipment for a cannula flush – ('I know one of my patients has a cannula') and two more kidney dishes with equipment (syringe, needles, alco wipes) and an ampoule for a subcutaneous injection. He asks another nurse, who is drawing up a medication for injection, if she will check out DD with him. Using the computer on his COW, Nurse_44 selects patient 14 and opens the eMAR. Both nurses check the medication order, open the DD cabinet, check the DD medication against the order, count the number of tablets for this medication that are left in the DD cupboard after they have taken the tablet for the patient, and cross check against the number in the

DD register book (DD book). Nurse_44 writes the date, the time, the patient's name, the dose taken from the cupboard, the number of tablets left, and the name of the prescribing doctor in the DD book. Both nurses sign the DD book. As he puts the DD book back next to the DD cupboard, Nurse_44 says aloud that I am observing, looking at me pointedly for the witnessing nurse's benefit. The witnessing nurse leaves a kidney dish containing an ampoule, needle and syringe on the COW she was using in the medication room and accompanies Nurse_44, who is pushing a COW, to the bedside of Patient 14. The witnessing nurse stands at the COW looking at the medication order on the screen as Nurse_44 looks at the patient's armband and reads out their name and date of birth to the witnessing nurse. They both watch Patient 14 take the DD medication. The witnessing nurse leaves Nurse_44 at the bedside of Patient 14 and returns to the medication room. (Field Notes: Observation_44_AM)

Nurses were observed to consistently comply with some of the process steps when administering S4D and S8 medications more than others. While the nurses made an effort to ensure that I observed them comply with some steps of the regulated process, they did not do so with other steps of the same regulated process. The steps that the nurses seemed more concerned that I observe them comply with were those that were specific to the regulations when administering these medications, and therefore seemed to relate to the likelihood that they would be in trouble should they not comply (e.g. two nurses going to the bedside to observe the patient take the medication and visibly check the patient identification together (even if they did not take the COW)). I noted fewer visible attempts to ensure that I had observed compliance with requirements that were the same as administration of other medications and nurses frequently prepared DD medications for more than one patient at a time and did not take the medication containers to the bedside. Rather, they relied on memory of what the tablet looked like, tucked them into a bedside folder, or marked the medicine cups with appropriate bed numbers or patient names.

Two nurses go to the bedside to check the ID and allergies for a DD medication but they do not take the COW, so they have nothing to check it against ... The two nurses go to a patient's room for administration. The patient is isolated and they do not take the COW. Nurse_103 waits at the door while the administering nurse gowns and gloves and goes into the patient's room – both nurses talk with the patient and their visitors – there is no ID check and no COW – as soon as the administering nurse calls out 'done', Nurse_103 leaves. (Field Notes: Observation_103_PM)

For the most part, participants expressed a reluctance to use workarounds in front of neophyte nurses so as not to teach them bad habits. However, some nurses reported that they did informally teach workarounds to colleagues, so that they were able to complete medication rounds more quickly. (This phenomenon will be described in more detail in the section on teaching and learning about workarounds.) In the following excerpt, Nurse_60 described how nurses protected themselves and neophyte nurses from professional retribution by choosing not to use collegial workarounds. When I asked Nurse_60 if there were times when he would not work around DD medication administration policies, he responded:

Definitely, if they are new, agency, new grads, or there is a student. You do it with the new staff and the agency staff to protect yourself because it is a DD. With the student and the new grads, you need to teach them the right way. You do it with new staff until you know them and trust them. You gotta be able to trust them. (Field Notes: Observation_60[1]_Night Shift)

9.2.8 The patient influenced the use of workarounds

Familiarity with the patient and whether nurses had administered medications to a patient previously influenced whether or not they took the COW to the bedside or checked the patient identification. Nurses described being less likely to take the COW to the bedside if they had previously administered medication to the patient. Instead, they asked their name, checked the cards above the bed, or looked at the bedside chart, if it was nearby.

If I'm giving medication, I definitely bring in the laptop. Oh one exception – when the S4 or S8 medication was checked on that laptop on the computer in the drug room, the treatment room – I don't think I've done that every single time, to bring the laptop in – especially when I know the patient and it's the second time I've given the patient medication, then I just go straight. (Interview: Nurse_31)

Participants explained that some patients, such as transplant patients, had a higher degree of familiarity with their medications and the most appropriate time they should be administered than the nurses. The nurses signed off the medication as administered in the eMAR and asked the patient to ensure they took the medications at the most appropriate time. Nurses were observed to type a comment in the eMAR recording that the patient had self-administered. When administering medications, there were instances where patients offered to swallow the DD

medication first so that they would not keep the nurse waiting, because they knew that the nurse had to watch while they took tablets that were DDs.

Nurses described administering medications early, if it was safe to do so, to avoid patients being abusive to them. If the medication could not be brought forward in the eMAR, they reported that they administered it and signed it off later, enlisting the help of a colleague who would be complicit in the workaround, should the medication need co-signing.

56: It's got to do with the patient because some of them it's what they want, they don't care whatever. You may have times that you're supposed to do this, supposed to do that, they don't want to know. They just want it and that's it. So how do you deal with people like that? You can't say no. If you say no they go off their rocker and that's it. So you need to go around the corner and try to do the best you can to ... For the patient and for yourself as well. Because you get abused. You can easily get abused and any sorts of things can happen. But that's an odd patient, not that it happens all the time but... (Focus group: Nurses_ID_6)

9.2.9 'Who I am working with' influenced the use of workarounds

Nurses described that who they were working influenced their use of workarounds – whether they trusted them with patient safety (Chapter 5) or to demonstrate trust for the purpose of enhancing collegial relationships (Chapter 7). Participants also revealed that whether or not they used workarounds was often influenced by the expectations and performance of their colleagues. Junior nurses deferred to their senior colleagues, and many nurses explained that the nurse responsible for administering medication to the patient (e.g. 'my patient' versus 'not my patient') often influenced whether or not workarounds were implemented. Nurses described the likelihood of using a workaround being moderated by whether their colleagues were 'pedantic' or not:

Another thing is, also depending on who you are working with, some of them are really pedantic, let's take everything to the patient. Some of them, even if you want them to come with you, you've basically got to lasso them to drag them, so it's just easier for you to check it on their computer, or at yours and then run away. (Interview: Nurse_39)

... so if it's my patient and I am checking with someone who is down the back, for example and I'm in the front, and it is my computer that I have got open, then I will

wheel it in there [to the medication room] and if it is actually their patients, and they have got their computer open, then I feel like it is the responsibility if they want to take it [the COW] in [to the medication room] or if they can put it outside. They decided who writes, who checks, who signs it off. (Interview: Nurse_06)

As outlined in the chapter on being a team player, nurses sometimes acquiesced to workarounds to facilitate their colleagues' work. For example, in the following excerpt, Nurse_54 described how unit norms and a combination of the acuity of the patient and the skill of the nurse she was working with influenced whether or not she would follow policy:

*04:40: I talk with Nurse_54 about the policies and I ask her whether if she found out the policy was different from the way she was enacting a practice e.g. taking two people to the bedside to check an IV medication, she would she change her practice. I asked her which is the stronger influence: the policy or the way it is done on the ward. She responds that it is probably the way it is done on the ward if it is satisfactorily explained to her why it is different and if it is still safe. So IV fluids for example, if checked on the computer by two nurses, if she knows the patient and they've both checked the fluid, the expiry date, the order etc. **But** it also depends on the patient and the nurse. So if it is a sick patient and if the nurse is not ... good or if they are a new grad, they need more supervision, she wouldn't let them go by themselves, she would be more likely to go with them. (Field Notes: Observation_54_Night Shift)*

Nurses described being less likely to work around the policy requiring two nurses to witness a medication administration if their colleague was: unfamiliar to them; inexperienced; too busy or flustered:

Nurse_71 explains that when in charge and working with an agency nurse, 'I will suss them out and at the beginning will go with the nurse to the patient ... With newer members of staff, I would always go with them and if I perceive that even regular members of staff are really busy or flustered, I will suggest to them I will go with them.' (Field Notes: Observation_71_PM)

As outlined in the chapter on nurses' use of workarounds to be safe, participants described using workarounds to complete medication administration quickly, if they perceived their colleagues to

be too slow or less safe than them, so that they were able to administer the medications before their colleagues. Conversely, participants were more likely to employ workarounds with nurses they knew well or whose skills they had confidence in, such as senior and experienced staff.

9.3 Professional safety

Pressure from external systems helped to 'enforce' safe practice. These included: professional registration; education; and threat of litigation or professional deregistration. For example, the presence and need to complete the drug register books for administration of the DD medications offered a consistent and frequent reminder of the legal and professional requirements related to medication work. Nurses frequently referred to the features of the EMMS that had enabled enhanced auditability of medication administration – who had administered what and when. There were frequent references to 'safety', 'risks', 'harm', 'errors', 'adverse events' and 'incidents'. There was an articulated perception that the impetus to follow policy was frequently to avert risk, often to one's professional safety:

because there's lots of policies and guidelines that I have to follow to protect myself. I have to work with the system. (Interview: Nurse_115)

Concerns about the risk of making a medication error to professional safety were articulated not only in conversations with me (which would have been expected given the focus of my research) but also with each other and were evidently important considerations as participants delivered care. Nurses at both hospitals described, with some angst, their experiences of near-miss medication errors that had occurred when they had opened the eMAR of a patient on another ward. A near miss rather than a medication error had occurred because the medications in the patients' bedside drawer did not match those on the eMAR. The nurses were visibly concerned about the potential harm to the patient and shaken by the experience. They emphasised how fortunate and 'lucky' they felt that that it was a near miss rather than an error and that they escaped official letters and trouble or threats to their registration. This underlined the salience of 'my professional safety'.

Had I actually gone ahead and given the patient an injection that I shouldn't have or something yeah that's IMMS and it's trouble. ... An official problem and probably notes and letters and all kinds of things would have come out. That was just a very unfortunate thing really wasn't it? I was just lucky. (Interview: Nurse_53)

I have included the following quote because it highlights the salience of professional safety for participants. Nurse_36 explained that because they check over and over, nurses keep junior doctors safe from making a medication error. In this particular section, nurses protected the doctors' professional safety rather than the patients' safety, although it may be that reference to patient safety in relation to a medication error was not made because it was considered obvious, and therefore not needing to be stated.

I think it's still true to say that nurses still trump doctors in terms of checking many, many times. Because – and I'll qualify that by saying very often – you've got junior doctors who are less experienced, not familiar with medications and particular times and so on – times and doses and roots – so the nurses actually keep them safe.
(Interview: Nurse_36)

Storage and handling of S4Ds and S8s was governed by specific legislative rules that overlaid policies governing medication administration. These medications were referred to traditionally as 'dangerous drugs' (DDs). Some nurses denoted the DDs as more dangerous for the patients; others reported that there were other medications that were more dangerous for the patients than DDs, and for which administration did not require two nurses. According to many participants, the 'danger' of the DDs lay in their addictive properties and resale value. For example, they explained that one reason two nurses were required to witness administration of a DD was because these were drugs of addiction and therefore liable to be stolen and the nurse may be suspected and investigated by the police:

There was discussion in the medication room about the street price of Endone – approximately \$50.00 per tablet. They explained to me that it is dissolved and injected – 'Hillbilly Heroin'. They were highlighting for me the importance of watching the patient actually take the tablet, as they may keep it and sell it. The nurses also talk about the safety aspects of carrying the DD keys – the red ribbon makes it very obvious who has the keys to access medications with a street value of thousands of dollars. (Observation_77_PM)

Nurses were observed taking additional precautions when handling DD medications. For example, nurses taking these medications to the bedside in a medication cup were observed to put another medication cup on top of it to stop the medication falling out – they explained this was 'to protect yourself' from external investigation.

Nurse 51 tells me that if the nurses were alone and 'the DD drops out there is an increased chance that it will be presumed you took it – so you need to protect yourself' (Field notes: Observation_57_PM).

Some participants expressed that they were less likely to work around when administering DD medications because they needed to focus and concentrate. Concerns about both patient safety and self-protection (professional safety) emerged as a salient constructs in relation to administration of these medications. Although used to enable patients to enjoy uninterrupted sleep (Chapter 6), for example, the use of workarounds at night was mediated by the type of medication involved. Nurses described being less likely to use workarounds when administering DD medications because of the added risks. Some nurses reported that incidents with the DD medications risked personal legal consequences. In the following interview excerpt, Nurse_35 stressed the perceived personal risk of litigation as impetus to not work around DD medication related administration policies:

F: So I guess what I'm really interested in is – so with one, do you do it and not with the other...

35: Oh okay.

F: Is that, like what is it, is it...?

35: It is a more, more scheduled. There you go – scheduled drugs are more vulnerable for us.

F: Yeah, in what way?

35: In all ways. If we obviously lost it, if we made a mistake, then we need to do – we are accounted for –we are more accounted for than other medications.

F: Right, okay, so it's about like the legislation, or whatever?

35: Yeah.

F: Would that be right?

35: Right, yep. For example, if we'd lose – or if we'd lost Endone or – Endone, yeah, and that's scheduled – we have to call up Federal Police. I'm sure you know about that, no?

F: No.

35: No, okay. If we lost it, or if the DDs are stolen, then we have to call the Federal Police. Not the normal police, we have to call the Federal Police, and they have to come and then actually have it investigated.

F: Right okay. Alright.

35: Then everybody had to be interviewed. Whereas other medications, obviously we had to do an IMMS, we have to let the doctors know. Then we have to get all the tests done. That's what the difference is between the medications. We can be sued for the schedules, and we can be fined, sued, or we can be... (Interview: Nurse_35)

Nurses described the role of colleagues in relation to nurses' professional safety. Stories about nurses who had been investigated in relation to missing DDs were told and retold. For example, a particular story about a nurse who had been investigated in relation to missing DD medications was relayed to me by several participants. In one rendition of that story, Nurse_54 highlighted the role of the nurse's colleagues in targeting her for investigation. This contrasted with another unit where it was disclosed that if there were an incident they would say they had not worked around policy, even if they had. These two contrasting excerpts emphasised the importance, for professional safety, of being part of the team and being trusted, both of which were sometimes supported by collegial workarounds:

One of the nurses told me that if they do not follow policy and there is an incident they would say that there were two of them. Both of the nurses who signed will say they did the right thing – you need to look after your colleagues. (Field Notes: Observation_56_AM)

I ask Nurse_54 about the observed variation in whether two nurses going to the bed for S4Ds, S8s and Warfarin. She responds that for Warfarin she did not need to do that, but definitely for the DDs it was necessary because of the fuss if one of the DDs goes missing. Nurse_54 tells me of an incident when a DD ampoule went missing.

She says that she thinks that the nurse accidentally threw it in the sharps but that you can't check the sharps container to find out. According to Nurse_54, there was an investigation. The nurse, whom the other nurses decided was the most likely culprit, was really targeted, for investigation ... Nurse_54 tells me, 'You know what nurses are like. It was awful for her, and they didn't find anything, and she is still working, but it must be really hard for her. If everyone treated all medications like DDs, I guess it would be safer.' I ask if two people always go to the bedside with the DDs and she responds that it depends on who you are working with, how reliable they are and how well you know them, how well you know the patient. If you know the patient has asked for pain relief, it is less likely that the nurse has made it up to get it. 'If I don't know a nurse I would definitely go, I wouldn't feel safe. Whoever's name is last in the DD book is the person who will be investigated.' (Field Notes: Observation_54_Night Shift)

9.3.1 Concerns about 'professional safety' influenced the use of workarounds

Risks to, and the safety of, nurses' professional status (professional safety) emerged as an important 'moderating motivation' in nurses' descriptions of factors influencing whether or not they used workarounds and how they felt about using them. Nurses reported that when they used workarounds they risked professional retribution. When participants referred to the importance of not working around policy to be safe, the 'safety' referred to was often the nurses' safety rather than patients' safety. For example, working around the policy that two nurses witness the administration of DD medications was described by nurses to be a 'safety thing', where the 'safe' referred to nurses being safe from external investigation by the police.

*53: Yeah it's like morphine and things like that. I'm not going to let the EEN race away with **my** ampoule where I might not have discarded all of it you know kind of thing to discard. You hear about it. I haven't had that experience but you do hear about people who do go and take the remainder of things or the remainder of morphine or whatever. So yeah it's a safety thing you need to...*

F: So that safety thing, that kind of thing is about – it's more about not taking it.

53: Not taking it and you not having to explain to the police why morphine goes missing on your shift. (Interview: Nurse_53)

At other times, participants emphasised the importance of not working around policy in relation to professional safety. They stressed that should an adverse event occur, following the protocol offered some protection from blame and retribution (professional safety). The excerpt below highlights the importance attributed to following policy for nurses' professional safety. During observation, this participant spoke frequently about risks in relation to nurses' professional registration. Nurse_41 related that while a patient had an adverse event during infusion of a blood product, the nurse was professionally safe **because** they had followed policy.

21:45 – Nurse_41 joins the conversation and relates that there had been a blood reaction last week on the ward. It was considered a big adverse event and had occurred 'even though every step of the protocol had been followed to a T'. They repeated the latter several times as if following the protocol should have meant that there was no reaction and was surprised when it did happen. There was discussion and the nurses asserted that because the protocol had been followed, the blood reaction was not the nurse's fault. (Field Notes: Observation_66_PM)

Nurses described weighing up the risk of professional retribution if they used workarounds, against being time efficient, patient-safe, patient-centred and a team player. The excerpt below was taken from observational data on an evening shift. The nurse was conflicted because the doctor had told her that the patient really needed the treatment to start but the requirements of the protocol had not been met. The senior nurses remind their colleague of the importance of following the protocol and that while she could trust following the protocol to protect her from professional retribution, she could not trust the doctor to do so.

19:58 – The doctor has ordered that a patient commence a medication. One of the nurses asks the others if they would be happy to start the first dose at this time of the evening – three senior nurses advise that without a protocol, they cannot tick the third box of the timeout sheet and so cannot proceed. The nurse looking after the patient expresses concern to her colleagues that the doctor will be cranky ... 20:45 – The doctor arrives on the ward with a protocol and the nurses are happy to start the medication – but then they note that required steps of the protocol have not been completed – e.g. anti-emetics have not been ordered, blood tests are outstanding. One nurse expresses some discomfort about telling the doctor who really wants the medication started. The other nurses reassure her that without the necessary steps of

the protocol completed they cannot start – ‘You will be in more trouble if you give it without a protocol than if you don’t go ahead ... The doctor won’t stand beside you and say ‘I made her do it’, she won’t stick up for you.’ The nurses RISKMAN the event. (Field Notes: Observation_103_PM)

The influence of who they were working with on nurses’ use of workarounds was attributed to whether or not participants trusted their colleagues’ ability or competency for the patient’s safety and whether or not they trusted them to protect their professional safety. Nurse_06 recounted that co-signing a medication made you half responsible should an error be ‘caught’:

Cause someone can easily say, oh this is Lincomycin, and then they give it through a push rather than through a bag and someone catches that and they come back then they are like – you are half responsible for that because you checked it and you didn’t check that there was a bag to go with it. (Interview: Nurse_06)

When they did not accompany their colleagues to the bedside for a medication that they had co-signed, there was a risk for both of the nurses that the medication would be given to the wrong patient. This risk was perceived to be greater if the administering nurse was a neophyte nurse:

Yeah, because the injection you need two people to check that. For the senior staff, you’d probably say, ‘Okay, you check my injection, just check the right injection’ and then they go and give it to the patient. But the new grads, they make mistakes, they’re not checking the patient. But every time when you send someone off and say, ‘Okay, you go and give them injections’, you’re still taking a risk because you don’t know whether they checked their arm band or not and whether they’re giving the right injection or not. (Interview: Nurse_30)

Concerns about professional safety were linked with how nurses felt about using workarounds and will be examined later in this chapter. Whether or not nurses used workarounds was also linked with trust.

9.4 Trust

Trust and mistrust, including individual, team, professional and organisational, emerged as important constructs in nurses’ descriptions. The word ‘trust’ featured frequently in participants’ conversations. During observation, it was also evident that patients need to be able to trust the

nurses caring for them. This spoke to the importance of trust as a good nurse characteristic (nurses having been voted by the public for several years to be the most trusted profession [339]).

07:10 – As I walk down the corridor of the ward, the first sensory input that I am aware of is the smell – a cocktail of sensations – faeces, urine and body odour – the mustiness of sleep, overlaid with the smell of toast and scrambled egg – subtle hints of talc and deodorant – I am sure like other shifts, the latter will become more dominant over the next hour. Concurrently my sense of order is challenged – the clutter, the business and messiness, the humanness of the early morning – the divide between the clean, fresh, uniformed, ‘together’ staff and the ‘dependent’, needy, unkempt, vulnerable patients – who have been observed while they sleep. It startles me – how would I feel knowing that a stranger is awake and near me while I sleep – that they hold the power – [none except the closest of close have been near me when I sleep] – I am struck by the forced trust in those who watch overnight. And for the nurses – what an honour to be in such a trusted position – the bareness, rawness and absolute vulnerability of patients who sleep – and they trust – the softness and mustiness of sleep is replaced by the sharpness, the clarity of clean sheets and tidiness, analogous with peeling off skin after sunburn – one room is ‘done’ bed by bed and they move to the next room to do the same. (Field Notes: Observation_111_AM)

The importance of being trusted must be seen in contrast to negative comments about not being trusted. Organisational intervention, such as automatically turning off lights at 21:00 hours and the introduction of the EMMS, were offered as evidence that the organisation did not trust nurses to deliver patient-centred, safe, timely care. The notion of the organisation not trusting the nurses to carry out ideal patient care was encapsulated in the following comments; the first by a nurse when the lights in the corridor automatically turned off at 21:00 hours and the second that reported that nurses perceived that they were being increasingly monitored.

The nurses are engaged in a variety of activities – some are pushing COWS from patient to patient, others linen trolleys or obs machines. One or two are writing in patients notes, and a couple are in the medication room – it constantly changes as they move quickly from one task to another. Suddenly, the corridor lights turn off

automatically and the nurse I am standing near mutters to me – ‘Just to remind us that the hospital thinks we are stupid, we can’t be trusted with the lights even – every time, the lights are turned off automatically.’ (Field Notes: Observation_57_PM)

In the following excerpt, Nurse_19 was explaining to me how things had changed over time in relation to quality and safety:

you filled out a form if there was an incident, but now it’s gone risk mad. You’re watched and it’s all analysed and assessed and graphed. We had a few incidents a few falls here and there, yeah medication error. (Interview: Nurse_19)

That these interventions were interpreted within a framework, reference or relation to trust highlighted the salience of being trustworthy in relation to being a good nurse. Participants described ways in which the EMMS combated distrustful actions. For example, it was no longer possible for nurses to hide the identity of who had administered a medication behind a scribble because the EMMS required a username and log in:

You can’t administer something – you need to get things double-checked. You need another signature or typed in password to be able to get those things checked. Where on a paper chart... I could just go and give it. Scribble an initial next to mine to say it’s been checked, and no one would really know, would they? (Interview: Nurse_174)

People are more mindful of their accountability because years ago it was just some squiggle – who knows who signed that and even if you were busted, ‘No, no that wasn’t my signature’. Where as if you’ve got your own ID log in, that’s you. (Interview: Nurse_65)

Participants offered examples of nurses’ mendacious behaviour that had potential ramifications for their colleagues. For example, instances when DD medications had gone missing and others when nurses had claimed that a colleague had checked a medication that they had not. Nurse_36 described an event in which a nurse had typed in the name of a nurse as having checked the medication when they had not done so:

It did happen one time; that did happen once and it was a major issue because it went to the executive. The checker who was invoked wasn’t in fact the checker, the checker denied it and it took a lot of courage for that checker to stand up to a senior

nurse and say. 'No I didn't do that, I didn't check it with you.' 'Yes, you did.' 'No, I didn't'. (Interview: Nurse_36)

At Hospital B, when the checking nurse did not need to enter their username and password, nurses described different ways of recording proof that a colleague really had checked a medication, suggesting a degree of distrust in their colleagues or the system. Some nurses said that they used a consistent way of typing in their name so that if questioned they were able to identify whether or not they had checked the medication. Others described additional process steps that they had added. One nurse revealed that she always typed in the expiry date as a marker that she had checked the medication.

Nurses explained that patients used the information available in the EMMS to keep track of which nurse had administered particular medications. They elaborated that the EMMS enhanced patients' trust that they were getting the correct medications:

87: Yeah, if they are unsure if the nurse is doing the right thing and if they ask us what the medication is for, and how did we get the information, and if we tell them it is from the software, from the internet information, or that all the information has been put in by the pharmacist or other reliable sources, then they are happier to take that medication. (Focus Group: Nurses_ID_7)

9.4.1 'Trust' and 'being trusted' influenced the use of workarounds

Trust and distrust of colleagues was revealed to be salient in nurses' motivation to use or not use workarounds and how they felt about using them. Nurses described trust as a moderating factor, particularly in relation to working around the policies that required: two nurses to witness administration of particular medications; that the nurse who logged into the eMAR administered the medication; that medications were prepared and checked for one patient at a time; that the COW was taken to the patient to check the 5Rs before medication administration; that the medication was signed off in the eMAR after it was administered; and that the nurses checking a medication check the 5Rs against the patient's eMAR. In the following excerpt, both nurses disclosed that the workarounds they used were enabled by trust:

Earlier in the shift, there was one COW in the medication room. One of the EEN's allocated patients needed a DD medication and Nurse_44 asked for a check for an IV antibiotic for one of his patients. So Nurse_44 logged in to the EMMS and selected

the eMAR for the EEN's patient and confirmed the DD as administered. Then Nurse_44 selected his patient who was ordered the IV antibiotic. The two nurses checked the IV antibiotic together and the EEN co-signed the order in the eMAR (Nurse_44 was logged in). The EEN took the DD medication to his patient while Nurse_44 went to his patient to administer the IV antibiotic. ... Later when they were together again, I asked Nurse_44 and the EEN about the process. They both seemed a little edgy and concerned – I said that I was just interested in the process – the logging in and logging out – the response from both nurses was 'I trust him and he trusts me'. (Field Notes: Observation_44_AM)

When nurses talked about workarounds that required more than one nurse to be enacted, trust featured heavily in their discourse. The workarounds symbolised trust and provided evidence that nurses trusted and were trusted. Being trusted by colleagues was said to validate a nurse's competency. For example, Nurse_31 interpreted that when her colleagues worked around the policy requiring them to witness her administering a medication, it demonstrated that they trusted her and validated her professionalism as a registered nurse.

So they are not really fussed about it, and I'm happy to just go with it – and the bottom line is I know this person is going in the right direction and it's the same, actually, when I see it in reverse. I see that my colleague trusts me. Just seeing me go that way. Somehow it's a kind of validation, like a respect – they trust you, as an RN, so I think, 'Ok, I will live up to their trust.' You know, somehow, you feel, wow that is a certain trust there as well – it depends on the person. (Interview: Nurse_31)

Nurses explained that in some contexts they would not workaround because they were unsure of their colleagues. Being trustworthy in relation to DD medications traversed rank and levels of seniority and nurses frequently articulated that trust for colleagues was based on previous experience with them rather than because they were more senior. Factors highlighted as important to deciding whether or not to concur with a workaround included trust that a colleague would not steal the DD medication:

I know a couple of senior staff – I don't trust them. Not because they are not, well they are more senior than me, but I knew they are just – not because they are not professional – not because I am worried about them stealing the medication, it is because they don't hold things properly, and it might fall out, and they will come back

to me and I will say let's write this up again because I lost the drug. As I get you a couple of times, I said 'I'll go with you – I'll hold it'. It's more of a preventive measure, its individual – is really individual, how you know that person. How much time you've worked with that person, you observe – not consciously observe, I think, you knew this person is very – she's more meticulous than me. Over a period of time, I build up this trust and if she is going shooting out of the door like a bullet, then I'm not going to stop her. (Interview: Nurse_31)

By inference, if nurses trusted their team members to be competent or not likely to steal a DD medication, the need to watch them administer a medication was redundant. Participants described on-going assessment and balance between trust and distrust when deciding whether or not to employ workarounds.

It depends who you are checking it with. 'Cause I'm in charge a lot, I am often the second checker at the S8s, so it depends, for me, it depends on how much you trust the person that is administering the drug as to whether you go with them to check the patient. Also, if it is a new patient, if you know them, or you don't know them, and you know the person looking after them knows them or doesn't know them. Because we've got so many patients here who stay for such a long time and you get to know them really well, it affects whether you need two people at the bedside or not. It is also if you trust the patient, if you know the patient, the staff member, and the drug. Some drugs, I would always go – Methadone. (Interview: Nurse_15)

For the most part, participants described being less likely to work around the policies that require the witnessing and administering nurses to observe DD medication administration when working with colleagues who were not well known to them, or if a colleague was thought to possibly have *'this habit or that habit'*. In the case of DD medications, nurses portrayed that working around the witnessing policy demonstrated trust and indicated that nurses belonged, that they were part of the team. The importance of not appearing to be distrustful of colleagues was illustrated in the following interview excerpt, in which Nurse_31 contrived an excuse for asking a colleague to follow policy based on distrust of the patient rather than implying distrust of a colleague:

but for some colleagues ... I knew, and it's not agency, and I am not 100% sure, I heard something about it, you know, other things like – 'Oh, this colleague has this habit or that habit.' I am able to say, 'Oh, let's go together.' ... So with the people, I

don't think that I can, unless I really have a very deep trust and I'll go and say, 'OK let's go together. I know this patient and last time this patient was a bit funny – let's go and make sure he's taking it.' When you say that, your colleague, kind of doesn't take it personally. Still funny, some people do take it personally. Like is it – you want to come with me, you don't trust me? Although we know its policy – Yes some, but I think not all the time. You can feel just through interaction, you can feel it. (Interview: Nurse_31)

Participants revealed that whether or not nurses worked around the policy that required two nurses to go to the bedside to administer DD medications was also influenced by whether or not they knew and trusted the patient. If they were unsure whether the patient would report that they had not received the DD medication, if they were a known intravenous drug user (IDU), the medication was Methadone or the patient was confused, they were more likely to both go to the bedside to witness the medication administration.

An RN 'checks out' an S8 medication with Nurse_77, and says 'I'll come with you for that one, he is an IDU' – the administering nurse shows no surprise. The next S8 medication was checked out by the same two nurses, but only one of the nurses went to the bed with the S8. (Field Notes: Observation_77_PM)

Participants described balancing whether or not they would work around the time barrier taken to comply with the requirement that they watch a patient take their medication (time efficient), meeting the patient's specific desires that they are not watched (patient-centred) against whether or not they could trust that the patient to do so. If the patient could be trusted, participants described leaving the medication for the patient to take when they were ready and signing off the medication as administered before it was:

Because sometimes the patient, you're supposed to see them take all the medication. Then some may take a while to take it and some don't like you to stand there and watch them to take it, and you can trust them and then you know that the patient will take the medication, then you just sign it off. (Interview: Nurse_30)

9.5 How nurses' defined workarounds

There was some variation in how nurses defined workarounds and what they understood them to be. While some participants were familiar with the term 'workaround', and offered examples of

behaviours that matched the definition used in this study, others were not and asked me what I meant by the term. Participants offered a variety of terms for behaviours that matched the operational definition of workarounds used in this study. These terms included: 'going off policy'; 'shortcuts'; 'bending the rules'; 'adlibbing'; 'manipulating'; 'violating' and 'cutting corners'. Some nurses expressed that it was never all right to work around or that they and their colleagues did not use workarounds. However, in the same interview or observation, they described or demonstrated behaviours that they and their colleagues used that matched the definition of workarounds. There were several potential explanations for this, including a reluctance to verbalise that they used workarounds. However, two other potential explanations are that: the term 'workaround' had not infiltrated across nurses' vernacular; and that many workarounds were normalised to the extent that they were such a part of what nurses did that they did not recognise them to be workarounds. When I did feedback sessions, participants were very positive. On one of the units, the nurses fed back that it was good to have a name for the variety of practices that matched the definition of workarounds, that the word was useful because they could name it. Following is a summary statement from one of the member-checking focus group sessions:

We didn't have a word to name what we do; workaround is a good word for it. Now we've got a way to name what we probably called 'tricks of the trade'. (Member-Checking Feedback Session 3)

9.6 Nurses' described feelings about and attitudes toward workarounds

Workarounds were deemed by many participants to be inevitable and were influenced by resource shortfalls, technology problems, the number of medications to be administered and the sheer number of tasks requiring simultaneous attention. Participants described a diversity of feelings about their own and their colleagues' use of workarounds. These emotions ranged from feeling positive (e.g. workarounds demonstrated flexibility and mindfulness), through ambivalence (e.g. they were an acceptable variation in nurses' practice), to negative feelings (e.g. fear and conflict). At one end of the continuum, workarounds were conceptualised as necessary to deliver effective and efficient, patient-centred, safe care as an individual and as part of a team and were consistent with being a diligent, mindful, expert nurse. At the other end of the continuum, workarounds were reported to be unsafe for the patient, the nurse and their colleagues and, therefore, unprofessional, particularly if performed in front of students or new graduates. Many participants conceptualised workarounds within the context of acceptable, although not desirable,

variation in practice that was inherent in nurses' work. While rationalised as necessary to deliver care in a timely manner, most participants conceptualised workarounds as less than ideal.

9.6.1 Feeling neutral about using workarounds

Some nurses described workarounds as occurring at every level of healthcare organisations. Thus the occurrence of workarounds at the clinical coalface was not surprising, and, as long as they followed 'the script', they were not 'a bad thing'. In the context of the entire interview and observational data, 'following the script' translated to following good nursing 'standards'.

*The very hierarchy, they have their own workarounds – do they **really** want to know how Mrs Smith fell in Ward X in bed 24, what was that nurse doing? OK, they know that the social things say that she was toileted, that she was observed every 20 minutes, that she was this, that she was that. But really, do they **really** want to know where the staff were or what really happened? So that's a really token thing. So that's their workaround – like they don't dig too deeply as long as we are following the script – and we all do it at different levels. But I don't think workarounds are a bad thing. (Interview: Nurse_50)*

Some workarounds did not appear to evoke an emotional response or attitude. Several nurses described theirs and their colleagues' workarounds using 'matter of fact' tones, without using qualifiers or words that depicted emotions. These descriptions of workarounds were not couched in positive or negative terms, rather they were part of the adaption to the EMMS, and to delivering care at a broader level, and were sometimes presented as a 'fait accompli'.

61: Legibility, and it is quite user friendly now that we've ironed out all the bugs and worked out our shortcuts and ways around doing things and stuff like that. (Interview: Nurse_61)

Nurses talked about their colleagues using workarounds as an accepted component of the variation in nurses' practice. Participants described variations as a normal part of nursing work that enabled nurses to deliver care using methods or routines that they found to work best for them and to account for the ever changing complexity of the clinical coal face.

Every nurse has their own little routine in the way that they like to do things. Some people like to get everything out in the medication room. Other people like to do what

they can do at the bedside and then go and get the stuff they can't – they need to get checked. It's just whatever little routine that they've come up with that works for them, and that's fine. (Interview: Nurse_61)

While some expressed that they did not use workarounds themselves, they sounded noncommittal about their colleagues doing so. For example, Nurse_42 reported that whether or not nurses worked around the policy that required them to take the COW to the bedside was not considered problematic, as long as they did not breach 'the standards' that good nurses are governed by.

I've seen some people – they have their own way. As long as I – personally I don't care, if they're not with their medication, the electronic medication, or take the COW or whatever – how they want to do it, as long as they don't breach 'the standards'. (Interview: Nurse_42)

When she described her colleagues' workarounds, Nurse_53's tone of voice that sounded non-committal and non-judgemental, just admitting that some nurses used workarounds and some did not:

I don't personally, but people do their own practices. Sometimes you will see people writing, putting it in a kidney dish and writing a number or a patient's drug and maybe racing them up because they've got all their meds from the medication room or something or other. I mean it's rare. They might line them up like the Heparins or Calciparines or Clexanes and things ready to go with numbers and things. I don't do that. I just collect what I need and palm them out as I go. (Interview: Nurse_53)

9.6.2 Feeling good about using workarounds

Participants described positive feelings about using workarounds, often because the workaround supported teamwork or enabled them to deliver time efficient, safe and patient-centred care. For example, administering pain relief early if a patient was in pain was reported positively ('that's good'). Recounts about workarounds frequently included descriptors that were desirable (e.g. resilient and resourceful) and denoted positive attitudes to workarounds.

Nurses are resilient – they can ensure that the basic care is given and then write a note to sign off a medication later. (Interview: Nurse_26)

Personally I don't know shortcuts through it but then again – or workarounds or whatever they call it ... I don't doubt that nurses and medical staff being extremely resourceful people, that if they're there, they'll find them quite quickly. (Interview: Nurse_20)

These affirmative terms, coupled with satisfaction, smiles and forthrightness with which nurses described workarounds, suggested positive feelings about using workarounds. Nurse_16 proudly explained that the EMMS facilitated his ability to prepare and check medications for more than one patient at a time, and thus promoted time efficiency:

So, as you know, there are good aspects and bad aspects in the electronic chart. One good thing is that it is much more legible so and much more accessible to the database as well as to the electric chart. I can check off all the medication in one go – in one place, I can check off all of the medication for the patient. I don't need to go in between to check again and again and again. So this is one good thing to – it is much more efficient in terms of going between the patient bedside and it is much more legible – in terms of the doctors' chart. (Interview: Nurse_16)

For several nurses, workarounds were expressed to be a positive response that demonstrated nurses' flexibility, mindfulness and awareness of the bigger picture and delivery of better patient care. Participants described that an integral part of being a good nurse was being able to think flexibly and solve problems. They felt positive about using workarounds because they enabled them to problem solve. According to one nurse who had seen me observe a workaround to transfer a patient's notes: *"thinking outside the square ... problem solving, that is what nurses do best"* (Field Notes: Observation_77_PM).

Nothing is set in black and white. You are dealing with humans. You are dealing with conditions, with bureaucracy, with microcosms. There are so many different influences, it is so hard to define and when you ask them, most nurses don't know how to define what they do. ... Most nurses don't know what they do. ... Nurses put their workarounds in place because they're dealing with any given situation that is never the same. (Interview: Nurse_50)

A group of nurses described, with pride, collective problem solving during an event some years prior to the time of data collection. The electricity supplying much of the suburb had been cut,

including the power to the hospital, and the back-up generators did not work. That the nurses had used workarounds, rather than let their patients suffer, was offered as evidence of resourcefulness, initiative and trustworthiness, all qualities that enabled and demonstrated patient-focused care. Part of being a good nurse was knowing not only how to solve problems, but the circumstances in which they were expected and ordained to do so.

The EMMS did not work and there were no paper charts. The patients were in pain. The nurses explain that they asked the patients what they were on and if they'd looked after the patients before that helped, but the main thing was that the patients were in pain – they needed analgesia so they had to give it and then write it on a piece of paper – the next day they told the head of pharmacy what they had done and they said fine. There had been no orders – especially for the S4s and S8s – 'They had to trust that we had given them to the patients. In extreme conditions or when warranted, nurses are expected and ordained to use their initiative.' (Field Notes: Observation_126_PM)

As illustrated previously, participants described feeling positive about workarounds that demonstrated that they were trusted and trustworthy. Evidence for feeling positive about using workarounds was also offered by expressed negative emotions when colleagues did not acquiesce to workarounds. In the following illustrative excerpt, Nurse_24 expressed frustration when colleagues refused to collaborate to work around policy that restricted the medications he could administer and that were described as beyond reason ("God knows why"). Rather than reflecting a colleague's desire to follow policy, refusing to agree to the workaround was interpreted as a personal slight, a lack of trust, because it questioned his judgement as a nurse:

I'm an enrolled nurse, so I don't carry enough weight – as a registered nurse. Along with that, there are certain medications that – God knows why – I am not really allowed to be responsible for administering. One of those is Heparin. One of those is morphine, and all S8 medications. Heparin, certain antibiotics. At the moment, I am not allowed to administer rectal medications. I think that is about it. ... Quite often I say, 'Are you happy for me to give this?'. ... Some people question my judgement, which I get frustrated about, but we always sort things out. (Interview: Nurse_24)

9.6.3 Feeling bad about using workarounds

Participants also described feeling unsettled, uncertain, and concerned about using workarounds. Expressed feelings of vulnerability and fear about using workarounds were frequently linked with concern about professional retribution and the official stance that workarounds were never acceptable because they compromised patient safety and staff integrity. Some participants described workarounds as unacceptable because of their collective potential to undermine patient safety.

But in terms of administering medications workarounds, they know what is required, in terms of work practice policy and procedure, and there aren't any shortcuts. If anyone chooses to create a shortcut which then puts everybody at risk – the patient and compromises the staff integrity. (Interview: Nurse_36)

Some participants were frank about the EMMS workarounds that they used, particularly when they perceived that the workarounds were part of usual practice of a competent nurse, or 'the way we do things around here'. Other nurses were not so forthright in talking about the workarounds that I had observed them using. On the one hand, these nurses described feeling compelled to use workarounds to deliver patient care, but their explanations, body language and often hushed, confiding tones when explaining the workarounds they used conveyed their discomfort with actual practice that did not match the ideal. Some saw them as "dodgy" and revealing the workarounds that they used to me was frequently preceded by phrases such as "I don't know if I should be telling you this". While variation in nurses' practices was expected, nurses conveyed that they judged themselves and feared that others judged them on the basis of how they measured up to their colleagues (Chapter 4) and how different their practices were. While they were satisfied that workarounds enabled them to 'do a good job', nurses were reluctant to talk about their workarounds because they feared the judgement of their peers about whether or not they were a good nurse or a bad nurse.

F: Why is there a sense that nurses shouldn't talk about workarounds?

50: Because we are all individual practitioners and we all do things differently and there is that whole peer group thing – 'Oh, I do it a bit differently from you so it is not necessarily the right way – but I get the job done, and I do a good job because I am doing it [the workaround]'. But what we don't recognise is that everyone practises

differently. We are all individuals and we have our own way of doing things. It doesn't mean it's right or wrong but we actually don't accept that in ourselves as individuals ... But why do we do that as nurses [not talk about workarounds]? Well, it gets back to your strengths and weaknesses and your perceptions of what is a good nurse and what is a bad nurse. (Interview: Nurse_50)

Other participants told me, contrary to what I had observed repeatedly, that, for example, all the nurses on their unit, including them, took the COWs to the bedside for all medication administrations, and that workarounds were not tolerated. One explanation for participants' denial of using workarounds that were clearly visible was that they felt concerned about using workarounds because they were not sanctioned behaviours.

It's pretty standard. You see people wheeling the medication around from bedside to bedside. Very few people just log in on a PC and then go and give – actually I don't see that. The only time you'd see someone log in on a PC would be next to the S8 cupboard and they'd take the medication with the other RN and escort the drugs out to the patient. Everyone takes the laptop from bed to bed, but it's just standard medication. (Interview: Nurse_21)

No, but I'm keen to define what these workarounds are because deviations from practice policy, and procedures, and protocols aren't tolerated. (Interview: Nurse_36)

Overall, the neophyte nurses were more forthcoming and appeared less anxious when telling me how workarounds were used on their unit than the more experienced nurses were. This may reflect less exposure of neophyte nurses to reprimand resulting from using workarounds. When talking about workarounds, the neophyte nurses described the tension between what they had been taught in university and the reality of delivering care.

The following excerpt from my Research Journal was written as I approached the end of data collection for phase two of the study. Notions of the division between the 'sacred' and 'profane' were evident as nurses expressed concern that their use of workarounds that were highly visible would be 'exposed', making them vulnerable to professional retribution.

I am reminded of that saying attributed to Oscar Wilde: 'The true mystery of the world is the visible, not the invisible.' The workarounds that nurses use with medication administration are highly visible, open electronic medication records on COWs

plugged in and parked outside patient rooms during medication rounds, use of the computer in the medication room to sign off medications, nurses carrying several kidney dishes or stacked medication cups down the ward without a COW in sight. So I am surprised at the number of nurses during data collection at both hospitals who have said things like: "I really hope that what I am telling you is de-identified, so that no one will know it is me"; "I could lose my job"; "I know that we probably shouldn't but ...". There seems to be a tension for nurses all the time between what I 'should do' and what I 'actually do'. How is it that one can do these things as part of their job every day and all the time knowing that once talked about these actions could potentially get them into trouble? There seems to be a constant tension that nurses work with: to deliver patient care they must use workarounds while knowing that in doing so they could get into trouble. Nurses don't talk about workarounds to 'outsiders', but the workarounds are clearly visible; it is as if the workarounds are 'hiding in plain sight'. There seems to be an underlying premise: that every nurse has his or her own way of doing things and that so long as that falls within the 'standards' and is safe practice then they should not challenge a colleague's way of doing it, just as they do not expect to be challenged. (Research Journal: Reflection_1 May 2012)

Participants conveyed feeling guilty about using workarounds. This was illustrated frequently when they juxtaposed how nurses 'should' use the EMMS with how they actually used it in practice. While they acknowledged that the 'should' was 'ideal good nurse' practice, participants argued that in many contexts the workarounds they used were essential to administer medications, manage competing demands and complete their workload in a timely manner, to be safe, patient-centred, and a team player. Thus, on the one hand, nurses described that they needed to use workarounds, on the other, workarounds were portrayed not to be ideal practices and they felt bad about using them.

She says they wait because they know she will check. 'I wish that I had time to do the same for the S4s, but I don't. We just wouldn't get the other important care done.' (Field Notes: Observation_69[1]_Night Shift)

Some nurses reported hiding their use of workarounds by using secondary workarounds to suggest that they were following ideal medication-administration practice: for example, delaying signing off administered medications in the EMMS so that the organisation perceived that they

had administered medications within a sanctioned timeframe. There was also an expressed fear and anxiety that not only did administration of a medication early 'not look good', it was 'illegal', particularly if the workaround was employed for the convenience of the nurse.

The guilt that nurses expressed about using workarounds was exemplified in recounts of nurses' experiences when moving from the classroom to the coalface. Neophyte nurses explained that delivering care in the 'real' world, where using workarounds was perceived to be necessary to get the job done, was far removed from the ideal practices taught at university. Neophyte nurses described the differences between the expectations in the classroom and those at the clinical coalface. For example, Nurse_71 described the gap between ideal practice taught at university and the reality in which competing demands forced nurses to choose which policies to follow and which to work around. Nurse_25 articulated the variation in experiences of neophyte nurses learning their trade.

There is a gap between education during training about how to give medications and the reality of when you get on the wards. I would like to say, yes the 5Rs are important, but I would like to know which are the most important because you don't have time. (Field Notes: Observation_71_PM)

Nurse_25 tells me that what they were taught at university isn't what happens in real life – like the three checks and the five rights – some of the steps don't happen, only the important ones. Like we don't check three times and all the steps of the five rights – so long as they have an armband on and you know what they are allergic to. I ask how they decide which are the important steps. She responds that it is common sense – three checks, you can't do it, you don't have time. I asked Nurse_25 the reason that what is taught isn't always able to be done like that on the wards. She explains that – in the classroom, it is calm with one thing to focus on, and one patient. That you aren't halfway through giving medications and another patient is about to fall or does fall. There are so many different things going on, so many demands and so many things you have to think about. You haven't got time to do every step like you do in class – like the 3 checks. She goes on to say that the staff on this unit are really supportive, not like in some other places. Some of her friends have been really traumatised by RNs being horrible to them and not helping them so then they can't think straight. Nurse_25 says that sometimes the patients affect how you do things. They may do

things that mean nurses have to follow a different way of doing it otherwise it won't get done – like if they are climbing out of bed or falling. (Field Notes: Observation_25_PM)

Participants also described uncertainty about the consequences of using workarounds. The organisation was said to respond reactively to an error or an incident. It clamped down in the first instance and then over time became less strict. As one nurse explained:

The hospital does that when an incident happens. It reacts. It clamps down on policies etc, then after a while it is back to where it was – it slackens off. (Field Notes: Observation_126_PM)

Participants described tension, powerlessness, uncertainty and fear when management put them in the position where they were expected to not follow policy. Their perception was that in some instances when 'management' tacitly expected nurses to break policy, the managers systematically 'turned a blind eye'. At the same time, the nurses felt that if they were to work around a policy, and an incident should occur, the organisation would not support the nurse because they had not followed the policy. The following summary of field notes is provided to illustrate this point.

Participants across all study sites explained that there were strict policies about who could carry the DD keys. Nurses stressed that only a registered nurse who was a permanent unit staff member could carry the DD keys. However, when staff shortages required it, casual pool nurses were designated shift In-charge and therefore allocated the DD keys. I observed that a casual pool nurse who worked regularly on the unit had been designated to be in charge of a shift several evenings later. When I asked about this, the nurses reported that if they complied, they worked around organisational policy relating to the DD keys and risked reprisal should an incident occur.

The nurses are discussing the organisational policy, which is that permanent staff need to hold 'the keys' – not casual and not agency. However, they said, they will send a casual to a ward and if necessary the casual will be In-charge – seniority over permanency when it suits the organisation – one of the casual nurses says, that the management turns a blind eye, and asks – 'What are the casual staff supposed to do?

But if there is an incident, I am hung out to dry because I know that it was against hospital policy for a casual to hold the keys.' (Field Notes: Observation_126_PM)

There were instances in which **not** working around policy to administer medication was considered potentially harmful to the patient, but at the same time, to do so was perceived to carry possible professional ramifications. In these situations, nurses faced a 'wicked' problem where to work around or not to do so caused anxiety about potential ramifications. At Hospital B, for example, some participants reported that at seven days an icon signalled that a medication order had expired and while no longer a legal order, it was still possible for nurses to administer and sign off the medication using the EMMS. Nurses described feeling conflicted between administering the medication from an "expired" order for the patient's benefit and not doing so to protect themselves from professional recrimination for having administered a medication from an order that had expired.

F: Right. Most of the medications I've seen have got that little hourglass. So what is that meant to mean?

35: It means the medication chart is expired.

F: So that the doctor should re-order it, okay. But you can still keep giving it, can't you?

35: That's right, but as in legally, we're not supposed to give it. I have a strong obligation not to give the medication charted. However, if the patient requires it ... Legally, we can't give it. If we give it, obviously we are in trouble in the future. If we didn't give it, in the future we're in trouble as well. (Interview: Nurse_35)

Nurses also described that while the organisation was less likely to punish nurses for using some workarounds, reprimand for using other workarounds was more likely to occur. Nurse_41 related a story in which a nurse had been suspended for two weeks for going to the DD cupboard alone, even though the door to the medication room was opened, the other nurses could see, and there had not been a medication error. The nurse revealed that there were some policies that could be bent and others that could not, for instance if a patient had severe chest pain in the presence of the doctor, the nurse explained, that nurses could administer intravenous morphine, but were not permitted to do so at any other time.

Nurse_27 explained that while technically it was never acceptable to use workarounds, they were frequently used but not acknowledged:

Technically none, there is never a time you should work around the system. However, there are definitely workarounds that are out there that we know about, and that we do, and everyone just seems to turn a blind eye. (Interview: Nurse_27)

9.6.4 Feeling good and bad about using workarounds

For the most part, the feelings that nurses described suggested an unresolved tension in which to work around was as 'bad' or 'good' as to not work around. The balance between feeling 'bad' and 'good' shifted, but was not resolved. While the data are replete with examples of expressed binary feelings about workarounds, the following excerpts are particularly useful in illustrating the role of the audience on the expressed conceptualisation of workarounds. The excerpts, in which different attitudes to workarounds were communicated, are taken from observational, interview and focus group data for the same participant. In the observational data, Nurse_56 worked around taking the COW to the bedside to administer medication because the patients were familiar. During the interview, the participant explained that she would never use workarounds because they were too 'risky' (although behaviours that matched the definition of workarounds were also described in the same interview). In the focus group data, there was collegial banter and the participants were evidently comfortable with each other as they discussed using workarounds. Interesting is the contrast between the observational data evidencing Nurse_56's use of workarounds, Nurse_56's individual interview assertion that workarounds were too risky, and the contribution to the shared, collegial claim that there is always a way around, even if you have to 'go around the corner'. These inconsistencies provide support for the use of triangulation of data collection methods and suggest that their audience helped shape participants' feelings about using workarounds.

Nurse_56 leaves the COW in the corridor and goes into the patient to administer the subcutaneous injection. The medication was confirmed as administered in the eMAR in the medication room when it was checked. (Field Notes: Observation_56_AM)

56: For instance, if I go there in the drug room and I'm going to get two antibiotics for two different patients, I must have my charts there because you always run the risk of giving that antibiotic to the wrong person if you don't have the paper chart – not even

the paper chart. It's the paper – your folder – saying that that's bed 26, that's bed 24. That's the only thing I like to have ...

*... I don't think there's a way of working around the system. I don't think so. It's hard to do that. I don't think – I think it's too risky. I wouldn't do that myself because if anything goes wrong, they're going to know that something went wrong. What are you going to say? 'I did that because I found that it was easier to do it?'*_(Interview: Nurse_56)

57: You can find a compliant staff member who can just get something out and then sign it off later – an hour or two later or something. We all do that.

56: There's always a way regardless

57: You might have to choose a staff member you ask to do that.

56: That's right.

57: Not one of the new grad students or one who does it by the book.

56: Yes, wouldn't ask them. (Focus Group: Nurses_ID_6)

9.6.5 Feeling conflicted about using workarounds and practice norms

Participants described being conflicted and appeared to balance diverging norms when they described using workarounds. On the one hand, if they did not complete work in a timely manner, they risked feeling disparaged by their colleagues. However, if they worked around policies, they risked being censured by the organisation and professional bodies (i.e. peer sanctions for being slow versus organisational sanctions for using workarounds). If they followed policy blindly, they jeopardised delivering safe and patient-centred care. However, if they worked around policy, they became professionally vulnerable.

And at what point do you actually say – 'I have to do this because my duty of care is to the patient rather than the policy' and how do you marry the two? ... If you go off policy, you are vulnerable, but you tend to find that the people who tend to follow the policy aren't necessarily very good nurses. Because they are so busy getting the policy right

that they are actually missing the bigger picture, which is patient care – and why is my patient deteriorating, and why is my patient doing this? (Interview: Nurse 50)

Some nurses managed the tension between expectations of being a good nurse in terms of 'work as done' – what their colleagues identified as being a good nurse – and 'work as imagined' – what the organisation identified as being a good nurse – by administering medication early, but not signing it off in the EMMS until the sanctioned time. The tension between protecting against error and creating the possibility of an error was then worked around by informally communicating with colleagues that the medication had been administered.

The time that medications were signed off in the EMMS as administered was auditable. The EMMS implementation stakeholders noted that they were aware that what was logged in the EMMS did not always reflect what was happening in real time:

58: In doing audits of the system, I've noticed that there are certain nurses who will follow the whole process, and others who just don't.

59: Take shortcuts or whatever?

58: Yeah, but that's only from a limited audit of...

59: That's just us looking here too. We're not looking at what the nurse actually does.

58: You can see – it sort of timestamps...

59: If things are overdue or...

58: ... when they actually do things, and whether – that certain things have been done. But having said that, it timestamps it to whenever they...

59: ... tick it off...

58: ... I can, from a system point of view, have a look ... From a system point of view, you can see what's occurred and then you have to make some inferences as to what the actual workflow behind that was. ((Focus Group: EMMS implementation stakeholders_ID_2)

Participants appeared to be more concerned that administering medications early would be recorded than that they administered medications for numerous patients at the same time. Some participants conveyed that it was important not to change the medication times in the EMMS because it would be 'recorded'. However, when they later signed off all the medications at the same time, they did not report being concerned that according to the EMMS records, they had administered medications for several patients at the same time. When nurses prepared medications for several patients at the same time, and signed them all off in the patients' eMARs before administering them, it was also recorded in the system that the same nurse had administered several patients' medications at the same time. This potentially highlighted for auditors that the nurse had worked around the requirement that they sign off the medication when it was administered.

20:00 – Nurse_108 asks Nurse_76 if she will help with the pad round – 'In a minute' she promises. Nurse_76 has three kidney dishes stacked one on top of the other with bed numbers and the name of the medication written on the bottom of the kidney dish. There is no COW with her. She goes to bed 3 – administers an IV medication, tosses the kidney dish and sharps in the sharps bin, washes her hands, and takes next kidney dish with a tablet and a nebuliser – goes behind the curtain after putting on gloves and an apron. The medications have already been signed off the medication in the EMMS for those patients. (Field Notes: Observation_76_PM)

The following excerpt suggests that for this nurse there was acceptance among some colleagues of the practice of early administration of medications. While administered early, the medications were signed off later, when they became 'available for administration' in the EMMS. Thus it would appear in the EMMS that these medications had been administered by the same nurse, at the same time, to every patient. The nurse explained to me during the following shift that this type of early administration of medication was to guard time efficiency – particularly if they anticipated that it would get busy. (I shadowed a nurse on the following shift and it did get very busy.)

12:40 – One of the nurses who has been rostered on for the evening shift arrives fifty minutes early. Another nurse jokes that the nurse is ten minutes late, commenting jokingly that if they started quickly, the nurse could 'get the four o'clocks done' ... they laugh and the nurse goes into the medication room. The nurse comes on early and starts medications that are due at 14:00 – the laughter and comments suggest that

this is a common practice – no one questions it. The evening nurse comes out of the medication room carrying a kidney dish in which there are multiple medication cups containing tablets and heads down the ward – carrying the kidney dish into one room and then into the next room. Later, the nurses signed all of the medications off at the same time. (Field Notes: Observation_72_AM)

Other nurses described feeling uncomfortable when the unit norm involved one nurse checking out all of the DD medications using the computer in the medication room, particularly if they were designated to carry the DD keys, because according to the 'system', they had administered medications for most of the patients on the unit. Nurse_71 explained when I asked about the team dance workaround (Chapter 7):

Nurse_71 explains that she does not like being In-charge sometimes because when logged in at the computer in the medication room, and their colleague says 'Oh, I just have to give this antibiotic or antiemetic', so you check them and according to the system you have administered all of these meds – half of the wards' meds.' (Field Notes: 71_PM)

9.6.6 Feelings about workarounds depended on who was using them

Earlier in the chapter, I reported that whether or not nurses used workarounds was moderated by the perceived competency of their colleague. This also influenced how they felt about their own and their colleagues' use of workarounds. Nurses described feeling guilty and anxious about using workarounds because they were considered unsafe for patients and themselves. However, many participants questioned whether some workarounds were actually unsafe practices. How they felt about them being used was moderated by the experience and skill of the nurse using the workarounds.

115: Some people, it's okay for them to work around the system ... I would say it depends on their – how busy the place is, that they work around the system if they're so busy that they have to work around the system to make it a bit easier on their work load. Most of the time, it depends on how skilled you are. It comes down to the skill mix. If you've been in the field for so long, some of them would probably work around the system and say, 'This is the easier way to do it'. Then you would just prioritise from there. (Interview: Nurse_115)

Participants described feeling more uncomfortable when they observed inexperienced nurses using workarounds than they did when senior staff employed them. According to Nurse_27, workarounds were shortcuts that required nurses to juggle different demands. The more skilled and experienced nurses could safely manage to 'keep more balls in the air' than their junior counterparts.

F: Are there some that you think okay as an RN, are there some that you think are okay and some should never, never be done?

27: Definitely.

F: What makes that ...

27: The safety aspect of it. But people, I always say to people that you know yourself, you know how much you can juggle. If you're not sure, don't give it, just stop and go back to the very, very slow way. Especially, you know, a new grad knows that they can't juggle three S4s and S8s at the same time. Well, then don't. But someone who's been working for 11 years has much more leeway and are able to do things much faster and able to keep more balls in the air really. But the other thing is that I suppose when you almost do an error, you do change your ways. ... So people know that 'No, I cannot do it, I can't do that shortcut because I know if I do that shortcut I will make an error', so they've changed their practice. ... Yeah. Also on skill level too. (Interview: Nurse_27)

9.6.7 Feeling bad if I do not use workarounds

There were some participants who described being torn and feeling 'bad' for not working around policy, particularly when asked to do so by a senior member of staff or someone they respected. This tension is illustrated in the following excerpt in which Nurse_49 described not complying with a request from a senior nurse to work around the requirement that the nurse logged into the EMMS, who signed off the medication ('clicked it'), administered the medication. Nurse_49 explained that she felt bad for not complying because she trusted that the senior nurses had administered the medication, but that she feared getting into trouble for doing so should the EMMS be checked.

49: *I think it depends on the practice of the RN. Some, when they get to know the patient really well, they don't check the patient's name or MRN anymore because they know this is the patient. But with me, I am still a beginning nurse, so I have to check the MRN and that is taking time – so I am dragging a bit. And there are RNs who will ask you to click on it – like I've given it already – but I haven't given that – so you should give that – I have to log off and then ask them to log on – I won't do that.*

F: *So they have given it – and you are logged on – and they ask you to click it and then you say, 'No, I will log off'?*

49: *I say, 'No.' I log off – I won't click it – and I log off.*

F: *Is that hard to do?*

49: *Yes it is hard to do especially if they are seniors because you believe them that they have given it – it's their word but you have to ... because it is computerised, and the history is all there and they can check – how come you logged on at this time when you were on in the afternoon and not in the morning? Or maybe you are in the morning – then that would be OK – cause all of you are on in the morning – but sometimes you are on in the afternoon and the morning staff will say, 'Can you check this off?' (Interview: Nurse_49)*

Nurses recounted that while they were uncomfortable with workarounds that their colleagues used, they did not feel it appropriate to question them if they were senior staff, because every nurse had established, over time, their own way of doing things:

57: *Experience mostly. Lining up four or five drugs on the trolley and then with no way of knowing, they say, 'I know who I'm giving them to', but there's no – nothing apart from maybe a bed number written on a mini swipe thing.*

F: *That's – you'd prefer to see nobody do that?*

57: *Yeah – well – yeah.*

F: *Or are there some people that you go, I think they're probably...*

57: *Some people I probably wouldn't worry too much about it.*

F: On the basis ...

57: Not – I'd probably worry, but not necessarily say something.

F: When you don't worry about it so much, is that on the basis of ...

57: Probably the basis of seniority and how long I've worked with them and know the practices as such, I suppose. (Interview: Nurse_57)

Some people would get out all their patients' drugs in four cups in a row, and get them all out and then take them to the bedside. I don't know if I necessarily think that that's the best practice for anyone to do. But people do it, and they've been doing it for eight – however long they've been working. Everyone's always been okay, so it obviously works for them. So I guess as long as that person knows what they're doing. (Interview: Nurse_174)

Nurses said that inexperienced staff deferred to the more experienced staff in relation to workarounds. As illustrated above, participants attributed this to an assumption that senior staff knew what they were doing. However, as explained by Nurse_39, who in the same interview referred to the reputation nurses had for eating their young, it was also considered inappropriate ('out of your place') for neophyte nurses to question senior nurses about their use of workarounds. The importance of not questioning, and even deferring to, the practices of senior nurses to facilitate one's work is illustrated in the interview excerpt with Nurse_06. While junior staff may have felt uneasy about using workarounds, they often did so because '*I have to work here*'.

39: There's definitely a perception, I mean I guess there's a perception where there are even paper charts when you see a senior staff, you just think they know what they're going to do, that they know what they're doing and yeah, I think that's a lot where it stems from. You think, obviously no one's perfect, so you've got to keep checking. Yeah, and your setting, it's out of your place, if you're younger, to say, 'Look, aren't you going to take it with you?' (Interview: Nurse_39)

And usually when that's the case, like you'll be taught at university, Alcoswab before you give a subcut, you'll come here, they'll see, and they will say 'Oh, don't Alcoswab. It will thicken the skin.' And you'll be like, 'Okay. I will just do whatever you are saying

because you think you're right, and I have to work here.' So it is that kind of situation.
(Interview: Nurse_06)

There were also participants who expressed that while they did not think that some collegial workarounds were appropriate, they acquiesced so as not to add pressure to their colleagues or because, in the case of unit-specific workarounds, the nurses on that unit knew the best way to complete timely patient care in that unit (Chapters 5 and 7).

9.6.8 Reflexivity: How I felt about recording workarounds

I did not expect the angst I experienced in anticipation of writing up and reporting the findings of this study. In one of the first of many supervisory debriefing sessions, during data collection, we discussed the umbilical tie I had with the nursing profession, and the visceral experience of having to describe 'out loud' 'secret nurses' business':

I started this research with a simple and executable plan but totally underestimated the umbilical tie that I still have with nursing. Not only do I sense their discomfort discussing what they do versus what they 'should' do but I realise that I feel uncomfortable making that gap explicit – not only by verbalising it, and asking them about it, but also in even watching for it. I sense their discomfort and I feel it too. It has taken me two months to work out why I find it so difficult to record when the nurses work around policies – it is not because I judge their practice as wrong or right ... In observing and asking, I am making explicit what is normally unspoken – but that everyone knows. Gradually, as a nurse works on a ward for long enough, people trust them, they are accepted into the fold – trusted to be competent enough to do it the same way ... and also not to talk about it ... Things like not following policy are not spoken about. Conversations about shortcuts and workarounds and 'This is how I do it' are frequent, but not in the context of rule breaking – it is the only way to avoid tension. This is unspoken – there is shared knowledge that rules are worked around but that if something goes wrong ... you will be left holding the bag, isolated and alone. Stories are passed on or over time nurses hear of and see colleagues 'hung out to dry', reprimanded for working around rules that are frequently worked around and that ordinarily are not punished. Most would probably think – 'There but for the grace of God go I – it could have been me'. (Research Journal: Reflection_30 July 2011)

9.7 Factors influencing whether nurses taught workarounds to colleagues

9.7.1 Using workarounds to teach neophyte nurses to be time efficient

In Chapter 4, I described the importance of time efficiency for nurses. I also outlined that neophyte nurses in particular assessed their performance against that of their colleagues, particularly in relation to being time efficient. In the following excerpt, a senior nurse described working around scheduled medication-administration times, pushing medications through early *to create a void*, as a means of teaching neophyte nurses, who required it, good time-management skills. Nurse_135 notes that not all the new graduates need the same thing.

Nurse_135 explains, 'I will use the clocks to see if someone needs a hand. I can monitor new grads who may be struggling. Yes, you can monitor if someone is struggling. If you have a whole lot of medications due, there is no point stressing out, just pick them off one at a time, there is no point getting stressed. But some of the new grads feel stressed by the clocks. Sometimes I purposely create a void to fill. Where practicable, I will push all of my five, six, seven and eight (o'clock) meds through in one hit. So, all of my meds are done. Then I twiddle my thumbs for two hours. It creates a void so that the new grads feel that they have to catch up. It helps with their time management, sort of pressuring them. Not everyone requires the same thing'. (Field notes: Observation_202_Night shift)

9.7.2 Learning about workarounds from colleagues

Participants described having learned about workarounds from watching other nurses. In the following excerpt from field notes, I had just observed Nurse_44 **not** work around any of the process steps while administering medication with a witness. However, he felt the need to explain to me that, while what I observed was 'how it **should** be done', it was not always possible to do so. Rather, he sometimes used workarounds that he had learnt from other nurses.

Nurse_44 explains that sometimes the In-charge is too busy to then accompany everybody who wants to give the DD medication. 'In reality it is too busy – if all your patients have DDs, then you have to get someone and the two of you have to go to every patient. There is no way that you would get all your work done – and they wouldn't get theirs done.' Nurse_44 tells me that over his time on the unit, he has learned from the other nurses. If he had to go and get every patient's medication from

the DD cupboard or subcutaneous or intravenous, and get every one of these for each patient, prepare for one patient at a single time, and then had to get a nurse to check every one of these as a single event, he would be going back and forth and he would get nothing else done. Nurse_44 says 'I know how it is meant to be done BUT we have to get care to our patients. We do the best we can. We choose the best way to get things done. We can't do it all'. (Field Notes: Observation_44_AM)

Some nurses also described learning about different types of workarounds from different sources. Others explained that they had tried various options to work out what suited them best.

Previous experience in placements and from watching some of the experienced nurses on the ward who taught me [have shaped my practice]. On my placement in mental health, I learned how to e.g. stacking an empty cup on top of the cup with the medication in it so the medications don't accidentally spill and get mixed up. Using the back of the handover sheet to make a list of medications due was shown to me by an RN who used to work on this ward. (Interview: Nurse_120)

49: I think that is the most efficient way that I have observed. When I first started, I had to go to the RN to check my meds and I had to give it one patient at a time and it was taking me so long than this present one of piling up the Clexanes and Heparins. So no one told me that you have to do it last because I was taking so much time. I just observed and I picked it up.

F: So you learnt from what they were doing?

49: Yes – basically copying them so this is how they do it and it works pretty well and I don't mind so long as I am giving the right patient – so I have those numbers that tell me that this is for this bed – bed 9 or whatever. (Interview: Nurse_49)

As described previously, individual variation in the way nurses practised was expected. Neophyte nurses described learning on the job, trying different practices to learn which workarounds suited their way of working best. For example, Nurse_23 described being unsure whether it was best to prepare and check one Heparin injection at a time or whether to prepare and check several to save time:

23: There is a lot of variation but there are certain rules that you have to follow to dispense the medication and also to check an intravenous or any invasive medications. I found it very different that in the morning you give a Heparin especially when you give subcut injections. A lot of patients have these daily or twice a day but still now, I have been doing it for two months, but I still don't have my own way. Because I don't know what is best for me, I haven't figured it out yet.

F: What do you mean by your own way?

23: When I ask some other nurses how to do it, for example if I was clicking through the medications at 8 o'clock and I found that this patient has Heparin and then some nurses want to do all of the Heparin injections at once and some nurses just want to get it done one by one. (Interview: Nurse_23)

9.7.3 Teaching colleagues about workarounds

Workarounds were not taught uniformly to all staff. Some nurses talked about protecting the neophyte nurses from learning the wrong thing. Others selectively taught workarounds to some and not others. Their selection was based on the judgement that the new nurses would not implement the workarounds blindly, that they could be trusted. The following interview excerpt, while not about medication administration, articulates the connection between implementing workarounds and time management to be 'successful' (a good nurse). It also highlighted that workarounds were not taught universally but rather were taught selectively to new staff. In this case, the senior teacher trusted that the participant would ask if she was not sure what to do.

An old nurse who told me – tip for young players if you want to be successful and you are time management poor, which you will be at the moment, just do temperature and pulse and if there are any abnormalities you will progress to blood pressure but otherwise 'trend it' – and that was considered a safe workaround until I got my time management under control. But he knew if I had questions and if I didn't know what to do, I would ask. (Interview: Nurse_50)

While nurses described teaching some workarounds to new nurses, they also recounted some workarounds that senior staff used that they advised neophyte nurses not to use.

27: No, you have to go into one record, check it, go out again, and the workaround that we did for that, which I actually encourage people to do, is to get an Alcowipe and write the patient's name on the Alcowipe, because you need an Alcowipe anyway, put it in the tray so it reminds you. I mean technically you're supposed to go in.

...

F: Okay so that would be, so the more skilled?

27: Yeah, I mean there are some workarounds that we do, that we say to new grads, don't do this. (Interview: Nurse_27)

Participants described teaching some workarounds to new nurses because of the benefits of the workarounds for the patients. In the following excerpt, Nurse_69, was observed and described using several workarounds for the purposes of saving time, reducing the risk of cross infection, and to promote patients' sleep. She also explained that she taught new nurses to log off as soon as possible to enhance the speed of the EMMS so that the administration of pain relief to patients would not be delayed:

22:58 – 23:15 – Med Admin Event 2: 1 IV medication; Male; Bed 30; patient is isolated

In the medication room, Nurse_69 gets the kidney dish and the medications. She puts these in the kidney dish, writes 30 in a circle on a box and pushes it to one end of the preparation self. She prepares another kidney dish in which she puts the medication, a flush, and additive label. She prepares it with gloves on. 'This one takes a while to mix'. There is no laptop, and she has not opened the computer in the medication room. Nurse_69 cleans and tidies up as she prepares the medications. She takes the kidney dish down the ward to the COW that is plugged in at the desk that is halfway down the corridor. She logs into the EMMS and says: 'I do it a quick way. Most of the mice are well loved and stick and if I tried to select just my patients I'm looking to click in a little box next to the name and takes too much time. What I do is select the ward, then 'Administer', then select all of the patients on the ward, and then I can select my patients by clicking anywhere on the name. I'm not looking for a little box.' ... She explains that she logs out every time because otherwise – 'It blocks the highway; it slows down the whole system. So I know I'm a nerd, but I always logout and I teach the new nurses to do it, because otherwise if it slows the system down then it takes

longer, longer to get the medications to the patients. It is better for the patients if it isn't slow for them to get the pain relief.'

23:05 – Nurse_69 asks another nurse at the desk if he will co-sign the medication. He checks it and enters the username and password in the co-sign box in the eMAR. He confirms it and then confirms again, closing the eMAR. Nurse_69 takes the medication in the kidney dish as well as the box of other medication that she had previously collected from the medication room, to put into the bedside drawer. She leaves the box of medication and the kidney dish on the table outside room 30 and she walks off down the corridor returning when IMED starts alarming. She then goes into the room, gowned and gloved to administer the IV medication. (23:15). She has not taken the laptop into the patient's room because the patient is isolated. Nurse_69 comments that her actions are to reduce disturbing the patient: 'He is febrile but he is on antibiotics and we know that this has been all evening and he is now asleep. He is due medications soon, which will disturb him, so I will take his temperature then rather than wake him now.' 23:25 – at the desk Nurse_69 opens the red folder, and the observation chart – she takes out her mobile phone and transcribes the observations that she has saved in her phone while she was with the patients. (Field Notes: Observation_69_Night Shift)

9.7.4 Not teaching colleagues about workarounds

Nurses described being mindful of not using workarounds in front of students, *"I do the right thing in front of students so they learn the right way to do it"* (Nurse_66). Participants recounted that informally teaching workarounds was bad practice and as such was not good nursing. Nurse_03 explained that 'on other wards' (not our ward) a nurse had been observed 'batching' medication preparation. It was deemed to be very bad practice because she was showing a student the workaround:

Not on this ward but I have seen it on other wards that you'll get nurses – I saw one nurse on [de identified ward Name] and she had the oral medication but then she had IV therapy there at the same time so she got the IV therapy ready so she didn't have to go – she had it all there, which is really not the way to go. She had a student doing it and that was very bad practice. (Interview: Nurse_03)

Participants explained that good nurses had a responsibility to reflect best practice for new nurses and students to model. Nurse_38 reported that, as workarounds were not considered best practice, to protect the safety of the patient and their colleagues, it was not acceptable for nurses to use workarounds.

we are a teaching hospital, so you always want to reflect best practice to the students whether they be uni students who are on the ward, whether they be new grads or even post new grads and they are just new starters on the ward. And we also have nurses from overseas who are very new to the system, so you always want to try to reflect best practice. So everyone is working from the same criteria and that is for their safety and, of course, for the safety of the patient. (Interview: Nurse_38)

Some participants elaborated that they did not teach neophyte nurses workarounds, to protect them from making an error. Nurses explained that they would not teach workarounds to colleagues because when using workarounds they had assessed the potential risk and ramifications. Other nurses, particularly neophyte nurses, may not be as aware of these risks or how to manage unexpected outcomes.

The nurse tells me that there are times when it is okay to use workarounds, that there are ways to override the times in the system – apart from the usual way is that you can do after midnight – but that you have to jump through a few hoops. The nurse says that most don't know how to do it and 'I wouldn't show them because when I do it, I have made an assessment about whether it is safe and I wear the ramifications if something goes wrong' – for example, if a BP medication is given early and then the blood pressure drops. However, if someone else gives the medication early and they don't know the ramifications or are unprepared for them... 'No, I won't show anyone else how to navigate the loops. You always stay within the rules and followed a policy that you might deviate or fly close to the edge. You assess the risk.' (Field Notes: Observation_41_Night Shift)

9.8 Conclusion

The first four findings chapters demonstrated the importance of: being time efficient and a team player; patient safety; and patient-centeredness for nurses in this study, and their use of workarounds to achieve these qualities. While it was desirable to realise all of these qualities at

the same time, mostly nurses described shifting and jostling demands of delivering care that foregrounded the salience of one goal over another in a continually changing way: (*'the fluidity of demands – at any one moment different things might be more important than others but that it can change all the time'* (Nurses: Member Checking Exercise_2)). Using workarounds both achieved and compromised the delivery of time efficient safe, patient-centred care or being a team player and secondary workarounds were employed to compensate. The fifth findings chapter described non-virtuous, often unavoidable, reasons that participants used workarounds. Across the five motivations to use workarounds were 'moderating motivations', which influenced whether and when nurses employed workarounds. When deciding whether to use workarounds, nurses described continually assessing and reassessing what was better for their patient, supported the nursing team and, at times, safer for themselves. Concerns about professional safety and the importance of trust and being trusted also influenced nurses' use of workarounds and were tightly coupled with how nurses rationalised and conceptualised their own and their colleagues' use of workarounds and whether or not workarounds were taught to other nurses.

Chapter 10 Discussion

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10.1 Introduction

In this chapter I will discuss the original contribution of this study. To begin, I summarise the study findings (Section 10.2) and consider how the thesis answered the research questions (Section 10.3). I then follow with a discussion of the three overarching findings of this study, that: 1) being, or being perceived to be, a 'good nurse', transcended policies and technology implemented to standardise behaviour; 2) contextual and relational factors moderated whether nurses used workarounds; and 3) nurses' experiences of, and feelings about, using workarounds, were complicated and induced a mixture of feelings including tension, vulnerability and competency, demonstrating the links between my findings and current knowledge of nurses' use of workarounds in acute-care settings (Section 10.4).

To tackle Research Question 3, in light of the emerging findings, Bourdieu's theoretical formulations were chosen as an appropriate explanatory framework for this study. This choice is justified in Section 10.5. I then define Bourdieu's key theoretical concepts of *habitus*, *field* and *capital* [163, 340] in relation to the findings of this study (Section 10.6). Finally, I discuss, in light of Bourdieu's concepts, an interpretation of the three central findings arising from this study (Section 10.7). The use of Bourdieu's concepts adds a new perspective to current analysis of nurses' use of workarounds in acute-care settings.

10.2 Summary of the study findings

Workarounds were ubiquitous in nursing medication administration practices in this study. Nurses were observed to use workarounds when administering medication with the EMMS across all study sites and shifts. The types of workarounds used were similar across study sites, but nurses did not use workarounds with every medication administration, nor did all nurses use workarounds equally.

The use of workarounds by nurses has largely been examined and understood in relation to the impact of technology on their work [113]. This research found that social, professional and cultural factors, rather than shortfalls in technology, were the main drivers for these practices.

There was a perceived disconnect amongst participants between policies created for use in an ideal world and the feasibility and utility of the same policies when delivering care at the clinical coalface. The 'ideal', embodied in professional and organisational standards, policies and guidelines, epitomised the normative 'sacred' stance of how nurses 'should' practice [341], as

taught at university. The 'real' (and profane) [341] was the everyday experience of nurses delivering care in a complex adaptive system. Nurses described imperatives to use workarounds in order to be seen to be a good nurse, but described at the same time how this made them vulnerable to professional retribution, such as being suspended from work.

Although, in alignment with previous research, there were many examples in this study where when workarounds were used as a consequence of technological issues, the dominant rationale was that the participants involved strived to be, or at least to be perceived as, good nurses. 'Good' in this context "implying the existence in a high, or at least satisfactory, degree of characteristic qualities which are either admirable in themselves or useful for some purpose" [342].

This goal was a stronger driver of nurses' behaviour than policies, organisational sanctions or regulations. It became apparent that for the participants being, or being perceived to be, a good nurse, was linked with a specific set of actions and approaches. These included being: time efficient and diligent; safe, competent and mindful; patient-centred and flexible; and a team player. While, there were some variations in descriptions about what it meant to be, or to be perceived to be, each of these characteristics, these themes spanned all the shifts observed at both hospitals.

For participants in this study, enacting, or being perceived to enact, these characteristics and competencies superseded adherence to EMMS policies. While supporting the enactment of some of the 'good nurse' characteristics (being diligent and safe), at the same time the EMMS created impediments to the nurses' ability to be a 'good nurse' (being time efficient and patient centred), and operated to highlight these failings across the workforce by increasing the visibility (and auditability) of medication work.

Whether nurses used workarounds, and how they felt about using them, was moderated by factors that spanned the good nurse and non-good nurse rationale. While, workarounds were used to enact one good nurse characteristic that supported the enactment of other good nurse characteristics (being a team player could mean using a workaround to be time efficient), it also became clear that using a workaround to enact one good nurse characteristic sometimes undermined other good nurse characteristics necessitating the use of secondary workarounds to compensate. Not taking the COW to the bedside (primary workaround) to avoid waking other patients, for example, was coupled with writing the patient's name and MRN on an Alco Wipe and

tucking it in the medication cup (secondary workaround to enable the identification). Being a good nurse was not equivalent to always following rules or organisationally sanctioned practices of delivering care. That is not to say that good nurses worked around every policy, whenever they chose to.

There were moderating factors that influenced when nurses used workarounds to be time efficient, safe, patient centred and a team player, and when they did not. One example was that there were specific situations, such as in the administration of chemotherapy, where it was clearly stated and observed that nurses simply would not use EMMS workarounds for medication administration.

The employment and proliferation of workarounds is multifaceted and relational. It is cultural in that it is transmitted. Nurses were observed at times to teach their colleagues workarounds. They described on-going assessment of when it was appropriate to use or teach colleagues primary and secondary workarounds.

Nurses' described experience of using workarounds was mixed, and included narratives of experienced tension or conflict between feelings. Positive feelings were associated with being trusted, competent and a good nurse. Negative feelings were associated with using, and refusing to use, workarounds.

10.3 Mapping the thesis findings to the study aims

This thesis examined nurses' workarounds in Australian acute-care settings. It sought to establish whether nurses in different Australian acute-care settings employed workarounds when using the EMMS and if so, why. The aim of the thesis is to improve our knowledge and understanding of why nurses use workarounds with EMMS in order to inform policy and technology development. The premises of this thesis were: that there is a need for empirical research on nurses' use of workarounds with EMMS in acute-care settings; that there is a need for this research to focus on how and why nurses explain their use of workarounds; that there is a need for this research to focus on nurses' explanations and experiences of enacting EMMS workarounds; that it is possible to apprehend individual and collective conceptualisation of EMMS workarounds; and that this examination should use qualitative methods. The thesis addressed three research questions in light of these aims and underlying premises. The study aims, research questions, concise answers to those questions and their location within the thesis are outlined in Table 10.1.

Table 10.1: Study aims, research questions, concise answers, and corresponding thesis chapter and section

Study aim	Objectives	Research questions	Concise answers	Corresponding thesis chapter and section	
To explore why nurses use workarounds when using EMMS in order to inform policy and technology development.	To establish whether nurses in different Australian acute-care settings employ workarounds when using the EMMS.	<i>Do nurses employ workarounds when using EMMS in two Australian settings?</i>	The use of workarounds by nurses with EMMS was ubiquitous. There was variety in the combinations of process step workarounds that were used.	Chapters 4,5,6,7,8 and 9	Examples of workarounds are offered across the findings chapters
	To examine why nurses use workarounds when using EMMS.	<i>How do nurses enact, experience and explain their use of using EMMS workarounds?</i>	Some workarounds were a response to technology shortfalls that prevented nurses doing their work.	Chapter 8	8.3
			Some workarounds were to avoid work health and safety risks, or because nurses were being lazy, or because they did know or did not agree with the policies.	Chapter 8	8.4, 8.5, 8.6 and 8.7
			Nurses used workarounds to circumvent barriers to their being a good nurse.	Chapters 4, 5, 6, 7	4.6, 5.4, 6.3, 7.4
			Whether nurses used workarounds how they felt about doing so and whether they taught colleagues workarounds were influenced by 'moderating motivations'.	Chapter 9 Chapter 10	9.2, 9.3, 9.4, 9.7, 10.3
			Nurses' experiences of using workarounds ranged between feeling good about using workarounds to feeling bad about using workarounds. Mostly they explained feeling tension and conflict.	Chapter 9 Chapter 10	9.6 and 10.4
		<i>Can sociological theory offer a way of interpreting the</i>	Nurses were motivated to use workarounds, even when to do so made them professionally vulnerable, primarily by the desire to be, or be perceived to be, a	Chapter 10	10.6 – 10.7

Study aim	Objectives	Research questions	Concise answers	Corresponding thesis chapter and section	
		<i>emerging findings?</i>	good nurse. Bourdieu's concepts of <i>habitus</i> , <i>field</i> and <i>capital</i> offered useful constructs to interpret the intensity and complexity of drivers to use workarounds.		

10.4 Overarching discussion, synthesis of findings and original contribution of this thesis

In this section, the findings of the thesis will be compared to existing empirical knowledge about nurses' use of workarounds with EMMS in acute-care settings. The findings of this thesis support and add to the empirical literature on nurses' use of workarounds.

Below I establish that nurses in this study used workarounds, fulfilling the first objective of the study. I then tackle the second objective of the study (as outlined in 10.2) to understand why nurses used workarounds, by identifying factors that contribute to the development and proliferation of workarounds, and how nurses individually and collectively explained and experienced their use of workarounds.

10.4.1 Nurses used workarounds with EMMS in an Australian context

The literature review identified a gap in studies with a focus on nurses' use of workarounds using EMMS in an Australian context. This study contributes to overcoming that gap. For the most part, the EMMS in studies that examine nurses' workarounds have comprised a BCMA component. This study adds to the literature by examining nurses' use of workarounds with two different types of EMMS, neither of which included a BCMA feature.

In seeking to capture variation in practices, this study sampled from two hospitals using different EMMS. The number and type of units, nurses, days of the week and shifts resulted in inclusion of combinations of variables not considered in other studies. While this study did not deliberately set out to compare the role of one nursing care model versus another on the implementation of workarounds, the findings suggest when coupled with EMMS specific features, models of care do influence their use. Specifically, a shared care nursing model, when coupled with eMARs that could be opened by multiple users, led to workarounds to protect patient safety. Alternatively, a patient allocation model of care, coupled with visible OMAs, led to workarounds to avoid being seen to be lazy or lacking time management capabilities.

The study finding that workarounds were used at different steps in the medication administration process supports and is supported by other studies examining medication administration by nurses [e.g. 208]. Identification of workarounds that were used to circumvent barriers that blocked medication work (leaving no alternative but to work around) or that slowed workflow, aligned with studies examining workarounds with barcode medication administration technology [e.g. 3, 4].

The factors that contributed to workarounds using non-BCMA EMMS in this study were consistent with those identified by Koppel and colleagues (2005) in relation to BCMA use: task; environment; organisation and patient [3].

Studies have noted a wide range of variations in nurses' compliance with medication administration policies [241] including failure to comply with formal patient identification requirements [134], preparing medication for more than one patient at a time [47] and signing off medication before it has been administered [134]. The findings of this thesis support those studies and others that have reported an influence of a range of factors on nurses' use of workarounds. These factors include: emergency situations; time pressures; conflict between policies; work flow barriers; operational failures; to avoid interruptions; to avoid confrontation; to enhance communication; and to manage competing demands and heavy workloads related to the type of patient specialty [e.g. 4, 208].

The good nurse framework proposed by this thesis offers one way of explaining these workarounds in relation to medication administration policies. According to Alper et al. (2012), non-compliance with protocols in the clinical environment occurs because "there is not enough time to comply with protocols, because the cost of compliance is perceived as higher than the cost of violating, or because the different protocols may conflict" [208:414]. This thesis offers the good nurse framework, endorsed by participants, with which to understand the 'cost' of compliance (to being a good nurse) versus that of using workarounds.

There is evidence that workarounds hide problems and thereby undermine opportunities for organisational learning and improvement [7, 8, 89]. The findings of this study concur with and contribute to that research. Workarounds can hide the way nurses enact safety at the clinical coalface. As a result, strategies designed to enhance patient safety can appear more successful than they are. Rigid rules presume a predictable system but tighter controls and strict adherence can erode system resilience and lead to hidden workarounds which in turn prevent an organisation from monitoring what is going on within its boundaries [95]. Workarounds undermine the trustworthiness of the EMMS and recorded medication administration activities (who administered what and when).

10.4.2 Nurses used workarounds to be or to be perceived to be a good nurse

While reasons other than those ascribed to the good nurse offered the best explanation for some workarounds, for the most part, nurses used workarounds to display, or to be perceived to display, competencies and qualities that, for them, were hallmarks of being a good nurse. For nurses, ideas about how to be, or to be perceived to be, a good nurse transcended sanctions and often diverged from using the EMMS or following medication administration policies in organisationally approved ways.

It became apparent that being, or being perceived to be, a good nurse was linked with being, or being perceived to be (one or more of): time efficient; safe; patient-centred; and a team player. These characteristics overlapped and workarounds to enact one good nurse characteristic often simultaneously realised other good nurse qualities. Being a team player, for example, included not leaving tasks for colleagues on the next shift. Workarounds used to be time efficient, so as to complete all shift-related tasks, therefore also enabled nurses to be a team player. However, at other times, the reverse was true and workarounds used to demonstrate a good nurse quality undermined other good nurse qualities. Frequently, nurses employed secondary workarounds to compensate. Thus on the one hand, workarounds simplified efforts to be or be perceived to be a good nurse, on the other, they made the process more complex. That workarounds beget other workarounds has also been identified in previous studies [119, 139]. This study extends that literature by providing an explanation for secondary workarounds that is located in a good nurse framework.

Findings of other studies offer credibility to those of this thesis that demonstrate that nurses used workarounds: to save time [124, 133, 208]; to administer medications in a BCMA system within 'allowable' time frames [226]; to deliver care that accommodated patients' needs [44, 78, 238, 245]; to act in the interests of patient safety [236, 244]; to manage risk [151]; and in the interests of collegial relationships [111, 139, 147]. The findings of this study align with those of Jennings et al. (2011) and Novak et al. (2013) who concluded that medication administration is inseparably linked with nurses' other work, and that nurses used articulation work or adaptations (including workarounds) to manage their workload and competing demands [45, 231].

The proposed good nurse taxonomy offered by this thesis is supported by, and adds to, notions of what constitutes good nursing and what good nurses offered in the existing literature. 'Responsible rule subversion', for example, is used to describe rule bending among nurses for

the sake of the patient [146]. Hutchinson (1990) proposed that nurses responsibly subvert rules when there is a conflict between the rules in a given situation and what nurses feel they need to do to deliver the best care to their patients. Hutchinson (1990) draws on Kohlberg's (1973) moral reasoning principles, which underpin Munhall's proposal (1980) that "the principled level nurse may well be the patient advocate, the change agent, the risk taker, the staunch supporter of individualistic values and ultimately, the purveyor of humanistic nursing" [343:61]. Hutchinson's (1990) framework for understanding responsible subversion suggests that nurses justify subversion on the basis of giving best care to their patients but do not make the subversion public for fear of reprisal.

Other studies, examining how nurses define a good nurse, have noted a connection between *being* and *doing* and a strong contribution of personal attributes in the construction of a good nurse, with a powerful link between being a good nurse and doing the 'right' thing [344, 345]. Good work in nursing was not only defined as scientifically effective, but socially and morally responsible [346]. Being a good nurse was about more than being good at one's job. Not being a good nurse had implications about one's character inside and outside of work [e.g. 347, 348]. The findings of this study add to this literature highlighting that being a good nurse was linked, for participants, with being a good person: to criticise a nurses' practice was to criticise them as a person. In as much as workarounds enabled the study participants to be a good nurse, they were linked with being a good person. To not be a model or exemplar of the 'most trusted profession' had implications that reached beyond the workplace.

Attributes of good nurses described by patients, student nurses, nurse educators and nurses themselves highlighted personal and professional characteristics, knowledge, virtues, ethical behaviour, communication, advocacy, critical thinking and the provision of safe, patient-centred care as important qualities of good nurses [344, 349-351]. Teamwork, cohesiveness and shared values were identified to support good work in nursing [346]. In a hermeneutic study Fagerström (2006) examined 29 nurses' experiences of their working situations in relation to different nursing care intensity levels. Fagerström suggested that nurses' work situations could be understood as a struggle between 'being' and 'not being' a good nurse, reflecting the dialectic conflict and tension between nurses' internal drivers to do good work and the external demands and restrictions that made doing good work difficult, leading to ethical conflicts that were on the border of "ethically unsolved dilemmas" [350]. Fagerström's (2006) study provides support for the good nurse framework offered by this thesis to explain nurses' use of workarounds.

There was evidence of reinforcement of the important facets of being and practising as a good nurse 'should', including the formal university curriculum. Participants explained that how they were taught to be a good nurse at university was not always possible in the reality of the clinical coalface unless they used workarounds. The nursing literature attests to the mismatch between the lived experiences of newly registered nurses in practice and their university founded expectations [352-355]. According to the findings of this study, social and organisational expectations, peer pressure and education influenced nurses' construction of a good nurse at the clinical coalface. Many of the good nurse characteristics identified in this study were personal attributes, and not easily mapped to rules and policies. For example, on the one hand, being a good nurse included being patient-centred, which for nurses encompassed being friendly, interested, 'knowing my patient' or minimising their agitation. Nurses went out of their way to demonstrate that they remembered the patients as individuals, including which medications they were on, and details about their families and social lives. However, this construction of being patient-centred and competent did not always coalesce with the formalised construction of enacting safe care, which required nurses to repeatedly check the identity of a patient they had been looking after, sometimes for several months. This study supports others which have reported that nurses are more likely to work around a formal identification check when they are familiar with patients [e.g. 208, 243].

Workarounds have been found to occur when nurses' orientation frame (practice frame), an aggregation of nurses' assumptions, decisions and priorities, including how they do their work in reality, collides with the orientation represented in technology and its implementation, which assumes how work is done (system frame) [231]. That is, the system frame, representing medication administration as a linear task, with implicit assumptions about the temporal aspects of medication-related work (e.g. what constitutes early, on time, late), collides with the way nurses experience their work, which is far from linear [231]. My findings coalesce with those of Novak and her colleagues (2013), and offer the good nurse framework as a way of further understanding the clash between system and practice frames.

The persistence of workarounds has been found to be due to the tension between top-down pressures from the external environment and the bottom-up pressures of operationalising everyday work. Workarounds were used to reach an equilibrium between the bottom-up challenges of day-to-day work and 'top-down' pressures, including policy directives [181]. This thesis builds on those findings by revealing the importance of managing, or being perceived to

manage, bottom-up and top-down tensions as fundamental to the essence of being a good nurse, and the power of this as a driver for nurses' use of workarounds. When used with EMMS, workarounds reveal the ways in which the EMMS impacts being or being perceived to be a good nurse. The good nurse framework supports and offers further explanation for Azad and King's (2012) proposal of antecedent conditions for persistent and institutionalised workarounds: material constraints; discretion to decouple among nurses (one person has more professional clout to break the rules than another); and work ethos (e.g. patient safety above the rules) [181].

Person-centred models of complex sociotechnical systems, such as those used by human factors/ergonomics, provide one way of describing the influence of the system in shaping the way work is individually and collaboratively enacted in healthcare [183]. For example, the Systems Engineering Initiative for Patient Safety (SEIPS) model of work system and patient safety incorporates Donabedian's (1978) Structure-Process-Outcome model of healthcare quality [183]. Through shaping the process, the work system influences outcomes including patient and employee safety. The work system is comprised of five elements: technology and tools; physical environment; organisation; tasks; and person. These elements interact, and given the dynamic nature of the model, changes to one element of the work system will lead to changes in other parts of the work system, that will then in turn influence process and outcomes. Carayon et al. (2014) describe characteristics of the person(s) at the centre of the system that can include physical, cognitive and psychosocial characteristics, including motivation [183]. The findings of this thesis point to the desire to be a good nurse as a powerful motivator of nurses' behaviour. It would therefore be useful in this paradigm, when considering the characteristics of the person(s) at the centre of the system, to take into account the motivations and drivers to be good at one's job and how being good is constructed by the individual or collective.

The results of this study speak to the relational and social nature of nursing, the dependence on teamwork and shared understanding of a world that was foreign to those outside the hospital world. While fundamentally the same, there were slight variations of the good nurse paradigm in study settings. That is, while there was an underlying, shared 'standard' that governed what were important markers of a good nurse, there were nuanced differences in descriptions of how the good nurse characteristics were manifested. According to nurses who worked across the hospitals, variations between unit practices reflected local adaptations to accommodate and respond to specific demands of delivering care in each unit. Gradations in how nurses explained and demonstrated particular good nurse characteristics, apparent between units, often reflected

the types of health-related needs of the patients. Descriptions of workarounds used to enact good nurse qualities revealed how those qualities were understood in practice. My findings highlighted the role of particular nurses in demonstrating and reinforcing unit norms. As with previous work [e.g. 356], this thesis suggests that particular nurses, often with strong personalities, set the tone of the unit and influenced the culture of how care was delivered.

Previous studies also demonstrate that 'fitting in' was important to nurses and involved a complex process of learning informal unit norms, so as not to offend senior nurses, to avoid being yelled at and to become an 'insider' [357, 358]. The findings of this thesis speak to similarly powerful mechanisms that reinforced the importance of time efficiency, patient safety, patient-centred care and teamwork as attributes of good nurses. These mechanisms were informal, tacit and collectively enacted. Informal mechanisms included overt praise, inclusion, camaraderie and an expressed desire to work with those nurses who were good. On the other hand, there were negative comments and covert messages (e.g. 'rolling' eyes; non-inclusion in the coffee runs or shared lunch breaks) about colleagues who did not perform well against the good nurse criteria. Other tactics included admiring nurses who 'coped' and 'shaming' others for not coping and withholding privileges to perform important nurses' work, such as medication administration, until, for example, the nurses had demonstrated that they were time-efficient, safe, patient-centred and did not question the practices of their senior colleagues. Studies have noted the influence of senior nurses on their junior colleagues' non-compliance with medication administration policies [359, 360], and as with studies by Varpio and colleagues [115, 117, 248], most nurses in this study described having learnt workarounds through observation, mimicry and trial and error – learning to use workarounds appropriately was considered part of becoming a good nurse. That the neophyte nurses in this study observed senior nurses using workarounds to enact good nurse characteristics reinforced the importance of those characteristics for nurses – e.g. if being time efficient warranted senior nurses working around policy to achieve it, being time efficient must be very important.

When they were not aligned, the importance of enacting the qualities of a good nurse over following the policies and using the EMMS as intended was supported by the strong collective inclination to dismiss those who would not use workarounds as difficult to work with, unpopular, 'sticklers' who put a 'spanner in the works' and made their colleagues feel like they were being watched and judged. There was clear evidence that nurses shared a view on those nurses who followed the rules precisely. While the participants conceded that you could not 'fault them' as

being 'safer' (particularly in relation to their colleagues' professional safety), nurses who did so were identified and negatively labelled by the community of nurses. Individual nurses who were 'rule followers' were unpopular because they were perceived to slow the work of the whole team and to judge those who used workarounds. Managers who required nurses on their units to follow organisationally sanctioned rules risked being labelled as 'bullies'. Supporting other literature, there was evidence that, for the most part, nurses applauded as positive attributes problem solving, 'making do' and being the 'masters of workarounds' [109]. As noted by others, time pressure, a sense of responsibility to patients, an expectation that workflow problems to delivering care are part of every nurses' work and the shared perception that proficient nurses solve those problems alone were noted in this study to contribute to nurses' use of workarounds [7, 22]. These studies suggested that nurses accepted and worked around operational failures to the point that they were no longer branded as problems. The findings of my study imply that, in the same way, workarounds also become 'invisible' to conscious thought. These workarounds that are hiding in plain sight become part of the normalised practice of the good nurse.

Previous studies have reported features of the EMMS that cause workarounds [e.g. 3, 74, 135]. This study adds to these by interpreting the influence of technology on nurses' use of workarounds in relation to their identity as a good nurse. For example, nurses conceptualised scope of practice blocks to administering medication as barriers to being time efficient, safe, patient-centred and a team player.

The EMMS supported and challenged the enactment of other characteristics considered important for good nurses. For example, while emphasising the importance of timely medication administration, the introduction of the EMMS also made it more difficult for nurses to be time efficient. In line with Patterson and colleagues' (2002) findings, the EMMS in this study was considered to have elevated the importance of medication work [77]. The EMMS made medication work, previously relatively private between the nurse and their patient, more public. In doing so, it highlighted when nurses were not being time efficient. Across the study sites there were different attitudes to the OMAs that were largely attributed to their visibility and mediated by unit norms. Many nurses were concerned that highly visible OMAs, coupled with a patient allocation model of care, suggested laziness or poor time management. When referring to the OMAs, nurses' descriptions of them as 'flashing', spoke to their perception that the OMAs were calling attention to their tardiness. Nurses used workarounds such as delaying medication or administering it in the EMMS (although perhaps not administering it to the patient) to remove the

OMA, so as not to be perceived to be inefficient or lazy. In contrast, almost all nurses, when referring to the less publically visible OMAs, highlighted their value as reminders of outstanding medications. By auditing and forcing functions, as well as making medication work more visible, the EMMS reinforced that being time efficient (e.g. forced medication times and overdue medication alerts (OMAs)), safe (e.g. legibility of orders and point of care information), patient-centred (e.g. decreased wait time for patients to get medications) and a team player (forcing co-signatures rather than a '*squiggle*') were important and desirable qualities of a good nurse.

Delivering care at the clinical coalface presented barriers and challenges and, moment by moment, foregrounded the salience of some good nurse characteristics over others. While delivery of care is frequently represented by the organisation as a linear process, including my maps of medication administration process, it can be better understood as part of a complex adaptive system [361, 362]. Nurses used human judgement and enacted choices in a complex ecosystem. In any given moment, nurses used workarounds to meet demands, which changed constantly across time. Delivering care required nurses to continuously assess and reassess, identifying the most salient demands in a given context. That nurses used workarounds sometimes and not others highlighted their on-going mindful assessment and attempts to balance, in light of the ebb and flow of the ever-changing context, what was best for their patients, colleagues, themselves and the organisation [245]. Given the demonstrated influence of organisational and unit culture on professionals' attitudes and behaviours, including to technology and medication administration [159, 261, 363], it was not surprising that my findings revealed that the interpretation and practice of good nurse characteristics, unit norms and relationships were reflected in subtle, fluid differences in the salience afforded one good nurse characteristic over another. A nurse working with an influential colleague, for whom diligence was a quintessential for good nurses, may foreground time efficiency over other good nurse characteristics during that shift.

10.4.3 Factors moderated whether using workarounds was acceptable

My research demonstrates that 'moderating' factors influenced nurses' enactment, explanation and experience of workarounds. Ward management and resources both supported and hindered the implementation of workarounds. In some units interventions were implemented to address barriers to enacting good nurse characteristics, thus impeding the use of workarounds. In contrast, as has been found in other studies, a culture of working around barriers rather than

fixing them was noted on other units [7, 61, 217, 243].

Nurses shared informal, unofficial 'rules of the game' [364], collectively constructed and enacted, that governed when workarounds were used and when they were not. The 'rules of the game' sanctioned what was acceptable and what was not. There were the governing 'rules of the nursing game' taught and reinforced at university. These reinforced and were themselves reinforced by organisational and legislative policies. However, as noted in previous studies, the 'rules of the game' governing how nursing was enacted at the coalface were not always in alignment with those taught at university. Maben and colleagues (2006) for example, conceptualised socialisation messages as four key 'covert rules' ('hurried physical care prevails'; 'no shirking'; 'don't get involved with patients'; and 'fit in' and 'don't rock the boat') [358:470]. Existing staff socialised the newer nurses to practice in a way that was contrary to the ideals they had learned at university [358]. My findings also noted nuanced differences in the 'rules of the game' across units, which were influenced by unit norms. Part of being a good nurse was to know when and which policies could be worked around and which nurses could use workarounds and when they could do so. 'Becoming' a good nurse involved learning how to be a good nurse in every day practice and included learning when it was appropriate to use workarounds and when it was not.

The findings of this thesis propose that collective, implicit 'rules of the game' moderated nurses' use of, and feelings about, workarounds. This resonated with the findings of a study that examined how Australian clinical nurses defined and redefined medication error. Baker (1997) noted the roles of collaboration, complicity, seniority, experience and familiarity in the process of medication error redefinition and concluded that clinical nurses shared a body of tacitly held knowledge that they used to redefine medication error [245].

The results of this study highlighted that 'moderating motivations', including perceived nursing competence, influenced whether or not workarounds were enacted in some situations, and whether or not nurses taught workarounds to newer nurses. This finding supports and is supported by the Benner et al. (2009) emphasis on the social embeddedness of clinical knowledge within the practice of nursing – nurses learn from each other and self-organise in a way that is responsive to tacitly understood context specific circumstances, including the skills and abilities of their colleagues, to deliver patient care [365].

Studies identifying adherence to WHO Surgical Safety Checklist [250] and policies relating to urinary catheters [151] have noted that while nurses comply with some requirements of a policy, they work around others. The authors suggested that participants' concepts of risk were a contributing factor. My results also demonstrate that, in some instances, nurses worked around some aspects of medication administration policy and not others. They suggest that, all things being equal, nurses were less likely to work around process steps if to do so was especially professionally risky.

As reported previously, nurses did not undertake workarounds with every medication administration. Informal rules related to the type of medication and the experience of the nurses also moderated the use of workarounds. While there were 'hard' rules associated with medications such as chemotherapy that were not circumvented, there were subtle variations in when and why workarounds were used when administering other medications. Other studies have also noted that when medications were considered to be 'high-risk', or regulated legally, nurses were more likely to follow protocols and guidelines [359, 366]. Nurses balanced the: potential for error if workarounds were not used (e.g. from interruptions) and if they were used (e.g. wrong patient); numbers of, complexity or unfamiliarity with the medication; and whether the patient was experienced with taking their medication. Part of being a good nurse was to know when the use of workarounds was acceptable.

As described previously, unit norms influenced the relative, context-specific, importance afforded particular good nurse characteristics. In doing so, they influenced the propensity for nurses to work around barriers to enacting those characteristics. Unit-specific norms governing the acceptability of workarounds also moderated their use. In both hospitals, there were units that were renowned for not using workarounds, and others where workarounds were acceptable. Nurses reported that the unit norms would govern their practice when working on that unit. Their offered rationale was that the nurses on the unit had local knowledge, developed over time, about what worked best for their patients, their colleagues and themselves. Nurses in other studies were found to consider it essential, when working across units, to adapt to the different routines and unwritten rules of each unit, so as to work effectively on those units [356]. While units operate differently because of medical specialities, when nurses talked about adapting to a new ward "they were referring more to the nursing culture than to the technicalities of the medical work. They adapted to the ward's customs, working methods and specific routines" [356:693], and therefore knew how to act on that unit.

My research demonstrates collective agreement among the majority of participants about who could use workarounds and who could not. For some nurses, workarounds were unacceptable in any circumstances. Among most others, there was a shared understanding that the use of workarounds was not acceptable for all staff or in all contexts, only for some nurses, in certain contexts, with particular medications. Nurses with more experience were said to be better able to juggle demands to enact workarounds and to judge when workarounds were safe in light of contextual demands. The informal rules about who should and should not workaround, and the expressed attitude to workarounds, were influenced by unit norms and reflected in variation between units. This finding resonates with studies by Baker (1997) and Hutchinson (1990) in which workaround behaviours were not accommodated for mediocre or non-permanent staff [146, 245].

In a study analysing nine nurses' interactions with technology obstacles, from a complexity science perspective, Lalley (2014) noted that power relations, within local interactions, influenced nurses' negotiations with each other about what they did and did not do, the process based on the ideology that nurses' identity was formed in order to be included or excluded by the group [227]. The importance of relationships also resonated throughout the study settings. Nurses enacted workarounds to maintain relationships with their colleagues, their patients, and 'management'. To not do so risked segregation and a reputation for not being a team player and hence a good nurse. Nurses openly discussed 'those' nurses, who because they followed the rules, made them feel like they were being judged. Collaborative workarounds supported and reinforced that nurses were trusted and part of the team, as nurses selectively asked colleagues to work around.

Nurses continuously weighed up the perceived risks and benefits of using workarounds, not only for their patients, but also for their colleagues, the organisation and themselves. They balanced the professional risk of using workarounds against the risk of being good at their job. In the event of an incident, nurses were at risk of professional and legal retribution if they had not followed policy. Even if there was no blame attributed, the identity of nurses who had been investigated was passed on in retold stories and their working life made difficult. The influences of trust and mistrust on assessment of professional risk moderated whether or not nurses used workarounds. Trusting relationships and being part of a team sometimes offered protection in potential investigations. Demonstrating trust by acquiescing in collaborative workarounds contributed to team relationships and reinforced one's position as part of a team. When reciprocated, being

trusted was described to reinforce a nurse's professional identity; being trustworthy is an important characteristic of good nurses [367].

There was a described gap between the design of policies, far from the clinical coalface, and for use in an 'ideal' world, and how they were enacted in the real world of care delivery. Workarounds occurred because of operational problems and contextual issues. Distanced policy makers and managers developed guidelines and rules. Nurses negotiated, on the ground, the difference between the requirements of the guidelines and rules with: their knowledge of the clinical status of each patient as an individual; the collective demands of all of the patients; the dynamics of the nursing team; the operational failures, the strengths and weaknesses of the wider team (e.g. new interns); and organisational demands (e.g. how many patients are in ED waiting for a bed). This finding adds to the evidence of nurses' reliance on vigilance that extends beyond rules to provide safe and effective patient care [44].

Compounding the disjoint between policy design and implementation was the explanation that there were too many policies. Not only were nurses unsure of what was the most current iteration, but many policies conflicted with each other and with what nurses understood to be safe practice in light of contextual considerations. In so doing, this study offers empirical support for the proposition by Carthey et al. (2011) that compliance with policies in healthcare has been undermined by their burgeoning numbers [368]. My research demonstrates that adherence to policies was not perceived by nurses to always be in the best interests of their patients. Most, but not all, participants did not consider that safety was an inherent quality of the policies or the EMMS. Rather, they proposed that safety was constructed and enacted in every day practice, with contextual application of policy and workarounds supporting patient safety. While there was unanimous agreement that by improving legibility of orders, and ease of access to information at the point of care, the EMMS supported patient safety, nurses identified that the EMMS also had the potential to undermined patient safety. Nurses used some workarounds because not to do so increased the risk of error. However, they were aware that other workarounds undermined safety and hid the 'true story' about whether medication had been administered and, if so, when it had been administered thus increasing the risk of error and the importance of informal communication.

10.4.4 Nurses experienced mixed feelings about using workarounds

While workarounds are understood to be ubiquitous, only a handful of studies note how nurses feel about using workarounds. These speak to a fear of professional vulnerability that nurses experience when they do not follow policy. Published research has noted that, because they were concerned about being ostracised and criticised by their colleagues and open to professional retribution, nurses concealed non-compliance with policies from colleagues, managers and patients [146, 238]. In other studies the complicit and shared nature of workarounds is featured [119, 147]. Studies by Tucker et al. (2002, 2003) linked solving problems with perceived proficiency [7, 8]. My research findings both resonate with, and add to, the extant literature in this area by reporting nurses' experience of using workarounds with EMMS.

My results demonstrate that nurses experienced mixed feelings about using workarounds. Positive feelings linked with workarounds included feeling competent, being trusted and being good at one's job – being a good nurse. Conversely, not using workarounds was associated with feelings of guilt for delaying colleagues or conveying distrust, and frustration at not being able to do a 'good job'. Positive and negative feelings about nurses' use of workarounds were also influenced by whether or not the person using them was considered qualified to do so. My results demonstrate that nurses frequently foregrounded the salience of one good nurse characteristic over another. This may have compromised other good nurse qualities. Using workarounds to be perceived, for example, to be time efficient might leave the nurse feeling bad because to do so might not have necessarily been the safest option.

While they may have felt uncomfortable with the use of workarounds by some of their colleagues, nurses reported being unlikely to comment or reprimand them. This finding adds to those of other studies that demonstrate the reluctance of nurses to highlight their colleagues' shortcomings [217, 369] or to confront conflict directly [370]. Nurses have been shown to fear "negative repercussions, including social isolation, peer retaliation, managerial reprisals, personal attacks, and being labelled as not a team player" [217:51]. Interestingly, my data suggest that while nurses were not happy to show disapproval of their colleagues' failure to follow rules, they were quick to point out other shortcomings such as when they were not time efficient. This suggests that not demonstrating good nurse characteristics, such as being time efficient, would be more likely to attract censure from one's colleagues than using workarounds. It would follow then, that given the previously established importance for nurses to 'fit in' and be part of a team [352, 354,

358] that on balance the drive to use workarounds to be a good nurse would be stronger than to follow policy.

Resounding across my findings was that nurses' experienced tension when using workarounds. Formal literature about what constituted 'ideal' or 'sacred' nursing practice described workarounds as unsafe and professionally risky practices [e.g. 371]. To use workarounds, therefore, was in opposition to being an 'ideal nurse' and to do so created tension. Delivering care at the clinical coalface involved prioritising competing demands that were inherently contestable [150, 151], and in this study often led nurses to use workarounds to deliver care ('profane'). When nurses used workarounds, even if it was deemed necessary to do a 'good job', it created conflict because workarounds did not constitute 'ideal nursing practice'. The rhetoric of those required to enforce policy, who often turned a blind eye to workarounds unless something went wrong, served to reinforce that 'ideal nurses' did not use workarounds. Nurses' anxiety about recounting theirs and their colleagues' use of them, suggested that these highly visible workarounds were thought to be secret or invisible.

Nurses operated within organisational, professional and legal systems. The tension between the organisational regulations and contextualised practices were explained in terms of risk – adhering to policies kept nurses safe. The status of workarounds as informal, non-sanctioned practices made nurses who used them vulnerable to professional retribution. Thus, on the one hand subverting policies created tension or fear (also noted by [e.g. 111, 146, 147, 238]). On the other, if following the policy blocked nurses from doing a 'good job', it also created tension. Therefore, using workarounds was linked with feelings of professional vulnerability, particularly given the unpredictability of the reaction of the hospital management that either turned a blind eye or punished nurses for using workarounds.

10.5 Justifying the choice of Bourdieu's theoretical framework

A number of different theoretical frameworks could have provided useful analytical tools with which to examine my findings. Nurses utilisation of workarounds could have been examined using theories and approaches from a philosophical focus on virtues or values (e.g. virtue ethics [372, 373]); a psychological approach, centring on psychological explanations such as cognitive dissonance [374]; a social approach encompassing informal rules and relationships (e.g. social rule system theory [375]); or from an organisational perspective, unravelling aspects of the organisational culture that enable or challenge workaround behaviours [376]. My findings spoke,

for example, to notions of Foucault's (1997) professional gaze (being observed and assessed) [377]; the transfer of culture; obeying or disobeying rules; conflict, vulnerability and tension; and being virtuous and doing the right thing.

Given that workarounds are, *in situ* every day practices, within specific institutional and organisational contexts, Bourdieu's (1984) theoretical concepts proved to be particularly useful in interpreting the emergent findings of this study. As Brown et al. (2008) argue:

The value of Bourdieu's notions of habitus, field and capital to the sociology of health and nursing lie in their focus on practice ... Bourdieu's concepts illuminate the minutiae of everyday work, whilst placing these practical elements in their institutional and organisational contexts. [318:1054]

My findings speak to the importance of the relational aspect of nursing in the process of professional enculturation, negotiation of rules within boundaries, power relations and vulnerability, and construction of professional norms. These aspects align with Bourdieu's concepts of *habitus*, *field*, *structure and agency*, *capital* and *doxa* [340], and made them useful constructs with which to further interpret the results.

Bourdieu's work reconciles how external (to the agent) forces (culture, religion, education and organisational regulations), and internal forces (values, ethics and experiences) mutually form and shape each other [378]. Individuals have the free will (*agency*) to act within a social *field*, but how they do so will be influenced by their experiences, knowledge, beliefs and predispositions to act in a certain way (that is, by their *habitus* or embodied history) and the specific rules which apply 'within the field' (*structure*). The individual's interaction with the structures will be influenced by the power relations in the field, their own and others (*capital*) (terms are explained in more detail in section 10.6).

Thus, "Bourdieu links agency (practice) with structure (via capital and field) through the process of habitus" [379:536]. Bourdieu offers concepts to account for the concept of the 'good nurse' in influencing behaviour, the 'moderating motivators' and the range of expressed feelings about the use of workarounds. The value of the perspective has been explained in this way:

One consequence of drawing upon Bourdieu for sociological understandings of healthcare is to enable an account of the moral and strategic stances ('prise de position') that actors may assume, which permit certain forms of improvisation while

inhibiting or disallowing others. [318:1054]

Bourdieu's work has contributed extensively to studies in the media [380, 381], culture, class and education [164, 382, 383] (his major fields of analysis). More recently, however, his theories and key concepts are being used increasingly to inform studies in healthcare, including the fields of patient safety [e.g. 384], nursing care [e.g. 318, 319, 385] and professional development in nursing [e.g. 320, 386].

10.6 Defining Bourdieu's theoretical constructs applied to account for the study findings

For Bourdieu, a person's 'practice' is the result of a social agent's disposition (*habitus*) and the range of options available to that social agent as a result of their power (*capital*) in a given social space (*field*) [378]. The concepts, *habitus*, *field* and *capital* will be further explained, followed by an example of how each concept has been applied in a study by Brown et al. (2008) that examined infection control work in nursing [318]. I will then summarise how each concept has been applied in this thesis before illustrating how the three main findings can be understood in light of these concepts.

10.6.1 *Habitus*

Habitus are agent(s)' embodied histories, a set of dispositions acquired as the agent encounters and experiences life [340]. *Habitus* is both structured (by past and present experiences e.g. culture, childhood, school, social, and professional education) and is structuring (it influences current and future decisions). *Habitus* operates at both a mental and physical level: it makes us 'feel' that the choices we make are intuitively 'right' based on what we have learned from others and from our society and culture. For example, a person's *habitus* is said to influence a person's taste for music and their physical taste for food [340]. *Habitus* is unique to individuals but is also influenced by collective experience of the group within which the individual operates as "*Habitus* denotes an acquired, collectively held pattern of thinking and acting" [318:1048]. That is, a shared reality, often taken for granted, that guides behaviour [318]. Professional *habitus* develops through previous and on-going experience, as people imitate others they admire, often those with power, and unconsciously incorporate their behaviours to become their own [387].

For Brown et al. (2008), the *habitus of hygiene* (within a healthcare setting) encapsulated the importance of hygiene as a 'taken for granted', an ingrained shared way of thinking that is basic

or fundamental to nursing – “in this case what it means to be a nurse and the harbinger of hygiene” [318:1053]. The *habitus of a ‘good nurse’*, as identified in my study, is the embodied collective understanding of the ‘taken-for-grantedness’ of the importance of being a good nurse. That understanding both constructs and is constructed by good nurse practices. It is nurses’ internalisation of their individual and collective experiences and understandings, as well as the social and historical expectations of what constituted a good nurse.

10.6.2 Field

Bourdieu’s conception of *field* is that of a social space, a series of rules, institutions, rituals, structures, authorities and history. A field encompasses a:

series of institutions, rules, rituals, conventions, categories, designations, appointments and titles which constitute an hierarchy which produce and authorise certain discourses and activities ... it is also constituted by, or out of, the conflict which is involved when groups or individuals attempt to determine what constitutes capital within that field, and how that capital is to be distributed. [388:21-22]

The field as explained in the study by Brown et al. (2008) included the policies, procedures, hospital structures and groups of players within the hospital, and knowledge that related to ‘hygiene’ [318]. In this thesis there are several fields, which at times overlap, align or clash at the point of patient care. The two major fields considered in this study are the hospital (including organisational, management and administration) and nursing (professional, practice, and patient care). Overlapping these two substantial fields is the field of patient safety, which draws both organisation and profession into a space of tension, which will be described later in this discussion (section 10.7.3).

10.6.3 Capital

Capital can be understood to represent the power a person holds to influence the ‘rules of the game’ within the field and thereby influence their position within the field [315, 387]. Within the field, some resources, characteristics or skills (capital) are considered to be more valuable than others and power is imbued to those in possession of or with access to these [378]. What constitutes field-specific resources, that is the field’s legitimate capital (social, cultural, economic or symbolic), is constructed by the relationships and struggles for power of agents within the field [389]. Within any field, agents subconsciously or consciously act to gain power, or maintain their

social position. The field is not static as changing practices and power relationships between those in the field challenge its boundaries [390].

The positions of individuals within any field are influenced by their capital. The interaction between the individuals within the field and their relative capital, both contribute to and are influenced by the structure of the field, and that which is attributed power and significance, including practices, goals and structures. The structure, determined by the power relationships of those within the field, reinforce what is considered significant and the power relations that support that by affording them a 'taken-for-grantedness' or an assumption that they are part of the 'natural order' of things [391]. How individuals behave within a field is not forced, but their agency is bounded by their habitus and the context, their practices shaped by wider practices and politics within the field as well as the influences of external fields.

Bourdieu originally proposed three types of social capital which circulate in fields. He suggested that capital:

can present itself in three fundamental guises: as economic capital, which is immediately and directly convertible into money ... *cultural capital*, which is convertible on certain conditions, into *economic capital* and may be institutionalised in the form of educational qualifications; and as *social capital*, made up of social obligations ('connections') ... [392:82]

Symbolic capital, including honour, status and prestige [393], was added later with other forms of capital, for example, emotional capital, being expounded by other researchers [394]. Capital was considered by Bourdieu to be fluid, with one of the benefits of having power within a field being the power to authenticate what is considered to be capital [391].

In relation to capital, Brown et al. (2008) argue, "the language of infection control has acquired a symbolic capital which privileges or grants power to the speaker within many officially sanctioned health care encounters" [318:1048]. Therefore, for a profession that portrays preoccupation with cleanliness, such as nursing does, hygiene becomes symbolic and cultural capital when the policy context underlines the human and economic cost of hospital acquired infections. Being a good nurse imbued several forms of capital. In my study, economic capital encompassed job security and opportunities for promotion to more senior levels. There was a historical construction of good nurses, as people of good character, being a good nurse was also linked with symbolic

capital: good nurses were good people and as such were afforded status as valuable. Social networks produced social capital, important given the collegial nature of nursing, the dependence on team members to complete some tasks, and the importance of 'looking out for each other' for professional safety. Cultural and professional capital included knowledge and experience as a nurse, which privileged some over others in using workarounds, furthering their status as good nurses.

10.7 Using Bourdieu as an explanatory framework for the three main study findings

Nurses used workarounds to circumvent or temporarily 'fix' workflow *hindrances* to achieve a *goal* or to achieve it more easily. Nurses' habitus, and the field within which the nurse was operating, and their capital within that field, influenced: the perception of *what constituted the goal* in a given context, and the importance it was afforded; the perception of *what constituted a workflow hindrance*; and *whether or not it was appropriate to circumvent* the hindrance; and *how it felt to do so*.

10.7.1 Nurses used workarounds to be, or to be perceived to be, a good nurse

Nurses' use of and conceptualisation of workarounds was influenced by their relationships and construction of their identity as a good nurse. Their professional habitus informed what it meant to be a good nurse. In this study, we can understand habitus in relation to nurses' internalisation of their individual and collective experiences and understandings, as well as the social and historical expectations of what constituted a good nurse (e.g. *'the old school teaches good nursing care and time management.'* (Field Notes_Observation_101)). The link between being a good nurse and a good person was internalised and continued to be propagated and strengthened by symbolic artefacts, including uniforms in which historically, "The glorification of self-sacrifice and vocation were blended to create a perfect picture of femininity and subservience, designed to 'inhibit deviancy'" [395:47]. Shift work spoke to the hardworking character of nurses who put others before themselves and worked through the night, on weekends and evenings. The community, who voted nurses the most ethical and honest profession for twenty years in a row, reinforce the virtuous image of nurses [396]. The connections with tradition and Florence Nightingale are also reinforced by events and celebrations such as International Nurses' Day. Using Bourdieu's concept of field, it is possible to see that the way people act within any given field is influenced by what they know or believe to be true and valid, which itself is shaped by the

boundaries and power relations within the field. The field and habitus adapt, but the historical references remain and continue to operate within the dominant culture of the day. The 'sisterhood' of nursing perpetuated and was perpetuated by the collective habitus that was internalised individually and collectively, and included what a good nurse was and did, as well as what it physically felt like to be a good nurse. There was strong, embodied motivation to work around barriers that were perceived to potentially stand in the way of being, or being perceived to be, a good nurse.

Professional habitus, particularly in nursing which is collective and patient-centred, meant that nurses used workarounds in the belief that to do so was in the best interests of the patient, their colleagues and the organisation. Several nurses in this study qualified that nurses would not use workarounds if they did not benefit the patients. In fact, for many nurses in this study, mindful practice, including the use of workarounds, was considered safer for patients than following policies blindly.

The contribution of social norms to the on-going construction of professional habitus also provides a way to understand the willingness of nurses to work around policies. Habitus is shaped by social norms and shared views of what is positive or negative. The willingness of health care workers to fulfil and to also go beyond formal job requirements (pro-social organisational behaviour), for example, is considered a positive characteristic that contributes to effective organisational performance [397]. Social norms and mores also contribute to the embodiment of notions that following rules precisely was not always in the best interests of the organisation, nor was it necessarily a noble activity. For example, the antithesis of using workarounds is to 'work-to-rule', largely used in lieu of going on strike. 'Work-to-rule' is considered dissident, with the purpose of bringing an organisation to a halt. Workers 'work-to-rule' to protect themselves from getting fired by following the policies and duties outlined within a job description or scope of practice. However, in doing so, the organisation is impacted negatively, with normal workflow and production severely hampered. Rather than 'work-to-rule', nurses in this study were observed to work past the time their shift ended; work through breaks and put off attention to their own needs (e.g. going to the toilet) until patient needs were attended to. Exposure to a shared community belief that following rules precisely was not always virtuous would be embodied and contribute to the nurses' habitus – using workarounds, then, was not a disqualifier to being a good nurse.

The development of professional habitus is not one-way enculturation; rather, each nurse brought with them their own pre-formed habitus. Thus nurses do not all act and think the same. Neophyte nurses were acculturated into the profession of 'clinical' nurses (as opposed to managers or educators). The nurses' habitus gave them a 'feel' for the game of patient care and influenced how they interpreted and enacted the 'rules of the game' (*doxa*).

Neophyte nurses were taught workarounds informally. Rhynas (2005) explains the development of professional habitus in neophyte nurses:

For example, student and newly qualified nurses are socialised in their workplace and learn ways of interacting with specific groups of patients. They observe their colleagues demonstrating attitudes to specific conditions and ways of interacting with the patients. These observations shape the interactions that they themselves choose to have in the future. Much of this process is unconscious, as principles and customs of the care setting are transmitted into the mind of the new nurse. [387:182]

My study findings illuminate manifestation of the professional habitus of nurses as well as habitus in creation. While some were intentionally taught workarounds, particularly if they had demonstrated qualities of a good nurse, many neophyte nurses reported having learnt them through observation and mimicry. By teaching workarounds selectively, senior nurses passed on the goals of a good nurse, what comprised a good nurse and the role of workarounds in procuring capital in one field (e.g. delivery of clinical care), while risking it in adjacent and overlapping fields (e.g. breaking organisational regulations).

Nurses informally learned how to become 'good nurses' – meeting the good nurse criteria that were part of their habitus – by observing, being reprimanded when they made an error and listening to stories about the actions of other nurses who were or were not judged to be good nurses. Neophyte nurses learnt who were good nurses and observed how they operated.

According to Hyde (2008) organisational stories are often used to illustrate what is expected of staff and what they may expect in return – "Stories serve to warn, entertain, educate, inform, advise and evoke strong emotions" [398:149]. Nurses' use of stories about positive and negative outcomes related to the use of workarounds was important to the construction of judgement of when and where workarounds could be used. That is, conceptualisation of the factors that moderated workarounds were formally and informally reinforced and passed on. 'Bad stories'

associated with workarounds were often linked with professional vulnerability. Stories about errors were presented with reference to the negative implications for the nurse. For example, the identity of the nurse who committed the error was known e.g. it was an agency nurse; it was a nurse working on X ward, he said he didn't do it but everyone thinks he did (clearly the nurse's identity is known); the nurse who was investigated is still working (everyone knew who they were). Workarounds were also reinforced by good stories. For example, when the system went down and the nurses had to rely on their problem solving skills – the emphasis was that workarounds benefited the patient. When nurses used workarounds and the outcome was good – the emphasis was that the patient was the beneficiary.

Nurses tolerated some workarounds as acceptable within nursing *“as long as they don't breach the standards”* (Interview: Nurse_42). The differentiation in this study between policies and ‘the standards’ were illuminated by the professional habitus. The policies differed from the standard, which was part of the professional habitus. The professional habitus informed nurses which policies could be worked around, which rules bent and when short cuts could be taken. The ‘standard’, not the policies per se guided nurses’ behaviour.

10.7.2 Factors moderated whether using workarounds was acceptable

Within the field of patient care there are rules and structures of organisations, professional bodies and, increasingly, the patient safety movement that both direct and provide boundaries to the ‘game’ of safe patient care. The EMMS can be understood as a structure designed to influence agency. By raising the importance of, making visible and recording nurses’ medication work the EMMS influenced the rules of the game and the way the game was played to be, or be perceived to be, a good nurse. Within the field of nursing, with accepted rules, traditions and history, neophyte nurses entered new social fields – hospitals where practices were governed by explicit and implicit doxa – rules of the game – how to be a good nurse in this hospital. Within the hospital and nursing fields were unit fields, connected but unique. The habitus influenced (and was influenced by) which forms of capital were most important in a particular field. The individual and collective habitus, within a particular field (each unit) influenced how ‘to be’ each type of good nurse in that field.

Lalley (2014) reported that nurses’ responses to HIT blocks were influenced by sets of rules including ideology and power relations [227]. My thesis supports and extends our understanding of the role of power relations in moderating nurses’ use of workarounds. Power relations

facilitated by cultural capital influenced nurses' workarounds. It was generally accepted that nurses who were senior were allowed to work around because they knew when it was safe to do so. By using workarounds, these nurses were able to enact good nurse characteristics, which gave them more kudos and cultural capital. Being a good nurse both imbued capital and required capital. Good nurses knew to whom they should pass on the ways to enact being a good nurse. When senior nurses required collaboration to enact workarounds, they either chose colleagues on the basis of their willingness to work around, or appealed to the 'natural order of things' – the hierarchy of nursing that encouraged junior nurses to defer to their senior colleagues. Neophyte nurses were judged according to their abilities to enact good nurse characteristics in ways that were most acceptable to the unit on which they were working.

Operating within the field were 'norms' which were influenced by the habitus and by the power games within the field. There were rule boundaries and modifiers. The modifiers were dependent on relationships between nurses and: their supervisors (supportive or unsupportive); the organisation (did they turn a blind eye); the unit norms; colleagues (trust some and not others); and the patient (e.g. the patient who is an intravenous drug user or the patient has a long term condition which gives them more expertise in managing their medications). The relationships were based on nurses' knowledge of each other and of the system.

In this study there were some nurses who were perceived to be more able to use workarounds. A nurse, who had yet to establish himself or herself as a good nurse, was not yet sanctioned to use workarounds. Neophyte nurses observed that nurses with authority as a good nurse, used workarounds. Part of developing the habitus of the good nurse was learning when it was appropriate, as a good nurse to use workarounds and when it was not, and for whom it was acceptable. As my results showed, neophyte nurses were more forthcoming in describing nurses' use of workarounds to me than their senior colleagues. As nurses became more senior, they seemed less inclined to expose the workarounds that they or their colleagues used. It may be that the neophyte nurses were still developing awareness that the use of workarounds was 'secret nurses' business'.

Senior staff did not teach neophyte nurses some workarounds because they were not experienced enough to juggle numerous tasks, nor had they developed the knowledge of what was involved and the potential consequences of using workarounds. The results also highlighted the differential teaching and exposure to inclusion, positive feedback and potential to acquire

more skills that was afforded to those new nurses who displayed good nurse characteristics (e.g. managed time efficiently, did not hand tasks on or question collaborative workarounds). As nurses acquired the social and cultural or professional capital associated with being a good nurse, they gained acceptance, which enabled them to gain more capital. Being seen to be a good nurse by one's peers, gaining professional capital, was not always in alignment with being seen as an 'ideal nurse' by the organisation, which ensured economic capital. Nurses used workarounds to be a good nurse at the clinical coalface (e.g. administer medications outside prescribed times) and secondary workarounds to **appear** an 'ideal nurse' to the organisation (such as administering medications but not signing them off in the EMMS until they were due).

Nurses' networks and social relationships at work imbue social capital created by, accessed and accumulated by sharing assets and ways of being and knowing [399]. Nurses in my study with multiple social networks and connections at work held social capital. This enabled workarounds such as borrowing medications from other units. To be part of the 'in group', demonstrated by social connections with each other outside work, and to be accepted was considered important to this collective culture. These connections made it easier to ask colleagues for help, provided the idea of protection from nurses who are *"renowned for eating our young and being so mean to them"* (Interview: Nurse_39) and from potential risks of investigation if a medication went missing, an error happened or a patient made a complaint. It could also be argued that social capital (and cultural capital which I will discuss next) enhanced the likelihood that colleagues would 'cover' or 'forgive' you. The study findings highlighted that by not agreeing to work around when invited, nurses intimated that their colleagues were doing the wrong thing, and made them unpopular. Therefore, not agreeing to work around threatened the individual's social capital.

Whichever capital was most relevant in a given field was the 'card' that got played. One form of capital may have competed with another in a particular field. The power differential (power capital) between RNs and EENs was also emphasised by the EMMS which physically blocked EENs from signing off as having administered some medications. The power of team relationships, efficiency, safety and patient care were observed to 'trump' that of policy and led to nurses working around scope of practice restrictions.

Within the field of clinical care, the power to authenticate the valued competencies of a good nurse was held by those considered to be good nurses. Wanting nurses to 'cope' and to be team players, who delivered patient-centred care, the organisation turned a blind eye to some

workarounds. Good nurses coped by using workarounds that enabled them not to upset the doctors by taking back the COWs (honouring the established hierarchy in the field) or asking the organisation for new or more COWs. They also did not stop working or wait until they got them (honouring their habitus which places the symbolic capital of 'duty' over economic capital)..

10.7.3 Nurses experienced mixed feelings about using workarounds

The results chapters reverberate with examples of tension and conflict. Understood within a Bourdieusian framework, tension between organisational regulations (structure) and nurses' professional contextualised practices (agency), is influenced by nurses' professional habitus. Nurses frequently conveyed being conflicted when they used workarounds. Tensions between organisational or structural regulations and contextualised practices such as workarounds were partially resolved using the framework of the good nurse. However, using some workarounds created professional risk for those who used them.

Tension created by the gap between the 'ideal' and the reality at the coalface undermined individuals' ability to feel confident or acquire power, and to know the 'rules of the game'. As a result nurses were uncertain and vulnerable. Organisations reinforced the uncertainty by proliferating rules and policies, by promoting expectations that nurses would solve organisational problems at a local level and by inconsistently turning a blind eye to nurses working around some rules. To deliver care, nurses used workarounds which, because they were non-sanctioned practices, created vulnerability and fear of reprisal. This in turn led to dependence on the willingness of others to protect or defend and therefore a need to build links. Categories of perception, including the dominant view that safety was the same as risk management contributed to the proliferation of rules and policies that made it harder to enact the good nurse characteristics in an 'ideal' way.

Student nurses learned what good nurses 'did' and 'were' in a 'sterile' setting where they had the time and resources to do things 'properly' – to follow ideal practices and rules. This served to reinforce the internalised expectations and understanding of what it 'felt' like to be able to deliver care in an ordered and measured way, following the rules and ideal practices. Ensuring that student nurses had a visceral experience of delivering nursing care in line with organisationally sanctioned policies and practices in a contrived and controlled setting (in an 'ideal' way) served to support the power differential between the healthcare organisation and nurses at the clinical coal face. How things "should" be done, once internalised, was less likely to be questioned, it became

taken for granted as “how it should be”.

When the habitus closely matches the practice expectations of the field in which it has evolved, there is no discord, intuitive and instantaneous responses are smooth. This would be *cohesion without concept* (fish in water) [379]. My findings suggest that the good nurse habitus mostly matched the field of nursing care. However, where this overlapped with the organisation field or the standardisation framework of the patient safety field there was mismatch, and workarounds (coupled with tension) occurred.

In this study, the institutions (organisations, educative bodies and political agenda) emphasised the importance of policies, rules, guidelines and technology to standardise the way care was delivered and how an ‘ideal nurse’ practised. While committed to the ‘ideal nurse’, nurses’ practice at the coalface was not in alignment with the dominant institutional discourse. The organisation proliferated rules and policies, the enactment of which were often suggested to have hindered delivery of care in a way that matched what was taught as ‘ideal’ practice. There were ‘accepted’ norms and structures that reinforced the hierarchy and the sense of one’s place, a sense of what one can and cannot ‘permit oneself’ [163] – a nurse’s place was not to question the rules and policies, which were the sanctioned methods of enacting patient safety. This created tension – the nurses were not powerful enough to change the discourse (and were kept powerless by the propagation of the ‘sacred’ with rules and policies to enforce the ‘sacred’ in the reality of the ‘profane’ – the enactment of the ‘work as imagined’ and ‘work as done’ divide [400]). The use of workarounds was ‘underground’, but they were not random, nor megalomaniacal.

Workarounds were socially sanctioned; the rules about when they could not be used were tacit and negotiated. When the positions of the nurses in the field changed, such as when the frontline clinical nurses moved to educate about or to create or enforce policies, the source of capital and how it was gained changed. Rather than being based on horizontal, collegial relationships, an upward trajectory meant a movement away from the field of nursing and into the institutional field, requiring them, for example, to maintain relationships with the frontline clinicians (to get them to manage with staffing level, patient load, and operational failures) and with upper management by enforcing rules.

Nurses’ feelings of tension were further complicated when the organisation tacitly required nurses to work around, turning a blind eye, unless something went wrong. At times, nurses’ acquiesced to workarounds in response to management’s appeals to the habitus of the good nurse – to

'manage', to fix problems and deliver safe, patient-centred care despite barriers to doing so.

10.7.4 Reflexivity on the power of professional habitus

It had been eighteen years since I had worked as a nurse, yet I experienced, viscerally, anxiety about describing nurses' use of highly visible but non-sanctioned workarounds. As part of my professional habitus as a nurse, I had embodied an understanding of what was 'secret nurses' business'. The visceral unease that I experienced when I was not aligned with the professional nurse habitus, after eighteen years, speaks to the power of that habitus in directing behaviour. That neophyte nurses seemed less concerned than their more seasoned colleagues about revealing workarounds suggests that the embodiment of 'secret nurses' business' as part of the professional habitus occurs over time. As neophyte nurses develop an understanding of what 'secret nurses' business' is, and how it operates, they will be trusted with collaborative workarounds. To be trusted with workarounds reinforces the feelings associated with being accepted as a good nurse.

10.8 Conclusion

This chapter synthesised the three key findings of this thesis and offered an interpretation of these findings using a Bourdieusian framework. In so doing, the thesis offers a theorisation of workarounds. The chapter demonstrated how the thesis answered the research questions to support and add to the empirical literature on nurses' use of workarounds. In the next, and final chapter, I outline the implications, limitations and suggestions for future research that arise from this thesis.

Chapter 11 Conclusion

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This chapter brings the thesis to a close. It discusses the implications of the study findings, proposes potential areas for future research and suggests the limitations of the study.

11.1 Implications of the thesis findings

11.1.1 Implications for policy and technology development, nursing practice and education

This thesis points to the implications and benefits of understanding and building on nurses' professional habitus in relation to workarounds to inform policy and technology development including implementation and education of nurses in acute-care settings. Brown and colleagues (2008) note that:

Bourdieu offers a means of capturing and explicating the less visible practical and material aspects of healthcare. Understanding a professional group's habitus and how to build upon this may make it easier to design effective educational or policy interventions where complex issues such as infection control are concerned.
[318:1054]

The findings of this thesis suggest that a nurse's desire to be a 'good nurse' is a powerful motivator that at times overrides the requirements of policies and technology implemented to standardise nurses' practice. Features of the EMMS that supported nurses being a good nurse, including improved legibility of orders and point of care access to information, were well accepted by nurses in this study. However, characteristics of the EMMS and related policies that blocked any one aspect of being a good nurse potentially led to workarounds. Given the strength of the good nurse habitus to influence practice, patient safety initiatives, including policies and technology, should consider whether and how their design and implementation might impact all the different aspects of being, or being perceived to be, a good nurse. If it does not address those, the initiatives will create tensions and the desire to use workarounds.

Synergy is needed between how nurses are judged to be a good nurse and the implementation of policies, resources and technologies. Technology and policy designed for nurses to use at the clinical coalface need to accommodate nurses' propensity to work around barriers to enacting any of the good nurse characteristics. While likely to consider workflow blocks, such as limited connectivity, and to design systems that take these potential problems into account, system designers should also consider how the system might create barriers to achieving what nurses,

using the system in everyday practice, consider important. System designers need to actively pre-empt physical workflow blocks and less evident blocks to nurses being time efficient, safe, patient-centred and team players. To reduce the number of workarounds, designers and implementers of technology and policy should consult those who use them about how implementation might support or hinder their ability to do a good job.

Identifying points of discord between quality improvement initiatives and what nurses consider to enable them to be good nurses requires a ground-up approach – nurses need to be consulted at the design stage to support the marriage of the goal of the quality improvement strategy with realisation of good nursing practice. Aligning the goal, reason and method of safety strategies with the enactment of good nurse characteristics would likely prove to be effective and to engender fewer workarounds. To illustrate, in the interests of making their patients feel valued and important, nurses memorised patients' details and medications to avoid a formal identity check. Rather than challenge the desire of the good nurse to be patient-centred, by suggesting that he or she is unfamiliar with the patient, the reason for the formal identification check could emphasise the potential created by the EMMS to access hundreds of medication records of patients even in distant wards or units. Therefore, the focus of the formal identity check could be shifted to emphasise the need to check that the nurse has opened the correct eMAR for the patient, rather than that the nurse has correctly identified the patient.

The current approach to patient safety relies heavily on policies as a means of keeping nursing care within the boundaries of safe practice. However, there was a gap between the design of policies away from the clinical coalface, and how they were implemented in the delivery of care, with some dissent in the utility of 'mindlessly' following policy in keeping patients safe. Those at the clinical coalface were overwhelmed with the number of policies and uncertain of which policy was most current. This was coupled with an uncertainty that all policies were effective in ensuring patient safety, and reinforced by the tendency of those who were charged with enforcing adherence to policies to turn a blind eye to workarounds unless something went wrong. Other authors have noted, that for health professionals, in relation to policies, a natural migration to non-compliance is likely [401], with proliferation of rules and policies leading to confusion and deviation [42, 402], and the persistence of workarounds being attributed to the tension between top-down pressures and bottom-up constraints associated with day-to-day operational work [181].

The study findings suggest a need to streamline the number of policies governing nurses' work, for example, to rationalise the number and type of medications requiring medication administration to be double-checked at the bedside. Evidence-based calls for similar changes in paediatric settings have been made previously [359]. Policies should be introduced only if following them is non-negotiable, irrelevant of context. In other instances, policies should be framed as a guideline rather than a directive, with acknowledgement of the possibility of workarounds. The inevitable desire of staff to use workarounds should be acknowledged and strategies put in place to pre-empt workarounds. The 'Traffic Light Model', used to guide antimicrobial prescribing [403], for example, could be used to pre-empt workarounds. 'Green policies' would be those that could be worked around if to do so in a given context would be beneficial, and if strategies have been put in place to counter secondary harms. 'Orange policies' would be those that could be worked around if to do so in a given context would be beneficial but the user must 'proceed with caution', justification and guidance from senior colleagues. Workarounds with 'red policies' would be prohibited.

Where possible, policies should only be implemented on the basis of empirical evidence of their efficacy. If empirical evidence is not available, then the implementation of a new policy should be accompanied by concurrent pre- and post-evaluation of its efficacy against its stated aim. The evidence should be disseminated such that nurses can use the evidence to inform good nursing practice. Student nurses should become well-versed in assessing the evidence for, and questioning the implementation of, potentially unfounded policies.

This thesis illustrated and emphasised that workarounds hide how care was actually delivered. As a result, management were unaware of and unable to correctly measure what was happening in their organisation. The implications of this are, first, that workarounds undermine the integrity of the EMMS and compromise the medication administration history; nothing therefore can be trusted as completely accurate. Second, because they were hidden, when workarounds were used to support teamwork and to deliver efficient, safe and patient-centred care, it appeared as though the quality and safety strategies (e.g. policies and technology) were successful in achieving these goals. The use of workarounds is often exposed publicly only when something goes wrong. Therefore, it appears that adherence to strategies is effective, and that using workarounds leads to harm. In response, more policies are promulgated and adherence to them more powerfully enforced. This in turn could, perversely, lead to more workarounds.

The findings also emphasise the need for on-going training for frontline staff to raise awareness and support identification of workarounds used on their units. Nurses should be supported to identify local workarounds, their causes and implications, and be empowered to offer solutions and make changes to resolve workarounds. Alternatively, if workarounds offer a better way of doing things, processes should be put in place to enable workarounds to be formalised and written into policy and procedures.

In as much as workarounds highlight problems, they provide opportunities to identify areas for improvement [7, 8, 227, 256]. The use of workarounds in this study by some nurses, for example, because they were unfamiliar with how to use the system, underlined the need for on-going education of nursing staff, across shifts, in the use of the EMMS. The findings of this thesis reported workarounds that were implemented to keep patients safe. The interaction of models of nursing care, features of the EMMS, approaches to staffing and access to the EMMS created context-specific threats to patient safety which, in some instances, were managed using workarounds. In other instances, the workarounds that nurses used potentially undermined patient safety. The findings suggest that rather than drive workarounds underground, they should be actively garnered and used to inform change that supports good nursing care. The findings advocate an adjustment of structures and resources that support the enactment of good nurse characteristics without the need for workarounds. Shift times for example could be altered to accommodate periods of heavy workload and to reduce the need to use workarounds to do a good job. At the time of the study, it appeared that one of the busiest times of the day, was from 05:30 – 07:00hrs, at the end of a ten hour shift, when the staff to patient ratio was lower than on any other shift. Across that time period, there were increasing demands on nurses to administer medications, toilet patients, attend to observations, blood sugar levels, weigh patients, take telephone enquiries and prepare patients for early morning tests and appointments. Workarounds were frequently implemented at such times to do a good job given the competing demands.

Tucker and Edmondson (2002) recommended that concepts of health system improvement be incorporated into all levels of nursing education [8]. The findings of the study support that recommendation and, in addition, emphasise that given the inevitability that they will encounter workarounds (and the associated tension and conflict) when transitioning to the clinical coalface, student nurses would benefit from open discussion about the gap between the 'sacred' and the 'profane'. As workarounds both straddle and create gaps in the delivery of safe care [255], lead to other workarounds [119] and at times create unforeseen problems elsewhere in the system [120],

student nurses would benefit from open discussion about the many and complex facets of workarounds – it may be a great workaround, and it may deliver patient-centred care in a time efficient manner, but it may also retard communication or cause delays for other patients or team members.

Workarounds were ubiquitous, that neophyte nurses will be exposed to them, and that they will become part of their habitus, is inevitable. However, nurses in this study spoke of tension and conflict, as they managed the gap between the way they should practice – the ‘ideal’ or the ‘sacred’ – and the reality of doing a good job– the ‘reality’ or the ‘profane’ – as they developed their good nurse habitus. Studies have identified that during the period when they are newly registered, disparity between ideal values and best practice taught at university and those experienced at the clinical coalface is a source of disillusionment, tension and dissatisfaction for neophyte nurses [352, 354, 358, 404, 405]. As a result, neophyte nurses are at risk of leaving nursing during this period [406, 407]. The powerful influence of informal social and professional relationships, expectations and sanctions in this process was highlighted in this thesis. Clinical nurse educators, largely responsible for the transition of neophyte nurses, were often part of the unit and may have had a patient load of their own. Given the role of unit norms in the development of the good nurse habitus, and the acceptability of workarounds, the first year following graduation should include regular confidential sessions for debriefing and on-going education with educators external to the units. Reflexivity has been identified as important to nursing practice and research [387]. Opportunities for nurses to increase their awareness of the role of expectations and habitus, and the interaction with the field and capital on the enactment of practice, would also be helpful.

The suggestions made here are likely to be resisted, as they require a shift in power relations. The findings of this study suggest that safety and danger were not inherent properties of workarounds. This interpretation of the findings is against mainstream thought, which is that when used in healthcare workarounds are axiomatically bad [113]. For Bourdieu, the dominant discourse, or mainstream thought, could be thought of as structures (a dominant patient safety discourse is that policies keep patients safe) that provided boundaries to individuals’ actions or agency (nurses’ practice) within a field (unit or healthcare organisation). The argument supporting the dominant view about workarounds follows: standardisation of practice, enforced by rules, policies, technology and training, support safety, and by virtue of the fact that they undermine standardisation, workarounds must therefore be unsafe. I would contend that one reason

workarounds are thought to be self-evidently 'bad' is because this conventional thought supports current power relations in the field of healthcare and patient safety. Improbable practices were excluded as unthinkable – not even on the agenda. This is important given that what was on the agenda was taken for granted – so the notion that frontline staff could work out what is safe care was not considered. The findings of this study support an alternate, emerging view (a shift from technological optimism to technological realism [408]):

a fifth age of safety, the 'adaptive age'; an age which transcends rather than replaces the other ages of safety, ages which include the dominant safety paradigm that assumes that safety is achieved by establishing safe systems and ensuring that managers and workers work inside the boundaries of those safety systems. [409:27]

Within this paradigm, workarounds can be understood as acts of localised resilience, used by nurses to construct safety at the clinical coalface [258, 259, 410]. However, given the current approach to patient safety, changes will be difficult to implement.

11.1.2 Directions for future research

This study identified that all nurses followed some policies, and that steps of particular policies were more likely to be followed than others. Further research is needed to deconstruct the factors underlying compliance with policies when executing some steps of the process and not others.

The findings of this study call for more research to demonstrate the direct link between patient safety initiatives such as EMMS, policy implementation and the specific goals they were designed to achieve. That is, to establish an evidence base for the efficacy of the policies and technology implemented to regulate practice.

There is a need for research to measure the impact of workarounds on patient outcomes. This will be a difficult task. Workarounds, as articulation work [114, 411, 412], remain largely hidden and difficult to measure. They support and enable other work to be completed, but their contribution to that work is difficult to capture. The tendency of workarounds to impact other parts of the system, often unpredictably, also makes it difficult to measure the impact of individual workarounds. However, it is important to do so. Given that workarounds can both support and undermine patient safety, future research should focus on identifying current workarounds and, having done so, refine and co-design them as teams – including healthcare professionals, patients and their carers to reduce the risk of negative outcomes and maximise their beneficial

effects.

The findings suggest that there is not a shared understanding of the term 'workaround'. While those in management, the policy makers, technology designers and implantation staff, researchers and the literature were aware of the term workaround, and what it meant, some nurses were not. Given that nurses may be reprimanded for using workarounds, it is important that there is a shared understanding of what the term means. Further research is needed to examine how nurses define workarounds and to establish whether nurses' definitions of workarounds are in alignment with those of management and policy makers.

In some units in this study processes had been implemented that precluded the use of workarounds when administering medications requiring a witness. Research investigating whether these processes reduced medication error would be useful in informing the development of quality improvement strategies.

Like other studies, my study findings identify that nurses engage in strategies in addition to, or in lieu of, following the '5 Rights of medication administration', for the purpose of medication safety [231]. Nurses, for example, used a variety of strategies to work around the formal identification check. Nurses' scanning patterns and behaviours during patient identification check have been linked with their likelihood of detecting patient identification errors [413]. However, further research is needed to examine the impact of using workarounds to check patients' identity – versus a complete and formal check, or no check at all – on medication error.

Evidence on the effect of double-checking when administering medications neither refutes nor supports the benefits in reducing medication errors [414]. Given the cost of double-checking medications, for the individual and team, and the link with workarounds identified in this study, evidence is needed for the efficacy of double-checking in preventing medication errors when using EMMS.

The study findings point to a relationship between the features of the EMMS and the model of nursing care on nurses' use of workarounds in light of the good nurse. Further studies focusing on the relationship between models of nursing care and EMMS features on nurses' use of workarounds would deepen our understanding of the contextual issues that influence the use of workarounds.

While nurses in this study used workarounds to avoid being interrupted by patients and their

visitors, doing so often put them in a position of being more likely to be interrupted by colleagues. Further research is needed to examine the effect of colleague interruptions versus patient interruptions on medication error.

11.2 Limitations

The complexity of social reality, coupled with limited resources and time necessitate trade-offs and inevitable limitations in the design and execution of this research [329]. A potential limitation of mapping the context, during observation, using elements determined *a priori* was that other relevant, but previously unconsidered, contextual elements may go unnoticed. This concern was balanced against the importance of facilitating the capture of possible contextual effects. To assuage the effects of preconceived bias and to remain open to emerging data, I remained reflexive, and consciously examined the influence of beliefs and tacit knowledge on the process of identification and analysis of observation and interview data. I also engaged in regular debriefing with my research supervisors.

A potential Hawthorne effect, demonstrated with some observational studies of nurses' compliance with interventions [e.g. 415] was a potential limitation of this study. Prolonged engagement in the field provided opportunity for nurses to adjust to my presence and to reduce the potential for sustained efforts to present a different image [416].

Being limited to observation of visible behaviour precluded me from identifying surreptitious behaviours that may have complied rather than worked around policies. Ways of formally checking an identification band, for example, may have been hidden from my view (e.g. taking the patient's pulse and checking the band at the same time). Given that nurses' report that repeated checking when familiar with a patient undermines patient confidence in their focus and depersonalises care, it was likely that some identification checks were undertaken using surreptitious methods. However, while no participant reported using surreptitious methods, many reported using workarounds to check patient identification. On some occasions, when the medication room was too crowded, I stood outside and looked through the glass windows or door – while I was still able to capture the nursing activities, I was not able to hear the communication.

The strength of *in situ* studies of behaviour is their capacity to take into account the effects of context on that behaviour [14]. However, the trade-off is that there are limits to the generalisability of findings to other settings. In studies of everyday use of technology in delivery of care, it is

important to examine the specifics of use across contexts to enhance generalisability [417]. This study sampled from six units, two hospitals, across all shifts and days, using two different types of EMMS, staffing approaches and nursing models of care to maximise variation and applicability of the findings across contexts.

There were limitations imposed by the PhD process. As with other studies [235], I was the only data collector, requiring that I was vigilant and conscious of the impact of my preconceptions and assumptions. I was only able to gather observational data on the study units. While there is no reason to think that other units would be very different, further studies would be useful to tease out differences between workarounds. This study did not audit or categorise workarounds. The study sampled for variation rather than to sample for every possible workaround. It is quite possible that there were different and more nuanced workarounds that were not captured in this study. Future quantitative studies could audit and categorise the workarounds nurses used by model of nursing care and type of EMMS.

11.3 Conclusion

This study suggests that the drive to be, or to appear to be, a good nurse is a powerful motivator for workplace behaviour, even to the point of taking professional risks, within specific, collectively determined, transmitted and enforced parameters. While technological issues contributed to the perceived need for workarounds, this thesis found that the rationale for the use of workarounds can be ascribed to a previously under examined factor – the drive to be, or to appear to be, a good nurse. What a good nurse is, and how it is manifest, was shaped by social expectations and individuals' experiences. It was influenced by, and in turn influenced, unit culture.

These findings have implications for other professions. When technology, policies or structures are introduced that hinder people from being, or appearing to be, good at their job, they are likely to work around those hindrances. They will weigh up – individually and collectively – whether using a workaround in a particular context supports or undermines their professional habitus, and modify their actions accordingly. It is important, then, to understand how people construct what it means to be good in their job, and how that conceptualisation shapes workplace practice.

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Appendices

Appendix 1: Published literature review paper

Debono et al. *BMC Health Services Research* 2013, **13**:175
<http://www.biomedcentral.com/1472-6963/13/175>



RESEARCH ARTICLE

Open Access

Nurses' workarounds in acute healthcare settings: a scoping review

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Abstract

Background: Workarounds circumvent or temporarily 'fix' perceived workflow hindrances to meet a goal or to achieve it more readily. Behaviours fitting the definition of workarounds often include violations, deviations, problem solving, improvisations, procedural failures and shortcuts. Clinicians implement workarounds in response to the complexity of delivering patient care. One imperative to understand workarounds lies in their influence on patient safety. This paper assesses the peer reviewed empirical evidence available on the use, proliferation, conceptualisation, rationalisation and perceived impact of nurses' use of workarounds in acute care settings.

Methods: A literature assessment was undertaken in 2011–2012. Snowballing technique, reference tracking, and a systematic search of twelve academic databases were conducted to identify peer reviewed published studies in acute care settings examining nurses' workarounds. Selection criteria were applied across three phases. 58 studies were included in the final analysis and synthesis. Using an analytic frame, these studies were interrogated for: workarounds implemented in acute care settings by nurses; factors contributing to the development and proliferation of workarounds; the perceived impact of workarounds; and empirical evidence of nurses' conceptualisation and rationalisation of workarounds.

Results: The majority of studies examining nurses' workarounds have been published since 2008, predominantly in the United States. Studies conducted across a variety of acute care settings use diverse data collection methods. Nurses' workarounds, primarily perceived negatively, are both individually and collectively enacted. Organisational, work process, patient-related, individual, social and professional factors contribute to the proliferation of workarounds. Group norms, local and organisational culture, 'being competent', and collegiality influence the implementation of workarounds.

Conclusion: Workarounds enable, yet potentially compromise, the execution of patient care. In some contexts such improvisations may be deemed necessary to the successful implementation of quality care, in others they are counterproductive. Workarounds have individual and cooperative characteristics. Few studies examine nurses' individual and collective conceptualisation and rationalisation of workarounds or measure their impact. The importance of displaying competency (image management), collegiality and organisational and cultural norms play a role in nurses' use of workarounds.

Keywords: Workaround, Violation, Deviation, Short cut, First order problem solving, Patient safety, Procedural failure

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Background

Workaround behaviours are those that circumvent or temporarily 'fix' an evident or perceived workflow block. Workplace workarounds are used to: solve problems [1,2]; sidestep 'problematic' rules [3]; bypass workflow blocks created by safety mechanisms [4]; address poor workflow design [5] and organisational and system issues [3]; save time [6]; backup software data applications [7]; compensate for inadequate technology [8,9]; patch software glitches [10]; or offer solutions to a range of problems including shortcomings in staffing, equipment and supplies [11]. Workarounds are claimed to increase when the complexity of the task is incompatible with the degree of structure imposed by the system [12,13] and when users feel 'controlled' by the system [14], with end user resistance contributing to their implementation [15].

Views about workarounds tend to polarise. On the one hand, negative conceptualisations report workarounds as a subset of errors, shortcuts, deviations and violations [3,16]. Terms such as improvisations [10,17] and innovations [18] offer more positive notions of workarounds. There is a paucity of clear and uniform definitions of these related constructs [3,16]. The definition of workarounds developed for this review has two components. *Workarounds are observed or described behaviours that may differ from organisationally prescribed or intended procedures. They circumvent or temporarily 'fix' an evident or perceived workflow hindrance in order to meet a goal or to achieve it more readily.*

Healthcare is a high-hazard industry in which workers have the potential to kill or maim [19,85]. More than most other industries, healthcare is complex, fragmented, decentralised and unevenly regulated [19] with clinicians required to learn on the job at the same time as they are required to display professional autonomy. Healthcare is characterised simultaneously by routine, highly organised and ultra safe practices (e.g. blood product protocols) and unpredictable, erratic hazardous demand. It is comprised of both long-term patient-clinician relationships (e.g. chronic disease) and acute, fleeting interactions (e.g. outpatient and emergency department episodes) [20]. These features of healthcare shape the way people work, behave and respond to the demands of clinical practice. Rules, policies and technologies seek to standardise clinicians' practice. Clinicians seem to implement workarounds as a way of responding to the complexity of care within a system that increasingly demands standardisation. Although nurses are touted the masters of workarounds [21] the empirical literature focusing on them has been slow to flourish [16]. Nurses comprise the majority of the healthcare workforce. Therefore while acknowledging the corpus of literature on workarounds in other industries [22], this study focuses on nurses' behavioural workarounds in acute healthcare organisations.

One imperative to understand workarounds in healthcare lies in their influence on safe care. Workarounds can both subvert and augment patient safety. In circumventing safety blocks [4], masking deficiencies [23,24], and undermining standardisation [25], they potentially jeopardise care to patients. Conversely, workarounds operate as localised acts of resilience [26,27], are at times crucial to the delivery of services [4], operate as adaptations to inefficiencies [20] and provide opportunities for improvement [28].

To enervate the negative and harness the positive potential of workarounds in healthcare, we must firstly understand the factors that influence their implementation and proliferation and the role of local and organisational culture in shaping them. This premise underpins this review, the purpose of which is: to assess the peer reviewed empirical evidence available on the use, proliferation and perceived impact of workarounds by nurses in acute care settings; and to examine how they are conceptualised and rationalised by those who use them.

Given the significance of the topic and the increase in publications in this area since 2008, it is timely to review the literature on workarounds. A 2008 review of workarounds in healthcare settings concluded that because there are so few studies that have empirically studied work-arounds "it was not possible to produce a typical quantitative review of the literature" [16:3]. A 2009 review of the empirical literature examining a construct overlapping with workarounds, rule violations in work settings, identified that this too is an area requiring further work [3]. Since the publication of these literature reviews significantly more work has been published in this area (Table 1).

Method

Scope

While our paper narrows the focus of Halbesleben et al's 2008 review [16] to workaround behaviours of nurses, it also broadens the enquiry to examine literature from a wider range of disciplines including Safety Science and Sociology. It also includes a greater variety of search terms to capture empirical literature on behavioural workarounds used by nurses. We differentiate from the work by Alper and Karsh [3], by narrowing the focus to nurses' behavioural workarounds (including situational violations). Our study builds on both reviews by also

Table 1 Scopus search using search term (workaround* OR work-around) [accessed 5th March 2012]

Year	Number of references identified in Scopus
2008-2012 (<4 years)	517
2000-2007 (7 years)	429
1961-1999 (38 years)	251

examining nurses' collective and individual conceptualisation and rationalisation of workarounds. These criteria allow for a more detailed and nuanced examination of workarounds.

Scoping methodology offers an opportunity to develop an understanding of multiple perspectives on a single issue [29]. We adopted a similar approach used in other studies [30] and diverged from the methodology described by Levac and colleagues [31] by excluding the final step of a six step framework, stakeholder consultation, which was not relevant for this study. We conducted a scoping review for several reasons. Workarounds are not yet a clearly indexed concept in academic literature databases. A systematic review involves a clearly defined topic and question. The examination of workarounds and safety violations is a pluralistic and expanding area informed by methodologically diverse research. The findings of these disparate methods do not easily lend themselves to traditional systematic reviews and meta-analyses [32]. The scoping method involves review, analysis and synthesis of a broad scope of

literature. Unlike systematic reviews, scoping studies do not assess the quality of studies [31] and as they require the literature to be analytically reinterpreted they differ from narrative literature reviews as well [31]. This method is appropriate given the complexity of the area and the aim, which is to build a comprehensive picture of workarounds, rather than to weigh up the levels of evidence in relation to a specific question. The process is outlined in Figure 1.

Search strategy

A multi-method search strategy was employed. The snowball method and reference tracking were used in conjunction with a systematic search of academic databases. The snowball method included checking references of relevant papers, serendipitously identified references, alerts and citation tracking. Studies identified in this manner up until 30th May 2012 were included for analysis.

Academic literature databases, initial search terms, limiters, inclusion and exclusion criteria were determined a

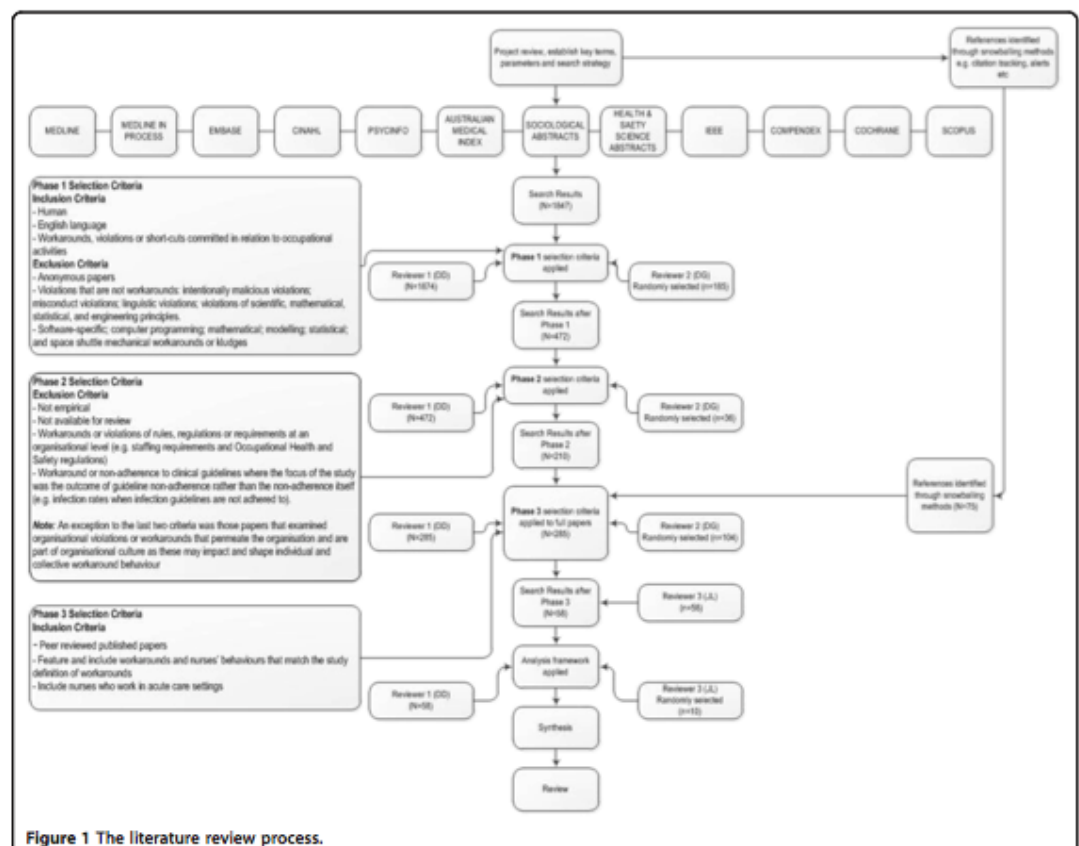


Figure 1 The literature review process.

priori utilising brainstorming and mind mapping techniques. An iterative process was then employed involving a preliminary review of key references and discussion with experts in literature searching techniques to hone search strategies and terms. References in articles that met the selection criteria were then searched as a way of identifying seminal articles and then tracking papers that had cited these references [3]. Key words, controlled and uncontrolled index terms in relevant references identified discipline-specific search terms were used. Consultation with a specialist university research librarian in August 2011 confirmed the search strategy and provided expertise and advice. The academic literature databases searched included: Medline; Medline in Process; Embase; Cinahl; PsycInfo; Australian Medical Index; Sociological Abstracts; Health and Safety Science; IEEE; Compendex; Cochrane Database of Systematic Review; and Scopus. All databases were interrogated using the search terms *workaround*/work-around*/work around**; and *Violation* + Safety + Rule*/Policy*. In addition, Medline; Medline in Process; Embase; Cinahl; PsycInfo; Australian Medical Index; Sociological Abstracts; Health and Safety Science data bases were searched using the search terms: *short-cut*/shortcut*/violation**; *problem-solving*; *temporary fix**; *informal practice**; *informal interaction**; *creative solution**; *deviation**; and *procedural error** cross-tabulated with *nurs**.

Search terms were subjected to standardised procedures. Truncation of the search term allowed for the search of plurals and other suffixes. Enclosing the search term within quotation marks restricted the search to the exact phrase. Limiters "human" and "English language", "NOT prison OR parole" were used when available.

Following the removal of duplicate and non-English references 1847 references remained. References were examined against the selection criteria as outlined following.

Selection criteria

Selection criteria were developed both a priori and through an iterative process that involved examination of the references and discussion between two authors (DD and DG) across three phases. At each phase, the selection criteria were refined to capture only those studies relevant to the review objective (Figure 1). Post hoc development of selection criteria is an integral part of the scoping review process [30]. In Phase 1 the selection criteria were broad to include papers examining workarounds, violations or short-cuts committed in relation to occupational activities. Additionally, the selection criteria were designed to screen out papers examining violations that are not workarounds: intentionally malicious violations (e.g. physical, sexual and human rights violations); misconduct violations (e.g. sporting, contract, copyright, privacy and parole violations); linguistic violations; violations of scientific, mathematical, statistical and engineering principles.

We excluded papers examining: software-specific; computer programming; mathematical; modelling; statistical; and space shuttle mechanical workarounds or kludges. We also excluded papers at this phase that were not written in English.

The purpose of Phase 2 was to further exclude papers if they met additional screening criteria. That is, papers that examined: workarounds or violations of rules, regulations or requirements at an organisational level (e.g. staffing requirements and occupational health and safety regulations); and workarounds or non-adherence to clinical guidelines where the focus of the study was the outcome of guideline non-adherence rather than the non-adherence itself (e.g. infection rates when infection guidelines are not adhered to). An exception to these criteria was those papers that examined organisational violations or workarounds that permeate the organisation and are part of organisational culture. These were included as they may impact and shape individual and collective workaround behaviour.

Following application of selection criteria in Phases 1 and 2, there were 210 references identified through academic database searches remaining. In addition, 75 references had been identified as relevant at face value via snowballing. The Phase 3 selection criteria were applied to these 285 references. Full papers were scrutinised and included if they met the following criteria: peer reviewed published papers; featured and included workarounds and nurses' behaviours that matched our definition of workarounds; and involved nurses who worked in acute care settings. We adopted a conservative approach, including rather than excluding studies. There remained 44 papers identified through academic database searching and 14 identified through the snowball technique that were eligible for inclusion in the review. Two authors (DD and JL) independently examined the 58 remaining papers against the selection criteria and were in agreement regarding their inclusion.

Analysis and synthesis

An analytic frame reflecting the objective of the study was developed by two of the authors (DD and DG) (see below). The first author (DD) used the analytic frame to interrogate all of the papers that met the selection criteria (N=58). Using a random number generator, 10 of the included studies were selected. A second author (JL) interrogated these 10 studies (17%) independently using the analysis framework. The two authors (DD and JL) compared their findings. The authors were in agreement on the extracted data. The findings are organised into categories based on the analysis framework [33]: workarounds implemented in acute care settings by nurses; factors contributing to the development and proliferation of workarounds; the perceived impact of

workarounds; and empirical evidence of nurses' conceptualisation and rationalisation of workarounds.

Analytic frame

- Citation
- Year of publication
- Year study was conducted
- Country of study
- Study setting
- Study objective
- Participants
- Methods
- Main findings and conclusions in relation to workarounds
- Technology involved (yes, no, type)
- Definition of workarounds
- Workarounds implemented
- Development and proliferation of workarounds
- Perceived impact of workarounds
- Conceptualisation and rationalisation of workarounds

Results

Key study features

Just over half of the studies reviewed (59%) were published between 2008–2012, with the mode being 2009

(n=9). Empirical evidence on workarounds arises predominantly from studies conducted in acute care settings in the United States of America (USA) (n=29). The United Kingdom (UK) (n=8) [34–41], Australia (n=5) [42–46], The Netherlands (n=5) [47–51], Canada (n=3) [52–54], Japan (n=1) [55], Lebanon (n=1) [56] and Thailand (n=1) [57] also hosted studies examining workarounds. Additionally, four studies were conducted in both Canada and the USA [1,24,58,59] (Table 2).

Study settings comprised hospitals that provided general medical, specialised paediatric and psychiatric services [60], and a variety of wards including, but not limited to: intensive care [1,4,35,58,59,61–66], medical and surgical [1,4,35,45,46,58,59,62,64,66–70], oncology [1,50,58,59,62,64,65], maternity [1,58,59,62,66,67,71], cardiac units [1,45,50,58,59], operating theatre units [38,52,62,72], emergency and trauma departments [35,57,58,62,73–75], outpatient clinics [76] and paediatrics [1,35,40,53,54,58–60,63–66,71]. These wards were identified in academic [48,49,58,64,71,75,77,78] and non-academic [58,61,72], community [1,58,59,61,62,72,79], tertiary [45,58,64] and teaching hospitals [1,40,46,52–54,59,79], in urban [1,45,53,58,59,64,69] and rural [1,43,44,58,59,61] settings (Table 2). Our examination focused on nurses' workarounds but a number of studies also incorporated other professional groups including doctors [4,34,37,39,48–50,53,54,56,72–76,80–82],

Table 2 Country and setting in reviewed studies

Country of study	Study setting
United States of America	[4, 6, 60, 61, 62*, 63, 64, 65*, 67, 68, 69*, 70–73, 74*, 75, 76, 77*, 78–81, 82*, 83–87]
Not specified	[66]
United Kingdom	[34–41]
Australia	[42–46]
The Netherlands	[47–51]
Canada	[52–54]
Canada and United States	[1, 24*, 58, 59*]
Japan	[55]
Lebanon	[56*]
Thailand	[57]
	Intensive Care Units [4,35,40,58,59,61–66]
	Medical and surgical Units [1,4,34,35,40,45,46,48,58,59,62,64,66–70]
	Oncology Units [1,34,41,50,58,59,62,64,65,84]
	Maternity Units [1,58,59,62,66,67,71]
	Cardiovascular Units [1,34,40,45,50,53,58,59,66]
	Operating Theatre [38,52,62,72,77]
	Emergency and trauma Units [35,57,58,62,73–75]
	Psychiatry Units [66]
	Long term care Units [6,84]
	Neurology Units [46,51,78]
	Pediatrics [35,40,53,54,58,59,63–66,71,77]
	Other [40,46,51]
	Veteran Affairs Medical Centers/Hospitals [6,76,80,81,84]
	Community Hospitals [1,58,59,62,72,79]
	Tertiary Hospitals [58,64,67]
	Teaching/University/Academic Hospitals [1,34,46,48,49,52–54,56,58,59,64,67, 68,71,75,77–79,82,84]
	Non Academic/Non Teaching Hospitals [34,40,58,72]

* Authors contacted.

pharmacists [4,34,35,48,50,56,70,80,81,83,84], information technology staff [4,56,80,81,84] and other hospital employees [60,72,75,78,79,81].

While some studies used a single data collection method (n=21), this review has identified that the majority of studies investigating this topic have engaged a multi method approach (n=37) (Table 3). A combination of interview and observation was the most frequently used multi method combination. An unusual method of data collection recorded nurses' talk about what they were doing and thinking as they were administering medication [67].

The term 'workaround' was defined in less than 30% (n=17) of the studies reviewed [4,34,48-50,54,56,60, 61,63,67,71,72,74,77,79,82]. Definitions of workarounds predominantly articulated intent to achieve an outcome through handling failures and exceptions in workflow [48,72,74] or by bypassing formal rules, protocols, standards or procedural codes [4,49,50,54,56,61,67]. Negative and positive views of workarounds were evident in the wording of several definitions. Positive aspects of workarounds include benefits for patients [67], increased efficiency for nurses [67] and a way for nurses to avoid

harmful or unrealistic expectations [71]. Other definitions of workarounds convey a negative message with workarounds described as non-compliant [56], at risk, unsafe behaviours [79]. Definitions in two of the studies intimate the simultaneous negative and positive characteristic of workarounds [50,60]. Of those studies that defined workarounds, almost three quarters (71%) were published between 2009-2012.

We included seven studies [39,40,43,44,55,64,65] that offered definitions for violations because the definition incorporated elements common to the definition of a workaround or the described behaviours aligned with the definition of a workaround. For example, violations as *necessary* deviations such as *having* to break protocol (authors' emphasis) [64] or shortcuts [43]. Violations were employed as a way of working around rules, regulations, policies, procedures and recommendations. Definitions of violations offered in two of the seven studies specified that violations were not intended to harm [40,43]. In other studies, definitions offered for first order problem solving and deviations matched our definition of workarounds [24,58,59,73]. In this paper we use the term workaround to refer to behaviours that

Table 3 Data collection methods in reviewed studies

Method	Studies
Discrete Method	
Observations	[62,73]
Interviews	[36,52,80,81]
Focus group interviews	[69,86]
Questionnaire surveys	[37,39,43,44,55,60,63-65,79,83,87]
Information system data analysis	[77]
Multi-method	
Interview and observation	[1, 6*, 34, 40, 41, 45, 53, 54, 56, 58, 59, 61, 66, 68, 72, 74, 75, 76*, 82, 84*]
Interview and document analysis including medication chart review	[48,51]
Interview, observation and document analysis (may include medication chart review)	[38,42,50]
Interview, observation, focus group, survey and time and motion studies	[78]
Analysis of information system data and observation	[70]
Analysis of information system data, observation and interview	[4]
Observation, clinical intervention data and medication chart review	[35]
Observation and medication chart review	[46]
Interview and collection of data from support desk and information system data	[85]
Questionnaire surveys, observations, interviews and Computer Provider Order Entry (CPOE) website review	[71]
Questionnaire surveys and observation and focus groups	[57]
Questionnaire surveys and interviews	[49]
Questionnaire surveys, interviews, process mapping, information system data and document analysis	[47]
Observation and journal narration	[24]
Self-recording by nurses as they gave medication and interviews	[67]

*Observational studies that noted inclusion of 'complementary' and 'opportunistic' interviews.

match the definition in this study (e.g. first order problem solving).

Workarounds implemented by nurses

Papers were examined for examples of behaviours that matched our operational definition of workarounds. The majority of studies offered exemplars of workarounds ($n=46$). However, some did not detail workaround practices [1,38,43,47,55,60,62-64,73,83]. While in most studies examples of behaviour were clearly workarounds, there were some studies in which it was more difficult to determine and for these it was necessary to consult the offered causes of the behaviour to determine whether it could be defined as a workaround. For example, we defined the practice of not checking the identification (ID) band as a workaround when a suggested barrier to accomplishing the goal of administering the medication is the time taken to check the ID band [46]. One study examined nurses working around the need to report errors by redefining errors [42].

Workaround categories

Nurses' workarounds in acute care settings have been studied predominantly in relation to technology including barcode medication administration (BCMA) features [4,6,34,51,63,65,67,68,70,84,85], Computer Provider Order Entry (CPOE) [47-50,71,82], electronic health record (EHR) [53,54,76,80,81], smart pumps for intravenous infusion [77,86], equipment [69], test ordering [75] and pharmacy dispensing [56]. Workaround behaviours have also been examined as a response to: operational failures; time pressures; and perceived workflow restraints [1,24,58,59,61,62,72,74,78]; expectations [44,58,59,72]; and rules (formal and cultural), policies, guidelines and regulations [36-40,42-44,46,52,55-57,64-67,73,83,87]. We grouped these into three categories: technology; operational failures and work restraints; and policies, rules and regulations. Workarounds within these categories fall into two broad groups, those that are enacted individually and those that are enacted collaboratively. Many studies portrayed participant involvement that was both collaborative and individual and described workaround behaviours that fell into more than one category. To illustrate, scanning a patient barcode on a sticker rather than on the patient's armband is an individually enacted workaround in response to technology and policy requirements [4].

The majority of described individually enacted workarounds involve responses to technology and policy particularly in relation to medication administration. Examples of collectively and individually enacted workarounds are provided in Table 4.

Factors contributing to the development and proliferation of workarounds

We examined the studies for factors identified as leading to the development of workarounds. We also sought evidence for those factors that encourage or enable established workarounds to continue, for example, nurses sharing or teaching workarounds to junior staff [53,69].

Workarounds develop in response to factors that are perceived to prevent or undermine nurses' care for their patients or are not considered in the best interest of their patients, make performance of their job difficult, or potentially threaten professional relationships. These factors can be categorised as organisational, work process, patient, individual clinician and relational/professional factors.

Organisational factors

Staffing levels, the need to manage heavy and fluctuating workloads (working in crisis mode) [78] and productivity pressures were commonly offered organisational causes of workaround behaviours [4,24,42-44,51,52,58,59,62,78,83,87]. In addition negative organisational climate characterised by poor leadership, a lack of involvement of nurses in decision-making, few opportunities for professional development and a lack of perceived human management resources and support contributed to the development of workaround behaviours [4,43,58,60,66]. Other factors include organisational expectations that clinicians multitask [52], a lack of role clarity [4,52], ambiguity [62], organisational processes that have not been re-engineered to fit with the implementation of technology [48,71], the low status of nurses [24] and organisational guidelines and group norms that prevent visible and formal expression of emotion about patients [75].

Work process factors

An array of work process factors giving rise to workaround behaviours were identified in the studies reviewed. The mismatch between introduced technology or policies and current workflow was one of the most common causes of workaround behaviours [4,6,34,42,47-51,53,54,56,61,63,68-71,76-78,80-82,84-86]. Operational failures including resource issues, equipment not stocked properly, documentation not completed, missing information and medications and environmental factors [1,4,35,44,57-59,61,69,72,78,85] were also typical precursors to workaround behaviours. Similarly, heavy workloads, time constraints or attempts to increase efficiency led to workaround behaviours [4,6,24,45,49,51,57-59,67,69,76,80-84]. Workaround behaviours were also attributed to the complexity and dynamic conditions of clinical work [72,74,80,81], including interruptions [61,68,83,84], emergencies [44,50,52,57,61,64,67,71] and the lack of availability of doctors to provide information [44,48,61,66]. Studies identified that in situations there

Table 4 Illustrative examples of workarounds

Factors	Studies that provided examples of individually enacted workarounds	Illustrative examples of individually enacted workarounds	Studies that provided examples of collaboratively enacted workarounds	Illustrative example of a collaborative enacted workaround
Technology, Characteristics of the technology that impose workflow blocks/delays	[4,6,34,48,49,51,53,54,63, 68-71,76,77,80-82,84-86]	<ul style="list-style-type: none"> In a study examining nurses use of BCMA, nurses were observed to "batch" and pre-pour medications which involves scanning medications and multiple ID bands for multiple patients before commencing medication administration [6] In a study examining the use of a CPOE system, dead zones caused the computers to freeze so the nurses used paper lists of pertinent patient information, surgery lists, whiteboards, and other computers to enhance communication and ensure that timely care was given [71] In a study examining the side effects of BCMA introduction, nurses were observed to workaround scanning wristbands on patients by typing in the 7-digit number because it took less time than wheeling the medication cart into the patient's room, the patient was isolated, did not have a band on, or the wristband barcode did not scan reliably [84] 	[4,6,48-50,53,54,56, 68,69,71,76,80-82]	<ul style="list-style-type: none"> A study examining use of a CPRS identified a paper-based workaround in which doctors write orders on paper and get the nurses to input them in the CPRS and the doctor signs the nurse-entered orders later [80] There were several workarounds described in a study that compared a paper-based and electronic prescribing system. For example, in the CPOE there was a similarity between the Start and Stop orders which nurses worked around by using a STOP stamp on the paper chart to indicate that the medication should be stopped. Another workaround involved nurses writing new times for administration on the paper Kardex but not entering these new times in the CPOE because nurses were blocked from making changes to orders in the system [50]
Operational failures, exceptions and work restraints, Issues that make it difficult to complete the task: resource and equipment issues; time; illegibility; too much or not enough information; knowledge; others' actions	[24,35,36,40,44,48,49,57, 59,61,65,66,69,76,78,80, 81,84,85]	<ul style="list-style-type: none"> A study examining the universal precaution practices of nurses in an ED, offers several examples of workarounds including nurses re-sheathing needles to workaround the distance to the disposal container and to facilitate dislodging needles from syringes; not wearing gloves to workaround the perceived greater risk of needle stick injury if the gloves were the wrong size [57] In examining the relationship between work constraints imposed on nurses and patient falls, nurses were identified to multi task, keeping mental track of where they are up to in their list of tasks (cognitive head data). To work around the constraints of too much cognitive head data, nurses use written and mental chunking schemas (e.g. visual reminders and chunking groups of tasks) [78] 	[24,42,48,49,59,61,67, 69,72,74,76,78,80,81]	<ul style="list-style-type: none"> A study examining rework and workarounds in hospital medication administration processes reported that when nurses were unable to understand a medication order, they worked around this barrier by asking other nurses', clerks', pharmacists' opinions or make a decision without calling the physician because they did not want to bother or feared repercussions from bothering the physician [61] A study of the relationship between nurses' work constraints and patient falls identified that nurses workaround the constraints imposed by a lack of formal handover between registered nurses and assistant nurses by informal querying of the previous care nurse about fall status and use of visual cues e.g. stickers [78]

Table 4 Illustrative examples of workarounds (Continued)

Rules/policies/guidelines/regulations, Formal rules, policies, guidelines, regulations regarding delivery of care	[4,34-36,40,41,44-46,48,49,57,61,65,66,68-71,79,82,84,85,87]	<ul style="list-style-type: none"> • A study assessing the impact of a CPOE system noted that when physicians had not yet entered medication orders in the system, nurses worked around the delay by beginning medication work based on the notes they took during medical rounds [49] • A study examining baby feeding practices by midwives in 2 UK hospitals, identified that while feeding breast fed babies a bottle of artificial milk was not evidence-based practice and against policy, midwives secretly gave bottles of artificial milk at night, working around espoused policy requirements by calling it a 'special' cup feed (a cup feed being acceptable to policy) [36] 	[4,6,42,48-50,52,56,67, 68,71,75,80,81,84]	<ul style="list-style-type: none"> • The clinicians work around the policy that requires completion of an authorisation form for a restricted antibiotic to be dispensed [56] • Collaboration is needed to work around error reporting by redefining the error. For example, a nurse may be given the medication chart from the day before to fix because she/he forgot to record it on their last shift [42]
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Legend: BCMA (barcode medication administration); CPOE (Computer Physician Order Entry); CPRS (Computerized Patient Record System); ED (Emergency Department).

were conflicting goals [84], or where nurses perceived particular requirements as less important, appropriate, useful or necessary, they were more likely to work around them [6,36,45,57,65,87]. To illustrate, in studies comparing medication administration workarounds across wards, not checking patient identification [64] and scanning a 'surrogate' wristband, which is not on a patient [6] were found to be more common in long-term care wards suggesting that the imperative to check patient identification was less because the nurses were familiar with the patients [6,64].

Patient related factors

One of the most frequently identified motives for implementing workarounds was the need to ensure that patients received care in a timely manner [4,44,45,49,61, 67,82,84,85]. Other justifications included a perception that rules and policies are not always in the best interest of the patient [36,42,66], the importance of customising care to the need of patients [4,6,42,72,84], patient isolation [4,68,84] and unavailability [6,34] and concern about the impact of adhering to policy on patients' perceptions (e.g. wearing gowns, gloves and masks [57] and repeatedly checking patient identification [41]).

Individual clinician factors

Causes of workarounds located with the individual were presented by some studies. These included fatigue [79,83], cognitive load [48,78,80,81], unfamiliarity with the technology or its safety features, or a perception that they are not critical or efficient [4,80,81]. In some cases nurses unknowingly use workarounds when they are unaware of hospital policies [4]. Nurses are more likely to work around rules if they do not know the content or meaning of the rule or policy [45,55], they believe they are unnecessary [57], they do not approve of them [36] or if following a rule was perceived to carry more risk than not [57].

Workarounds in relation to a new electronic system were attributed to individual's preferred sensory input or motor activity for a task: continued use of paper provided something to 'hear' (hearing the paper drop into the basket); something easy to manipulate (hand held notes); and something to 'deliver' [80,81]. Seniority [42,53], maturity [51] and intention to turnover [60] were linked with workaround behaviours. Psychological gratification and a heroic attitude about their ability and competence to creatively and persistently solve problems and care for their patients without having to depend on a colleague's help, causes many nurses to workaround rather than employ second order problem solving [24]. Laziness offered by a participant is reported in one study as a contributor to circumventing a protocol [41]. However, evidence from the reviewed studies suggests that

workaround behaviours reflect nurses' attempts to deliver patient centred care when workflow processes make that difficult [48,49] and that they are more likely to bend the rules if distressed and when morale is low [43]. In their study examining nurses' use of first order problem solving Tucker and Edmondson (2003) draw on observational data to specify that it is "not because nurses are uncommitted, lazy, or incompetent" [59:63]. Nurses are more likely to engage in second order problem solving (less likely to rely on workarounds) when they are motivated and feel psychologically safe to do so [58].

Social and professional factors

Evidence offered by some studies suggests that workaround behaviours are influenced by relational factors. To illustrate, evaluation of the impact of CPOE on nurse-physician communication identified that whether or not nurses informally acted on verbal orders before they were entered in the CPOE was dependent on their professional relationship and trust in the physician [49]. Workarounds, described as 'situated' practices [48,56], are enabled by collaboration and a belief that the rules are negotiable [42,56,66].

Workarounds were used because of poor communication or to enhance communication and coordination of interrelated tasks between co-working professionals [48,72,78,81,83], to avoid possible or actual inter professional confrontation [44,58,59,61], or because of inter professional etiquette [52,66] or lack thereof (e.g. nurses being logged out of BCMA while they are still using it [84] or ignoring nurses' input about a patient's care [24]). An emphasis on individual vigilance and a professional expectation that nurses will solve problems contributed to workarounds being implemented [44,58,59]. This notion is captured in the words of a nurse interviewed in one of the reviewed studies, "working around problems is just part of my job" [59:61].

Proliferation of workarounds

There was evidence from the reviewed studies that collaboration enables workarounds to continue and proliferate [42,49,54,56,66,74,81]. Enactment of workarounds relies on willingness of others to help. Kobayashi et al. (2005) indicated that a "workaround cannot be effective if the persons involved are not able or willing to perform. Initiators of workarounds take their tacit knowledge of others' skills and abilities into account when deciding how to implement workarounds" [74:1563]. Workarounds are shared or passed on informally [40,53, 54,59,69,71,86] particularly from senior to junior staff, they are observed and absorbed by other professionals and become part of the group behaviour [62].

Workarounds persist because of an emphasis on efficiency [59,62,72], an expectation that staff will solve

problems [24,44,58,59,72], the autonomy of clinicians [56,62] and lack of role clarity [52]. The ambiguous nature of operational failures and the expectation that they are part of work routine [1] and the diverse relationships between causes and workarounds also contribute to their persistence [4]. When facing workflow blocks, rather than necessarily asking those best equipped to correct problems, nurses ask those who are socially close so as to protect their reputation of competence, thus perpetuating workarounds rather than engaging in second order problem solving [59]. Workarounds proliferate when human resource management activities reinforce them [60], in a culture and climate that supports unsafe practices [40,41,59], rather than reporting of them [87]. Conversely, an organisational culture that promotes psychological safety [58,59], executive dedication [85], supportive leadership and assistance with root cause problem solving [58,59,82,85], compliance checking [85], simplifying processes and decreasing ambiguity [62] will slow the propagation of workarounds.

The perceived impact of workarounds

While it was implicit that workarounds circumvent workflow blocks and ergo deliver care, we examined papers for explicit perceptions of the impact of workarounds. A small number of studies reported the impact of the workaround practices in terms of measured outcomes, including the estimated cost in nursing time spent on workarounds [59] and the impact of safety workarounds on occupational injuries [79]. In relation to patient safety, not checking patient identification was found to be significantly associated with making an intravenous medication administration error [46]. There were no studies that measured the positive impact of workarounds for patient safety although these were suggested by some studies [e.g. 36, 78]. For the most part, studies propose potential effects of workarounds rather than provide empirical evidence for their impact. Studies were examined for evidence of potential effects of workarounds. These are grouped according to their perceived negative or positive impact in relation to patients, staff and the organisation (Table 5). Several studies identified that workarounds could be both positive and negative [1,24,48,58,59,71,82] depending on the context [69] and the expertise of those using the workarounds [54]. More studies highlighted a negative [4,6,34,40,43,45,46,49,51,61-64,68-70,83-87] rather than positive [42,53,60,66,67,81] impact of workarounds.

Nurses' conceptualisation and rationalisation of workarounds

Less than a third of the reviewed studies explicitly examine nurses' conceptualisations or rationalisation of their own and their colleagues' workaround behaviours

(including rule subversion, first order problem solving, deviations, violations, error re-definition) [1,36-39,42,44,52,58,59,64,66,69,71,82,87]. Mostly conclusions in relation to this issue are not explicit. Tension in the way workarounds are perceived by nurses emerged in the evaluation of studies. On the one hand, studies reported workaround behaviours as necessary to deliver care or in the best interest of the patient [1,6,36,42,44,56,59,66,67,69,71,72,75,80,81,84,86]. However, nurses also identified them as unsafe in particular contexts [69,87] and as workarounds are not legally sanctioned, some nurses perceived them as professionally risky [36,44,52,66].

Workarounds were justified through autonomy of practice [62] and rationalised in some studies as acceptable when deemed not to jeopardise patient safety [40,69,87], in emergency situations [4,42,44,67,71], when the nurse is familiar with the patient [6,41,45], when the doctors' response is predictable [66] and when the behaviours fall within the scope of the nurse's knowledge and skill [44,66]. However, nurses also reported that not adhering to policy undermined professional ideals and quality of care [38,87] and some workarounds were considered malpractice by nursing leaders [82].

A contradiction in the perceived relationship between workaround behaviours and competency was also evident in a few studies. Fixing problems and working around rules for the sake of the patient were linked with perceived proficiency and satisfaction [59,66] and "the ability to circumvent problems validated nurses' confidence in their competence and professionalism" [24:129]. Rules were perceived as flexible and while on the one hand part of being a 'good nurse' was the ability to use one's judgement to workaround the rules for the benefit of the patient, to do so risked colleagues' perceptions that one was not a 'good nurse' [66]. As workaround behaviours are not legally sanctioned, they can be viewed poorly by colleagues [36,38] and not accommodated for by 'mediocre' [66] and casual or non permanent nurses [42]. Expertise and patient criticality influenced the number and type of deviations from standard protocols in a critical care environment [73].

One study provides evidence that nurses perceive workarounds and breaking protocol, both terms for violations, as different concepts. This study, investigating violations in medication administration, found that working around and breaking protocol "did not fit together as a measure, and the lack of overlap between the predictors of working around protocol and breaking protocol offer evidence that the two terms measure different concepts" [65:748]. That violations and improvisations are understood to mean different things is highlighted by the findings of two studies examining attitudes to patient care behaviours that comply, violate or

Table 5 The potential effects of workarounds in acute care settings for patients, staff and organisation

	Patient	Staff	Organisation
Positive effects	<ul style="list-style-type: none"> Care is delivered according to the patient's specific needs [42,67]. For example, 'batching' care so that the patient can get a good night sleep; giving medications early so that they won't be four hours late [42] Circumvent barriers to delivering care [56,67] Annotating printed paper patient information sheets rather than only viewing information in EHR, enables clinicians to acquaint themselves more with the patients [53] 	<ul style="list-style-type: none"> Decrease stress for manager and other staff [42] Increase efficiency and support work [76] 	<ul style="list-style-type: none"> Workarounds may lead to better rules [66] Provide excellent information for improvement efforts [81,82]
Negative effects	<ul style="list-style-type: none"> Decrease patient safety by increasing the potential for error [4,6,34,40,41,43,45-49,51,61-64,68-70,82-87] Do not accurately reflect patient care delivery (e.g. charting a medication earlier than it was given) [6,48,61,84] Decrease surveillance of patients [72] Staff work without necessary equipment [72] Loss of information about patients [49,71,75,76,81] Create new pathways to error [81] 	<ul style="list-style-type: none"> Make staff vulnerable to retribution [37,39,44,66,67] Time consuming, erode staff time and energy or increase cognitive effort [48,49,58,59,72,74,82] Increase the risk of occupational injuries [79] Informal teaching of workarounds is problematic because there is no clarity about what clinicians are being taught [53] Enable staff to express emotion to coordinate and work more effectively [75] 	<ul style="list-style-type: none"> Prevent organisational learning and improvement through hiding problems and practices that are occurring in real time [1,6,24,47,56,58,59,72] Create problems elsewhere in the system and can lead to other workarounds [4,24,48,59,62,74] Directly or indirectly cost hospitals money [1,24,59] Contribute to a culture of unsafe practices [40,62] Potentiate security breaches (e.g. nurses borrowing access codes and posting them for easy viewing) [69]
Both positive and negative effects	<ul style="list-style-type: none"> In some instances workarounds enhance patient care but they can also potentiate patient harm [4,24,48,69,71] Workarounds fix problems so that patient care can continue but in not addressing the underlying problem similar problems may reoccur in relation to patient care [1,58,59] While one workaround may prevent medication errors (e.g. using a STOP stamp on the paper medication chart to indicate that a medication has been ceased because the stop and the start orders in the CPOE look very similar) other workarounds using the same system increase error risk (e.g. recording actual administration times on paper medication chart but not in the CPOE) [48-50] Informal handover of information to workaround the lack of formal communication channels reduced falls but may create gaps in passed on patient information [78] Deviations are linked with good patient outcomes (innovations) and bad patient outcomes (errors) [73] 	<ul style="list-style-type: none"> Workarounds may ease and accelerate performance but increase workload [48] Help with the coordination of work and reduce cognitive load by providing solutions to recurring problems but lead to unstable, unavailable or unreliable work protocols [74] Fix problems so that patient care can continue but in not addressing the underlying problem similar problems will occur requiring staff to address them again [58,59] Workarounds may circumvent problematic EPR-mediated communication between staff but may also create confusion if the workaround is not explained [54] 	<ul style="list-style-type: none"> Allow the use of CPOE but hide opportunities for redesign and improvement [47] Allow the system to continue functioning but may lead to widespread instability [74]

Legend: EHR (Electronic Health Record); CPOE (Computer Physician Order Entry).

improvise in relation to protocols. These report that while healthcare workers and the public view violations as inappropriate, the opposite is true for compliance regardless of patient outcome. Attitudes to improvisations were influenced by outcome for the patient [37,39]. Thus nurses perceived that improvisations were acceptable if the outcome for the patient was good. Violations on the other hand were viewed as inappropriate regardless of outcome [37,39].

Discussion

Our findings build on and extend the work of Halbesleben et al (2008) [16] and Alper and Karsh (2009) [3]. Although the literature examining nurses' use of workarounds has increased since 2008, there are still relatively few peer reviewed studies examining nurses' workaround behaviours as a primary focus and most that do are located in the USA. There is considerable heterogeneity in the aim, methods, settings and focus of

the reviewed studies. Some studies observe the frequency and causes of workarounds; others examine attitudes of professionals to circumvention of rules. There are few studies that examine the effect of workaround behaviours in terms of measured outcomes [16]. Workaround behaviours, for example, have been shown to consume organisational resources [59], impact on health professionals occupational health and safety [79] and patient medication safety [46]. However, for the most part, the consequences of workarounds are offered tentatively rather than being solely empirically based [16]. Workarounds have a cascading effect often impacting other microsystems [48,74] thus their effect may not be immediately evident making it difficult to harness and quantify their impact.

Contributing to the relatively underdeveloped body of healthcare research focused on workarounds, given their influence on patient safety, is the difficulty in investigating them. This underlies the use of multiple rather than single research approaches to uncover workarounds' interwoven processes and characteristics [4]. While survey questionnaires have been employed [37,39,43,44,55, 60,63-65,79,83,87], the primary methods used in the reviewed studies included a combination of observation and interviews [1,6,34,40,41,45,53,54,56,58,59,61,66, 68,72,74-76,82,84], which are resource intensive. In addition, the possibility for such research to identify glitches or deficiencies in technology and workers 'breaking' rules is fraught with potential implications, that is, financial, legal and political [88].

Workarounds both straddle and widen the gaps in health care delivery [89]. Overall they are reported negatively. There are claims that their implementation: destabilises patient safety [4,49,61,63,77]; undermines standardisation [56,62]; increases physical and cognitive workload [49,59,72,82]; hides actual practice and opportunities for improvement thus preventing organisational learning [1,6,24,58,59,84,86]; and creates further problems and workarounds [24,48,56,59,72,74]. However, other accounts of workarounds describe them as mindful behaviours [60] that provide opportunities for improvement [48] and both compromise and promote patient safety [48,53]. Nurses justify workarounds as necessary circumventions to deliver timely and customised patient-centred care in complex and highly variable systems [36,42,44,47,48,56,58,61,66,67,69,76,80,81,84]. The potential pathways of workarounds to innovation and excellence and the connection of workarounds with resilience are being recognised [26-28,90].

Studies demonstrate that workarounds are individually or collectively enacted. When enacted as a collective process, they rely heavily on: a shared view that rules are flexible [42,56,66]; a tacit agreement to enact [42,44,52, 56,66]; and an understanding of who will and will not

workaround [74]. There is some evidence, from a small number of studies, that group norms [40,42,58,59,86], local and organisational leadership [58,59,82,85], professional structures [24,59,74] and relationships [49] and others' expectations [44,56,58,59,66,74] influence the implementation of workarounds. Despite the collegial nature of nursing work and the demonstrated effect of organisational and local culture on clinicians' behaviour and attitudes [91,92], the influence of social networks, relationships, expectations and local and organisational culture on the enactment and proliferation of workarounds is under investigated.

There are suggestions that nurses' notions of what constitutes a 'good' nurse, their ideologies, knowledge and experience, influence their implementation of workarounds [24,59,66]. For example, nurses viewed problem solving as part of nursing and perceived that an ability to do so alone demonstrated competency. They reported a sense of gratification at being able to solve problems individually, protect patients and deliver care [24,59]. There is evidence that nurses justify working around rules and policies for the benefit of the patient [36,42,66]. However, the importance of adhering to protocols was considered by other nurses to be central to a professional approach to patient care [38]. Introducing technology incites ambiguity in practice and changes the meaning of nursing work [93] which may undermine confidence and threaten a professional's image.

Workarounds continue to be ill defined [16] with less than half of the studies reviewed offering a definition for workarounds or related concepts. Those that did were primarily published since Halbesleben and colleagues' articulation of this shortcoming in 2008 [16]. The lack of clarity may reflect the uncertainty about how workarounds are conceptualised in clinical settings and by researchers. For example, some authors suggest that workarounds lead to potential errors [34], while others propose that these behaviours are the error [52,83]. Importantly, there is lack of clarity in how nurses themselves differentiate workarounds from related constructs [65]. Contributing to the confusion is that some workarounds are viewed as normal practice, with clinicians being unaware that they are in fact workarounds. Furthermore, at times informal workarounds become sanctioned practices [48]. Imprecision in how workarounds are defined and reported poses challenges for researchers and those who would synthesise the evidence.

This scoping review identifies gaps in the literature, which offer opportunities for future research. Further studies are needed that investigate nurses' workarounds as a primary focus; individual and collective conceptualisation of their own and their colleagues workarounds *in situ*; workaround behaviours and measured patient outcomes; team and organisational cultures on the enactment and proliferation of workarounds.

Limitations

This review examined empirical peer reviewed studies written in English. A limitation of literature reviews is that imposed by research and publication timelines, which create a lag between those studies included in the review and new published information. While every attempt was made to capture all published papers in this area using systematic and comprehensive search strategies, some may have been missed.

The main challenge in studies of this type is that work-around behaviours are difficult to delineate from other behaviours [16]. We applied an operational definition of workarounds to behaviours described in the reviewed studies and were inclusive rather than exclusive. It is possible that we missed some work-around behaviours. Alternatively it is possible that we included some behaviours that may not be work-around behaviours. We attempted to ameliorate this effect by employing two reviewers to independently cross-examine randomly selected studies in phases one and two and all of the studies in phase three.

Conclusion

Workarounds operate as a dichotomous trope. They enable yet potentially compromise patient care and safety. They provide and hide information about clinicians' work. They are individually and collectively enacted. Organisational, work process, patient-related, individual, social, and professional factors, group norms, local and organisational culture, image management and collegiality influence the development, implementation and maintenance of workarounds. As nurses comprise the majority of the healthcare workforce, it is important to understand the use of workarounds in this population. Understanding nurses' practice and their perception of work-around behaviours is at the heart of apprehending how to improve healthcare at the bedside, where care is delivered.

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

DD participated in the design of the study, carried out the literature search and selection process, analysed and synthesised the literature and drafted the paper. DG also participated in the design of the study, the literature selection process and helped to analyse, synthesise and draft the paper. JL helped to analyse, synthesise and draft the paper. JB, DB, JT and JJ helped to design the study and to draft the paper. All the authors read and approved the final manuscript.

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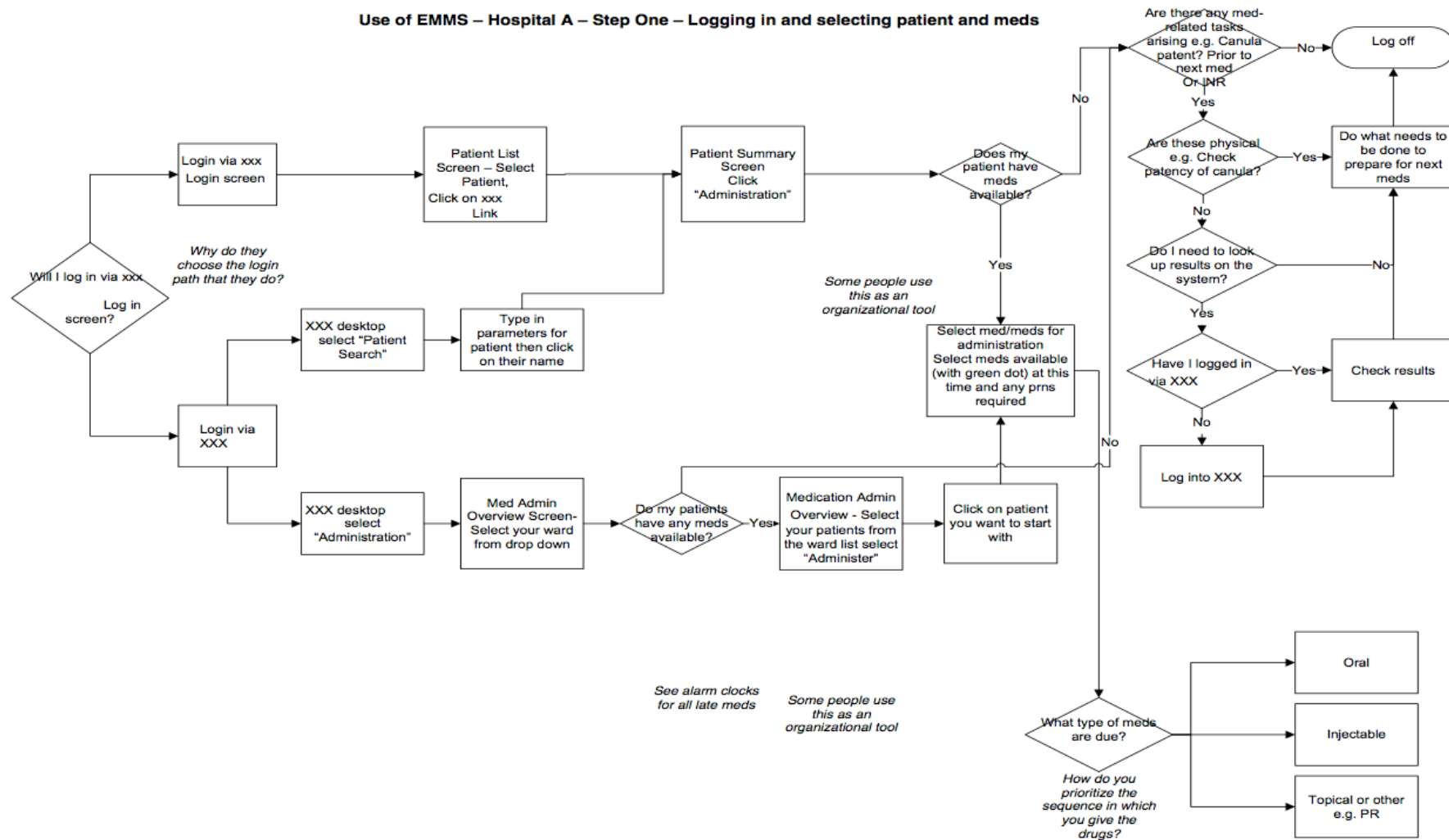
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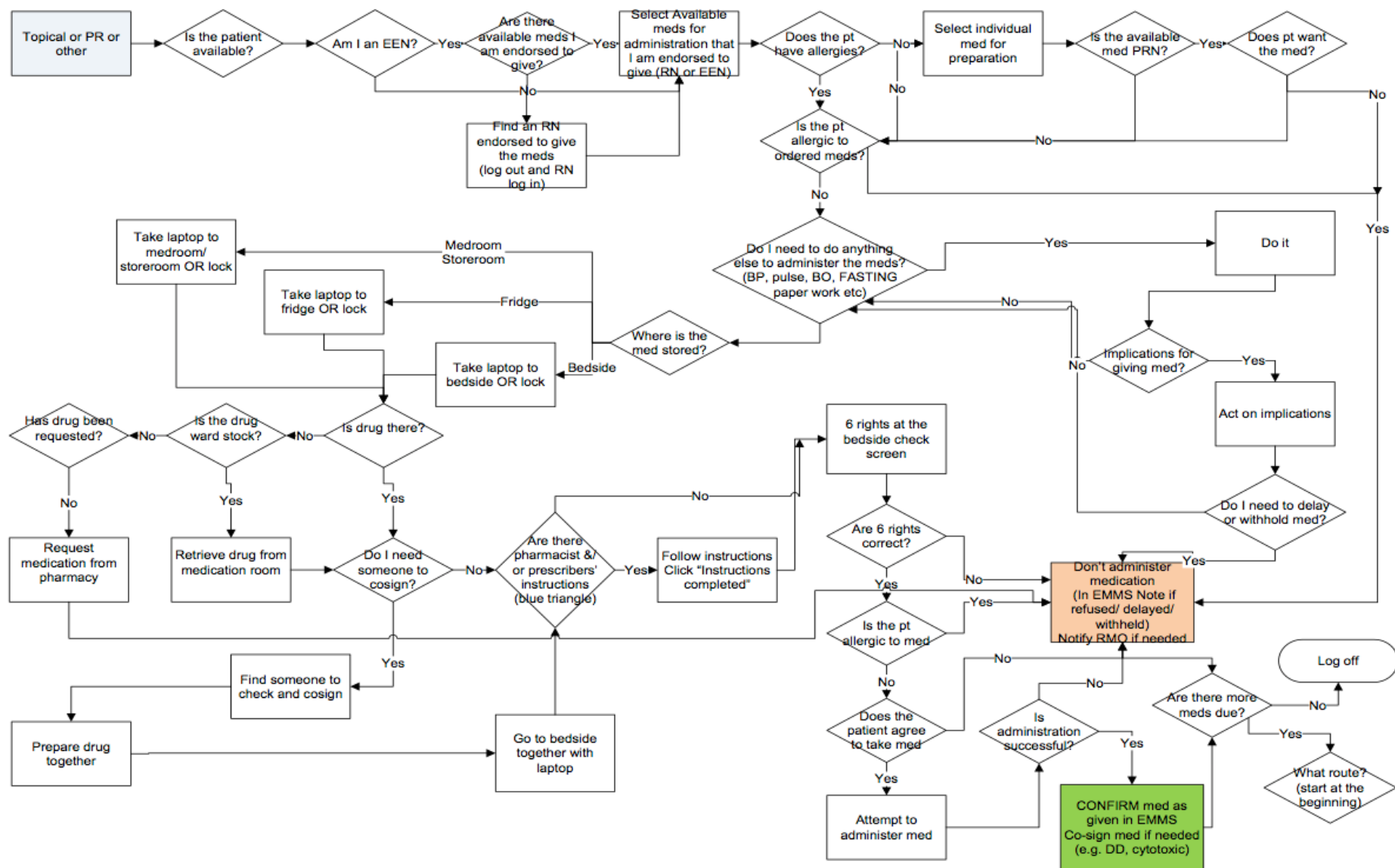
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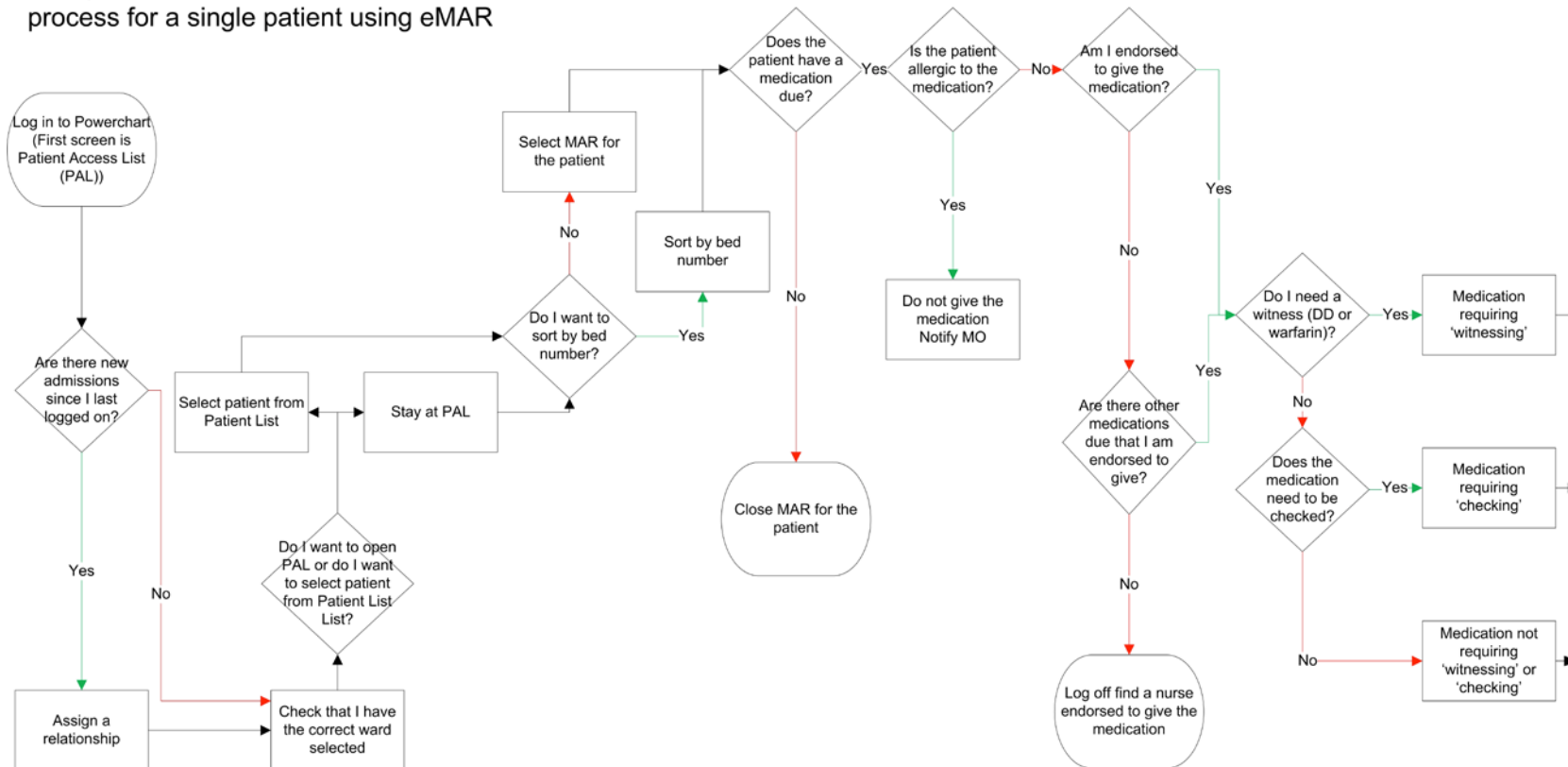
Appendix 2: Process Map for medication administration at the first hospital [four pages]





Appendix 3: Process Map for medication administration at the second hospital [four pages]

Hospital B - Medication administration process for a single patient using eMAR

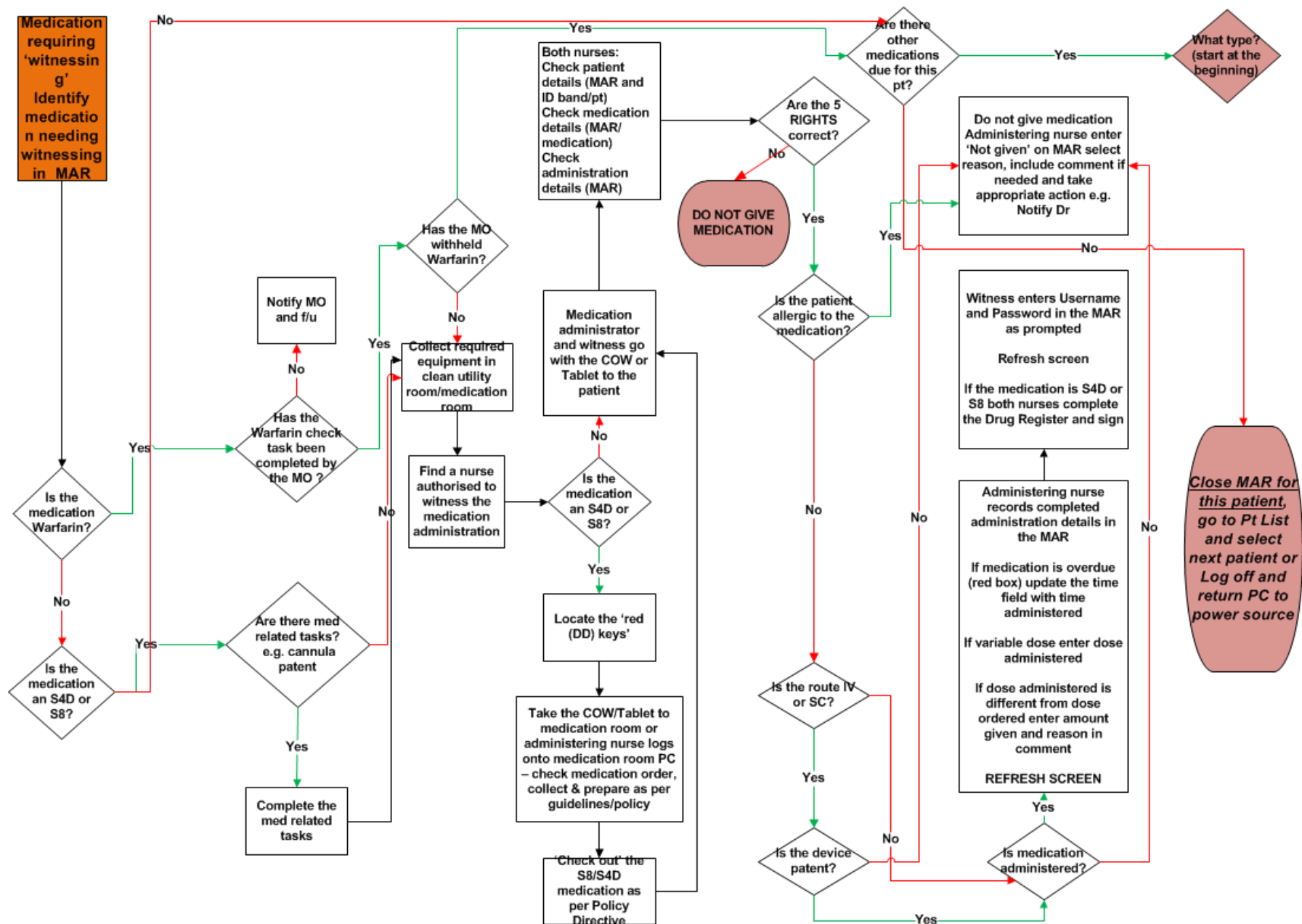


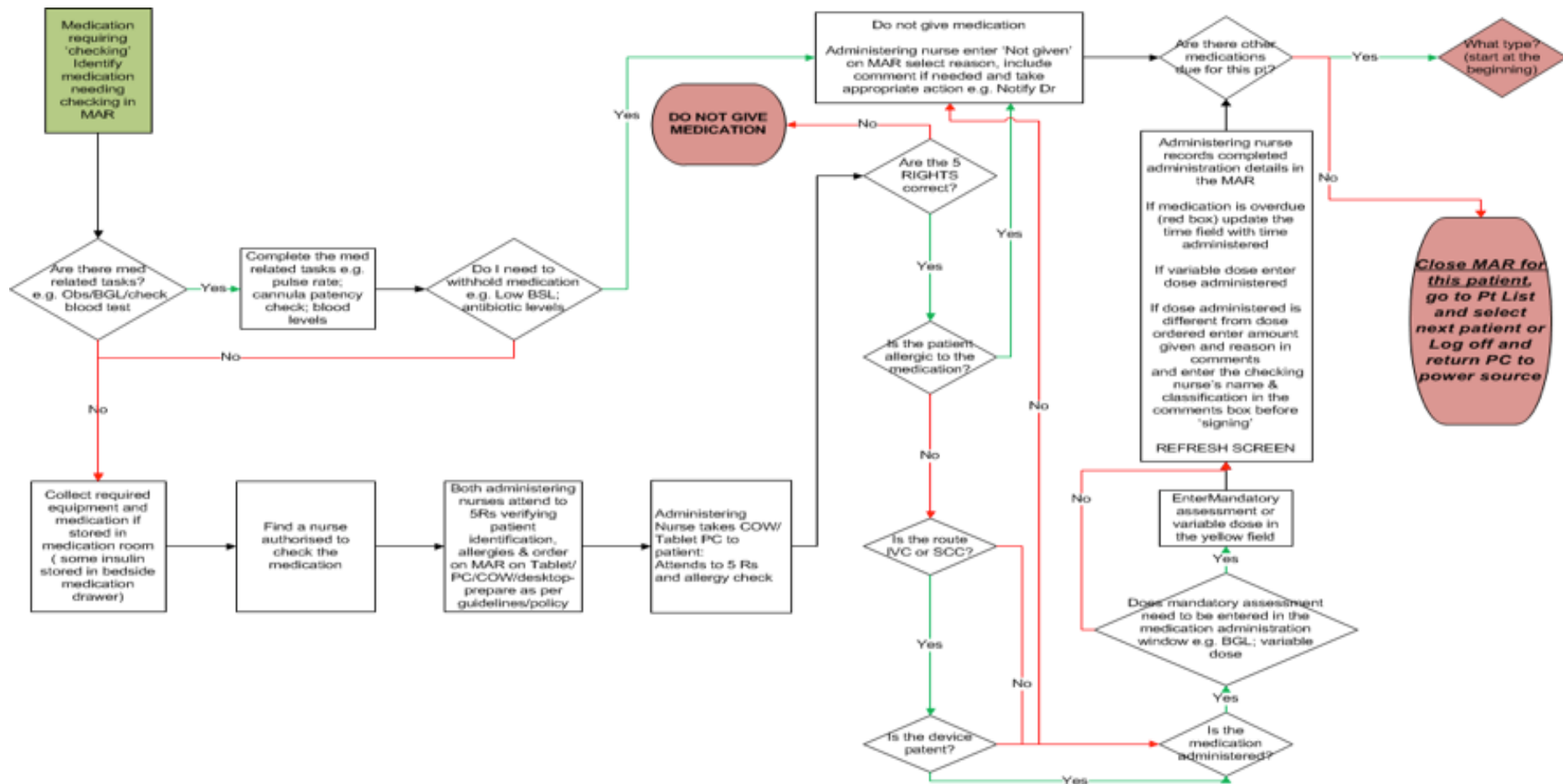
- Prepare and administer only one medication for the one patient at any one time (Principle to be observed: NSW Health Policy Directive - Document Number: PD2007_077: p. 52)
- If a nurse needs to leave the computer for any distraction they are required to log off the MAR or change user (XX Policy Directive – Document: XX)

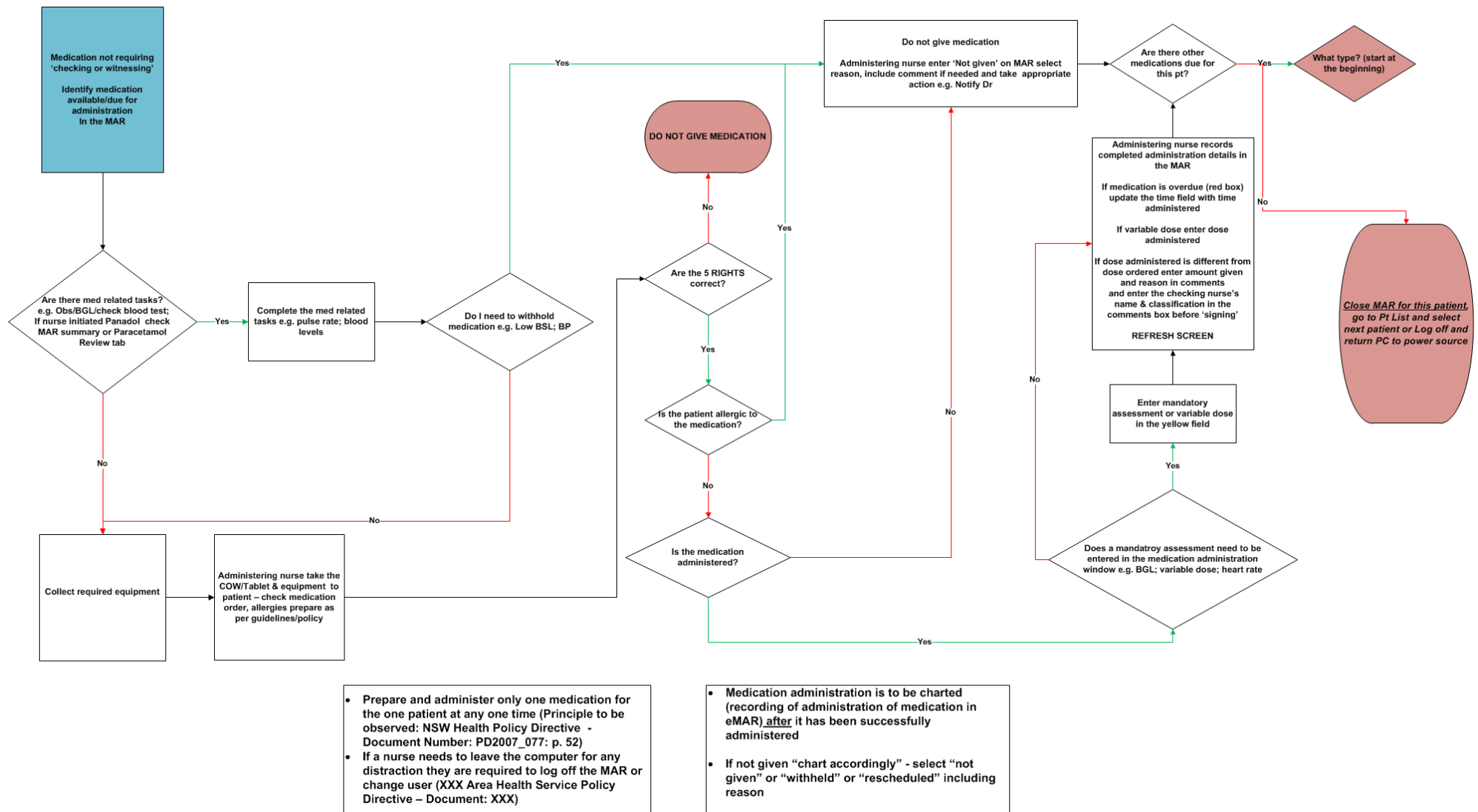
- **Witnessing:** Legislation requires that S4D and S8 medication administration is witnessed by medical officer, RN, EEN or accredited EN. Preparation, administration and discarding of unused medication must be witnessed and the witness enter their username and password in the eMAR
- NSW Health Policy requires that Warfarin administration is also witnessed

- **Checking:** Hospital Policy requires that a second person check IV, SC and IMI medications. The administering nurse and checking nurse must attend to the 5 Rights verifying the patient identification, allergies & order on MAR. The medication administrator is logged onto eMAR should type the name of the person who has checked the medication in the COMMENTS box

- Medication administration is to be charted (recording of administration of medication in eMAR) **after** it has been successfully administered
- If not given "chart accordingly" - select "not given" or "withheld" or "rescheduled" including reason







Appendix 4: Demographic questionnaire

<i>Demographic Information</i>	
Gender	Male/Female
What is your current professional role?	
How many years' experience do you have in this profession?	
How long have you been in this professional role?	
What is your highest qualification?	
In which year did you complete that qualification?	
How long have you worked for your current facility/organisation?	
How long have you worked on this unit?	
Are you employed fulltime, part-time or casually?	
How many shifts do you work in this unit each week?	

Appendix 5: Strategies for ethnographic observation note taking

Source: Spradley 1980:78 [295]

Space:	the physical place or places
Actor:	the people involved
Activity:	a set of related acts people do
Object:	the physical things that are present
Act:	single actions that people do
Event:	a set of related activities that people carry out
Time:	the sequencing that takes place over time
Goal:	the things people are trying to accomplish
Feeling:	the emotions felt and expressed

Appendix 6: Guidelines for conducting observation of nurse interaction with electronic medication management systems

Adapted from: Carayon P, Wetterneck T, Hundt A, Ozkaynak M, Prashant R, DeSilvey J, et al. (2004) [289]

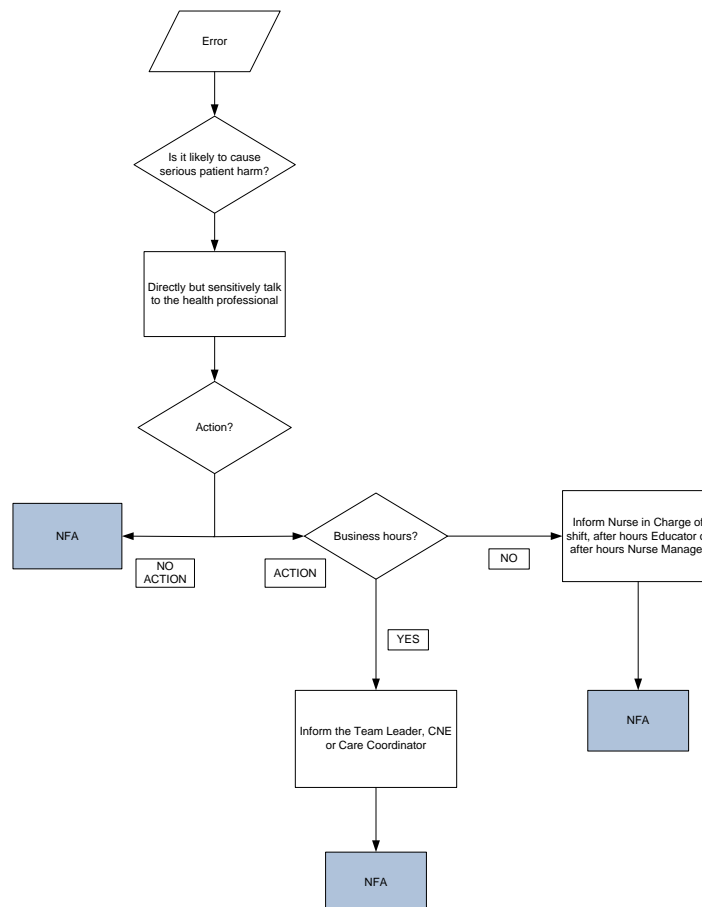
Contact each nurse unit manager to explain the research project and seek permission to conduct the observations, semi structured interviews and focus groups on their unit
Once participation of the unit is confirmed liaise with the nurse unit manager to conduct information sessions on their units
Before each information session confirm the time and venue with the nurse unit manager
Conduct information session on the unit. Invite nurses to participate. Provide study information statements and consent forms. Take nurses who are interested in participating through the consent process
Revisit the unit leading up to commencement of data collection. Answer questions and provide more information if needed
Confirm dates of observation and the shift times with the Nurse Unit Manager before commencing data collection
Following each break in data collection, re-confirm upcoming dates for observation with Nurse Unit Manager
Confirm observation times with the charge nurse for the shift (especially for evening, weekend and night shift when the nurse unit manager is not on the unit) the day before the observation visit
Prepare observation material prior to the visit – pens, process map, paper, spare information sheet and consent forms
Go to the unit
Meet with the nurse unit manager and/or the nurse in charge
If possible attend handover and explain to the nurses about to start the shift the aims of the research and what you plan to do that shift
Identify whether any of the nurses on the shift have agreed to participate in the study by signing the consent form
Reconfirm with them that they agree to be observed when they conduct medication rounds and administer medication
If a nurse has not yet signed a consent form but agrees to participate in the study, go through the study information sheet and obtain written consent before commencing observation
While not observing a medication activity find a central location in the unit so as to observe as much nursing activity as possible
When observing a medication round, enter a patient's room and ask them if they are happy to

have you observe the medication administration
Conduct the observation
Complete the Medication Administration Event/Context and the Shift/Context Tools
If during observation an error is noted that is potentially dangerous for the patient, intervene as per the Serious Error Protocol for this study
Record as much observation data as possible at the time of observation
Immediately following completion of the observation complete abbreviations in notes and unclear sections
Before leaving the unit thank the participants and ask if they have any questions
Recruit participants for further observation, semi structured interviews and focus groups
Confirm times that you will be revisiting

Appendix 7: Serious Error Protocol for use with observation of nurse interaction with electronic medication management systems

Adapted from: Westbrook JI, Woods A, Rob MI, Dunsmuir WTM, Day RO. (2010) [23]

If during observation of a medication administration, the researcher notes an error which may potentially lead to serious harm to the patient, the researcher must follow the steps outlined in the Serious Error Protocol. Firstly decide whether or not the error is likely to cause serious harm. If the researcher is concerned about the potential consequences of the error but unsure of whether it has the potential to cause harm, they should contact the Team Leader or Nurse in Charge (I/C) of the shift to check. They should then follow the decision tree below:



Examples of errors that may cause serious harm:

- ☐ Giving medication to a patient who has an allergy to that medication
- ☐ Giving the wrong drug or using the wrong IV additive
- ☐ Giving a drug via the wrong route
- ☐ Giving a drug to the wrong patient
- ☐ Serious overdose e.g giving Methotrexate daily instead of weekly

Example of errors that would not be considered to cause serious harm:

- ☐ Procedural errors e.g not taking a pulse before giving Digoxin, not signing for a medication (except chemotherapy)

Appendix 8: Electronic medication systems study semi structured interview questions

Could you explain the electronic medication management system that is used in this unit to me please?
Can you tell me about the medication process that is used in this unit? [Prompts: Is there a medication round, nurse dedicated to medication delivery, pharmacy round etc]?
Can you tell me about how has using the electronic medication management system changed aspects of your work?
Are there times when it is difficult to use the electronic system in administering medication? Can you tell me about some of the things that make it difficult?
Can you tell me about what do you do when something makes it difficult to get the medication to the patient?
Does everyone use the same practices to get the medication to the patient? Can you tell me about how the practices differ between nurses?
Can you tell me about whether and how you workaround the system to get the medication to the patient?
Can you tell me about whether and how other people workaround the system the system to get the medication to the patient?
Would you explain for me if there are times when it is OK to work around the system to get the medication to the patient and when it is not OK ? Is this the same for everyone?
Can you tell me about times when it is OK for some nurses to work around the system the system to get the medication to the patient but not OK for others to work around?
Are there times when it is easier to use the electronic system in administering medication? Can you tell me about some of the things that make using the electronic medication management system easier?
Can you tell me what impact you think the electronic medication management system has had on quality and safety?
What sort of things impact on the use of the electronic medication management system? [For example, experience with the system, business of the shift, staff levels]

Appendix 9: Electronic medication systems study focus group questions

Can you tell me about your experiences using electronic medication management systems?
Are there any characteristics of the organisation, unit environment or set up that make it less or more difficult to use the electronic medication management system?
Can you tell me about any characteristics of the electronic medication management system that make it easy or difficult to use?
Can you tell me about any patient characteristics that make it harder or easier to use the electronic medication management system?
Can you tell me about circumstances when it is more difficult to use the electronic medication management system? (Prompts: Busy, short staffed, patient factors e.g. patient sleeping)
Can you tell me about any positive and negative unintended consequences of electronic medication management systems?
I am really interested in whether everyone uses the same practices to get the medication to the patient. Can you tell me about how the practices differ between nurses?
Can you tell me about whether and how you workaround the system the system to get the medication to the patient?
Can you tell me about whether and how other people workaround the system the system to get the medication to the patient?
Would you explain for me if there are times when it is OK to work around the system to get the medication to the patient and when it is not OK? Is this the same for everyone?
Is there anything else you would like to add?

Appendix 10: Guidelines for conducting focus group and semi-structured interviews regarding nurse interaction with electronic medication management systems

Contact each nurse unit manager to explain the research project and seek permission to conduct the observations, semi structured interviews and focus groups on their unit
Once participation of the unit is confirmed liaise with the nurse unit manager to conduct information sessions on their units
Before each information session confirm the time and venue with the nurse unit manager
Conduct information sessions on the unit. Invite nurses to participate. Provide study information statements and consent forms. Take nurses who are interested in participating through the consent process
Revisit the unit leading up to commencement of data collection to answer questions and provide more information if needed. Take nurses who are interested in participating through the consent process
Confirm dates, times and the availability of a quiet and private room in which to hold the interviews with the Nurse Unit Manager before commencing data collection
Following each break in data collection, re-confirm upcoming dates for interviews with Nurse Unit Manager
Confirm interview times and the availability of a quiet and private room in which to hold the interviews with the charge nurse for the shift (especially for evening, weekend and night shift when the nurse unit manager is not on the unit) the day before the interview visit
Prepare interview material prior to the visit – pens, paper, questionnaires, spare information sheet and consent forms
Go to the unit
Meet with the nurse unit manager and/or the nurse in charge
If possible attend handover and explain to the nurses about to start the shift the aims of the research and what you plan to do that shift
Identify whether any of the nurses on the shift have agreed to participate in the study by signing the consent form
If a nurse has not yet signed a consent form but agrees to participate in the study, go through the study information sheet and obtain written consent before commencing interviews
Conduct the interviews
Record the interviews and in the focus group interviews note the interactions, body language, dynamics
Immediately following completion of the interviews complete abbreviations in notes and unclear sections
Before leaving the unit thank the participants and ask if they have any questions
Recruit participants for further observation, semi structured interviews and focus groups
Confirm times that you will be revisiting

Appendix 11: Examples of code names and descriptions used during the descriptive coding stage of data analysis

Code Name	Full description	When to use (inclusion instances)	Data-based illustrative examples for each code
Accessibility to information about medication order	Accessibility is the degree to which information about the medication order is available	<p>Descriptions of when, how or in what ways and why the EMMS may hide information about medications ordered and their administration more visible</p> <p>Do not use this code in relation to transparency and auditability i.e. who gave what medication and when, the clocks and red squares</p>	<p>"... yeah, because some people do something and I didn't know how to do, that you can do. Like, you can log into multiple computers, even though you can do one patient - you can log onto one, then have another one open or you can select all the names of your patients and then it flicks back and forward. Some people do things in a slow way."</p> <p>Other examples: doctors can see medication orders when they are not on the ward; nurses opening medication charts of patients on other wards; more than one nurse being able to access a patient's medication chart at the same time</p>
Being a team player	Actions or comments that describe contributing to a team or to a colleague	Motivation or behaviour that illustrates wanting to be cooperative, willing to work hard and pitch in, and working together in harmony. Demonstrating behaviours that facilitate effective team member interaction. Not requiring other nurses to do your tasks or tasks that you feel you are responsible for – not leaving work for other members of the team on your shift or the team coming on the next shift. Minimising the time demands you place on another nurse so that you don't hold them up	"If not, then I can quite easily hand that job away and put further responsibility on the RN. I guess that is maybe why our RNs get paid more. But I am a team player. Looking after my own patients, giving them their own medications, I feel confident and comfortable doing it."
Being time pressured	Visible or articulated competing demands and pressure to complete tasks	When there is observed or articulated sense of pressure created by workload or competing demands and pressure to complete tasks	"You might have someone delirious in bed one that the registered nurse needs to be there with the AIN because of that is what's happened or the person's been grossly incontinent and they may have clostridium or you're not even able to do your work"
Being conflicted or feeling tension	Being or feeling conflicted/stressed or tense about an action - There are perceived contradictory demands – in meeting one, another will not be met – this creates tension e.g.	When nurses articulate that they feel a degree of stress/conflict tension in relation to what is being said or done – (red flag = "should/should not" – hushed tones)	<p>"We are not supposed to use that to give medications, but we do."</p> <p>"Oh maybe I won't go and check that or you might think – Oh I'll check it later (whispers) and then you never do"</p>

Code Name	Full description	When to use (inclusion instances)	Data-based illustrative examples for each code
	between policy and practice, or demands at the same time; or helping two different people; or patient and visitor; or staff member and self		
Being important nurses' work	The work that is considered to be more important or essential than other nurses' work – it may be symbolic of status or power or may require attention over other tasks	Observed or articulated status afforded to particular types of nurses' work – e.g. attributing a title to those who do that work, or contrasting it with "les" important work	"They can do the little things while you get the medication done" Use of a title "Medicators" for those nurses who can administer medication
Collaborative workarounds	Workarounds requiring collaboration to be enacted: when more than one nurse is needed to enact the workaround – that is more than one nurse is part of the workaround	When the workaround cannot occur unless there is an accomplice	Two nurses are meant to go to the bedside with an IV medication or a DD medication, and the nurses sign the medication off before administering it and the administering nurse goes to the bedside alone, it is an accomplice workaround as it could not be enacted alone
Feeling professionally vulnerable	Being open to sanctions, criticism, or retribution	Expressed or observed concern that the nurse is vulnerable to professional retribution (this may be because of an action, event, relationship etc)	"A lot of my colleagues are happy for me to give things under their name. I guess if we were standing in a court of law it could get quite serious."
Ideal versus real	Espoused theory /normative actions/"sacred" versus in use theory/practice/"profane". It may incorporate the sense of nurses feeling that they should follow policy but are not (also in "Being Conflicted" or "tension" node) but would also capture the theme of awareness and resolve that this is just how things are - there is the ideal and the real	When there is evidence in the data of a contrast between what the ideal situation/context would be and what is reality	"They're all supposed to be on the electronic system but usually they come up on the paper chart from ED or sometimes they didn't - the doctor doesn't know how to use it and then they just do a paper chart. But most of them are supposed to be on electronic chart." Example 2: "Only just to keep - while you're talking, just to keep moving through the list of medications and stuff. Obviously it's not ideal that you're having a conversation with the patient while you're trying to concentrate and dish out medications, but you can't - it's not..."
Informal learning	Acquiring new, or modifying existing, knowledge, behaviours,	When participants describe learning workarounds though being informally taught, watching,	"I: Yes. They have - people work a way round it. Which has made it a lot quicker for some; but I had to give something the other day -

Code Name	Full description	When to use (inclusion instances)	Data-based illustrative examples for each code
	skills, values, or preferences through interactions and shared relationships rather than through formal teaching approaches - often not intentional	modelling AND when participants specify when they do not informally teach practices to others e.g. students.	nurse initiated - and if you haven't used it in a while you forget how to do it. Those that use it can work out that you just change it a different way and you can put in a space, and then also that you've - you can - yes. F: They're the things that I'm really interested in. I: So there's certain ways you can do it, in that if you put a certain symbol or something in there the computer will read it. It's like a way to get round it. F: Does everybody do that, or some people know how to do that and some people don't? I: I think the more people use it and encounter problems, others that have worked out how to do it tell them."
Inter-professional workarounds	Workarounds facilitated by inter-professional interaction	When workarounds are observed or described to occur between professionals and because of the interaction between the professionals	"Yeah, and I noticed if you can't back time it, people will write, was given at such and such a time. Otherwise we get the doctors to give us a STAT order, which annoys the doctors."
Managing interruptions	Responses to interruptions including avoidance of them	When data excerpts display nurses' actions or descriptions that relate to the way they "manage" interruptions – this may include actions to avoid, protect against or handle interruptions	"But that's [interruption] going to happen. Once you see the nurse there - but that's not going to go away. I'm very strict when I'm giving medications and I'm very assertive. A lot of the nurses probably can't formulate the language but that's just experience. I'll say if I've got four ladies in a room and they're going I want this, I want that, I want that, I'll say stop now. I say I'm giving drugs, medications, unless I concentrate you get the wrong medication and I need to concentrate and it's not easy so I will get to you when I can but let me do this first."
Not working around/adhering to policy	Specific comments about adhering to policy or not working around e.g. in a given context or because of a particular characteristic or reason	When there is an emphasis that the nurse adheres to policy or does not work around in a particular context situation – if this is unusual in light of the nurses' usual practice, (or it is not congruent with practice that I have observed from the particular nurse – must be coupled with an annotation when coding)	"F: Now can you tell me, does - what - so what would you do - so you take the laptop into the infectious room and then you just have to clean it? I: You clean it down yes. F: What about when the med room's full? I: You've just got to wait your turn. F: You wait your turn? I: Yeah." ¹ (Annotation: ¹ During observation I noted that this participant did not take the COW into the infectious rooms and used the desktop in the

Code Name	Full description	When to use (inclusion instances)	Data-based illustrative examples for each code
			medication room. This suggest that either she is unaware that she does this or (and by the tone of voice and guarded answers in the interview the following seems plausible), the participant views workarounds as something she should not do - therefore does not disclose on tape that she does them even though she knows that I have observed them)
Protecting me professionally	Reference made to acting or not acting in a particular way that relates to averting professional risk	When the data being coded is about acting or not acting in a particular way because of a potential professional risk	"Work with the system, sorry - work with the system - because there's lots of policies and guidelines that I have to follow to protect myself. I have to work with the system"
Quality and safety and EMMS	Effect of the EMMS on - Safety - that the degree to which potential risk and unintended results are avoided or minimised Quality = the extent to which a health care service or product produces a desired outcome (effective, safe, reliable, patient centred, timely, efficient, patient centred care EMMS	Descriptions or observations that capture what nurses think is quality and safety and how they perceive that the EMMS has impacted on that. Descriptions that include mention of quality and safety as 'quality and safety' or in response to question about 'quality and safety' or description of factors matching the definition of either: Safety = the degree to which potential risk and unintended results are avoided or minimised Quality = the extent to which a health care service or product produces a desired outcome (effective, safe, reliable, patient centred, timely, efficient, patient centred care	<u>Negative impact of EMMS on quality and safety:</u> "So there have been times where the whole hospital system is down, so if the hospital system is down no one in the hospital can use anything. Yeah, so that's the danger of it" ⁷ <u>Positive impact of EMMS on quality and safety:</u> "I think it was a better way. It's safer because - the problem with paper charts - it's okay when you're here for 10 years, 15 years, five years. You know how to read whatever they write, but when you're here for six months, that you're going to try and read what they write, sometimes it's very hard. With [EMMS name], that doesn't happen. It's there and it's clear and you know what it is. If you don't know what it is - like I said before - you click a button and you know what that is. There it will say - it's got all the information about the drug. If you're giving out a blood pressure tablet or are you going to give that blood pressure tablet, the blood pressure's low." <u>Both positive and negative impact of EMMS on quality and safety:</u> "Oh it's changed much, I think there's less errors. There's less errors, less things are missed, and more things are followed up, especially by pharmacy. So medication is more likely to appear, strange doses are more likely to be picked up by pharmacy, and drug interactions are more likely to be picked up as well by the pharmacists. But not just the pharmacists by other doctors as well who will come along

Code Name	Full description	When to use (inclusion instances)	Data-based illustrative examples for each code
			and say oh "why is this patient on these two meds, I'll talk to the team about it". But it's also created more errors as well, for example the variable dose one, people are very sometimes - naughty and they'll delay things and then the next dose is due and that will get delayed. It's actually an error to delay something if the medication is not available, sorry not delayed, it's actually an error to click it off saying 'Not Given' because the medication is not available. But people still do it."
Trusting	<p>Trust or expectation that a person will behave in an acceptable or 'correct' manner, or in the way that you would want them to act</p> <p>Willing to rely on the actions of another party versus uncertainty about the way another person will behave or act</p> <p>The uncertainty involves the risk of failure or harm to the trustor if the trustee does not behave as desired</p> <p>To demonstrate a belief in the reliability, truth, or ability of someone or something</p>	<p>When the data refers to 'trust', confidence or belief in, or it is clear that the participant believes in the ability of another person or that they will do the right thing, or that their actions will not bring harm (professional, legal, social, personal) to themselves or others</p> <p>This may include symbols of organisational trust or distrust e.g. policy in which the permanent, senior RNs carry the DD keys, EMMS designed to guide practice; trust that the EMMS will protect nurses from making a mistake</p>	<p>"I honestly do just trust the senior nurses a lot more. I know they're not infallible, and they are only human but my instinct tells me that they have got a lot more experience and they are reliable and dependable. If they had been doing it wrong this entire time, they wouldn't be doing that practice; they would be caught up already. Where is me, it shouldn't happen, I shouldn't be doing it. But for me it's always what's easiest, it's not what I should be doing, which is bad practice"</p> <p>[trust senior staff but not necessarily trusting her own skills]</p>
Working around	<p>Observed or described behaviours that may differ from organisationally prescribed or intended procedures. They circumvent or temporarily 'fix' an evident or <u>perceived</u> workflow hindrance in order to meet a goal or to achieve it more readily. It</p>	<p>Observation or description of a behaviour that circumvents what they are 'meant' to do (e.g. identified by the 'gold standard' the process map, or if the participant refers to an action as a workaround</p>	<p>"F: When there are no laptops or if they are not available, what do you do?</p> <p>I: The only thing you can do is - I wonder if I have got any evidence in my locker - on the bank of my hand or a sheet write down the numbers; write down the drugs; tick them off and go out there.</p> <p>F: Where do you tick them off? At the desk?</p> <p>I: At the desk, yeah"</p>

Code Name	Full description	When to use (inclusion instances)	Data-based illustrative examples for each code
	may actual or conceptual e.g. working around potential conflict		<p>Observed example: Not giving a medication and entering 'withheld' that is ordered because they do not want to wake the patient – the nurse is working around the requirement to wake the patient to take the medication by not administering it.</p> <p>'Batching medication preparation' - when the nurse prepares medications for more than one patient at the same time</p>
Workarounds: Conceptualising	Interpretation of workarounds; how nurses interpret the use of workarounds by themselves, and their colleagues	Comments or actions that suggest how workarounds are understood, interpreted and perceived as well as what nurses understand the term 'workaround' to mean - e.g. unsafe, safe, good practice, bad practice, what senior or expert staff members do – e.g. whether they think that it is safe for some nurses to work around and not others, or in some situations and not others. Statements that indicate what they think term workaround means	<p>A participant responds to the question about whether she uses workarounds by asking - "Workarounds?" and then asks for an example of what a workaround is</p> <p>OR</p> <p>In the following excerpt, the participant describes workarounds as shortcuts, which can lead to mistakes, and therefore the participant does not perceive that they are acceptable practice. Workarounds are the same as 'getting away with things', which the participant does not think, is good. To work around is to not do it properly: "So I think we tend to - I don't think, really, [EMMS name] allows you to make many shortcuts. Basically, it governs what you do because it's not really - it's not fair to allow you to make mistakes. You take shortcuts you can make mistakes. I think [EMMS name] doesn't allow you to do that, which is good. The paper chart might allow you to do - to go to medication later on and not give a reason. [EMMS name], you always have to give a reason for what you're doing, so you can't really bend it too much ... You can't get away - not get away - you can't get away with things. You have to do things properly, which is good."</p>
Workarounds: Rationalising	The explanations nurses offer to explain or justify their own or their colleagues workarounds with logical reasons, even if these are not appropriate	When the data demonstrates the explanation of why it is necessary to conduct the workaround or the reasons for the workarounds and why it is alright in that situation	One nurses explains that "if in doubt I go back to the computer to check" (otherwise she works off her paper) – She is rationalising the workaround as alright because she is sure about what the medication is"

Appendix 12: Sample of annotations made during coding of interview data (one code – ‘Being conflicted or feeling tension’)

⁷⁶ If you are not busy you have got time to do it “properly” – ergo, if you are too busy then you do not have time to do it properly (time pressure means workarounds), therefore, workarounds are not the ‘proper’ way of doing it

⁷⁷ Important to note the exception - this nurse does not see any difficulties at all with having an isolated patient and taking the COW into the single room

⁷⁸ This interview with the NUM who acknowledges that due to juggling policies, the nurses work around - going backward and forward between the bedside and the COW “trying to remember what they are actually administering”

⁷⁹ These nurses rationalised the workaround because they cannot physically touch the COW and they cannot take it in because the patient is infectious

⁸⁰ The manner in which the NUM discusses this - very supportive of the nurses - recognises how difficult it is for them

⁸¹ The nurses are logged out - should be ticking off the medication as they administer it but they cannot because they are infectious and then it logs them out so then they have to log back in and tick all the meds off (the workaround is to administer and then tick off after hands are washed) - not take the COW to the bedside – observational data is useful to provide more information on this

⁸² The NUM is quite aware that this is the practice that is used by some nurses to work around the computer logging them out when they are gowned and in the infectious room - Working around by not taking the COW to the bedside when the patient is infectious results in another workaround being required - working off a piece of paper because by not taking it to the bedside the computer logs out

⁸³ There seems to be some confusion about who has to enter the information as ‘checking nurse’ - the participant is concerned with who is logged in and that if another nurse comes to check the medication with him (not witness) that he needs to log off there and then and let the other person log in so that he is not signing off the medication. While he says that he gives them his surname so that they can enter it in the “Checked By” box, there is a sense of unease as though he feels that he shouldn’t be doing this - even though that is the policy as on this ward there are additional rules and the nurses adopt ways of protecting the use of their names as ‘checker’ in case something goes wrong

⁸⁴ They cannot change the future times in the EMMS - so if they gave the medication late then the workaround is to pass the information on - but as this happens over and over the participant identifies that at some point the information will be lost

⁸⁵ The doctors need to write up a STAT dose for the first dose because the EMMS won't make the medication available until the dose after it is ordered e.g. if the doctor writes up the order at 10am for BD antibiotic then the medication is not available to be given in the EMMS until 8pm (missed the 8am dose). On paper they would have given it at 10am and just written that time in the first box on the paper chart - but from then on it would have been 08:00 and 20:00.

⁸⁶ The participant makes the comment that they don't get a lot of orientated and alert patients - which makes the use of patients' responding to their name as an indication of a positive ID check concerning

⁸⁷ Note observations relating to this activity – nurses addressing patient by name as an ID check

⁸⁸ The medication order should be recharted every week. With the paper chart, there was no option but to get a new order because there was nowhere left for the nurses to sign that the medication was administered. The EMMS uses an icon to indicate that the order has expired but it is still possible to administer the medication even though technically it is not a legal order. The participant highlights the conflict they experience - I shouldn't (because it is not legal) but I must (because the patient needs it) so I do and then work around the responsibility by telling the NUM. The participant works around the block created by the legal requirement by giving the medication (Situational violation - workaround because it is perceived to be necessary to do so)

⁸⁹ The nurses know that he/she shouldn't administer if the eMAR is not a legal script (because the hour glass icon indicates that the script has expired) – The RN defers to the NUM - asks the NUM what they should do and administers it. To set the context – gained through observation and interviews, the patients in this ward are medical - there are medications that they have been on for a long time - most patients are on many medications - the doctors would spend a considerable portion of their time reordering medications. There are many medications for each patient with 'expired' icons - it would mean that the nurse would spend a considerable part of the shift chasing up 'expired' orders and many patients would have their medications run late which would have implications for the patients and for the next shift as the medications on that shift would run late etc

⁹⁰ 'bad' thing to not check the ID but the nurse rationalises 'I know the patient'

⁹¹ Working around the ID check by addressing the patient by name and checking the lucidity of their responses is OK because I know the patient – the nurse points out that other nurses don't use these checks and balances, they just check the bed number which this participant judges as not OK

⁹² NOT respecting my colleagues' practice - The tone in the participant's voice when talking about "but obviously some people they don't ask how the patient is using their name - they just check the bed number" – is quite disparaging - their workaround (checking the bed is not as OK as my workaround) -

⁹³ Having enough staff to adhere to policy is considered 'lucky'

⁹⁴ The participant identifies that it is possible to make an error using this workaround (writing meds on a piece of paper rather than taking the COW to the bedside)- he is very careful – but also sounds from his tone as if he is feeling conflicted - I know I shouldn't but the computer is heavy and bulky and so while aware of the potential for error does it anyway

⁹⁵ Note this participant says that it is a good thing that the EMMS enables you to check all of the medications at once rather than having to go backwards and forwards between the patient and the medications - Contrast Nurse_35 who indicated that it was problematic that nurses check all the meds at once for the DDs and that it would be better if they went back and forth doing patients' meds individually

⁹⁶ Has added 'right bed' and not included 'right time'

⁹⁷ "can't change it or fix it" – suggests that the nurse feels constrained by limitations

⁹⁸ referring to a physical workflow block

⁹⁹ Overall, there is a sense of pressure - there is variation in practice depending on physical and resource blocks, number of medications, and the person with whom you are checking the medication with

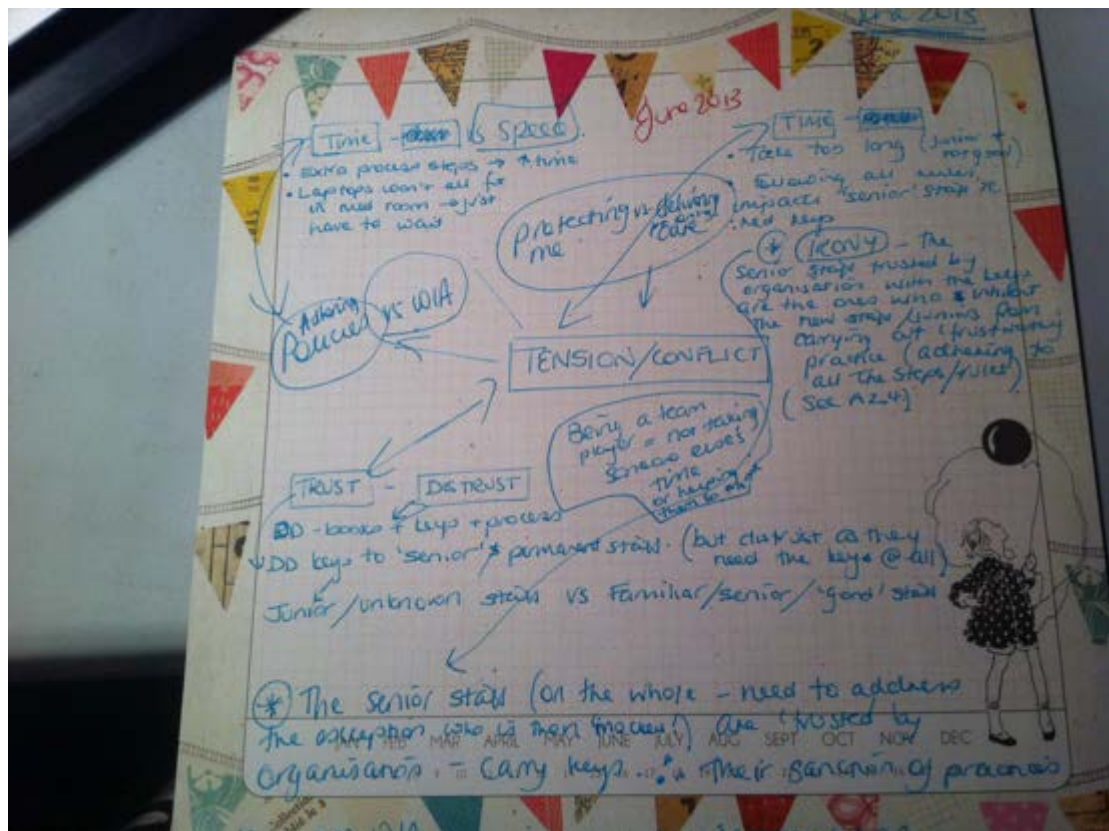
Appendix 13: Mind map reflection of emerging conceptual connections
February 2013



* W/A = workaround

Appendix 14: Mind map reflection of emerging conceptual connections

June 2013



* W/A = workaround

Appendix 15: Participant Information Sheet and Consent Form [de-identified]



University of New South Wales and [Name of Hospital]

PARTICIPANT INFORMATION SHEET AND CONSENT FORM

RESEARCH

Study of the use of electronic medication systems

Invitation

You are invited to participate in Phase 2 and/or 3 of a research project that aims to examine how electronic medication management systems (EMMS) are used in clinical practice. The intention is to understand how staff negotiate the demands of doing their clinical work and the requirements of the electronic medication management system, particularly in situations in which alternative solutions to work flow blockages are used (i.e. a workaround). Phase 1 of the study has been completed and involved a literature review, focus group and development of a process map for medication administration with electronic medication management systems.

You are being invited to participate in Phase 2 and/or 3 of the study. Phase 2 involves observation of nurses working (and in particular using electronic medication management systems), and both of these phases include focus groups and interviews.

The study is being conducted by Mrs Deborah Debono, Professor Jeffrey Braithwaite, Dr David Greenfield, and Professor Richard Day from the University of New South Wales and Professor Deborah Black from the University of Sydney.

The project is one study of a program of research studies funded by the National Health and Medical Research Council, Australia.

Before you decide whether or not you wish to participate in this study, it is important for you to understand why the research is being done and what it will involve. Please take the time to read the following information carefully and discuss it with others if you wish.

1. 'What is the purpose of this study?'

The purpose of this study is to examine how electronic medication systems are used in clinical practice. The intention is to understand how staff negotiate the demands of doing their clinical work and the requirements of the electronic medication system, particularly in situations in which alternative solutions to perceived work flow blockages are needed.

2. 'Why have I been invited to participate in this study?'

You are eligible to participate in this study because you are involved in the implementation of electronic medication management systems or because you are a nurse on a ward where electronic medication management systems are used.

3. 'What if I don't want to take part in this study, or if I want to withdraw later?'

Participation in this study is voluntary. It is completely up to you whether or not you participate. Your decision whether or not to participate will not prejudice your future relations with the University of New South Wales or the hospital in which you are working. If you decide to participate, you are free to withdraw your consent and to discontinue participation at any time without prejudice. A decision not to participate will not negatively affect your current or future relations with the hospital in which you are working or the University of New South Wales.

If you wish to withdraw from the study once it has started, you can do so at any time without having to give a reason. However, it may not be possible to withdraw your data from the study results if these have already had your identifying details removed and therefore it will not be possible to identify which data is yours.

4. 'What does this study involve?'

If you agree to participate in this study, you will be asked to sign the Participant Consent Form.

The study will be conducted between 1st February 2011 and 31st March 2014.

If you decide to participate in this study, we will observe you for an entire shift in the ward in which you are working (not including breaks). We are interested in observing factors that impact on how the Electronic Medication Management Systems are used. We will collect information on contextual factors such as the layout of the ward, the patient to staff ratio, and the number of outlying patients. We will collect data on the patterns of: activity over time; interaction and communication between staff; as well as the factors that impact these patterns (e.g. shift). We will observe the medication administration process and collect data on the sequence of events in medication administration (process steps) and how the electronic medication management system is used. If you agree we will take field notes of our observational study.

We will interview you and/or enrol you in a focus group. During the interview and focus group we will ask for your perceptions about how electronic medication management systems are used and how staff negotiate the demands of doing their clinical work and the requirements of the electronic medication system. We are particularly interested in situations in which alternative solutions to perceived work flow blockages are needed. If you agree, we seek your consent to audio record the interview with you and/or the focus group meeting in which you participate. Interviews and focus groups will be audio taped to ensure that your views and related experiences of participants are recorded and analysed accurately. Only research team members will listen to these tapes which will be de-identified and examined for the purposes of assessing responses generally, not any one specific person's responses. Both verbal and non-verbal communication will also be observed and recorded during the focus groups. If you agree to participate in a focus group we ask you not discuss the content discussed within the focus group outside the focus group meeting. An hour will be allocated for focus groups and interviews.

5. 'How is this study being paid for?'

The study is being funded by a grant from the National Health and Medical Research Council, Australia. Participating sites will not receive funding for participation in this study.

6. 'Are there risks to me in taking part in this study?'

While we do not see any risks to you in participating, you may feel uncomfortable answering interview questions, discussing issues we raise or being observed.

7. 'Will I benefit from the study?'

We cannot and do not guarantee or promise that you will receive any benefits from this study. We do not provide any fees for your participation. The findings of the study have the potential to identify characteristics that contribute to a mismatch between actual practice and introduced technology. This will be of benefit to clinicians who use the systems.

8. 'Will taking part in this study cost me anything, and will I be paid?'

Participation in this study will not cost you anything. We do not envisage any costs to you as a result of your participation. If you incur travel expenses in meeting with us, or participating in the study, we will reimburse them. You will need to provide documentation in support of your claim.

9. 'How will my confidentiality be protected?'

Any information that is obtained in connection with this study and that could potentially be identify you will remain confidential. It will not be provided to your line managers or the organisations who employ you, and will be disclosed only with your permission, except as required by law. All data will be de-identified and will be stored securely so that only the researchers of this study will have access to the information. Records, transcripts, tapes and digital data will be stored securely with electronic or keyed access available only to researchers approved by the Human Research Ethics Committees. The interviews will be transcribed and individuals and institutions de-identified. Audio recordings of focus groups and interviews will be destroyed as soon as they have been transcribed. Names used during focus groups and interviews will be coded (names removed) when transcribed. Digital data will be stored in password-protected electronic files, and tapes, de-identified coded records and transcripts in locked filing cabinets accessible only to HREC-approved investigators.

10. 'What happens with the results?'

If you give us your permission by signing the consent document, we plan to discuss/publish the results. The findings of the study will be based on aggregated data, not on individual data. The results of this study will be published in a PhD dissertation, peer-reviewed journals and monographs and reports, public lectures, presentations at conferences, scientific meetings, study sites and summaries documented for peak bodies and consumer groups. The results will be provided to the Human Research Ethics Committee for monitoring purposes. We will feed our findings into workshops and symposia for the benefit of practitioners, policymakers and

researchers. In any publication or presentation, information will be provided in such a way that you cannot be identified.

11. 'What should I do if I want to discuss this study further before I decide?'

When you have read this information, the researcher, Mrs Deborah Debono, will discuss it with you and any queries you may have. If you would like to know more at any stage, please do not hesitate to contact her on 0404 832254 (mobile) or 9385 2132 (work). You may also contact [*the site supervisor, tel: XXXX*] for more information about this project.

12. 'Who should I contact if I have concerns about the conduct of this study?'

This study has been approved by [de-identified] HREC. Any person with concerns or complaints about the conduct of this study should contact the Research Office who is nominated to receive complaints from research participants. You should contact them on [de-identified telephone number] and quote [*HREC/10/XXX/116*].

The conduct of this study at the [*name of site*] has been authorised by the [*name of organisation*]. Any person with concerns or complaints about the conduct of this study may also contact the [*Research Governance Officer or other officer*] on [*telephone number*] and quote reference number [*Site specific Ethics Number*]

Thank you for taking the time to consider this study.

If you wish to take part in it, please sign the attached consent form.

This information sheet is for you to keep.



[and hospital logo]

University of New South Wales and [Name of Hospital]

CONSENT FORM

[To be used in conjunction with a Participant Information Sheet]

STUDY OF THE USE OF ELECTRONIC MEDICATION SYSTEMS

1. I,.....
of.....

agree to participate as a participant in the study described in the Participant Information Sheet set out above (*or: attached to this form*).

2. I acknowledge that I have read the Participant Information Sheet, which explains why I have been selected, the aims of the study and the nature and the possible risks relating to the study, and the information sheet has been explained to me to my satisfaction.
3. Before signing this consent form, I have been given the opportunity of asking any questions relating to any possible physical and mental harm I might suffer as a result of my participation and I have received satisfactory answers.
4. I understand that I can withdraw from the study at any time without prejudice to my relationship to the [insert names of entities].
5. I agree that research data gathered from the results of the study may be published, provided that I cannot be identified.

6. I understand that if I have any questions relating to my participation in this research, I may contact Deborah Debono on telephone: 9385 2132 or 0404832254 who will be happy to answer them.
7. I acknowledge receipt of a copy of this Consent Form and the Participant Information Sheet.

Complaints may be directed to the, Research Office, Phone: 02 XXXXXXXXX

Signature of participant Please PRINT name Date

Signature of witness Please PRINT name Date

Signature of investigator Please PRINT name Date



[and hospital logo]

University of New South Wales and [Name of Hospital]

STUDY OF THE USE OF ELECTRONIC MEDICATION SYSTEMS

REVOCATION OF CONSENT

I hereby wish to **WITHDRAW** my consent to participate in the study described above and understand that such withdrawal **WILL NOT** jeopardise my relationship with the [insert name of entity].

Signature

Date

Please PRINT Name

The section for Revocation of Consent should be forwarded to:

Professor Jeffrey Braithwaite,
Centre for Clinical Governance Research
Australian Institute of Health Innovation
Faculty of Medicine
The University of New South Wales, Kensington, NSW 2052