

# Measuring and valuing societal and offender preferences for treatment programs - an economic perspective

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**Measuring and valuing societal and offender  
preferences for treatment programs - an economic  
perspective**

**Stella Settumba Nalukwago**

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



The Kirby Institute

Faculty of Medicine

August 2019

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**Abstract 350 words maximum:**

## Introduction

The global offender population has rapidly increased over the past two decades. In Australia, incarceration rates have increased by 98% since 2000 with violent offences comprising the largest proportion. Research indicates that most violence can be classified as impulsive rather than premeditated, and that impulsive offenders are more likely to respond positively to treatment interventions than premeditated offenders. Despite the existence of interventions aimed at reducing reoffending, little is known about society's or offenders' preferences for such interventions, or value placed on them. This PhD aims to assess societal and offender perspectives and value placed on treatment programs for impulsive-violent offenders.

## Methods

A systematic review of economic evaluations of treatment programs for offenders highlighted the dearth of economic evidence. Two economic methods - discrete choice experiment (DCE) and contingent valuation (CV) – were used. A randomised control trial (REINVEST), providing pharmacotherapy treatment to impulsive-violent offenders, currently underway in New South Wales (Australia) provided the base for quantifying and valuing preferences. Prior to conducting the DCE and CV, qualitative methods (focus groups, in-depth interviews), priority setting methods of voting and ranking, and a Delphi method were undertaken to identify important characteristics of programs for impulsive-violent offenders.

## Results

The 23 characteristics generated using qualitative methods were reduced to 8 attributes and then used to develop the DCE and CV questionnaires. DCE results from 1021 community-based respondents demonstrated society's preference for programs that: are more effective; provide full as opposed to partial treatment of co-occurring health conditions; are compulsory; have flexible appointments; and are continued post-prison. The CV study showed that society placed a high value for treatment programs such as REINVEST and were willing to pay an additional annual tax of \$70 for them.

## Conclusion

The studies included in this thesis demonstrate that economic methods can be used to value programs in the justice area and provide a measure of the societal value/benefits of treatment programs for impulsive violent offenders. Additionally, this work demonstrates that when provided with relevant information, society places a positive value on treatment programs for impulsive-violent offenders.

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*Authors: Stella Nalukwago Settumba, Marian Shanahan, Tony Butler, Peter Schofield, Lise Lafferty, Paul Simpson, Georgina M. Chambers*

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*Full title: Societal preferences for the treatment of impulsive, repeat-violent offenders: A discrete Choice Experiment.*

*Authors: Stella Nalukwago Settumba, Tony Butler, Georgina M. Chambers, Marian Shanahan*

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<i>Full title:</i> Valuing the benefits of a treatment program for Impulsive Violent Offenders using the Contingent Valuation Approach				
<i>Authors:</i> Stella Nalukwago Settumba, Tony Butler, Georgina M. Chambers, Marian Shanahan				
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## Acronyms and Abbreviations

ABS	Australian Bureau of Statistics
ATO	Australian Taxation Office
AUD	Australian Dollars
CBA	Cost Benefit Analysis
CBT	Cognitive Behavioural Therapy
CEA	Cost Effectiveness Analysis
CUA	Cost Utility Analysis
CV	Contingent Valuation
DCE	Discrete Choice Experiment
FGD	Focus Group Discussion
GDP	Gross Domestic Product
LC	Latent Class
LCRPL	Latent Class Random Parameter Logistic
MNL	Multinomial Logistic
NSW	New South Wales
QALY	Quality Adjusted Life Years
RCT	Randomised Control Trial
RNR	Risk-Need-Responsivity
RPL	Random Parameter Logistic
SSRI	Selective Serotonin Reuptake Inhibitor
USD	United States Dollars
WTP	Willingness to Pay



# **Thesis Abstract**

## **Introduction**

The global offender population has rapidly increased over the past two decades. In Australia, incarceration rates have increased by 98% since 2000 with violent offences comprising the largest proportion. Research indicates that most violence can be classified as impulsive rather than premeditated and that impulsive offenders are the most likely to respond positively to treatment interventions compared to premeditated offenders.

Despite the existence of interventions aimed at reducing reoffending, little is known about society's or offenders' preferences for such interventions, or value placed on them. This PhD aims to assess societal and offender perspectives and value placed on treatment programs for impulsive-violent offenders.

## **Methods**

A systematic review of economic evaluations of treatment programs for offenders highlighted the dearth of economic evidence. Two economic methods - discrete choice experiment (DCE) and contingent valuation (CV) – were used. A randomised control trial (REINVEST), providing pharmacotherapy treatment to impulsive-violent offenders, currently underway in New South Wales (Australia) provided the base for quantifying and valuing preferences.

Prior to conducting the DCE and CV, qualitative methods (focus groups, in-depth interview), priority setting methods of voting and ranking, and a Delphi method were undertaken to identify important characteristics of programs for impulsive-violent offenders.

## **Results**

The 23 characteristics generated using qualitative methods were reduced to 8 attributes and then used to develop the DCE and CV questionnaires. DCE results from 1021 community-based respondents demonstrated society's preference for programs that: are more effective; provide full as opposed to partial treatment of co-occurring health conditions; are compulsory; have flexible appointments; and continued post-prison.

The CV study showed that society placed a high value for treatment programs such as REINVEST and were willing to pay an additional annual tax of \$70 for them.

## **Conclusion**

The studies included in this thesis demonstrate that economic methods can be used to value programs in the justice area and provide a measure of the societal value/benefits of treatment programs for impulsive violent offenders.

Additionally, this work demonstrates that when provided with relevant information, society places a positive value on treatment programs for impulsive-violent offenders.

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## **Chapter 1: Introduction**

## 1.1. Chapter Overview

This PhD thesis contributes to the body of research on the economic value of treatment programs for offenders with a focus on impulsive violent offenders. In this thesis, offender treatment programs are defined as interventions delivered to offenders with the general aim of reducing re-offending (also referred to as recidivism and used interchangeably throughout the thesis). The thesis background is presented against the backdrop of two views of interventions in the justice area described in Section 1.2 of this chapter: 1) '*the nothing works doctrine*' first proposed in the 1970s, that challenged the effectiveness of treatment programs, and the subsequent emergence of evidence regarding '*what works*' in offender treatment. The thesis then raises a question about the economic value of the vast number of reported effective treatments available in the justice area; and 2) society's opinion or attitude towards the treatment of offenders that is largely based on 'punitive populism' rather than the benefit to society. Both these views have had a role in the increasing offender population over the past three decades.

Section 1.3 summarises the global and Australian current statistics on offending, recidivism and the associated costs to society. Recidivism, a term that is often used throughout this thesis, is described as the proportion of people discharged from either prison or community corrections orders who returned to corrective services (either prison or community corrections supervision) with a new correctional sanction within a certain period of time, commonly two years [1]. Section 1.3 illustrates the large societal burden of offending and the need for more offender targeted treatment programs that may have an effect on crime and recidivism as well as provide value for money. Violence is highlighted as one of the crimes with high rates in Australia where targeted interventions are needed.

Section 1.4 provides an overview of various offender treatment programs followed by a summary of programs available in Australia for violent offenders. To demonstrate

the potential use of economic methods in assessing the value and benefits of treatment programs in the offender area, this PhD focussed on the REINVEST trial as an exemplar of treatment programs for impulsive violent offenders. REINVEST is described in section 1.4.2 of this chapter.

To answer the broad question raised in section 1.2 regarding whether the large number of available treatment programs for offenders represents economic value of, section 1.5 provides an overview of economic evaluation methods and how these can be used to assess the societal value and benefit. The objectives of this PhD work are then stated in Section 1.6 followed by the study rationale in Section 1.7.

Section 1.8 provides the thesis outline illustrating how the different studies within the PhD work, demonstrated in the remaining chapters of this thesis i.e. chapters 2 through 7, relate and combine to answer the research objectives.

## **1.2. Background**

### **1.2.1. From ‘nothing works’ to ‘what works’ in offender treatment programs.**

Before 1974, rehabilitative treatment programs for offenders were seen as priority for correctional facilities worldwide [2]. It was argued that punishment alone, especially incarceration, was insufficient in ensuring community safety because these offenders are, in almost all cases, returned to the community sooner or later [3]. With this in mind, earlier prison reforms required prison departments to provide, in addition to the safe custody of prisoners, a function that allowed prisoners to undergo treatment that may lead to their reformation and rehabilitation [4, 5].

However in 1974, after a review of over 231 studies evaluating the effectiveness of treatment programs, Martinson concluded that ‘nothing works’ in the rehabilitation of prisoners to prevent recidivism [6]. This view was demonstrated in a report published a year later by Lipton, Martinson and Wilks in 1975 [7] and reiterated by Sechrest and colleagues in 1979 [8]. Lipton and his team further stated that not even treatment outside prison had an impact on recidivism [7]. This view, now known as the ‘nothing

works' doctrine [9], created a setback in the development of treatment programs for offenders and led to a cancellation of many rehabilitation programs particularly in the United States of America (USA) [10].

The 'nothing works' view was later challenged by a wave of new researchers who believed in treatment. Andrew and Bonta [11] argued that the studies evaluated by the earlier researchers showed no effect because of their design and administration. This prompted a wave of new research to attempt to demonstrate that treatments for offenders was effective [9]. These later studies have been recently summarised in two publications: a book that reviews evidence on 'what works' in offender rehabilitation and includes a summary of over 90 meta-analyses [12], and a review of systematic reviews on the effectiveness of correctional rehabilitation [13]. Both reviews found that almost all intervention effect sizes were positive indicating the effectiveness of many of these programs.

Despite the effectiveness of offender treatment programs, the vast number of such programs available and the limited resources available to justice systems necessitates that policy makers have evidence to guide them on the societal economic value and benefit of programs when making decisions about their provision.

### **1.2.2. Society's attitude towards offenders**

Public opinion and perception has had a significant influence on offender policies [14]. Several researchers have discussed the influence of political forces, fuelled by a perceived punitive public sentiment, on harsher criminal justice policy and practice and mass incarceration [15-17]. These punitive public sentiments popularly known as 'punitive populism' [17] or 'populist punitiveness' [18] suggests that the public's support for severe criminal justice policies like incarceration, has become a primary driver of policy making with the result of increasingly harsher punishments regardless of their effectiveness. Surveys in which members of the public in five western countries, including Australia, were asked questions relating to whether court sentences were 'too lenient', 'about right' or 'too harsh', found similar responses

across jurisdictions with between 66% and 75% of the public saying they were too lenient [17]. Snap polls from such public opinion surveys conducted in New South Wales (NSW), the largest state in Australia with over 7 million people, have yielded similar results and have remained largely unchanged over recent years [19-21]. However, it has been noted that often the results from such opinion polls are the result of poor methodology and participants who are not fully informed of the nature and extent of crime and correctional policies, thereby denying them the opportunity to look beyond punitiveness to the benefits of treatments [22]. Once more nuanced surveys are given, the public has been shown to prefer rehabilitation over punishment [23, 24]. Indeed, better information about offenders' criminogenic needs (the factors that influence their offending behaviours) their social backgrounds and the links between poor health and offending plays a role in increasing public empathy towards the rehabilitation of the offender [25].

### **1.3. The societal burden of offending**

#### **1.3.1. The offender population**

It is estimated that 11 million people (145 per 100,000) worldwide were held in penal institutions as at November 2018 [26]. This is an increase of 24% since the year 2000, a rate higher than the increase in the general world population. Currently, 16 countries in the world have rates of 400 per 100,000 people or higher in prison, with USA having the highest rate of imprisonment at approximately 650 per 100,000 population and the highest prisoner population at 2.1 million [26]. In Oceania, the prisoner population has increased by 86% since 2000, two thirds of whom are incarcerated in Australia [26]. It is reported that Australia's prisoner population has grown rapidly over the past three decades largely due to "tough on crime" policies, mandatory sentencing, longer sentences, more stringent bail conditions and a reduced access to parole [27].

Corrective Services in Australia, under the department of Justice, has the mandate to administer correctional sanctions imposed by judicial courts and orders of the parole boards through the management of custodial facilities and community corrections



orders, and the provision of programs and services to prisoners and community offenders. In Australia, incarceration rates have increased by 98% since 2000 and by 109% since 1975 [26]. In the financial year 2017/2018 on average 41,867 people per day were held in Australian prisons; a national imprisonment rate of 216.8 per 100,000 [1]. An average of 69,634 offenders per day were serving community corrections orders in 2017/2018; a rate of 360.6 per 100,000 adult population [1]. Males comprise the majority of the Australian offender population accounting for 92% of total prisoners and 80.5% of community offenders [28].

Violent offences account for a large proportion of the offender population in Australia. As at June 2018, the most common offence in Australia was acts intended to cause injury, accounting for 22% of prisoners and 33% of community offenders [28]. The number of prisoners with the offence/charge 'acts intended to cause injury', the majority of whom are men (93%), has increased by 66% since 2010 [28]. The violent crime rate in NSW, which includes murder, attempted murder, manslaughter, assault, robbery and sexual offences, was approximately 1500 per 100,000 population in 2014 [29]. In the 24 months to March 2019 in NSW, violent crime attributed for almost one fifth of sentenced adults and 32% of those held on remand [30].

Incarceration is regarded as punitive and is seen as a way of reducing recidivism; however research has shown that prisons in general do not necessarily reduce recidivism for all offender types but rather often have a criminogenic effect (an increased likelihood to re-offend) [31]. In 2018, approximately 52.4% of adult prisoners in Australia returned to corrective services within two years of their release [32]. This 2-year recidivism rate is similar to that of Quebec, Canada (55%), lower than that in Denmark (63%), New Zealand (61%), and Sweden (61%) but higher than that in Ontario, Canada (35%), Chile (39%), Finland (36%), France (40%), Iceland (27%), Netherlands (46%), Norway (20%) and USA (26%-36%) [33].

In addition to making up the largest proportion of the offender population, evidence suggests that violent offenders re-offend much quicker than non-violent offenders [34]. Recidivism is an important indicator of not only the efficiency but also the

effectiveness of the criminal justice system. One of the factors associated with recidivism is fewer treatment resources for offenders, particularly for those in greatest need such as violent offenders who are often denied entry to programs because of their violence [35].

### **1.3.2. Costs associated with offending**

As a result of the increasing number of offenders and rates of recidivism, the cost of operating the judicial system requires a substantial amount of societal resources. The total annual government expenditure for the justice system in the financial year 2017 – 2018 in Australia was 12.7 billion United States' dollars (USD) (7.3% of total government expenditure), representing a national expenditure per person of USD 513 [1]. The average daily cost of providing corrective services was USD 225 per prisoner and USD 17 per community offender [1].

In comparison the justice system expenditure for the USA was USD 283 billion in the fiscal year 2015 (8.6% of government expenditure) [36] and was USD 12 billion in the United Kingdom (UK) (2% of government expenditure) [37]. Australia and USA, which both have a higher offender prevalence rate compared to UK, spend a significantly larger percentage of their total government expenditure on the judicial system.

In addition to the cost of administering the justice system, the costs of crime are significant. The annual costs of crime in USA are estimated at USD 1,700 billion [38]. The Australian costs of crime are estimated to be USD 50 billion per year or 4.1% of the nation's gross domestic product [39].

The global annual cost of violence, excluding terrorism and war, is estimated at USD 1,240 billion [40]. The costs of violent crime to the Australian economy, including medical costs, lost output, and intangible costs, are estimated to be \$3.081 billion each year [41]. A study that assessed the return on investment in crime prevention interventions in Australia demonstrated a net return on investment in strategies that reduce incarceration rates and violence [42]. Section 1.2.1 discusses the effectiveness of treatment programs in reducing recidivism. Investment in these programs can

potentially have a net economic societal gain. The next section provides an overview of offender treatment programs with a focus on interventions for violent offenders.

#### **1.4. Offender treatment programs**

According to the International human rights commission, the rights and freedom of prisoners include the right to the highest attainable standard of physical and mental health. Unfortunately, during incarceration many prisoners do not receive this care or other targeted rehabilitation programs, putting them at a greater risk of a deteriorating life-course, often returning to the community within a short period and imposing this burden on the community. Placing people into custody with minimal rehabilitation has been shown to be largely ineffective as a deterrent to offending [43].

##### **1.4.1. Types of offender treatment programs**

Usually, successful treatment programs are designed to target specific offender groups but some are general programs used for any offender group. There are a number of treatment programs that have been trialled and some implemented either in community or in custodial settings. Without attempting to list all of them, in this section an overview of the commonly provided programs is given.

Many treatment programs delivered to offenders such as those targeting sexual offending, anger management, substance misuse, violence and general problems of failure to consider the consequences of unhealthy thinking habits, feelings and behaviours are based on cognitive behavioural therapy (CBT). CBT programs help individuals change their negative thinking and equip them with skills to change behaviour [44]. The programs can be delivered one-on-one (individual therapy) or in a group setting (therapeutic community). Examples of CBT programs include multisystemic behavioural therapy mainly developed for violent offenders, especially juveniles [45, 46] and dialectical behavioural therapy used in the treatment of personality disorders [47]. Contingency management, often used in substance abuse treatment by rewarding individuals for improved behaviour, is often used in combination with multisystemic or dialectical behavioural therapy [48]. Other

programs that do not necessarily target specific offender groups include increasing community support to cope with individual challenges especially during prison-to-community transitions [49, 50], prison-based programs using animals [51], and structured physical or mental disciplines such as boot camps [52], and wilderness programs [53].

Some programs have been designed for specific offender groups. For offenders who have substance use problems, programs include substance abuse education and drug treatments such as opioid substitution therapy [54] with buprenorphine or methadone to treat opioid dependency. At the system level, court diversion/liaison schemes have been introduced to deal with the high number of individuals with mental illness in contact with the criminal justice system [55]. These schemes are premised on the view that treatment is preferable to incarceration and that effective treatment reduces future offending behaviour. Similarly, drug courts [56] target both adults' and juveniles' substance misuse problems. Programs for violent offenders include anger management [57] to target aggression and domestic violence programs focus on the family relationships. Recently, the use of pharmacotherapies in the treatment of sex offenders and violent offenders has been introduced [58-60].

Having highlighted the burden that violent offenders place on society i.e. they make up the largest proportion of offenders in Australia, re-offend at a rate faster than non-violent offenders, and cost the tax-payer billions of dollars, this thesis will focus on treatment programs for violent offenders, particularly within the Australian criminal justice context.

Traditionally, violence was largely recognised as only a problem for the criminal and justice system, but in 1996 the World Health Organisation (WHO) forty-ninth assembly adopted a resolution declaring violence as a leading public health problem [61]. WHO defines violence as 'the intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community, which either results in or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment or deprivation' [62]. It is estimated that more than 1.3 million people

worldwide die each year as a result of violence accounting for 2.5% of global mortality [63].

The Corrective Services NSW compendium of offender behaviour change programs provides a list of 35 approved offender behaviour change programs within the state that directly or indirectly seeks to reduce re-offending [64]. The report states that all Corrective Services NSW offender behaviour change programs are based on the Risk – Need – Responsivity principles (RNR) of offender management [65]. The ‘need’ principle states that program content should aim to address the offender criminogenic needs i.e. the individual factors that are directly related to an individual’s likelihood to re-offend. Results of a study that reviewed meta-analyses of interventions to reduce recidivism in adult violent offenders showed that some studies were effective and suggested that those that targeted offender criminogenic needs were more likely to have positive effects sizes [66]. The NSW compendium for treatment programs lists only four approved programs for violent offenders, mostly based on CBT: 1) The Equips Aggression program is designed to increase participants’ ability to manage difficult life events and minimise aggressive behaviour. 2) The Equips domestic abuse program uses narrative and gestalt approaches with a strong emphasis on inviting perpetrators to accept responsibility for their behaviour. 3) The Violent Offenders Therapeutic program provides a residential therapeutic community setting that enables offenders to work intensively on changing the thinking, attitudes and feelings that led to their offending behaviour. It includes a follow-up program after offenders are released from custody or parole. 4) The Self-Regulation Program is designed for offenders with intellectual disability or cognitive impairment who have limited environmental adaptive skills. While impulsivity is listed as one of the criminogenic needs that requires targeted programs, no approved programs are listed for impulsive violent offenders in NSW [64].

#### **1.4.2. Impulsivity and the REINVEST Study**

Aggressive behaviour, like violence, has been categorised as being either impulsive or pre-meditated [67, 68]. Unlike pre-meditated violence, impulsive violence is typically a

response to a provocation and is usually accompanied by anger or fear. Research has shown that violent crime is much more likely to be classified as impulsive than non-violent crime [69]. In addition, impulsive offenders have a higher chance of recidivism than those offenders committing premeditated crimes, and have a higher chance of responding positively to treatment and rehabilitation programs [67-69]. Medical research has established a link between impulsivity and low serotonin levels in the brain [70] prompting the use of Selective Serotonin Reuptake Inhibitors (SSRIs) to increase serotonin levels which may in turn reduce aggression and impulsivity.

REINVEST study is an ongoing randomised control trial which seeks to evaluate the effectiveness of a commonly prescribed antidepressant, Sertraline (an SSRI), in reducing impulsivity, recidivism and a range of other behavioural aspects in impulsive, repeat-violent offenders is currently underway in NSW. The study, through magistrate courts and probation and parole offices, recruits men who are serving a community order and have a history of two or more previous records of violent offences and randomises them to receive either sertraline or placebo (a sugar pill). These men are individually followed up for a period of at least six months by health workers and psychologists. Prior to the trial, a pilot study was conducted with 34 repeat violent offenders who were all administered 100 mg/day of sertraline for 12 weeks. The results showed significant reductions in impulsivity (35% reduction), irritability (45%), anger (63%), assault (51%), verbal assault (40%) and indirect assault (63%) [60]. The ongoing trial will evaluate the effectiveness of the intervention using a larger number of participants. The trial received ethics approval from Corrective Services NSW, in addition to other ethics committees. The PhD studies in this thesis are nested in the REINVEST study.

A systematic review on the use of SSRIs in the treatment of violent sex offenders found only nine studies that evaluated their effectiveness, all of which had a poor methodology, and no studies that included an economic evaluation [71]. The review highlighted the need for a double blinded randomised controlled trial to evaluate the effectiveness of SSRIs across a range of violent offenders as well as an economic

evaluation to be conducted [71]. The ongoing REINVEST study provides such an opportunity for an economic evaluation of SSRIs in the treatment of violence in real time, alongside the trial, and no research has been done in this area so far.

## **1.5. Economic Evaluations of treatment programs**

### **1.5.1. Introduction to Economic Evaluations**

Decisions to allocate scarce resources to provide treatment for offenders, especially violent offenders, are seen by some as controversial even when the benefits of treatment, e.g. community safety, extend beyond the offenders themselves [72]. Economic evaluations can be used to demonstrate to policy makers and other stakeholders that expenditure on these treatments is justified.

Economic evaluations aim to quantify the opportunity cost of what is given up by the society when a treatment program is funded, and the consequences or the benefits gained. Economic analyses are critical to effective decision making because the use of an intervention depends partly on how costly it is to implement relative to its potential benefits. In an era of rising costs, economic evaluations can be used to guide authorities regarding which strategies both improve clinical and crime outcomes and decrease costs or represent the best value for money from the available budgets.

An economic evaluation is the comparative analysis of alternative courses of action in terms of both costs (resource use) and consequences (outcomes, effects) [73]. Four methods of economic evaluation are commonly applied in the health care sector to assess the cost effectiveness of interventions: cost minimisation analysis (CMA), cost-benefit analysis (CBA), cost-effectiveness analysis (CEA) and cost-utility analysis (CUA) [73].

CMA compares interventions with equal consequences and therefore focuses on the analysis of costs to arrive at the cost difference between them in order to identify the intervention with the lowest cost [74]. CEA uses natural units of outcome that are specific to the program investigated. In offender health, some of the units of outcome

commonly used are “number of drug free days” or “number of crimes averted”. In doing so, CEA sometimes excludes itself from being able to quantitatively compare health interventions of different outcome measures. CUA on the other hand utilises Quality-adjusted life years (QALYs) as a generic outcome measure, which can be used to assess the benefits of interventions for all health conditions [75]. The QALY is a unit that takes into account both mortality and morbidity and therefore considers both the life expectancy and quality of life produced from the consumption of a healthcare intervention [75]. Finally, the CBA measures both costs and outcomes in monetary units. This use of monetary valuation of effects means comparisons between very different interventions are possible [74].

In identifying the costs and benefits of interventions, one of two perspectives is generally considered: the provider or the societal perspective. The provider perspective typically only includes costs and consequences incurred by the provider of treatment or services. In the provision of offender programs, this could be the justice department, treatment service provider or the taxpayers’ perspectives. The societal perspective would consider broader costs and benefits regardless where they fall and include a patient, victim and general population perspective. It is preferable that an economic evaluations consider a broad societal perspective [76], although a provider perspective is sometimes chosen based on the need for the economic evaluation or question to be answered, the resources available to undertake the evaluation and the availability of data.

Benefits can be categorised as either tangible or intangible. Tangible benefits are the dollars saved or gained as a result of the intervention either directly to the offenders, e.g. productivity gain through employment as a result of community re-integration, or society at large e.g. tax-payers’ savings from reduced incarceration. Intangible benefits e.g. the society’s feeling of safety or offenders’ restored family relationships are those that do not have a direct dollar value attached to them [77].

In a cost benefit analysis, placing a dollar value on benefits, especially intangible benefits, of treatment programs is often challenging. As a result intangible benefits,



which often constitute a larger proportion of benefits than direct benefits, are commonly left out of analyses [78]. Methods have been developed to quantify benefits derived from programs and these include the human capital approach method and methods that value the preferences of individuals for treatment outcomes [79]. The human capital approach quantifies the value of a treatment program in terms of the person's increased production in the market place [79]. However, it is argued that this approach underestimates the total value of benefits because it measures only part of the benefits of treatment: productivity gains [80]. This method further underestimates the value of offender treatment benefits because research has shown that ex-offenders often struggle to find employment [80]. Measuring individuals' and societal preferences for treatments, a method widely applied in the public health care context but relatively new in the justice health context, is therefore a more favourable method used in valuation of benefits than the human capital approach [81].

### **1.5.2. Valuation of benefits of treatment programs**

Two methods have been employed to elicit societal value for programs and interventions by quantifying their preferences. These methods include stated preferences and revealed preferences methods. Revealed preference method refers to situations where people's choices are observed in actual market situations. However, in the absence of an actual market situation, such as with health programs or new interventions, stated preference data are often used. Stated preference methods refer to situations in which choices are observed in a hypothetical situation using a survey context. Valuation techniques using stated preference methods include discrete choice experiments and contingent valuation. These methodologies have been described extensively in chapter three of this thesis and their use demonstrated in chapters four, five and six. The following sections will provide an overview of the methods.

#### **1.5.2.1. Discrete Choice Experiments**

A discrete choice experiment (DCE) enables hypothetical choices incorporating multiple characteristics to be used to simulate realistic scenarios. A DCE requires

respondents to make trade-offs among different choice sets enabling researchers to gain more in-depth insight into the relative importance of each characteristic (referred to as an attribute) [82]. DCEs have been increasingly used in health economics to address a wide range of health policy related aspects and have recently gained popularity as the model of choice for eliciting stated preference in healthcare research. Systematic reviews on health related DCEs show that there were 34 DCE studies between 1990 – 2000 [83], 114 studies between 2001 – 2008 [82] and 179 studies carried out between 2009 – 2012 [84]. More recently DCEs have been used within the criminal justice field, for example, to explore societal preferences for alternative cannabis drug policies and to demonstrate the effect of varying cannabis policy characteristics and wider social consequences such as healthcare and criminal justice expenditures [85], and in valuing the public demand for crime prevention programs [86]. However, their use within the criminal justice field remains limited.

As further described in Chapters 3 and 5, the DCE approach combines the micro-economic theory of consumer behaviour, Lancaster's theory of choice in consumer demand [87] and the random utility theory [88]. In the theory of consumer behaviour, consumers are assumed to be rational decision makers seeking to maximise utility given a set of alternative goods or services and a fixed budget. In a DCE, participants are tasked to state a preference between two or more choice sets, by choosing the set that maximises their utility. Lancaster's theory states that consumers derive utility not from the good itself but rather from its underlying attributes and as they make choice, their preferences are revealed.

Using these theories, DCEs are used to quantify the strength of preferences for treatments, and with the addition of price as an attribute can be used to measure willingness to pay and therefore the value respondents place on a treatment program attributes.

#### **1.5.2.2. Contingent Valuation**

As further described in Chapters 3 and 6, in the contingent valuation (CV) approach, respondents are presented with a hypothetical scenario about an intervention in a survey and are asked to think about its actual existence on the market and reveal the maximum they would be willing to pay for the intervention [79]. This method is also called the willingness to pay (WTP) method. The total WTP stated by all study participants is equivalent to their total benefit arising from the provision of the intervention being valued.

In addition to being used to place dollar values on intervention benefits for use in cost benefit analyses, the CV method can be used to assess the society's support for treatment programs for offenders. The method has previously been used in two studies in USA [24, 89] and one study in NSW, Australia [20] to demonstrate the public's support for offender rehabilitation. Obtaining the maximum amount offenders, as beneficiaries to the health interventions, and society, as tax payers, are willing to pay for offender health interventions (in view of what they would be willing to sacrifice in terms of other items on their budgets) enables them to think about both the costs and benefits of the programs and therefore is a better estimate of how much they value the interventions than asking them if they are or are not in favour of the interventions.

#### **1.5.3. Economic evaluation of treatment programs for offenders**

The most recent systematic review of monetary costs and benefits of treatment programs for offenders was in 2004, covering studies from 1970 until 2002 [90]. This review aimed to assess whether there was an economic argument for offender correctional treatment. The review also aimed to update previous reviews of cost-benefit analysis of correctional treatment programs [91, 92]. The review concluded that there was an economic benefit from investment in treatment programs that reduced recidivism, and that the benefits from these programs extended beyond crime reduction to other important areas in the lives of offenders including improved

offender health, better family relationships and improved livelihoods. However, the review only found 14 studies over a 32 year period that conducted economic evaluations of offender treatment programs. None of the studies considered a societal perspective. Only two studies included intangible costs, but only to victims of crime, and none included the measurement of intangible benefits. None of the study interventions were for violent offenders. While a systematic review to update the last review done in 2003 was needed, the review suggested a lack of evidence to support economic value for treatment programs for offenders, especially violent offenders.

### **1.6. Research Objectives**

The broad question of this PhD body of research was whether treatment programs for impulsive violent offenders bestow societal benefit/value, thus providing an economic argument for their provision.

The first objective was:

1. To review the existing literature on economic evaluations of treatment programs for offenders. Specifically,
  - a) To assess the scope and quality of economic evaluation studies of offender treatment programs.
  - b) To assess the cost effectiveness and net benefit to society of offender treatment programs from the results of identified studies.

Following the literature review conducted to meet Objective One, This research applied economic stated preference methods were applied to answer the following specific objectives using the REINVEST study as an example of treatment programs for offenders.

2. To elicit societal and offenders' preferences for treatment of impulsive violent offenders. Specifically,
  - a) To assess the characteristics of treatment programs for impulsive violent offenders that could influence the uptake by offenders and support by society.

- b) To quantify the strength of preferences for and assess trade-offs between characteristics of treatment programs for impulsive violent offenders.
- 3. To elicit societal and offenders' value, in terms of WTP, of treatment of impulsive violent offenders. Specifically,
  - a) To estimate the societal and offenders' average WTP for the treatment of impulsive violent offenders using an SSRI.
  - b) To elicit the factors affecting societal WTP for violent offender treatment programs.

### **1.7. Study rationale**

The costs of crime to both the judicial system and society are high, and likely to continue to increase with increasing numbers of offenders. Justice department decision makers are faced with the task of allocating scarce resources to programs that produce the greatest benefits; improve offender health outcomes, reduce re-offending rates and have a net saving. The cost of crime is substantial enough to make economic evaluations of intervention programs worthwhile. While there is literature on 'what works' in offender treatment, very little is known about economic evaluations of these treatment programs.

Eliciting societal and offender preferences for treatment programs is important in designing treatment programs that are acceptable to both offenders and the society as these decisions affect both groups either directly or indirectly. Valuation of societal benefits of treatment of impulsive, violent offenders is needed to advocate for the uptake by policy makers of such a program if found effective.

An understanding of the trade-offs made and the strengths of preferences of society and offenders in the provision of interventions for violent offenders provide valuable information for policy makers, treatment providers, and other practitioners in designing treatment options. When deciding whether to fund an intervention, policy

makers would like to know how much the public values the benefits - hence how much they would be willing to pay.

### **1.8. Thesis outline**

The next five chapters of this thesis address each of the objectives of this PhD work (see section 1.6) as outlined below:

Chapter 2 provides the results of objective one: a systematic review of economic evaluations of offender treatment programs.

This systematic literature review has been published in the *American Journal of Criminal Justice*. The publishers provided copyright clearance for the re-use of the accepted version of this manuscript provided this is done 12 months after its first publication in 2017. The final publication is available at:

<https://rd.springer.com/article/10.1007/s12103-017-9399-1>

**Citation: Settumba, S.N., et al., *Are We Getting Value for Money from Behavioral Interventions for Offenders? A Research Note Reviewing the Economic Evaluation Literature*. American Journal of Criminal Justice, 2017.**

This systematic review highlighted the dearth of economic evidence in the criminal justice space. The discussion section of the paper suggested that the reason for this could be: 1) the lack of health economics expertise to carry out economic evaluations, and 2) the difficulty involved in placing a dollar value on the benefits of offender programs, especially the intangible benefits. As a result, the PhD work described in chapters 3 – 6 focused on contributing to this research gap.

Chapter 3 is the methods paper detailing the protocol followed for the sub-studies of this body of research i.e. the discrete choice experiment (used for objective 2) and the contingent valuation study (used for objective 3). These are stated preference methods that are used to value benefits of interventions. While each of the papers presented in chapters 4 and 5 have a methods section, this paper provides a more detailed description of the methods used. It is an open source paper published in *BMJ Open* and copyright clearance for its re-use in this publication was given.

The final publication is available at:

<http://dx.doi.org/10.1136/bmjopen-2018-024899>

**Citation: Settumba SN, Shanahan M, Chambers GM, et al Assessing societal and offender perspectives on the value of offender healthcare: a stated preference research protocol BMJ Open 2019;9:e024899. doi: 10.1136/bmjopen-2018-024899**

Chapter 4 provides the results for objective 2a. This chapter provides a thorough description of the rigorous process undertaken in developing attributes and attribute levels leading up to the final list used in the discrete choice experiment. It is a manuscript that was published in the *Applied Health Economics and Health Policy* journal and copyright clearance for its re-use in this publication was given. The final publication is available at:

<https://rd.springer.com/article/10.1007%2Fs40258-019-00484-5>

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Chapter 5 provides the results for objective 2b: the discrete choice experiment. Prior to submission of this thesis the manuscript that forms this chapter was submitted for publication.

Chapter 6 is the results of objective 3: the contingent valuation study. It is a manuscript that is currently under review. It is important to note that the same respondents in one survey used for the DCE study in chapter 5 and this CV study. Having the DCE study done first allowed respondents to fully understand the different attributes being evaluated thus making it easier for them to state a WTP for a program described by all the different attributes.

Chapter 7 concludes this body of research. In this chapter, a general overview of the results is provided. A comparison is made between results of the DCE and CV with a discussion of their differences and similarities. Policy considerations are provided as well as some recommendations for future work.

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## **Chapter 2: Are we getting value for money from behavioral interventions for offenders? A research note reviewing the economic evaluation literature.**

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**Title: Are we getting value for money from behavioral interventions for offenders? A research note reviewing the economic evaluation literature.**

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## **Abstract**

Public expenditure on the criminal justice system represents a significant fiscal burden to government worldwide, making the economic evaluation of interventions aimed at improving justice outcomes critical to informing resource allocation. This study systematically reviews and assesses the scope and quality of economic evaluations of behavioral interventions aimed at reducing reoffending. Only seventeen studies met the inclusion criteria, with wide variation in methodological approaches, including differences in costing perspectives, study design, and the definition of cost and outcome measures. The majority of behavioral interventions for offenders remain unevaluated from an economic perspective, representing a significant evidence gap for informing cost-effective and efficient allocation decision. Based on the studies reviewed, economic benefit can be derived from investing in offender behavioral programs. However, whether this investment represents 'value for money' remains unclear. What is clear is that economic evaluations in the justice health sector lag behind research in other areas of public policy.

## **2.1. Introduction**

Incarceration is regarded as a punitive measure to recidivism; however, research has shown that in general, prisons do not necessarily reduce recidivism for all offender types but rather often have a criminogenic effect [1]. In Australia, the number of adult prisoners returning to prison within two years of their release has increased from 33% in 2000 to 51% in 2015 [2]. Within 3 years of their release in 2005, about 68% of state prisoners in the USA were arrested at least once [3], and in the UK the re-offending rate is approximately 46% after one year of release from prison [4].

The large offender population and the increasing recidivism rates impose a significant societal financial burden. The total annual judicial expenditures for the USA, UK and Australia respectively are 265 billion United States dollars (USD), USD12 billion and USD11.5 billion respectively [2, 5, 6]. Furthermore, the costs of crime impose an additional financial burden, estimated at USD1.7 trillion in the US [7], and USD50 billion per year in Australia or 4.1% of the nation's gross domestic product [8]. Given this significant financial burden, assessments of the economic implications of offender programs that seek to reduce crime is critical to informing policy about efficient allocation of the justice system dollars [9].

Incarcerating people with minimal rehabilitation is ineffective in reducing re-offending [10]. Treatment programs have the potential to provide far greater net economic benefits than incarceration without treatment, in terms of reduced crime and improved health of offenders and victims [11]. While a significant literature exists on the effectiveness of offender treatment programs, little is known about the economic implications of such programs. Despite the importance of demonstrating the value of public investment in offender treatment programs, the systematic review described in the paper is the first published since 2002 to assess the number, quality and findings of economic evaluations relating to interventions to improve health and reduce recidivism and that covers all types of economic evaluation studies not just cost-benefit studies as in the previous reviews [12-14]).



An economic evaluation is the comparative analysis of alternative courses of action in terms of costs (resource use) and consequences (outcomes, effects) [15]. Four methods of economic evaluation are: cost minimization analysis (CMA), cost-benefit analysis (CBA), cost-effectiveness analysis (CEA) and cost-utility analysis (CUA).

In identifying the costs and consequences of interventions, two perspectives are generally considered; the provider perspective or the societal perspective. A broad societal perspective that considers all costs and consequences regardless of where they occur is preferred [16]. However, a provider perspective, which only considers costs incurred by the treatment provider, is sometimes chosen to answer a specific question. Typically, the costs associated with criminal activity include arrest, conviction, incarceration, wage loss and victim loss [17]. Lost wages, productivity and victim costs are only included in a societal perspective but are often difficult to access, precluding a societal perspective. Victim costs can be tangible (e.g. health care costs for injury and property loss from burglary) or intangible (e.g. pain and suffering).

The most recent systematic review of economic evaluations of programs in criminal justice focused on costs and benefits of crime prevention programs [18] not on interventions for prisoners and offenders. Previously, the same author [12] conducted a systematic review of monetary costs and benefits of treatment programs for offenders, covering studies from the 1970s until 2002. This review represented an update of previous reviews of cost-benefit analysis of correctional treatment programs [13, 14] and an attempt to determine whether there was an economic argument for correctional treatment. The review concluded there were economic benefits from the investment in treatment programs that reduced recidivism. However, the benefits of offender treatment are not limited to recidivism but include improvements to other important areas in the lives of offenders including health and welfare [12].

This current review expands on the previous review of studies published to 2002 [12], and goes beyond cost-benefit analysis to consider all possible economic evaluations and all primary outcomes of included studies, not only recidivism.

## **2.2. Methods**

Studies included English language, peer-reviewed journal articles published between January 2003 and June 2016. Reviews, letters, abstracts and methodological articles were excluded. No restriction on geographical location was made. Studies were included if they fulfilled all of the following inclusion criteria.

Population: The intervention group or at least one intervention group, were offenders/prisoners or had ever been convicted of crime and served a sentence either in incarceration, another correction facility or in the community. These could be juvenile or adult offenders, and men and/or women.

Intervention and Comparator: The intervention was a program administered with the aim of reducing recidivism or improving health of offenders that might have an impact on recidivism. The study had a comparison group which was either given another treatment, a placebo or no treatment. Studies without a comparison group including before and after studies that did not have matched controls were excluded.

Outcomes: Only the primary outcomes of the studies were considered and were classified as recidivism, mortality, morbidity or quality adjusted life years (QALYs).

Study design: Only full economic evaluations were included. A full economic evaluation was considered to be a comparative analysis of two or more interventions in terms of both costs (resource use) and consequences (outcomes, effects). These included cost-effectiveness, cost-benefit, cost-utility analyses, and also evaluations based on modelling of secondary data.

The following information sources were searched; Bibliographic databases: MEDLINE, EMBASE and CINAHL, Tufts cost-effectiveness analysis registry and the Cochrane database; and Citation databases; Scopus and Web of Science. Reference lists were

cross-referenced for potentially relevant papers. The list of search terms is available on request.

To ensure consistency, a data extraction form was used to record details of: author, publication date and location of study; question/objective; type of economic evaluation; study design; costing perspective; offender type and targeted offending behavior; treatment setting; primary intervention, duration of intervention and intervention group sample size; comparator intervention, duration and sample size of comparator group; follow up period or model duration; outcome data, cost data, cost year and results of the economic evaluation.

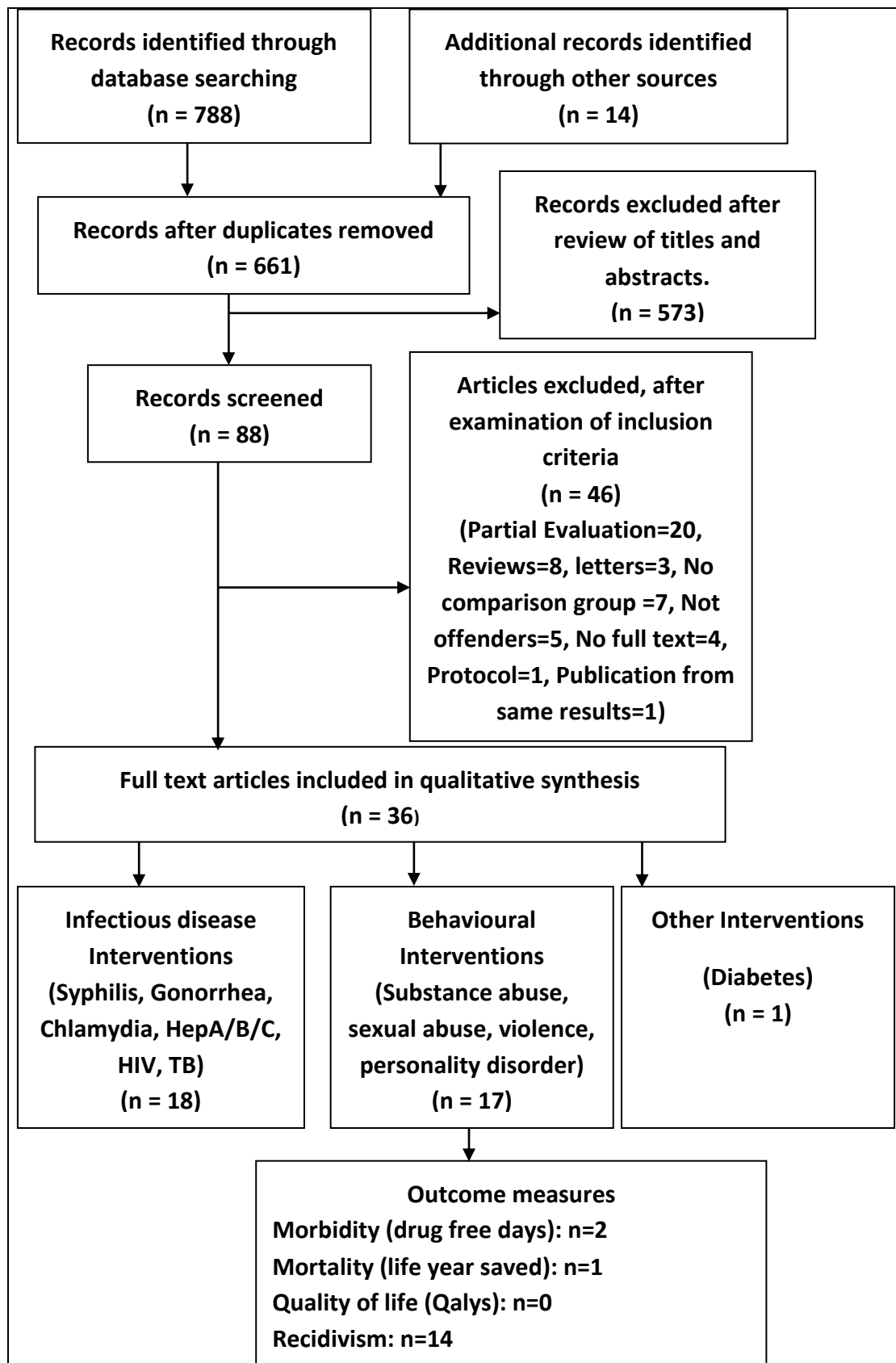
Quality assessment determined with respect to whether or not studies adhered to standard methods for economic evaluation as outlined in the 2015 Drummond checklist for economic evaluations [19]. The Checklist includes 33 items under 10 major headings covering the research question, description of interventions, study design, identification measurement and valuation of costs and consequences, discounting, analysis of uncertainty of results and the discussion of the results.

### **2.3. Results**

Overall, 802 records were retrieved using the applied search terms. Following a review of retrieved abstracts, 88 records were identified that had undertaken an economic evaluation of an offender treatment program/intervention (**Figure 1**).

After a further screening of these records against the inclusion and exclusion criteria, 36 were retained. Of these, 18 related to infectious diseases [20-37], one focused on diabetes [38] and 17 were economic evaluations of behavioral interventions among offenders or prisoners covering substance abuse, sexual abuse, violence and personality disorder [39-55]. This paper focuses on economic evaluations of behavioral interventions only as these target offending behavior, whereas those involving infectious diseases transmission and chronic health conditions are unlikely to impact on offending.

**Figure 1. PRISMA Chart for the exclusion of records for the review**



Key characteristics of the economic evaluations studies in this review are shown in Table 1. The primary outcome measure for 14 of these articles was recidivism and was measured using a variety of metrics such as crimes committed post treatment, time to first offence post treatment, time to re-incarceration post treatment, and probability of arrest post-treatment for cost-effectiveness analysis studies; and reported as savings from reduced crime for cost-benefit analysis studies. The primary outcomes for the other 3 behavioral interventions were morbidity due to drug free days (2 studies), and mortality due to reduced substance abuse (1 study). No study had QALYs as an outcome measure. Studies were from USA (n=13), Australia (n=3) and the UK (n=1).

Eleven studies were CEA, 6 were CBA, and none were CUA or CMA studies. Six studies covered young offenders and 11 covered adults. Among the adult offender studies, 5 involved men, and 6 included both men and women. None focused on women offenders only. Offending behaviors targeted in the studies were: personality disorder (n=1) substance abuse (n=12), violence (n=3), and sexual offending (n=1). The treatments evaluated in the studies were cognitive behavior therapy for personality disorder; a specialized mental health treatment and multi-systemic therapy program for violence, multi-systemic therapy for sexual offending; and substance abuse education, residential treatment, drug courts, drug abuse therapeutic treatment with and without aftercare, multi-systemic therapy with and without contingency management, multi-systemic therapy with and without drug court, motivational enhancement therapy/cognitive behavioral therapy and seamless combination of probation and treatment for substance abuse.

The Drummond 33-item checklist was used to assess the quality of the articles (Appendix 1) and summarized using the 10 major checklist criteria. Apart from two articles [48, 51] which did not clearly state the economic perspective of the study, all the other studies had a well-defined question in an answerable form. All the articles had a comprehensive description of competing alternatives with a no treatment option included when the alternative was not usual or standard care. To establish the effectiveness of treatment programs, 10 studies used a randomized control. One study

[40] found the treatment was not effective in the primary effectiveness study. Six studies used observational data to establish effectiveness [42, 43, 45, 46, 48, 51] and indicated potential for selection bias. Three studies used propensity scoring matching to minimize selection bias [42, 45, 46].

In the identification of all important and relevant costs and consequences for alternatives, four studies adopted the societal perspective, 11 used a provider perspective and two did not state the costing perspective. The type of costs included in the provider and societal perspectives varied with some studies considering only treatment provider costs while others included costs from the criminal justice health perspective, and still others the tax payer perspective. In the societal perspective, some studies included productivity gains and losses while others did not. Few studies included both tangible and intangible costs in their valuation. Six studies [41, 44, 48, 52, 53, 55] provided a detailed description of the measurement of costs and consequences making it difficult to assess the credibility of the others. Among the studies that had a follow-up period of more than one year, five did not mention or did not adjust their costs and consequences for differential timing [39, 42, 43, 49, 51]. Five studies [47, 49-51, 54] did not make any allowance for uncertainty in the estimate of costs and consequences. Overall, the presentation and discussion of study results in this review included issues of concern to users (comparison of results to similar studies, discussion on generalizability of results, application of findings) except for two studies that did not present incremental cost-effect ratios between treatment and control groups [39, 54]. With studies that did not include uncertainty analysis in estimates of costs and consequences, implications of uncertainty for decision-making were not explored in the need for future research.

**Table 1: Characteristics of economic evaluation studies included in the review.**

<b>Author, Publication year, Location</b>	<b>Type of economic evaluation</b>	<b>Design of study</b>	<b>Costing perspective</b>	<b>Offender type, Targeted offending behavior</b>	<b>Treatment setting</b>	<b>Primary Intervention, duration, sample size (N)</b>	<b>Comparator, duration, Sample size (N)</b>	<b>Follow up period/ Model duration</b>	<b>Outcome data</b>
<b>Alemi et al, 2006, USA</b>	CEA	RCT with Decision analytic model	Provider	Adult male and female Offenders, substance abuse	Community	Seamless probation system, N=101	Traditional probation system, N=101	2.75 years	Recidivism: Follow up days for treatment, arrests, incarceration, hospitalization
<b>Barret B &amp; Byford S, 2012, UK</b>	CEA	Markov decision model	Provider	Adult Male prisoners, personality disorders	Prison	Dangerous severe personality disorder program i.e. CBT and DBT, 1 year, N=21	Usual care: sex and violent offender program but no specialist intervention, 1 year, N=19	25 years	Recidivism: Serious re- offending
<b>Borduin &amp; Dopp, 2015, USA</b>	CBA	Washington State Institute for Public Policy model	Societal	Juveniles, sex offending	Community	MST, 30.8 weeks	Usual Community services (CBT and IT), 30.1 weeks	8.9 years	Recidivism: Cost savings from reduced arrests during follow up
<b>Caldwell et al, 2006, USA</b>	CBA	Observational study with Propensity matching	Provider	Juvenile delinquents , Violence	Residential correction center	Mental health treatment, 2.5 years, N=101	Usual juvenile corrective services, 2.5 years, N=101	4.5 years	Recidivism: Cost savings from Reduced crime

**Table 1 (Continued)**

<b>Daley et al, 2004, USA</b>	CEA	Matched control, Before & After	Provider	Adult male and female Prisoners, Substance Abuse	Prison	Drug and alcohol education session, 1 week, N = 8780	No treatment	2 years	Recidivism: probability of arrest during follow up period
						30 outpatient group sessions, 10 weeks, N=4911	No treatment		
						64 sessions of intensive treatment program, 4 months, N=526	No treatment		
						Residential treatment program, 6 months, N=905	No treatment		
<b>Dopp et al, 2014, USA</b>	CBA	Washington State Institute for Public Policy model	Societal	Juveniles and their siblings, Violence	Community	MST, N=92 juveniles + 67 siblings, 20.7 hours	IT, N=84 juveniles + 62 siblings, 22.5 hours	25 years	Recidivism: benefits arising from reduced crime
<b>Gisev et al, 2011, Australia</b>	CEA	Observation Retrospective cohort study with propensity score matching	Provider	Adult male and female prisoners, substance abuse	Community	OST, N=7957, 7 days	No OST, N=8116, 7 days	6 months	Mortality: Number of deaths



**Table 1 (Continued)**

<b>Klietz et al, 2010, USA</b>	CBA	Washington State Institute for Public Policy model	Societal	Repeat juveniles, Violence	Community	MST, 4-6 months, N=92	IT, 4-6 months, N=84	13.7 years	Recidivism: Cost savings arising from a reduction in number of arrests done post-treatment
<b>Logan et al, 2004, USA</b>	CBA	Case-Control	Provider	Male and female adults on probation and parole, Substance abuse	Community	Drug court (graduates and terminators), 15-20 months, N=222 graduates and N=371 terminators	No drug court program, probation and parole only sometimes with imprisonment, N=152	12 months	Recidivism: Cost savings arising from post program behavior including incarceration, crime, substance use, employment
<b>McCollister et al, 2003B, USA</b>	CEA	RCT	Provider	Male offenders on work release, Substance abuse	Community	Both Drug abuse therapeutic treatment, approx. 185 days and aftercare program, approx. 140 days, N=209	Work release, eligible but not recruited for drug treatment, N=249	18 months	Recidivism: Number of days incarcerated during follow up period

**Table 1 (Continued)**

						Drug abuse therapeutic treatment, approx. 185 days and aftercare program, approx. 140 days, N=209	Drug abuse therapeutic treatment only, approx.137 days, N=378	18 months	
<b>McCollister et al, 2003A, USA</b>	CEA	RCT	Provider	Male prisoners, substance abuse	Prison	Drug abuse therapeutic treatment only, 310 days	Incarceration with no treatment	1 year	Recidivism: Number of days incarcerated during follow up period
					Prison and Community	Both Drug abuse therapeutic treatment, approx. 382 days and aftercare program, 146 days	Drug abuse therapeutic treatment	1 year	
					Prison and Community	Combined group of both therapeutic treatment only and therapeutic treatment with after care	Incarceration with no treatment	2 years	

**Table 1 (Continued)**

<b>French et al, 2010, USA</b>	CBA	Observational study with Propensity scoring matching	Societal	Adult Male repeat offenders, Substance abuse	Residential center	Community education and residential treatment of substance abuse, N=176	No offender treatment programs, N=395	1 year	Recidivism: Cost savings resulting from number of days without re-arrest
<b>Gisev et al, 2011, Australia</b>	CEA	Observation Retrospective cohort study with propensity score matching	Provider	Adult male and female prisoners, substance abuse	Community	OST, N=7957, 7 days	No OST, N=8116, 7 days	6 months	Mortality: Number of deaths
<b>Klitz et al, 2010, USA</b>	CBA	Washington State Institute for Public Policy model	Societal	repeat juveniles, Violence	Community	MST, 4-6 months, N=92	IT, 4-6 months, N=84	13.7 years	Recidivism: Cost savings arising from a reduction in number of arrests done post-treatment
<b>Logan et al, 2004, USA</b>	CBA	Case-Control	Provider	Male and female adults on probation and parole, Substance abuse	Community	Drug court (graduates and terminators), 15-20 months, N=222 graduates and N=371 terminators	No drug court program, probation and parole only sometimes with imprisonment, N=152	12 months	Recidivism: Cost savings arising from post program behavior including incarceration, crime, substance use, employment

**Table 1 (Continued)**

<b>McCollister et al, 2003B, USA</b>	CEA	RCT	Provider	Male offenders on work release, Substance abuse	Community	Both Drug abuse therapeutic treatment, approx. 185 days and aftercare program, 140 days, N=209	Work release, eligible but not recruited for drug treatment, N=249	18 months	Recidivism: Number of days incarcerated during follow up period
						Drug abuse therapeutic treatment, approx. 185 days and aftercare program, 140 days, N=209	Drug abuse therapeutic treatment only, approx. 137 days, N=378	18 months	
<b>McCollister et al, 2003A, USA</b>	CEA	RCT	Provider	Male prisoners, Substance abuse	Prison	Drug abuse therapeutic treatment only, 310 days	Incarceration with no treatment	1 year	Recidivism: Number of days incarcerated during follow up period
					Prison and Community	Both Drug abuse therapeutic treatment, approx. 382 days and aftercare program, 146 days	Drug abuse therapeutic treatment	1 year	

**Table 1 (Continued)**

<b>McCollister et al, 2004, USA</b>	CEA	RCT	Provider	Male prisoners, substance abuse	Prison and Community	Combined group of both therapeutic treatment only and therapeutic treatment with after care	Incarceration with no treatment	2 years	Recidivism: Number of days incarcerated during follow up period
					Prison	Only Drug abuse in- prison therapeutic treatment, approx. 260 days	Incarceration with no treatment	5 years	
					Prison and Community	Both Drug abuse in- prison therapeutic treatment and aftercare program, approx. 260 days	Drug abuse prison therapeutic treatment	5 years	
					Prison and Community	Combined group of both in-prison therapeutic treatment only and therapeutic treatment with after care	Incarceration with no treatment	5 years	

**Table 1 (Continued)**

<b>Olmstead et al, 2007, USA</b>	CEA	RCT	Provider	Young adults referred by the office of adult probation, Substance abuse	Community	MET/CBT, 8 weeks, N=32	Usual care i.e. DC, 8 weeks, N = 32		Morbidity: Longest duration of abstinence from marijuana (LDA)
						DC with CM, 8 weeks, N=32	MET/CBT, 8 weeks, N=32		
						MET/CBT with DC, 8 weeks, N=33	DC with CM, 8 weeks, N=32		
<b>Shanahan et al, 2004, Australia</b>	CEA	RCT	Provider	Male and female adults convicted of crime, substance abuse	Community	Adult Drug court - supervision, treatment, monitoring and counselling, 1 year	Normal judicial process with jail or probation/bail	1 year	Recidivism: Time to first offence, offending frequency per unit time
<b>Sheidow et al, 2012, USA</b>	CEA	RCT	Provider	Juveniles, substance abuse	Community	Juvenile drug court with community services, 1 year	Family court	1 year	Recidivism: Number of offences committed during follow-up period
						Juvenile drug court with MST, 1 year			
						Juvenile drug court with MST and CM, 1 year			
<b>Warren et al, 2006, Australia</b>	CEA	RCT	Provider	Adult male and female Prisoners, Substance abuse	Prison	Prison methadone program	No prison methadone program	4 months	Morbidity: Number of heroin free days

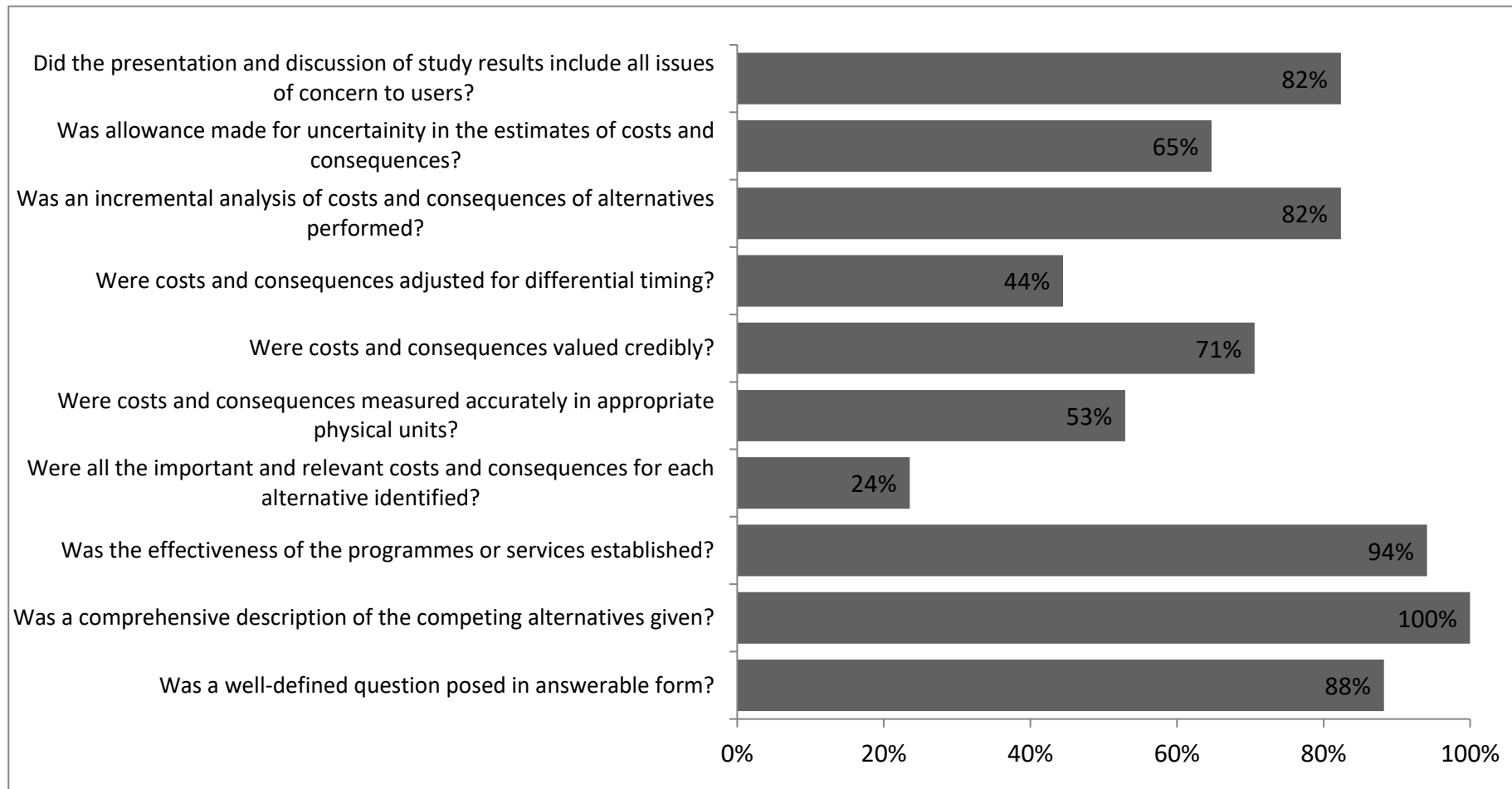
DC = Individual counselling, CM = Contingency management, MET = Motivational enhancement therapy, CBT = Cognitive behavioural therapy, OST = Opioid substitution therapy, MST = Multisystemic therapy, IT = Individual therapy, DBT = Dialectical behavior therapy, CEA = Cost-effectiveness analysis, CBT = Cost-benefit analysis, RCT = Randomised control trial

The quality of studies was measured against the items under Drummond's 10 categories. A 'yes' was allocated when an article fulfilled all the conditions, excluding those that were not applicable (for details see the supplementary material). Figure 2 shows the percentage of articles that complied with each of the 10 Drummond categories used to describe the quality of an economic evaluation. Only two studies complied with all of the 10 categories of quality. All studies provided a 'comprehensive description of the competing alternatives'. Only 24%, 44% and 53% of studies respectively satisfied the following categories; 'Identification of all important and relevant costs and consequences of alternatives', 'adjustment for differential timing' and 'accurate measurement of costs and consequences'.

It was not possible to state which treatment programs were more cost-effective or yielded more economic benefit given the methodological variations between studies, even among studies where the same economic evaluation method was used. The variations include: costing perspectives, follow-up periods (ranging from 5 months to 5 years and up to 25 years for models), range of costs and outcomes considered. However Table 2 provides a summary of the results of the economic evaluations.

All the six CBA studies reported either a positive net benefit or a cost-benefit ratio of less than one. This means that the treatment evaluated yielded higher incremental benefits than the incremental costs when compared with an alternative. This was the case for specialized mental health treatment for 'delinquent' boys when compared with usual mental health treatment provided for juveniles within corrective services [42], community education and residential treatment for substance abuse when compared to no treatment [45], a drug court program for substance abuse offenders when compared to no treatment [56] and multi-systemic therapy for violent, sexual offending and serious offending juveniles when compared with individual therapy and cognitive group therapy [41, 44, 47].

**Figure 2:** Percentage number of articles that had a 'yes' score for each item on the Drummond checklist.





Among the CEA studies six out of eleven studies found the treatment program was more cost-effective than the alternatives. The cost-effective treatments were therapeutic treatment combined with an aftercare program compared with treatment with therapeutic treatment alone or no aftercare program for substance abusing offenders [50, 51], adult drug court program compared with normal judicial process for substance abuse offenders [53], drug court with addition of multi-systemic therapy and contingency management compared with family court for juvenile substance abuse offenders [54], substance abuse treatment program compared to educational program and no treatment at all [43] and opioid substitution therapy compared to no treatment [46]. Three studies found that the treatment programs were not cost-effective when compared to their alternatives. These were: cognitive behavior therapy with dialectical therapy compared with usual offender treatment with no specialist care for severe personality disorder program [40], aftercare post-release substance abuse treatment compared to no aftercare [49], and seamless probation compared with traditional probation for substance abuse offenders [39].

Two studies had a higher incremental cost per effect for the treatment program compared with the alternative and therefore the cost-effectiveness results can only be interpreted in relation to a threshold analysis or an analysis of the WTP of society of stakeholders for the additional benefits achieved by the intervention [52, 55].

**Table 2: Summary of results of the economic evaluations of studies in the review**

<b>Author, Publication date, Location</b>	<b>Cost year and currency</b>	<b>Result of Economic Evaluation</b>
<b>Barret B &amp; Byford S, 2012, United Kingdom</b>	2005-2006 GBP	Incremental cost per serious offence prevented = £2.24 million. At no point on the cost effective acceptability curve does the curve move above 40% for willingness to pay values up to £5 million. <b>Dangerous severe personality disorder program not cost-effective.</b>
<b>Caldwell et al, May 2006, USA</b>	2001 USD	Treatment program produced benefits at a cost-benefit ratio of 1:7.18, i.e. \$7.18 saved for every dollar of cost. <b>Mental health treatment more cost-effective than no treatment.</b>
<b>French et al, 2010, USA</b>	2001 USD	Treatment program produced a net benefit of \$4307-\$6200 per person per year over the control group. <b>Community education and residential treatment more cost-effective than no treatment at all.</b>
<b>Klietz et al, 2010, USA</b>	2008 USD	The benefit of MST per dollar of cost was between \$9.51 and \$23.59 per participant. <b>MST more cost effective than Individual therapy.</b>
<b>Logan et al, April 2004, USA</b>	2000 USD	\$3.83 and \$1.56 benefit for every dollar spent on graduates and terminators (drop-outs) of the drug court program respectively. <b>Drug court more cost effective than no drug court.</b>
<b>McCollister et al, December 2003, USA</b>	1997 USD	ICER for drug treatment compared to no drug treatment = \$65. ICER for drug treatment with aftercare program compared to drug treatment alone = \$19. A day of reincarceration was avoided at \$65 when in the treatment group. Adding aftercare program to the treatment avoided an additional day of re-incarceration at \$19. <b>Drug treatment with Aftercare more cost effective than drug treatment alone.</b>

Table 2 (Continued)

<b>McCollister et al, January 2003, USA</b>	<b>1993 USD</b>	<p>ICER for drug abuse therapy compared to no treatment = \$113, A day of reincarceration was avoided at \$113 when in the treatment group.</p> <p>ICER for drug abuse therapy and after care compared to drug abuse therapy alone = \$51, Adding aftercare program to the treatment avoided an additional day of re-incarceration at \$51. ICER for drug abuse plus after care compared to no treatment = \$80, Drug abuse plus aftercare compared program to no treatment avoided an additional day of re-incarceration at \$80.</p> <p><b>Drug abuse therapy with Aftercare more cost effective than both drug treatment alone and no treatment.</b></p>
<b>McCollister et al, September 2004, USA</b>	<b>2000 USD</b>	<p>ICER for drug abuse therapy compared to no treatment = \$45, A day of reincarceration was avoided at \$45 when in the treatment group.</p> <p>ICER for drug abuse therapy and after care compared to drug abuse alone = \$41, Adding aftercare program to the treatment avoided an additional day of re-incarceration at \$41.</p> <p>ICER for drug abuse plus after care compared to no treatment = \$65, Drug abuse plus aftercare compared program to no treatment avoided an additional day of re-incarceration at \$65</p> <p><b>Drug abuse therapy with aftercare plus more cost effective than drug treatment alone but not cost-effective when compared to treatment.</b></p>
<b>Shanahan et al, February 2004, Australia</b>	Not mentioned	<p>ICER 1 = \$0.17: An additional \$0.17 is incurred to achieve an additional crime free day in the control group; suggesting no difference between groups.</p> <p>ICER 2 = \$1905: An additional \$1905 is incurred to prevent one additional drug related offence in the control group</p> <p><b>Drug treatment group more cost effective.</b></p>
<b>Sheidow et al, 2012, USA</b>	<b>2004 USD</b>	<p>ACER for juvenile drug court with community services = \$5402.</p> <p>ACER for juvenile drug court with MST = \$3208.</p> <p>ACER for juvenile drug court with CM = \$3412.</p> <p>ACER for family court = -\$7668.</p> <p><b>Family court not cost effective (negative effect). Drug court with MST more cost effective than drug court with CM and drug court with community services.</b></p>
<b>Borduina &amp; Dopp, June 2015, USA</b>	<b>2013</b>	<p>Cost-Benefit ratio of 1:48.81.</p> <p><b>MST benefit was \$48.81 for every dollar of cost compared to usual community services (CBT and IT).</b></p>

**Table 2 (Continued)**

<b>Daley et al, 2004, USA</b>	<b>1996 USD</b>	Drug and alcohol education session compared to no treatment yielded negative benefits. Outpatient group treatment sessions compared to no treatment had a benefit cost ratio of 5.74:1. Fairly intensive group treatment session compared to no treatment had a benefit to cost ratio of 3.81. Very intensive residential treatment compared to no treatment had a benefit to cost ratio of 1.79:1. <b>Outpatient group was most cost effective followed by fairly intensive treatment and then the very intensive treatment. The education session was not cost effective.</b>
<b>Dopp et al, March 2014, USA</b>	<b>2012 USD</b>	Incremental benefit of MST per dollar of cost was \$4.78 for juveniles and \$5.04 for sibling pairs compared IT. <b>MST more cost-effective than IT.</b>
<b>Gisev et al, July 2011, Australia</b>	<b>2012 AUD</b>	ICER for OST compared to no treatment = -\$1401 per life saved. OST is dominant (costs less and saves more lives) <b>and therefore more cost-effective than no treatment.</b>
<b>Olmstead et al, April 2007, USA</b>	<b>Not mentioned</b>	To lengthen the longest duration of abstinence, ICER = \$102 for MET/CBT compared to DC ICER = \$1104 for DC with CM compared to MET/CBT ICER = \$1333 for MET/CBT with CM compared to DC with CM. <b>DC is most cost effective, followed by MET/CBT, followed by DC with CM and then MET/CBT with CM.</b>
<b>Warren et al, January 2006, Australia</b>	<b>2003 AUD</b>	ICER for prison methadone compared to no treatment = \$38 / additional heroin free day <b>Cost-effectiveness results not conclusive</b>
<b>Alemi et al, March 2006, USA</b>	<b>2001 USD</b>	ACER for Seamless probation = \$38.84 per follow up day, ACER for Traditional probation = \$21.60 per follow up day. <b>Seamless probation not cost effective compared with traditional probation.</b>

ICER = Incremental cost-effectiveness ratio, ACER = Average cost-effectiveness ratio, DC = Individual counselling, CM = Contingency management, MET = Motivational enhancement therapy, CBT = Cognitive behavioral therapy, OST = Opioid substitution therapy, MST = Multi-systemic therapy, IT = Individual therapy, DBT = Dialectical behavior therapy.

## **2.4. Discussion**

This paper provides a review of economic evaluation studies of treatment programs for offenders between 2003 and 2016 and highlights the dearth of economic evidence supporting the plethora of programs that exist in the justice space area. Given the huge economic burden that offenders place on society in terms of the resources required to police, prosecute, treat and rehabilitate this group, and the societal cost of crime it is concerning that such little attention is paid to economic aspects of intervention and treatment programs. Many studies have been conducted to demonstrate the effectiveness of treatment programs for offenders as reflected in recent reviews of 'what works' in offender treatment [57-59]. It is, however, striking that in this global review of published literature covering a 13-year period from 2003 to 2016, only 17 studies were found that conducted a full economic evaluation of treatment programs. Previous reviews also found a small number of studies; 14 studies in the review by Welsh between 1970 and 2000 [12].

One possible limitation of this review is that we focused only on the peer-reviewed published literature and some economic evaluations may have been undertaken in-house and thus not available for inclusion in this review and we did not include the grey literature. For example, this includes benefit-cost evaluations by the Washington State Institute for Public Policy (<http://www.wsipp.wa.gov/BenefitCost>). However peer reviewed publications from this institute were included.

Locally in Australia, Corrective Service New South Wales (NSW) lists at least 34 approved rehabilitation programs aimed at addressing behaviors associated with offending [60]. However, only three identified studies in Australia had a published economic evaluation (the NSW prison methadone program [46, 55] and the NSW adult drug court [53]). No evidence was found for economic evaluation studies for other offending behaviors in Australia and very little evidence was found globally. In addition, no evidence was found for economic evaluations for women offenders' treatment programs, and only six studies internationally focused on juvenile offenders.

The focus on treatment programs for adult men is likely due to them constituting the largest proportion (93.5%) of the prisoner population.

What is evident is that most treatment programs available for offenders remain unevaluated from an economic perspective making it difficult to answer the question about whether society is receiving value for money from investments in such programs. Why this is so remains unclear, but we recommend that a culture of robust economic evaluations be developed to ensure that the available resources are spent on the most cost effective programs. In many developed countries strict standard recommendations and guidelines based on both clinical and economic evidence are in place for the provision and use of health care programs, treatments and technologies. In the UK, health technology assessments (HTAs) are conducted for the National Institute for health and Clinical Excellence (NICE) and the results are used for developing guidance for the National Health Service. Similar to NICE is the Pharmaceutical Benefits Advisory Committee and the Medical Services Advisory Committee for recommendation on the use of medicines and medical services in Australia. Likewise, *Haute Autorité de Santé*: The French National Authority for Health and the Swedish Agency for Health Technology Assessment and Assessment of Social Services perform HTAs to guide resource allocation in the health system. However, there appear to be no equivalent agencies to provide economic evidence recommendations in the justice space despite the vast sums expended on such programs.

In terms of overall quality, although guidelines exist for the general application of economic evaluation studies, these were mostly not adequately followed. Most studies deviated from the Drummond guidelines used in this review. These deviations were often in the identification and measurement of costs and consequences. While carrying out a full economic evaluation is a complex task, it is recommended that a societal perspective that considers all costs and consequences regardless on whom they fall is adopted [16]. However, in this review only six studies adopted the societal perspective which is the appropriate perspective for the offender area as they impact

on all levels of society. As a provider perspective does not consider costs and benefits to the wider society, this perspective may not provide a true estimate of the results of an economic evaluation.

There was wide variation in methodologies and it was not possible to compare results between studies however, from the economic evaluation results in this study, there is some evidence to support the economic benefit of investing in treatment programs.

It is clear that economic evaluation in the justice sector lags behind research in other areas of public policy such as the environment and health [61]. The measurement of the benefits of treatment programs should extend beyond recidivism rates and include successful treatment, better family relationships and improved livelihoods. Placing a dollar value on benefits and losses especially for intangible costs is often challenging. This may be one of the reasons why there is still very little research concerned with economic evaluations in criminal justice. Furthermore, health economic evaluations are costly to perform and there is a shortage of health economists employed in health and social sciences. However, we propose that a culture of robust economic evaluations be developed to ensure that the available resources are spent on the most cost effective programs to provide value for money.

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## Appendix 1: Assessment of the quality of studies using Drummond's 10 categories.

Article	1. Was a well-defined question posed in answerable form?				2. Was a comprehensive description of the competing alternatives given?		
	Did the study examine both costs and effects of the service(s) or program(s)?	Did the study involve a comparison of alternatives?	Was a viewpoint for the analysis stated and was the study placed in any particular decision-making context?	Were the patient population and any relevant subgroups adequately defined?	Were all important alternatives included? (Were there any important alternatives omitted?)	Was a do-nothing alternative considered, if applicable? (Was (should) a do-nothing alternative be considered?)	Were relevant alternatives identified for patient subgroups?
Barret B & Byford S, 2012, United Kingdom	Yes	Yes	Yes. Service perspective (criminal justice, health and social services costs)	Yes. Men in prison who have severe personality disorder.	Yes. Alternative was usual care in prison for offenders with personality disorder.	No DSPD treatment was considered in the usual care.	Yes
Caldwell et al, May 2006, USA	Yes	Yes	Yes. Taxpayer costing perspective	Yes. Difficult to manage incarcerated delinquent boys.	Yes. Youth that received the usual juvenile correctional services.	No treatment was considered in the usual care.	Yes
French et al, June 2009, USA	Yes	Yes	Not stated. We assumed a societal perspective based on the unit cost estimates.	Yes. Substance abuse repeat male offenders.	Yes. Offenders that did not receive treatment (community education and residential treatment)	No treatment was considered.	Yes
Klietz et al, 2010, USA	Yes	Yes	Yes. Taxpayer and victim perspective.	Yes	Yes	Not required as the usual care is individual therapy.	Yes
Logan et al, April 2004, USA	Yes	Yes	View point not stated. Assumed to be provider perspective from analysis done.	Yes	Yes	No treatment considered.	Yes
McCollister et al, December 2003, USA	Yes	Yes	Yes. Narrow perspective, department of corrective services expenditures.	Yes	Yes	No treatment was considered in the usual care.	Yes. Treatment compared to current practice
McCollister et al, January 2003, USA	Yes	Yes	Yes. Narrow perspective, department of corrective services expenditures.	Yes	Yes	No treatment considered.	Yes. Treatment compared to current practice
McCollister et al, September 2004, USA	Yes	Yes	Not clear	Yes	Yes	No treatment considered.	Yes. Treatment compared to current practice
Shanahan et al, February 2004, Australia	Yes	Yes	Yes. Treatment provider perspective	Yes	Yes	No treatment considered.	Yes. Treatment compared to current practice
Borduin and Dopp, June 2015, USA	Yes	Yes	Yes	Yes	Yes	Not required as the usual care is community services.	Yes
Dopp et al, March 2014, USA	Yes	Yes	Yes	Yes	Yes	Not required as the usual care is individual therapy.	Yes
Gisev et al, July 2011, Australia	Yes	Yes	Yes. Treatment provider and criminal justice	Yes	Yes	No treatment considered.	Yes. Treatment compared to current practice
Olmstead et al, April 2007, USA	Yes	Yes	Yes. Treatment provider	Yes	Yes	Not required as the usual care is individual therapy.	
Warren et al, January 2006, Australia	Yes	Yes	Yes. Provider/prison funder	Yes	Yes	No treatment considered.	Yes. Treatment compared to current practice
Sheidow et al, 2012, USA	Yes	Yes	Yes. Payer perspective	Yes	Yes	Not needed as usual care is the family court.	Yes
Daley et al, 2004, USA	Yes	Yes	Yes. Criminal justice perspective.	Yes	Yes	No treatment considered.	Yes.
Alemi et al, March 2006, USA	Yes	Yes	Yes. Payers (tax payers and government)	Yes	Yes	Not applicable	Yes

## Appendix 1 (Continued)

Article	3. Was the effectiveness of the programmes or services established?			4. Were all the important and relevant costs and consequences for each alternative identified?		
	Was this done through a randomised, controlled clinical trial? If so, did the trial protocol reflect what would happen in regular practice?	Was effectiveness established through a systematic overview of clinical studies? Were inclusion/exclusion rules outlined?	Were observational data or assumptions used to establish effectiveness? If so, were potential biases recognized?	Was the range wide enough for the research question at hand?	Did it cover all relevant viewpoints? (Possible viewpoints include the community or social viewpoint, and those of patients and third-party payers. Other viewpoints may also be relevant depending upon the particular analysis.)	Were the capital costs, as well as operating costs, included?
Barret B & Byford S, 2012, United Kingdom	No effectiveness proven (worse outcome for offenders) in the previously reported RCT (Barrett et al. 2009)	Not applicable	Not applicable	Not clear what was included in the unit costs used in the model.	Provider perspective including criminal justice, health and social services costs.	Can't tell. Costing details not provided.
Caldwell et al, May 2006, USA	Not applicable	Not applicable	Cost effectiveness alongside effectiveness trial. Observational data with a matched comparison group. Propensity scoring matching used to eliminate bias.	Treatment costs, criminal justice costs, costs of crime. Excluded health and social services costs and victim costs.	Provider perspective (only tax payer resources).	Can't tell
French et al, June 2009, USA	Although populations were randomly selected, treatment groups were not.	Not applicable	Observational data was used and propensity scoring matching used to eliminate bias.	Treatment costs, criminal justice costs, wage loss, victim costs. Excluded health and social services costs.	Yes, Societal perspective included all costs.	Can't tell
Klietz et al, 2010, USA	Yes. Effectiveness established in previous RCT studies (Borduin et al. 1995)	Not applicable	Not applicable	Yes, including intangible costs/benefits	Yes, Societal perspective included all costs.	Yes
Logan et al, April 2004, USA	Not applicable	Not applicable	Yes. Potential selection bias.	Costs to the victim excluded.	Provider perspective used (DATCAP costing and not Client DATCAP)	Yes
McCollister et al, December 2003, USA	Yes. (Inciardi et al 1997)	Not applicable	Not applicable	No. Only program costs considered	Provider perspective (Criminal justice perspective)	No. Only operating (direct) costs.
McCollister et al, January 2003, USA	Yes. (Wexler and colleagues)	Not applicable	Not applicable	Only costs to the program	Provider perspective (Criminal justice perspective)	Yes
McCollister et al, 2004, USA	Yes. (Wexler and colleagues)	Not applicable	Observational data used in aftercare program. Bias recognised.	Not clear	Not clear	Yes
Shanahan et al, February 2004, Australia	Yes.	Not applicable	Not applicable	Treatment costs, criminal justice costs. Patient and victim costs excluded	Provider (treatment) perspective	Yes
Borduin and Dopp, June 2015, USA	Yes. (Borduin et al 2009)	Not applicable	Not applicable	Yes, including intangible costs/benefits	Societal perspective (Criminal justice, tangible and intangible costs)	Yes
Dopp et al, March 2014, USA	Yes. (Borduin et al 1995)	Not applicable	Not applicable	Yes, including intangible costs/benefits	Societal perspective (Criminal justice, tangible and intangible costs)	Yes
Gisev et al, July 2011, Australia	Not applicable	Not applicable	Yes. Potential bias accounted for in propensity scoring matching.	Treatment costs, criminal justice costs. Patient and victim costs excluded	Provider perspective (treatment provider and Criminal justice perspective)	Can't tell
Olmstead et al, April 2007, USA	Yes. (Carroll et al 2006)	Not applicable	Not applicable	Only treatment costs. Criminal justice, patient costs excluded	Provider perspective (treatment only)	No
Warren et al, January 2006, Australia	Yes. (Dolan et al. 2005)	Not applicable	Not applicable	Only treatment costs from the criminal justice system	Provider perspective (treatment ponly)	Yes
Sheidow et al, 2012, USA	Yes. (Henggeler et al. 2006)	Not applicable	Not applicable	Only treatment and criminal justice costs.	Provider perspective	Can't tell
Daley et al, 2004, USA	Not applicable	Not applicable	Yes. Potential biases recognised.	Only treatment and criminal justice costs	Provider perspective (criminal justice perspective)	Only operating costs
Alemi et al, March 2006, USA	Yes. Alongside economic evaluation.	Not applicable	Not applicable	Only treatment costs, criminal justice costs, health services utilisation.	Provider perspective (tax payer and government perspective)	Yes

## Appendix 1 (Continued)

Article	5. Were costs and consequences measured accurately in appropriate physical units?			6. Were costs and consequences valued credibly?			
	Were the sources of resource utilization described and justified?	Were any of the identified items omitted from measurement? If so, does this mean that they carried no weight in the subsequent analysis?	Were there any special circumstances (e.g., joint use of resources) that made measurement difficult? Were these circumstances handled appropriately?	Were the sources of all values clearly identified? (Possible sources include market values, patient or client preferences and views, policy-makers' views and health professionals' judgements)	Were market values employed for changes involving resources gained or depleted?	Where market values were absent (e.g. volunteer labour), or market values did not reflect actual values (such as clinic space donated at a reduced rate), were adjustments made to approximate market values?	Was the valuation of consequences appropriate for the question posed (i.e. has the appropriate type or types of analysis – cost-effectiveness, cost-benefit, cost-utility – been selected)?
Barret B & Byford S, 2012, UK	Yes	Can't tell. Costing details not provided.	Can't tell. Costing details not provided.	Can't tell	Can't tell. Costing details not provided.	Can't tell. Costing details not provided.	Yes
Caldwell et al, May 2006, USA	Yes	Can't tell	Can't tell	Yes	Can't tell	Can't tell	Yes
French et al, 2009, USA	Yes	Can't tell	Can't tell	Yes, sources from literature	Can't tell	Can't tell	Yes
Klietz et al, 2010, USA	Yes	Some costs e.g. psychiatric care service utilization were omitted and these could have an impact on costs or benefits	Can't tell	Yes	Yes	Yes	Yes
Logan et al, April 2004, USA	Yes	Victim costs of crime, cost estimates for some crime classifications and reduction in child support deficits not provided.	Yes	Yes	Yes	Yes	Yes
McCollister et al, December 2003, USA	Yes	Can't tell	Can't tell	Yes	Yes	Yes	Yes
McCollister et al, January 2003, USA	Not clear	Only considered incremental costs of treatment. Could the provision of treatment have altered standard resource use e.g. space used?	Use of common resources in prison was eliminated from costs.	Yes	Yes	Yes	Yes
McCollister et al, September 2004, USA	Yes	All included	Can't tell	Yes	Yes	Yes	Yes
Shanahan et al, 2004, Australia	Yes	All included	Yes	Yes	Yes	Yes	Yes
Borduin and Dopp, June 2015, USA	Yes	All included	Yes	Yes	Yes	Yes	Yes
Dopp et al, March 2014, USA	Yes	Benefits resulting from increased employment and reduced use of social services not included.	Yes	Yes	Yes	Yes	Yes
Gisev et al, July 2011, Australia	Yes	All included	Can't tell	Yes	Yes	Yes	Yes
Olmstead et al, April 2007, USA	Yes	All included	Yes	Yes	Yes	Yes	Yes
Warren et al, January 2006, Australia	Yes	Overhead costs, Costs related to treatment of overdose and injuries excluded	They were excluded	Yes	Yes	Yes	Yes
Sheidow et al, 2012, USA	Yes	All included	Yes	Yes	Yes	Yes	Yes
Daley et al, 2004, USA	Yes	Incarceration costs were excluded and assumed to be equal in each group	Yes	Yes	Not clear	Not clear	The question was a cost effectiveness analysis but final incremental results were of a cost benefit analysis.
Alemi et al, March 2006, USA	Yes	All included	Yes	Yes	Yes	Yes	Yes

## Appendix 1 (Continued)

Article	7. Were costs and consequences adjusted for differential timing?		8. Was an incremental analysis of costs and consequences of alternatives performed?	9. Was uncertainty in the estimates of costs and consequences adequately characterised?			
	Were costs and consequences that occur in the future 'discounted' to their present values?	Was there any justification given for the discount rate used?	Were the additional (incremental) costs generated by one alternative over another compared?	If patient-level data on costs or consequences were available, were appropriate statistical analyses performed?	If a sensitivity analysis was employed, was justification provided for the range of values (or for key study parameters)?	Were the conclusions of the study sensitive to the uncertainty in the results, as quantified by the statistical and /or sensitivity analysis?	Was heterogeneity in the patient population recognized, for example by presenting study results for relevant subgroups?
Barret B & Byford S, 2012, UK	Yes, at 3.5%	Yes.	Yes	Not applicable	No justification for values used.	Results sensitive to changes in values	Not applicable
Caldwell et al, May 2006, USA	Not mentioned	Not mentioned	Yes	Yes. Table 2	Not applicable	Not applicable	Yes
French et al, J2009, USA	Not applicable as follow up period was one year	Not applicable	Yes	Yes	Not applicable	Not applicable	Yes (table 2, 3)
Klietz et al, 2010, USA	Yes, at 3%	Yes	Yes	Not applicable	No	No allowance for uncertainty made	No allowance for uncertainty made
Logan et al, 2004, USA	Not applicable as follow up period was one year	Not applicable	Yes	Statistical analysis not performed.	No	No	Yes. Analyses conducted (table 4) but no differences found
McCollister et al, December 2003, USA	No	Discounting not done.	Yes	No allowance for uncertainty made	Not applicable	No allowance for uncertainty made	No allowance for uncertainty made, even when table 1 shows patient group heterogeneity.
McCollister et al, January 2003, USA	Not applicable as follow up period was one year.	Not applicable	Yes	No allowance for uncertainty made	Not applicable	No allowance for uncertainty made	No allowance for uncertainty made, even when table 1 shows patient group heterogeneity.
McCollister et al, 2004, USA	No	Discounting not done.	Yes	No allowance for uncertainty made	No	No, even when differences in groups existed according to table 1.	No allowance for uncertainty made, even when table 1 shows patient group heterogeneity.
Shanahan et al, 2004, Australia	Not applicable as follow up period was one year.	Not applicable	Yes	Not applicable. Patient level data not available.	Yes	Yes, results sensitive to changes in values	Groups similar except for more men in the treatment group than control.
Borduin and Dopp, 2015, USA	Yes	Yes	Yes	Not applicable	Yes	Results remained robust	No difference between groups
Dopp et al, 2014, USA	Yes	Yes	Yes	Not applicable	Yes	Results remained robust	No difference between groups
Gisev et al, 2011, Australia	Not applicable. Follow up period was less than one year.	Not applicable	Yes	Yes. Statistical analyses were performed.	Yes	Results remained robust	Propensity scoring matching used to account for heterogeneity
Olmstead et al, April 2007, USA	Not applicable. Follow up period was less than a year.	Not applicable	Yes	Yes. Statistical analyses were performed.	Yes	Results remained robust	No difference between groups
Warren et al, 2006, Australia	Not needed as follow up period was less than one year	Not applicable	Yes	Not applicable	Yes.	Results sensitive to inclusion of correctional officer time	No difference between groups
Sheidow et al, 2012, USA	Not needed as follow up period was one year	Not applicable	No	No	Not applicable	No allowance for uncertainty made	No. Even when results in parent study show heterogeneity as a result of significant differences in psychosocial measures.
Daley et al, 2004, USA	Not mentioned	No	Yes	Yes.	Not applicable	Results remained robust	Yes, age was used as a control variable in the regression analysis
Alemi et al, 2006, USA	No	No	No	Not applicable	Yes.	Results remained robust	No difference between groups

## Appendix 1 (Continued)

Article	10. Did the presentation and discussion of study results include all issues of concern to users?					
Author, date of publication, Location of study	Were the conclusions of the analysis based on some overall index or ratio of costs to consequences (e.g. cost-effectiveness ratio)? If so, was the index interpreted intelligently or in a mechanistic fashion?	Were the results compared with those of others who have investigated the same question? If so, were allowances made for potential differences in study methodology?	Did the study discuss the generalisability of the results to other settings and patient/client groups?	Did the study allude to, or take account of, other important factors in the choice or decision under consideration (e.g. distribution of costs and consequences, or relevant ethical issues)?	Did the study discuss issues of implementation, such as the feasibility of adopting the 'preferred' program given existing financial or other constraints, and whether any freed resources could be redeployed to other worthwhile programs?	Were the implications of uncertainty for decision-making, including the need for future research, explored?
Barret B & Byford S, 2012, United Kingdom	Yes	Yes	Yes	Yes	Yes	Yes
Caldwell et al, May 2006, USA	Yes	Yes	Yes	Yes	Yes	Yes
French et al, June 2009, USA	Yes	Yes	No	Yes	No	No
Klietz et al, 2010, USA	Yes	Yes	Yes	Yes	Yes	No allowance uncertainty made
Logan et al, April 2004, USA	Yes	Yes	Yes	Yes	Yes	Yes
McCollister et al, December 2003, USA	Yes	No	Yes	Yes	Yes	Yes
McCollister et al, January 2003, USA	Yes	Yes	Yes	Yes	Yes	Yes
McCollister et al, September 2004, USA	Yes	Yes	Yes	Yes	Yes	Yes
Shanahan et al, February 2004, Australia	Yes	Yes	Yes	Yes	Yes	Yes
Borduin and Dopp, June 2015, USA	Yes	Yes	Yes	Yes	Yes	Yes
Dopp et al, March 2014, USA	Yes	Yes	Yes	Yes	Yes	Yes
Gisev et al, July 2011, Australia	Yes	Yes	No	Yes	Yes	No
Olmstead et al, April 2007, USA	Yes	Yes	Yes	Yes	Yes	Yes
Warren et al, January 2006, Australia	Yes	Yes	Yes	Yes	Yes	Yes
Sheidow et al, 2012, USA	No	Yes	Yes	Yes	Yes	No allowance uncertainty made
Daley et al, 2004, USA	Yes	Yes	Yes	Yes	Yes	Yes
Alemi et al, March 2006, USA	No	Yes	Yes	Yes	Yes	Yes



### **Chapter 3: Assessing societal and offender perspectives on the value of offender health care: A stated preference research protocol**

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## **TITLE PAGE**

**Title: Assessing societal and offender perspectives on the value of offender health care: A stated preference research protocol**

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**Keywords:** Discrete choice experiment, Contingent valuation, Focus group discussions, consensus methods, Delphi method, Offender rehabilitation, Impulsivity, Violence.

**Abstract.****Introduction:**

The increasing burden that offenders place on justice and health budgets necessitates better methods to determine the benefits of and value society places on offender programs to guide policy regarding resource allocation. The aim of this paper is to demonstrate how economic methods will be used to determine the strength of preferences and value of violent offender treatment programs from the perspectives of offenders, their families and the general population.

**Methods and analysis:**

Two stated preference economic methods, discrete choice experiment (DCE) and contingent valuation (CV), will be used to assess society's and offenders' value of treatment programs. The mixed methods process involves a literature review and qualitative methods to derive attributes and levels for the DCE and payment card values for the CV. Consensus building approaches of voting, ranking and the Delphi method will be used to further refine the findings from the qualitative phase. Attributes and their levels will be used in a D-efficient Bayesian experimental design to derive choice scenarios for the development of a questionnaire that will also include CV questions. Finally, quantitative surveys to assess societal preferences and value in terms of willingness to pay will be conducted.

**Ethics and dissemination:**

Ethics approval from this study was obtained from the University of New South Wales (UNSW) Human Research Ethics Committee, Corrective Services New South Wales Ethics Committee and Aboriginal Health and Medical Research Council ethics committee. The findings will be made available on the Kirby Institute UNSW website, published in peer reviewed journals and presented at national and international conferences. This study was funded by grants from the National Health and Medical Research Council, under the Centre of Research Excellence in Offender Health

Australia [grant number RG124596]. It is part of the research done by the Justice and Health program, Kirby Institute.

### **Strengths and limitations of the study**

- This study is the first to quantify societal and offender preferences for violent offender treatment and provides a rigorous mixed methodological approach that can be generalised for use in other DCE and CV studies of valuation of offender programs.
- The results from these studies will be used in valuing the strength of preferences of society and offenders for treatment programs to reduce reoffending.
- The study will provide an estimate of the value, in terms of willingness to pay, that society and offenders place on violent offender treatments.
- This study will also provide the basis for conducting cost-benefit analysis to indicate the relative 'value for money' for violent offender programs.
- Recruitment of violent offenders to participant in a study is often challenging and while we hope to have a large enough representative sample in the future to participate in a DCE with offenders only, in this study recruitment will be done among the general population. Questions that ask participants to self-identify as offenders and family members of offenders will be included in the survey and sub-analysis done if a large enough sample is obtained.

### **Funding**

This study was funded by grants from the National Health and Medical Research Council, under the Centre of Research Excellence in Offender Health Australia [grant number RG124596]. It is part of the research done by the Justice and Health program, Kirby Institute.

### **Competing Interests**

There are no competing interests regarding this study.

**Author contributorship statement**

Stella Settumba is involved in the study design, participant recruitment for the FGDs, data collection, analysis and write-up; Georgina Chambers and Marian Shanahan are involved in the study design, data analysis and write-up, Tony Butler and Peter Schofield are involved in the study design, participant recruitment for the FGDs, data analysis, and write-up.

### **3.1. Introduction**

Violence is a leading public health problem. It is estimated that more than 1.3 million people worldwide die each year as a result of violence accounting for 2.5% of global mortality [1]. The costs of violence to the health system in Australia, including medical costs, lost productivity, and intangible costs, are high and estimated at \$AUD3.1 billion each year [2]. Imprisoning people with minimal rehabilitation has been shown to be largely ineffective as a deterrent to offending [3]. Well designed and evaluated interventions to reduce violence can save both lives and money. Research has shown that most violent crime can be classified as impulsive rather than pre-meditated and that impulsive offenders have a higher likelihood of recidivism than those offenders who commit pre-meditated crimes. Furthermore, impulsive offenders are more likely to respond positively to treatment and rehabilitation programs [4-6].

Decisions to allocate scarce resources to treat offenders, especially violent offenders, are seen by some as controversial even when the benefits of treatment extend beyond the offenders [7]. Public opinion and perception are often important determinants of the treatment and rehabilitation opportunities afforded to offenders since the justice system is financed through taxation, and politicians and other policy makers are wary of incurring the public's disapproval. However, surveys to determine the public's attitudes towards offender rehabilitation often suffer from poor methodology with poorly informed participants who lack accurate information on crime, its causes, and rehabilitation options and consequently are rarely given the opportunity to look beyond punitiveness [7, 8]. Most surveys rely on snap polls with simple questions. Recommended techniques in the literature [9] for eliciting more considered and informed views from the public include: qualitative techniques such as one-to-one interviews, the Delphi technique, focus groups, citizens' juries, consensus panels and nominal group techniques; and quantitative techniques such as ranking, rating, discrete choice experiments (DCEs) and contingent valuation (CV) studies.

A variety of quantitative economic methods, including stated preferences and revealed preferences methods, have been employed to elicit patients' value for healthcare by

quantifying their preferences [10]. Revealed preference methods refer to situations where people's choices are observed in actual market situations. However, in the absence of an actual market, as often found with many health programs or new interventions, stated preference techniques can be used. Stated preference methods refer to situations in which choices are made in a hypothetical market situation using a survey context. Valuation techniques using stated preference methods include the DCE [11, 12] and CV method [13, 14].

In one Australian state, New South Wales (NSW) after a successful pilot [15], a large randomised control trial (RCT) is underway, seeking to evaluate the effectiveness of a class of antidepressants, Selective Serotonin Reuptake Inhibitor (SSRI) (sertraline), to reduce impulsivity in men with a history of violent offending. This pharmacotherapy-based double blinded RCT is known as REINVEST ('Reducing Impulsivity in Repeat Violence Offenders Using a Selective Serotonin Reuptake Inhibitor'). Men who consent, are medically fit, have committed two or more violent offences and score highly on an impulsivity screener are randomised to receive either the SSRI or placebo for 6-12 months. If the intervention is found effective, valuation of its benefits is needed to advocate for the uptake of such treatment programs.

Using the REINVEST study as an exemplar, this paper demonstrates how economic methods will be used to assess the societal and offenders' value of treatment programs for offenders. The following are the aims of the economic study:

1. To elicit societal and offenders' preferences for treatment of impulsive violent offenders. Specifically,
  - a. To assess the characteristics of treatment programs for impulsive violent offenders that could influence the uptake by offenders and support by society.
  - b. To quantify the strength of preferences for and assess trade-offs between characteristics of treatment programs for impulsive violent offenders.

2. To elicit societal and offenders' value, in terms of WTP, of treatment of impulsive violent offenders. Specifically,
  - a. To estimate the societal and offenders' average WTP for the treatment of impulsive violent offenders using an SSRI.
  - b. To elicit the factors affecting societal WTP for offender treatment programs.

The study protocol described in this paper details the methods used in assessing offenders' and society's preference and value (stated as WTP) of violent offender treatment programs using the DCE and CV stated preference methods. To our knowledge, this will be the first study to assess both offenders' and societal preferences for offender treatment programs. Although the involvement of patients in preference measures for decision making has been advocated [16] no DCEs have been performed involving offenders.

### **3.2. Methods**

Aims 1(a) and 1(b) will be achieved through the qualitative (Phase 1) and quantitative (Phase II) components of the DCE respectively and objective 2 through the CV method (Phase II). The next paragraphs describe these methods.

#### **3.2.1. The DCE**

In a DCE, respondents' preferences are elicited based on their stated preference when faced with hypothetical choices between treatment scenarios that differ in terms of specified attributes and attribute levels. DCEs have been increasingly used in health economics to address a wide range of health policy related decisions (see [17-19] for more details on DCE methods). More recently, DCEs have been used in the justice area, for example, to explore societal preferences for alternative cannabis drug policies and to demonstrate the effect of varying cannabis policy characteristics and wider social consequences such as healthcare and criminal justice expenditures [20].

In this DCE study, participants will be asked to indicate their preference between two treatment programs for impulsive repeat-violent offenders, and a no treatment



option. They will be presented with different choice scenarios comprised of differing characteristics of the treatment program (attributes) and attribute-levels. The results will be used to quantify the strengths of the preferences and assess the trade-offs between characteristics of treatment programs for impulsive violent offenders. By adding 'price' as an attribute in the DCE, the average societal WTP for a program can be estimated. A mixed methods design will be used (Figure 1). The DCE has four main steps (1) identifying attributes and levels, (2) the experimental design, (3) the data collection survey, and (4) the analysis and interpretation of results [12]. In this study, step 1 was carried out in phase I and steps 2 to 4 will be in phase II. At the time of writing this protocol paper, phase I has been completed.

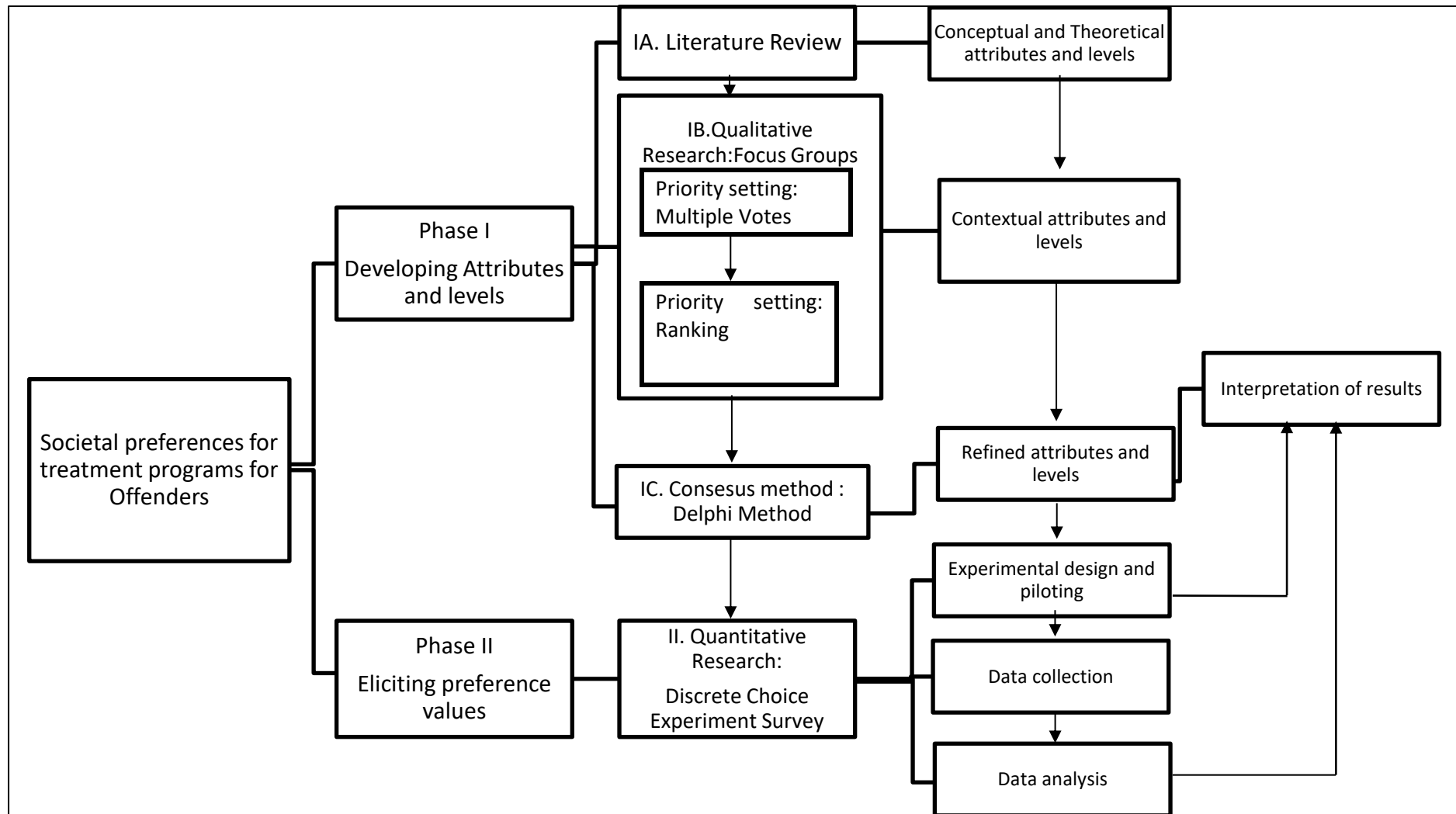
#### **3.1.1.1. Developing attributes and levels**

Phase 1 involves identifying all relevant attributes and assigning their associated levels. The generation of attributes used in DCEs is often poorly performed and reported and the need for rigorous research involving theoretical, conceptual, contextual and refined attributes has been emphasised [21]. In this study attributes were generated through a review of literature and primary qualitative research methods, Focus Group Discussions (FGDs). The consensus methods used to refine and narrow the attributes to a sizeable number included: ranking attributes, voting, and the Delphi method. The attributes characterise the factors considered by offenders and society to be most valuable for acceptance, support and uptake of treatment programs by impulsive violent offenders and the levels are the ranges over which the attributes vary.

#### **Literature Review (1A)**

A literature review developed the conceptual and theoretical attributes and levels which were further examined in FGDs. In this study, the literature searches considered existing theories that define an effective offender treatment program, positive and negative experiences of offenders with treatment programs, and views held by society regarding offender treatment programs.

**Figure 1: The mixed methods design of the Discrete Choice Experiment**



### **Focus group discussions (IB)**

Following the literature review, the next step involved developing contextual attributes and their levels using qualitative research, FGDs.

Participants recruited into the REINVEST study were invited to participate in the offender FGDs and fell into two categories: (1) current or past participants, and (2) those who were eligible for the study according to the selection criteria but declined to participate in REINVEST. Common reasons cited for non-participation in REINVEST included not wanting to take medication and current use of a psychotropic medication. All individuals invited to the offenders FGDs were: male, over 18 years of age, had a history of committing at least two violent offences, and a score over 70 on the Barratt Impulsiveness Scale [22] indicating impulsive personality traits. Purposive selection was made to ensure a balance in terms of age, and number of prior convictions. For all offenders selected to participate in the FGDs, a member of the REINVEST study team asked for their consent to be contacted for this study at one of the routine contact visits and those showing an interest were contacted by a letter requesting them to participate.

In addition, each participating offender in the REINVEST trial study was asked when they attended a routine study follow-up visit if they were happy for a family member to take part in a FGD. The REINVEST study team has good working relationships with some family members of offenders. With the offenders' consent, a member of the REINVEST study team requested the family members' consent to be contacted for this study. Those who agreed were sent an invitation letter to take part in the study including an email address and phone contact by which to contact the research team. Participants for the family members' FGD were defined as a partner or family member of a male offender participating in the REINVEST study and over 18 years of age.

Recruitment notices for the FGD with the general public were placed in libraries and community and online notice boards (e.g. Gumtree). Purposive sampling was done from those who responded, with an aim of having people with various ages, social and

demographic backgrounds. Those selected were sent an invitation letter including an email address and phone number to contact the research team. Participants for the general public FGDs were required to be resident tax payers in NSW and over 18 years of age.

Recruitment and FGDs were conducted until saturation was reached, i.e. when no new data was generated with additional groups, bringing the total number of FGDs to 8 (4 offender, 2 general public and 1 family members group).

During the FGDs, after exploring participants' knowledge and views on violence, impulsivity, incarceration, recidivism and the role of treatment programs, they were provided with precise definitions of terms, examples of available interventions and contemporary statistics on violent crime, incarceration and recidivism rates. Participants then provided characteristics of treatment programs they might value if considering joining or supporting a treatment program. The levels reflected the range of situations that respondents might experience for each attribute. A semi-structured guide was used for the data collection.

After generating an exhaustive list of attributes, participants were asked to take part in a voting exercise [23] used to identify the top five characteristics generated within their FGD. Each participant was given unlimited votes and asked to vote 'yes' or 'no' if they thought a characteristic was important. 'Yes' votes were tallied for each characteristic and those with the top five most votes were noted as the top five attributes of preference for each group.

Participants then ranked the top 5 attributes in order of preference. Ranking exercises, as used in health priority setting, ask participants to give an ordinal rank to their preferences and those with the highest ranking are viewed as the most important [24-26]. The top attributes from the voting and ranking methods could now be included in the DCE. However, in this study, all attributes obtained from the FGDs were further assessed through the Delphi method and the results from the voting and ranking

exercises used to provide a qualitative indication of the strength of the different attributes that will then be compared with results from the DCE.

All FGDs were recorded and Digital audio data was transcribed and then destroyed. The transcribed data and the facilitator notes were coded and analysed using thematic analysis in *NVivo* to identify all major and minor themes on characteristics of treatment programs for impulsive violent offenders. The themes were subsequently grouped to classify the similarities and differences between the different groups of offenders, their families and the general public. These themes were then summarized to create a list of attributes and levels that were discussed during the Delphi method.

### **Delphi Method (IC)**

The attributes and their levels obtained from the literature review and FGDs were further deliberated on by a team of experts using the Delphi method to generate a final list of attributes that were used for the experimental design of the DCE. The Delphi research method is widely used in healthcare research to achieve consensus from a panel on issues of selected subjects [27, 28]. It has also been recommended for use in deliberating on issues raised through FGDs and literature reviews [29] and for further refining of attributes and levels to be used in a DCE [30]. It is popular because, in addition to providing an opportunity for everyone's views to be taken into consideration by the group, it allows anonymous voting and avoids the domination of the consensus process by experts [31]. Delphi, in contrast to other data gathering and analysis techniques, involves heterogeneous expertise, motivated and involved participants and employs multiple iterations/rounds in the form of feedback giving participants an opportunity to make informed decisions with good reasons for judgments or preferences [32]. Using iterative qualitative methods to refine attributes for a DCE also enables the rewriting of attributes to incorporate all relevant concepts [21]. Although there are no strict guidelines on the number of rounds needed to achieve consensus, the basic principle of the Delphi technique is to have as many rounds as are required or until the 'law of diminishing returns' occurs but generally at

least two rounds are required [33]. Figure 2 describes the Delphi method process that was used in this study.

The aim of the Delphi process was:

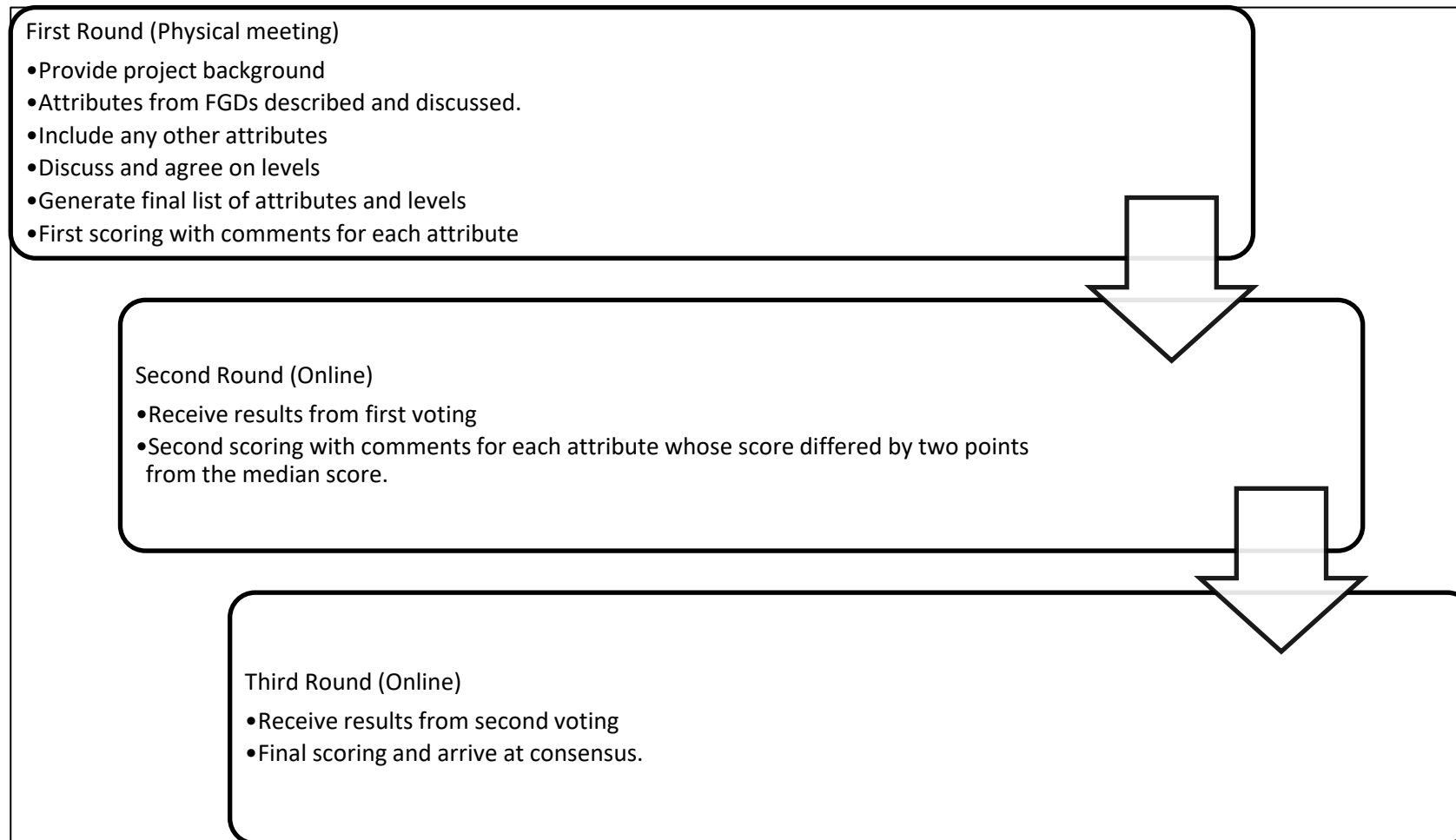
1. To further refine the attributes that had been gathered from the FGDs.
2. To reach consensus on the levels for each attribute.
3. To arrive at a consensus of 5 – 8 attributes that would be evaluated in a DCE survey.

All participants, identified through research, academic and program implementation networks of people in the justice space, received an invitation e-mail, together with an information sheet explaining the study, the Delphi method, and an online informed consent form. Non-responders were approached by phone after one week. Before enrolment, it was confirmed that participants had the intention to complete all rounds of the study and had access to the internet. Participants for the Delphi method included criminologists, nurses from the justice health sector, psychologists working in criminal justice, health economists, forensic psychiatrists, members of the Australian Indigenous community, Corrective Services NSW staff, and police officers.

#### **3.1.1.2. Experimental design and pilot**

Scenarios were constructed using the final attributes and levels ascertained from the Delphi method. A full factorial design takes on all possible combinations of attributes and their levels. Given the large number of attributes and multiple levels obtained from phase I, it is not feasible for respondents to assess all possible choices. An experimental design, which involves selecting through the use of statistical software (NGENE [34]) a subset of scenarios for respondents to complete, will be used to construct a fractional factorial design [35]. This helps to minimise the number of choice sets presented to respondents while still obtaining the maximum amount of information.

**Figure 2: The Delphi method used to refine the attributes for the impulsive violent offender DCE**



Attributes in this study will be described by a continuous, discrete or categorical scale. Effects coding will be used for all categorical attributes and parameters estimated for each level. The design will be unlabelled, which means that the treatments in the scenarios will be generic and labelled as treatment 1 and treat 2.

A D-efficient experimental design that maximises model statistical efficiency by minimising the parameter standard errors will be employed [36]. To optimise D-efficiency, prior assumptions on model parameter estimates will be used. A pilot study will be carried out to obtain priors and to guide development and testing of the questionnaire. This will include testing of the appropriateness of the questions such as determining the number of respondents willing to answer personal questions on exposure to violence, respondents' understanding and the correct balance between attributes and levels, task complexity, and timing of the length of response rates. Priors and their signs for the pilot will be based on data from the literature, or knowledge of known parameters [37]. Coefficients from the pilot testing will then be used as Bayesian priors for the Bayesian efficient experimental design [38], and the refined questionnaire will then be created. The design will be optimised for a multinomial logit model and this will then be evaluated in *NGENE* using a panel mixed logit model, which accounts for the parameter distribution, and a latent class model which accounts for non-uniformity of respondents.

#### **3.1.1.3. Scenario presentation**

Scenarios constructed from the experimental design will be presented to respondents in a survey delivered via a web-based questionnaire to elicit preferences. Respondents will be directed to read a description of all attributes prior to answering the questionnaire. Respondents will be then asked to choose between two treatment choice sets with different levels of attributes and a no treatment option. Those who chose the no treatment option will also be presented with a forced choice. The total number of choice sets per participant will be determined during the pilot and care will be taken to reduce cognitive burden. Generally 6-8 choice sets are recommended . Figure 3 is an example of a choice set.



Figure 3: An example of a choice set for the DCE

Characteristic of treatment	Treatment 1	Treatment 2	No treatment
Effectiveness of the treatment	30% reduction in crime	50% reduction in crime	—
Treatment of co-occurring health conditions/addictions	Minimal treatment provided in program	Full treatment of all co-occurring morbidities both within program and at referral facilities	—
Type of treatment	Offender group counselling sessions only	Individual and Family counselling with Medication	—
Treatment provider	Prison/Probation & parole officers with Counsellors/Psychologists	Prison/Probation & Parole officer with Counsellors/Psychologists with Health Professional	—
Flexibility of appointments	Not flexible	Flexible	—
Compulsory/Voluntary participation	Voluntary	Compulsory	—
Cost per tax payer per year	\$50	\$75	—
Which treatment would you prefer to be given to Impulsive violent offenders?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If you had to choose between treatment 1 and treatment 2, which one would you prefer?	<input type="radio"/>	<input type="radio"/>	

Future work using the above methodology will involve conducting three separate DCEs, one with offenders, one with their families and one with members of the general public. Currently, the DCE will sample only from the general public. However, a question will be included in the survey to identify participants who are themselves offenders (having been accused of violence and having been in contact with the justice system for a violent offence) and family members of offenders. If an adequate number of participants self-identify as offenders and family members of offenders, sub-analyses for each group will be undertaken.

There is no agreed rule on the correct sample size required for a DCE [39]. However, research has shown that in all DCE studies with efficient designs, model estimate precision increases rapidly at sample sizes greater than 150 and then flattens out at around 300 observations [35]. It is also estimated that a minimum sample size of 200 respondents per sub-group be used for studies involving an analysis of differences between samples [40]. Furthermore, the s-efficiency measure in the experimental design in *NGENE* will estimate the required sample size for the study [41]. Recruitment, for the first DCE, will be from an outsourced online panel provider where respondent duplication and fraudulent completion of surveys is monitored. Participants are recruited via verified, certified sources and methods to create a large pool of potential research respondents for our clients. These participant panels have agreed and provided consent to participate in research conducted by the commercial survey company.

#### **3.1.1.4. Data analysis and result interpretation**

The data derived from the DCE surveys will be analysed to estimate attribute preference weights, also known as parameters, denoting the relative strength of each attribute in the choice of treatment programs for the offenders. This is done using the random utility maximisation framework [42].

The econometrics software *Nlogit* [43] will be used to perform the analysis. A multinomial logit model, a mixed logit model, or a latent class model will be estimated

[44]. The final model will depend on which model best fits the data. An assessment of how each model predicts the data will be made using the likelihood ratio index. Sub group analysis will be performed to analyse the differences in parameter strengths between the three groups: offenders, family members of offenders and members of the general population.

WTP for an attribute will be defined as the ratio of the change in marginal utility of an attribute (attribute k in the equation) to marginal utility for the price attribute (p in the equation), as follows:

$$WTP = \frac{\text{Change in } X_k}{\text{Change in } X_p} = \frac{\frac{d}{dx_k} \beta_k x_k}{\frac{d}{dx_p} \beta_p x_p} = - \frac{\beta_k}{\beta_p}$$

An estimation of WTP for a treatment program that is described by the attributes in the DCE model will be calculated as the sum of marginal WTP for each attribute.

### **3.2.2. The Contingent Valuation method**

#### **3.2.2.1. Design**

The contingent valuation method will also be used to solicit respondents' willingness to pay for a defined treatment program for impulsive violent offenders. Obtaining accurate WTP estimates using CV method requires detailed descriptions of the treatment being valued. This is evident from the name of the method, which produces values, contingent upon, the description of treatment. A description of the REINVEST study treatment program will be provided as an exemplar of a treatment program for impulsive violent offenders.

The payment card will be used as the WTP elicitation question. Respondents will be presented with a range of bid amounts and asked to choose the maximum amount in the form of an additional tax levy that they are willing to pay to have a described treatment available to impulsive repeat violent offenders. This reflects real life by allowing individuals to 'shop around' for the value closest to their maximum WTP [45].

The dollar values used on the payment cards were also explored in the FGD qualitative interviews and in the pilot study.

The CVM has been widely criticised for bias in terms of the validity of its results. Therefore, care will be taken in the design and analysis to reduce any bias that may arise. This will include randomisation of positioning of the dollar values of the payment cards to reduce anchoring or starting point bias [46, 47]. Furthermore, to reduce the point bias or range bias [48] one of the options in the WTP payment card values will be 'none of these amounts' and respondents will then be asked to state how much they would be willing to pay.

#### **3.2.2.2. Data Collection**

The results from the qualitative methods in phase I and the pilot survey described in the DCE method will be used to describe the treatment to be valued in the CVM. Through an additional question to the DCE survey, participants will be asked to state their WTP for a described intervention similar to REINVEST. The respondents and sample will therefore be the same as explained in the DCE study.

#### **3.2.2.3. Data Analysis**

Mean and/or median WTP values will be calculated. Logistic regression models will be used to identify the factors affecting both zero and positive WTP and to estimate the independent effects of demographic characteristics on the WTP for offender treatments. The outcome of the model will be specified as the probability of agreeing to pay for offender treatment. The model fit will be estimated using the maximum likelihood function.

#### **3.2.3. Patient and Public involvement**

This protocol is about a study that seeks to assess offender and public preferences and therefore greatly involves the two groups. Phase 1 of this study involves the eliciting of offender and general public preferences through focus group discussions and the Delphi method. The offenders were voluntarily recruited through REINVEST, a study by

the Justice Health Program at Kirby Institute UNSW. Phase II is a quantitative general population survey that will quantify the strength of preferences and assess the value of the treatment program. Participants for the survey will be representative of the NSW population and will be voluntarily recruited through a marketing survey company.

#### **3.2.4. Ethics and dissemination**

Ethics approval for this study has been provided for the two phases. Phase 1 ethics approval has been provided by UNSW – Higher Risk Ethics Committee, NSW Corrective Services Ethics Committee, and Aboriginal Health and Medical Research Council (AH&MRC) ethics committee. Phase II ethics approval has been provided by UNSW – higher risk ethics committee for the DCE general population sample. If in future the DCE is to be conducted with a sample from offenders, further ethics applications will be made to NSW corrective services and AH&MRC ethics committees.

The findings of this study will be made available on the Kirby Institute UNSW website, published in peer reviewed journals and presented at national and international conferences.

#### **3.3. Importance of this paper**

This research will provide a significant contribution to the assessment and evaluation of offender programs. In the DCE, an understanding of the trade-offs made and the strengths of preferences of society in the provision of healthcare for violent offenders will help provide valuable information for policy makers, treatment providers and other practitioners in designing treatment options.

Eliciting societal willingness to pay for offender treatment programs will be used to assess the value/benefit of the programs to both offenders and the public. When deciding whether to fund an intervention, policy makers need to consider how much the public values the benefits - hence how much they would be willing to pay. If the costs of interventions similar to REINVEST are known, the results (benefit values) of this study can be used in cost-benefit analyses.

The average WTP obtained using the DCE method can be compared with the average WTP obtained using the payment card CVM [49]. This can allow for testing of convergent validity of the two WTP methods i.e. the degree to which the results of the two methods are related.

This paper outlines a rigorous methodological approach that can be used to assess societal preferences and generalised for use in other DCE and CVM valuation for offender treatment programs as opposed to the traditional methods of opinion polls, which often only emphasise punitiveness of the public towards offenders, especially those who commit violent offences.

We outline a mixed methods process that involves qualitative methods, consensus approaches and economic methods of preference setting. We also provide a study context where the methods are applied: the REINVEST study. The rich qualitative component of this study will contribute to the literature concerned with the development of attributes for DCEs.

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## **Chapter 4: Developing attributes and attribute-levels for a discrete choice experiment: an example for interventions for impulsive violent offenders.**

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**Title: Developing attributes and attribute-levels for a discrete choice experiment: an example of interventions for impulsive violent offenders.**

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**Key words:** Preference, discrete choice experiment, Delphi method, focus group discussions, Consensus methods, Offender rehabilitation, Impulsivity, Violence

**Running title:** Developing attributes and levels for a DCE on interventions for violent offenders.

## **Abstract**

## **Background**

Discrete-Choice Experiments (DCEs) are used to assess the strength of preferences and value of interventions, but researchers using the method have been criticised for failing to either undertake or publish the rigorous research for selecting the necessary attributes and levels. The aim of this study was to elicit attributes to inform a DCE to assess societal and offenders' preferences for, and value of, treatment of impulsive-violent offenders. In doing so, this paper thoroughly describes the process and methods used in developing the DCE attributes and levels.

## **Methods**

Four techniques were used to derive the final list of attributes and levels: (1) a narrative literature review to derive conceptual attributes; (2) seven focus group discussions (FGDs) comprising 25 participants including offenders and the general public and one in-depth interview with an offender's family member to generate contextual attributes; (3) priority-setting methods of voting and ranking to indicate participants' attributes of preference; (4) a Delphi method consensus exercise with 13 experts from the justice health space to generate the final list of attributes.

## **Results**

Following the literature review and qualitative data collection, 23 attributes were refined to eight using the Delphi method. These were: treatment effectiveness, location and continuity of treatment, treatment type, treatment provider, voluntary participation, flexibility of appointments, treatment of co-morbidities and cost.

## **Conclusion**

Society and offenders identified similar characteristics of treatment programs as being important. The mixed methods approach described in this manuscript contributes to the existing limited methodological literature in DCE attribute development.

#### **4.1. Introduction**

Approximately \$16 billion (AUD) are expended annually in Australia[1] on the justice system. Decision makers are continuously faced with the task of allocating limited resources to programs that hopefully produce the greatest benefits in terms of health and justice outcomes. To this end, priorities need to be determined regarding the best allocation of resources across competing offender interventions. However, a recent systematic review of the literature between 2003 – 2016 on economic evaluation of treatment programs for offenders found only 17 published peer reviewed articles globally [2], suggesting limited opportunities for evidence-informed policies. One way potential program benefits can be evaluated is by assessing the value society places on the program.

Discrete choice experiments (DCEs) are frequently used in the health area to assess the strength of preferences and the value of interventions across a wide range of health policy contexts [3-6]. A DCE asks respondents to consider hypothetical but realistic choice sets and to make a choice between two or more alternative scenarios comprised of multiple characteristics of the program or policy under consideration. By analysing the trade-offs respondents make when making choices, researchers gain insight into the relative importance or preference of each characteristic (referred to as an attribute) over a range of defined dimensions for each characteristic (referred to as attribute levels).

Violence is one of the leading public health problems accounting for 2.5% of global mortality [7] costing the Australian health system approximately \$AUD3.1 billion each year [8]. Well designed and evaluated interventions to reduce violence can save both lives and money. While violent crime can be categorised as either impulsive or pre-meditated, impulsive offenders have a higher likelihood of recidivism and are more likely to respond positively to treatment and rehabilitation programs [9-11]. REINVEST, a large randomised control trial (RCT) conducted by the Justice Health Research Program at the Kirby Institute, UNSW Sydney, New South Wales (NSW) [12] seeks to evaluate the effectiveness of an antidepressant (Sertraline, a selective serotonin

reuptake inhibitor) in reducing recidivism in impulsive, repeat-violent offenders and in improving a range of behavioural measures.

Using the REINVEST study the overall aim of this research is to elicit societal and offenders' preferences for, and assess the value of treatment of, impulsive-violent offenders using a DCE. To our knowledge no DCEs have previously been performed to explore societal preferences for providing treatment to offenders. This is remarkable given the vast sums spent on running the justice system and the impact this group has on the community. The DCE has four main stages: identifying and defining attributes and levels, the experimental design, the data collection survey, and the analysis and interpretation of results [6]. Researchers using the DCE method have been criticised for not explicitly undertaking rigorous research to identify and define relevant attributes and levels [13, 14]. Part of the criticism includes the non-involvement of intervention beneficiaries and the general lack of transparency in how researchers arrive at the DCE attributes and levels. The aim of this paper is to explicitly describe the systematic approach we took in selecting attributes and attribute levels to be used in our DCE.

The specific aims of the study were to:

- I. Elicit the characteristics of treatment programs for impulsive violent offenders that could influence the uptake and support choices of offenders and society respectively.
- II. Create a list of attributes and their levels to be used in a DCE to quantify the strengths of preferences for and assess trade-offs between characteristics of treatment programs for impulsive violent offenders.
- III. Compare and contrast the preferences for treatment programs for impulsive-violent offenders between the different groups of offenders, family members of offenders, and members of the general public.

## **4.2. Methods**

In conducting a DCE, the first step involves the development of attributes and their levels that will then be used in an experimental design to arrive at the scenarios for the DCE survey. The methods used in this study included four components: I) a literature review; II) focus group discussions (FGDs) and an in-depth interview, III) priority setting methods of voting and ranking, and IV) the Delphi method.

### **4.2.1. Literature Review**

The aim of the narrative literature review was to obtain conceptual and theoretical attributes and their levels to inform the qualitative design of the study. PUBMED and Google Scholar were searched using the following key search terms: prisoner, criminal, offender, violence, perception, perspective, recidivism, acceptance, treatment, rehabilitation.

It is generally agreed in the literature that offender health intervention planning and evaluation is often guided using the Risk-Need-Responsivity (RNR) model [15-18]. As its name suggests, the model is based on three principles: 1) the risk principle suggests that treatment should focus on the higher risk offenders or those most likely to reoffend; 2) the need principle emphasises targeting offender criminogenic needs in the design and delivery of treatment; and 3) the responsivity principle describes how the treatment should be provided. The compendium of offender behaviour change programs in NSW [19] states that its offender programs are based on the RNR model and that approaches consistent with this model have demonstrated a reduction in violent recidivism. On the basis of the three principles of the RNR model, the literature was further explored to document any societal perspectives regarding treatment programs. The REINVEST study was also compared against these three model elements. A list of conceptual attributes was then derived and used to develop the tools for the qualitative study.

#### **4.2.2. Focus group discussions and In-depth Interview**

FGDs and one in-depth interview were used to further explore conceptual attributes obtained from literature to arrive at contextual attributes from the perspectives of impulsive offenders, a family member, and the general community.

The FGDs and in-depth interview were conducted in three locations across the Sydney metropolitan area in New South Wales, Australia. Locations were broadly chosen to align with where REINVEST participants lived. Four FGDs were conducted with members of the general population, two FGDs with offenders who were current or past REINVEST, one FGD with offenders who were eligible for the REINVEST study but dropped out of the trial, and one in-depth interview with an offender's family member. A FGD with family members of offenders was scheduled but because only one participant turned up for the discussion, it was conducted as an interview.

Prior to the FGDs two pilot interviews were conducted; an in-depth interview with an ex-violent offender, and a FGD with members of the general public. These helped to revise the FGD guides ensuring suitability for the various groups. All offender FGD participants and the family member were recruited through the REINVEST study. Members of the general public were recruited through advertisements placed on public notice boards such as supermarket noticeboards and gumtree. Prior to the start of each discussion the participants were given information about the study and asked to provide signed consent. All participants received \$50 remuneration for their time and participation in the FGD.

A semi-structured guide was used to aid the discussion. FGDs ranged from 65 minutes to 105 minutes, with a mean of 90 minutes. After exploring the general topic of violence, the differences between impulsive and pre-meditated violent offences, and providing some statistics on the current rates of crime and recidivism in NSW, participants were informed that the discussion would then have a focus on impulsivity. A question tailored to each group was then posed to derive various characteristics that



would be considered by offenders and society in acceptance, support and uptake of treatment programs for impulsive violent offenders (Table 1)

All characteristics suggested were written on a flipchart. Characteristics obtained from the literature search were probed for, if not suggested by the participants. For each characteristic, a range of possible levels were explored using probing questions. The levels chosen were those that reflected the range of situations that respondents might expect to experience, both preferred and not preferred. After an exhaustive list of attributes was created, priority setting among FGD participants and the Delphi method were then conducted to shorten and refine the list of attributes for the DCE.

**Table 1: Preference elicitation questions for the focus group discussions.**

<b>Group type</b>	<b>Question to elicit preference characteristics.</b>
<b>Offenders</b>	Imagine the government is introducing a new program for impulsive violent offenders. What concerns, or components of the program, would you consider before joining?
<b>Family members of offenders</b>	Imagine the government is introducing a new program for impulsive violent offenders. What concerns might you have about the treatment programme when you are considering recommending it to a violent family member?
<b>General public</b>	If the government introduced a new program for impulsive violent offenders and you as tax payers were required to vote for or against it, what components would you consider in the treatment program before you decide on whether or not to support it?

#### **4.2.3. Priority setting by FGD and in-depth interview participants**

The list of attributes generated through the FGDs and interview were further examined by each group and the participant interview to indicate those that were prioritised over others. The priority setting methods used were multiple votes [29] and ranking [20].

In the voting exercise each participant was allowed unlimited votes, and asked to indicate 'yes' or 'no' to each of the characteristics as an indication of preference. Aggregation occurred by summing the total number of 'yes' votes allocated to each characteristic to arrive at the top five characteristics.

Each of the top five characteristics generated from the voting were written on a separate card, and each group was tasked to arrange the cards in order of preference using the ranking consensus method [20]. This process involves group discussions with continuous iterations of ranking until all group participants agreed with the order of cards. This was done to qualitatively assess the strength of preference for each of the top five characteristics. The number of times each characteristic was voted in the top five and the position each characteristic was placed out of five in the ranking were recorded.

#### **4.3. The Delphi method**

A team of experts in the justice and health space (see the acknowledgements section for details) deliberated on the attributes and levels generated from the FGDs using the Delphi method to achieve group consensus on priority attributes and levels to further be tested in the DCE [21, 22]. Three rounds of deliberation were conducted. The first round occurred during a five-hour face-to-face meeting. The second and third iterations were conducted online over two weeks using the *qualtrics* software [23].

At the face-to-face meeting, invited participants were presented with the background of the project where the concepts of impulsive-violent offending and the need to design programs that are valuable to society were explained. Key findings from the FGDs and the list of characteristics generated were provided. Following a detailed description of each attribute, participants were given an opportunity to include any other important attributes they believed had been overlooked by the FGDs and to further refine the attribute levels. During a short break, a final list of attributes and levels was compiled and printed. Participants were then asked to [anonymously] score

each attribute on a scale of 1 – 5 with 1 being ‘attribute not very important’ and 5 being ‘attribute extremely important’. Participants also were requested to provide a short explanation for each score against each attribute.

A median score was calculated for each attribute and then all attributes were ranked from highest to lowest after the first round. To ensure that all participants’ views were considered by the others experts when voting, a summary of the reasons given by participants when assigning scores was provided against each attribute. In round two, the list of attributes and summary comments was returned to each participant, indicating their response from round one and how this compared with the overall median score. Each participant was then given an opportunity to reconsider the importance of each attribute using results from round one and re-score each attribute. In this round the participants were asked to specifically provide a comment against any new score that differed by 2 points from the median. This process was repeated in round three to arrive at a consensus; there was no difference between round 2 and round 3 scores and thus the process ended when the top 8 attributes ranked by median scores at round three.

#### **4.4. Compliance with ethical standards**

This study was funded by grants from the National Health and Medical Research Council, under the Centre of Research Excellence in Offender Health Australia [grant number RG124596]. It is part of the research done by the Justice and Health program, Kirby Institute.

The study received ethics approval from three committees: UNSW human research ethics committee, Corrective Services NSW human research ethics committee, and Aboriginal Health and Medical Research Council human research committee. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical

standards. Informed consent was obtained from all individual participants included in the study.

## **4.5. Results**

### **4.5.1. Literature Review Results**

The REINVEST study was compared to the RNR model and conceptual attributes and attribute levels were obtained from the literature on the basis of the three principles of this model:

- I. **Risk:** REINVEST targets men who are violent. Males are responsible for committing the majority of violent offending in the community. The study is open to those who have been found guilty of two or more violent offences which is consistent with the risk element in RNR model [24]. Therefore including these men as FGD participants was vital to the attribute development process.

Reduced recidivism is a measure that is used in the evaluation of most offender treatment interventions [17, 25]. In two studies in which offenders were asked about their perceptions of treatment, they mentioned relapse prevention as an important attribute of treatment programs [26, 27]. Shorter duration (less than a year) treatment programs for those at higher risk of recidivism have been shown to have little impact [28]. Therefore, in addition to 'Effectiveness in reducing recidivism', 'length of the treatment program' was included as a characteristic of interest.

- II. **Need:** Criminogenic needs, those factors in an individual's life that are likely to be associated with crime and violence, include impulsive personality patterns [29]. In addition to improvement in other behavioural traits, reduced impulsivity is a key outcome of REINVEST.

Some of the effective offender programs found in the literature that have been used to address the criminogenic needs of violent offenders include cognitive behavioural therapy, anger management [25, 30, 31] and pharmacotherapy (i.e. drug therapies

such as SSRIs used in REINVEST to increase brain serotonin levels and decrease externalised aggression) [12, 32-34]. ‘Effectiveness in reducing impulsivity’ and ‘type of treatment’ were included as characteristics of interest.

- III. **Responsiveness:** Treatment should be delivered in a manner that is responsive to the individual’s learning styles, motivations, strengths, and abilities [16]. Responsiveness is also referred to as the ‘how’ of the intervention [35]. There is very little literature on responsiveness, especially from an offender perspective. Some of the responsiveness factors found in the literature include the type, training and conduct of program staff [36, 37] (e.g. correctional officers, peer groups [26] and health professionals as with REINVEST), treatment setting (e.g. prison, community (as occurs with REINVEST), probation and parole, or a residential setting [38, 39], and whether participation is voluntary or mandated [40]. In our DCE, the possible attributes were: ‘location of treatment’, ‘type of treatment provider’ and ‘voluntary nature of program participation’. It was determined to further examine through the FGDs the ‘how’ of intervention provision from both the offenders’ and general public perspectives.

A DCE often includes a monetary attribute thus permitting an estimation of the willingness to pay for more of each attribute; a measure of societal attribute value. No plausible levels for cost were found in the literature. In the FGDs we therefore explored the levels for the cost attribute and the payment vehicle i.e. as a cost to tax payers or a personal cost to the offender and/or their family.

Guided by these insights from REINVEST and the literature, a list of conceptual attributes and plausible attribute levels was compiled (Table 2).

**Table 2: List of attributes obtained from literature review.**

<b>Element of RNR model</b>	<b>Attribute</b>	<b>Plausible levels*</b>
Risk	Effectiveness in Reducing Recidivism in violent offenders. [26, 27]	- 51% [12]
	Length of the treatment program [35]	
Need	Effectiveness in reducing Impulsivity. [29]	- 35% [12]
	Type of treatment.	
Responsivity		- Cognitive Behavioural Therapy [30]
		- Psychopharmatherapy [12, 32]
	Voluntary program participation. [37]	- Compulsory
		- Voluntary
	Location of treatment	- Prison/Probation and Parole
		- Residential setting
		- Community [38]
	Cost	
	Type of provider	- Peers [26]
		- Correctional officers
		- Health Professionals

**\*Ranges for each attribute**

#### **4.5.2. FGD and in-depth interview results**

A total of 26 participants aged between 19 and 66 years participated in 7 FGDs, and one family member of an offender participated in an in-depth interview. Four participants identified as Indigenous Australian.

Recruitment of family members to the FGD presented unique challenges. Many of the offenders reported not being in contact with or in good relationships with their families. Approximately 10 family members were contacted to participate in the FGD but only one confirmed attendance. Family members contacted either declined participation (no explanation for decline was requested) or explained that they did not

want to be involved with the offender. The FGD for family members was therefore conducted as an in-depth interview. However, the interview guide and format were kept very similar to that for the FGDs. At the final FGD meeting, no new characteristics were raised that had not already been discussed in previous groups, and thus saturation was considered to have been achieved.

Table 3 provides a complete list of the attributes (n=20) and levels obtained from the FGDs and interview either as initially raised by the participants or probed by interviewers as a result of the literature review. In Table 3, the interview has been labelled as a group to provide participant confidentiality. To give voice to participant views on attributes and levels, a few direct quotes have been selected and included in Table 3.

Attribute levels were extracted directly from the transcripts and all the levels identified by participants are included in Table 3. The levels have been classified to show the similarities and differences in preference between the different groups of offenders, general public and views of the family member interviewed. The attributes selected by the three groups were similar but the attribute levels sometimes differed. For example, regarding the characteristic 'effectiveness of the treatment program in reducing impulsivity', the general population generally spoke about improved health and wellbeing, offenders were concerned about being able to stay in employment, and the family member was concerned about better family relationships. Regarding the characteristic 'type of treatment program', offenders who were participants on the REINVEST study and the family member held strong views that medication seemed to be working especially as many were repeat offenders and had previously tried a range of interventions. However, while some members of the general public believed that medication could work, others argued for behavioural therapy and education.

All offenders and the family member suggested that for a treatment program to be effective, it should not be provided by probation and parole officers. They recommended health professionals as a better option because they found them to be more helpful and supportive. While some members of the general public held similar

views, others suggested that probation and parole and prison officers should be involved in the delivery of these programs to ensure community safety.

#### **4.5.3. Priority setting results**

The number of asterisks (\*) beside each characteristic in Table 3 represents the number of times a characteristic was voted among the top five in the voting exercise. Apart from 'incentives for program participation' and 'time involvement per session', all the other 18 attributes were voted for at least once. The attribute 'Effectiveness of the treatment program in reducing impulsivity' received the highest number of votes and was ranked in first place by three groups. While participants understood that incentives, especially in research studies like REINVEST were used to encourage participation, many did not find them to be important. Interestingly, this was true for the offenders participating in the REINVEST study. Among the two FGDs consisting of REINVEST study participants (n=7), these participants reported that while initially they were excited about the \$50 they received at each follow-up visit with program staff, with time they felt they had already appreciated the benefits of the treatment program and did not need any payment and were willing to use their own resources to travel to screening visits.

The characteristics that were voted in the top five by three or more groups in the multiple voting exercises were: 'effectiveness in reducing impulsivity', 'type of treatment program', 'treatment providers' and 'family involvement'. The characteristics that were ranked in first position by any group during the ranking exercise were: 'effectiveness in reducing impulsivity', 'type of treatment program', 'treatment providers', 'voluntary participation', and 'family involvement'.

The 20 characteristics that FGD participants thought were important for a treatment program for impulsive repeat-violent offenders needed to be reduced to 5-8 characteristics for inclusion in a DCE. This was achieved in using the Delphi method.



**Table 3: Attributes and levels generated from the FGDs**

Attributes									Levels						
Characteristic of preference	Position in ranking exercise								Key quotes from FGDs	Offenders		General Population		Family Members	
	FGD 1	FGD 2	FGD 3	FGD 4	FGD 5	FGD 6	FGD 7	FGD 8		Preferred	Not Preferred	Preferred	Not Preferred	Preferred	Not Preferred
Effectiveness of treatment program in reducing Impulsivity*****		1			1	1	3	3	<i>Does the program work? Does it fix my short fuse? - <b>Offender</b></i> If there is a program that works to improve serotonin and therefore reduce impulsivity that would be good. It is the root cause of impulsive violent crime - <b>Member of the general public</b>	- Stay at employment		- Improved health and well being		- Good relationships with family members	
Effectiveness of treatment program in reducing crime**				5	2				<i>Has someone tried out the program and did it work? In terms of reducing crime. I would like to look at the crime stats - <b>Member of the general public</b></i>			- Recidivism lower than the 50% after incarceration			
Type of treatment program****			1			3	1	5	<i>The medications work. Before I joined the short fuse study, I was like a ticking bomb. I was in and out of prison. I had tried all different programs like counselling. I am a lot calmer now. My friends, family, everybody, they're happy since I went on it - <b>Offender participating in REINVEST study</b></i> I have tried talking therapy and it is good - <b>Offender</b> In the areas of cognitive impairment, medication may work or it may not. They need to incorporate behavioural therapy with medication - <b>Member of the general public</b> I generally do not think it is ethical to keep people medicated - <b>Member of the general public</b> If impulsivity is a chemical thing, then you could work on it that way....some sort of treatment for serotonin....I guess if there's a medical solution and someone's just got to pop a pill then that would be nice - <b>Member of the General Public</b>	- Medication - Counselling/ Talking therapy	- Education - Incarceration	- Education - Medication - Counselling e.g. cognitive behavioural therapy, spiritual counselling	- Medication	- Medication - Counselling	- Incarceration - No side effects of medication
Treatment providers***			3	1		4			<i>Definitely health professionals have got to be in it and not probation and parole.... they're just going. "you just don't go out there and don't do any more naughty stuff. We won't have no problems". They're there to control, I think. Whereas the health people are there to help. Help support. So I don't really find parole supportive - <b>Family member</b></i> Who are the educators? Is it counsellors or nurses....certainly not social workers and I'm being serious. You have to know the real world in all places and not just be nice and warm and glowing - <b>Member of the general public</b>	- Health professional - Ex-offenders	- Probation and Parole Officers	- Health professionals - Probation and parole officers - Ex-offenders - Psychologists	- Social workers	- Health professionals - Social workers	- Probation and Parole officers

**Table 3 (Continued)**

Family Involvement ***	1						2	4	When my partner was joining the program, I was involved. The study team explained everything to me and I had an opportunity of asking questions. Because I am informed, I remind my partner of appointments and medications. This is important for me - <b>Family member</b>			- Family involved	- Family not involved	- Family involved	- Family not involved
Inclusion of vocational trade training**	4			3					Any program that does not include skills training is not helpful. These offenders need to be equipped with a skill to keep them busy and away from crime especially after serving their sentences...Wouldn't skills building be compulsory? Really that has to be - <b>Member of the general public</b>	- Include skills training	-No skills training	- Include skills training	- No skills training		
Voluntarism in participation**	5		2				5	1	It is important that the program is voluntary so that offenders can opt in – <b>Offender</b> It needs to be compulsory especially if they are repeat offenders. These are impulsive violent offenders we are talking about - <b>Member of the general public</b>	- Voluntary	- Compulsory	- Compulsory - Voluntary		- Voluntary	- Compulsory
Treatment group composition**		2					5		Individual sessions are good because I get the specialized care I need. But meeting up with others who are like me you know...maybe not 50-80 people but maybe 5-10 at a time...to talk about each other's problems...because we are similar, we relate – <b>Offender participating in REINVEST study</b>	- A mixture of both Individual and group sessions (5 – 10 people)	Large groups	- Small groups (6 - 8 people)	- Individually - Large groups	- Together with family members	
Accessibility of treatment location**				4	5				How far is the program venue and what is the travel time involved – <b>Offender</b>	- 10 - 30 minutes of travel - Travel vouchers provided	- More than 30 minutes of travel			- Online	- Days away from home
Community Involvement in planning and delivery of program**	2		4						A program where the community is involved in the delivery and where offenders give back through community work - <b>Member of the general public</b>			- Community involved	- Community not involved		
Social support***				2			2		Someone like on the short-fuse program (REINVEST) that I can call up for advice. Like I called him the other day when I needed legal advice. He is in court with us every day, and he's understanding how we feel, he sees our emotions and that, he sees what we are going through every day, like this is what we need – <b>Offender participating in REINVEST study</b>	- Social support person in program		- Link offenders with social support services			

**Table 3 (Continued)**

Location of treatment program**							4	2	<i>A program in the community, where the offenders are likely to live long term will be more real. But if they are in a setting where they still have to report and are a bit captive maybe parole....these people are impulsive maybe a more confined location is best - <b>Member of the general public</b></i>	- Community health centres	- Prison - Probation and parole office	- Community health centres - Residential rehabilitation - Probation and parole office - Prison	- Probation and parole	- Home - Community	- Prison - Probation and parole office - Residential rehabilitation centres
Cost of treatment**	3		5						<i>Cost is important but If I have a medical problem, I will somehow get the help I need regardless of cost. Can impulsivity be a medical problem that is covered under Medicare?....but I guess this would still be a cost to the tax payer - <b>Member of the general public</b></i>	- Cost to government - A saving from reduced incarceration - Cost to tax payer of \$30 a year - Cost to participant as a loan	-Cost to participant in terms of a financial burden	- Cost to tax-payer of \$30 - \$100 a year - Cost to offenders in terms of community work - Cost to families (\$200 one off)	Cost to participant	- Cost to government (any amount less than the cost of daily incarceration) - Cost to family (\$1 a day)	
Flexibility in appointments*		3								- Flexible	- Not Flexible	- Day appointments	- Night appointments		
Length of the program*		5							<i>I don't think it matters, I think maybe the program could be a lifetime thing, where it's something that you have to ...it's just part of your maintenance....like just going to get my health checked today - <b>Family member</b> Is it a one off treatment or is it longitudinal, perhaps over a number of years. The longer the time, the more effective but it increases the cost - <b>Member of the general public</b></i>	- One year - Does not matter if it works		- One - two years - Long term follow up	- less than three months - More than three years	-Life time	-A few days
Percentage of Offenders that want to be helped*					3				<i>As a tax-payer, I would be interested in how many offenders would like to do the program....people need to believe that they personally can benefit from it and that they need it....you could have the most scientifically sound evidence that something is going to work but you need the people to want to help themselves - <b>Member of the general public</b></i>			-50% - 100%	-Less than 50%		

**Table 3 (Continued)**

Friendliness of offender program*		4								<i>An environment that is relaxing, not judgmental or cruel. One where I am respected as a person and I look forward to going to - <b>Offender</b></i>	-Relaxed friendly space with music and food	-Not a place of punishment				
Intervention time point*					4					<i>Is the program only available in prison, after my prison sentence, or only after I commit a certain number of crimes....can it be provided at first contact with the justice system or even as prevention? This will save us a lot of money - <b>Member of the general public</b></i>			- Prevention - At first contact with the justice system - At second contact with the justice system			
Incentives for participation										<i>In this program (REINVEST study), the one thing I did notice was like, you paid my partner money sometimes, and I just think, "wow". I don't think they should be getting paid for it. And as soon as my partner gets the money, he goes, "oh I'm just going to the pub." They're being punished, they shouldn't be paid -<b>Family member</b> I've gone into court; I've done this program. All I've really done is he gives me money, and I tell him I don't want your money; I just want your tablets. He gives me the money and I keep saying I don't want your money, because if I don't get these tablets where am I going to get them from? Well I walk to the court myself, 7-8 minutes, and you give \$20 – <b>Offender participating in REINVEST study</b></i>	-Social activities with others, fun days like a barbeque and a day out doing fishing.	-Monetary	-Certification for program participation		- Fun group activities - Meal and clothing vouchers	-Monetary
Time involvement per session										<i>How much of my time is involved? Do I need time off work? - <b>Offender</b> If as a community member I need to be involved in the delivery of the program, how much of my time is involved - <b>Member of the general public</b></i>	- one hour every week	-More than once a week	- Three hour monthly meetings - Full time (30 hours a week)			

\* Number of times the characteristic was voted among top five by a group

**Table 4: Delphi method round 1 and 2 results for preferences of attributes to be explored in the DCE**

Attribute Rank	Attribute	Description of Attribute	Median round 1	Median round 2	median change	Summary of comments
1	Effectiveness – reducing reoffending	Reduction in violent offending	5	5	0	Goal of any treatment, a key outcome (some said primary others secondary)
2	Effectiveness - reducing impulsivity	Percentage of participants on the treatment program who have a reduction in impulsive behavior	5	5	0	A key outcome, underlying biological cause of violence, could be combined with the attribute on effectiveness in reducing re-offending
3	Continuity of care	Treatment program is integrated in a continuum of care e.g. from prison to community	4.5	4	-0.5	Important for sustained effects and benefits but not essential to treatment outcome and may be difficult to quantify. This attribute can be combined with location.
3	Co-occurring morbidity intervention support	Provision of support and treatment for other issues e.g. trauma, mental health and substance use.	4.5	4	-0.5	Relevant to cover all health aspects. Co-morbidities are common and sometimes violence has more than one causes.
5	Type of treatment	The type of treatment program	4	4	0	Effective, evidence based treatments should be evaluated to test preference as an indicator of uptake. However not one program fits all and a mix of types is important.

Table 4 (Continued)

5	Treatment providers	Who or which type of person provides the treatment?	4	4	0	We need to test only what is known to be effective. There's a need to test to see the societal appeal of health professionals compared to usual custodial personnel. It is an attribute that might be important for offenders but not the public.
5	Treatment Location	Where is the treatment provided?	4	4	0	Treatment location will affect appeal and retention. It will be good to test and see the preference of offenders versus community.
5	Flexibility in appointments	Flexibility in day and time treatment is provided to suit offender	4	4	0	This is a very important characteristic for offenders but community might not care. Professionals working with this group of offenders were that they require a lot of flexibility due to their impulsivity.
5	Compulsory vs voluntary participation	Mandated offender participation or offenders have a choice to opt into program	4	4	0	Evidence shows no difference in efficacy. Could we therefore test it for preference? Participants need to have choice and this might reflect on acceptance of program.
10	Social support	Education, vocational trade training as part of treatment program, social/peer support	3.5	3	-0.5	Addresses many of the contributing factors to violence and provides on-going care. Should we test to see what elements of social support are needed?
10	Accessibility of treatment program	Travel time required to arrive at treatment location	4	3	-1	Important but not priority. Need to be accessible to those in rural/remote, however, can this be combined with the attribute on program flexibility?
10	Length of program	Period of time each offender should be enrolled on the treatment program	3.5	3	-0.5	Not so important - depends on individual; some need a longer time others a shorter time. However others thought length of program might have an effect on appeal.

Table 4 (Continued)

10	Support for family	Support/education for partners and family members in treatment programs for offenders.	3.5	3	-0.5	Family may give support to offenders to engage in treatment when involved. However, others suggested this is not a priority as the offender is the priority. Other programs that do not focus on the offender may provide this support.
10	Time involvement	Number of sessions and amount of time devoted to the treatment program per session	3	3	0	Characteristic is too detailed and technical to be tested. Can this be combined with flexibility and length of program?
10	Community awareness	Raise awareness/educate community members of offenders in treatment program	3	3	0	Nice but might be a distraction. It is not feasible, difficult to do and might not have an impact on the offender.
10	Accountability to victims	Victims given support and feedback	3	3	0	Might be relevant to some but not all as it might be less likely to be accepted. However it is a good idea for restorative justice.
10	Intervention time point	Time point at which treatment is started	3	3	0	The earlier the better but depends on acceptability. As long as client demonstrates willingness to participate then an intervention should be made available to them at any point in time. Should we test to see if early intervention will be acceptable? Currently most programs target repeat offenders.

Table 4 (Continued)

10	Offenders open to being helped	Percentage of offenders that would like to be part of a treatment program	3	3	0	Not a priority but if demand is low, it affects intervention uptake. Is this characteristic covered in voluntary/mandatory participation?
10	Cultural competence	Inclusion of cultural component to allow relevance and accessibility e.g. language, Indigenous community	3	3	0	Will be attractive and improve efficacy especially for Aboriginal people. However sometimes we are in danger of highlighting differences in these offenders when in reality they have more common factors.
10	Cost of treatment program	Cost per day of treatment	2.5	3	0.5	Cost is not important in comparison to better society. However it may be an issue to policy makers and tax payers. Should we test to see how much cost value people attach to programs?
21	Incentives	Giving of incentives to offenders for on-going participation in treatment	3	2.5	-0.5	Impulsive violent offenders may need to work towards a goal and incentives might contribute to retention. However this may not have a large impact and not appeal to general public. Should we test to find out?
21	Satisfaction level of previous treatment participants	Satisfaction level of previous treatment participants	2.5	2.5	0	If a program works, is satisfaction level an issue? If peers and ex-offenders are involved in program delivery, isn't that an indication of satisfaction?
23	Counselling group	Group composition for counselling	2.5	2	-0.5	Not important, depends on each individual need, it is also a sub-attribute to particular treatment types and pharmacotherapy can work without this.



#### **4.5.4. Delphi Method results**

A total of 13 experts participated in the Delphi method process with 100% participation rate in all three rounds of the study. All the 20 attributes obtained from the qualitative stage described above were presented to the experts with an emphasis on those that were prioritised in the voting and ranking exercises. Table 4 shows the 23 characteristics (potential attributes for the DCE) as agreed upon by the team of experts at the face-to-face round one meeting. Also listed in Table 4 are the group median scores for round one and two and the median changes for each attribute. The attributes have been ranked in order of median scores at the last round of voting and a summary of comments from round one and two are also presented.

With guidance from the comments provided by the team of experts and taking care to reduce multicollinearity and interaction of attributes, the researchers combined the 'effectiveness-reoffending' with 'effectiveness-reducing impulsivity' attribute, 'treatment location' with 'continuity of care' and 'flexibility in appointments' with 'accessibility of treatment location'. The experts noted that preference levels for some of the attributes are likely to differ between offenders and the general public. These include 'type of treatment provider' and 'location of treatment'. The experts reported that there was no evidence in the literature on efficacy of compulsory versus voluntary participation and were keen for this attribute to be tested in the DCE for preference.

The team of experts played a vital role in the wording of the attributes and refining the final list of levels to be used in the larger DCE. Table 5 shows the final list of 8 attributes and their levels arrived at by expert consensus through the Delphi method. This list will be used in the experimental design of the DCE. While the attribute 'family involvement' was not among the top 8 characteristics, researchers thought it was important as seen from the results from the FGDs and therefore included it in the levels of the attribute 'type of treatment' such that one of the levels was 'individual and family counselling with medication'.

**Table 5: Final list of attributes and levels to be used in the experimental design for the DCE**

Attribute	Attribute description	Attribute Levels
Effectiveness of the treatment	Percentage reduction in crime among impulsive repeat violent offenders who attend treatment for impulsivity. A higher number of participants who achieve a reduction in impulsivity will result in a higher reduction in violent crime.	<ul style="list-style-type: none"> <li>- 10% reduction in crime</li> <li>- 30% reduction in crime</li> <li>- 50% reduction in crime</li> <li>- 70% reduction in crime</li> </ul>
Location and Continuity of treatment	Location where treatment is provided based on where an offender is serving their sentence/order (Prison or community) and the degree to which treatment and care is coordinated and provided during offender transitions between the two settings, prison and community.	<ul style="list-style-type: none"> <li>- Prison only (with no continuity of care post prison)</li> <li>- Community only (with no continuity of care when imprisoned)</li> <li>- Prison with continuity of care post prison</li> <li>- Both prison and community with continuity of care in between transitions</li> </ul>
Treatment of Co-occurring health conditions/addictions	Provision of support and treatment for other health conditions such as trauma, mental health and substance use.	<ul style="list-style-type: none"> <li>- Minimal treatment provided in program</li> <li>- Full treatment of all co-occurring health conditions/addictions both within program and at referral facilities</li> </ul>
Type of treatment	The type of treatment program	<ul style="list-style-type: none"> <li>- Offender group counselling sessions only</li> <li>- Offender group counselling sessions with medication</li> <li>- Individual counselling with medication</li> <li>- Individual and Family counselling with medication</li> </ul>
Treatment providers	The type of professional person who provides the treatment such as counsellors, psychologists, medical health professional, prison/Probation and parole officer.	<ul style="list-style-type: none"> <li>- Health professional</li> <li>- Prison/Probation &amp; parole officers with Health Professional</li> <li>- Prison/Probation &amp; Parole officer with Counsellors/Psychologists with Health Professional</li> </ul>

**Table 5 (Continued)**

Flexibility of appointments	Flexibility in day and time the treatment is provided to suit the offender, with ability to vary appointments.	<ul style="list-style-type: none"> <li>- Not flexible</li> <li>- Flexible</li> </ul>
Compulsory/ Voluntary participation	Offenders MUST attended a compulsory program or offenders have a choice to opt into a voluntary program	<ul style="list-style-type: none"> <li>- Compulsory</li> <li>- Voluntary</li> </ul>
Cost per tax payer per year	Cost per tax payer per year to fund the provision of the treatment program.	<ul style="list-style-type: none"> <li>- \$25</li> <li>- \$50</li> <li>- \$75</li> <li>- \$100</li> </ul>

#### 4.6. Discussion

While the literature on DCE studies is growing, few peer reviewed papers exist that demonstrate the process of developing attributes and their levels [13]. This study contributes to this literature by being explicit on the mixed-methods used in the development of the DCE attributes. In addition, to the best of our knowledge there are no studies which have elicited offenders and the general public preferences for treatment programs for offenders. For this same reason, not many conceptual and theoretical attributes and levels were sourced from the literature review.

The RNR model [16] however, provided foundational construct for creating an initial list of attributes to be further explored in the FGDs.

It is interesting that while the characteristics were very similar across the three different groups (offenders, the general public and family member), they differed in the attribute levels. This suggests that society and offenders broadly consider the same characteristics of treatment programs to be important however the trade-offs made between the characteristics when making choice are likely to be different and this will be tested in the DCE that will compare trade-offs between the different groups. To increase program acceptability and uptake, policy makers need to consider these characteristics when designing intervention programs for offenders.

REINVEST is a RCT which seeks to evaluate the effectiveness of an in reducing recidivism in impulsive, repeat-violent offenders and in improving a range of behavioural measures such as impulsivity, aggression, irritability, and anger. Although the effectiveness of the medication has shown positive results in a pilot study, the results of the RCT are pending. From the FGDs in this study, offenders participating in the trial suggested that the medication is working. However, the trial is double blinded with no information on whether the offenders are on the active treatment or placebo. It should be noted that offenders on the trial were easier to recruit, kept their FGD appointments giving an indication of better behavioural and personality outcomes than perhaps the offenders not receiving the intervention. The final list of attributes includes 'type of treatment' as an attribute with medication as one of the levels. It will be interesting to see the trade-off DCE results between medication and other treatment types, providing a clearer idea for decision makers on the strength of medication as a preference treatment from both the offenders and society perspective.

This study had a number of strengths. Firstly, this study demonstrates the use of various qualitative and consensus methods in arriving at the final list of attributes to be used in a DCE study. The very few DCE studies that undertake qualitative studies to generate attributes do not provide methods used in selecting the final list of attributes selected to be used in the DCE. Secondly, the prior exposure of our offender and family member participants to the concept of impulsivity, its links to offending and the different programs available for offenders added to the rich discussions and quality of attributes and levels collected. Thirdly, inclusion of offenders that were not participating in the REINVEST study provided a different perspective to consider; offenders that are either not receiving an intervention. Finally, the general public participants engaged in a guided discussion on violence, impulsivity and issues of incarceration and recidivism, providing them with informed perspectives.

The study had some challenges. Research has shown that impulsive violent offenders often have antisocial traits and are suspicious and likely to impact on recruitment and

retention in a trial [41]. This might be a reason as to why offenders who were not receiving intervention were difficult to recruit. However, contrary to this, offenders who were participants in the REINVEST study were easier to recruit and honoured their appointments. This could probably be as a result of improved behaviour and impulsivity either through the one-on-one regular meetings with study nurses or the medication received by those on the active drug. Recruitment of family members was challenging. The REINVEST study contacted approximately 10 family members to participate in a family members' FGD. Unfortunately, only one family member participated resulting in an in-depth interview being conducted rather than a FGD. Research has shown that some families of violent offenders lack family cohesion and are not likely to be involved in the lives of offenders [42]. While the study had only one family member voice, it still benefited from their participation. We recommend that while the involvement of violent offenders and their families may be challenging, policy makers should seek their opinions in the design of interventions, especially those that affect them.

The DCE literature suggests a list of 4 – 8 attributes to be used. The FGDs generated a list of 20 attributes and a wide range of levels. In the voting and ranking exercises, 18 of the 20 attributes were shown to be of strong preference to the participants as these were voted at least once by each group. From this list of attributes, the experts involved in the Delphi method arrived at a consensus of 8 attributes. These attributes will further be evaluated in a population survey of approximately 1000 participants using a DCE. This will allow the strength of each attribute to be tested and therefore make conclusions on the societal value of each attribute and inform the development of proposed treatment programs for impulsive violent offenders. Future studies can learn from the rigorous methods used to improve the DCE methodology of attribute development. This is the first time these methods have been used to include society and offenders' views in treatment programs in the justice health field and has scope to be used in studies with other hard to reach populations.

**Acknowledgements:** We acknowledge all focus group and in-depth interview participants (who chose anonymity), for their time and involvement in this study. We also acknowledge the following experts (listed are those that provided consent to be identified) in the justice and health space, who responded positively to an invitation to participate in the Delphi method process of this study: Forensic Psychologists: David Greenberg, Daria Korobanova; Criminologists: Melanie Simpson. Caitlin Hughes, Stacie Tzoumakis; Justice Health nurses: Noella Ellis, John Nguyen; Psychologists: Emma Barrett, Anindita Sudewo.

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## **Appendix 1: FGD Discussion guide**

Journal name: Applied Health Economics and Health Policy

Article title: Developing attributes and attribute-levels for a discrete choice experiment: an example of interventions for impulsive violent offenders.

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Location:  
Date of FGD:  
Duration (start time and end time):  
Name of moderator:  
Name of note-taker:  
Participant summary:

Age range of respondents:

### **Introduction**

Welcome.

Introduce yourself (FGD facilitator) and the note taker(s), and give each participant an individual Sign-In Sheet with a few quick demographic questions (First name, age, suburb where you live(not address)) while you are introducing the focus group.

*Review the following:*

- Who we are and what we're trying to do:  
*We are researchers from UNSW, involved in a study that is looking at offenders and societal perspectives of treatment programs for repeat-violent offenders. As part of the study, we would particularly like to understand the characteristics of treatment programs for violent offenders that you think are important and could influence your choice on whether or not to participate or join.*
- What will be done with this information:  
*This information will be analysed and written up and used to inform policy makers and the wider body of researchers and justice health service providers. It will also be used to design a larger survey of about 300 people, who will be asked to select their preferences for characteristics of offender health interventions that will partly be identified through this focus group discussion.*
- Why we asked you to participate:  
*We asked you to participate because you are currently serving/previously served a community based order and are enrolled or eligible for the REINVEST study. Therefore the information you share with us will be vital in trying to understand the type of treatment programs that will be acceptable by people involved in the justice system with similar offence types.*

### **Consent Process**

Consent forms for focus group participants are completed in advance by all those seeking to participate. Below is a summary of the information in the consent form that focus group organizers and facilitators should use to make sure participants understand the information in the consent form.

*Thank you for agreeing to participate. We are very interested to hear your valuable opinion and preferences for treatment programs for impulsive violent offenders.*

*The purpose of this study is to find out the characteristics of treatment programs for offenders who have committed violent crimes that you might consider when choosing to join the program. We hope to learn things that are important to you which might influence your choice on what type of program to join or which you think will lead to improved offender outcomes and reduce your chances of committing another violent*

*offence. We are not asking about your individual stories. Examples of characteristics include: chance of the program/treatment decreasing impulsivity and by what various degrees, the program/treatment reducing the chance of committing crime, whether or not the program that includes medication and how often it must be taken, whether or not the program includes a visiting counsellor and how often, costs.*

- *The information you give us is completely confidential, and we will not associate your name with anything you say in the focus group.*
- *In addition to taking notes, we would like to tape the focus groups so that we can ensure the thoughts, opinions, and ideas we hear from the group are documented correctly and that nothing is left out. No names will be attached to the focus groups and the tapes will be destroyed as soon as they are transcribed.*
- *You may refuse to participate in the discussions, answer any question or even withdraw from the study at any time.*
- *We understand how important it is that this information is kept private and confidential. We will ask participants to respect each other's confidentiality.*
- *If you have any questions after we have completed this discussion, you can always contact a study team member like me by calling the phone number on the information form given to you. Does anyone have a question now?*
- *Please check the boxes on the consent form and sign to show you agree to participate in this focus group.*
- *We will now start recording this session.*

#### **Ground Rules**

- All ideas have value.
- It is important for everyone to participate, and it is helpful if individuals don't over participate at the expense of others.
- Respect others' opinions, even if you do not share them!
- Participants can ask for clarification if questions asked are not clear.
- Confidentiality of all participants must be respected. Everything that is discussed in this meeting should stay in this meeting. We will summarize all ideas discussed without identifying individuals.
- The entire discussion will last approximately 90 minutes but participants can indicate to facilitators when they need a break.
- Please turn mobile phones off for the duration of the session or put them on vibrate/silence.
- Any others from participants?

#### **Warm Up Exercise**

1. *What name do you want us to use in this discussion? (Not your real /full name)*
2. *How did you travel to this meeting this morning/afternoon?*

**Part 1 – Exploring Violence:** The aim of this section is to explore participants understanding violence, attitudes towards people who commit violent crimes and what society's response should be.

**Main goal:** To examine societal perspectives of violent offenders before accurate statistics on offending and recidivism are provided.

*To start we are going to talk about violence and generally about people who commit violent offences.*

- *What is a violent offence?*

- Are people who commit violent offences different from people who commit other offence types? How?

*I will now give you the World Health Organisation definition of violence:*

*Violence is the intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community, which either results in or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment, or deprivation.*

- As a society, how should we manage people who commit violent offences?

## **Part 2 - Prevalence of offending, Re-offending, and the causes for this:**

**Main goal: To examine if participant perceptions on society's treatment of violent offenders change after providing them with statistics on offending and re-offending.**

*We are now going to provide you with some statistics on offending and re-offending and then discuss ways that society can help to reduce these rates.*

- Provide participants with current rates of violent crime and re-offending.

**Statistics on violence:** Although the rate of violence in NSW is generally declining (this includes assault, homicide, robbery, harassment and threatening behaviour) it accounts for 21% of prisoners and 33% of community offenders.

Approximately 15 people for every 1000 commit violent crimes in New South Wales annually.

58% of all violent crime in NSW is attributed to assault.

Approximately 50% of adult prisoners in Australia return to prison under sentence within two years of their release.

- *Having now heard the statistics on re-offending, how can society better support people who continue to commit violent offences especially after serving community orders or after imprisonment?*

## **Part 3 – Exploring Impulsivity:**

**Main goal: To examine if participant perceptions further change when offenders are classified as impulsive and pre-meditated and whether impulsive repeat-violent offenders are viewed by participants as 'valuable' to society.**

*We are now going to talk about the difference between Impulsive and Pre-meditated violence and ask for your opinions about it.*

- What in your own words is impulsivity?
- Introduce and explain to the participants the concepts of impulsive and pre-meditated violence.

*Violence can either be Impulsive or pre-meditated.*

*Impulsivity can be defined as not thinking before you act, getting involved in things that you later wish you hadn't or simply "losing it". Often impulsive people don't think of the negatives – for example, they might get involved in a fight without thinking of the possibility of going to prison or being in trouble with the police. Sometimes impulsivity*

*is described as being related to internal stimuli or external stimuli. Simply put, internal stimuli are feelings within your body or thoughts with external stimuli being a response to a situation you are placed in (such as a road incident which makes you angry) or somebody might provoke you into a fight.*

*Research has shown that violent crime is more likely to be classified as impulsive and that impulsive offenders have a higher chance of committing more than two crimes than those offenders committing pre-meditated crimes, and have a higher chance of responding positively to treatment and rehabilitation programs*

- What are your thoughts on impulsivity as a cause to violent offending?
- Do you think impulsive people who have been twice (or more) convicted of violent offences want to be active people in their society?
  - What does this look like?

*Loop: We have discussed violent offences and what society's response should be. We have also looked at some statistics on re-offending and looked at impulsivity as one of the causes of repeat-violent offences. We have also examined the important roles that impulsive repeat-violent offenders might be able to play in society.*

- How can they be better helped to achieve these?

#### **Part 4 – Possible solutions to impulsive violent re-offending?**

**Main goal: To list the various characteristics participants would like to see in a treatment program for violent offenders.**

- Imagine the government is introducing a new program for impulsive violent offenders.

What would be your considerations or concerns in joining the program?

If participants mention programs like anger management, unpack each program e.g. ask:

- How will it be provided?
- Who should provide it?
- Where should it be provided?
- Probe for the following.
  - Is a 'working treatment program' a characteristic you would consider?

What does a working treatment program look like?

- Where should the treatment occur? In custody or in the community?
- How long should a treatment program last? (6 months, 2 years, life time.)
- Should treatment be voluntary or compulsory?
- What if the treatment involves medication?
  - Side effects for the medication? What side effects are tolerable and which ones are not?

If Incarceration/imprisonment is suggested:

- After hearing the re-offending rates and discussing some of the causes, do you still believe in incarceration/imprisonment? Why?
- Should incarceration and treatment programs work together? What is a good mix?

If cost of the treatment is mentioned, tell participants that this is going to be explored later.

### **Part 5 – A summary of suggested characteristics**

**Main goal: To elicit participants' top 5 characteristics and take note of the process and negotiations among participants.**

- Give participants 5 cards and ask them to write 5 top characteristics (from all those that have been discussed) for a treatment program for impulsive violent offenders. (Participants should do this collectively)
- Ask the participants to now rank these 5 characteristics in order from most preferred characteristic to least preferred.

### **Part 6 – Willingness to pay**

**Main goal: To arrive at an agreed price to be used in the DCE and CV surveys.**

Treatment programs like the ones we have been describing cost money and cost is a characteristic that people consider when making a choice to either provide or join a program.

- Incarceration with minimal treatment: Cost per prisoner per day is approximately \$315
- Diversion treatment programs: Providing therapeutic treatment to a violent offender costs \$75 a day
- What do you think about this cost?
- Who should pay this cost?
  - Government/ Tax payer pays 100%.
  - A person who commits an offence and their family pay 100%
  - Cost share between the government and offenders/families.

Probes:

- Would people who commit violent crimes be willing to pay for such programs for a chance of reduced impulsivity and therefore be less likely to commit a crime?
  - What is the maximum amount you think people would be willing to pay?
  - What do you think is the maximum amount people would be willing to pay if they had had a regular income? (Average weekly income of approximately \$1500)
- If people who commit violent offences were asked to share this cost between themselves/your family and the government, what would be a good cost share?
  - Probe for 80% government and 20% from participant.
- If every tax payer in NSW was asked to contribute an additional amount of money every year to meet the cost of these treatment programs, what would be a realistic amount? Ask for \$30 and:-
  - IF NO, reduce to \$20 and then \$10
  - IF YES, increase to \$40 and then \$50
  - What is the maximum each tax payer should pay on average?

### **Conclusion**

We have come to the end of this discussion. Before we leave, does anyone have any question or additional comments?

Thank you for taking time to participate in this discussion. All your ideas and thoughts will be useful for the next phase of this study.

## **Chapter 5: Societal preferences for the treatment of impulsive, repeat-violent offenders: A discrete Choice Experiment.**

This is a manuscript that is currently under review in *BMJ Open*.



**Title: Societal preferences for the treatment of impulsive-violent offenders: A Discrete Choice Experiment.**

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### **Compliance with ethical standards**

The study received ethics approval from the University of New South Wales Human Research Ethics Committee. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent was obtained from all individual participants included in the study.

All authors, that is Stella Nalukwago Settumba, Marian Shanahan, Tony Butler and Georgina M. Chambers, have no conflicts of interest to declare.

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### **Author Contribution**

All authors, were involved in the study concept and design. Stella and Marian were involved in the data analysis. All authors contributed majorly to the data interpretation and write up of the manuscript.

## **Abstract**

### **Background**

Violence places a huge burden on global economies, costing huge sums of money in healthcare, social welfare and justice systems. Public attitudes towards the treatment of offenders influence policy decisions and the design of treatment programs. The aim of this study is to assess societal preferences for treatment programs for impulsive-violent offenders.

### **Methods**

A discrete choice experiment was used to assess the preferences of the Australian taxpayer population for treatment programs for impulsive violent offenders. The survey presented participants with six choice sets in which they chose between two unlabelled treatment scenarios and a 'no treatment' choice. A random parameters logistic (RPL) model and a latent class (LC) model were used to analyse the societal preferences for treatment and estimate willingness to pay (WTP) values based on marginal rates of substitution. Respondents were asked to self-identify if they ever had experiences with violence and sub-group analysis was done.

### **Results**

The survey was completed by 1021 highly engaged participants. The RPL model showed that society had a preference for more effective programs, programs that provided full as opposed to partial treatment of all co-occurring health conditions, compulsory over voluntary programs, those with flexibility in appointments, and programs that are provided with continuity of care post prison. Respondents were willing to pay an additional annual tax contribution for all significant attributes, particularly compulsory programs, continuity of treatment and effectiveness.

The LC model identified two classes of respondents with some differences in preferences which could be largely identified by whether they had experiences with violence or not.

**Conclusion**

The results are important for future program design and implementation. Programs for impulsive violent offenders that are designed to encompass societal preferences are likely to be supported by public and tax payers.

**Key point for decision makers**

Society values treatment programs for impulsive violent offenders especially if they are effective, are provided in prison with follow-up post prison, provide full treatment of all co-occurring health conditions/addictions, provide flexible appointments, are provided by health workers together with prison or probation and parole officers and have compulsory participation. Programs designed with these attributes will have societal support.

The willingness to pay values for these preferred attributes can be used in cost benefit analyses by comparing them to incremental cost per taxpayer per year incurred in the introduction or change in attribute level. This will help decision makers in the allocation of resources to treatment policies that have a positive net social benefit.

There are some differences in preference between people who have had experiences with violence and those who have not. Notably is that while the general public prefer compulsory treatment programs people with experiences with violence prefer voluntary programs.

### **5.1. Introduction**

It is estimated that 11 million people worldwide were held in penal institutions as of November 2018; a 24% increase since 2000 [1]. In Australia, incarceration rates have increased by 98% since 2000 [1] despite evidence that it has little effect on reducing re-offending [2]. In 2017 – 2018, 54% of prisoners in Australia released from prison returned within two years of release [3]. Alternative interventions to incarceration, especially targeted at crimes with the highest volumes of offending, could potentially have a large effect on bringing down the re-offending rate and have significant financial benefit for the public purse [4].

Violent offenders make up a significant proportion of adult offenders in Australia; in 24 months to March 2019 ‘acts intended to cause injury’ accounted for almost one fifth of sentenced adults and 32% of those held on remand in New South Wales (Australia), the state with the largest population and highest number of prisoners [5]. Many violent offenders will re-offend when released from prison, with evidence suggesting they do so much quicker than non-violent offenders [6]. Corrective Services NSW provides a non-specific general violent offender treatment program to inmates [7]. However, a meta-analysis on treatment programs targeting violent re-offending showed that programs that targeted criminogenic needs (e.g. substance abuse, anger, anti-social personalities, impulsivity) were more effective than those that did not [8]. Pharmacotherapy-based treatment approaches for violent offenders are much less common than psychological therapies. However, among violent offenders, impulsivity has been linked to violent offending, and has been shown to correlate with altered brain serotonin functioning. This suggests that treatment with a class of drugs known as a selective serotonin reuptake inhibitor (SSRI) may regulate brain serotonin and reduce impulsivity and hence offending [9]. This approach was used in a pilot study and showed improvements in behavioural measures following administration of an SSRI (sertraline) [10].

Effectiveness of treatment programs for offenders, such as reducing violent crimes, is only one of many characteristics that can influence policy decisions on the provision of treatment programs. Indeed, public perceptions of crime and their [assumed] punitive attitudes have had a large impact on incarceration rates around the world [11, 12]. However, when the public are better engaged using deliberative methods that allow informed decision-making, they provide solutions beyond punitiveness [13], including engaging in discussions on the design and delivery of treatment programs [14]. Thus, designing programs for offenders that are characterised by societal preferential attributes may increase public support.

Discrete choice experiments (DCEs) are increasingly used in the health care sector to assess the strength of preferences for, and therefore the value placed on, intervention characteristics [15-18]. A DCE asks respondents to consider two or more alternative treatment choices comprised of varying characteristics (referred to as attributes) over a range of defined dimensions for each characteristic (referred to as attribute levels). By analysing respondents' trade-offs when making choices, conclusions can be made on the relative importance or preference of each characteristic. Results of such analyses can be vital to program design, implementation and provide predictions to program outcomes.

The aim of this research was to quantify societal preferences for, and assess trade-offs between, characteristics of treatment programs for impulsive-violent offenders. An assessment is made on the differences in preferences between people who have had experiences with violence (offenders, victims, and their families) and those without.

## **5.2. Methods**

This DCE is part of a wider research project, assessing societal and offender perspectives on the value of offender healthcare, with detailed methods described and published elsewhere [19]. A DCE has four main stages: (i) identifying and defining attributes and levels, (ii) the experimental design, (iii) the data collection survey, and (iv) the analysis and interpretation of results [18, 20].

### **5.2.1. Identifying and defining attributes and levels**

Prior to conducting the DCE, a mixed-methods study was undertaken to identify and define attributes and relevant levels [14]. This process included 7 Focus Group Discussions (FGDs) with offenders and members of the general population, one in-depth interview with a family member of an offender, within group prioritising methods of voting and ranking, and a Delphi method with 13 experts in the justice sector to select a list of eight final attributes to be used in the experimental design of the DCE (summarised in Table 1).

#### **5.1.1. Experimental design**

The experimental design for the survey was generated using *NGENE* software [21]. An unlabelled design with three alternatives was chosen; i.e. treatment 1, treatment 2, and no treatment. A no treatment option was included because the research intended to evaluate the trade-offs between attributes and not necessarily a choice between treatments [22]. With eight attributes, four of which had five levels each and two with 3 levels each, a full factorial design of 5625 ( $5^4 \times 3^2$ ) possible choice tasks was not feasible for respondents to complete. Thus, following recommended practice, a statistically reduced partial factorial experimental design to estimate main effects was obtained [20].

This design sought to achieve both statistical and response efficiency, i.e. one that would achieve statistical significance with small standard errors yet engage respondents in such a way that none of the attributes were ignored in choice making. A D-efficient Bayesian experimental design [23] generated 24 choice scenarios which were blocked into 4 sets of 6 choice tasks each. A D-efficient design seeks to minimize the determinant of the asymptotic variance covariance (AVC) matrix of models estimated on the data collected which in turn minimizes the standard errors, making it possible to obtain more reliable parameter estimates [24]. Effects coding was used for categorical variables.

Two pilot studies to pre-test the questionnaire were undertaken. In the first pilot, a basic multinomial logistic (MNL) design was obtained with very small near-zero initial priors. This was administered to 100 participants. The prior coefficient sign used for the cost attribute was assumed negative with all the others assumed positive. The parameter estimates from this pilot provided Bayesian priors to be used in the second pilot with each variable assumed to have a normal distribution. The second design was an MNL model evaluated against both a mixed and a latent class model. The S-efficient measure in NGENE was then used to determine a sample size of 830 participants required for a statistically significant estimate of each parameter [21, 24].

Qualitative data from the first pilot study indicated that a large percentage of respondents primarily considered two attributes when making their choice; cost and effectiveness of the treatment program. While this did not suggest that the other attributes were not important, it indicated that taxpayers appeared concerned about the value of their taxes in terms of the effectiveness of the program. Good choice tasks are those that result in trade-offs between the attributes and do not have strongly dominant alternatives. Thus, in the second pilot study, constraints were placed in the design to ensure that in some choice tasks both cost and effectiveness were equal over the two alternatives.



**Table 1: Summary of attributes and their levels used in the experimental design**

Attribute	Attribute Levels
Effectiveness of the treatment among program participants.	10%, 30%, 50%, 70%
Location and Continuity of treatment.	Prison only (with no continuity of care post prison); Community only (with no continuity of care when imprisoned); Prison with continuity of care post prison; Both prison and community with continuity of care in between transitions.
Treatment of Co-occurring health conditions/addictions.	Minimal treatment provided in program; Full treatment of all co-occurring health conditions/addictions both within program and at referral facilities.
Type of treatment program.	Offender group counselling sessions only; Offender group counselling sessions with medication; Individual counselling with medication; Individual and Family counselling with medication.
Treatment providers.	Health professionals; Prison/Probation & parole officers with Health Professional; Prison/Probation & Parole officer with Counsellors/Psychologists with Health Professional; Counsellors/Psychologists with Health Professional.
Flexibility of appointments.	Not flexible, Flexible.
Compulsory/ Voluntary participation.	Compulsory, Voluntary.
Cost per tax payer per year.*	\$25, \$50, \$75, \$100

\*Additional tax per tax payer per year

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### **5.1.2. Data collection survey**

Choice sets obtained from the experimental design were used to design the questionnaire. Societal perspectives were obtained online from a general population recruited by a commercial online panel provider (*SSI International*) in June 2018. Email invitations were sent to New South Wales (NSW) panel members only. The sample was selected to be representative of the NSW taxpayer population in terms of age, sex and geographical location (rural or metropolitan areas). Respondents were all NSW income tax-paying residents, over 18 years of age, who provided consent to participate in the study. A taxpayer in Australia is an individual who earns above the base taxable threshold income (\$18,200 a year) and therefore pays through annual tax returns a percentage of their income as tax. Treatment for offenders is more likely to be funded through tax payers' government funding and therefore it was important that the values and preferences used were for tax payers. Each respondent was randomly allocated to one of four questionnaire blocks and tasked with 6 choice sets. Along with demographic characteristics, respondents were asked about their experience with violence (accused of perpetrating violence, subjected to violence, family member of someone accused of perpetrating violence, family member of someone subjected to violence, or no experience of violence).

Prior to the choice tasks, respondents were provided with definitions and information on violence and impulsivity, rates of violence in NSW, and information on treatment programs available for violent offenders. They were also provided with summarized definitions as well as links to detailed explanations of the attributes used in the DCE.

Respondents were tasked to choose between treatment 1, treatment 2 and no treatment options using the following question:

*Which treatment would you prefer to be given to impulsive violent offenders?*

Respondents who chose the 'no treatment' option were presented with a follow-up forced task asking them to choose between treatment 1 and treatment 2 (forced choice) using the following question:

*If you had to choose between treatment 1 and treatment 2, which one would you prefer?*

To assess participant engagement in the study the length of time it took participants to complete the survey questionnaire was also recorded. Respondents were also asked to state which attributes they ignored when making choices and to indicate how easy or difficult it was to answer the choice task. The survey also had a qualitative follow-up question asking respondents to comment on the survey.

This study received ethics approval from the University of New South Wales, Sydney Human Research Ethics Committee (HC17848).

### **5.1.3. Data analyses**

The Demographic characteristics of the participants were compared to those of the NSW population. The number of participants that chose the 'no treatment' alternative for each choice task was examined to make a decision on whether to include it in the analysis or use the forced choice.

DCEs analysis are rooted in two economic theories, McFadden's [25] and Lancaster's [26] framework based on the random utility theory. Estimations are based on the assumption that if participants chose a treatment it was because it gave them a higher utility (wellbeing) as a result of the level of the attributes in that treatment. As shown in equation 1, the utility ( $U$ ) that an individual  $n$  derives from the treatment alternative  $j$  in the choice set  $c$  is explained by an observed component  $V_{ncj}$  and an unobserved component  $\varepsilon_{ncj}$ .

$$U_{ncj} = V_{ncj} + \varepsilon_{ncj} \quad (\text{Equation 1})$$

The observed component of the utility associated with alternative j,  $V_{ncj}$ , is a function of a vector of k attributes that describe treatment alternative t,  $x_{ncjk}$ , with associated preference weights,  $\beta$ , to be estimated. Such that:

$$V_{ncj} = \sum_{k=1}^k \beta_k x_{ncjk} \quad (\text{Equation 2})$$

Analyses were conducted in *NLOGIT* using logistic models. A basic multinomial logit (MNL) model was estimated to ensure functionality. This was followed by a random parameters logit (RPL), a fixed parameters latent class logit (LCL) model, and a random parameters latent class (RPLC) model.

Unlike the MNL model, in the RPL model the independent of irrelevant alternative (IIA) property is relaxed by allowing heterogeneity in respondent preference. The LCL model assumes that preferences are discretely distributed and are similar among individuals within clusters/classes but vary between clusters [27]. Model improvement for both the RPL and RPLC models was tested using the log-likelihood function in comparison with the MNL and LCL models respectively.

In this study, based on the attributes described in Table 1, the model description based on equation 2 can be explained as:

$$\begin{aligned} U_{treatment} = & \beta_{constant} + \beta_{effectiveness} + \beta_{location \text{ and } continuity \text{ of } treatment} \\ & + \beta_{treatment \text{ of } co\text{-occurring } health \text{ conditions/addictions}} \\ & + \beta_{type \text{ of } treatment} + \beta_{treatment \text{ provider}} + \beta_{flexibility \text{ of } appointments} \\ & + \beta_{compulsory \text{ or } voluntary \text{ participation}} + \beta_{cost} \end{aligned}$$

Choice probabilities in RPL models take on a multidimensional integral which is estimated using simulation. The RPL models were estimated using 500 random Halton draws, which have been proved to produce better estimations than random draws [28]. An initial attributes-only RPL model was estimated with all  $\beta$  parameters treated as random parameters. Ultimately, a parameter was denoted as random (i.e.

unobserved heterogeneity in preference for a specific attribute) when the modelling process indicated a statistically significant parameter mean and standard deviation around the estimated parameter mean. Model complexity was reduced based on the log-likelihood ratio test against the attributes-only model while retaining significant predictors of choice ( $p < 0.05$ ). Only the parameters 'effectiveness of the treatment', 'cost' and 'compulsory/voluntary participation' were treated as random parameters. All other parameters that were not statistically significant when treated as random and were treated as fixed parameters. All parameters were treated as having a normal distribution.

The model was then fitted with covariates: respondent characteristics and interaction terms. Various respondent characteristics i.e. experience with violence, age, sex, residential location, income and education, were tested but only 'experience with violence' was significant and improved the model based on the log-likelihood ratio test. Interaction terms of interest were then tested. The parameter 'effectiveness of the treatment program' was interacted with all other parameters, one interaction at a time, but none were significant. The random parameters were also interacted with respondent characteristics of 'age' and 'experience with violence'.

Using the respondents' answers to the question regarding their experience with violence, sub-groups were constructed and RPL models were estimated for each group. For the sub-group of people with no experiences with violence, the variable denoting people who had an objection to the treatment of violent offenders was interacted with the variables 'flexibility of appointments', 'compulsory/voluntary programs' and 'effectiveness of the treatment program'. This was of interest because a larger percentage of people who objected to the treatment of offenders were those who had no experiences with violence (98% of  $N=672$ ). A parameters-only RPL model was fitted for all other subgroups i.e. offenders, family members of offenders, victims and family members of victims.

A fixed parameters latent class model was followed by a random parameters latent class model. After determining the number of classes based on model fit, model

convergence and significance, respondent variables were added as covariates to describe the class compositions. The random parameters were 'effectiveness of the treatment' and 'compulsory/voluntary participation'.

Estimation of willingness to pay (WTP) values (and their standard deviations) were based on conditional estimates from the RPL model in the WTP space, which take into account individual heterogeneity as a result of random attributes and specifies the distribution of WTP directly at the estimation stage [29] rather than the standard approach of specifying the distributions of the coefficients and deriving WTP as the ratio of two coefficients (estimation in preference space). The WTP for a binary or categorical attribute is the incremental tax participants are willing to pay to have the attribute or characteristic relative to the base as part of the treatment program for impulsive violent offenders. The WTP for a continuous attribute is the incremental tax for every unit increase in the attribute that participants are willing to pay. The calculation, which in effect quantifies the trade-offs that society would be willing to make, is a simulated-based estimate describes as the marginal rates of substitution between a statistically significant attribute parameter of interest and the cost parameter, weighted by the log-likelihood function [30].

DCEs are based the fundamental premise that individuals are rational when making choice (i.e. consider all available information and make decisions on the basis of maximizing their utility) and are willing to trade between choices. To assess this rationality in choice, the number of participants who always chose the same treatment (either treatment 1, 2 or none) for each choice set was calculated.

## **5.2. Results**

### **5.2.1. Participant characteristics**

In total, 1021 participants completed the questionnaire with a 100% response rate for all 6 choice tasks per participant thus generating 6126 observations. Time to complete the questionnaire ranged from 3 to 76 minutes with a median time of completion of 9 minutes. Demographic characteristics of the sample participants are summarised in

Table 2. Our study sample was similar to that of the NSW taxpayer population in terms of age, sex and residential location and respondents' characteristics were similar across the four questionnaire blocks. Taxpayers' household income and education level data were not obtainable from the Australian taxation office.

**Table 2: Sample characteristics compared to the NSW taxpayer population (N=1021)**

		NSW taxpayer Population*	Study Sample	Questionnaire Block			
		(%)	(%)	1	2	3	4
		(%)					
<b>Gender</b>	Females		49	50	51	49	48
	Males	52	51	50	49	51	52
<b>Age</b>	18-24	10	11	11	11	12	10
	25-34	21	19	20	18	18	20
	35-44	22	21	22	18	20	21
	45-54	21	19	18	22	19	20
	55-64	16	17	16	17	18	17
	65+	10	12	13	14	13	12
<b>Residential location</b>	Metro	71	68	68	69	67	70
	Rural	29	32	32	31	33	30
<b>Annual Household Income</b>							
	<25K	-	3	2	3	3	3
	25K - 50K	-	15	14	14	17	16
	51K - 100K	-	30	31	26	32	31
	101K - 150K	-	23	23	26	21	23
	>150K	-	16	18	17	16	12
	Prefer not to say	-	13	12	14	11	15
<b>Education</b>							
	Did not complete secondary school	-	6	5	6	6	6
	Graduated from secondary school	-	16	16	15	19	17
	TAFE & Trade qualification	-	32	31	31	34	32
	University qualification	-	46	48	48	41	45
	Not stated	-	-	-	-	-	-

\* According to the 2016-2017 Australian Taxation Office statistics

### 5.2.2. Participant study engagement

The number of respondents that provided responses to the optional general qualitative comments about the study was 82% indicating an extremely high level of engagement in the study question. Overall, 54% of respondents stated that they paid equal attention to all attributes when making choice. The percentage of respondents who stated having paid least attention to an attribute were: 8.2% for 'treatment of co-occurring health conditions/addiction', 8.6% for 'compulsory/voluntary participation', 9.0% for 'effectiveness of the treatment', 11.3% for 'location and continuity of care', 12.4% for 'type of treatment', 14.2% for 'cost', 16.4% for treatment provider' and 18.1% for 'flexibility of appointments'.

No respondents chose the same treatment (either treatment 1, 2 or 'no treatment') for all choice sets. The percentage of respondents who preferred the 'no treatment' option for each choice set was very low (between 1.3% and 3.5%), and therefore the choice modelling was focused on the forced choice i.e. between treatment 1 and treatment 2.

### 5.2.3. Results from the Random Parameter Logit model

Table 3 provides the results of the RPL model (the MNL results are in **Appendix**). The RPL model is preferred to the MNL model (log-likelihood function of -3714.93 compared to -3962.92). While the signs of all the significant coefficients remained the same in the move to the RPL model, the coefficient for the attribute level 'prison/probation and parole officers with health professionals' as a treatment provider becomes insignificant.

The significant coefficients of the RPL model indicate that holding other variables constant, when choosing a treatment program for impulsive violent offenders, participants preferred more effective treatments, treatment programs that cost less per tax payer per year, and programs that provide full provision of treatment of all co-occurring health conditions both within the program and at referral (compared to minimal treatment provided within the program).



**Table 3: Results from the random parameters logit model**

Attributes		β (SE)
Main effects	Constant	1.0658*** (0.2223)
	Effectiveness of the treatment	0.0378*** (0.0094)
	Cost per tax payer per year	-0.0157*** (0.0033)
	Treatment of Co-occurring health conditions/addictions (Base level = Minimal treatment provided within program)	
	Full treatment of all co-occurring health conditions/addictions both within program and at referral facilities	0.2638*** (0.0767)
	Compulsory/Voluntary Participation (Base level = Compulsory)	
	Voluntary	-0.6561*** (0.2223)
	Flexibility of appointments (Base level = Not flexible)	
	Flexible	0.1833*** (0.0470)
	Location and Continuity of treatment (Base level = Both prison and community with continuity of care in between transitions)	
	Prison only (with no continuity of care post prison)	-0.3621*** (0.0723)
	Community only (with no continuity of care when imprisoned)	-0.3661*** (0.0543)
	Prison with continuity of care post prison	0.1037*** (0.0254)
	Type of treatment (Base level = Individual and Family counselling with medication)	
	Offender group counselling sessions only	-0.0460 (0.0424)
	Offender group counselling sessions with medication	0.0515 (0.0609)
	Individual counselling with medication	-0.1192* (0.0663)
	Treatment providers (Base level = Counsellors/Psychologists with health professionals)	
	Health professional	-0.1888*** (0.0511)
	Prison/Probation & parole officers with health professional	0.0570 (0.0434)
	Prison/Probation & Parole officer with Counsellors/Psychologists with Health Professional	0.0380 (0.0382)
Interaction terms	Compulsory/voluntary participation*Experience with violence	0.2908*** (0.1064)
	Compulsory/voluntary participation*Age	-0.0840** (0.0331)
	Effectiveness of the treatment program*Age	0.0025* (0.0014)
Goodness of fit	Log-likelihood function	-3714.93
	Degrees of freedom	21
	AIC	7471.8
	Number of observations	6126

\*\*\* = 99% confidence level, \*\*=95% confidence level, \*=90% confidence level

There was also a preference for compulsory over voluntary participatory programs and programs that have flexibility in appointments over those that do not. For the attribute 'location and continuity of treatment', when compared with 'both prison and community with continuity of care in between transitions', 'prison with continuity of care' is preferred. Respondents expressed a dis-utility for programs provided either in community or prison alone with no continuity of care when imprisoned or post-prison. Treatment provision by counsellors or psychologists alongside health professionals was preferred over health professionals alone.

Analysis of interaction terms indicated that people who had experience with violence preferred programs with voluntary rather than compulsory participation. Also, compulsory participation became more preferred as respondents' age increased.

The WTP results (interpreted as additional annual tax for a unit increase in the continuous variable and for a categorical or binary variable level relative to its base) shows that holding all other attributes constant in the RPL model, the marginal rate of substitution of significant attributes to the cost attribute revealed that respondents were willing to pay an additional annual tax contribution over and above what they currently pay (in 2018 AUD) of:

- \$2.40 (sd = \$1.90) for every 1% increase in effectiveness of treatment programs.
- \$27.30 (sd = \$4.20) to have programs provided in both prison and community with follow-up in between transitions compared to programs in prison only without follow-up post prison.
- \$27.20 (sd = \$4.20) to have programs provided in both prison and community with follow-up in between transitions compared to programs in community only without follow-up when imprisoned.
- \$7.70 (sd = \$2.50) to have programs provided in prison with follow-up post prison compared to having them provided in both prison and community with follow-up in between transitions

- \$19.80 (sd = \$6.40) to have programs that provide full treatment of all co-existing health conditions/addictions both in the program and at referral facilities compared to programs that provide minimal treatment within the program.
- \$13.90 (sd = \$3.00) to have programs provided by both health workers and counsellors or psychologists compared to health professionals only.
- \$14.00 (sd = \$3.00) to have programs that have flexibility in appointments compared to those that are not flexible.
- \$37.00 (sd = \$8.20) to have programs that have compulsory participation of impulsive violent offenders than those with voluntary participation.

#### **5.2.4. Results from the latent class model**

Results for the latent class models are reported in Appendix 2. A move from the LC to the LCRPL did not improve the model (i.e. the log-likelihood function changed from -3723.66 to -3727.92) and all the coefficients maintained the same sign and size. Therefore, the LC model was compared to the RPL model. Compared to the RPL model, the LC did not improve the model (log-likelihood function of -3714.93 and -3727.92). The RPL was therefore used as the final model. However the LC model has some interesting results that can be used to explain the sample participants. The best LC model fit has two classes. The class probabilities, i.e. the chance that participants will belong to a class, are 60% in class one and 40% in class two. The class membership shows that class one is more likely to have those who had experiences with violence than class two (a coefficient of 0.4033 at 95% confidence level).

Key differences are class two members preferred programs that are flexible over those that are not flexible while class one appears to be indifferent (coefficient not significant). Class two also preferred programs that are located in prison with continuity of care post-prison in comparison to those provided in both prison and community with continuity of care in between transitions while the coefficient for this attribute is insignificant for class one. Compared to class two whose coefficient was

insignificant, class one members preferred individual counselling with medication over individual and family counselling with medication as the treatment type for impulsive violent offenders. Class one preferred prison/probation and parole officers with health professionals over counsellors/psychologists with health professionals class one as treatment providers. This attribute's coefficient was insignificant for class two.

#### **5.2.5. Sub-group analysis**

While the experimental design was not designed for sub-group analyses it is clear that their responses are differences in groups based on participants' experiences of violence, therefore we further explored these groups. Here we present results for MNL (Appendix 3) and RPL (Appendix 4) models for the sub-groups: offenders (n=31), victims (n=217), family members of offenders (n=59), family members of victims (n=192), and people with no reported violence experience (n=672). Of note, participants were not equally distributed across questionnaire blocks and this was especially true for the offender group. All RPL models for each group improved compared to the MNL models. The main differences in the RPL models are presented below.

Similar to the LC model, people with no reported experience with violence preferred programs with flexible appointments compared to those that are not flexible. The coefficient for flexibility of appointments was insignificant for other groups. Offenders, victims and people with no experience with violence preferred programs provided in prison with continuity of care post-prison compared to those provided in both prison and community with continuity of care in between transitions. This was not significant for family members of either offenders or victims. Compared to counsellors or psychologist with health professionals as treatment providers, offenders prefer health professionals with prison or probation and parole officers.

### **5.3. Discussion**

The aim of this study was to quantify societal preferences for, and assess trade-offs between, characteristics of treatment programs for impulsive-violent offenders. Using

a DCE, results comparing the basic MNL, RPL, LC and LCRPL models showed that the RPL best describes the data, based on the log-likelihood ratio and coefficient significance. The model suggests that society prefers programs that are effective, are provided in prison with follow-up post prison, provide full treatment of all co-occurring health conditions/addictions, provide flexible appointments, are provided by health workers together with prison or probation and parole officers and have compulsory participation. It is interesting to note that society prefers and are willing to pay more for programs that have a follow-up component than those without. However they prefer programs provided in prison with follow-up over those provided in both community and prison with follow-up between transitions. This suggests that society finds better value for money for programs that are prison based with follow-up.

The LC model provides some further explanation on heterogeneity between groups that might result in preferential differences when it comes to making choice for treatment programs for impulsive violent offenders.

Treatment of offenders is a controversial topic with opinion polls often revealing a largely punitive society that is in favour of incarceration and harsher prison sentences [11]. This is especially true for crimes such as violence which society perceives as being more serious than others [31]. However, evidence suggests that opinion polls are often misleading. With advances in research methodologies designed to accurately determine public opinion, and when presented with facts about the limited effectiveness of incarceration and the associated staggering costs, there is an increasing understanding of the public's attitude to on crime [32] and an appetite for rehabilitation [33]. Results from DCE's such as the one described here provide evidence that societal support for treatment programs can be better explained when consideration is made of the characteristics (attributes) of the treatment programs.

As in many other DCEs in the health area, this study shows that society is likely to support treatment programs for impulsive violent offenders if they are effective [34-36]. Consistent with economic theory, the negative coefficient for the attribute 'cost per tax-payer per year' suggests there is a preference to pay less rather than more.

Our study demonstrates that society has a preference for treatment programs that are compulsory as opposed to voluntary for violent offenders and that taxpayers are willing to pay an additional annual tax of \$37 to have programs made compulsory. Compulsory programs for offenders are often contentious. A systematic review of the effectiveness of compulsory illicit drug and alcohol treatments reported that the percentage of studies that found negative impacts on criminal recidivism when comparing compulsory and voluntary treatment was similar to the percentage that observed positive impacts [37]. However, this may be due to drug dependence having a different mechanism to violence. In a qualitative study conducted prior to this DCE study [14], results showed that while the general public was split between compulsory versus voluntary programs, offenders preferred voluntary programs. While offenders thought they would more likely benefit from a program where they were allowed to opt-in, FGD participants with the general public thought of violent offending as a serious crime needing programs to be compulsory [14]. This is reflected in the results of the interaction terms in the RPL model that indicate that participants that had experiences with violence preferred voluntary programs.

Violence is now considered to be a public health problem and not confined to the criminal justice area [38]. Public health models to tackle violence are being advocated globally and emphasis is placed on prevention rather than reacting once an offence has been committed [39, 40]. Programs like REINVEST, a public health intervention that seeks to treat impulsive violent offenders with a pharmacotherapy, have shown effectiveness in a pilot study and a randomised controlled trial is currently underway to further investigate its effectiveness [10]. The program is voluntary and is provided by nurses and psychologists in the community to men with a history of at least two violent offences. Participants are referred by local court magistrates or probation and parole officers. The program provides some flexibility for the men to make monthly follow-up appointments, where they receive their medications and are routinely monitored. The results of the RPL suggest that a program such as REINVEST is likely to have societal support should it prove to be effective in reducing re-offending. Support is also apparent because delivered by psychologists alongside nurses and offers flexible

appointments. Additional societal endorsement would arise from it being made compulsory (currently it is voluntary), and delivered in prison with post-prison continuity rather than only in the community.

The value of programs to offenders should also be assessed. Qualitative research prior to this DCE showed that offenders and the public consider similar attributes when making choices but there was difference between groups over the levels of the attributes [14]. While we provide some sub-group analysis of people with experiences with violence, as a study limitation the results should be considered with caution as the experimental design focussed on the societal perspective and not the various sub-groups. As a recommendation for future work, DCEs to assess preferences for offender treatments should be conducted with various sub-groups of people that have experienced violence especially offenders. This would be essential if programs are designed to not only increase public support but offender uptake as well.

A recent systematic review found a lack of economic evidence to support programs in the criminal justice space [41]. In addition to influencing policy on the design of offender programs, the findings of this study can be used in cost-benefit analyses of treatment programs for impulsive violent offenders. Using REINVEST as an example, if the program was made compulsory for all impulsive violent offenders, the additional cost incurred per tax-payer per year would be compared to the additional benefit (WTP for compulsory over voluntary programs) of \$37 per tax payer per year. If the difference in the dollar amount was greater than zero, then a policy that required compulsory treatment of impulsive violent offenders would be considered to have a net monetary benefit and thus be considered good value for money.

#### **5.4. Conclusion**

In conclusion, this DCE offers an assessment of preferences for treatment programs for impulsive violent offenders that should be used to inform the design of programs. Society values treatment programs especially if they effective, are provided in prison with follow-up post prison, provide full treatment of all co-occurring health

conditions/addictions, provide flexible appointments, are provided by health workers together with prison or probation and parole officers and have compulsory participation.



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## Appendix 1: Results of the Multinomial logistic model (MNL)

	Attributes	$\beta$ (SE)
Main effects	Constant	0.9015*** (0.1193)
	Effectiveness of the treatment	0.0219*** (0.0020)
	Cost per tax payer per year	-0.1309*** (0.0019)
	Treatment of Co-occurring health conditions/addictions (Base level = Minimal treatment provided within program)	
	Full treatment of all co-occurring health conditions/addictions both within program and at referral facilities	0.2704*** (0.0558)
	Compulsory/Voluntary Participation (Base level = Compulsory)	
	Voluntary	-0.4021* (0.0484)
	Flexibility of appointments (Base level = Not flexible)	
	Flexible	0.1329*** (0.0360)
	Location and Continuity of treatment (Base level = Both prison and community with continuity of care in between transitions)	
	Prison only (with no continuity of care post prison)	-0.3112*** (0.0569)
	Community only (with no continuity of care when imprisoned)	-0.276*** (0.0414)
	Prison with continuity of care post prison	0.0887*** (0.0189)
	Type of treatment (Base level = Individual and Family counselling with medication)	
	Offender group counselling sessions only	0.0064 (0.0346)
	Offender group counselling sessions with medication	0.0111 (0.0489)
	Individual counselling with medication	-0.0838* (0.0507)
	Treatment providers (Base level = Counsellors/Psychologists with health professionals)	
	Health professional	-0.145*** (0.0559)
	Prison/Probation & parole officers with health professional	0.0689** (0.0315)
	Prison/Probation & Parole officer with Counsellors/Psychologists with Health Professional	0.0227 (0.0315)
Goodness of fit	Log likelihood function	-3962.92
	Degrees of freedom	15
	AIC	7955.8
	Number of observations	6126

\*\*\* = 99% confidence level, \*\*=95% confidence level, \*=90% confidence level

## Appendix 2: Results of the latent class models

Attributes		LATENT CLASS FIXED PARAMETERS		LATENT CLASS RANDOM PARAMETERS	
		CLASS 1	CLASS 2	CLASS 1	CLASS 2
Main effects	Constant	0.7817*** (0.2079)	1.2484*** (0.2844)	0.7913*** (0.2184)	1.2247*** (0.2788)
	Effectiveness of the treatment	0.0432*** (0.0038)	-0.01167 (0.0053)	0.0436*** (0.0039)	-0.0102 (0.0054)
	Cost per taxpayer per year	-0.0083 (0.0032)	-0.0238*** (0.0048)	-0.0083 (0.0039)	-0.0232*** (0.0047)
	Treatment of Co-occurring health conditions/addictions (Base level = Minimal treatment provided within program)  Full treatment of all co-occurring health conditions/addictions both within program and at referral facilities	0.2575*** (0.0998)	0.2685** (0.1154)	0.2385*** (0.1053)	0.2736** (0.1118)
	Compulsory/Voluntary Participation (Base level = Compulsory)  Voluntary	-0.5294*** (0.1026)	-0.3458*** (0.1252)	-0.4862*** (0.1082)	-0.3972*** (0.1211)
	Flexibility of appointments (Base level = Not flexible)  Flexible	0.0796 (0.0606)	0.3329*** (0.1089)	0.0867 (0.0618)	0.2870*** (0.1041)
	Location and Continuity of treatment (Base level = Both prison and community with continuity of care in between transitions)  Prison only (with no continuity of care post prison) Community only (with no continuity of care when imprisoned) Prison with continuity of care post prison	-0.2460*** (0.0919) -0.3256*** (0.0706) -0.0233 (0.0342)	-0.4155*** (0.1399) -0.3271*** (0.1023) 0.2766*** (0.0589)	-0.2482*** (0.0953) -0.3337*** (0.0739) -0.0240 (0.0353)	-0.3892*** (0.1347) -0.3157*** (0.0990) 0.2579*** (0.0556)
	Type of treatment (Base level = Individual and Family counselling with medication)  Offender group counselling sessions only Offender group counselling sessions with medication Individual counselling with medication	0.0122 (0.0530) 0.0605 (0.0805) 0.1147** (0.0543)	-0.1322* (0.0750) -0.0485 (0.1083) 0.0726 (0.1149)	0.0130 (0.0539) 0.0684 (0.0843) 0.1957** (0.0940)	-0.1184 (0.0734) -0.0420 (0.1056) 0.0659 (0.1126)
	Treatment providers (Base level = Counsellors/Psychologists with health professionals)  Health professional Prison/Probation & parole officers with health professional Prison/Probation & Parole officer with Counsellors/Psychologists with Health Professional	-0.1807*** (0.0657) 0.1147** (0.0543) -0.0095 (0.0505)	-0.2165** (0.0899) 0.0056 (0.0844) 0.1070 (0.0682)	-0.01721 (0.0675) 0.1100** (0.0568) 0.0113 (0.0618)	-0.2092*** (0.0877) 0.0042 (0.0806) 0.0996 (0.0670)
	Goodness of fit	Log likelihood function Degrees of freedom AIC Number of observations		-3723.66 33 7513.3 6126	
Demographics	Experience with violence	0.4033**		0.4033**	
Class probabilities	Class probabilities	0.6	0.4	0.6	0.4

\*\*\* = 99% confidence level, \*\*=95% confidence level, \*=90% confidence level

### Appendix 3: Results of the MNL models for the sub-group analysis

Attributes		MNL MODEL ( $\beta$ (SE))				
		Offenders	Victims	Offenders' family members	Victims' family members	No violence experience
Main effects	Constant	1.3187 (0.3256)	1.1886*** (0.2802)	1.3702** (0.5507)	1.1036*** (0.2970)	0.7343*** (0.1448)
	Effectiveness of the treatment	0.0235* (0.0139)	0.0275*** (0.0045)	0.3078** (0.0087)	0.0316*** (0.0048)	0.0189*** (0.0024)
	Cost per taxpayer per year	-0.0156 (0.0125)	-0.0170*** (0.0044)	-0.0216** (0.0086)	-0.0170*** (0.0047)	-0.0104*** (0.0023)
	Treatment of Co-occurring health conditions/addictions (Base level = Minimal treatment provided within program)					
	Full treatment of all co-occurring health conditions/addictions both within program and at referral facilities	-0.0801 (0.3821)	0.3206** (0.1259)	0.3671 (0.2396)	0.3388** (0.1027)	0.2868*** (0.0687)
	Compulsory/Voluntary Participation (Base level = Compulsory)					
	Voluntary	-0.8433*** (0.3256)	-0.6142*** (0.1113)	-0.6818*** (0.2189)	-0.4082*** (0.1205)	-0.3416*** (0.0587)
	Flexibility of appointments (Base level = Not flexible)					
	Flexible	0.3740 (0.2447)	0.0455 (0.0796)	0.1982 (0.1547)	0.2034 (0.0861)	0.1854*** (0.0448)
	Location and Continuity of treatment (Base level = Both prison and community with continuity of care in between transitions)					
	Prison only (with no continuity of care post prison)	-0.8005** (0.3532)	-0.3175** (0.1260)	-0.4053* (0.2458)	-0.4082*** (0.1387)	-0.2994*** (0.0700)
	Community only (with no continuity of care when imprisoned)	-0.5280* (0.3068)	-0.3092*** (0.0932)	-0.2056 (0.1715)	-0.3360*** (0.1027)	-2402*** (0.0511)
	Prison with continuity of care post prison	0.2191* (0.1316)	0.1134*** (0.0422)	0.1160 (0.0750)	0.0728 (0.0463)	0.0797*** (0.0235)
	Type of treatment (Base level = Individual and Family counselling with medication)					
	Offender group counselling sessions only	-0.1562 (0.2409)	0.0281 (0.0789)	0.1259 (0.1575)	-0.1114 (0.0828)	0.0042 (0.0425)
	Offender group counselling sessions with medication	0.1509 (0.3354)	-0.0690 (0.1093)	-0.2383 (0.2144)	-0.0549 (0.1184)	0.0353 (0.0602)
	Individual counselling with medication	-0.2190 (0.3615)	-0.0775 (0.1158)	-0.0684 (0.2208)	-0.1291 (0.1257)	-0.0609 (0.0621)
	Treatment providers (Base level = Counsellors/Psychologists with health professionals)					
	Health professional	-0.6988** (0.2866)	-0.3282*** (0.0901)	-0.1893 (0.1725)	-0.2903*** (0.0977)	-0.0603 (0.0488)
	Prison/Probation & parole officers with health professional	0.4083* (0.2263)	0.1105 (0.0693)	-0.0868 (0.1291)	0.1452 (0.0764)	0.0594 (0.0381)
	Prison/Probation & Parole officer with Counsellors/Psychologists with Health Professional	0.0605 (0.2295)	0.0655 (0.0704)	0.1320 (0.1547)	0.0381 (0.0203)	0.0162 (0.0389)
Goodness of fit	Log likelihood function					
		-102.01	-815.34	-224.30	-704.58	-2585.18
	Degrees of freedom	15	15	15	15	15
	AIC	234.0	1660.7	478.6	1439.2	5200.4
Number of observations		186	1302	354	1152	3936

\*\*\* = 99% confidence level, \*\*=95% confidence level, \*=90% confidence level

#### Appendix 4: Results for the RPL model for the sub-group analysis

Attributes		RANDOM PARAMETERS MODEL ( $\beta$ (SE))				
		Offenders	Victims	Offenders' family members	Victims' family members	No violence experience
Main effects	Constant	1.4443 (0.8828)	1.3533*** (0.3048)	1.4134** (0.6331)	1.2206*** (0.3553)	0.9003*** (0.1879)
	Effectiveness of the treatment	0.0269 (0.0157)	0.0307*** (0.0052)	0.0380*** (0.0123)	0.0443*** (0.0077)	0.0620*** (0.0096)
	Cost per taxpayer per year	-0.01718 (0.0135)	-0.0194*** (0.0047)	-0.0233** (0.0098)	-0.0194*** (0.0055)	-0.0139*** (0.0030)
	Treatment of Co-occurring health conditions/addictions (Base level = Minimal treatment provided within program) Full treatment of all co-occurring health conditions/addictions both within program and at referral facilities	-0.0591 (0.4229)	0.3462** (0.1408)	0.3957 (0.3015)	0.4020** (0.1876)	0.3210*** (0.0994)
	Compulsory/Voluntary Participation (Base level = Compulsory) Voluntary	-0.9753** (0.3928)	-0.6791*** (0.1345)	-0.7463*** (0.2587)	-0.5536*** (0.1683)	-0.6366*** (0.2197)
	Flexibility of appointments (Base level = Not flexible) Flexible	0.3921 (0.2540)	0.0552 (0.0830)	0.2754 (0.1895)	0.0640 (0.1073)	0.7390*** (0.1931)
	Location and Continuity of treatment (Base level = Both prison and community with continuity of care in between transitions) Prison only (with no continuity of care post prison)	-0.8844** (0.3770)	-0.3633*** (0.1335)	-0.4485 (0.2917)	-0.4985*** (0.1705)	-0.3951*** (0.0909)
	Community only (with no continuity of care when imprisoned)	-0.5297 (0.3319)	-0.3348*** (0.1023)	-0.2336 (0.2040)	-0.3923*** (0.1306)	-0.3503*** (0.0720)
	Prison with continuity of care post prison	0.2515** (0.1403)	0.3348*** (0.1023)	0.1483 (0.0960)	0.0844 (0.0605)	0.1106*** (0.0330)
	Type of treatment (Base level = Individual and Family counselling with medication) Offender group counselling sessions only	-0.1700 (0.2523)	0.0310 (0.0831)	0.0847 (0.1794)	-0.0541 (0.0983)	-0.0464 (0.0782)
	Offender group counselling sessions with medication	0.1584 (0.0353)	-0.0665 (0.1152)	-0.2257 (0.2477)	-0.0549 (0.1430)	0.0660 (0.0782)
	Individual counselling with medication	-0.2217 (0.4229)	-0.1175 (0.1302)	-0.0829 (0.2637)	-0.1501 (0.1580)	-0.0808 (0.0853)
	Treatment providers (Base level = Counsellors/Psychologists with health professionals) Health professional	-0.7787** (0.3073)	-0.3543*** (0.0940)	-0.2324 (0.2071)	-0.3607*** (0.1218)	-0.1158 (0.0648)
	Prison/Probation & parole officers with health professional	0.3987** (0.2376)	0.1133 (0.0730)	-0.1111 (0.1666)	0.1737 (0.1042)	0.0847 (0.0560)
	Prison/Probation & Parole officer with Counsellors/Psychologists with Health Professional	0.5427 (0.2442)	0.0591 (0.0753)	0.1597 (0.1534)	0.0488 (0.0890)	0.0390 (0.0493)
	Goodness of fit	-100.94	-807.55	-210.71	-671.09	-2397.01
	Degrees of freedom	16	16	16	17	21
	AIC	233.9	1647.1	453.4	1376.2	4836.0
	Number of observations	186	1302	354	1152	3936

\*\*\* = 99% confidence level, \*\*=95% confidence level, \*=90% confidence level

## **Chapter 6: Valuing the benefits of a treatment program for Impulsive Violent Offenders using the Contingent Valuation Approach.**

This chapter is a manuscript that is currently under review in the *Journal of Health Economics Policy and Law*.



Title: Valuing the benefits of a treatment program for Impulsive Violent Offenders using the Contingent Valuation Approach

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## **Abstract**

### **Objective:**

Using a randomised control trial assessing the effectiveness of an oral antidepressant in reducing impulsivity in violent offenders (the ReINVEST trial) as an exemplar, the aim of this study is to assess the societal value, in terms of willingness to pay (WTP), for treatment programs for impulsive violent offenders.

### **Methods:**

The contingent valuation method was used. Employing the payment card method, 1021 survey respondents were asked to indicate their maximum WTP, expressed as an additional annual tax levy, to have the treatment available for impulsive violent offenders. Mean WTP was calculated for offenders, victims, family members of offenders and victims, and those with no experiences of violence. Regression models were used to identify factors affecting WTP.

### **Results:**

The study sample consisted of: 3% violent offenders, 18% victims of violence, 5% family members of offenders, 18% family members of victims, and 56% indicated no experiences with violence. The majority of participants (86%) were in favour of treating violent offenders to reduce reoffending and 77% had no objection to the use of medication as treatment. The average annual societal WTP per taxpayer for an intervention that would realise a 30% - 50% reduction in violent crimes among program participants was \$70.39 (median of \$50). Victims and respondents who had never had an experience with violence were more likely to provide a lower WTP value.

### **Conclusion:**

This study demonstrates that society largely values interventions that are likely to reduce violent crimes, and are willing to pay additional tax to have treatment programs implemented. The WTP values generated can be used to assess the net monetary benefit of such programs.

### **6.1. Background**

The Australian costs of crime are estimated to be 48 billion Australian dollars per year or 4.1% of the nation's gross domestic product [1]. Violent offences account for a large proportion of the offender population in Australia. As at June 2018, the most common offence in Australia was acts intended to cause injury, accounting for 22% of prisoners and 33% of community offenders [2]. The costs of violence to the Australian economy, including medical costs, lost output, and intangible costs, are estimated to be \$3.1 million each year [3]. Well designed and evaluated interventions to reduce violence crimes can save both lives and money. This is particularly true for impulsive violent offenders who have a higher likelihood of recidivism but are more likely to respond positively to treatment and rehabilitation programs [4-6].

Punitive responses to crime such as incarceration with minimal rehabilitation are expensive (\$315 per prisoner per day in Australia [7]) and are shown to be largely ineffective as a deterrent to re-offending [8]. Over the past two decades, the incarceration rate in Australia has increased by over 80% with recidivism rates at 51% in 2018 [7]. Policy makers often justify expenditures for punitive justice policies like incarceration on the basis of responding to the community's desire for harsher sentences [9], and therefore the public's taxes are likely being wasted on approaches that may not be cost effective in comparison with alternative crime prevention measures. Polls from public opinion surveys in the state of New South Wales (NSW) in Australia have demonstrated distorted perceptions of crime [10], with the public support of a punitive approach changing little over recent years [11, 12]. 66% of residents in NSW feel that the sentences imposed on offenders are either 'a little too lenient' or 'much too lenient' [11]. More nuanced questions and methodologies that inform the public are needed to assess the value and benefit society places on offender programs that offer alternatives to incarceration and adopt a treatment approach. This will not only allow for improved comparisons between incarceration and other alternatives (such as diversion to treatment programs) but also contributes to cost benefit analyses of treatment programs to guide resource allocation. In this

study, we assess the value that society places on the treatment of impulsive violent offenders using an economic methodology - the contingent valuation (CV) or willingness to pay (WTP) method.

The CV approach presents respondents with a hypothetical scenario about an intervention and asks them to identify the maximum amount they are willing to pay for the intervention [13]. Obtaining the maximum amount offenders (as those directly benefiting from the interventions) and society (as those whose taxes pay but also benefit from safer communities) are willing to pay for offender interventions represents a concrete estimate of the value placed on such interventions as opposed to just asking whether they are or are not in favour of the intervention. Asking how much respondents as individual taxpayers are willing to pay for a specific policy (in view of what they would be willing to sacrifice in terms of other items on their budgets) enables them to consider the benefits of the program thus providing a more considered estimate of their attitude toward that policy. The response requires the individual to consider the additional price they would be paying in relation to the benefits they might receive from the policy (e.g. "Would I be willing to pay an additional annual \$50 to have more violent men access the treatment program and therefore have reduced crime in my community?").

The CV method allows for an estimate of the economic value of a given program. Significant sums of money are spent on criminal justice programs but very few have undergone economic evaluation to guide policy makers in effective resource allocation. A recent systematic review assessing economic evaluations of behavioural interventions for offenders between 2003 and 2016 found only 17 peer reviewed studies [14]. An economic evaluation entails the comparison of the program's costs and benefits to that of an alternative. While estimating the actual costs associated with program delivery has standardised methodology and is easily quantifiable, estimation of the benefits in monetary terms (necessary for a cost benefit analysis, one form of economic evaluation) is more challenging with the outcomes including significant intangible benefits that are difficult to quantify e.g. society's perception of

safety after an intervention program for violent offenders. The CV method is one way of quantifying outcomes through the estimation of program benefits in terms of the amount individuals are willing to pay for the program, thus including both tangible and intangible benefits. Total societal benefits can then be estimated by multiplying the average amount taxpayers are willing to pay for the program by the number of taxpayers. If the costs of the program are known, the net benefit can then be estimated. Programs with a positive net benefit (i.e. where the benefits outweigh the costs) are considered to be economically viable. Different programs' net benefits can then be compared to reveal those that represent the best societal value.

The CV methodology has been applied in studies in environment and health policy areas [15, 16], but only recently used in the criminal justice context to estimate the value of crime-control and crime prevention programs [17, 18] and drug abuse intervention programs [19, 20]. The current study employs the CV methodology to estimate the societal value for the treatment of impulsive violent offenders. One such program (the ReINVEST trial) seeks to evaluate the effectiveness and social benefits of a particular class of antidepressant medication (a selective serotonin reuptake inhibitor - sertraline) in reducing recidivism in impulsive, repeat-violent offenders and in improving a range of behavioural measures. ReINVEST is a double-blind, randomised control trial (RCT) being conducted in New South Wales (NSW), Australia [21]. Using ReINVEST as an example of a treatment program for impulsive violent offenders, the aim of this study is to estimate society's support for such programs by estimating the percentage of taxpayers who are willing to pay for such a program, to estimate the social value/benefit of the program and make valuation comparisons between people who have had direct experiences with violence (i.e. offenders, victims and family members of offenders and victims) and those without, and to estimate the factors affecting societal willingness to pay for the intervention program.

## 6.2. Methods

### 6.2.1. Design

An online survey using the payment card approach was used as the WTP elicitation method. In the payment card method respondents are presented with a range of dollar bid amounts and asked to choose the value that represents the maximum amount they would be willing to pay for the good/service being valued. In this study the payment card dollar amounts were in the form of an annual additional tax levy to have the described treatment made available to impulsive violent offenders in NSW.

### 6.2.2. Formative research

Prior to the CV study, qualitative formative research in form of focus group discussions (FGDs) were undertaken with offenders, victims, and family members (of offenders and victims) to: i) obtain characteristics of treatment programs that society consider important when deciding to support a treatment program; and ii) obtain a range of dollar values in terms of annual tax that society is willing to pay for such treatment programs. The characteristics obtained were then used in the background information section of the survey questionnaire to describe offender treatment programs such as ReINVEST. The attributes/characteristics of the ReINVEST intervention determined by the FGDs are shown in Table 1. The tax amounts were used as the payment card dollar values.

**Table 1: A description of the ReINVEST study to be valued**

Characteristic	ReINVEST description
Treatment type	A medication used to treat impulsivity and therefore reduce violent crime
Treatment provider	Health professionals
Program location and continuity of care	Community only
Voluntary/Compulsory participation	Voluntary
Flexibility of appointments	Flexible
Treatment of comorbidities	Regular medical tests with referrals to health centres
Treatment effectiveness	30% - 50% crime reduction

### **6.2.3. Participant Sample**

An online survey panel provider (*Research Now SSI*) [22] was used to recruit taxpayers in the community. Participant panels for Research Now SSI are recruited via verified, certified sources and methods to create a large pool of potential research respondents. These participant panels have all agreed and provided consent to participate in research conducted by the commercial survey company. Prior to being assigned to a survey, a three stage randomization and matching process is used.

This process starts with exactly understanding the target population. The respondent inclusion criteria for this study were tax paying residents of New South Wales aged over 18 years. Participants meeting these criteria were randomly selected from panel's online sample blend, a consistently-managed, diverse and large frame. At the time *Research Now SSI* recruited for this survey, participants meeting the inclusion criteria were also eligible for three other surveys they were recruiting for. To minimize the risk of bias, a set of profiling questions was randomly selected for them to answer (these are methodologically correct questions, never affirmation questions) and upon completion, participants were assigned, again using a randomization factor, to a survey they are likely to be able to take. Other factors considered in the assignment include the likelihood that they will be able to complete the survey and the characteristics of the specific study, including factors such as field time.

### **6.2.4. Elicitation of Willingness to Pay**

Respondents were provided with the definitions of violence (according to the World Health Organisation [23]) and impulsivity, and provided with the current rates of violence, imprisonment, and recidivism in NSW (50% after two years) derived from statistics from the Bureau of Crime Statistics and Research [24], as well as the cost of incarceration (\$315 per prisoner per day [25]). They were also provided with information on various treatment programs for violent offenders in NSW such as those based on cognitive behavioral therapy, a description of ReINVEST and details of the

program delivery (Table 1). Respondents were informed that the program could potentially result in a 30% - 50% reduction in crime rates among participants (the ReINVEST pilot study reported a 35% reduction in impulsivity and 51% reduction in assault among study participants [21]).

Figure 1 shows the scenario presented to participants to elicit the WTP values. The six different payment card options presented to study participants were based on suggestions from participants in the formative qualitative research and pilot studies: \$25, \$50, \$75, \$100, 'None of these amounts', and 'I am not willing to make any contribution'. Those who selected the \$100 value were asked a follow-up question whether they would be willing to make a contribution over \$100 and, if so, how much they were willing to pay. Participants who chose 'none of these amounts' were asked a follow-up question to state how much they were willing to pay. This allowed for an increase in the number of payment card values and therefore increasing the efficiency of the payment card approach. Participants who indicated that they were unwilling to make any contribution were assigned a zero WTP and asked the reason for their choice. In addition to the scenario questions, respondents' demographic and socio-economic information were collected, as well as data on their perceived health state, their attitudes toward the treatment of violent offenders, and attitudes towards the use of pharmacotherapies in the treatment of offenders. To explore participant cognitive burden, participants were also asked to state the level of difficulty in assigning a monetary value to the valuation question.

To minimise position bias of the payment values, participants were randomly assigned to one of four blocks with each block having the payment card dollar values positioned in a different order. Position bias was tested in the regression analysis. Prior to conducting the survey, two pilots were conducted: the first with 100 participants and the second with 50 participants. The pilot study aided pre-testing and revision of the questionnaire based on the qualitative feedback from participants.



**Figure 1: Hypothetical elicitation scenario presented to study participants**

If the government was thinking of providing this program to impulsive violent offenders in New South Wales and would like to do this without affecting the provision of all other services:

1. If you as a tax payer were asked to make an annual voluntary contribution in the form of tax to have more men with histories of violent offences access this treatment program and therefore see a reduction in the violent crime rate in New South Wales, how much are you willing to contribute? (Consider that any amount you choose to contribute to the levy will reduce your personal expenditure on other items in your household such as food and clothing. Providing this treatment program will not affect the provision of all other services e.g. health and education)

How much are you willing to contribute per year? (**Note to programmer: Change positioning of values with each block**)

\$100 ☐ (answer question 3.)

\$75 ☐

\$50 ☐

\$25 ☐

None of these amounts ☐ (answer question 2.)

I am not willing to make any contribution ☐ (answer question 5.)

2. You chose 'None of these amounts' in the previous question. Can you indicate how much you are willing to pay?  [Number in dollars]

3. You indicated you are willing to contribute \$100 per year in taxes. Are you willing to contribute more than \$100? If so, state how much you are willing to contribute.

Yes ☐ (answer question 4.)

No ☐

4. You stated that you are willing to contribute more than \$100 per year in taxes, state how much you are willing to contribute  [Number in dollars]

5. You said you are not willing to make an annual tax contribution. Can you state the reason for your response? .....

6. Please indicate how easy or how difficult it was to assign a monetary value to the contribution you would like to make to fund the treatment program in section B.

Very easy ☐

Easy ☐

Okay ☐

Difficult ☐

Very difficult ☐

7. Give a reason for your answer.....

### 6.2.5. Data Analysis

Mean WTP values were calculated for the sample. Because the WTP data was right skewed the median WTP values were also calculated. A conservative estimate of the total societal WTP was calculated by multiplying the median WTP per tax payer by the number of tax payers in New South Wales (approximately 4.2 million according to the Australian Taxation Office). Responses to the qualitative questions from the reasons respondents provided to explain their choices were manually coded and analysed to provide explanations for the zero WTP responses and the motivations behind those that provided a positive WTP response. A demand curve was drawn to estimate the percentage societal demand for the impulsive violent offender intervention at each WTP price.

Logistic regression was used to identify factors predicting zero and positive WTP. WTP distributions are usually positively skewed and therefore a log-transformed linear regression model used to estimate the effects of the different variables on the WTP for offender treatments [26, 27].

Based on the economic literature, we hypothesised that WTP would be influenced by: ability to pay [28, 29], and the utility participants derived from the service being valued [30]. The effect of ability to pay on WTP was examined in the regression using the variables household income, education level (on the assumption that people with a higher education level generally have higher incomes), household size (on assumption that the higher the household size the less the disposable income) and health status (on assumption that people in poor health have less disposable income either as a result of loss of productivity or needing to pay for their own health care). Utility derived from providing a treatment program for violent offenders was examined using the variables: experience of violence (categorised as: offender, victim, family member of offenders and or victim, and no experience of violence), having been in contact with the justice system, objection to treatment of offenders, and objection to the use of medication as a treatment for violence. To test for position bias in influencing WTP, the dummy variable 'block' indicating the questionnaire block participants were

assigned to was included in the linear regression. Demographic factors (age and gender) were also included in the models. Prior to the regression analyses, all variables were tested for multi-collinearity.

#### **6.2.6. Ethics**

This study was approved by the Human Research Ethics Committee, UNSW, Sydney (HREC No. HC17848).

#### **6.3. Results**

A total of 1021 participants whose characteristics were similar to the NSW taxpayer population (2016/2017 Australian Taxation Office) according to sex, age and geographical location, completed the questionnaire (Figure 2). Our sample's household income and education levels could not be compared to that of NSW taxpayers because this data is either not available/not reported by the Australian tax office.

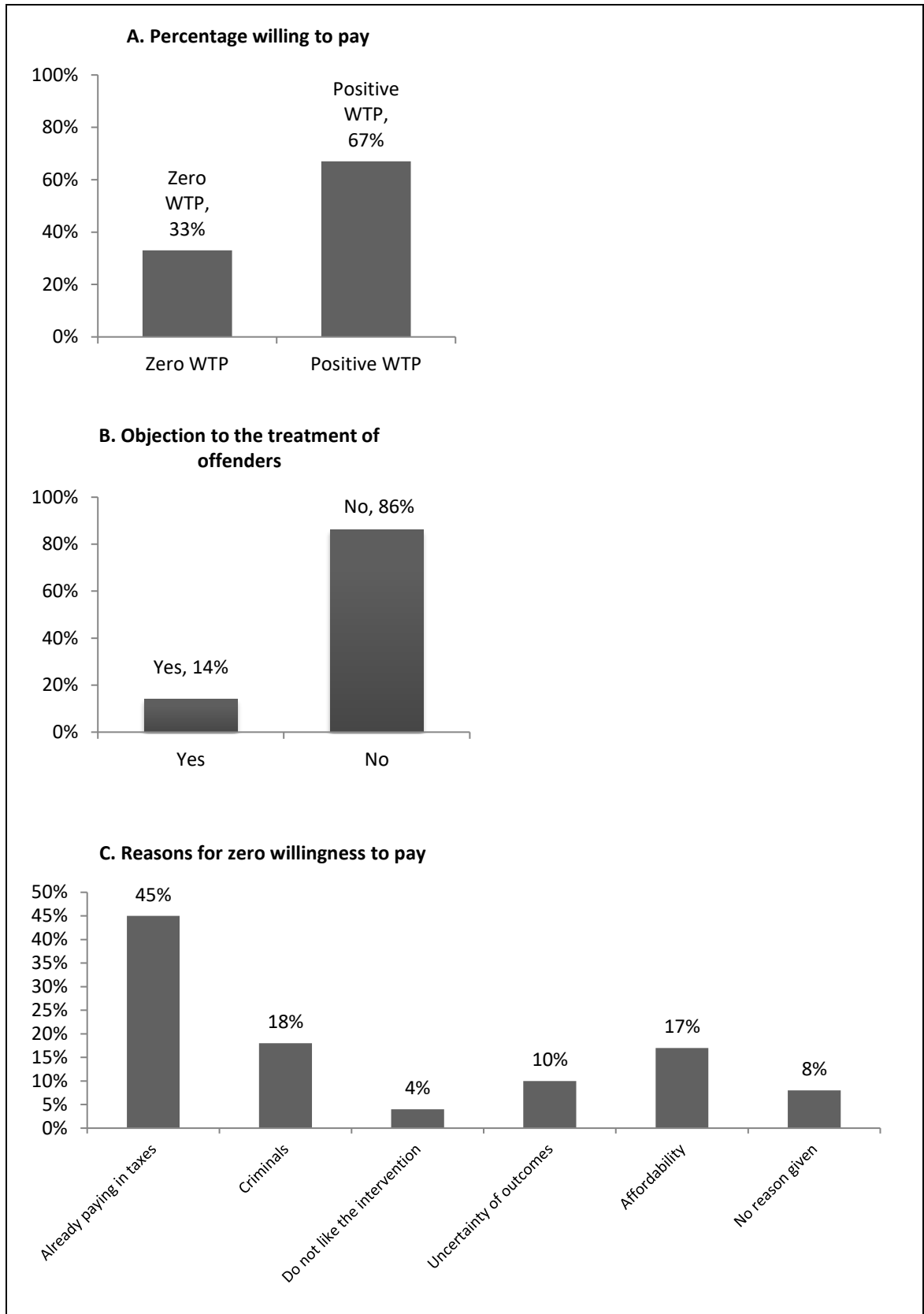
Figure 2 illustrates the participants' WTP descriptive statistics. Overall, 67.2% of participants provided a positive WTP i.e. were willing to pay something, and 32.8% provided a zero WTP (Figure 2A). However, a further analysis of the data (Figure 2B) reveals that only 14.3% had an objection to the treatment of offenders. Subsequent exploration of participants' qualitative responses who indicated a zero WTP (Figure 2C) indicated that almost half (45% of 334 respondents) felt they were already paying enough in taxes and that this should be used for offender interventions such as the one valued in this study. The other reasons provided for zero WTP were affordability (17%), uncertainty of program outcomes (4%) and unfavourable treatment program characteristics (4%). 18% of respondents argued that the offenders should either be incarcerated or pay for their own treatment. Various forms of payment methods were proposed by some respondents and these included: community work, loans, reductions from any government subsidies offenders were receiving, or having their family members pay the treatment costs.

**Table 2: Sample characteristics compared to the NSW taxpayer population (N = 1021)**

	NSW Taxpayers*	Study Sample
<b>Gender</b>		%
Females	48	49
Males	52	51
<b>Age</b>		
18-24	10	11
25-34	21	19
35-44	22	21
45-54	21	19
55-64	16	17
65+	10	12
<b>Location</b>		
Metro	71	68
Rural	29	32
<b>Annual Household Income</b>		
<25K	-	3
25K - 50K	-	15
51K - 100K	-	30
101K - 150K	-	23
>150K	-	16
Prefer not to say	-	13
<b>Education</b>		
Did not complete secondary school	-	6
Graduated from secondary school	-	16
TAFE & Trade qualification	-	32
University qualification	-	46
Not stated	-	-

\* According to the 2016/2017 ATO statistics

**Figure 2: Willingness to pay descriptive statistics.**



The significant positive coefficients on variables in the logistic regression model (Table 3), showing the relative probability of providing a positive WTP, were: income (for respondents who stated their income) and respondents who indicated they had difficulty assigning a monetary value to the valuation question. The probability of providing a zero WTP value was more likely among respondents who were victims, had never had an experience with violence, were older, had an objection to the treatment of violent offenders, or had an objection to the use of medication in the treatment of violent offenders.

Among all survey respondents, 3% self-reported as having been accused of a violence crime (offenders), 21% reported as victims, 6% as family members of offenders, 19% as family members of offenders, while 66% reported having had no experience with violence (Table 4). Including the zero WTP respondents, the mean annual societal WTP per tax payer in additional taxes for a 30% - 50% reduction in violent crimes among program participants was \$48. However, as 86% of respondents had no objection to the treatment of violent offenders, we also examined those who provided a positive WTP value.

**Table 3: Logistic regression: Characteristics of respondents providing a zero and non-zero WTP to have the intervention available to impulsive violent offenders.**

(Dependent variable: Zero WTP value =1)

Variables entered in the model	Final model coefficient ( $\beta$ )	95% Confidence interval	p-value
Gender (Female)	0.090	-0.215 – 0.395	0.565
Education	0.007	-0.090 – 0.104	0.888
Income (< \$25K)			
\$25K - \$50K	1.228	0.328 – 2.128	0.007*
\$51K - \$100K	1.227	0.357 – 2.097	0.006*
\$101K - \$150K	1.303	0.407 – 2.200	0.004*
> \$150K	0.955	0.040 – 1.870	0.041*
Prefer not to say	0.544	-0.367 – 1.456	0.242
Offenders (No)	0.017	-0.864 – 0.899	0.969
Family members of offenders (No)	-0.31	-0.986 – 0.365	0.368
Victims (No)	-0.892	-1.524 – -0.261	0.006*
Family members of victims (No)	-0.453	-1.037 – 0.030	0.128
No Experience with Violence (No)	-0.904	-1.602 - -0.206	0.011*
Been in contact with the justice system (No)	0.297	-0.156 – 0.750	0.199
Region – Metro/Rural (Metro)	-0.145	-0.464 – 0.175	0.376
Household size	0.041	-0.081 – 0.163	0.506
Health state	-0.113	-0.278 – 0.052	0.179
Age	-0.271	-0.376 – -0.166	0.000*
Objection to treatment of offenders (No)	-1.101	-1.538 – -0.664	0.000*
Objection to use of Medications (No)	-0.438	-0.812 – -0.063	0.022*
Difficulty assigning a monetary value (No)	0.366	0.239 – 0.493	0.000*

\* Significant at the 95% level of confidence.

**Table 4: Willingness to pay descriptive statistics by sub-group (N = 1021)**

	Offenders	Victims	Family members of offenders	Family members of victims	No experience of violence	Societal (total)
<b>Proportion by group</b>	3%	21%	6%	19%	66%	100%
<b>Mean WTP (including zero WTP)</b>	\$92	\$51	\$68	\$59	\$42	\$48
<b>No objection to the treatment of offenders</b>	90%	87%	85%	87%	85%	86%
<b>Proportion providing a positive WTP value</b>	65%	62%	61%	71%	68%	68%
<b>Mean WTP (excluding zero WTP)</b>	\$142	\$82	\$111	\$89	\$61	\$71
<b>Median WTP (excluding zero WTP)</b>	\$88	\$50	\$50	\$50	\$50	\$50
<b>Coefficient of skewness</b>	1.29	2.84	1.93	2.56	4.42	3.51

The mean annual societal WTP in additional taxes among this group was \$71. Here, respondents who had experiences with violence were willing to pay more than those without such experiences. The highest WTP value was among offenders (\$142), followed by family members of offenders (\$111). The median annual societal WTP per taxpayer for an intervention that would realise a 30% - 50% reduction in violent crimes was \$50. Apart from offenders who had a median WTP of \$88, all other subgroups had a median WTP of \$50.

The log transformed linear regression of positive WTP values (Table 5) identified that respondents were more likely to provide a lower WTP value if they were victims, had never had an experience with violence, had an objection to the treatment of offenders, and an objection to the use of medication in the treatment of violent offenders. The coefficient of determination ( $R^2$ ) was low at 0.09.



**Table 5: Linear regression for positive WTP values (natural logarithms)**

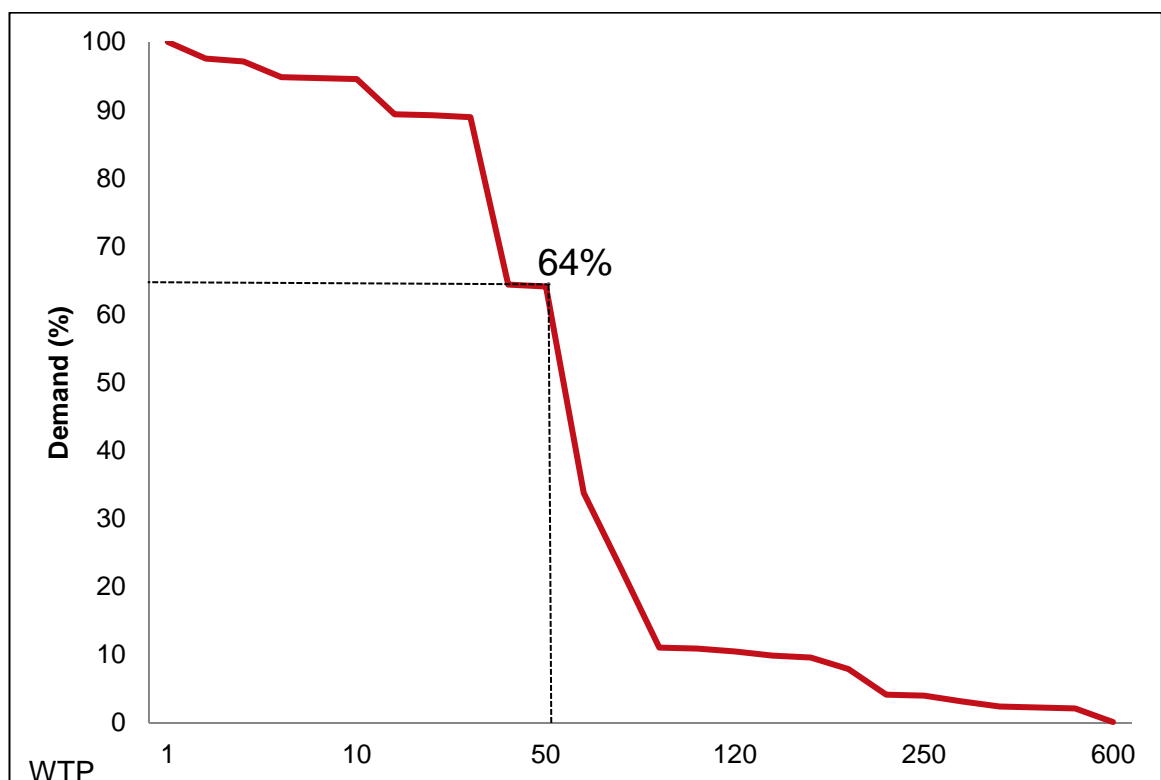
Variables entered in the model	Final model coefficient ( $\beta$ )	95% Confidence interval	p-value
Gender (Female)	-0.108	-0.272 – 0.055	0.194
Education	0.030	-0.021 – 0.081	0.254
Income (< \$25K)			
\$25K - \$50K	0.197	-0.392 – 0.785	0.512
\$51K - \$100K	0.262	-0.313 – 0.838	0.371
\$101K - \$150K	0.357	-0.228 – 0.942	0.231
> \$150K	0.351	-0.247 – 0.948	0.249
Prefer not to say	-0.022	-0.629 – 0.585	0.943
Offenders (No)	0.335	-0.166 – 0.836	0.190
Family members of offenders (No)	0.109	-0.269 – 0.488	0.571
Victims (No)	-0.411	-0.741 - -0.080	0.015*
Family members of victims (No)	-0.328	-0.656 – 0.000	0.050
No Experience with Violence (No)	-0.658	-1.022 - -0.259	0.000*
Been in contact with the justice system (No)	0.096	-0.163 – 0.355	0.467
Region – Metro/Rural (Metro)	0.131	-0.042 – 0.304	0.138
Household size	0.038	-0.025 – 0.102	0.234
Health state	-0.067	-0.158 – 0.024	0.148
Age	0.039	-0.015 – 0.093	0.158
Objection to treatment of offenders (No)	-0.350	-0.650 - -0.050	0.022*
Objection to use of Medications (No)	-0.344	-0.562 - -0.125	0.002*
Difficulty assigning a monetary value (No)	-0.068	-0.142 – 0.005	0.069
Randomisation block (1)			
2	0.076	-0.140 – 0.293	0.489
3	0.144	-0.075 – 0.363	0.197
4	0.166	-0.052 – 0.384	0.136

\* Significant at the 95% level of confidence.

There was clustering of stated WTP for certain values and therefore, an ordered logistic regression was also tested on the data (appendix 1). The signs of all the coefficients remained the same as those in the results of the log transformed linear regression. The coefficients for age and gender became significant suggesting that respondents were more likely to provide a lower WTP if they were male and a higher WTP if they were older. However the  $R^2$  for this model was lower at 0.05 and therefore we concluded that the log-transformed linear regression fitted the data better.

The demand curve (Figure 3) shows the societal demand for the intervention at each suggested additional annual tax value (between \$1 and \$600) per tax payer per year. At the median societal WTP of \$50 per tax payer per year, as found in this study, 64% of the tax paying population of NSW would have a demand for the intervention (i.e. support the provision of the intervention to impulsive-violent offenders).

**Figure 3: Societal demand curve for interventions for impulsive violent offenders**



#### 6.4. Discussion

The aim of this study was to illustrate society's support for treatment programs for impulsive violent offenders such as the ReINVEST trial and to estimate the value the community places on such programs in terms of WTP. In this study, 67% of respondents were willing to pay to have the treatment program provided to impulsive-violent offenders (i.e. provided a non-zero WTP value). Consistent with other research [31], this study concurs that 'off the top of the head' responses to opinion polls that

report 66% societal support for punitive responses to crime do not reflect society's true views to offender rehabilitation. When individuals are engaged in such a way that provides evidence and a more detailed and nuanced description of programs and potential outcomes, around two-thirds (67% in this study) are in favour of the treatment and rehabilitation of offenders as a response to crime. This juxtaposes with the similar number who support punitive measures when asked a snap poll question in the absence of contextual information and evidence.

This study reports a mean societal WTP of \$71 (median \$50) in additional annual tax per tax payer to support treatment programs for impulsive violent offenders. This is an indication of the value society places on interventions likely to reduce violent crimes. NSW constitutes the largest percentage of tax payers in Australia (31% of the 13.5 million tax payers in NSW); approximately 4.2 million tax payers in the financial year 2015 – 2016 [32]. With a median WTP per tax payer per year of \$50 (or mean \$48 including zero WTP), this means that the total societal WTP or total benefit that the society derives from the provision of treatment programs to impulsive violent offenders that yield a 30% - 50% reduction in violent crimes among program participants would be approximately AUD 210 million annually. With a NSW violent crime rate, which includes murder, attempted murder, manslaughter, assault, robbery and sexual offences, of approximately 65,000 crimes a year [29], a 30% reduction in crime rate would estimate the WTP per crime prevented at \$10,700.

Locally and internationally, a number of interventions to reduce crime and recidivism rates exist, but very few of these have economic evaluations conducted to aid resource allocation [14]. Our findings which contribute to filling this gap can also be used in a cost-benefit analysis of similar interventions with similar effectiveness such as the one described in this paper. A cost-benefit analysis compares the costs and the benefits of interventions and if the benefits outweigh the costs, there is a positive net benefit and the intervention is therefore worth an investment. Therefore, in this study, if the costs of the treatment program i.e. the costs of ReINVEST that would yield a 30% - 50% reduction in violent crime among program participants were less than AUD210 million,

then there would be a positive net benefit. This net benefit would then be compared to that of other interventions for violence to determine which interventions should be prioritised. Currently, data is not available on the actual expenditure on various treatments for violent offenders in NSW. It is therefore important that interventions are costed. ReINVEST is an on-going double-blinded RCT and the costing of the trial is on-going. The costs being collected include the program implementation and ongoing costs, and cost savings from a reduction in crime rates (health costs, victim costs and costs to the criminal justice system).

The CV method is popular because of its ability to measure both tangible and intangible benefits as well as spill-over effects such as society's feeling of safety due to reduced crime rates. However, the method has been previously criticised especially for its hypothetical bias [33] and the validity of its results as a result of survey methods used [34]. It is however argued that with better study design and implementation [35] such biases can be minimised as was attempted in this study. In this study's design respondents were provided with background information and statistics to make an informed decision. Care was undertaken to minimise starting point and position biases using randomisation of respondents to questionnaire variations with different positioning of the payment cards. In the analysis, the dummy variable representing the questionnaire to which respondents were randomly allocated was not significant in the linear regression and therefore showing no position bias. The study also used and followed the National Oceanic and Atmospheric Administration guidelines for the design of CV studies that have been suggested by those using the approach in environmental science [36]. This study also utilised a large sample (n=1021) with 100% completion rate per participant and therefore provides a good opportunity to make conclusions about how the NSW tax payer population values treatment programs for impulsive violent offenders by assessing their WTP for them.

This study had some limitations. Firstly, the study design missed the opportunity of a scope test. Additional questions on whether respondents would be willing to pay more or less for the program if some of the characteristics were changed would be used as

internal validity to check if respondents were considering the size effect of characteristics as they state a WTP value. Secondly, the study sample's household incomes and education levels could not be compared to that of taxpayers in NSW because this data is not available or not collected by the Australian taxation office. Thirdly, the  $R^2$  for the regression models were very low. This suggests that even after inclusion of all the speculated explaining variables in our analysis, there are more variables that explain WTP for treatment programs than those that were tested in this study. There being very little in the literature on factors affecting WTP for offender treatment, we are pleased to have made a contribution to fill this gap and recommend that more variables are explored in further research. Finally, given that the payment vehicle was a voluntary contribution, participants' stated WTP could have been lower than the value they place on the treatment program, although this was not verified. This is because when voluntary payment vehicles are used, participants could act as free riders hoping that other taxpayers will make higher contributions.

In conclusion society values treatment programs for impulsive-violent offenders such as REINVEST. Policy makers should prioritise well designed and evaluated programs that are likely to realise lower recidivism rates as opposed to placing a focus on non-effective punitive measures.

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### Appendix 1: Ordered logistic regression for positive WTP values

Variables entered in the model	Final model coefficient ( $\beta$ )	95% Confidence interval	p-value
<b>Gender (Female)</b>	-0.372	-0.673 - -0.071	0.015*
<b>Education</b>	0.044	-0.049 - 0.138	0.353
<b>Income (&lt; \$25K)</b>			
<b>\$25K - \$50K</b>	0.580	-0.508 - 1.668	0.296
<b>\$51K - \$100K</b>	0.395	-0.664 - 1.455	0.465
<b>\$101K - \$150K</b>	0.678	-0.401 - 1.757	0.218
<b>&gt; \$150K</b>	0.730	-0.373 - 1.834	0.195
<b>Prefer not to say</b>	0.210	-0.913 - 1.334	0.714
<b>Offenders (No)</b>	0.933	-0.053 - 1.918	0.064
<b>Family members of offenders (No)</b>	0.068	-0.651 - 0.787	0.853
<b>Victims (No)</b>	-0.999	-1.646 - -0.352	0.002*
<b>Family members of victims (No)</b>	-0.803	-1.441 - -0.166	0.014*
<b>No Experience with Violence (No)</b>	-1.400	-2.101 - -0.670	0.000*
<b>Been in contact with the justice system (No)</b>	0.042	-0.451 - 0.535	0.868
<b>Region – Metro/Rural (Metro)</b>	0.284	-0.030 - 0.600	0.077
<b>Household size</b>	0.115	-0.003 - 0.232	0.055
<b>Health state</b>	-0.144	-0.314 - 0.025	0.095
<b>Age</b>	0.138	0.038 - 0.238	0.007*
<b>Objection to treatment of offenders (No)</b>	-0.195	-0.789 - 0.341	0.006*
<b>Objection to use of Medications (No)</b>	-0.565	-0.975 - -0.155	0.007*
<b>Difficulty assigning a monetary value (No)</b>	-0.224	-0.334 - -0.055	0.437
<b>Randomisation block (1)</b>			
<b>2</b>	0.131	-0.269 - 0.530	0.522
<b>3</b>	0.206	-0.203 - 0.615	0.324
<b>4</b>	0.369	-0.029 - 0.768	0.070

\* Significant at the 95% level of confidence.



## **Chapter 7: Conclusion**

### **7.1. Study research gap and objectives**

The doctoral studies detailed in this thesis contribute to filling an important research gap in the field: that of whether interventions to reduce the burden of crime, with a focus on violence, represent value for money. The following sections summarise and synthesise the research performed during this PhD in terms of the research objectives, key results, contribution to the body of research, policy considerations and recommendations for future work.

As highlighted in the background literature presented in Chapter 1 of this thesis, the societal burden of offending is significant. In Australia, the high offender population combined with high recidivism rates (54.2% of offenders return to corrective services within two years of release from prison) have contributed to the high justice costs (AUD 17.2 billion a year) and placed a huge burden on the national budget (7.3% of total government expenditure) [1]. Offenders who have committed violent offences, the majority of who are men, form a significant proportion of the offender population - over half of all remanded and sentenced offenders in New South Wales in 2017 were convicted for violent offences [2]. A significant reduction in the number of violent offenders, most of whom are impulsive rather than pre-meditated, would significantly reduce the societal burden. As such, this PhD's focus was on impulsive violent offending.

Globally, a number of interventions that seek to reduce this societal burden have been developed with some being implemented by correctional bodies. However, evidence as to whether these interventions represent good value for money is lacking. The first objective of this PhD was to review the existing literature on economic evaluations of behavioural interventions for offenders and assess their scope and quality and draw conclusions on the cost effectiveness of the identified studies. As such, a systematic international review was conducted to assess the scope and quality of full economic evaluations of either adult or juvenile offender behavioral interventions published between the years 2003 – 2016. These years were chosen because the last systematic

review which was summarized in section 1.4.2 was conducted in 2003, covering studies from the 1970s until 2002 [3].

The results of the systematic review (Chapter 2) [4] found only 17 published articles on economic evaluations of offender behavioral interventions, 3 of which were conducted in Australia. Three studies addressed violence, none of which were targeting impulsive violence. One of the evaluated programs for violence was specialized mental health treatment and the other two used multi-systemic therapy.

In assessing the quality of these studies, only two complied with all of Drummond's 10 categories of quality assessment of economic evaluation studies. Wide variation was found in methodological approaches, including differences in perspective, study design, the scope of cost data and outcome measures. This made it impossible to compare results between the studies or make conclusions about the relative cost effectiveness of interventions.

These results highlight the dearth of evidence on economic evaluation of programs in the justice space. Of the 17 studies, 12 were deemed cost-effective or had a net benefit when compared with an alternative. This provided some evidence to suggest that treatment programs for offenders represent value for money yet still more evidence is needed. Because of constrained health and justice budgets, there is a need for informed decision making regarding the allocation of resources that not only prevent crime and reduce recidivism but also represent the greatest value for money to society. Cost benefit analysis (CBA), a type of economic evaluation whereby both costs and benefits are expressed in monetary units, provides policy makers the opportunity to make comparisons between two or more interventions by choosing interventions that provide a greater net benefit.

In the systemic review, only 4 CBA studies were found. Furthermore, these were the only studies conducted from a societal perspective which included all direct, indirect and intangible benefits not only to the offenders but to society as well. As discussed in Chapter 2, one of the reasons for the lack of CBA studies is the difficulty involved in valuing or placing a dollar value on the benefits of programs, which in the justice space

include intangible benefits such as the society's feeling of safety. Stated preference methods can be used to value the benefits of such programs in monetary terms. However, none of the cost benefit analysis studies used preference studies to value the benefits of programs.

Objectives two and three of this PhD therefore focused on the use of stated preference methods to value benefits provided by interventions to treat violent offender. Importantly, using information about the acceptability and preferences of society for treatment programs for offenders is critical in garnering support from the public to fund interventions and programs. The REINVEST study, described in section 1.4.2 of this thesis, was used as an example of an intervention for impulsive violent offenders. At the time of conducting this study, this was the only program in NSW that provided an intervention targeting impulsive violent offenders. The study provided an opportunity to investigate societal preferences in real time alongside this trial.

The second objective of this PhD research was to elicit societal and offenders' preferences for the treatment of impulsive violent offenders and assess trade-offs between characteristics of treatment programs. This study was conducted in two phases. The first phase included an extensive consultation through focus group discussions, a one-on-one in-depth interview, priority setting methods of voting and ranking, and a Delphi method with taxpayers, offenders, family member and professionals to establish the relevant characteristics. Such a detailed approach is highly essential to ensure that the results are relevant to all communities (taxpayers, policy makers, offenders and their families). The important attributes of treatment programs for impulsive violent offenders obtained through this process were then utilised in the second phase of the study; a quantitative discrete choice experiment (DCE) survey conducted among taxpayers in NSW.

Finally, the third objective was to elicit societal and offenders' value, in terms of WTP, for the treatment of impulsive violent offenders. This third objective had two specific aims. Firstly, to estimate the societal and offenders' average WTP for a described

treatment for impulsive violent offenders. The second was to identify the factors associated with society's WTP for the treatment program. The method used was the contingent valuation (CV) method.

## **7.2. Main results from the DCE and CV studies**

The qualitative work in phase 1 of the DCE study, determining important attributes and levels (Chapter 4) [5], found that offenders and the general public consider similar characteristics of offender treatment programs (attributes) as important. Specifically these were: treatment effectiveness, location and continuity of treatment, treatment type, treatment provider, voluntary participation, flexibility of appointments, treatment of comorbidities and cost. However, their preferences differed in the range of defined dimensions of the program characteristics i.e. attribute levels. For example, while offenders preferred voluntary programs, the general public preferred them to be compulsory. Differences were also found in the type of treatment (e.g. unlike offenders on the REINVEST study, some members of the general public didn't like the idea of treatment using medication) and treatment providers preferred (e.g. unlike the general public, offenders and the family member did not like programs provided by probation and parole officers). Such differences can further be tested in the quantitative DCE especially when separate DCE studies are done with the various groups. The DCE in this study was done with members of the general public and represents their preferences and value.

In the DCE survey (chapter 5), the high-level of acceptability of treatment programs was evidenced by the low percentage of participants (between 1.3% and 3.5%) who chose the 'no treatment' choice for any presented choice set. The results of the choice analysis (chapter 5) showed that society values treatment programs for impulsive violent offenders, especially if they are effective, provide continuity of care when offenders are incarcerated or released from custody, provide full treatment of all co-occurring health conditions/addictions, provide flexible appointments, are provided by

health workers together with prison or probation and parole officers and have compulsory participation.

Similarly, wide support for treatment was evidenced by the CV results (Chapter 6) with 86% of participants being in favour of the provision of treatment to violent offenders and 77% having no objection to the use of medication as treatment. Almost two thirds (67%) indicated they would be willing to pay for the treatment for impulsive violent offenders as described based on the REINVEST study. However, there were WTP differences between groups. While the annual overall average societal WTP was \$70.39 per taxpayer, the average WTP for offenders was \$142.30, \$81.89 for victims, \$110.96 for family members of offenders, \$89.23 for family members of victims and \$60.84 for participants with no experiences of violence. This suggests that people who had experience with violence, especially offenders and family members of offenders, had a higher WTP or expressed a higher value for programs such as REINVEST.

Overall, this dissertation has clearly demonstrated that members of society place a positive value on treatment programs for impulsive violent offenders such as REINVEST. This has been demonstrated by the discussions in the qualitative studies, the high engagement in the surveys, the high percentage of participants who chose treatment options rather than 'no treatment' in the DCE choices, the support for various attributes of treatment programs and the percentage of study participants who were willing to pay additional taxes over and above what they currently pay to have these programs available to offenders.

The DCE and CV methods used in this study are both stated preference methods that can be used to measure the economic value of non-market goods. While the CV method estimates the WTP of the intervention described as a whole, the DCE method estimates the marginal WTP of each described attribute.

In this study the intervention being valued in the CV study specifically reflected the REINVEST trial and was described to participants as follows:

The program is **20% - 35% effective** in reducing impulsivity resulting in a 30%-50% reduction in crime rates committed by participants. The program is **voluntary** and is provided by **nurses and psychologists** in the **community** to men with a history of at least two violent offences referred by local court magistrates or probation and parole officers. The program provides **flexibility** for the men to make monthly appointments at their convenience, where they receive their **medications** and are routinely monitored. Participants are provided with a **full medical examination at enrolment and are referred to health services for treatment.**

Using the CV method, the societal value for the treatment of impulsive violent offenders using an SSRI (an antidepressant) in terms of mean WTP was \$70 (median \$50) per taxpayer per year.

Using the significant results in the DCE method (chapter 5.3.3) and the description used in the CV method, the REINVEST program's societal annual mean WTP per taxpayer calculated using marginal WTP for each attribute would increase as follows when all other attributes are constant:

- By \$2.40 for each percentage increase in effectiveness.
- By \$37.00 if the program was made compulsory.
- By \$27.00 if the program was provided with continuity of care. This might be either post prison for those who initially received treatment in prison or within the prison setting if the offender was incarcerated after enrolling into a program in the community.

### **7.3. Contribution of this study to the body of research**

The systematic review, (Chapter 2) of this thesis [4], highlighted the dearth of evidence on economic evaluation of programs in the justice space. It also showed that many of the economic evaluations did not follow the guidelines used in conducting quality studies. The fact that economic evaluations in the justice sector lag behind research in

other areas of public policy such as environmental and health economics has been highlighted in previous research [6]. Some of the possible reasons for the lack of economic evaluation studies discussed in Chapter 2 include the lack of skilled health economists to conduct such evaluations and the difficulty involved in placing a dollar value on the benefits of programs in the criminal justice space which include spill over effects like safe communities. As a result, the study protocol used in the studies in this PhD research was published (Chapter 3). The publication [7] sets out a rigorous methodological approach that can be used to assess societal preferences and generalised for use in other DCE and CV studies for offender treatment programs.

While the literature on DCE studies is growing, studies using this methodology have been criticised for failing to undertake rigorous preliminary research to inform the selection the necessary attributes and levels [8]. The published work in Chapter 4 [5] contributes to filling this research gap by explicitly describing the rigorous mixed-methods used in the development of the DCE attributes and attribute levels. In addition, the study highlights how different stakeholders can be engaged in a preference studies that might have policy implications.

To the best of our knowledge, this is the first study to elicit societal preferences for treatment programs for impulsive violent offenders using both a DCE and a CV. The DCE study demonstrated the strength of attributes for treatment programs for impulsive violent offenders and societal willingness to pay for them. These results can be used to demonstrate societal support when policy makers are involved in designing such treatment programs. Additionally, these results could be used to inform a CBA of, for example, compulsory compared to voluntary programs for impulsive violent offenders.

The CV study presented here represents the first study to quantify the benefits, expressed as WTP, that society places on treatment programs for impulsive violent offenders. Although this is only one of the steps involved in a CBA, it is often the more challenging part. If for example REINVEST was compared with another program that aims to reduce recidivism among impulsive violent offenders, both programs would



need to be costed. The societal benefit of the program would then be assessed from the taxpayer perspective in a similar process used in the CV study in this thesis. The cost of each program would be compared to the benefit to assess the cost benefit ratio. The program with the smallest ratio would provide a greater value for money.

#### **7.4. Limitations to the studies**

There are important limitations to this thesis which are worth noting. The systematic review in Chapter 2 focused only on the peer-reviewed published literature thus excluding economic evaluations undertaken in-house or published in the grey literature. However, the review followed the PRISMA guidelines for systematic reviews and the Drummond guidelines for economic evaluations.

The Australian National Health and Medical Research Council encourages the engagement of all stakeholders in decision making. This study strongly suggests that both offenders' and society's preferences can and should be taken into consideration when making decisions. In the qualitative phase (chapter 4), offenders and the general public were engaged in FGDs to identify and prioritise the characteristics of treatment programs that they considered important. However, the DCE and CV surveys in this thesis (chapter 5 and 6) only sampled from the general population. It would be necessary to conduct similar studies with offenders as the sampling frame to make better comparisons of group preferences. However, as one might expect, the amount of time it takes to obtain all the required ethics clearance to conduct surveys with offenders is substantial and a second DCE of offenders would not be possible within the 3.5 years of this PhD program. It took 13 months to obtain ethics for the qualitative phase of these studies (Chapter 4), which involved offenders and 3 additional months for approval for the quantitative survey phase. The DCE with offenders is still planned to be conducted.

However, participants were asked to self-identify as offenders, victims, family members of offenders and victims, or those with no experiences of violence. Sub-analysis was performed for these groups. In total, 3% of the sample self-identified as

having been convicted of perpetrating violence i.e. violent offenders. While this is representative of violent offenders in society and provides good estimates of the value they placed on the treatment program in the CV study, the DCE experimental design was only conducted for the general public., Given the DCE survey was not designed for multiple groups, a technical limitation meant that there was an unequal distribution of offenders in the survey blocks (the design being spread over 4 blocks). Therefore the results of the DCE sub group analysis (appendix 3 of chapter 5) should be interpreted with caution. However, these results will be used as pilot results for a future offender DCE.

The DCE and CV studies were sampled from the NSW taxpayer population. While it is important for WTP studies to reflect the income of the target population, the household incomes and education level of taxpayers in NSW was unavailable. I therefore cannot ascertain if the sample used in these studies had similar incomes to that of general taxpayers. However, the study sample was similar to the NSW taxpayer population in terms of age, gender and geographical location.

The CV study did not include a scope test i.e. assessing changes in WTP with changes in program characteristics. While additional CV questions would make the overall survey questionnaire (which included both the CV and DCE) much longer than the time recommended by the survey company that collected the data, additional questions asking if respondents would be willing to pay more or less for the program if some of the characteristics were changed would have been helpful. For example, presenting the same WTP question for the described REINVEST study with the program made compulsory would allow for the assessment of added value when programs are not voluntary. This would also allow for a direct comparison between the CV and DCE estimates for value for compulsory versus voluntary programs. It is also important to note though that it would not have been possible in one survey to scope test all the different characteristics of the REINVEST study. Choosing which ones to scope test without prior knowledge of which attributes in the DCE would be significant is difficult. However a scope test on any of the attributes is important in itself to test in the CV

study if respondents are considering the size effect of characteristics as they state a WTP value. The problem of the scope test is however overcome in the DCE method which assessed the changes in WTP as attribute levels changed.

### **7.5. Policy recommendations**

Many studies have demonstrated the effectiveness of treatment programs for offenders as reflected in recent reviews of 'what works' in offender treatment [9-11]. It is however striking that in the global review of published literature in Chapter 2 [4] of this thesis that covered a 13-year period from 2003 to 2016, only 17 studies were found that conducted a full economic evaluation of treatment programs. To ensure efficient use of resources, policy makers in the corrective services environment need the information provided by economic evaluations of offender treatment programs. This research quantifies the value of benefits of treatment programs for impulsive violent offenders and when combined with the costs of implementing programs would inform full economic evaluations. As recommendation, all approved offender programs and any trials being conducted should have economic evaluations performed to aid the decision making process. Providing national guidelines on the methods of conducting economic evaluations will ensure that such studies are uniformly conducted and therefore enable the relative comparison of studies in terms of costs, benefits and value for money.

One of the key methodological advantages of stated preference methods (used in the studies in this thesis) over traditional methods such as snap opinion polls is the detailed information provided to participants thus enabling them to provide a more considered response. In the DCE participants are presented with treatment scenarios consisting of combinations of attributes and levels. Participants are asked to carefully consider the scenarios before making choice. In the CV study, participants are presented with a thoroughly described treatment intervention again giving them the chance to think through the treatment before making a decision about WTP. Background survey information on current offending rates, and the links between poor

health and offending, assists with this process. A strong recommendation is for methods such as the DCE and CV to be used when seeking public opinion rather than snap poll results that do not allow the public to look beyond punitiveness.

Based on the evidence generated from this PhD, the societal values that should be included in the design of programs for interventions targeting impulsive behaviour are: programs should be effective in reducing impulsivity and reducing crime rates, should be provided in prison with follow-up post prison and not prison or community without follow-up, should provide full treatment of all co-occurring health conditions/addictions either in the program or at referral health centres, provide flexible appointments, are provided by health workers together with prison or probation and parole officers, and have compulsory participation. Programs designed with these characteristics are likely to encourage the public support for treatment programs for violent offenders.

Furthermore, based on the evidence from this body of work, society values treatment programs for violent offenders, including programs like REINVEST which use pharmacotherapy-based treatments. This has been demonstrated by society's and offenders' willingness to pay for such programs in incremental tax over and above what they already pay.

## **7.6. Recommendations for future work**

The DCE and CV studies in this PhD assessed the benefits of treatment programs for impulsive violent offenders. These results can be used in CBA to assess the net benefit of providing these programs. To do so, the first step would be to cost treatment programs such as REINVEST. A costing study for REINVEST is currently underway and the incremental social costs of providing the treatment will be obtained from the difference between costs of participants on the active drug treatment and those on placebo. This will be conducted after the unblinding of the REINVEST study (a double-blinded RCT) in the next 24 months. The incremental costs will then be compared with the incremental benefits i.e. additional annual tax (expressed by the WTP values

obtained in the DCE) to obtain the net benefit. A positive value will indicate that the intervention, in this case REINVEST, is worth an investment.

Furthermore, the net benefit can be compared to that of other interventions for violence to determine which interventions should be prioritised. However, based on the results of the systematic review in chapter 2, this will only be possible if there is an increase in the number of studies in the criminal justice area that conduct economic evaluation analyses.

In future, a DCE and CV with offenders will also be carried out to compare intervention preferences and values of the general public (as reporting in this PhD) with those of offenders. Programs where the main aim is to increase societal support for treatment programs can use societal values in their cost benefit analyses, while those whose main aim is to increase offender uptake of treatment programs can use offender values in their analyses.

## **7.7. General conclusion**

Overall, this PhD examined the societal value of treatment programs for impulsive violent offenders. Characteristics of treatment programs for offenders that are considered by offenders and the general public when choosing a treatment program to support or participate in were identified. The characteristics were found to be similar but differences between offender and general public preferences were found in the ranges over which the characteristics lie. A DCE and CV general public survey was then conducted to quantify these preferences, assess the trade-offs made when making choice, and estimate the value society places on treatment programs for impulsive violent offenders. In conclusion, society values treatment programs for offenders and this was demonstrated by the willingness to pay not only for the preferred characteristics but for the provision of such programs to impulsive violent offenders. These are important findings that can be used in the advocacy and design of treatment programs for violent offenders. Further, given the limited evidence available from

economic evaluation of offender programs, the results in this study provide important quantification of the societal benefits and value for such programs to inform future cost benefit analyses.

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