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Effects of the Practice Guide for Intervention (PGI) on behaviour change intervention dosage among community-based offenders

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Aims

To examine how implementation of the new Practice Guide for Intervention (PGI) model of supervision has contributed to delivery of behaviour change intervention dosage to target offenders in the community, relative and in addition to trends in delivery of the EQUIPS suite of offender programs.

Methods

This study examined trends in delivery of PGI and EQUIPS sessions between 1 January 2015 and 31 May 2018, among a target population of offenders serving community orders who were of medium or higher assessed risk of reoffending (n = 26,029). A difference in differences design was also applied to assess how PGI session dosage influenced EQUIPS participation and dosage outcomes for offenders of comparable risk and needs.

Results

Trends data indicated that the PGI has generated substantial increases in the average number of behaviour change intervention sessions received by offenders, compared to delivery of EQUIPS alone. This was associated with increases in both the volume of sessions delivered and reach to higher proportions of the target population. The PGI also appeared to affect trajectories of dosage so that offenders receive more intervention at earlier stages of their order. However, there was no indication that intensity of PGI dosage was associated with differences in the likelihood of participating in or completing EQUIPS, or in the number of EQUIPS sessions successfully attended.

Conclusion

The results of this study suggest that the PGI model has potential to increase the dosage of behaviour change intervention received by offenders in the community relative to structured group programs, and may be well placed to address gaps in service delivery such as intervention at early stages of the community episode and for offenders with shorter sentences. Indirect effects of the PGI on motivation and compliance with other interventions may improve as supervising officers continue to develop skills in delivering the model, and would benefit from additional research in the future.

INTRODUCTION

The Risk Need Responsivity (RNR: Andrews & Bonta, 2010) model provides an instrumental framework for interventions with offenders by describing what should be delivered, who it should be delivered to, and how it should be delivered. From an implementation perspective, the risk principle also raises important implications about how much intervention should be delivered, or treatment dosage. The risk principle primarily addresses considerations of treatment dosage in relative terms, whereby high risk offenders are prioritised for delivery of units (e.g. sessions or hours) of intervention and receive a greater intensity of units of intervention compared to medium, and in turn low, risk offenders.

Effective implementation of interventions also requires a consideration of the absolute dosage required to promote behaviour change and achieve outcomes such as reducing reoffending among target offenders. Definitions of sufficient dosage vary and are influenced by multiple factors including the range of criminogenic needs and responsivity characteristics of participants, in addition to the risk principle (e.g. Bourgon & Armstrong, 2005; Day et al., 2017; Yates, 2013). Analyses by Bourgon and Armstrong (2005) indicated that offenders require some 100 hours of behaviour change intervention to address moderate risk of reoffending and relatively few needs; 200 hours to address either high risk of reoffending or multiple complex criminogenic needs; and 300 hours to address both high risk and multiple criminogenic needs (see also Hanson & Yates, 2013).

Historically, RNR principles have been primarily developed around and applied to discrete, structured therapeutic interventions such as group offender treatment programs. For example, within Corrective Services NSW offenders of medium or higher risk of reoffending are commonly referred to the frontline EQUIPS suite of programs to address identified criminogenic needs. The EQUIPS programs are standardised modular format group interventions for offenders who have primary or foundational generalist criminogenic needs (EQUIPS Foundation); offenders who have needs associated with domestic violence towards intimate partners (EQUIPS Domestic Abuse) or other violent behaviours and expression of anger (EQUIPS Aggression); and offenders with substance use needs (EQUIPS Addiction). EQUIPS programs are delivered to offenders in custody and the community by specialist facilitators over a series of 20 two hour sessions.

Models of community supervision and implications for dosage

There has also been growing recognition that supervision of offenders in the community in accordance with RNR principles has substantial potential to promote behaviour change among offenders at the population level (e.g. Cullen et al., 2017; NSW Department of Justice, 2018). A large number of offenders are required to engage in regular sessions of supervision with corrections officers as part of their community sentence or parole following release from custody. For example, the Community Corrections division of Corrective Services NSW received more than 25,000 new offenders and maintained an average active caseload of 19,137 offenders over the 2017/2018 financial year (Corrective Services, 2018), the majority of whom would be required to undergo routine face to face and other contacts with a supervising officer. While supervising officers have requirements to ensure compliance to legal orders, they also have extensive opportunities to develop positive working relationships with offenders and structure sessions in a manner that addresses criminogenic needs (e.g. Cullen et al., 2017; Gleicher et al., 2013; Pearson et al., 2011).

The functions and activities of community supervision have historically been understudied

(Pearson et al., 2011) and supervising officers have often had relatively little guidance or oversight into the content of their sessions with offenders (Gleicher et al., 2013). This has led to a proliferation of various roles for supervision sessions including social work, psychotherapy, compliance, surveillance, intensive punishment-based supervision, and others (Pearson et al., 2011). Consistent with this, a seminal study by Bonta and colleagues (2008) found that despite having a case management system of community supervision that adhered to RNR principles in the Canadian province of Manitoba, officers showed a substantial degree of variation in the activities of their unstructured supervision sessions and often tended towards more compliance oriented functions. Partly as a result of the variability of supervision practices in addition to the prevalent focus on compliance or punishment, community supervision has previously been found to have minimal impact on reoffending outcomes (e.g. Drake et al., 2006; Lowenkamp et al., 2010). Under such conditions, community supervision may not be considered to consistently comprise effective behaviour change intervention or contribute to the dosage of intervention provided to an offender as part of their case management.

Over the past decade or more a number of models have been developed to improve the consistency and behaviour change orientation of community supervision. Models such as the Strategic Training Initiative in Community Supervision (STICS: e.g. Bonta et al., 2011; 2013) and the Effective Practices in Community Supervision (EPICS: e.g. Smith et al., 2012) programs have provided training to supervising officers in order to promote their adherence to RNR principles and ability to identify and intervene with offenders' criminogenic needs in sessions. Using a more content oriented approach, the Citizenship model links identification of risk and needs with delivery of a series of intervention modules by supervising officers (as well as external agencies) in areas relating to alcohol misuse, drug misuse, lifestyle and associates, relationships, and wellbeing (Bruce & Hollin, 2009; Pearson et al., 2011). A developing evidence base has indicated that implementation of these and similar models has been associated with various improvements in the consistency and focus of supervision, including increased focus on criminogenic needs and use of cognitive behavioural techniques in sessions, in addition to improved reoffending and other outcomes of supervision (e.g. Bonta et al., 2011; 2013; Lowenkamp et al., 2012; Pearson et al., 2011; Robinson et al., 2011; Smith et al., 2012).

Following from these international examples, Corrective Services NSW has implemented the Practice Guide for Intervention (PGI) model of community supervision. The PGI is a content oriented model comprising a series of 56 exercises across 13 modules that can be applied to assist case formulation in accordance with RNR principles and address offenders' criminogenic needs in supervision sessions. A primary associated innovation is the development of a comprehensive User Guide that provides simple structured activities and guidance for behaviour change interventions for various identified needs (Corrective Services NSW, 2016). A second component of the PGI is the introduction of a statewide team of Practice Managers that act as a supervisory group to monitor officers' delivery of PGI content and provide routine feedback and skills development. The PGI was introduced to Community Corrections officers on a voluntary basis in June 2016 and became a mandated component of service delivery to offenders of medium or higher risk from July 2017 (see also Thaler et al., 2019).

The present study

Implementation of behaviour change interventions in routine supervision sessions has the potential to substantially change how offenders access and receive intervention dosage, relative to traditional structured group programs. Consistent with this, the PGI was developed with aims to both

supplement and support interventions provided in other behaviour change programs and referrals, and to enable offenders to engage in intervention under conditions where there is a lack of relevant programs or external service providers (Corrective Services NSW, 2016). In this regard the PGI may complement or address limitations to a behaviour change model that is predicated on structured group interventions such as the EQUIPS suite of programs alone, including the limited availability of trained staff and logistics of securing offenders' placement in and regular attendance to capacity-limited and geographically dispersed group programs for specific needs.

The first aim of the current study is to quantify how the PGI contributes to delivery of behaviour change interventions to priority offenders in the community by Corrective Services NSW. To achieve this we examined trends in the delivery of sessions with behaviour change content to eligible offenders in accordance with the PGI model, relative to and in addition to existing methods of delivering such content in the form of the frontline EQUIPS programs. One innovation associated with implementation of the PGI is the requirement for supervising officers to record when they used PGI exercises with offenders in sessions and the area for intervention or module applied, which allows for measurement of the number of behaviour change sessions delivered in a similar manner to EQUIPS. We aimed to assess multiple interacting trends that are relevant to intervention dosage including the volumes of sessions delivered, the extent of reach to the population of eligible offenders in the community, and trends in cumulative delivery across the timeframe of the supervision episode.

The second aim of this study is to explore whether the PGI has had additional, indirect effects on delivery of intervention dosage by impacting the likelihood that offenders participate in and complete other behaviour change programs, in this case EQUIPS. The PGI model is intended to improve offenders' engagement in case management by encouraging them to collaborate in and take ownership of the aims and activities of supervision (Corrective Services NSW, 2016). It is well established in the therapeutic literature that agreement on tasks and goals is a critical factor in intervention outcomes, including with offenders (e.g. Bordin, 1979; Horvath et al., 1991; Taft & Murphy, 2007). In addition, the PGI model encourages officers to schedule exercises so that they are relevant to and reinforce an offender's concurrent participation in modules of the EQUIPS programs, which may further contribute to engagement in or compliance with the program over time. To this end we employed a difference in differences design to examine EQUIPS participation and dosage outcomes across offenders who have equivalent risk and prioritisation for programs, although are expected to receive differing levels of PGI session dosage as a function of discontinuities in service delivery standards.

METHODS

Data and Sampling

The sample for this study comprised offenders who had commenced community supervision (resulting from a community based order or parole) with Community Corrections between 1 January 2014 and the data census date of 31 May 2018. In accordance with eligibility criteria for participation in EQUIPS as well as routine delivery of non-mandatory PGI modules, all offenders in the sample were required to be of medium or higher risk as assessed by the Level of Service Inventory – Revised (LSI-R: Andrews & Bonta, 1995). This derived community episodes for a total sample of 26,029 unique offenders.

It is noted that outcomes for this cohort were only assessed over the period starting from 1 January 2015 until the data census date. The EQUIPS programs were not instituted in current form until January 2015 and reliable data on equivalent programs was not available prior to this time. Our

sampling approach was intended to provide a lead-in time to measurement of outcomes so that an established cohort of supervised offenders was available at the time of measurement.

Data for this study were extracted from the Corrective Services NSW Offender Integrated Management System (OIMS), which is used to collate and manage demographic, sentencing, episode, operational, and intervention data for all offenders under supervision by Corrective Services NSW. Variables of interest from OIMS included offenders' community episode characteristics; their assessed actuarial risk of reoffending; their monthly participation in supervision sessions with PGI content; and EQUIPS program outcomes including referral, participation, monthly number of sessions delivered, and completion status.

Analytical plan

Outcome variables

Primary analyses of treatment dosage in this study applied data relating to delivery of supervision sessions with PGI behaviour change content and delivery of sessions of EQUIPS. It is noted that reporting of PGI use in OIMS includes mandatory planning and assessment exercises (module 1) that are used for the initial case management formulation process, in addition to discretionary delivery of PGI exercises from modules that are oriented towards behaviour change (modules 2-13). For the purposes of this study only sessions involving delivery of PGI content from modules 2-13 were included in calculations of dosage, and sessions solely containing content from module 1 were excluded.

While calculations of dosage typically refer to number of hours (e.g. Bourgon & Armstrong, 2005; Yates, 2013) this approach could not be readily applied to both EQUIPS and PGI data. A significant limitation is that it is unclear from the available data as to the duration of community supervision sessions or what proportion of each session was used to focus on PGI content. As such our definition of dosage is based on counts of sessions of EQUIPS and PGI, which may not be directly equivalent to number of hours of intervention delivery.

Analysis of trends

Analyses of trends in treatment dosage employed variations on two techniques, including analysis of population wide delivery of EQUIPS and PGI by Corrective Services NSW per sequential month, and subpopulation comparison of session delivery outcomes for groups of offenders who underwent supervision in the community either before (pre-PGI) or after implementation of the PGI (post-PGI).

Introduction of the PGI followed a staged process in which Community Corrections staff were encouraged to become familiar with the model and increasingly apply exercises with offenders from June 2016. Delivery of the model became nominally mandatory from December 2016, whereas related key performance indicators requiring business as usual delivery of PGI exercises in 70% or more of sessions with eligible offenders were instituted from June 2017 (see Thaler et al., 2019).

To account for this transitional phase of PGI implementation we defined pre-PGI and post-PGI groups as those offenders who commenced their supervision order between 1 May 2015 and 31 May 2016 (n = 4,532), and between 1 May 2017 and 31 May 2018 (n = 3,798), respectively. For these cohort level analyses outcomes were examined for up to the first 12 months of each offender's supervision episode, in order to account for data censoring dates and limit cross-measurement across pre-PGI and post-PGI periods.

Analyses for population level trends in PGI and EQUIPS session delivery were largely assessed at a descriptive level. Basic non-parametric tests of outcomes across subpopulations (e.g. Wilcoxon rank-sum tests) and covariance with time (e.g. Kendall's tau-b) were also applied to assess the

significance of group differences and trends where noted.

PGI dosage effects on EQUIPS outcomes

Additional analyses aimed to assess whether receiving increasing PGI dosage has an effect in improving participation outcomes for the EQUIPS programs. A challenge in interpreting such data is that natural variance in the delivery of PGI exercises to offenders may be a function of factors that could also be expected to influence their priority for or likelihood of progressing in EQUIPS, such as their risk level or severity of needs. A number of studies have shown that program non-participation and non-completion show significant covariance with risk factors for reoffending (e.g. Howard et al., 2018; Larochelle et al., 2011; Olver et al., 2011), which may then interact with dosage outcomes for both the PGI and EQUIPS. An additional complexity is that EQUIPS has undergone changes in resourcing and availability over time and thus would be expected to covary across pre-PGI and post-PGI cohorts.

To account for these factors we identified a discontinuity whereby offenders have comparable risk and needs profiles although receive different dosages of supervision. According to the Community Corrections Service Delivery Standards, offenders with higher risk and severity of needs as assessed by the LSI-R receive more intensive supervision, including priority for intervention programs and frequency of supervision sessions.

Significantly, offenders of comparable risk and needs also receive supervision more or less frequently according to their score on the Community Impact Assessment (CIA), which is a tool developed by CSNSW to assess the potential category, severity, and public impact of reoffending. These Service Delivery Standards based on LSI-R and CIA assessments have remained operational and in current form throughout the period of measurement in this study.

For the purposes of this study we identified medium-high to high risk offenders who were allocated to Tier 1 and Tier 2 of the Service Delivery Standards. Offenders in the two tiers have the same priority for interventions such as EQUIPS although are scheduled to receive face to face sessions with their supervisor once every week (Tier 2) or once every fortnight (Tier 1). It is therefore expected that offenders in Tier 2 would receive up to twice as much PGI dosage compared to those in Tier 1.

A difference in differences design was then applied to compare interactions of EQUIPS outcomes between offenders in the Tier 1 (n = 701) and Tier 2 (n = 719) groups from the pre-PGI cohort, and between offenders in the Tier 1 (n = 342) and Tier 2 (n = 452) groups within the post-PGI cohort. Binary logistic and Poisson regression models were developed to assess multiple dosage outcomes of interest including likelihood of participation in EQUIPS among those who received a referral to programs; likelihood of completion among offenders who participated in EQUIPS; and count of sessions among offenders who participated in EQUIPS.

As a result of differences in proximity to the data censoring date, post-PGI offenders had a shorter average supervision measurement period (mean = 6.5 months; SD = 2.66) compared to pre-PGI offenders (mean = 10.3 months; SD = 2.33), and therefore less opportunity to engage in EQUIPS participation pathways. To adjust for these differences we included supervision measurement period as a critical offset variable for each of the regression models of EQUIPS participation outcomes.

RESULTS

The target community sample

Figure 1 shows the monthly number of offenders under active community supervision with an assessed recidivism risk of medium or higher between January 2014 and May 2018. Because the sampling approach for this study only includes offenders who commenced their supervision episode over the measurement timeframe, the 2014 time period was included to allow for accumulation of offender episodes and was not used to examine trends in dosage outcomes. The observed peak of 8,733 active supervised offenders in September 2015 was followed by declines to a steady population of some 5,000 supervised offenders per month from mid-2016.

The observed variations in sample size are an artefact of the sampling procedure and delays in establishing equilibrium between new offenders commencing episodes and others completing their order as opposed to population trends. However, there is the implication that dosage delivery outcomes may be influenced to some degree by fluctuations in the offender sample. To address this, the following analyses report population adjusted rates and averages where appropriate.

Trends in PGI and EQUIPS session delivery

Figure 2 shows trends in the gross monthly count of sessions of EQUIPS and PGI delivered to the target offender population between January 2015 and May 2018. It can be seen that the total number of sessions of EQUIPS delivered in the community has fluctuated on a monthly basis although has not shown evidence of growth trends since the suite of programs was implemented in 2015 (mean = 1,745 sessions; SD = 679.7; τ = .40; p = 0.90).

Figure 1. Counts of offenders in the target population commencing supervision orders by month.

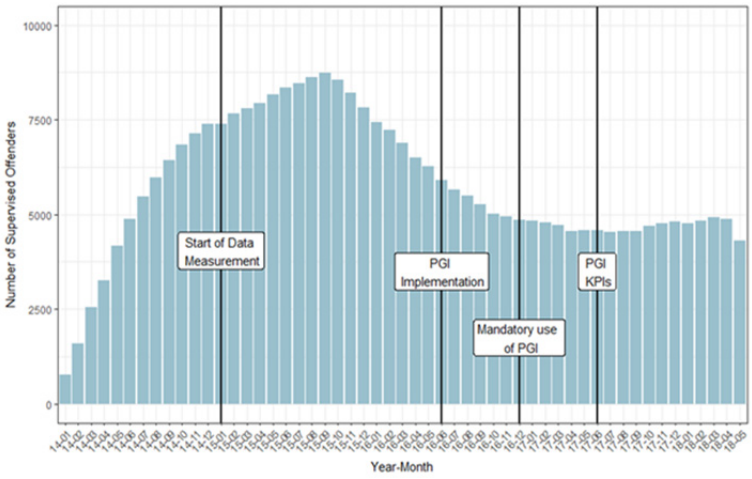
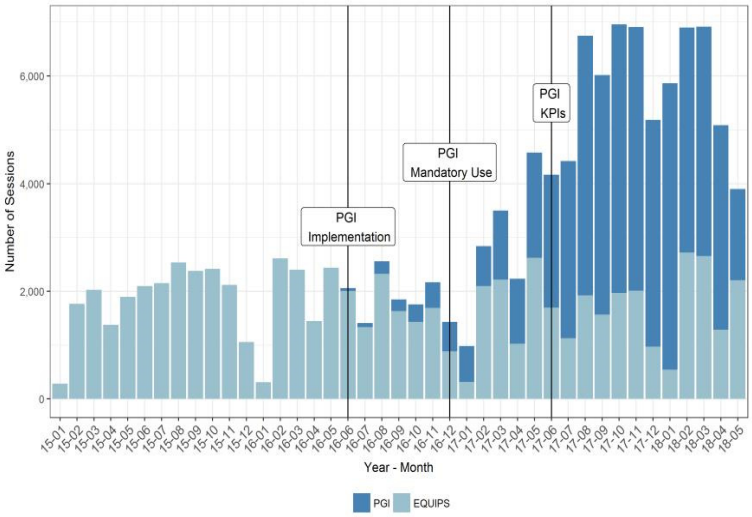


Figure 2. Counts of sessions of EQUIPS and PGI delivered to the target population by month.

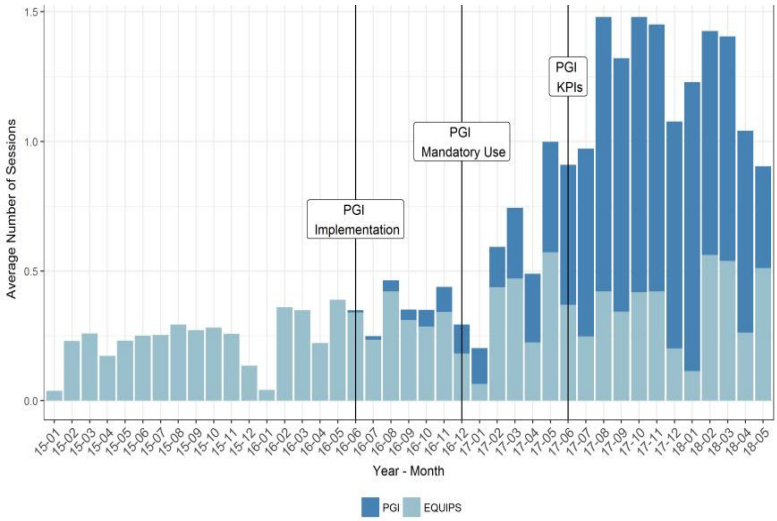


Delivery of PGI sessions has shown significant growth trends since the model was introduced on a discretionary basis in June 2016 (τ = .72; p <.001). Session delivery was relatively infrequent during the initial discretionary period although grew after the introduction of mandatory use requirements. It is noted that initial low PGI delivery rates are emphasised by counting of only those optional PGI modules with behaviour change content, whereas Community Corrections officers have most frequently applied the mandatory assessment module since the model was introduced (Chong et al., 2017). Following the

introduction of business as usual KPIs in June 2017 the PGI delivery volume has grown rapidly and averaged 4,176 sessions per month over the past 12 months (SD = 1,004.0)[1].

Considering the intervention trends in combination, Figure 2 indicates that CSNSW had available resources to deliver less than 2,000 sessions of EQUIPS to the target population per month on average. With the addition of the PGI, this capacity expanded to reach a total volume averaging 5,900 sessions per month in the business as usual PGI period following June 2017 (SD = 1107.4). Total session volume peaked at 6,961 sessions in October 2017.

Figure 3. Population adjusted average number of EQUIPS and PGI sessions received per offender in the target population per month.



In order to account for fluctuations in the target population over time, Figure 3 shows the population adjusted average monthly rate of session delivery per offender of medium or higher risk. It can be seen that on average, delivery of EQUIPS sessions across the target population has equated to around a quarter to a half a session per offender per month (M = 0.30; SD = 0.13). There is some indication that the population adjusted rate of EQUIPS session delivery has increased over the timeframe of measurement (τ = .55; p <.01).

Implementation of the PGI has again corresponded with improved capacities for population adjusted rates of session delivery relative to EQUIPS. While the PGI has been associated with delivery of an additional 0.5 sessions per offender on average over the lifespan of the intervention (SD = .41), this increase is more pronounced when considering the current business as usual phase of PGI operations from June 2017 (M = 0.86; SD = 0.22). Consistent with this, average PGI delivery per offender in the target population has shown significant increases since initial implementation (τ = .70; p = <.001). This equates to a combined dosage of 3-4 times the number of sessions per offender per month in the current phase of PGI operations from June 2017 (M = 1.22; SD = 0.23) compared to EQUIPS alone (M = .23; SD = .09).

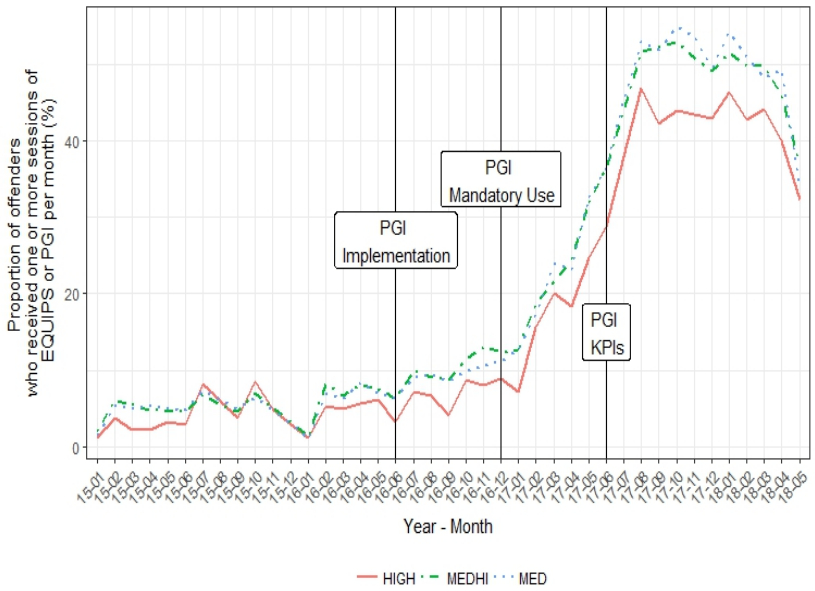
From an operational perspective, increased delivery of intervention sessions to the target population could be a function of two trends. The first is that intervention is oriented towards a similar number of offenders in the target population while increasing the intensity or number of sessions received by those offenders. The second is that intervention shows increasing reach or provides sessions to an increasing number of offenders in the target population. Reach is an important factor in delivery of dosage at the population level, and is an intended benefit of implementing PGI sessions as part of existing community supervision frameworks.

Figure 4 shows trends in the proportion of offenders in the target population who received one or more session of EQUIPS or PGI per month. Separate trends are shown for offenders of medium, medium-high, and high risk of reoffending, which acts as an indicator for priority for more intensive intervention. The graph illustrates that prior to implementation of the PGI,

[1] Declines in PGI session delivery and other outcomes in the last 1-2 months of the observation period most likely represent incomplete data and effects of censoring as opposed to any known changes in PGI operations or policy resulting in reductions in use of the modules.

less than 10% of all offenders in the target population received one or more sessions of EQUIPS (M = 5.01%; SD = 2.06). When considering EQUIPS and PGI in combination, the proportion of offenders who received a session or more of dosage increased substantially. In the current phase of PGI operations since June 2017, almost half of the target population received a session or more of EQUIPS or PGI per month (45.64%; SD = 6.71). Delivery of sessions to the target population reached a peak of 53.3% in October of 2017.

Figure 4. Proportion of offenders in the target population who received one or more sessions of EQUIPS or PGI per month, by LSI-R risk category.



Interestingly, Figure 4 indicates that trends in reach of behaviour change interventions to the target population have not shown clear variation as a function of offenders' risk profiles. Delivery of both EQUIPS and PGI dosage has been consistently more prevalent for offenders in the medium and medium-high categories of risk compared to high risk offenders across the timeframe of measurement.

Cumulative dosage over the supervision episode

The following section explored how the PGI model can impact trajectories of intervention dosage over the course of target offenders' community supervision episodes. To achieve this we examined patterns of dosage over the first 12 months of supervision when delivered by EQUIPS alone (pre-PGI) and when delivered by both EQUIPS and PGI during the current operational phase of PGI implementation (post-PGI).

Given that the within-supervision format of the PGI potentially allows for both greater opportunity to intervene and reductions in operational barriers to intervene compared to EQUIPS, we aimed to assess how the offender cohorts differed in terms of accumulation of dosage over the course of the supervisory episode (up to 12 months), as well as how early and how quickly they accumulated dosage during the episode.

Figure 5 shows the average monthly accumulation of session dosage over the first 12 months of supervision, for offenders in the pre-PGI and post-PGI cohorts. To account for variation in the length of supervision across offenders, accumulation was calculated as the mean total number of sessions received up to the month of interest, for all those offenders who had supervision up to or surpassing the month of interest.

It can be seen from Figure 5 that in the pre-PGI cohort (left panel), offenders could expect to receive an average of 3.5 (SD = 0.4) sessions of EQUIPS over the first 12 months of supervision, with incrementally increasing session delivery over the course of the year. A similar pattern of EQUIPS session delivery was also observed in the post-PGI cohort (right panel), so that rates of EQUIPS session accumulation after 12 months were not significantly different across the groups (p = .07).

On average, offenders in the post-PGI cohort were also estimated to receive an additional 14.5 PGI sessions over the 12 month observation period. As a result, offenders in this cohort were estimated to receive a total of 21.5 (SD = 3.2) EQUIPS and PGI sessions over a 12 months of supervision on average. PGI session delivery contributed a relatively consistent proportion of total dosage received over the supervision period, corresponding to 67.8% of estimated session dosage accumulation over 6 months and 67.4% of dosage accumulation in the first 12 months on average.

Figure 5 also suggests that addition of PGI sessions may act to facilitate early delivery of behaviour change intervention dosage, as shown by more rapid accumulation of PGI sessions relative to EQUIPS sessions. This will be explored in greater detail in the following analyses.

Accumulation of session dosage across the total offender cohort provides an incomplete picture of trajectories of intervention over the supervision period. Such data are conflated by variation in population reach and calculate gross averages that include offenders who might previously not be priority targets for intervention, in addition to those who would be expected to receive intensive intervention in both cohorts. Figure 6 considers how implementation of the PGI has influenced active intervention pathways by including only those offenders in the pre-PGI and post-PGI cohorts who participated in one or more EQUIPS program.

Consistent with the average duration of EQUIPS programs and variance in completion rates, participating offenders in the pre-PGI cohort were

Figure 5. Average accumulation of EQUIPS and PGI sessions over the first 12 months of supervision for all offenders in the pre-PGI cohort (left panel) and offenders in the post-PGI cohort (right panel).

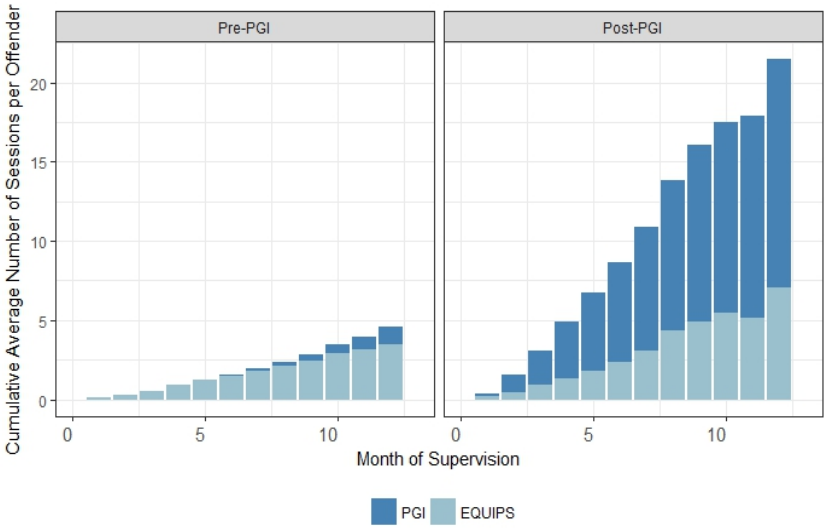
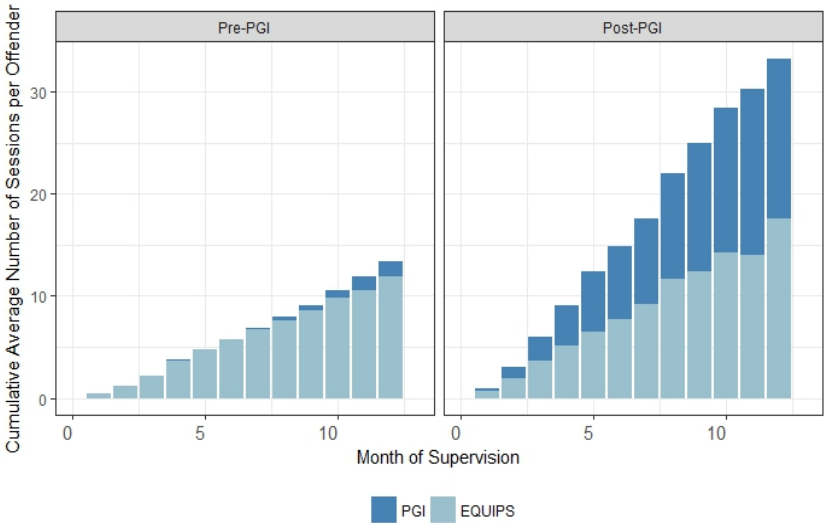


Figure 6. Average accumulation of EQUIPS and PGI sessions over the first 12 months of supervision among offenders who had participated in EQUIPS, for offenders in the pre-PGI cohort (left panel) and offenders in the post-PGI cohort (right panel).



estimated to receive 11.9 (SD = 2.97) sessions of EQUIPS on average over the first 12 months of supervision. Offenders who attended EQUIPS in the post-PGI cohort were observed to receive a higher number of EQUIPS sessions over the supervision measurement period on average (M = 17.6, SD = 3.82); however this difference was not significant (p = .18). After accounting for the additional delivery of PGI sessions, offenders in the post-PGI cohort were estimated to receive an average of 33.2 sessions over the first 12 months

of their supervision episode. Receipt of PGI sessions comprised 48.4% of total dosage accumulation over 6 months and 47.1% of dosage accumulation over 12 months on average for offenders in this cohort.

As previously noted, the PGI model could also confer differences in when offenders receive intervention dosage across the supervision period, relative to participating in EQUIPS. To assess this we compared proportions of total session dosage received over 12 months that was delivered in each of the months, either in the form of both EQUIPS and PGI (post-PGI) or in the form of EQUIPS alone (pre-PGI).

Figure 7. Average proportion of 12-month PGI and EQUIPS session dosage received at each month of supervision among offenders who had participated in EQUIPS, by PGI cohort.

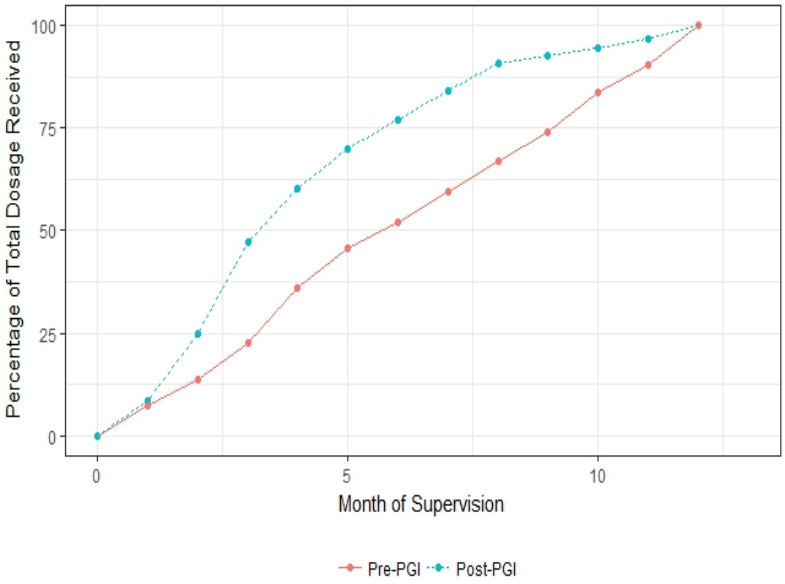


Figure 7 indicates that offenders who received both EQUIPS and PGI showed a steeper rate of accumulation of sessions, compared to those who received EQUIPS only. Offenders in the post-PGI cohort showed pronounced increases in dosage over the initial months of supervision that appeared to plateau after 8-9 months. As an illustration, offenders in this cohort were estimated to receive 77.1% of their 12 month total accumulated sessions in the first 6 months of supervision. In contrast, offenders in the pre-PGI cohort showed more linear growth in dosage over the supervision period and were estimated to receive half (51.9%) of their 12 month total accumulated sessions in the first 6 months.

Effects of PGI dosage on EQUIPS participation outcomes

A series of regression models were developed to estimate differences in EQUIPS participation and dosage outcomes for Tier 1 and Tier 2 offenders of medium-high to high risk in the pre-PGI and post-PGI cohorts. Each of the models entered PGI cohort (pre-PGI; post-PGI) and Tier (Tier 1; Tier 2) as categorical predictor variables and supervision measurement period as an offset variable. In accordance with the difference in differences design, a significant impact of PGI dosage on EQUIPS outcomes may be detected from a significant interaction effect, marked by improved outcomes for the post-PGI Tier 2 group relative to both Tier 1 groups in addition to the pre-PGI Tier 2 group.

Manipulation checks

Prior to conducting regression models in this section we examined whether supervision session and PGI delivery outcomes varied as a function of Tier of the Service Delivery Standards as expected. Separate Wilcoxon rank-sum tests were conducted to compare the average number of supervision sessions offenders in Tier 1 and Tier 2 received per month for each of the pre-PGI and post-PGI cohorts. As indicated in Table 1, Tier 2 offenders received a significantly higher number of supervision sessions than Tier 1 offenders in both the pre-PGI cohort ($Z = -9.62$; $p < .001$) and in the post-PGI cohort ($Z = -4.96$; $p < .001$).

An additional Wilcoxon rank-sum test for the post-PGI cohort only indicated that offenders in Tier 2 received a significantly higher number of PGI

sessions per month on average compared to offenders in Tier 1 (Z = -3.10; *p* = .002). Taken together, the results indicate that offenders' allocation to Tier of the Service Delivery Standards has a significant impact on their supervision and PGI session dosage, and therefore meets expectations for use in the difference in differences design.

PGI dosage and likelihood of EQUIPS participation

A preliminary analysis examined odds of commencing a program among those offenders who had been referred to EQUIPS. This analysis was considered to be exploratory only; while motivational factors are likely to contribute to pre-commencement attrition, we acknowledge that participation also hinges on a range of factors that may be out of the control of the offender, such as limited available resources and how allocation to placements are prioritised by staff.

Among the referral sample (n = 1,014), more than half (n = 529; 52.1%) commenced an EQUIPS program within the supervision measurement period. A binary logistic regression model showed significant main effects of both PGI cohort and Tier. Referred offenders in the post-PGI group were more likely to commence treatment compared to those in the pre-PGI group (OR = 2.04; 95% CI = 1.36 – 3.08; *p* = .001), and offenders in Tier 2 were more likely to commence compared to those in Tier 1 (OR = 1.41; 95% CI = 1.03 – 1.91; *p* = .03). There was no significant cohort x Tier interaction effect, however (*p* = .31).

PGI dosage and EQUIPS dosage outcomes

Among those offenders who participated in EQUIPS (n = 529) we examined two indicators of EQUIPS dosage, including odds of completion and count (incidence) of sessions received over the supervision measurement period. Given that offenders are required to attend a set number of EQUIPS sessions to complete the program it was expected that completion and session outcomes would be closely related. The session dosage outcome was included to provide a continuous (as opposed to discrete) indicator of ongoing compliance and engagement in treatment over time, which may also be more robust to censoring of the supervision measurement period compared to final completion outcomes. We expected that conversion of participation to dosage / completion outcomes would be more critically impacted by offender engagement or motivation factors relative to pre-commencement outcomes.

Again, around half of offenders (44.6%) who participated in EQUIPS completed the program within the supervision measurement period[2]. A binary logistic regression model for completion was non-significant ($\chi^2(3) = .35$; p = .95), indicating that the entered variables were not good predictors of completion outcomes in total. Consistent with this, both the Tier and PGI cohort main effects were non-significant (*p*s > .60). The Tier x PGI cohort interaction was also non-significant (*p* = .75).

Offenders who participated in EQUIPS in this sample attended an average (median) of 8 sessions (range = 1 - 45) over the measurement period. A Poisson regression model predicting counts of EQUIPS sessions was found to explain significant variance in outcome overall ($\chi^2(3) = 135.74$; *p* < .0005). In this model PGI cohort was found to be a significant predictor, indicating that attending supervision in the post-PGI period was associated with a 40% increase in the number of EQUIPS sessions received relative to the pre-PGI period (IRR = 1.40; 95% CI = 1.27 – 1.54; *p* < .0005). Both the Tier main effect (*p* = .27) and the Tier x PGI Cohort interaction effect (*p* = .79) were not significant in the model (see Figure 8).

[2] As noted elsewhere, this completion rate is assessed within the supervision measurement period, which may be arbitrarily truncated by data censoring. As such the reported figures may not be representative of final EQUIPS completion outcomes among this cohort by the time of terminating supervision.

Associations between EQUIPS participation and delivery of the PGI

The above analyses indicated that differences in standards for delivery of supervision sessions (and therefore PGI content) across offenders were not associated with EQUIPS participation and dosage outcomes. A potential account for these results is that regardless of opportunity for PGI session delivery as implied by the Community Corrections Service Delivery Standards, unobserved selection factors may be contributing to a low level of correspondence between simultaneous delivery of PGI and EQUIPS dosage. While the PGI is intended to supplement concurrent attendance to EQUIPS sessions, it also serves a systemic purpose in providing behaviour change interventions where others are unavailable (Corrective Services NSW, 2016). In the event that the latter purpose is prioritised in favour of the former, it is possible that selective delivery of PGI sessions could result in an underutilisation of the PGI for offenders who participate in the EQUIPS programs.

To address this possibility, we conducted supplementary analyses examining the relationship between participation in EQUIPS over the first 12 months of supervision and number of PGI sessions received over that period. Using the post-PGI cohort of medium-high to high risk offenders described above, we compared offenders who participated in EQUIPS to an equivalent group who were found eligible for and referred to EQUIPS although did not participate in the first 12 months of their supervision. To account for possible differences in priority for participation as well as opportunities for PGI delivery, we included Tier of supervision (Tier 1; Tier 2) as a covariate in the model. We also included supervision measurement period as an offset in the model. Only main effects were considered and the participation x tier interaction term was not included in the model.

Before adjusting for supervision measurement period, offenders who were referred to EQUIPS but did not participate (n = 139) received an average (median) of 4 PGI sessions over supervision (range = 0 – 64 sessions). Offenders who participated in EQUIPS (n = 195) received a median of 5 PGI sessions over the supervision period (range = 0 – 32 sessions).

The full Poisson regression model for counts of PGI session delivery over supervision measurement period did not explain significant variance ($\chi^2(2) = 4.05$; $p = .13$). Examination of the coefficients indicated that EQUIPS participation status was not a significant predictor of number of sessions received ($p = .80$). In contrast there was a significant main effect of tier. Consistent with earlier manipulation checks, offenders in Tier 2 received a significantly higher number of PGI sessions compared to offenders in Tier 1 (IRR = 1.28; 95% CI = 1.01 – 1.64; $p = .04$).

DISCUSSION

The aim of this study was to quantify how implementation of the PGI model of community supervision has contributed to delivery of behaviour change interventions to priority offenders in the community. Results indicated that the PGI has substantial potential to increase the number of behaviour change sessions received by target offenders per month, corresponding to an average 218% higher dosage relative to EQUIPS alone. Trends in average dosage appear to be a function of increases in the gross number of sessions delivered to the population as well as increases in reach, or the proportion of offenders in the population who receive some behaviour change intervention per month. These outcomes are consistent with the intended benefits of the PGI in improving both access to and frequency of behaviour change interventions (Corrective Services NSW, 2016).

Trends data indicated that growth in the overall number of behaviour change interventions delivered to the target population was almost exclusively attributable to PGI activity, whereas the

number of EQUIPS sessions remained relatively static. Although there is a clear need for interventions such as EQUIPS in the target population, a large proportion of eligible offenders do not have the opportunity to participate (e.g. Zhang et al., manuscript in preparation). This highlights a critical challenge associated with structured group offender programs, in that they often require extensive financial and organisational resources that tend to inhibit rapid changes of the delivery model in response to population needs. In contrast, an observed advantage of the PGI is that resources to intervene with offenders are contingent upon and therefore responsive to workload models for supervising the community offender population in general.

Growth in the number of PGI sessions delivered and reach to the target population was observed to accelerate following transition from an introductory phase of discretionary use to operational phases of mandatory use and associated KPIs. One potential implication of a content oriented model of behaviour change in community supervision, such as the PGI or Citizenship (Bruce & Hollin, 2009), is that interventions are readily quantified and therefore may be more amenable to increased uptake as a result of mandatory requirements and monitoring, relative to models that focus on developing relevant soft skills among supervising officers such as STICS (Bonta et al., 2011; 2013).

While implementation of the PGI appears to have allowed for greater reach to the target population, growth trends were relatively uniform across offenders of differing recidivism risk. Further, there appeared to be a tendency towards underservicing offenders in the high risk category as compared to those in the medium and medium-high risk categories of the LSI-R. It is possible that this reflects increasing prioritisation of containment and public protection functions of supervision for very high risk offenders (e.g. Bruce & Hollin, 2009; Pearson et al., 2011). Whereas these trends are contrary to the risk principle (Andrews & Bonta, 2010), there is some evidence to suggest that models of behaviour change in community supervision are more likely to derive treatment effects among offenders of lower risk (Pearson et al., 2011; Robinson et al., 2011). On the other hand, subsequent analyses indicated that higher priority offenders may be expected to receive an increased intensity of PGI dosage as a result of their placement in tiers of the Community Corrections Service Delivery Standards. Further research would be beneficial to investigate how local standards of service delivery and prioritisation by both recidivism risk and community impact interact to influence dose response relationships for the PGI model.

Additional analyses indicated that the PGI may confer change in the trajectories by which offenders receive behaviour change intervention over the course of supervision. When compared to EQUIPS alone, participants who received both PGI and EQUIPS received greater accumulations of session dosage and appeared to do so more rapidly, or at earlier stages of the supervision episode. This has important implications for management of many offenders in the community because the initial months after release from custody are a critical period marked by elevated risk of recidivism (e.g. Baldry et al., 2006; Jonson & Cullen, 2015). In addition, given that group offender programs such as EQUIPS often require a set length of time for completion, offenders with shorter sentences are often ineligible. The results of this study suggest that the PGI model may have particular utility in bridging gaps in delivery of behaviour change dosage at early stages of the case management process and for offenders with shorter timeframes for intervention.

Although the trend analyses have promising implications for the direct impact of the PGI model in delivering behaviour change interventions to target offenders, there was no indication that receiving increased PGI dosage was associated with improved EQUIPS participation outcomes. Applying a difference in differences analytical

design, we found that offenders who had increased opportunity to engage in PGI sessions did not show corresponding increases in likelihood of participating in EQUIPS among those referred to the programs, or in likelihood of completion or number of sessions attended among those who participated in the suite of programs.

One possible interpretation of these results is that the PGI model may achieve aims of increasing intervention dosage but does not necessarily improve offender engagement, through mechanisms such as greater collaboration and agreement on case management tasks and goals (e.g. Horvath et al., 1991). Previous research has suggested that officers are able to maintain positive dual role relationships with offenders in the context of delivering the PGI (Howard et al., 2019). In this case there is the alternative possibility that working with offenders towards motivation for and compliance with interventions is a consistent priority of Community Corrections case management, independent of any effects of the PGI. From a more structural perspective, resourcing or logistics factors in the EQUIPS delivery model may place external pressures on participation outcomes that confound the effects of internal motivational factors. We also recognise that null effects may be a function of the relatively minor (although statistically significant) variation in PGI dosage between offenders in Tier 1 and Tier 2 conditions.

Supplementary analyses also suggested that null effects of PGI dosage on EQUIPS outcomes may not be attributable to systematic underutilisation of the PGI among those offenders who were already participating in the EQUIPS programs. Offenders were found to receive comparable counts of PGI sessions independent of their participation in EQUIPS. While unrelated to the primary aims of this study, these findings indicate that supervising officers may not exhibit bias towards a single function of the PGI in either supplementing delivery of EQUIPS, or in increasing dosage for those offenders who do not have other opportunities for behaviour change intervention (Corrective Services NSW, 2016). Although it appears that the PGI may not significantly improve offenders' progress in EQUIPS, the results suggest that the model is being implemented as intended to supplement EQUIPS dosage, and that this additional intervention process is not having observable detrimental impacts on participation outcomes for this frontline suite of programs.

Limitations

Some limitations of the current study are noted. Significantly, given data limitations we were unable to generate an index of dosage that was equivalent for the PGI and EQUIPS. Dosage in terms of sessions received was used as a common unit of analysis across both of the interventions; however we acknowledge that a session of PGI may not be considered to be directly comparable in terms of time or content to a session of EQUIPS. An understanding of relevant outcomes such as dose response relationships may be improved by development of measures that are equivalent across interventions, such as time spent on behaviour change interventions (e.g. Bourgon & Armstrong, 2005; Yates, 2013). Time spent in sessions invokes further complexities, including whether case formulation modules contribute to behaviour change dosage, which may require further content recording processes and decision making to refine a working definition of dosage.

Similarly, the study does not account for variance in quality of dosage between PGI sessions and EQUIPS sessions, or the impact of that dosage on outcomes such as reoffending. Previous evaluation of the PGI model indicated that there is substantial variance in the fidelity or flexibility with which PGI content is implemented (Thaler et al., 2019). Integrity in delivery of the PGI is likely to be a critical factor in outcomes, considering the model's implementation among a large cohort of staff with varying operational roles and skill sets.

An additional limitation was that some analyses were constrained to assess intervention outcomes for up to the first 12 months of offenders' supervision episodes. This approach was taken to limit effects of data censoring and to prevent excessive overlap in cohort membership. It is also noted that the average total duration of supervision for offenders in the target population was less than 12 months. In any event it is possible that the PGI model, which emphasises collaboration and continuity in the community case management process, would have more pronounced effects as the length of supervision episode increases. On the other hand, an interesting area of inquiry for future research would be to examine how the PGI, which has a limited range of prescribed content, is applied to deliver constant and relevant behaviour change intervention to offenders over the course of a prolonged supervision episode. This is particularly relevant in light of observational indications that trajectories of dosage tended to plateau in later months of supervision for offenders in the post-PGI cohort (see Figure 7).

Finally, the current study was designed to quantify how different system-wide, frontline intervention models deliver behaviour change dosage at the population level. We acknowledge that offenders often receive other, more tailored interventions as part of their supervision that were not accounted for here. It is also likely that many officers would have intervened to promote behaviour change with offenders during supervision sessions prior to introduction of the PGI, in which case the new model may largely reflect a different method of recording such activities. In this regard, the results highlight the scope of intervention afforded by adopting behaviour change models of supervision such as the PGI, and are not intended to give an exhaustive account of absolute trends in intervention activity before and after implementation of the PGI.

Conclusion

The results of this study illustrate that implementation of a behaviour change model of community supervision such as the PGI can have substantial impacts on how priority offender populations receive intervention dosage, relative to traditional structured programs alone. By introducing behaviour change content to the routine sessions between officer and offender that have traditionally been a primary component of community supervision (e.g. Bonta et al., 2008), the PGI has been shown to contribute to increases in the volume, frequency and reach of interventions that adhere to RNR principles.

At the same time, this study highlights some of the challenges and limitations associated with delivering behaviour change interventions in the form of structured group programs such as EQUIPS. Results indicated that participation in EQUIPS over recent years has been limited to relatively small proportions of the population studied, including those offenders who are identified as high risk and priority targets for intervention. It is also clear that delivering adequate levels of dosage, such as those outlined by Bourgon and Armstrong (2005), to community-based offenders may not be readily achieved by current schedules of EQUIPS programming alone. To some extent the observed trends in EQUIPS session dosage may be attributable to the significant organisational and resourcing challenges associated with delivering these programs to offenders in the community. The results suggest that the PGI model may be well placed to address existing gaps in intervention dosage and reach among the target population, and could also provide a viable foundation for a tiered system of intervention that selectively focuses delivery of more intensive and resource-limited programs such as EQUIPS to priority offenders with the highest risk and needs.

While this study did not provide evidence to suggest that the PGI confers indirect effects on

dosage by improving EQUIPS participation outcomes, it is noted that the data relates to early phases of implementation and elements of model delivery continue to develop over time. For example, supervising officers have reported needs for continuing professional development in in-session practical skills such as motivational interviewing (Thaler et al., 2019), which may be instrumental in compliance and engagement outcomes. More generally, given the scope of implementation for the PGI model and diversity in both officers and offenders involved it is likely that effects will often be variable, and it will be an ongoing process to establish standards of quality and integrity in delivery. There is a need for further evaluations to understand sources of variability in delivery of the PGI across the jurisdiction and related moderators and mediators of intervention outcomes.

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