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Publication Date:

2010

DOI:

<https://doi.org/10.26190/unsworks/761>

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Implementation and Evaluation of a Hospital-Wide Gout Protocol

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Abstract

A systematic case-file clinical review carried out at Liverpool Hospital, Australia reported sub-optimal management of acute gout occurring during hospitalization, resulting in poor clinical outcomes. To improve patient care, we developed a new hospital-wide gout protocol to inform decision making regarding investigations, management, and referrals to Rheumatology. To maximise adoption of this protocol by non-rheumatologists, we sought to develop and employ evidence-based implementation strategies for the distribution of the new protocol, and to evaluate the effectiveness of this implementation. A literature review indicated that the strongest strategy is a form of continual reminder system, while use of opinion leaders and passive sessions such as lectures and seminars were less effective. A baseline survey of hospital medical staff supported the need for a new protocol, and a multi-factorial implementation approach was adopted that included computerised and paper reminders, interactive education sessions, and an audit and feedback process to be completed in the near future. An evaluation survey after four months revealed that the interactive education sessions were rated most effective by clinicians. While the automated reminders did not rate as highly with clinicians at this stage, they are likely to become a more significant distribution tool over an extended period. A repeat case-file review is planned and should be a true indicator of the success of the protocol in improving professional practice and patient outcomes.

Introduction

Acute gout is one of the most common causes of inflammatory arthritis and has the potential to cause significant morbidity. It affects approximately 6-7% of males aged over 65 and 3% of females over 85 [1], with the majority of patients being managed in primary care or by specialists in fields other than rheumatology. Curiously, both the incidence and prevalence of gout are increasing worldwide despite a sound knowledge of its pathogenesis and pathophysiology, and with safe and effective treatment available [2]. Several studies have reported sub-optimal management of gout, including overtreatment, undertreatment, and inappropriate medication use, corresponding to poor clinical outcomes [2-4]. Becker & Chohan (2008) suggest that this is primarily the result of failure to recognise gout as a potentially disabling condition, as well as a combination of obstacles such as diagnostic inaccuracy, poor patient education and a deficiency of appropriate management guidelines/protocols [2]. There is indeed a lack of evidence-based guidelines for the management of acute gout in the hospital setting.

A recent systematic case-file clinical review carried out at Liverpool Hospital, Sydney, Australia [5] focused on the management of acute gout during hospital admission, identifying 154 episodes of acute gout over a 20-month period. Analysis of patient management revealed a number of concerning issues, including: (i) a high rate of discontinuation of baseline medications on admission, (ii) variability in management and inappropriate prescription of anti-gout medication, (for example 8% of patients received no pharmacotherapy, while 23% of patients on colchicine received an over-dosage), and (iii) delays in the commencement of anti-gout medication of over 3 days in up to 20% of patients. Furthermore, it was found that patients who had a rheumatology consultation were more likely to receive appropriate therapy, receive follow-up, and experience resolution of their gout. On the basis of these results, we set out to develop a new hospital-wide protocol for use by non-rheumatologist medical staff to inform decision-making with regards to investigations, management and referrals to rheumatologists.

Studies of management practice in primary care have revealed similar results to our hospital study, with wide variations in medical treatment, high rates of inadequate and unnecessary prescription, and low rates of referral to rheumatology specialists [6-7]. Keith and Gilliland (2007) recently concluded that "Unfortunately, gout remains one of the most frequently mismanaged diseases in both emergency departments and primary care settings" [8]. The British Society for Rheumatology and British Health Professionals in Rheumatology [9], along with EULAR [10-11], have developed national evidence-based guidelines for diagnosis and management, but these are more suited to ambulatory and community settings due to their emphasis on long-term management and lifestyle changes, as opposed to management in the acute hospital environment.

The purpose of developing and introducing new guidelines in any field, is to instigate change in the behaviour of practitioners and thus improve patient outcomes [12-13]. However while considerable resources are invested into research and development, the actual implementation stage is often underestimated. Despite the existence of well-established evidence based guidelines, numerous studies have shown that these recommendations are frequently ignored in practice and so patients lose the benefit of that knowledge [14]. Successful integration of clinical guidelines is a complex process involving three major

stages: (i) developing the guideline, (ii) educating clinicians about the guideline, and (iii) ensuring clinicians act upon the guideline [15]. Numerous well-targeted strategies must be employed to achieve this integration, on the background of considerable planning. Furthermore, once guidelines are implemented, they should be subjected to appropriately timed re-appraisal, evaluation and reiteration to ensure their successful integration [16].

The aims of this project were to (i) develop a practical protocol to assist non-rheumatologists in the management of their patients suffering from acute gout occurring during hospital admissions; (ii) determine and employ optimal approaches and strategies to implement the new gout protocol throughout the hospital; and (iii) evaluate the effectiveness of the implementation strategies with regards to clinician contact and uptake.

Development of a hospital-wide gout management protocol

The protocol was developed by the rheumatology department at Liverpool Hospital, based upon evidence from the British and EULAR guidelines for management [9-11] and the clinical experience of senior staff. We designed a relatively practical but non-prescriptive protocol targeted at non-rheumatologists with primary intentions to emphasize the importance of continuation of baseline anti-gout medications on admission, prevent inappropriate prescriptions of colchicine, NSAIDs and allopurinol in hospital, encourage invitations for assistance by rheumatology and promote the use of combination therapy in cases of more severe gout (>1 joint involvement) (Figure 1).

The review of actual practice at our institution [5] guided the design of the protocol. We found that patients suffering acute gout in our hospital were elderly with ~70% having evidence of chronic renal impairment (creatinine >90µmol/L), thus NSAIDs would generally be contraindicated. Although NSAIDs are often used as a first-line treatment option for acute gout, a double-blind, randomized, controlled trial comparing indomethacin plus paracetamol with prednisone plus paracetamol found while both therapies had equal efficacy, there were significantly less adverse events recorded in the group prescribed prednisone [17]. Oral prednisolone (35mg daily) has also been shown to be comparably effective to naproxen 500mg twice daily [18]. Furthermore, current guidelines limit colchicine daily dosing to 1.5-1.8mg [9]. Thus, our protocol provides guidelines to use each of NSAIDs, colchicine and prednisone safely, and recommends combinations of these agents if >1 joint is involved. We recognize that the published guidelines for acute gout management [9-11] do not advocate the use of combination anti-inflammatory therapy, but this approach is the preferred option by most rheumatologists when compared to non-rheumatologists [5, 19].

Determining optimal strategies for protocol implementation

Literature review

An initial literature review was undertaken to determine implementation strategies with the highest levels of evidence by searching the electronic databases of Medline, The Cochrane Library and Google Scholar, with a particular focus towards systematic reviews and primary studies. The review provided the necessary scope to develop an effective implementation plan.

Figure 1: A4 formatted version of the protocol for distribution

Protocol For Prevention And Management Of Gout In Hospital

WHEN ADMITTED TO HOSPITAL	ACTION
Enquire about history of gout Note current anti-gout medications <ul style="list-style-type: none"> ♦ Allopurinol, Probenecid ♦ Anti-inflammatory gout drugs (eg: colchicine, NSAIDs, COX2 inhibitors, prednisone) 	<p>Document in health care record</p> <p>Continue unless contraindicated</p> <p>Continue unless contraindicated Watch for acute gout during admission if discontinued</p>
POSSIBLE GOUT FLARE IN HOSPITAL (ACUTE INFLAMMATORY MONO-ARTHRITIS OR OLIGO-ARTHRITIS)	ACTION
Diagnosis uncertain	<p>Urgent joint aspiration to exclude septic arthritis, especially if large joint involved. (Request Rheumatology or orthopaedic assistance as needed)</p> <p><u>Investigations</u> – UEC, Serum urate, WCC, CRP, XRay, Blood culture</p> <p>Request Rheumatology consultation</p>
Diagnosis of gout very likely	<p><u>Investigations</u> – UEC, Serum urate, WCC, CRP, XRay</p> <p><u>Management</u> – Treat without delay – consider:</p> <ul style="list-style-type: none"> ♦ Colchicine < 1.5mg/day maximum dose¹ ♦ Prednisolone 15 to 30mg/day² – consider relative contra-indications: <ul style="list-style-type: none"> • Diabetes mellitus • Infection ♦ NSAIDs with PPI³ – (only if eGFR>60mL/min) <ul style="list-style-type: none"> • Eg: Diclofenac 50 mg bd + Pantoprazole 40mg daily ♦ Combination therapy⁴ <ul style="list-style-type: none"> • Prednisolone + Colchicine • NSAIDs/PPI + Colchicine • NSAIDs/PPI + Prednisone ♦ Use adjunctive Paracetamol or other analgesia <p>Request Rheumatology consultation if not on allopurinol or at any time for advice</p>

Notes:

¹ Maximum dose of colchicine 500 micrograms – three times a day (tds) unless advised by Rheumatology team

² Use 20mg/day prednisolone unless relative contraindications warrant reduction and 30mg/daily for resistant cases once other causes of ongoing inflammation such as infection excluded – specify team responsible and date for review of prednisolone therapy in health care record

³ Never use NSAIDs or COX2-inhibitors in patients with renal impairment

⁴ Combination therapy is preferred option if more than one joint involved, and a good initial option in all cases if no contraindications

The first task in implementation is to appreciate the local setting and target group at which the new guidelines are aimed at, and ensure that the existing clinical process or pathway is well identified [20-21]. Common barriers identified in the literature include a lack of awareness or knowledge of the guidelines by clinical staff, lack of ‘trust’ or credibility in the guidelines both by staff and patients, inadequate resources, or guidelines that are too complex or radically different from established norms [20, 22]. The literature largely supports the employment of a systemic and organisational approach for the successful integration of new guidelines. That is, while the involvement and influence of clinicians is clearly the ultimate goal, it is more effective to make organisational changes and create systems to support the desired behaviour, than directly trying to change the behaviour of individual clinicians [23]. Implementation structures encompassing multiple strategies have also been proposed by many of the studies to be more effective when compared to a single targeted strategy [21, 24]. However, results from Grimshaw *et. al*’s large systematic review of 235 implementation studies concluded that “multifaceted interventions did not appear to be more effective than single interventions and the effects of multifaceted interventions did not appear to increase with the number of component interventions” [25]. More recently, Coortos *et. al* supported this claim, finding that a multiple-intervention strategy did not automatically result in higher improvements in a hospital setting; specific hospital factors had to be addressed [26]. Overall, our review identified 7 main strategies that we ranked in order of effectiveness as determined from the majority of articles (Table 1).

Table 1: Classification and overview of interventions with effectiveness rank

<i>Intervention class</i>	<i>Intervention</i>	<i>Description</i>	<i>Rank based on articles</i>
Educational	Printed materials	Distribution of educational materials	7/7
	Educational meetings	Includes participation in courses, seminars, grand rounds, workshops and conferences	6/7
	Educational ‘outreach’	Trained person meets with clinicians in their work environment to provide information with the aim of changing their practice	3/7
Reminders	Paper-based	Printed forms with standard/generic information e.g. ward posters, pocket cards	2/7
	Computerised	Integrated computer reminder system that is prompted when certain information is accessed or entered	1/7
Local opinion leader	Local opinion leader	Influential members as nominated by colleagues using their authority to mediate and promote change	4/7
Audit and feedback	Audit & feedback	Summary of clinical performance over a period of time compared to baseline data, with appropriate constructive feedback to improve practice	5/7

Reminder systems: Provided either verbally, on paper or on a computer, reminders assist clinicians by prompting them to recall information they know or are expected to know, by presenting it to them in a relevant and accessible format close to the time of decision-making. Reminders have been found to be the most frequently evaluated single intervention and in general the most effective [16, 21-25, 27-29]. Grimshaw *et. al's* review concluded that any guideline intervention should include paper or computer-based reminders wherever possible [25]. Only one study indicated a negative attitude towards reminder systems, specifically computer-based systems, which involved an interview study of five general practices which implemented new systems [30].

Educational meetings and training: While reminders are always a helpful tool, it is imperative that guidelines also instil a change in a clinician's knowledge, attitudes and behaviours. Formal meetings and training are perhaps the most commonly used method of promoting new guidelines in the context of physicians maintaining clinical competence [16]. However, care must be taken in the selection and planning of these sessions, as the majority of literature suggests that passive and didactic educational sessions are among the least effective of intervention strategies, when used alone. Conversely, interactive workshops and other similar strategies such as outreach programs and use of local opinion leaders (discussed below), have displayed great potential for change [31]. One study involving a small-group CME session and review of charts led to improved rates of vaccination for influenza in elderly patients [32]. However there was little to no improvement in another study which involved a three-hour seminar on cholesterol management, that also included additional printed materials and subsequent follow-up meetings [33]. Therefore it seems one of the major characteristics for a successful educational intervention is the active involvement of its participants.

Educational 'outreach' visits: These involve personal visits by trained people to clinicians in their own setting, to provide information with the aim of changing their practice or performance, particularly in relation to prescribing behaviour [34-35]. Admittedly in the hospital setting, this face-to-face intervention may slightly overlap with existing educational programs for clinicians, and this is consistent with the considerable variation and lack of formal definitions of an educational outreach visit. In terms of success, educational outreach programs were the second most commonly evaluated intervention and reported moderate levels of effectiveness in most studies, but stressing that any potential benefits should be weighed against the costs and practical considerations of this resource-intensive intervention. A Cochrane review that examined the impact of outreach visits on health care outcomes and professional practice, concluded that outreach visits either alone or combined with other interventions provide small but consistent effects on prescribing [35].

Local opinion leaders: Opinion leaders are a select group of people who are perceived as "educationally influential" by their colleagues. They are often seen as trustworthy and likeable characters, and the theory is that they are in a exclusive position to advise and persuade others to utilise evidence-based information in their practice [36]. However, due to inherent variation in interpersonal skills of opinion leaders, it is not surprising that trials have not defined the roles of opinion leaders clearly and reported mixed results of their effectiveness as an implementation strategy [24]. A more recent Cochrane review however, did conclude that opinion leaders are effective in reducing non-compliance and promoting

evidence-based practice, and are on a comparable level of effectiveness to other implementation strategies [36]. The review also supported the integration of opinion leaders with a systemic approach to implementation. For example, a randomised controlled study by Soumerai *et. al* [37], often referred to as the best example of the effectiveness of opinion leaders [23], demonstrated that an intervention at hospitals with opinion leader physicians led to a 17% and 33% greater likelihood of receiving aspirin and beta-blockers respectively, compared to control hospitals.

Printed educational materials: Traditionally presented as monographs, mailed distributions, publications in journal articles and clinical guidelines, printed materials appear to be the most frequently employed method for disseminating information, despite not being the most effective [38]. A previous systematic review of the effects of printed educational materials on professional practice found no statistically significant improvements in professional performance with the passive dissemination of information [39], and this appeared to be the general consensus among the majority of studies and reviews. Nonetheless, there were some studies which noted a positive impact when the context of the clinical practice was conducive to change [40-41].

Audit and feedback: The clinical audit aims to improve patient care and outcomes through the systematic review of management against specific criteria and implementation of change [24]. A recent Cochrane review defined ‘audit and feedback’ as: “any summary of clinical performance of health care over a specified period of time” presented in written, electronic or verbal form [42]. In addition to providing an evaluation tool to assess the outcome of the new guideline, in theory it also acts as an incentive and driver to the implementation process by motivating clinical staff to modify their practice [24].

Pre-protocol implementation survey of key stakeholders

A baseline survey aimed at the clinicians responsible for acute gout management was created to aid in the establishment of implementation strategies (Table 2). Questions were grouped into two categories – those based on the previous case-file review [5], including questions on medication use, referrals to rheumatology, confidence in current management, and questions based on access to the new protocol. The survey was distributed through mass-email to all participants via a link to an online-response form, and hard-copies were handed out at intern and registrar education sessions. The survey yielded 49 responses from junior and senior hospital medical staff. Almost all clinicians stated that they would routinely continue baseline anti-gout medications on admission, barring complications, despite the case-file review having found an average rate of 40% discontinuation of allopurinol, colchicine, NSAIDs and prednisone. Regarding referrals, 68.1% of clinicians indicated they had referred patients to Rheumatology at some point, at an average rate of approximately 38% of their patients. Results for the pharmacotherapy questions are presented in Table 3.

Regarding current management, only 15.2% of respondents felt confident in their current management strategy for acute gout, while 73.9% were somewhat confident and 10.9% were not confident. This suggests a real need for the protocol. All respondents indicated that a hospital-wide gout protocol would be useful for them.

Table 2 – Questions and response options from baseline survey

<i>Question</i>	<i>Response options</i>
When a patient who has been on anti-gout medication (allopurinol, colchicine, NSAIDs, prednisone) is admitted, do you generally continue this baseline medication?	<ul style="list-style-type: none"> - Yes - No (please give reasons)
When a patient presents with an acute gout flare, what is your usual form of management?	<ul style="list-style-type: none"> - Treatment with a single drug - Treatment with multiple drugs - No initial drug therapy
If you prescribe drugs, which of the following would you commonly prescribe? (Select all that apply, including dosage)	<ul style="list-style-type: none"> - Colchicine: 0.5 - 1.5 mg/d - Colchicine: > 1.5mg/d - Corticosteroids (e.g. oral prednisone): ≤ 10mg/d - Corticosteroids (e.g. oral prednisone): 10-20mg/d - Corticosteroids (e.g. oral prednisone): ≥ 20mg/d - NSAIDs - Other (please specify)
Have any of your patients ever experienced any side effects from the use of anti-gout medication?	<ul style="list-style-type: none"> - No - Yes (please list the side effects)
Have you ever referred a patient for consultation by the Rheumatology unit?	<ul style="list-style-type: none"> - No - Yes (please list the reasons for referral)
If you have referred patients to Rheumatology, approximately what percentage of patients would you say you have referred?	<i>Open response</i>
How confident do you feel that your current management strategy for gout is the best one?	<ul style="list-style-type: none"> - Not confident - Somewhat confident - Very confident
Would such a protocol for gout management help you? (after explanation that a new protocol is being introduced)	<ul style="list-style-type: none"> - Yes - No
How effective do you think each of the following interventions would be as a reminder/reference for you in gout management? (Rate Not effective / Somewhat effective / Very effective)	<ul style="list-style-type: none"> - A4 reminder sheet on all the wards - Integration into Powerchart when you order serum urate - Educational session with a Rheumatology consultant involving active discussions
Finally, how important do you think the optimal management of gout is in hospital inpatients?	<ul style="list-style-type: none"> - Not very important - Somewhat important - Very important

One clinician commented: *“Liverpool Hospital lacks available protocols for common acute medical things, it would be useful to have them in some sort of manual, and on the intranet in a way we can find”*. When asked about which methods of access to the new protocol they would find useful, the strategy rated most effective was educational sessions with a consultant involving active discussion (62.2%), while A4 ward posters were rated lowest, with one comment suggesting that reminder sheets on the ward might get lost.

Table 3 – Results from pharmacological management questions

Question	Options	Response rate
When a patient who has been on anti-gout medication (allopurinol, colchicine, NSAIDs, prednisone) is admitted, do you generally continue this baseline medication?	Yes	81.6%
	No	18.4%
When a patient presents with an acute gout flare, what is your usual form of management?	Single drug	67.3%
	Multiple drugs	32.7%
	No initial drug therapy	0%
If you prescribe drugs, which of the following would you commonly prescribe? (Select all that apply, including dosage)	Colchicine: 0.5 - 1.5 mg/d	69.4%
	Colchicine: > 1.5mg/d	12.2%
	Corticosteroids: ≤ 10mg/d	8.2%
	Corticosteroids: 10-20mg/d	28.6%
	Corticosteroids: ≥ 20mg/d	14.3%
	NSAIDs	63.3%
Have any of your patients ever experienced any side effects from the use of anti-gout medication?	Other	2.0%
	No	30.6%
	Yes	69.4%

Implementation methods adopted

Based upon information obtained from the literature review and results of the baseline survey, the structure of the implementation strategy adopted was a systemic, organisational and multifaceted one aiming to reach target clinical staff by as many means as possible. The specific interventions we adopted can broadly be grouped into reminders and education. Once the protocol had been reviewed and passed by relevant committees, it was made electronically accessible on the intranet for the local area health service, and emails were sent to the majority of clinicians at the hospital informing them of its introduction.

Reminders: A computerised reminder system was developed utilising the existing hospital-wide electronic pathology test reporting and ordering system known as Powerchart. The placement, timing and ease of use of this guideline were carefully considered with the aim of reaching the maximum amount of relevant staff while not becoming an interference. The reminder was linked to the ordering of serum urate, and placed in a key location within the Powerchart interface that was mandatory before an order could be completed. Clicking on this reminder would transfer the clinician to the electronic version of the protocol located on the Health Service intranet. Printed reminders were also developed in the form of laminated single-paged posters of the protocol. These were distributed to nursing managers at their weekly meeting along with a brief overview of the project, and posted at select locations throughout wards in the hospital and in the Emergency Department (Figure 1).

Education: The education component of the implementation program integrated three of the strategies identified in the literature: educational meetings and training, educational ‘outreach’ visits and the use of local opinion leaders. Consultants from the Rheumatology department performed two sets of ‘outreach’ visits in the form of educational sessions to interns, residents and medical and surgical registrars at their teaching sessions, with an emphasis on interaction and involvement of the participants. The initial sessions involved the consultant reviewing the results of the previous clinical audit and discussing any issues with management that the clinicians had, while introducing the new protocol with instructions on how it can be accessed. Follow up sessions occurred 4 months later, where the consultant re-introduced the topic and initiated further discussion about management issues.

Initial evaluation of the effectiveness of the protocol introduction

Four months after implementation began, an evaluation survey of clinicians was released. Questions were grouped into three broad categories, based on: contact with the new protocol, use of the new protocol and impact on management (Table 4). There were 52 valid responses.

Table 4 – Questions and response options from evaluation survey

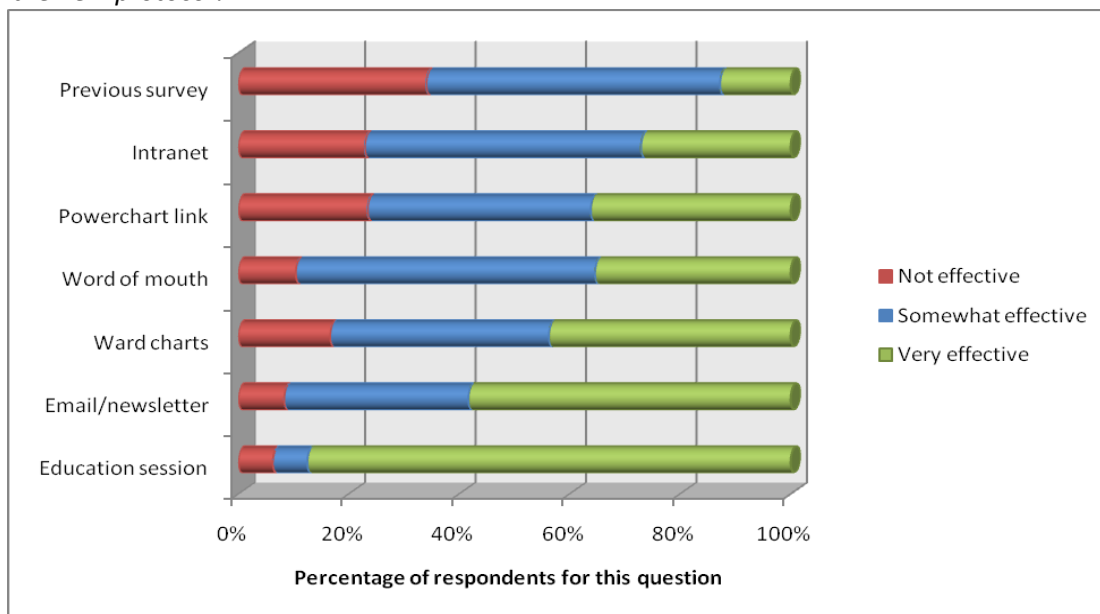
<i>Question</i>	<i>Response options</i>
Before this survey, have you seen or heard about the new protocol for the management of acute gout in Liverpool hospital? (If Yes, about how long ago did you FIRST hear about it?)	<ul style="list-style-type: none"> - No - Yes (please enter how long ago you FIRST heard about it)
In which way did you FIRST come to know about the new protocol?	<ul style="list-style-type: none"> - Word of mouth - Email/newsletter - Previous survey - Wall charts on the wards - Education session with Rheumatology consultant - Through the intranet - Powerchart link - Other (please specify)
In which of the following ways have you heard or come across the protocol SINCE THEN (select all that apply):	<ul style="list-style-type: none"> - Word of mouth - Email/newsletter - Previous survey - Wall charts on the wards - Education session with Rheumatology consultant - Through the intranet - Powerchart link - Other (please specify)
Please rate how effective you think the following methods are of finding out about the new protocol? (Not effective / Somewhat effective / Very effective)	<ul style="list-style-type: none"> - Word of mouth - Email/newsletter - Previous survey - Wall charts on the wards - Education session with

	Rheumatology consultant - Through the intranet - Powerchart link
Have you referred to the new gout protocol to help manage acute gout in your patients?	- Yes - No
Had other members of your team heard of or used the new protocol?	- Yes – they had used it - Yes – they had heard of it - No
Did you find the protocol useful in aiding your management of acute gout?	- Not useful at all - A little useful - Moderately useful - Very useful
How accessible/effective to use were the following forms of the new gout protocol? (Not effective / Somewhat effective / Very effective)	- Email/newsletter - Wall charts on the wards - Education session with Rheumatology consultant - Protocol on the intranet - Powerchart link
How confident do you feel about your current management strategy for gout?	- Not confident - Somewhat confident - Very confident
If you have come across the new protocol, would you say it has helped to improve your confidence in managing gout?	- Yes - No
Finally, how important do you think the optimal management of gout is in hospital inpatients?	- Not very important - Somewhat important - Very important

Contact with the new protocol: 44.2% of respondents specified they had heard about the protocol at some point before answering this survey, varying from 2 weeks back, to 6 months back at an average of 2.6 months. Of those that had previously heard of the protocol, the strategy found to be the most common first contact was the education sessions, being the first contact of the protocol for 44.2% (23) of respondents. When asked about further contact, 57.7% (30) of respondents indicated they had come across the protocol again on one or more occasions. Education sessions were the most common, at 53.3% (16) contact for this group. The next question asked clinicians to rate each strategy as to how effective it was to learn about the new protocol, whether they had already heard about it or not. The education sessions were again the clear favourite, rated very effective by 87.5% (42) of respondents.

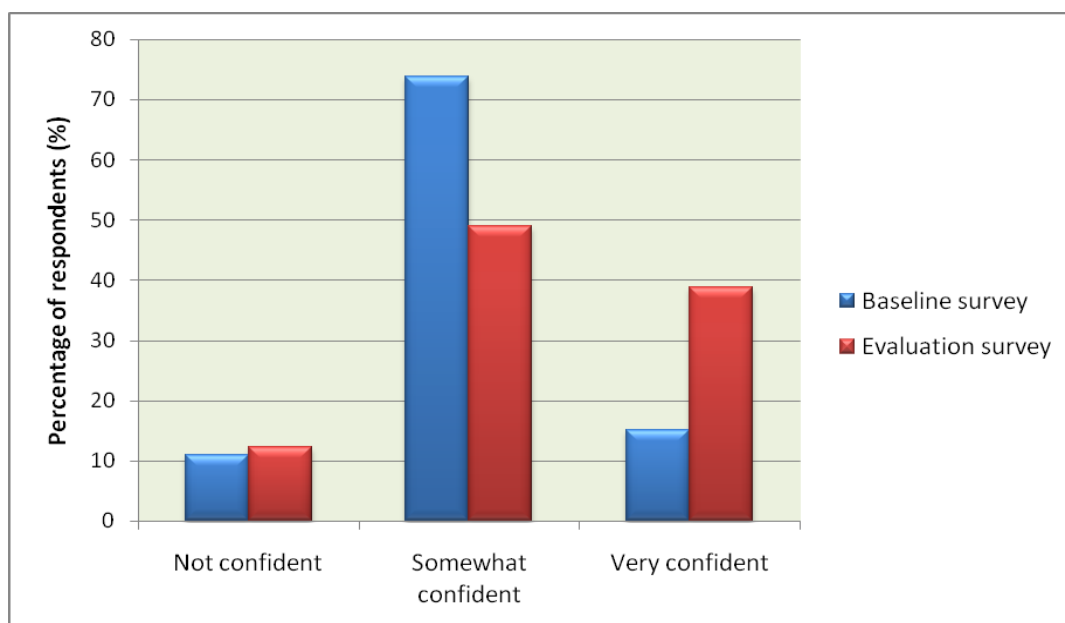
Using the new protocol: Only 10% (4) of clinicians admitted to having used the new protocol, while 18% reported that a member of their team had either heard of or used the protocol. The responses to subsequent questions on utility of the protocol were too low to be meaningful for analysis.

Figure 2: Please rate how effective you think the following methods are of finding out about the new protocol?



Management of gout: When asked again about how confident they were with their management strategy, with the protocol having been available for 4 months, 39.6% responded they were very confident, an increase of over twice the rate from the baseline survey, while 50% were somewhat confident and 10.4% were not confident – all showing slight improvements (Figure 3).

Figure 3: Confidence in managing gout before and after implementation



Discussion

Although there have been numerous reviews and studies offering recommendations for the management of acute gout, such as those from The British Society for Rheumatology [9] and EULAR [10-11], we could not find any other reports that involved testing or implementing a new guideline for this commonly mishandled disease. The results of our study validate our previous case-file review of actual practice in demonstrating the need for a protocol. A baseline survey of clinicians revealed a disconnect between intention and practice, particularly comparing pharmacotherapy, referrals, and sub-optimal confidence rates for gout management. Furthermore, every clinician responded that a new gout protocol would be useful indicating receptivity to change. The previous review found a high average rate of 40% discontinuation of baseline medications on admission with no identifying reasons, while only 18.4% of clinicians admitted to frequently discontinuing baseline medications, particularly allopurinol. While this gap in practice requires addressing, the influence of contraindications and other complicating factors in these results must be acknowledged. Furthermore, 12.2% of respondents indicated that they would prescribe colchicine at over 1.5mg/d (Table 3), representing an over dosage leading to increased rates of side effects such as diarrhoea, and the need for a standardised protocol.

Once the protocol had been implemented, it was interesting to note that the confidence level in managing gout increased substantially in those that rated themselves as now 'very confident', from 15.2% to 38.8% (Figure 3). Comparatively, a survey of general practitioners in the UK showed an overwhelming 86% claimed to be confident in diagnosing and managing gout [7]. The same study found that less than a third of GP's routinely referred patients with gout to a rheumatologist or other specialist. While our study demonstrated that 68% of clinicians had referred patients to rheumatology, this was only at an average rate of approximately 38% of their patients. These types of results further underscore the need for intervention in gout management.

When asked to rate three of the proposed strategies, clinicians selected education sessions as potentially most useful and the best method to first learn about the protocol, contrary to findings from the literature that electronic and printed reminders were the most evaluated and the most effective. Similar results were apparent in the early post-implementation evaluation survey, with education sessions being the clear favourite followed by email and the automated reminders: ward charts and the integrated Powerchart link. A reason for this is perhaps due to the combination of sessions being run by an eminent rheumatology consultant and an emphasis on active discussion, rather than passive and didactic sessions and merging with the more effective strategy of 'local opinion leaders'. One clinician commented: *"if something is to be a rule, it needs to be preached by effective communicators, ie consultants in the area"*. Indeed the interactive education sessions received largely positive feedback from participants, and with a four-month follow up period, it was also the most common method of continual contact of the protocol. With a longer follow-up period however, this may be likely to change, depending on the frequency of organised sessions, attendance, rotation of clinicians to this particular hospital, and the eventual long-term effectiveness of the automated reminders.

The most common method of first contact, not surprisingly, was through email. Essentially this could have represented an invitation to complete either of the surveys, or an official notification of the protocol, being sent to most practicing clinicians at the hospital. While an effective tool for initial distribution, a key issue is raised from one of the comments: *"you have to overcome the 'white noise' of all the intranet and emails"*, which is indeed a limiting factor that is difficult to overcome. While the automated reminders consisting of ward charts and electronic Powerchart link were generally rated lower than the education sessions and email, both in the baseline and evaluation surveys, this may signify the tendency for clinicians to lean towards more direct and informative avenues, despite the high rating of reminders in the review. One clinician commented: *"We are all so busy that methods which are more 'in your face' are more effective - at least for me. Therefore a received email or talk or word of mouth is more effective than seeing it accidentally on Powerchart (unless you were notified on the noticeboard when you first open Powerchart)"*.

The demonstrated success of the educational sessions is likely to be a short-lived effect, since this type of regular face-to-face contact by busy consultants is labour intensive and may not be sustainable over the long-term, unless a dedicated education program is established and a series of talks integrated into the schedule of junior and trainee doctors. This type of program would ensure the current cohorts of junior doctors are well-informed, and likely to carry this knowledge throughout their professional career when encountering patients with acute gout. It is more difficult to address the re-education of the more senior doctors: *"... as a JMO, you can suggest protocol based treatment ad nauseam, but unless your seniors (ie registrars and consultants) have had the same education, they tend to stick to their existing practice"*. Automated reminder systems such as the Powerchart link and ward charts would provide a more sustainable and effective long-term solution to promoting the protocol, despite not being popular with clinicians in this short-term review.

In the longer term, we have planned for a repeat case-file review be carried out to determine the true success or failure of the protocol in improving professional practice and patient outcomes. Audit criteria can be based on the previous study, with a gearing towards answering the key concerns that were found in that review: Is there less discontinuation of baseline medication? Are the appropriate drugs being prescribed? Are the drugs being prescribed at appropriate doses? Is there less delay in the commencement of anti-gout medication? Is there an increased rate of referrals to rheumatology?

In conclusion, this study confirmed the need for a new guideline for the management of acute gout, and emphasised the importance of developing an appropriate plan for the implementation of new guidelines into practice. After a relatively short follow-up period of four months, the interactive education sessions were the most popular and most effective form of distributing knowledge of the protocol, followed closely by email distribution, which was the most common form of first contact. Automated computer and paper reminders, while not proving as popular or effective in the short-term, are likely to become more significant in reaching a broader population of clinicians in the future. A repeat case-file review will be a true indicator of any improvement in professional practice or patient outcomes as a result of the protocol.

REFERENCES

1. Mikuls, T.R., J.T. Farrar, W.B. Bilker, S. Fernandes, H.R. Schumacher, Jr., and K.G. Saag, Gout epidemiology: results from the UK General Practice Research Database, 1990-1999. *Ann Rheum Dis*, 2005. 64(2): 267-72.
2. Becker, M.A. and S. Chohan, We can make gout management more successful now. *Curr Opin Rheumatol*, 2008. 20(2): 167-72.
3. Roddy, E., W. Zhang, and M. Doherty, Concordance of the management of chronic gout in a UK primary-care population with the EULAR gout recommendations. *Ann Rheum Dis*, 2007. 66(10): 1311-5.
4. Singh, J.A., J.S. Hodges, J.P. Toscano, and S.M. Asch, Quality of care for gout in the US needs improvement. *Arthritis Rheum*, 2007. 57(5): 822-9.
5. Gnanenthiran, S., Hassett, GM., Gibson, KA., McNeil, HP., Acute Gout Management During Hospitalisation: A Need For A Protocol. *Intern Med J*, 2010. (e-pub ahead of print 4 January 2010; doi: 10.1111/j.1445-5994.2010.02165.x).
6. Pal, B., M. Foxall, T. Dysart, F. Carey, and M. Whittaker, How is gout managed in primary care? A review of current practice and proposed guidelines. *Clin Rheumatol*, 2000. 19(1): 21-5.
7. Roberts, C., A.O. Adebajo, and S. Long, Improving the quality of care of musculoskeletal conditions in primary care. *Rheumatology (Oxford)*, 2002. 41(5): 503-8.
8. Keith, M.P. and W.R. Gilliland, Updates in the management of gout. *Am J Med*, 2007. 120(3): 221-4.
9. Jordan, K.M., J.S. Cameron, M. Snaith, W. Zhang, M. Doherty, J. Seckl, A. Hingorani, R. Jaques, and G. Nuki, British Society for Rheumatology and British Health Professionals in Rheumatology guideline for the management of gout. *Rheumatology (Oxford)*, 2007. 46(8): 1372-4.
10. Zhang, W., M. Doherty, T. Bardin, E. Pascual, V. Barskova, P. Conaghan, J. Gerster, J. Jacobs, B. Leeb, F. Liote, G. McCarthy, P. Netter, G. Nuki, F. Perez-Ruiz, A. Pignone, J. Pimentao, L. Punzi, E. Roddy, T. Uhlig, and I. Zimmermann-Gorska, EULAR evidence based recommendations for gout. Part II: Management. Report of a task force of the EULAR Standing Committee for International Clinical Studies Including Therapeutics (ESCISIT). *Ann Rheum Dis*, 2006. 65(10): 1312-24.
11. Zhang, W., M. Doherty, E. Pascual, T. Bardin, V. Barskova, P. Conaghan, J. Gerster, J. Jacobs, B. Leeb, F. Liote, G. McCarthy, P. Netter, G. Nuki, F. Perez-Ruiz, A. Pignone, J. Pimentao, L. Punzi, E. Roddy, T. Uhlig, and I. Zimmermann-Gorska, EULAR evidence based recommendations for gout. Part I: Diagnosis. Report of a task force of the Standing Committee for International Clinical Studies Including Therapeutics (ESCISIT). *Ann Rheum Dis*, 2006. 65(10): 1301-11.
12. Grimshaw, J. and I. Russell, Achieving health gain through clinical guidelines. I: Developing scientifically valid guidelines. *Qual Health Care*, 1993. 2(4): 243-8.
13. Grimshaw, J.M. and I.T. Russell, Achieving health gain through clinical guidelines II: Ensuring guidelines change medical practice. *Qual Health Care*, 1994. 3(1): 45-52.
14. McGlynn, E.A., S.M. Asch, J. Adams, J. Keesey, J. Hicks, A. DeCristofaro, and E.A. Kerr, The quality of health care delivered to adults in the United States. *N Engl J Med*, 2003. 348(26): 2635-45.
15. School of Public Health, U.o.L., Centre for Health Economics, University of York, Research Unit of the Royal College of Physicians, *Effective Health Care. Implementing*

- clinical practice guidelines: A bulletin on the effectiveness of health service interventions for decision-makers*. 1992, University of Leeds: Leeds.
16. Davis, D.A. and A. Taylor-Vaisey, Translating guidelines into practice. A systematic review of theoretic concepts, practical experience and research evidence in the adoption of clinical practice guidelines. *CMAJ*, 1997. 157(4): 408-16.
 17. Man, C., Cheung, IT., Cameron, PA., Rainer, TH., Comparison of oral prednisolone/paracetamol and oral indomethacin/paracetamol combination therapy in the treatment of acute goutlike arthritis: a double-blind, randomized, controlled trial. *Ann Emerg Med.*, 2007. 49(5): 670-7.
 18. Janssens, H., Janssen, M., van de Lisdonk, EH., van Riel, PL., van Weel, C., Use of oral prednisolone or naproxen for the treatment of gout arthritis: a double-blind, randomised equivalence trial. *Lancet*, 2008. 371: 1854-60.
 19. Schlesinger, N., Moore, DF., Sun, JD., Schumacher, HR. Jr, A survey of current evaluation and treatment of gout. *J Rheumatol*, 2006. 33(10): 2050-2.
 20. Irving, M.J., J.C. Craig, M. Gallagher, S. McDonald, K.R. Polkinghorne, R.G. Walker, and S.D. Roger, Implementing iron management clinical practice guidelines in patients with chronic kidney disease having dialysis. *Med J Aust*, 2006. 185(6): 310-4.
 21. Solberg, L.I., M.L. Brekke, C.J. Fazio, J. Fowles, D.N. Jacobsen, T.E. Kottke, G. Mosser, P.J. O'Connor, K.A. Ohnsorg, and S.J. Rolnick, Lessons from experienced guideline implementers: attend to many factors and use multiple strategies. *Jt Comm J Qual Improv*, 2000. 26(4): 171-88.
 22. Curry, S.J., Organizational interventions to encourage guideline implementation. *Chest*, 2000. 118(2 Suppl): 40S-46S.
 23. Solberg, L.I., Guideline implementation: what the literature doesn't tell us. *Jt Comm J Qual Improv*, 2000. 26(9): 525-37.
 24. Yana, R. and R.M. Jo, Getting guidelines into practice: a literature review. *Nurs Stand*, 2004. 18(50): 33-40.
 25. Grimshaw, J.M., R.E. Thomas, G. MacLennan, C. Fraser, C.R. Ramsay, L. Vale, P. Whitty, M.P. Eccles, L. Matowe, L. Shirran, M. Wensing, R. Dijkstra, and C. Donaldson, Effectiveness and efficiency of guideline dissemination and implementation strategies. *Health Technol Assess*, 2004. 8(6): iii-iv, 1-72.
 26. Cortoos, P.-J., S. Simoens, W. Peetermans, L. Willems, and G. Laekeman, Implementing a hospital guideline on pneumonia: a semi-quantitative review. *International Journal for Quality in Health Care*, 2007. 19(6): 358-67.
 27. Eccles, M.P. and J.M. Grimshaw, Selecting, presenting and delivering clinical guidelines: are there any "magic bullets"? *Med J Aust*, 2004. 180(6 Suppl): S52-4.
 28. Grimshaw, J.M. and M.P. Eccles, Is evidence-based implementation of evidence-based care possible? *Med J Aust*, 2004. 180(6 Suppl): S50-1.
 29. NHS, Effective Health Care: Getting evidence into practice. *Effective Health Care Bulletin*, 1999. 5(1).
 30. Rousseau, N., E. McColl, J. Newton, J. Grimshaw, and M. Eccles, Practice based, longitudinal, qualitative interview study of computerised evidence based guidelines in primary care. *BMJ*, 2003. 326(7384): 314.
 31. Davis, D., M.A. O'Brien, N. Freemantle, F.M. Wolf, P. Mazmanian, and A. Taylor-Vaisey, Impact of formal continuing medical education: do conferences, workshops, rounds, and other traditional continuing education activities change physician behavior or health care outcomes? *JAMA*, 1999. 282(9): 867-74.

32. Karuza, J., E. Calkins, J. Feather, C.O. Hershey, L. Katz, and B. Majeroni, Enhancing physician adoption of practice guidelines. Dissemination of influenza vaccination guideline using a small-group consensus process. *Arch Intern Med*, 1995. 155(6): 625-32.
33. Browner, W.S., R.B. Baron, S. Solkowitz, L.J. Adler, and D.S. Gullion, Physician management of hypercholesterolemia. A randomized trial of continuing medical education. *West J Med*, 1994. 161(6): 572-8.
34. Soumerai, S.B., S. Salem-Schatz, J. Avorn, C.S. Casteris, D. Ross-Degnan, and M.A. Popovsky, A controlled trial of educational outreach to improve blood transfusion practice. *JAMA*, 1993. 270(8): 961-6.
35. O'Brien, M.A., S. Rogers, G. Jamtvedt, A.D. Oxman, J. Odgaard-Jensen, D.T. Kristoffersen, L. Forsetlund, D. Bainbridge, N. Freemantle, D.A. Davis, R.B. Haynes, and E.L. Harvey, Educational outreach visits: effects on professional practice and health care outcomes. *Cochrane Database Syst Rev*, 2007(4): CD000409.
36. Doumit, G., M. Gattellari, J. Grimshaw, and M.A. O'Brien, Local opinion leaders: effects on professional practice and health care outcomes. *Cochrane Database Syst Rev*, 2007(1): CD000125.
37. Soumerai, S.B., T.J. McLaughlin, J.H. Gurwitz, E. Guadagnoli, P.J. Hauptman, C. Borbas, N. Morris, B. McLaughlin, X. Gao, D.J. Willison, R. Asinger, and F. Gobel, Effect of local medical opinion leaders on quality of care for acute myocardial infarction: a randomized controlled trial. *JAMA*, 1998. 279(17): 1358-63.
38. Farmer, A.P., Légaré, F., McAuley, L.M., Thomas, R., Harvey, E.L., McGowan, J., Grimshaw, J.M., Wolf, F.M., Printed educational materials: effects on professional practice and health care outcomes (Protocol). *Cochrane Database Syst Rev*, 2003(3): CD000172.
39. Freemantle, N., Harvey, E.L., Wolf, F., Grimshaw, J.M., Grilli, R., Bero, L.A., Printed educational materials: effects on professional practice and health care outcomes. *The Cochrane Library*, 1997(1).
40. Black, N., Hutchings, A., Reduction in the use of surgery glue ear: did national guidelines have an impact? *Quality and Safety in Health Care*, 2002(11): 121-124.
41. Mason, J., N. Freemantle, and G. Browning, Impact of effective health care bulletin on treatment of persistent glue ear in children: time series analysis. *BMJ*, 2001. 323(7321): 1096-7.
42. Jamtvedt, G., J.M. Young, D.T. Kristoffersen, M.A. O'Brien, and A.D. Oxman, Audit and feedback: effects on professional practice and health care outcomes. *Cochrane Database Syst Rev*, 2006(2): CD000259.