

Youth justice conferencing and indigenous over-representation in the Queensland juvenile justice system: a micro-simulation case study

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Abstract Restorative justice conferencing for young offenders is firmly established in Australian juvenile justice, and legislated conferencing schemes are operating in all Australian states and territories. While there is some variation in the terms used to describe restorative justice conferences (e.g., family group conferencing, family conferencing, or youth justice conferencing), there is much more consistency in how the conferencing process is managed across Australian jurisdictions. In Queensland youth justice conferencing is a process that brings together an offender, the victim and their supporters to discuss the harm caused by the offending behaviour and provide the young person with an opportunity to take responsibility for his or her behaviour and make amends. This paper begins by briefly sketching the development of restorative justice conferencing in Queensland and describes the Juvenile Justice Simulation Model (JJSIM), a micro-simulation model developed for criminal justice policy analysis in Queensland, Australia. We use this micro-simulation model to conduct an experimental exploration of the effects that youth justice conferencing has on system-wide outcomes for indigenous young people. The model simulates the impact of interventions up until 2011 on the number of finalised youth justice court appearances. Our results indicate that youth justice conferencing is unlikely to reduce the over-representation of indigenous young people in the juvenile justice system. The simulations demonstrated that, by the 2011, youth justice conferencing would result in a 12.5% decrease in finalised court appearances. Unfortunately, this decrease was more apparent for non-indigenous young people (13.7% decrease in court appearances) than for indigenous young people, who had a 10.5% decrease in court appearances. This differential impact of conferencing is due to the different court appearance profiles between indigenous and non-indigenous young offenders, with indigenous young people initiating offending at an earlier age and offending more frequently than non-indigenous young offenders.

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Introduction

In December 2000, six Queensland government departments were signatories to the *Queensland Aboriginal and Torres Strait Islander Justice Agreement* (Queensland Government 2001). This agreement was developed in a partnership between the Queensland Government and the Aboriginal and Torres Strait Islander Advisory Board (ATSIAB), which represented the indigenous communities of Queensland. The Justice Agreement was a strategic document that aimed to address the over-representation of indigenous people in the Queensland criminal justice system. The stated long-term aim of this agreement was to reduce the rate of Aboriginal and Torres Strait Islander people coming into contact with the Queensland criminal justice system to at least the same as other Queenslanders. The stated outcome of the Justice Agreement was that, *by the year 2011, there will be a 50% reduction in the rate of Indigenous people incarcerated in Queensland.*

While the Justice Agreement is not a legally binding document, it is a formal public commitment to addressing the over-representation of indigenous people in the criminal justice system. Outlined in the document is a set of guiding principles and broad strategic directions to achieve the outcome of the Agreement. The Action Plan developed in conjunction with this document identifies the availability and use of appropriate alternatives to court as one of the key supporting outcomes for the Justice Agreement. The use of youth justice conferences is identified as a strategy for targeting juvenile offenders (Queensland Government 2001). In 2003 a progress report on the Justice Agreement identified the state-wide expansion of youth justice conferencing as an initiative contributing to the reduction of incarcerated indigenous people by 2011 (Justice Negotiation Group 2003).

Micro-simulation modelling is a policy analysis tool that enables experimentation with the criminal justice system to investigate the long-term impact of different policy options. In 2004 we developed the Queensland Juvenile Justice Simulation Model (JJSM), a micro-simulation model that simulates the progress of individual young offenders through their juvenile offending careers (Stewart et al. 2004). This model allows examination of the differential impact of different interventions on indigenous and non-indigenous young offenders over time. In this paper we use the model to examine the impact of youth justice conferencing on the over-representation of indigenous young people in the juvenile justice system. The specific policy question we ask is: Can youth justice conferencing reduce the over-representation of indigenous young people in the Queensland juvenile justice system by the year 2011?

We have organised this paper in the following way. First, we provide the necessary background to this policy question by examining the over-representation of indigenous people and, specifically, indigenous young people in the Queensland criminal justice system. We then summarise the development of youth justice conferencing in Queensland before moving to an overview of modelling in the criminal justice system. We then provide an overview of the development of the

JJSM and present a baseline simulation. Two youth justice conferencing scenarios will be examined. The first examines the introduction of youth justice conferencing applied equally to indigenous and non-indigenous young offenders. This replicates the current policy on youth justice conferencing. The second scenario examines the introduction of youth justice conferencing specifically targeting young indigenous offenders. Finally, we examine the implications of our findings for the Justice Agreement and for the use of simulation modelling as a policy analysis tool.

Over-representation of indigenous people in the Queensland justice system

Two distinct groups of people are indigenous to Australia, the Aborigines and the Torres Strait Islanders. Indigenous people are a minority group in Australia, with only 2.2% of the population identifying as indigenous (Australian Bureau of Statistics 2002). After two centuries of European domination, indigenous people are the most disadvantaged minority group in Australia. This is particularly evident in their over-representation in the criminal justice system. In 2006–2007 the national imprisonment rate per 100,000 indigenous adults was 2,142.2, compared with a rate of 122.4 for non-indigenous offenders (Report on Government Services 2008).

In Queensland, the proportion of indigenous people in the population is slightly higher than the national average. In the 2001 census, 3.1% of Queenslanders identified as indigenous (Australian Bureau of Statistics 2002). However, in 2004, 25% of the Queensland adult prison population identified as indigenous. Furthermore, the rate of imprisonment of indigenous people was 11-times greater than the rate of non-indigenous people, with 1,572.2 per 100,000 indigenous people imprisoned compared with 138.3 per 100,000 non-indigenous people imprisoned (Office of Economic and Statistical Research 2004).

There are substantial differences in the age profiles between indigenous and non-indigenous Queenslanders, mainly due to high fertility rates and low life expectancies (Australian Bureau of Statistics 2005). Indigenous Queenslanders are younger (median age=19 years) than non-indigenous Queenslanders (median age=36 years) (Office of Economic and Statistical Research 2003). Currently, 4.4% of 10–16 year olds (the age of criminal responsibility within the Queensland juvenile justice system) in Queensland identify as indigenous (Australian Bureau of Statistics 2001). However, in 2003/2004, 31% of young people appearing in the Queensland Children's Court were indigenous and 61% of young people in Queensland detention centres were indigenous (Department of Communities 2004). The imprisonment rate for these indigenous young people was nine-times that for non-indigenous young people. The imprisonment rate was 296 per 100,000 for indigenous young people, compared to 32 per 100,000 for non-indigenous young people (Office of Economic and Statistical Research 2004).

There are differences in trying to reduce over-representation of indigenous people in imprisonment rather than reducing the actual rate of imprisonment. Between 1994 and 2003 the rate of detention of indigenous young people in Australia declined from 413.9 to 320.9 per 100,000. However, over this period, the ratio of over-representation remained relatively stable, with indigenous young people being

almost 20-times more likely than their non-indigenous counterparts to be in detention (Charlton and McCall 2004).

Initiatives within the juvenile justice system are likely to be one of the most effective strategies for reducing the over-representation of indigenous people in the criminal justice system. Lynch et al. (2003) investigated the progression from the juvenile justice system to the adult criminal justice system in Queensland and found that 79% of young people on supervised orders progressed to the adult system and 49% had a term of imprisonment. Similar findings have been found in the international literature (see, for example, Farrington 2003; Moffitt et al. 2001; Piquero and Buka 2002; Tillman 1987; Tracy et al. 1990; Wolfgang 1974).

However, when such findings were examined for indigenous young men, in Queensland 89% of young people who had received a supervised order had progressed to the adult system, and 71% of these had served at least one term of imprisonment (Lynch et al. 2003). Similar findings were reported in New South Wales, with over 90% of all indigenous young people who appeared in the Children's Court having at least one adult court appearance and 36.1% receiving at least one custodial sentence (Chan 2005). Conversely, 52.6% of non-indigenous young offenders had an adult court appearance and less than 10% received a custodial sentence.

In 2003 the Justice Negotiation Group identified the state-wide expansion of youth justice conferencing as a key initiative to progress the implementation of the Queensland Aboriginal and Torres Strait Islander Justice Agreement. Youth justice conferencing was credited with preventing young offenders becoming entrenched in the criminal justice system and leading to a reduction in incarceration rates of indigenous people (Justice Negotiation Group 2003). In the following section we summarise the development of youth justice conferencing in Queensland.

Restorative justice and youth justice conferencing

Australia and New Zealand are at the international forefront in the development and implementation of restorative justice conferencing for young offenders and their victims. Restorative justice is "...a process whereby parties with a stake in a specific offence collectively resolve how to deal with the aftermath of the offence and its implications for the future" (Marshall 1999: 5). The key aim of restorative justice processes is to meet the needs of victims (Bennett 2007). The conventional adversarial justice process affords victims a very minor role, and they often have little or no input into the adjudication of offenders. Restorative justice processes encourage the active participation of victims such that they are given the opportunity to meet offenders, to describe the emotional, physical and financial impact of crime, and to negotiate ways for young people to repair harms they have caused. Additional aims of restorative justice include involving participants (victims, offenders and their supporters) holding offenders accountable, reparation and restoration (Hayes 2005; Maxwell and Hayes 2006).

The development of restorative justice initiatives in Australia began in the early 1990s, following the introduction of family group conferencing in New Zealand through the passage of the *Children, Youth Persons and their Families Act* in 1989.

Since then, restorative justice developments in Australia have progressed with impressive momentum. Today, restorative justice processes are legislated in all Australian States and Territories and are now considered a standard feature of Australian juvenile justice (Maxwell and Hayes 2006).

There is a large degree of variation in the forms that restorative justice takes around the globe. For instance, Braithwaite (2002) noted that those processes considered to fall under the restorative justice 'banner' include transformative justice, peacemaking, transformation justice, mediation and conferencing. Conferencing is the principal form of restorative justice in Australia. Known as youth justice conferencing in Queensland, this process brings young offenders together with their victims and supporters in a constructive dialogue about the offending behaviour and what young offenders can do to make amends. Youth justice conferences are conducted by trained facilitators (known as 'conference convenors'), and they proceed in three phases: introduction, story telling and agreement negotiation. Conference convenors open a conference by introducing participants and laying down some ground rules to ensure all participants understand their roles and what they are expected to do. Next, offenders are asked to describe events leading up to their offending behaviour, followed by victims' descriptions of how the offending has affected them. Conferences conclude when participants (offenders, victims, and offender and victim support people, such as the parents of young offenders and young victims, and partners or other family members of adult victims) negotiate ways for young offenders to repair harms they have caused (known as an agreement). Common agreements include verbal and written apologies, monetary restitution and performing some reparative work for the victim or community.

In Queensland, young offenders may be referred to a youth justice conference by police, where the young person has admitted to the offence, or by the youth court, where there has been a finding of guilt. If the young offender has been referred from the youth court, the conference may be convened in lieu of sentencing ('indefinite court referral') or as a condition of sentencing ('conference before sentence'). Conferencing was introduced as a trial in Queensland in April 1997, following amendments to the *Juvenile Justice Act 1992*, which were enacted in 1996. Youth justice conferences were convened in two Brisbane metropolitan centres (Ipswich and Logan), as well as in the remote Aboriginal community on Palm Island, off the central eastern coast of Townsville. Following further amendments in 2002, youth justice conferencing services were expanded state-wide. Referrals from the police and courts climbed from an average 250 per annum during the trial period to approximately 2,500 by 30 July 2007 (Maxwell and Hayes 2006; Julie Reidy, Queensland Department of Communities, personal communication). Currently, police referrals make up just over half (approximately 52%) of all referrals to youth justice conferences.

Youth justice conferencing programmes in Queensland and other Australian states and territories have been subjected to a large degree of empirical research. Results from evaluation studies in New South Wales, Western Australia, Northern Territory, Victoria and Queensland are consistent and show that participants (offenders, victims and support people) generally are satisfied with conference outcomes and feel they have been treated fairly and respectfully (Trimboli 2000; Cant and Downie 1998; Fry 1997; Wilczynski et al. 2004; Hayes and Prenzler 1998; Palk et al. 1998).

Results from other major research projects comparing the impact of conferencing and court on future offending suggest that young people who participate in a conference are less likely to reoffend than those who attend the youth court. For instance, Sherman et al. (2000) found that young violent offenders in the Canberra Reintegrative Shaming Experiments, who were randomly assigned to a police-run conference, had a lower post-assignment reoffending rate than young violent offenders assigned to court. In New South Wales, Luke and Lind (2002) conducted a retrospective analysis of several thousand official offending records and found that young offenders who had attended a youth justice conference had an estimated rate of re-arrest that was 15–20% lower than that for offenders who attended the youth court.

Research conducted in the USA and Canada that compared restorative justice conferencing with other interventions (e.g., court or court diversion) has yielded mixed results. For example, in the USA, young violent offenders in the Bethlehem, Pennsylvania Restorative Policing Experiment who attended police-run conferences were significantly less likely to reoffend after 12 months than were similar offenders who had attended court (McCold and Wachtel 1998). However, the researchers noted that this outcome stemmed more from the nature of the offenders referred to a restorative justice conference than the effects of the conference itself on future offending. They note: “It appears that any reductions in recidivism are the result of the voluntary programme diverting from formal processing those juveniles who are least likely to reoffend in the first place” (McCold and Wachtel 1998: 107).

Results from other US research comparing the reoffending rates for very young offenders (14 years or younger) randomly assigned to a restorative justice conference with similar offenders assigned to other court diversion programmes are similar. While there were significantly fewer re-arrests among offenders assigned to conferences than those assigned to other diversions after 6 months of follow-up, these differences diminished and were no longer statistically significant after 12 months’ follow-up (McGarrell et al. 2000).

Research results from Canada also are mixed. Bonta and colleagues (1998) followed two matched groups of offenders referred to restorative justice or receiving a traditional justice sanction. After 2 years they found that male offenders referred to restorative justice had a statistically significantly lower rate of reoffending than male offenders either incarcerated or on probation. Also, results from a small meta-analysis conducted by those researchers showed that, on average, restorative justice interventions yielded reductions in reoffending. Comparing 20 effect sizes across 14 restorative justice and reoffending studies, they found that restorative justice programmes resulted in an average reduction in reoffending of 8%. However, effect sizes varied widely. Some of the restorative justice programmes examined resulted in reductions in reoffending by as much as 29%, while other programmes yielded increases in reoffending of up to 45% (Bonta et al. 1998). Results from a more recent meta-analysis of Canadian programmes were similar. Analysing 32 effect sizes across 22 studies, Latimer and colleagues (2001) found that restorative justice programmes yielded an average 7% reduction in reoffending compared with other types of traditional interventions. However, effect sizes ranged considerably, from reductions in reoffending as high as 38% to increases in reoffending as high as 23%.

Thus, results from these Canadian studies cloud the picture regarding the crime reduction potential of restorative justice quite considerably.

Moving across to the UK, one finds that research examining the reoffending rates of offenders referred to one of seven restorative justice schemes suggests that restorative justice may effect some change in reoffending. A significantly smaller proportion of offenders referred to one of the restorative justice schemes assessed were reconvicted after a 2-year follow-up period than were offenders in a control group. However, no significant differences were observed for offenders referred to restorative justice in the other six schemes (Miers et al. 2001).

Other research in Australia has examined the variable effects of conferencing on future offending (Hayes 2007). Hayes and Daly (2003) drew on observational data from 89 conferences convened in South Australia in 1998, as well as the official offending histories for the primary offenders in these conferences gathered 8–12 months later, to learn what observed features of youth justice conferences were associated with reductions in future offending. They found that, beyond those offender characteristics known to be associated with future offending (gender, race, and prior offending), when young offenders were observed to be remorseful and when decision-making about conference outcomes was observed to be consensual, reoffending was less likely. Those results are remarkably similar to findings from Maxwell's and Morris's earlier study, which showed that reoffending was less likely among offenders whose conferences were memorable, who were not stigmatically shamed, who were remorseful, and whose conference outcomes were arrived at by genuine consensus (Maxwell and Morris 2001).

However, in another variation study in Queensland drawing on post-conference survey data and official offending histories from 200 young offenders attending a conference during 1997 and 1998, Hayes and Daly (2004) found that there were no conference features associated with reoffending. However, age, prior offending history, and gender remained highly predictive of future offending. This was due largely to very little or no variation in how offenders rated their conference experiences, with nearly all young offenders (98–100%) rating their conference very highly on measures of procedural fairness and restorative justice.

Youth justice conferencing in Australia has been, and continues to be, subjected to empirical scrutiny. Research conducted to date suggests that youth justice conferencing has the potential to reduce further offending. However, it is still unclear how or why. Further qualitative research on restorative justice may help us to understand better how the restorative features of youth justice conferences work to reduce crime (Hayes 2006). What is also unclear is how the crime reduction potential of youth justice conferencing will have an impact upon criminal justice system case flows differently for young indigenous and non-indigenous offenders. Simulation modelling is one way of determining the long-term impact of the introduction of youth justice conferencing for these offenders.

Simulation modelling in the criminal justice system

Simulation modelling provides a tool to examine the long-term impact of the introduction of youth justice conferencing on the numbers of indigenous and non-

indigenous young people moving through the juvenile justice system. It enables us to answer the question: Can youth justice conferencing reduce the over-representation of indigenous young people in the Queensland juvenile justice system by the year 2011? However, before examining this question, we provide a brief overview of simulation modelling in the criminal justice system.

Over the past four decades a range of criminal justice simulation models have been developed. Unfortunately, many of these models remain undocumented, as much of the literature in this area is in the form of in-house government reports and unpublished documentation. Here, we provide a brief history of simulation modelling in a criminal justice context. A more detailed review of this field is available in Stewart et al. (2004).

Simulation modelling of the criminal justice system was developed during the 1970s primarily in the USA (e.g., Stollmack 1973) as the need for evidence-based planning for court and correction systems was recognised. This original work focused on simple “stock and flow” models that allowed the effects of minimal system changes to be examined. Throughout the 1980s justice system modelling increased in sophistication, with JUSSIM and JUSSIM 2 (Blumstein 1980) modelling the flow of individual cases through the system. These models also incorporated information on the underlying population structure and attempted to model reoffending behaviour. These models, along with similar work in the UK (Morgan 1985) were hampered by the level of detail they attempted to incorporate. While increases in model complexity provide a wider range of policy options that can be explored, they also necessitate a greater range of data and depend on a larger number of assumptions. Data dependencies were particularly problematic for the JUSSIM models, with Blumstein (1980) noting that few jurisdictions collected the necessary data to make use of JUSSIM.

More recent attempts to model the justice system in the UK resolved some of the problems of earlier modelling attempts, and The Flows and Costs model was widely used for almost a decade (Henderson 2003). However, the model was not generally accepted outside of the Home Office and has recently been superseded by a micro-simulation model of the UK justice system, which is more flexible and relies on fewer data (Henderson 2003). In the USA, criminal justice modelling also has moved towards micro-simulation, with the National Council of Crime and Delinquency’s development of PROPHET, a flexible micro-simulation tool primarily used to project prison populations that is currently in use in over 30 US states (Austin et al. 1992).

In Australia, most modelling work has been conducted within Government, and little has been published. Lind et al. (2001) discuss the development of a detailed model of the New South Wales justice system, which was highly complex, dependent on a vast number of data, and, subsequently, costly to maintain and infrequently used by the non-technical policy makers that were its target audience. This model was subsequently replaced by a much simpler stock and flow model.

Lind et al. (2001) outlined a number of difficulties inherent in the development of simulation models of the justice system, emphasising the exhaustive data requirements of many models and the difficulty of engaging non-quantitative policy analysts with technical computer-based models. Furthermore, Lind et al. offered a framework for developing criminal justice models that would be accessible to decision makers and

relatively simple to maintain. Specifically, Lind et al. emphasised the need to: (1) develop the simplest model capable of the desired analysis; (2) design the model so that the necessary parameters can be largely obtained from existing data sources; and (3) make the model as user-friendly as possible.

There is increasing awareness of the benefits that could result from policy simulation modelling of the criminal justice system. The development of such models facilitates the simulation of proposed practice, policy, and legislative changes to provide decision makers with information pertaining to the short-term and long-term consequences of any proposed changes.

Simulation scenarios ask the ‘what if’ questions. They are akin to mini-experiments that identify the downstream impact on the system of a proposed change if everything else is held constant. Of course, systems are extremely dynamic, and models are limited in their abilities to predict the future. Rather, models provide predictions on the basis of past trends and take into account what is known about a particular system. As such, policy simulation modelling would provide decision makers with additional information that would assist them in making rational decisions on the optimal use of scarce resources and improve the accountability of the criminal justice system. The JJSM was developed to provide such a tool for Queensland policy makers (Stewart et al. 2004).

Queensland Juvenile Justice Simulation Model

The JJSM is a discrete event flow model that uses Monte Carlo processes to simulate the passage of young offenders through the juvenile court system. The model was built in Extend, a flexible, extendable, simulation program. Extend allows the construction of simulation models using a wide array of pre-defined components or ‘blocks’. Extend allows the implementation of a built-in database with dynamic links to Microsoft Excel and provides dynamic visualisation. Additionally, Extend allows users to develop their own blocks through its proprietary programming language, ModL. This allows the development of user-friendly blocks that perform complex tasks. The leverage blocks in the juvenile justice system were developed in this way, allowing a straightforward user interface and a wide variety of options to be included.

A substantial amount of effort in the model’s development was focused on detailed analyses of the juvenile court data so that appropriate and accurate model parameters could be developed. These data contained information on finalised court appearances (that is, court appearances by a young offender in which there was a finding of guilt and the matter was finalised). The analyses are described in detail in Stewart et al. (2004). Based on these analyses, the model probabilistically assigns individual offenders’ gender, indigenous status, age (for the first offence), and geographic region. Age of initiation of offending varied significantly, with indigenous status, with indigenous offenders far more likely than non-indigenous offenders (regardless of gender) to have their first court appearance before the age of 15 years (Table 1).

Offence types and court outcomes were reduced to categories that meaningfully reflected statistical differences in behaviour between demographic groups (e.g., age,

Table 1 Age at first court appearance (for an offence) by indigenous status and gender

Age	Male		Female	
	Non-Indigenous	Indigenous	Non-Indigenous	Indigenous
Less than 15 years	1,551 (35.9%)	945 (61.7%)	368 (33.2%)	271 (56.1%)
15 years or older	2,764 (64.1%)	587 (37.3%)	739 (66.8%)	211 (43.9%)

gender and indigenous status). The following eight offence types were modelled: offences against the person, break and enter and burglary, theft and related offences, drug offences, traffic offences, public order offences, property damage, and other offences. Analyses indicated that gender and indigenous status determined the offending profiles for young offenders and there was no evidence of offence specialisation. That is, regardless of the number of previous offences, the probability of particular offence categories remained constant. Consequently, the model assigned probability parameters to each demographic group corresponding to the offending profiles identified in the data (Table 2). For example, 20.2% of offences committed by indigenous male offenders and 10.8% of offences committed by non-indigenous male offenders were classified as break and enter and burglary.

To determine the court outcomes [divert from formal order, non-supervised order, community supervised order, detention order—suspended (immediate release order) and detention order—served] a series of logistic regressions was performed to examine a range of predictive variables (number of prior appearances, indigenous status, gender, offence type, previous detention order, number of prior detention orders, number of offences at appearance, total number of prior finalised offences) (Stewart et al. 2004). These analyses indicated that two variables accounted for the majority of the variance in sentencing (the offence types and the number of prior appearances for an offence). Consequently, probability tables based on these two variables (and gender, due to the simplicity of including it and its significance in some of the logistic models) were created and are used in the model to assign court outcomes to offenders.

The final and, arguably, most critical parameter to be modelled was the reappearance of offenders. Young offenders reappeared in the model if they reoffended and came back into the juvenile court system. In the two financial years 1999/2000 and 2000/2001, 65% of finalised juvenile court appearances were by

Table 2 Probabilities of offence types for the four demographic groups used as parameters in the JJSM

Offence Type	Non-Indigenous		Indigenous	
	Male	Female	Male	Female
Offences against the person	0.086	0.100	0.096	0.145
Break and enter, burglary	0.108	0.048	0.202	0.108
Theft and related offences	0.321	0.394	0.308	0.330
Drug offences	0.097	0.081	0.043	0.032
Traffic offences	0.120	0.071	0.069	0.039
Public order offences	0.106	0.140	0.115	0.167
Property damage	0.073	0.046	0.081	0.058
Other offences	0.089	0.121	0.085	0.122

young offenders reappearing in the system. Thus, if the reappearance parameters for the model were inaccurate, then the model would not replicate the system. The number of prior appearances was also critical in predicting sentencing outcome. Survival analyses indicated that there were significant differences in the time to reappear between the four demographic groups (gender by indigenous status). These differences were apparent in the time from the first to second appearance, the second to third appearance and the third to fourth appearance. After the fourth appearance, the survival curves were converging (and the numbers of young offenders in the groups were small). Two population Weibull distributions (with a desistance term) were fitted to the 16 categories [gender, indigenous status, appearance number (1, 2, 3, 4+)] to provide the reappearance parameters for the JJSM. Indigenous young people had significantly more finalised court appearances [$M=4.17$, standard deviation (SD)=0.87] than their non-indigenous counterparts ($M=2.25$, $SD=2.32$) [$F(1,2462)=118.00$, $P<.0001$)]

The JJSM is a parsimonious model, modelling new offenders entering the juvenile court system by a number of demographic characteristics, the types of offences these young people appear in court for, and the sentence imposed (court outcome) by the court. Finally, the model determines whether or not the young person will reoffend and reappear in the court system or will desist from offending and not reappear in the court system. There were 1,840 parameters required to populate the model. Figure 1 provides a graphical description of the model.

Model validation

To validate the Queensland Juvenile Justice Simulation Model (JJSM) the simulated results for the court outcomes for 2002/2003 (based on the parameters developed

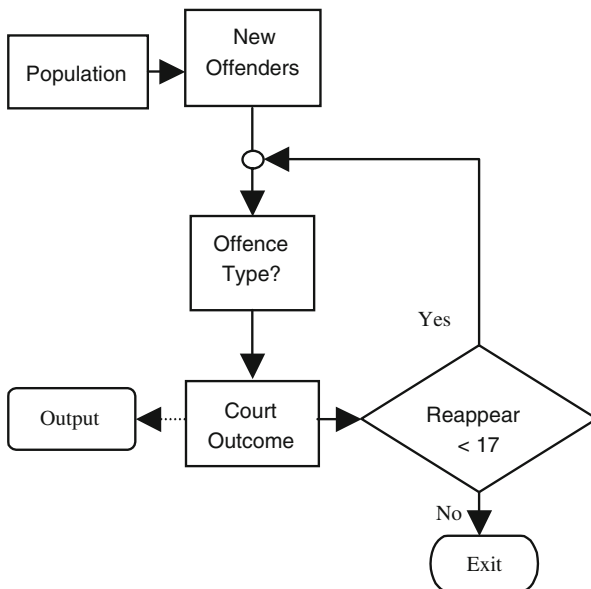


Fig. 1 Queensland Juvenile Justice Simulation Model (JJSM) schema

from the 2001/2002 values) were compared to the actual court outcomes obtained for that year. These results are aggregated by court outcome and indigenous status of the young offender (Fig. 2). Only detention outcomes for both the indigenous and non-indigenous young people fell outside the 95% upper and lower bounds of the simulated values. Therefore, the simulation model underestimated the numbers of young people sentenced to detention orders. However, in Queensland, few young people are sentenced to detention, and these numbers show high variability, making simulation of these numbers extremely difficult and therefore these underestimations were not considered to invalidate the model.

Once the baseline model had been developed and validated, three crime prevention *leverage blocks* were programmed into the JJSM (early intervention, pre-court diversion and criminal justice interventions). Leverage blocks are user friendly model interfaces that enable simulation of the implementation of a range of programme, policy or legislative changes and examination of the resultant reduction in offending or reoffending. The leverage blocks replicate identified crime prevention strategies and are defined both by their position within the model and the nature of the intervention strategy that they simulate. The early intervention leverage block simulates interventions that occur prior to the offence. They may either prevent the initiation of offending behaviour (such as developmental programmes) or prevent a specific offence occurring. The pre-court diversion leverage block models a range of interventions designed to divert young people from formal processing by the court system. The criminal justice intervention block models interventions ordered by the court system (such as therapeutic interventions) to prevent reoffending.

Policy analysis with JJSM¹

The primary purpose in developing the JJSM was to provide a flexible tool that would enable analyses to be made of the impact of proposed changes in the juvenile justice system over time. Such simulation tools provide opportunities for investigating the impact of a wide range of proposed innovations (both realistic and unrealistic) on the system into the future. As such, they can address questions that cannot be addressed by any other social science methodology (such as randomised control trials). For example, models can examine questions such as, *Can youth justice conferencing reduce the over-representation of indigenous young people in the Queensland juvenile justice system by the year 2011?*

The model does not aim to predict precisely what will happen in the future, as there are too many influential factors that cannot be modelled accurately (e.g., ‘law and order’ political campaigns). Instead, the model provides a baseline set of data assuming that the current system behaviour remains stable over the modelled time period, with changes only to the underlying population demographics. This baseline model provides a set of standard outputs that can be used for comparison with the simulated outputs of proposed system innovations.

¹ The JJSM has a user friendly web interface that allows non-technical users to access and use the model (www.griffith.edu.au/jmag).

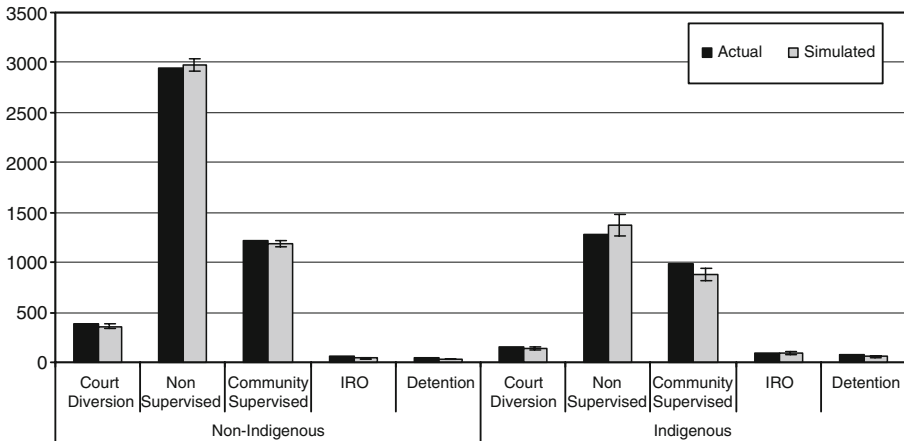


Fig. 2 Validation results for the JJSM. Simulated and actual finalised court outcomes by indigenous status and outcome for the financial year 2002/2003. *IRO* immediate release order

Once the baseline results have been recorded, users can utilise the various leverage blocks to simulate one or more prospective system changes. Using estimates of the efficacy of different types of interventions, the model has the capacity to project quantitatively the impact of interventions on participation rates and types of court outcomes over time. The model is then re-run with the proposed programmes included, and the relative reduction in cases through the juvenile justice system can be compared to the baseline model.

Owing to the nature of micro-simulation models, the results of the modelling exercises can be aggregated in a number of ways to address different questions. For example, the user can broadly explore the overall reduction in court appearances or can examine the reduction in detention orders given to indigenous female offenders over each year of the programme. Furthermore, the model allows simple cost-benefit analyses to be made by incorporating the costs incurred by government departments under each scenario (e.g., the cost of court appearances and supervision of detention and community-based orders).

Scenario testing

An excellent example of the utility of the JJSM is provided by the identification of the state-wide expansion of youth justice conferencing as a key initiative to progress the implementation of the Justice Agreement and reduce the over-representation of indigenous people in the criminal justice system by 2011. At the time of the model’s development in 2001/2002, youth justice conferencing had been introduced in pilot mode but was only available in a limited number of sites. Consequently, few young people in the system had an opportunity to participate in a youth justice conference (Maxwell and Hayes 2006). Therefore, the baseline scenario simulated the youth justice system without the introduction of youth justice conferencing.

Two policy scenarios were analysed. The first scenario simulated the impact on the number of juvenile court appearances of the state-wide role out of youth justice

conferencing through to 2011. In this scenario, youth justice conferencing was equally available for all young people across Queensland (regardless of gender or indigenous status), consistent with the legislation and anticipated practices. This scenario, when compared to the baseline scenario in which youth justice conferencing was not available, provided the most realistic estimation of the anticipated impact of youth justice conferencing on the juvenile justice system up to 2011.

The second scenario simulated differential rates of youth justice conferencing being applied to indigenous and non-indigenous young offenders. In this scenario, 90% of indigenous first offenders and 40% of indigenous second offenders attended conferences, regardless of offence type. There are a range of practical, legislative and ethical issues associated with such a scenario; however, simulation modelling allows examination of the impact of improbable and controversial policy scenarios. The running of such a scenario provides an upper estimate of the impact that youth justice conferencing may have on the over-representation of indigenous young people in the juvenile justice system and, therefore, contributes to the 2011 targets set by the Justice Agreement.

However, it must be emphasised that there is a range of reasons why such a policy could not be implemented. The Queensland *Juvenile Justice Act 1992* states that the young person must admit to the offence before referral to a conference. Youth justice conferences are designed to provide a process by which young persons may address their offending behaviour. It is not a process for the determination of guilt. Young people have the right to plead not guilty and have their matter finalised in the Children's Court. Furthermore, even if the young person does admit to an offence, conferencing may not be an appropriate response for a number of reasons, including the seriousness of the offence. In addition, there is substantial debate concerning the ethics of targeting criminal justice responses at identified 'at risk' groups (see, for example, Feeley and Simon 1994), especially when those groups are distinguished on the basis of race.

Baseline scenario results

The baseline scenario simulated the number of finalised court appearances in Queensland juvenile courts to 2011. This scenario assumed that there would be no changes to the juvenile justice system and that changes in the number of finalised appearances would reflect only the demographic changes in the population.

The estimated demographic changes through to 2011 for non-indigenous young people were provided by the Australian Bureau of Statistics population projections (Australian Bureau of Statistics 2003). The projections of the Australian Bureau of Statistics Indigenous Experimental Population Projections (Australian Bureau of Statistics 2004) provided estimates of indigenous young people through to 2009. Extrapolation of these values provided the estimates for indigenous young people through to 2011. All simulations were performed 20 times, and the mean results were presented to smooth out random fluctuations in the simulation results.

As can be seen from Fig. 3, because of the differences in the demographic profiles between indigenous and non-indigenous young people, the number of court appearances by indigenous young people is anticipated to increase at a greater rate

than the number of court appearances by non-indigenous young people. In 2001, 4.4% of the population of 10–16 year olds in Queensland were indigenous. By 2011, this percentage will have increased to 6.1% of young people. Consequently, while indigenous young people were responsible for 31.2% of all juvenile court appearances in 2001, by 2011 it is estimated that this percentage will have increased to 37.8%. While the net result is an increase in the number of court appearances by indigenous young people, the rate of over-representation by indigenous young people remains the same (7.6-times more likely than non-indigenous young people).

Scenario 1: state-wide availability of youth justice conferencing results

The first scenario examines the impact of state-wide availability of youth justice conferencing on the over-representation of young indigenous offenders in the juvenile justice system through to 2011. Youth justice conferencing was available across Queensland by 2004. The estimates behind this simulation provide the most realistic estimations of the impact of the state-wide introduction of conferencing on juvenile court appearances.

Two estimates were required to implement this policy scenario: the rate of police referrals to youth justice conferencing and the efficacy of youth justice conferencing on preventing young people from reappearing in the juvenile justice system. The estimates of the rate of police referral were derived from an analysis of the referral rates in the pilot sites (Table 3). It was assumed that police referral rates would remain constant as youth justice conferencing was implemented state-wide. These referral rates favour property and first time offenders.

Estimation of the efficacy of youth justice conferencing on preventing reoffending was difficult, due to the lack of empirical evaluations. Luke and Lind’s (2002) New

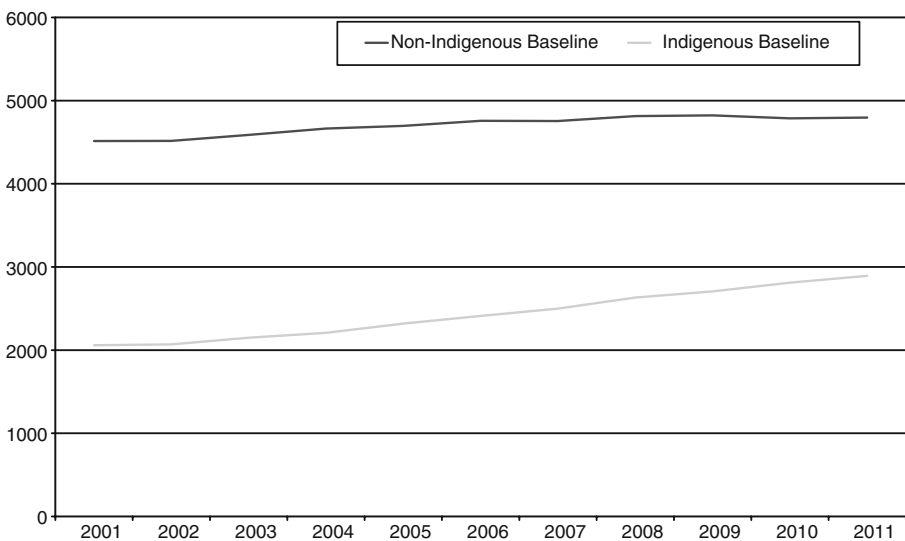


Fig. 3 Baseline simulation results for finalised appearances by year (2001 – 2011) and indigenous status (mean of 20 simulations)

South Wales (NSW) study that compared young people undergoing conferencing with those who went to court provided the best approximations. This study focused on first offenders and controlled for the effects of age, gender, prior record and offence type. Unfortunately, as a substantial proportion of data on indigenous status was missing, they analysed this variable separately. Luke and Lind identified that, regardless of the gender, criminal history, age and indigenous status of the offenders, conferencing produced a reduction in reoffending of between 15% and 20%. The upper limit of this estimate was used as the estimate for efficacy of conferencing. That is, participation in a youth justice conference was estimated to reduce the likelihood of the young offender reappearing in court by 20%, regardless of the age, gender, offence type or indigenous status of the young offender.

As can be seen from Fig. 4, the results of the simulation indicated that the introduction of youth justice conferencing had an immediate effect on the number of finalised court appearances for both indigenous and non-indigenous young people. By 2011 in scenario 1, the state-wide introduction of youth justice conferencing would result in a drop of 12.5% in finalised court appearances. Furthermore, this drop would be more noticeable for non-indigenous young people, with an estimated 13.7% drop in court appearances compared with 10.5% for their indigenous counterparts (Table 4).

However, these data need to be interpreted cautiously, as over half of the estimated reduction in court appearances can be attributed to the diversion of matters away from the court system to conferencing, rather than a reduction in actual offending 'events'. Young people who are diverted from formal court processing to a youth justice conference are still coming into contact with the juvenile justice system (i.e., no reduction in offending). Examination of the actual crime prevention impact of conferencing (i.e., the impact of the reduction in the number of young people reoffending following a conference) indicates that, by 2011, there would be a 4.7% reduction in actual offending 'events' (Table 3).

Again, the reduction in offending 'events' was more noticeable in non-indigenous young offenders than in indigenous young offenders (Table 4). The differential impacts of conferencing on indigenous and non-indigenous young people, both in relation to court appearances and reoffending, is due to the different offending profiles between indigenous and non-indigenous young people. Indigenous young

Table 3 Scenario 1. Simulation parameters of the percentage of young people diverted to a youth justice conferencing intervention by type of offence and number of previous appearances

Offence Type	Number of Prior Appearances for an Offence			
	0	1	2	3
Offences against the person	16%	4%	1%	0%
Break and enter and burglary	28%	5%	2%	0%
Theft and related offences	28%	5%	2%	0%
Drug offences	10%	2.5%	1%	0%
Traffic offences	10%	2.5%	1%	0%
Public order offences	10%	2.5%	1%	0%
Property damage	10%	2.5%	1%	0%
Other offences	10%	2.5%	1%	0%

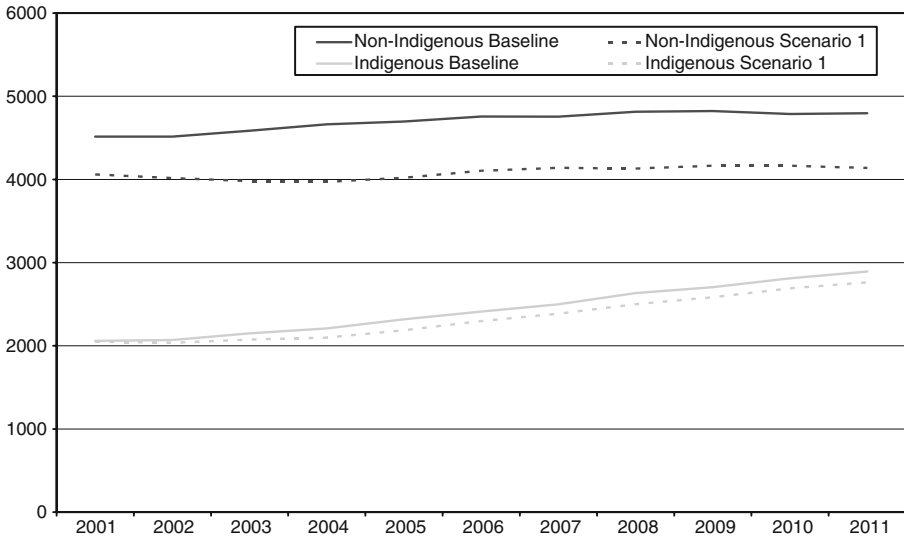


Fig. 4 Universal Youth Justice Conferencing scenario. Court appearances by year and indigenous status

people are younger at their first appearance, appear more frequently, and are less likely to commit property offences than their non-indigenous counterparts (Stewart et al. 2004). Consequently, a diversionary programme available principally to first time offenders and property offenders (Table 3) will have a greater impact on the number of court appearances and offending behaviour of non-indigenous young people.

Table 4 Simulated frequencies of court appearances, youth justice conferences and total offending events in 2011 comparing baseline and scenario 1. Frequencies were calculated as the mean of 20 simulations. CI confidence interval; n.a. not applicable

Simulated Outcome	2011 Simulated Frequencies						
	Baseline			Scenario 1			Percentage Decrease
	Mean	95% CI		Mean	95% CI		
		Lower Bound	Upper Bound		Lower Bound	Upper Bound	
Appearances							
Indigenous	2893.3	2855.5	2931.2	2589.8	2551.5	2628.1	10.5%
Non-indigenous	4796.3	4751.9	4840.7	4138.3	4082.3	4194.4	13.7%
Total	7689.6	7634.4	7744.9	6728.1	6665.9	6790.4	12.5%
Appearances diverted							
Indigenous	0			174.1	168.2	180.1	n.a.
Non-indigenous	0			424.5	416.9	423.1	n.a.
Total diversions	0			598.6	598.2	608.2	n.a.
Offending 'events'							
Indigenous	2893.3	2855.5	2931.2	2766.0	2728.3	2799.6	4.4%
Non-indigenous	4796.3	4751.9	4840.7	4562.8	4505.2	4620.5	4.9%
Total events	7689.6	7634.4	7744.9	7326.8	7265.3	7388.3	4.7%

Scenario 2: targeted youth justice conferencing

To examine the impact of intervention targeted specifically at indigenous young people, a second scenario was set up, where 90% of all indigenous young people would undergo conferencing on their first offence and 40% on their second offence (regardless of the offence type). Such an improbable scenario provides challenges for the modeller. For such a scenario to be run, it is necessary to estimate the efficacy of conferencing in reducing reoffending when indigenous offenders are being targeted. There are no evaluation data that will support such a scenario. Furthermore, there is evidence that police refer to conference those young offenders whom they consider would benefit from the process (Stewart and Smith 2004). Consequently, it is likely that there will be a selection bias in the referral process and that referring all young offenders to conference will substantially reduce the efficacy of conferencing in preventing reoffending. Nevertheless, given the lack of empirical data for this scenario, it was assumed that the efficacy of conferencing in reducing reappearances would remain at 20%, the same as that identified by Luke and Lind (2002) and used in scenario 1.

The results of this simulation are presented in Fig. 5. It is evident that the targeted youth justice diversion has a substantial impact on the number of court appearances by indigenous young people. In 2011, under the conditions simulated in this scenario, it was estimated that conferencing could result in an almost 60% reduction in the number of court appearances by indigenous young people (Table 5).

However, over half of this reduction was due to the diversionary nature of youth justice conferencing (Table 4). This targeted process resulted in a substantial increase in the number of conferences and a 26.8% reduction in the number of young indigenous people coming into contact with the juvenile justice system (offending ‘events’).

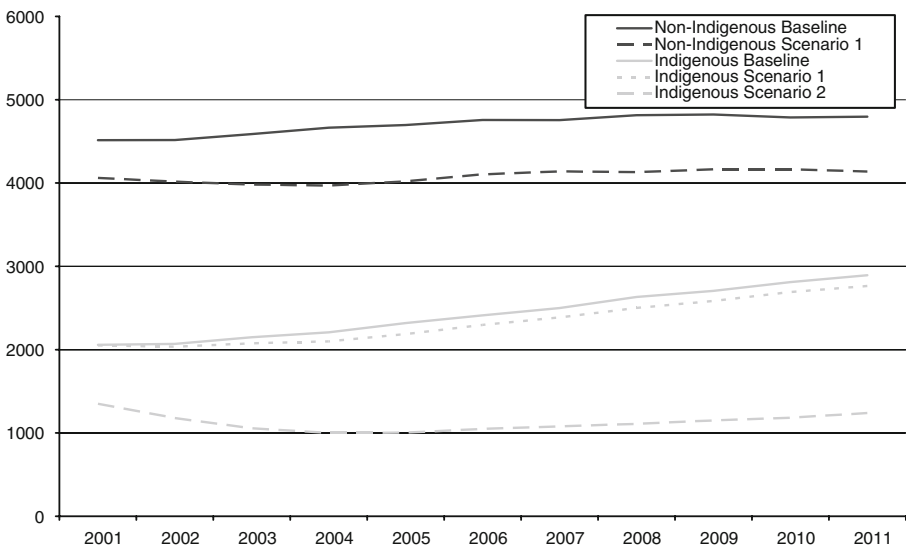


Fig. 5 Targeted Youth Justice Conferencing scenario. Court appearances by year and indigenous status

Table 5 Simulated frequencies of court appearances, youth justice conferences and total offending events in 2011, comparing baseline and scenario 2. Frequencies were calculated as the mean of 20 simulations. *CI* confidence interval; *n.a.* not applicable

Simulated Outcome	2011 Simulated Frequencies						Percentage Decrease
	Baseline			Scenario 2			
	Mean	95% CI		Mean	95% CI		
		Lower Bound	Upper Bound		Lower Bound	Upper Bound	
Appearances							
Indigenous	2893.3	2855.5	2931.2	1240.2	1209.4	1271.1	57.1%
Total	7689.6	7634.4	7744.9	5352.0	5295.2	5408.9	30.4%
Appearances diverted							
Indigenous	0			876.4	861.5	891.4	n.a.
Offending 'events'							
Indigenous	2893.3	2855.5	2931.2	2116.7	2076.6	2156.8	26.8%
Total events	7689.6	7634.4	7744.9	6657.4	6597.1	6717.7	13.4%

Summary of results

The long-term aim of the Justice Agreement is to reduce the rate of indigenous people coming into contact with the criminal justice system to at least the same rate as that of other Queenslanders. The stated objective is a 50% reduction in incarceration of indigenous people by 2011 (Queensland Government 2001). As can be seen in Table 6, the current rate of contact of indigenous young people with the juvenile justice system is 7.6-times that of their non-indigenous counterparts. Under the baseline condition, the only changes modelled were demographic changes, and the rate of contact (and the level of over-representation) with the juvenile system remained constant.

Scenario 1 modelled state-wide availability of youth justice conferencing, which is consistent with the current policy on youth justice conferencing, and indicated an actual *increase* in the rate of over-representation of indigenous young people in juvenile court system. This was because of the different offending profiles of indigenous and non-indigenous young people. Initial analyses of the court appearance data indicated that indigenous young people were less likely to appear in court for property offences and more likely to be repeat offenders than were non-indigenous young people. Under scenario 1, the simulation modelled the referral

Table 6 Summary results of the reduction in over-representation for the baseline and two scenarios by indigenous status in 2011; *n.a.* not applicable

Scenario	Non-Indigenous Rate per 1000	Indigenous Rate per 1000	Ratio of Indigenous Rate to Non-Indigenous Rate	Percentage Change from 2001
Baseline	12.6	100.2	7.6	n.a.
Scenario 1	12.0	94.8	7.9	-3.4%
Scenario 2		77.6	6.0	20.7%

rates as favouring property and first time offenders. Consequently, indigenous young offenders were less likely than their non-indigenous counterparts to be eligible for a conference.

Scenario 2 targeted indigenous young people regardless of offence. This scenario estimated the maximum impact that youth justice conferencing could have on the rate of indigenous young people coming into contact with the juvenile justice system. However, even with these unrealistic assumptions, the results of the simulation indicated that youth conferencing would result in a maximum reduction in over-representation of 20.7%. However, it is extremely unlikely that the efficacy of youth justice conferencing will remain consistent under the conditions simulated in this scenario (i.e., a 20% reduction in reappearance). Consequently, these results need to be interpreted very cautiously.

These simulations effectively highlight the value of simulation modelling for policy analysis. The results of the simulation provide an opportunity for us to examine the *relative* impact of the introduction of youth justice conferencing in 2011, holding all other factors constant. These results have clearly indicated that the universal introduction of youth justice conferencing will have more impact on reducing the rate of offending of non-indigenous young people, thereby increasing the level of over-representation of indigenous young people.

Discussion

The primary goal of this paper was to present an example of criminal justice policy analysis using micro-simulation modelling. The simulation model used was the Queensland Juvenile Justice Simulation Model (Stewart et al. 2004). Simulation modelling is an under-utilised methodology in the criminal justice system for a number of reasons. Historically, these reasons revolved around the availability of computing power, flexible user-friendly software, and access to data at the appropriate level. While some of these reasons are valid today, we are increasingly moving towards an environment in which simulation modelling is readily accessible. However, as Blumstein noted: “Management of the agencies of the criminal justice system is still far from the model of efficiency one might like, and is still slowly moving into the information technology era” (Blumstein 2002: 22). It is hoped that the use of simulation modelling to examine the feasibility of youth justice conferencing in meeting the specific aims of the Justice Agreement will encourage policy analysts to consider simulation modelling as one of their analytical tools.

The results of the simulations indicated that youth justice conferencing is unlikely to contribute significantly to the targets set by the Justice Agreement. While conferencing has the potential to reduce the number of young people re-offending overall, this impact may be more apparent for non-indigenous young offenders, resulting in an increase in the disparity in the ratio of indigenous to non-indigenous young offenders in 2011. While youth justice conferencing is only one of a range of criminal justice interventions identified in the Justice Agreement as strategies for reaching the identified goals, it is the only diversionary option that has been empirically shown to reduce rates of reoffending (Weatherburn et al. 2003; Hayes 2007). However, there is a desperate need for more rigorous evaluations of the

impact of youth justice conferencing on reoffending. Simulation modelling is only as good as the estimates that are used as parameters in the models.

Weatherburn et al. (2003) argue that efforts to reduce Aboriginal imprisonment rates through policing or criminal justice system policy have failed and will continue to fail unless they become effective in reducing crime in Aboriginal communities. They go on to suggest that, rather than focusing attention on reducing Aboriginal crime, diversion schemes (such as youth justice conferencing) have been the dominant strategy that most state and territory governments have supported to reduce Aboriginal over-representation. They suggest that rather than focussing on criminal justice responses, more progress in reducing Aboriginal over-representation might be made if the focus was shifted to the underlying causes of Aboriginal crime (e.g., substance abuse, family violence, poor school performance, and unemployment). While the Justice Agreement acknowledges the importance of addressing the underlying causes of crime in Aboriginal communities, the strategies identified in the Justice Agreement to meet established targets centre on the criminal justice system, as the signatories of the Justice Agreement are the justice-related government departments. Further development of initiatives to address the underlying causes of offending by indigenous young people, as well as the continued use of effective criminal justice responses (e.g., youth justice conferencing), likely will be more effective in reducing the over-representation of young indigenous people in the juvenile justice system.

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