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The impact of the NSW Intensive Supervision Program on recidivism

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Aim: *To determine whether the NSW Juvenile Justice Intensive Supervision Program (ISP) is more effective than conventional case management in reducing the frequency of offending among young people.*

Method: *Using a non-equivalent groups design, offending frequency over a 48-month period is examined for three groups of offenders; ISP graduates (those who signed up to and completed ISP), ISP terminates (those who signed up to but did not complete ISP) and a comparison group (those who received a supervised community order or a court-referred Youth Justice Conference in locations where ISP was not available). Days spent in custody over this 48-month period are also examined for each of these three groups. Time-series models are used to assess changes in offending frequency and days in custody during the 6 and 12 month periods after the intervention. Multilevel models are also used to test for group differences in offending frequency during the post intervention period after controlling for other factors.*

Results: *Multilevel modelling showed a significant reduction in offending frequency during and after the intervention period for both ISP graduates and the comparison group, but the rate of decrease was not significantly different across these two groups. The time-series analysis found a significant reduction in offending frequency in the 6 months after the intervention start date that was restricted to non-Indigenous ISP graduates and Indigenous offenders from the comparison group. For all other groups (Indigenous ISP graduates, all ISP terminates and non-Indigenous offenders from the comparison group), offending decreased in the latter part of the study period but this drop did not coincide with commencement of the intervention. For the ISP graduates only, there was a significant reduction in days spent in custody during the 6-month intervention period. Nevertheless this downward trend was not sustained in the 6 months following program completion.*

Conclusion: *There is no evidence that ISP impacts the offending frequency of young people over and above the usual effect of a supervised order. However, there is good evidence that young people who complete ISP spend significantly fewer days in custody during their treatment program.*

Keywords: *Juveniles, MultiSystemic Therapy, intensive supervision, reoffending, NSW, young people, offending frequency, custody, juvenile detention.*

INTRODUCTION

The NSW Juvenile Justice Intensive Supervision Program (ISP) is a rehabilitation option for young offenders who have received a Supervised Community Order or court-ordered Youth Justice Conference (YJC). ISP is a licensed MultiSystemic Therapy (MST) program. MST is a family and community-based intervention that has proven both effective and cost-beneficial in reducing delinquent behaviour (Henggeler, 2012; Lee, Aos, & Pennucci, 2015; van der Stouwe, Asscher, Stams, Dekovic, & van der Laan, 2014).

MST is an intensive program that aims to address all environmental systems in which risk factors for behavioural problems (including offending) are found. This social–ecological approach is based on the premise that antisocial behaviour is caused by a multitude of risk factors which are both internal to the young person (for example, attitudes, beliefs, biological factors) and present in his or her social environment (for example, poor family functioning and antisocial peer associations). The primary focus of MST is improved family functioning through better parenting skills and enhanced family relationships. Working closely with the primary caregiver, MST therapists work to create an environment for the young person in which pro-social behaviour is supported and encouraged. They also work with the caregiver and young person to enhance factors, such as school attendance and achievement, that are protective against engagement in delinquent behaviours;

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the establishment of pro-social rather than anti-social peer associations and increased support from social networks. MST is usually delivered by a single therapist and requires intensive, home-based, clinical work with the young person and their family to achieve specific goals during a 5-month treatment period (Henggeler, 2011).

A large body of experimental and quasi-experimental research shows that in general, MST is an effective method for achieving positive outcomes for young offenders, including reducing their involvement in criminal activities and subsequent contact with the criminal justice system (e.g. Bourdin et al., 1995; Bourdin, Henggeler, Blaske, & Stein, 1990; Bourdin, Schaeffer, & Heiblum, 2009; Brunk, Henggler, & Whelan, 1987; Henggeler, Melton, & Smith, 1992; Timmons-Mitchell, Bender, Kishna, & Mitchell, 2006). For example, Bourdin and colleagues in Bourdin et al. (1995) presented results from one of the largest US randomised control trials of MST showing a 63 per cent reduction in recidivism at 4-year follow-up for violent and chronic young offenders who received MST compared with offenders who received an alternate treatment (Individual Therapy). In a randomised control trial conducted in South Carolina, Henggeler et al. (1992) compared re-arrests for a group of young offenders who received MST with a control group of youths who received the usual juvenile justice services. They showed a 43 per cent reduction in recidivism amongst the treatment group compared with the controls after 59-weeks of follow-up.

MST has also been shown to have positive effects on the psychopathology, family relations and peer networks of young offenders participating in the program (Rowland et al., 2005; van de Stouwe et al., 2014), to improve the parenting skills and competence of their caregivers (Dekovic, Asscher, Manders, Prins, & van der Laan, 2012; Tighe, Pistrang, Casdagli, Baruch, & Butler, 2012) and even decrease the likelihood that their siblings will become involved in criminal activity (Wagner et al., 2014). Importantly, the effect of MST on juvenile offending behaviour has been shown to be sustained for many years after treatment; with some evidence of benefits still being observed well into adulthood (see for example, Borduin, Schaeffer, & Heiblum, 2009; Sawyer & Bordouin, 2011; Wagner et al., 2014). The economic benefits of MST are also well-documented (Cary, Butler, Baruch, Hickey, & Byford, 2013; Lee, Aos, & Pennucci, 2015). Recent US estimates show a benefit-cost ratio of 3:1 for MST, which is comparable with other community-based programs for juvenile offenders (Lee, Aos, & Pennucci, 2015).

While this evidence is very encouraging, many of the earlier efficacy studies demonstrating substantial effects of MST on criminal activity and anti-social behaviour were conducted by MST developers and their associates. These studies evaluated interventions that employed highly trained and closely supervised therapists who delivered the treatment under relatively well controlled conditions (Henggeler, 2012; Littell, 2005). Evaluations of MST interventions delivered by institutions in community-based treatment settings and in countries outside of the USA have generally found weaker or no treatment effects (Henggeler, 2012; Littell, Campbell, Green, & Toews, 2005; van der Stouwe et al., 2014).

A randomised trial for youth diagnosed with conduct disorder in Sweden, for example, found no differences between young people participating in MST and those who received 'treatment-as-usual' (from social services) on a wide array of outcome measures, including self-reported delinquent behaviour and psychiatric symptoms (Leschied & Cunningham, 2002). Similarly, a large randomised trial of MST services in Ontario, Canada, found that young offenders who participated in MST were equally as likely to be reconvicted for a new offence and to be reincarcerated as young offenders who received the usual services in the local juvenile justice system. Significant improvements were observed in this latter study for the MST group on several psychometric measures such as parent report of family cohesion, family functioning and social skills of youth, but improvements in these measures were also observed amongst members of the control group (Sundell, Hansson, Lofholm, Olsson, Gustle, & Kadesjo, 2008).

Three other experimental studies evaluating MST programs in Europe have provided more promising results for transportability of MST methods across borders and the delivery of MST services by institutions. Butler and colleagues (2011) undertook a randomised trial of MST with juvenile offenders in England and found a significant decrease in self-reported nonviolent offenses during an 18-month follow-up compared to an intensive control condition. In a four-site randomised trial of MST in Norway, Ogden and Hagan (2006) found that youths who participated in MST reported significantly less delinquent behaviour compared to youths who received the regular interventions from the Child Welfare Services. The results from a Dutch experiment (Asscher et al., 2007) also showed significant reductions in parent and adolescent reports of delinquent behaviour amongst juveniles randomly assigned to MST compared with a 'treatment-as-usual' (TAU) group. Yet even amongst these studies, there is only limited evidence for an impact of MST on criminal behaviour. The British study found significant group differences for nonviolent offences but no differences across treatment conditions for violent offences. The Dutch and Norwegian studies found reductions in self-reported delinquency amongst MST participants but did not observe these same reductions when offending was measured using official recidivism data.

Independent agencies and MST developers agree that treatment fidelity and organisational support to help administer MST with fidelity is vital for achieving positive outcomes (Henggeler, 2011; Seigle, Walsh, & Weber, 2014). Variations in program implementation may therefore account for some of these weaker or null effects. But other factors have also been identified as possible explanations for the equivocal results from MST effectiveness studies. These include differences in the characteristics of the offender population being treated, the strength of the alternative treatments against which MST is

compared and the broader context in which the MST program is implemented (Leschied & Cunningham, 2002; Mitchell et al., 2008; Sundell, Hansson, Lofholm, Olsson, Gustle, & Kadesjo, 2008; van der Stouwe et al., 2014).

ISP is the first program based on MST principles to be delivered in New South Wales (NSW) and this is the first Australian study to assess the effectiveness of MST in reducing juvenile reoffending. Given mixed evidence for the success of MST programs delivered outside of the USA, as well as the significant cost and resource intensive nature of this treatment, evaluating the impact of MST in this new setting is clearly warranted.

INTENSIVE SUPERVISION PROGRAM (ISP) IN NSW

The NSW Juvenile Justice ISP is a program specifically aimed at juveniles who commit serious and/or repeat offences or whose severe anti-social behaviour increases their likelihood of offending. Consistent with the MST treatment model upon which it is based, ISP seeks to promote behavioural change by working with a young person's family, school and local community to address various risk factors associated with juvenile offending including substance abuse, financial problems, housing needs, family conflict and negative peer pressure. Clinicians delivering the program receive training and ongoing support from the MultiSystemic Therapy Institute through a local network partner, and quality assurance measures are in place to ensure program fidelity.[1] While not restricted to Aboriginal young people, ISP has a particular focus on Aboriginal families with a designated Aboriginal liaison officer employed to ensure the interventions delivered are well matched to the needs and strengths of Aboriginal young offenders, their families and their community.[2]

ISP commenced operation in NSW in May 2008 in two sites: Islington (Newcastle) and Werrington (Western Sydney). It is a voluntary program in which both the offender and the primary caregiver of the young offender must agree to participate. Families accepted by ISP are expected to remain in treatment for at least 5 months (or 6 months for Indigenous clients).

To be eligible for ISP a young person must:

- Be aged 10 to 16 years
- Have at least 6 months remaining on their court order at the time of referral
- Be assessed as medium-high risk on YLS/CMI:AA[3]
- Have a primary caregiver who is willing to participate
- Be living in established accommodation
- Reside in the ISP catchment area

Further, young persons with the following characteristics are not eligible for ISP:

- Living independently, or without an identified primary caregiver
- Sex offence as their primary offence
- Organic condition underlying offending (e.g. autism)
- Actively suicidal, psychotic or homicidal states

Since the commencement of the program, these eligibility criteria have been modified to increase referral numbers and align referral characteristics with the target group for treatment. The most important of these modifications are: (1) the inclusion of court-ordered Youth Justice Conferences (YJC) in the Newcastle catchment area from September 2011; (2) extending the age criteria to include offenders aged up to 16.5 years; (3) expanding the catchment area for Newcastle to include several adjoining postcodes in the Hunter region; (4) relaxing the order length criteria to accept referrals for offenders on supervised orders of less than 6 months.[4]

THE CURRENT STUDY

The primary aim of the current study is to determine whether ISP is more effective than conventional case management in reducing recidivism. To achieve this aim, a cohort of young offenders referred[5] to ISP are compared with a cohort of young offenders who received a supervised court order of 6 months or more (i.e. bond, probation, suspended sentence, bail order, community service order) or a court-ordered YJC. Given that a large number of important variables are unknown in this analysis (e.g. developmental delay, drug use, familial environment, previous history of abuse) between group comparisons are not considered appropriate because any group differences observed in the outcome measures could be due to selection bias rather than treatment effects. For this reason, repeated measures analyses examining changes in the number of offences recorded per month for the 36 months before and 12 months after treatment start date are employed to investigate the impact of ISP on young offenders' contact with the criminal justice system. This type of analysis is more robust to the influence of potentially confounding factors than between group comparisons because each group effectively operates as their own 'control'.

METHOD

Changes in offending frequency in the 36 months[6] pre and 12 months post intervention are considered for three groups of ISP referrals: graduates (those who signed up and completed the program), terminates (those who signed up but did not complete the program) and non-participants (those who were referred to the program but did not sign up). The most common reason for referrals not signing up to ISP was lack of engagement (51%), lack of family support (21%) or crisis in the young person's family at the time of referral (10%). Lack of engagement was also a common reason for young people being exited early from ISP (38% of terminates). Other reasons for early program termination included the young person being placed in custody (13%) and change of primary care giver during the course of the program (11%).

Trends in offending frequency for the graduate and terminate groups are compared with trends in offending frequency for a comparison group of offenders who received a supervised community order or a court-referred YJC in locations where ISP was not available. Offending frequency was not considered for the non-participant ISP group because, as will be discussed later in the report, there were significant differences across the pilot sites in how these types of referrals were recorded. Treatment start date for offenders in the ISP groups was the date when the ISP referral for the offender was 'accepted' by the program manager. Treatment start date for the comparison group was the date when the supervised order commenced (using index court finalisation date as a proxy for order start date) or the YJC was finalised. Time spent in custody during the pre- and post-observation periods were also taken into account in the analysis.

DATA SOURCES

Juvenile Justice NSW provided BOCSAR (NSW Bureau of Crime Statistics and Research) with a data extraction from their Client Information Management System (CIMS) for all young offenders who were referred to ISP between 1 May 2008 and 30 June 2013. These data included information about participation in the ISP program as well as information on all supervised community based orders or YJC referrals for each of these offenders. The dataset comprised ISP referral records for 495 unique offenders with 3,152 community based orders or YJC referrals. Juvenile Justice NSW records were then linked to BOCSAR's Reoffending Database (ROD; Hua, & Fitzgerald, 2006) using the offender's first and last name, date of birth and Criminal Number Index (CNI). The comparison group was identified from ROD records. Police charge data and court finalisation data up until 30 June 2014 were extracted from ROD for each offender in the ISP and control groups.

TREATMENT AND COMPARISON GROUPS

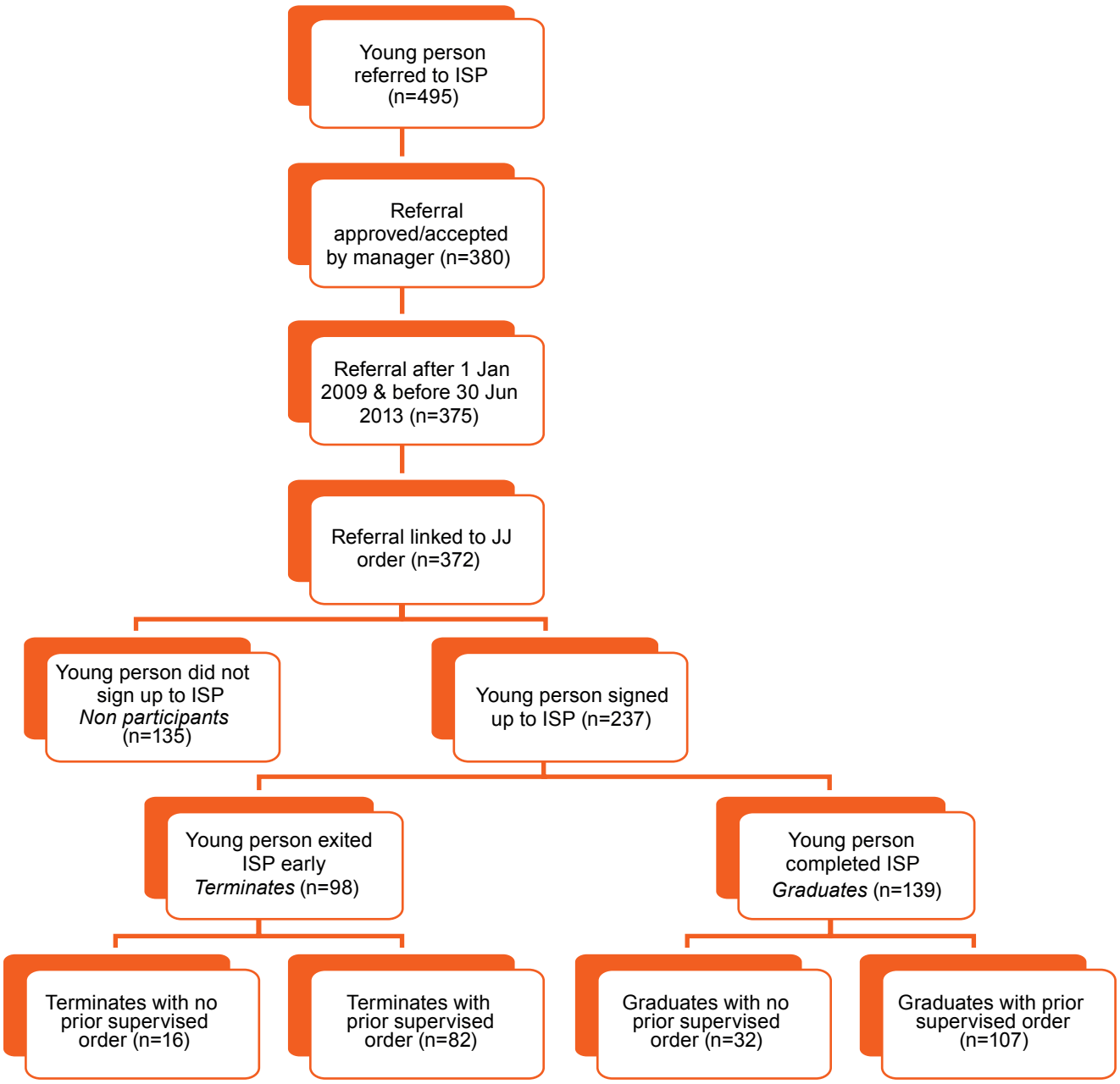
An offender was included in the treatment group if they had an ISP Referral ID recorded and were flagged as an 'approved' referral on the CIMS database. Only one referral record per offender was included in the analysis. If an offender was referred more than once to the ISP program, the earliest referral record was selected. Of the 495 young people with an ISP referral in the CIMS database, 380 people had an ISP referral that was approved or accepted by the ISP program manager and 29 of these offenders had more than one approved referral to ISP. Two offenders had an ISP referral that was approved after 30 June 2013, so were excluded from the analysis. In addition to the information regarding the offender's participation in ISP, the CIMS data extract also contained records on all community orders and YJCs for each offender referred to ISP.

To identify the index order generating the ISP referral, the order with the start date that was closest to the ISP approval date was selected (note that only orders commencing before or within one month of the ISP approval date were considered). Three offenders were removed from the analyses because an eligible index order could not be identified. This left 375 unique offenders in the treatment group for the offending analyses. After discussions with the program administrators and further scrutiny of the referral data, three offenders who were referred to the program in 2008 were excluded because the referral data for this period was thought to be incomplete. Of the remaining 372 offenders, 139 signed up and completed the ISP program, 98 signed up but did not complete the program and 135 were referred to the program but did not sign up.

Of the 372 offenders who were referred to ISP during the study period, 191 (51.3%) were referred to the Islington treatment site and 180 (48.4%) were referred to the Werrington treatment site (this information was not recorded for one offender). There were significant differences across these two treatment sites in the proportion of referrals who signed up to the program. In the Islington site, over a half of all referrals were recorded as having not signed up to the program, 33 (17.3%) signed up but did not complete and 57 (29.8%) signed up and completed. In the Werrington site, 33 (18.3%) were recorded as having not signed up to the program, 65 (36.1%) signed up but did not complete and 82 (45.6%) signed up and completed the program. Advice from the program manager suggests that these figures may reflect differences in referral processes and recording practices across the two pilot sites, rather than differences in the implementation of the intervention. This problem seems to be most relevant for the referral group who did not sign up to the program (non-participants). If this group is excluded, completion rates across the two sites are comparable (55.7% for Werrington; 63.3% for Islington). For this reason, the non-participant ISP referral group is described in the first section of the results but is not included in subsequent analyses.

The ISP eligibility criteria (specified above) were used to select a comparable group of offenders with which the ISP participants could be compared. This comparison group consisted of all young offenders (excluding those accepted onto ISP) who had a finalised Children's Court appearance between January 2009 and June 2013 and who received a supervised community order (e.g. suspended control order with supervision, bond with supervision, probation with supervision) of at least 6 months in duration at that index court appearance. Young offenders who had their court matter finalised by YJC between January 2011 and June 2013 were also included because the ISP eligibility criteria was changed in 2011 to include this type of referral.[7] Only offenders residing in major cities and inner regional areas (as defined the Australian Bureau of Statistics' Remoteness Index (ARIA) for the offender's postcode (ABS, 2005)) outside of the ISP catchment areas were included. Offenders with a sex offence as their principal offence and offenders aged 16.5 years or more at the index finalisation were excluded. Exclusions on the basis of YLS/CMI:AA were not applied to the comparison

Figure 1. Selection criteria applied to young people referred to ISP and allocation to treatment



group because this information was not reliably recorded for young offenders in this cohort. Information regarding living arrangements, primary caregiver support and mental health was also not available to be used as exclusion criteria. Only one record for each person was included in the analysis. If a participant had more than one supervised community order (or YJC court referral) during the study period then one record was selected at random.

OUTCOME VARIABLE

The primary outcome for this study is offending frequency. Offending frequency is measured using data on persons of interest (POIs) proceeded against by police. These data were extracted from the NSW Police Force's Computerised Operational Policing System (COPS) for each offender for the relevant pre- and post-observation periods. All criminal justice system contacts (e.g. court appearances, Criminal Infringement Notices, police-referred YJCs, Cannabis Cautions, formal

warnings and cautions under the Young Offenders Act 1997 (NSW)) are included in the definition of offending frequency. Breaches of custodial, community-based and violence orders are not counted, due to problems with the recording of offence date for these offences and the potential for breaches to be influenced by policing practice. Multiple charges with the same offence date are counted once (i.e. maximum number of offences per day = 1).

Given offending frequency depends upon the number of free days available to offend, time in custody was also considered in this analysis. In the multilevel model, 'days in custody' was included as an offset variable in order to measure offending frequency during 'free' time. 'Days spent in custody' is also a secondary outcome of the treatment program and is therefore modelled separately in the time-series analysis.

INDEPENDENT VARIABLES

The Independent Variable (IV) of interest in this study is whether or not the individual participated in ISP. The following control variables known to be associated with offending were also extracted from ROD (or the ISP database) and considered for inclusion in the analysis:

Gender

DOB – offender date of birth

Year – year of index event

Indigenous status – whether offender ever identified as Aboriginal or Torres Strait Islander at any court appearance

Postcode – postcode of residence at index court finalisation (control group) or postcode of residence at referral (treatment group)

SEIFA index – the Australian Bureau of Statistics' Socio Economic Index for Area (SEIFA) for the offender's postcode (ABS, 2001)

Remoteness classification – the Australian Bureau of Statistics' Remoteness Index (ARIA) for the offender's postcode (ABS, 2005)

Index date – date when the index court appearance or YJC was finalised (for comparison group) or referral 'acceptance' date (treatment group)

Index type – whether the index referral or finalisation was for a court or YJC matter

Age at first contact – age at first known caution, conference or court appearance

Time spent in custody – total number of days in custody each month for the 36 months preceding the index event and the 12 months after the index event

ISP Site Location – intervention site where the offender received MST services (Werrington or Islington)

Prior supervised community orders – number of court appearances prior to the index date at which offender received a supervised community order

Prior cautions – number of cautions issued under the Young Offenders Act 1997 prior to the index date

Prior conferences – number of youth justice conferences prior to the index date

ANALYSIS

In this evaluation two types of statistical analysis are conducted: a time series analysis and a multilevel analysis based on mixed models. The time series analysis estimates the long term dynamics in offending frequency and custody days over the 48-month observation period to determine whether there has been any change in these outcomes within each group over time. The second analysis, using multilevel models, is then used to test whether any changes observed over time are significantly different across groups while accounting for individual characteristics such as gender, Indigenous status, number of prior supervised orders and age at the intervention or index finalisation date. This multilevel analysis compares the different groups on the outcome variable whilst accounting for linear time trends and individual characteristics, as well as the dependencies between repeated measures within individuals using a random component in the model.

For the time series analysis, monthly aggregated counts of offending episodes and days in custody for 36 months prior to and 12 months after the index date were calculated for the graduates, terminates and the comparison group. Only individuals with a prior supervised order are included in the analysis because (as will become evident in the first section of the results) the treatment and comparison groups differed significantly on this characteristic. Due to the count nature of the data, its sparsity and over-dispersion, we conduct a time series analysis by fitting negative binomial generalized additive models (Wood, 2006). The advantage of these models is that we can estimate non-linear trends over time to obtain a clearer picture of the changes in offence frequency and days in custody before and after the intervention. In addition, variables measuring the effect of the ISP program after 6 and 12 months are examined to better understand and test program effectiveness. Similar analyses are carried out to study changes in custody over the same time period. Independence of model residuals is tested using Ljung-Box tests (Ljung & Box, 1978) and goodness of fit is measured using the R-squared adjusted values (Wood, 2006). Different models are compared using the Akaike Information Criterion (AIC; Akaike, 1974).

In the multilevel model analysis, the aim is not just to focus on time trends but also to take into account differences between individuals in demographics and other characteristics, as well as differences between individuals in the number of days spent

in custody during the observation period. Furthermore, the longitudinal nature of the data requires care when dealing with dependencies between repeated measures within individuals. In order to take all the aforementioned factors into consideration, we conducted a multilevel analysis based on negative binomial generalized linear mixed models (Pinheiro & Bates, 2006) to test for differences between groups. In addition, the models include variables (defined in the models as offset variables) counting the number of 'days in custody' for each individual in each month. This allows us to estimate the frequency of offending when individuals are 'free' to offend in the community. Computational issues arose when estimating the parameters for the multilevel model because of large differences in the size of the graduate and comparison groups. To deal with this problem, a subset of individuals (43%) in the comparison group was randomly selected and included in the analysis as a control group. Once again, the AIC is used for model selection and the analysis is restricted to individuals with a prior supervised order so as to render the groups more comparable.

RESULTS

CHARACTERISTICS OF ISP AND COMPARISON GROUPS

Table 1 presents demographic, index and prior offending characteristics for the ISP and comparison groups. Most offenders in the three ISP groups were male, non-Indigenous and resided in a major city and in an area of socio-economic disadvantage (SEIFA quartile 1 and 2). In addition, they had their first contact with the criminal justice system when they were aged between 13 and 14 years and were appearing before the

Table 1. Demographic, index offence and prior offending characteristics by group

Variable		Comparison group (n=2,406) (%)	ISP non participants (n=135) (%)	ISP terminates (n=98) (%)	ISP graduates (n=139) (%)
Demographic characteristics					
Age	<15	29.3	34.6	32.7	43.8
	15	38.4	38.4	50.0	38.7
	16+	32.3	27.1	17.4	17.5
Gender	Female	24.4	19.6	21.4	22.6
	Male	75.6	80.5	78.6	77.4
Indigenous status	Non-Indigenous	54.2	66.7	54.1	59.7
	Indigenous	44.9	30.4	45.9	38.9
	Unknown	0.9	3.0	0.0	1.4
SEIFA of residence	Quartile 1	27.3	32.6	31.6	36.0
	Quartile 2	35.1	26.7	27.6	22.3
	Quartile 3	25.0	36.3	37.8	30.9
	Quartile 4	12.6	4.4	3.1	10.8
ARIA of residence	Inner metro	51.3	89.6	92.9	95.0
	Inner regional	48.7	8.9	7.1	3.6
	Outer regional/remote/very remote	0.0	1.5	0.0	1.4
Age at first contact (caution, conference, court appearance)	10-12	24.1	23.3	35.1	25.6
	13-14	49.4	56.4	47.4	56.9
	15+	26.5	20.3	17.5	17.5
Index offence characteristics					
Year of index contact	2009	21.0	5.2	7.1	20.1
	2010	20.3	5.2	30.6	20.9
	2011	25.3	27.4	29.6	20.1
	2012	22.1	34.1	14.3	24.5
	2013/14	11.3	28.1	18.4	14.3
Type of index contact	YJC	17.7	24.4	17.4	12.2
	Court	82.3	75.6	82.7	87.8
Prior offending characteristics					
	5+ offences in 3 yrs prior	54.2	57.0	67.4	55.4
	5+ offences in 2 yrs prior	47.4	48.9	58.2	51.8
	5+ offences in 1 yr prior	26.8	29.6	39.8	33.1
	1+ supervised orders in 3yrs prior	23.4	74.8	83.7	77.0
	Control order in 3yrs prior	3.4	11.9	17.4	4.3

Note: Age was missing for 4 offenders, age at first contact was missing for 15 offenders and gender was missing for 4 offenders

Children's Court at their index contact. Offenders referred to ISP also had extensive prior offending histories. More than half had five or more offending episodes and over three-quarters had received a supervised order in the three years prior to their index contact. A much smaller proportion (between 4 and 17%) had previously been sentenced to a control order.

Comparing across the three ISP groups, there are some noteworthy differences. In particular, offenders who completed ISP were generally younger at the time of referral than both offenders who signed up to the program but did not complete (terminates) and those who were referred to the program but never signed up (non-participants). Also, compared with other ISP referrals, a higher proportion of offenders who signed up to ISP but did not complete the program were aged 10-12 at their first contact with the criminal justice system. A higher proportion of the terminates group also had five or more offending episodes in the three years prior to the index contact, had previously received a supervised order and had previously been sentenced to juvenile detention. ISP referrals who did not sign up to the program had a smaller proportion of offenders who recorded five or more offending episodes in the 12 months leading up to the index contact and a smaller proportion of Indigenous offenders compared with the other two ISP groups.

Offenders in the comparison group also differed significantly from offenders in the ISP groups on several key characteristics. Compared with ISP referrals, offenders in the comparison group were older and less likely to reside in inner metropolitan areas at the time that their matter was finalised. The most striking difference between the comparison and treatment groups was whether or not they had previously been under the supervision of Juvenile Justice. Seventy-five per cent or more of the ISP referrals had previously received a supervised order from the court compared with less than 25 per cent of the offenders included in the comparison group. A much smaller proportion of the comparison group had previously received a control order compared with ISP referrals who did not sign up or who signed up but did not complete. Similar to ISP graduates, less than five per cent of offenders in the comparison group had previously been sentenced to a control order. The ISP and comparison groups did not differ significantly in the number of offences recorded in the 3 or 2-year periods prior to the index finalisation date, however a much smaller proportion of the comparison group recorded five or more offending episodes in the 12 months prior to the index event compared with ISP referrals who signed up to the program.

Regardless of whether or not they signed up to the program or completed it, the vast majority of offenders who were referred to ISP offended in the 12 months after the referral, with over 70 per cent of offenders in each of the three groups recording at least one new offence (see Table 2). Similarly, a large proportion of offenders in the three ISP groups spent at least one day in custody during the 12-month follow-up period. However, compared with other ISP referrals, a higher proportion of offenders who were referred to ISP but did not complete the program were gaoled during the follow-up period. Nearly two-thirds of this latter group recorded at least one new custodial episode in the 12 months following referral, compared with a little less than half of the ISP graduates and 45 per cent of the referrals who never signed up to the program.

At the bivariate level, there were significant differences between the ISP and comparison groups for the outcomes measured during the follow-up period. Compared with offenders referred to ISP, a smaller proportion of the comparison group recorded a new offence in the 12 months following their court finalisation and fewer offenders spent time in custody during this 12-month follow-up period. But recall also that the ISP groups included

Table 2. Proportion reoffending and proportion spending time in custody after the intervention start date by group

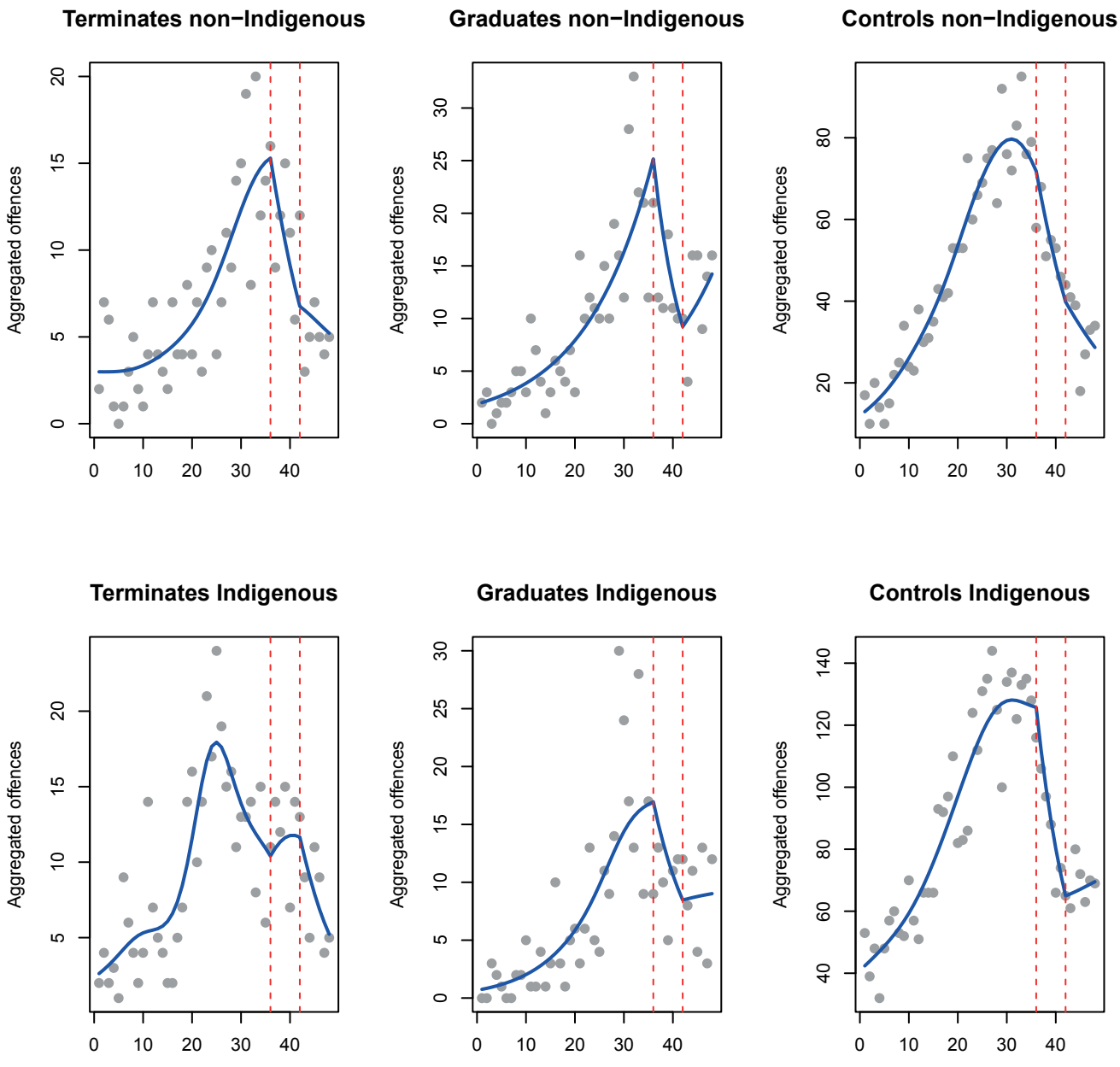
	New offence within 6 months of index (%)	New custodial episode within 6 months of index (>1day) (%)	New offence within 12 months of index (%)	New custodial episode within 12 months of index (>1day) (%)
All offenders				
Comparison group (n=2,406)	48.8	25.9	63.4	35.5
ISP non participants (n=135)	57.0	37.8	71.1	44.4
ISP terminates (n=98)	64.3	53.1	76.5	64.3
ISP graduates (n=139)	57.6	36.7	73.4	48.9
Offenders with a prior supervised order				
Comparison group (n=562)	60.1	42.7	74.7	54.6
ISP non participants (n=101)	58.4	41.6	70.3	49.5
ISP terminates (n=82)	59.8	48.8	73.2	61.0
ISP graduates (n=107)	57.9	33.6	72.9	45.8

a much higher proportion of offenders who had previously received a supervised order from the court compared with the comparison group. If we restrict the analysis to offenders with a previous supervised order (in order to render the groups more comparable), there are no significant differences across groups in the proportion reoffending in the 12 months post intervention. Amongst this reduced cohort, 75 per cent of the comparison group reoffended, 70 per cent of the ISP non-participants reoffended, 73 per cent of the ISP terminates and 73 per cent of the ISP graduates reoffended. Fewer ISP graduates spent time in custody during the follow-up period compared with other offenders, particularly in the first 6 months following the index date. In the 6 months post intervention, 43 per cent of the comparison group, 42 per cent of ISP non-participants, 49 per cent of ISP terminates and just 34 per cent of ISP graduates recorded a new custodial episode. This difference was not, however, statistically significant at the 0.05 level.

TIMES SERIES ANALYSIS

Figure 2 shows the total monthly counts of offending episodes for the 36 months prior to the index date and 12 months post intervention. These counts, broken down by Indigenous

Figure 2. Trend estimates (blue) of monthly offending episodes (grey) 36 months before and 12 months after the intervention start and end date (red) by Group and Indigenous status



status, are shown for three groups (terminates, graduates and the comparison group) and these three groups only include offenders who have a prior supervised order. Also shown in Figure 2 is the intervention period (marked by dotted vertical red lines indicating the start and end of this 6-month period) as well as the fitted trend line modelling changes in offending frequency over time. As seen in this figure, all the estimated trends display a nonlinear behaviour, going from an initial increasing trend in the number of offending episodes for all groups to a substantial decrease over the 6 months after the index date. For most of the groups, the peak in offending did not coincide with the intervention point but occurred several months prior to the start of the intervention period.

The time series models tested for the effect of the intervention both during the 6 months and the 12 months after (shown in the Appendix) the index date. These analyses show statistically significant reductions in monthly offence counts for the non-Indigenous ISP graduates as well as for the Indigenous comparison group who received a regular supervised order (or YJC outcome plan) in the 6 months post intervention (see Table 3). For all other groups, the time-series models found no evidence that the decrease in offending frequency observed in the latter part of the study period coincided with the index date.

Figure 3 displays the total monthly counts of days in custody for the two treatment groups and the comparison group over the same 48-month study period. Again the intervention period is defined by the two broken red lines, the data series are shown separately for Indigenous and non-Indigenous offenders and a fitted trend line is included. We can observe from the estimated trend that there was an increase in the total number of days spent in custody each month during the study period. For most groups this increasing trend continued throughout the entire study period (48 months). However, for ISP graduates there appeared to be a decrease in the number of days in custody whilst enrolled in the ISP program.

This was confirmed by the same time series analyses, which tested for intervention effects; the results of which are displayed in Table 4. As seen from this table, there was a statistically significant drop in custody days during the 6-month intervention period for both Indigenous and non-Indigenous ISP graduates. However, as is also shown in Figure 3, the trend in custody days began to rise (once again) after these Graduates completed the ISP program. There was no evidence of similar effects for offenders who signed up to ISP but did not complete the program or for offenders who received a regular supervised order or YJC without ISP treatment.

MULTILEVEL MODELS

In the multilevel analysis our aim is to conduct a longitudinal study in order to compare changes over time for the ISP graduates and the comparison groups, and to test for any group differences in these trends. To achieve this, we used mixed models, which include both time trends and a set of demographic and prior offending variables to account for differences across individuals. The demographic and prior offending variables included in the model were: age (10 to 14 or 15 to 17); Indigenous status and number of prior court appearances in the 36 months before the index date at which a supervised community order was imposed. In order to compare the effect of the intervention, we look at three time periods; before, during (0-6 months after index date) and after (6-12 months after index date) the intervention. Similar models were also estimated to study the effects of the ISP program 12 months after the index date and these models can be found in the Appendix.

Table 5 presents the estimated effects from the multilevel model. We see that offence frequency increases for both the comparison group and ISP graduate group prior to the intervention, and then decreases for both groups during and after the intervention. From the results we can see that, overall, the frequency of offending for the group of graduates is 1.73 times[8] lower than the comparison group during the same period. Furthermore, offenders with two, three or four prior supervised orders offended more frequently compared with those without a prior order. During and after the intervention period the frequency of offending decreased for both the ISP graduates and the comparison groups but, importantly, the rate of decrease was not significantly different across these two groups.

Table 3. Changes in offending frequency during 6-month intervention period by Group and Indigenous status

Indigenous status	Group	N	Intervention effect	*p*-value	R squared adjusted	Box-Ljung test *p*-value
Indigenous	ISP Terminates	37	0.64	0.33	0.66	0.46
	ISP Graduates	43	-0.77	0.21	0.54	0.68
	Comparison	345	-0.68	<.001	0.11	0.11
Non Indigenous	ISP Terminates	45	-0.75	0.13	0.65	0.80
	ISP Graduates	64	-1.44	<.001	0.61	0.61
	Comparison	216	-0.30	0.20	0.91	0.79

Table 4. Changes in days in custody during 6-month intervention period by Group and Indigenous status

Indigenous status	Group	N	Intervention effect	*p*-value	R squared Adjusted	Box-Ljung test *p*-value
Indigenous	ISP Terminates	37	0.23	0.75	0.88	0.13
	ISP Graduates	43	-1.79	0.01	0.72	0.31
	Comparison	345	-0.29	0.53	0.93	0.32
Non Indigenous	ISP Terminates	45	-0.55	0.67	0.79	0.98
	ISP Graduates	64	-1.68	0.01	0.85	0.61
	Comparison	216	-0.18	0.28	0.87	0.39

Figure 3. Trend estimates (blue) of monthly custody days (grey) 36 months before and 12 months after the intervention start and end date (red) by Group and Indigenous status

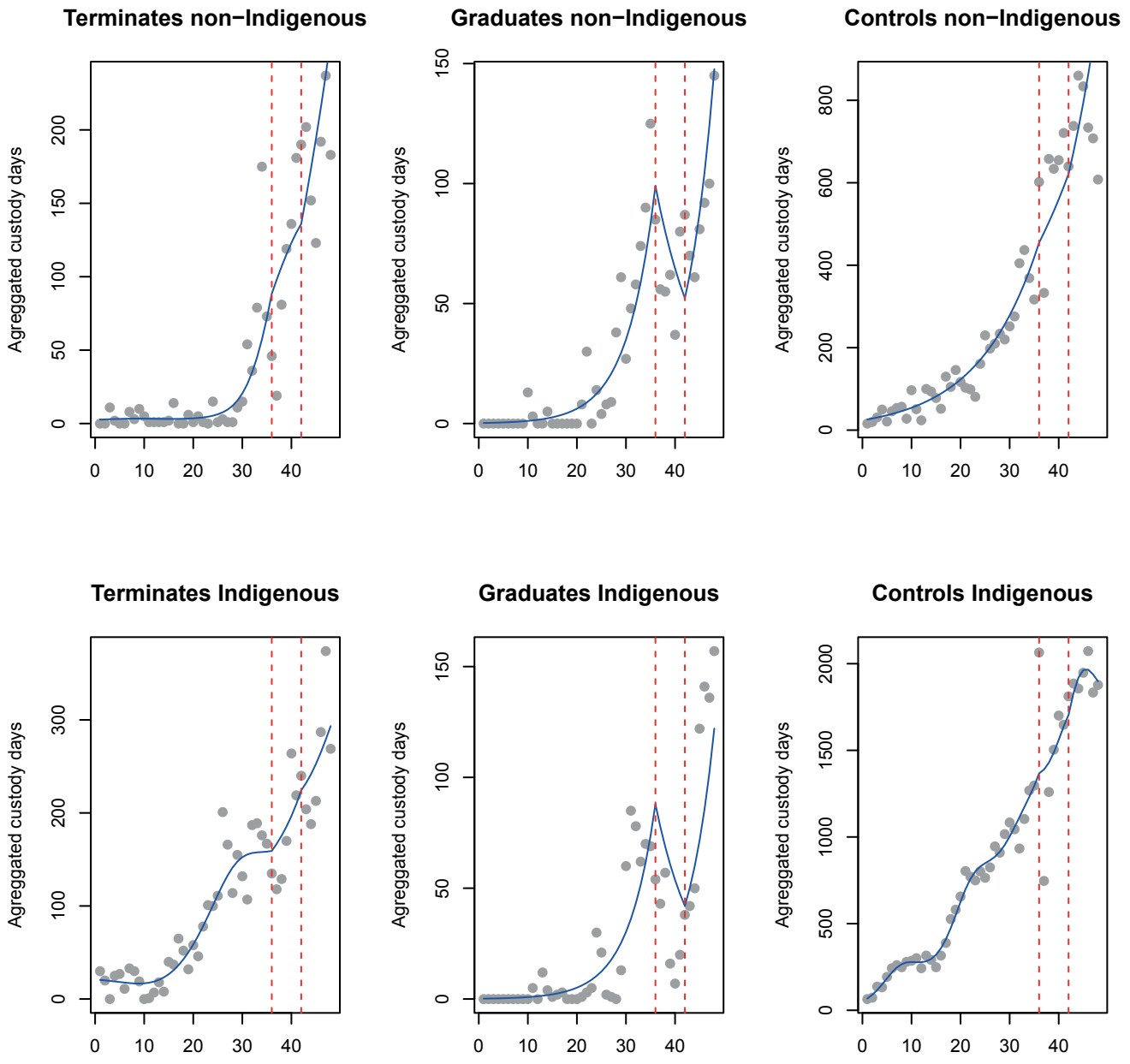


Table 5. Estimates from the longitudinal multilevel analysis predicting the frequency of offending for the ISP Graduates and Comparison groups before, during and after the ISP program was delivered

Coefficients	Estimates	Standard Error	*p*-values
Intercept	-4.79	0.09	<.001
Time	0.06	0.00*	<.001
Graduates vs comparison group	-0.55	0.08	<.001
Age 15-17 vs 10-14	-0.10	0.08	0.177
Indigenous vs non-Indigenous	0.17	0.07	0.014
2 prior supervised orders vs 1	0.30	0.08	<.001
3 prior supervised orders vs 1	0.62	0.12	<.001
4 prior supervised orders vs 1	1.12	0.22	<.001
5 prior supervised orders vs 1	0.60	0.41	0.014
Intervention period vs before	-1.04	0.08	<.001
After intervention vs before	-1.71	0.10	<.001
Graduates x intervention period	-0.01	0.15	0.940
Graduates x after intervention	0.05	0.17	0.774

Note: The standard error estimate is 0.00329

DISCUSSION

This study sought to determine whether ISP is more effective than conventional case management in reducing the offending of young people. To do this, the offending frequency of ISP participants who were referred and started the program was compared with the offending frequency of a group of young people who were sentenced to a supervised order of at least 6 months or who participated in a YJC (from 2011).

The results presented here provide weak evidence for an impact of the ISP program on the frequency with which young people offend. The time series analyses showed that there was an overall reduction in offending for ISP participants during the follow-up period but for most groups the decline commenced several months prior to the start of the intervention period so could not be attributed to the ISP program. The exception is for the non-Indigenous ISP graduate group. Our analysis provides some evidence that for this offender group, the reduction in offence counts observed during the follow-up period coincided temporally with the start of the intervention period. A similar pattern was observed for the treatment-as-usual comparison group. Initially there was a significant upward trend in offending frequency amongst our controls and then a downward trend during the follow-up period (i.e. after finalisation of their index matter). However, only in the case of Indigenous controls did the decline coincide with the start of the intervention period. The multilevel modelling comparing offending frequency for ISP graduates and controls (with a previous supervised order) confirmed the results of the time series analyses. For both groups of offenders, offending frequency was lower during and after the intervention compared with before the intervention, but the rate of decrease was not significantly different across groups.

The main differences between groups involved the time offenders spent in custody. The time series analysis provides good evidence that, at least for the time whilst they are being treated, offenders who complete ISP spend significantly fewer days in custody than other young offenders. There are two potential explanations for this effect; (1) the type of offences committed by ISP graduates during the intervention period may have been less serious in nature than offences committed in the months preceding or following the 6-month intervention and, for this reason, they were less likely to be remanded or sentenced to a control order; (2) the fact that ISP graduates were actively engaged in the MST program may have reduced their likelihood of being bail refused or receiving a control order for a new offence. ISP caseworkers would likely advocate for non-custodial sanctions for their client if the young person was picked up for a new offence and, if able to demonstrate to the judicial officer that the young person is committed to treatment and rehabilitation, mitigate the risk of custody, or at least reduce the total time that that young person is gaoled if a control order is imposed. The latter of these two explanations seems the more likely given that the amount of time spent in custody did not remain at these lower levels once the young person had completed their program and, further, that there were no group differences apparent in the offending frequency during the follow-up period. Regardless of the cause, the reduction in days in custody evident from our analysis is an important and positive outcome for ISP given the significant financial and social costs associated with youth incarceration.

Given the absence of a randomised trial we cannot definitively conclude that ISP has minimal impact on offending frequency over and above the usual effect of a supervised order as it is possible that there might be other uncontrolled factors which were not taken into account. Randomisation is the best way to ensure that we have a legitimate counterfactual with whom the treated individuals can be compared. To render the groups more comparable we opted to compare only offenders who had previously received a supervised order and we included controls in the models for prior offending, age, time in custody and Indigenous status. However it is possible that the treatment groups differed on other important factors that we have not been able to take into account in the multi-level models. The most obvious of these would be drug and alcohol use but other factors such as mental health, parental neglect and housing stability may also play an important role in predicting offending frequency.

Nevertheless, the current results are broadly consistent with previous evaluations of MST programs delivered to offenders in community-based settings; many of which have employed a randomised control design (see Hengeller 2012; Leschied, &

Cunningham, 2002; Littell, Campbell, Green, & Toews, 2005; Mitchell et al., 2008; Sundell, Hansson, Lofholm, Olsson, Gustle, & Kadesjo, 2008). Problems of program implementation have typically been cited as likely explanations for weaker or no treatment effects of MST in these contexts. While there was no monitoring data made available to us in order to assess program implementation in the case of ISP, there were significant variations in service delivery over the life of the program which could have impacted program effectiveness. For example, the ISP treatment model was altered in more recent years in order to include the young person in therapy sessions. Having the MST therapist work closely with both the primary care giver and the young person would seem more consistent with the intended purpose of the program and may have had an impact on how effective ISP was in the latter days of implementation. Other changes to ISP that have occurred since the program commenced in 2007/08 include: (1) broadening referral criteria to include YJC matters and (2) improving consistency across intervention sites in terms of who is referred and asked to sign up to the program. At the broader level, delivery of a therapeutic intervention within an organisation (such as Juvenile Justice) which traditionally has focused on case management and supervision of young people would present additional challenges for program managers, administrators and case coordinators.

Characteristics of the target population, in particular age, have also been found to moderate the effect of MST. A recent meta-analysis of MST evaluations reports that significant effects were only found in studies where the average age of the treatment sample was less than 15 (van der Stouwe et al. 2014); this is possibly because the primary caregiver, who the ISP therapists engage, may have greater involvement in the lives of these younger participants. It is noteworthy then that most participants included in our ISP sample were aged 15 or above (but a larger proportion of ISP graduates were aged less than 15). A moderating effect for prior arrests was also reported by van der Stouwe and colleagues (2014). However, in this case, larger effects of MST were evident in studies that had target populations comparable with the ISP sample. That is, effects were larger in studies where there were a higher proportion of previously arrested juveniles. Future research should examine the extent to which factors relating to program implementation and characteristics of the target population are able to account for the weak effects of ISP on offending frequency.

Before concluding, there are several shortcomings of the current work that should be noted. Firstly, offending was measured in our analysis using police data. Only a small number of offences committed by young people ever come to the attention of police so subtle changes in actual offending rates may not be detected in police recorded crime data. It could also be argued that ISP participants may be more likely than their treatment-as-usual counterparts to come to the attention of police when they commit an offence because they are under more intensive surveillance. This possibility was minimised by excluding breach offences from the monthly counts since these types of offences can be unduly influenced by policing practice. However, it is possible that other enforcement-driven offences, such as drug offences or conduct offences, may have had a differential impact on officially recorded crime for our ISP group compared with our controls. Additional data on self-reported offending patterns would augment the criminal justice system data reported here.

Secondly, while reducing reoffending is one of the primary outcomes of ISP, MST has been shown to deliver numerous other positive outcomes for young people who participate in these programs. Previous studies have identified significant improvements in psychiatric symptoms, social skills and externalising problem behaviours (e.g. Ogden & Hagen, 2006 and Leschied & Cunningham, 2002) amongst young people who have participated in MST, even in the absence of an overall effect of the treatment on official recidivism data. Demonstrable benefits for other family members emanating from the young persons' participation in MST have also been cited in the literature (e.g. Tighe et al., 2012 and Wagner et al., 2014). Evaluating changes in these additional outcomes was out of the scope of the current study but are real potential benefits of ISP that should be measured by subsequent research.

Thirdly, the reoffending analysis reported in this bulletin was restricted to a 12-month follow-up period. It is possible that the ISP program had more long-term effects on reoffending that are not captured by this study. Indeed, there is some evidence of a delayed treatment effect of MST on offending from a recent program implemented in the UK with evidence of larger intervention effects at the 18-month mark post intervention than the 6- or 12-month mark (Butler, Baruch, Hickey, & Fonagy 2011). Our study should therefore be replicated with a longer follow-up period to confirm the results reported here.

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NOTES

1. Life without barriers (LWP) is the designated network partner for ISP in Australia. The role of LWP is to support the agencies that are licensed to deliver ISP (in this case Juvenile Justice) by providing weekly supervision, ongoing

coaching and quarterly training to MST therapists. LWP also has a quality assurance function to ensure program fidelity (see http://www.lwb.org.au/children-and-young-people/youth-justice-services/ for further detail). MST primarily uses four measures to ensure fidelity to the model. The measures review adherence to the MST model from the perspective of therapist, supervisor, consultant, and combines the three into a regular report on a programmatic level. The specific measures are; (i) Therapist Adherence Measure - Revised (TAM-R) (ii) Supervisor Adherence Measure (SAM) (iii) Consultant Adherence Measure (CAM) and (iv) PIR (Program Implementation Review - bi yearly).

2. The program added an Aboriginal Team Advisor position to (a) follow up with referrals of Aboriginal families, (b) liaise with Aboriginal community organisations and (c) provide feedback in case planning and interventions. To compensate for any past negative experience of government agencies the program added an additional month of service to enhance engagement and support.
3. YLS/CMI-AA refers to the Youth Level of Service/Case Management Inventory – Australian Adaptation. This is a standardised instrument used by Juvenile Justice to identify the risk/need profiles of their clients. See Thompson and Pope (2005) for further details on this measure and its use within the Australian Context.
4. The MST treatment length was 5 months (6 months for Aboriginal families). Initially referral had a supervised order longer than 6 months. Over time the majority of referrals changed to young people with a 6-month supervised order. By the time Juvenile Justice Community Services (JJCS) had assessed the case and decided to refer to ISP a significant amount of time may have passed. To overcome this obstacle the 6-month criterion was dropped. Also as the referral pool shrunk, YJC families were accepted. These cases did not have a minimum time involvement with Juvenile Justice.
5. Referrals were made internally by JJCS or custodial officers.
6. 36 months was considered the most appropriate period to measure prior offending because offenders as young as 13 were included in the analysis. Offences committed prior to the age of 10 would not appear in the charge data examined here.
7. The inclusion of persons who had their matter finalised by way of a YJC did have the potential to 'dilute' the comparison group by including less serious offenders. However, this is dealt with in later analyses by just focusing on those who had a previous supervised order.
8. This value was calculated by exponentiating the corresponding estimated effect.

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APPENDIX

Table A1 shows the results from the time series analysis testing for effects of the ISP intervention on offending frequency during the 12 months after index date. As seen here, there is a significant reduction in monthly offence frequency in the 12 months post intervention for non-Indigenous offenders who took part in the program but did not finish (i.e. terminates). No other significant intervention effects were apparent. We cannot, however, rule out the possibility that such an effect was due to other confounding factors, such as time spent in custody.

Table A2 shows the results from the time series analysis testing for effects of the ISP intervention on days spent in custody during the 12 months after the index date. As seen here, there is a significant reduction in monthly custody days in the 12 months post intervention for non-Indigenous graduates from the ISP program as well as for the non-Indigenous offenders in the comparison group. However, as with offending frequency it is difficult to rule out the possibility that other factors might have influenced this outcome.

Table A3 presents the results for the multilevel analysis looking at the effects of ISP 12 months after the intervention. These results are consistent with the analysis reported earlier in this bulletin examining the effect of ISP during and after the intervention. As seen from Table A3, offending frequency decreased for both the ISP graduates and comparison groups in the 12 months after the intervention but there is no evidence for a significant difference between the two groups in the rate of this decrease.

Table A1. Changes in offending frequency during 12-month intervention period by Group and Indigenous status

Indigenous status	Group	N	Intervention effect	*p*-value	R squared adjusted	Box-Ljung test *p*-value
Indigenous	ISP Terminates	37	0.55	0.78	0.67	0.40
	ISP Graduates	43	-0.27	0.85	0.60	0.48
	Comparison	345	-0.88	0.14	0.87	0.09
Non Indigenous	ISP Terminates	45	-2.08	<.001	0.65	0.91
	ISP Graduates	64	-0.43	0.78	0.69	0.68
	Comparison	216	-0.70	0.17	0.91	0.82

Table A2. Changes in days in custody during 12-month intervention period by Group and Indigenous status

Indigenous status	Group	N	Intervention effect	*p*-value	R squared adjusted	Box-Ljung test *p*-value
Indigenous	ISP Terminates	37	0.84	0.62	0.88	0.10
	ISP Graduates	43	-1.70	0.07	0.54	0.22
	Comparison	345	-1.94	0.16	0.94	0.98
Non Indigenous	ISP Terminates	45	-2.46	0.29	0.82	0.97
	ISP Graduates	64	-2.07	0.01	0.76	0.59
	Comparison	216	-0.41	0.05	0.92	0.30

Table A3. Estimates from the longitudinal multilevel analysis predicting the frequency of offending for the ISP Graduates and Comparison groups before and after the ISP program was delivered

Coefficients	Estimates	Standard Error	*p*-values
Intercept	-4.79	0.09	<.001
Time	0.06	0.00*	<.001
Graduates vs comparison group	-0.55	0.08	<.001
Age 15-17 vs 10-14	-0.11	0.08	0.155
Indigenous vs non-Indigenous	0.17	0.07	0.016
2 prior supervised orders vs 1	0.30	0.08	<.001
3 prior supervised orders vs 1	0.62	0.12	<.001
4 prior supervised orders vs 1	1.13	0.22	<.001
5 prior supervised orders vs 1	0.60	0.41	0.016
12 months after intervention vs before	-1.28	0.08	<.001
Graduates x 12 months after intervention	0.02	0.13	0.868

Note: The standard error estimate is 0.00317

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