Criminology Research Grants

Targeting crime prevention: Identifying communities which generate chronic and costly offenders to reduce offending, crime, victimisation and Indigenous over-representation in the criminal justice system

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Chapter 1. Introduction

Indigenous over-representation is the most significant social justice and public policy issue within the Australian criminal justice system. Despite the existence of justice agreements and plans in every jurisdiction over the past decade, the gap has continued to widen in every jurisdiction (ABS, 2012a). Indigenous people aged 10 and over were between 5.6 and 8.4 times more likely than non-Indigenous people to be arrested during 2009-2010 (ABS, 2012b). Indigenous youth were 13.4 times more likely than non-Indigenous youth to be under community supervision and 23.9 times more likely to be in youth detention during 2009-2010 (AIHW, 2011). Indigenous adults were 14.3 times more likely than non-Indigenous adults to be incarcerated during 2011 (ABS, 2012a).

Two national policy initiatives are driving attempts to reduce Indigenous disadvantage, including Indigenous over-representation in the criminal justice system. The *Closing the Gap* strategy recognises the need for a long-term approach to reduce Indigenous disadvantage (COAG, 2009). The strategy aims to achieve simultaneous improvements in seven areas of life: early childhood, schooling, health, economic participation, healthy homes, safe communities and governance and leadership. The *National Indigenous Law & Justice Framework* aims to create safer Indigenous communities (SCAG, 2009). One of the main mechanisms proposed to reduce Indigenous over-representation as offenders in the criminal justice system is through the use of effective and targeted crime prevention programs. Unfortunately little publically available information exists regarding how programs might be targeted to reduce offending by Indigenous peoples.

1.1. Frameworks Driving Crime Prevention

Two of the main frameworks that shape our understanding of offending and which may be used to target interventions aimed at reducing offending are the criminal careers paradigm and crime and place. This section provides an overview of each approach, highlighting how they improve our understanding of offending and may be used to target interventions.

1.1.1. Criminal Careers Framework

The criminal careers framework has been described as one of the most visible areas of scholarship within criminology (DeLisi & Piquero, 2011). Within this field, studies have been conducted in many jurisdictions focused on the nature, pattern and correlates of offending over the life-course (see DeLisi & Piquero, 2011). These studies aim to improve understanding about how offending develops and factors that can potentially be manipulated to hinder initiation, hasten desistence and reduce career length (Blumstein, Cohen, Roth & Visher, 1986; Piquero, Brame, Mazerolle & Haapanen, 2001; Piquero, Paternoster, Mazerolle, Brame & Dean, 1999). Several major longitudinal studies have been carried out in the United Kingdom (Piquero, Farrington & Blumstein, 2007; Jones, Nagin & Roeder, 2001), United States (Chung, Hill, Hawkins, Gilchrist & Nagin, 2002; Piquero et a., 2001), Canada (LaCourse, Nagin, Tremblay, Vitaro & Class, 2003) and New Zealand (Fergusson, Horwood & Nagan, 2000). This research has found that:

- Offending peaks in the late teenage years;
- The peak onset age of offending is between eight and 14;
- The peak desistence age of offending is between 20 and 29;
- The process of desistance operates across all offenders;
- Early age of onset predicts a relatively long criminal career duration and the commission of relatively many offences;
- There is marked continuity in offending and anti-social behaviour from childhood into adulthood;
- A small proportion of the population commit a large proportion of all crimes; and
- Different types of offences are committed at distinctly different ages.

Criminal careers research has been aided by statistical techniques, such as the Semi-Parametric Group-based Method (SPGM) (Nagin and Land, 1993).The SPGM identifies different groups, each with their own trajectory, to capture the variation in offending in the data (Kreuter & Muthén, 2008). In his review of over 80 studies which employed this technique, Piquero (2008) drew four main conclusions. First, research identifies at least two offender groups: an adolescent-peaked pattern and a chronic offender pattern. The chronic offender pattern includes a small proportion of offenders who account for relatively high proportions of offences. This group begins offending early in life, at high rates, and persists at relatively high rates when the norm seems to be desistence from

offending. Research also typically identifies a late-onset chronic group, which begins offending during adolescence and continues offending into adulthood. Second, the trajectory method typically identifies between three and five groups, slightly more in studies using self-reports of offending than official records. Third, a sample size of greater than 500 provides robust categorisation of groups. Finally, there tends to be a low-rate group, a high-rate group and a moderate-but-declining group.

Knowledge derived from criminal careers research is particularly useful for understanding whether certain groups of offenders should be targeted and when interventions are likely to be most effective. While few trajectory studies have been conducted in Australia, findings indicate that there is a small group of early-onset chronic offenders who account for a large proportion of offending. This group comprises between 3% and 11% of offenders and accounts for 27% to 33% of offences (Allard, Stewart, Smith, Dennison, Chrzanowski & Thompson, under-review; Livingston, Stewart, Allard, & Ogilvie, 2008; Stewart, Chrzanowski, Thompson, Dennison & Allard, under review). Not surprisingly, Indigenous Australians are more over-represented in the early-onset chronic offender group than other offender trajectories. Livingston et al. (2008) found that 50.9% of the chronic group were Indigenous offenders, while 25.4% of the adolescent limited group and 18.4% of the adolescent onset group were Indigenous. Stewart et al. (under review) found that Indigenous peoples were 11.3 times more likely to be in the early onset chronic offender group, with 7.3% of all Indigenous peoples in Australia in this group compared with 0.6% of non-Indigenous people.

Targeting crime prevention towards potential chronic offenders is likely to be a cost-effective approach. Recent criminal careers research has assessed the costs of individuals on different offender trajectories. Cohen, Piquero and Jennings (2010a) explored costs using ‘bottom-up’ and ‘top-down’ costing approaches. The ‘bottom-up’ approach involved assessing the value of specific cost categories that result from crime, including victim costs, criminal justice system costs and the cost of forgone earnings by the offender. The ‘top-down’ approach was based on the public’s willingness-to-pay to reduce crime which produces higher estimates, because it includes collateral costs relating to fear of crime (i.e., crime prevention expenditure, avoidance behaviour and insurance costs) and loss of social cohesion. When costs were applied to individuals in the offender trajectories, the high-rate chronic offender group constituted 3.1% of the

sample but over 40% of costs. Each high-rate chronic offender was found to cost either US$515,382 or US$1.1 million by the time they turned 27, depending on whether intangible costs were included. In their follow-up study, Cohen, Piquero and Jennings (2010b) used a 'top-down' costing approach and examined costs separately based on sex and ethnicity. While a different number of trajectories were identified, 2.8% of males were found to be high-rate chronic offenders and they accounted for 37% of male offending costs, or in excess of $1.5 million each. Although 0.5% of females were chronic offenders, they accounted for 49% of female offending costs or US$754,440 each. Offending by African-Americans was found to be the most expensive out of any ethnic trajectory group and averaged in excess of US$1.6 million for each chronic offender.

Two studies conducted outside the United States have also assessed the costs of crime using 'bottom-up' costing approaches. In Australia, Allard et al. (under review) found that an early onset chronic offender group comprised 3% of offenders yet accounted for 26.5% of costs, with each early onset chronic offender costing $323,645 in criminal justice system and wider social and economic costs. A second chronic offender trajectory group was also identified, with adolescent onset of offending. This group comprised 1.8% of offenders and accounted for 15% of costs, with each adolescent onset chronic offender costing $302,034. Piquero, Jennings and Farrington (2011) assessed the costs of offender trajectories based on the Cambridge Study in Delinquency Development (CSDD) which included convictions of 411 South London males aged 10 to 50 years old. The high-rate chronic offender group was found to cost over 10 times as much as other groups, with each offender costing $US95,241.

Unfortunately, it is difficult to target potential chronic offenders because there is a lack of research which differentiates offender trajectories based on risk factors, with no Australian studies. Nevertheless, this group would be ideal candidates for developmental/early intervention. Programs based on this approach target at-risk children, aiming to reduce the number of risk factors and increase the number of protective factors (Table 1). The effects of risk factors on development appear to be cumulative, interactive and sequential (Farrington, 2002; Granic & Patterson, 2006). However, the accumulation of multiple risk factors appears to be more important than the acquisition of specific risk factors for the development of offending (Farrington,

2002; Howell, 2003; Stouthamer-Loeber, Loeber, Wei, Farrington & Wikstrom, 2002; Tremblay & LeMarquand, 2001; Wasserman & Miller, 1998; Wasserman & Seracini, 2001). Evidence indicates that offending is much more likely among those who are exposed to or experience greater levels of risk, such as many Indigenous peoples (Bonta, LaPrairie & Wallace-Capretta, 1997; Day, 2003; Ge, Donnellan & Wenk, 2001; Loeber & Farrington, 2000; Mason & Windle, 2001; Spivakovsky, 2009; Tremblay & LeMarquand, 2001; Wasserman & Seracini, 2001). Specific forms of developmental/early intervention include parental training, home visiting, day-care/pre-school and home/community programs (Farrington & Welsh, 2003). While family and social factors are not readily amenable to policy intervention, there is ample evidence that these programs can be cost-effective and reduce offending by about 15% (Aos, Miller & Drake 2006; Farrington & Welsh 2003).

1.1.2. Crime and Place

One approach that may assist with targeting interventions towards individuals on different offender trajectories involves examining the locations where offenders resided when they first had contact with the criminal justice system. Geographic Information System (GIS) technology is increasingly being recognised as a powerful tool that can be used to enhance organisational decision making, better understand the causes of crime, target and help assess the impact of crime prevention programs (Anselin, Cohen, Cook, Gorr & Tita, 2000; Canter, 2000; Hirschfield & Bowers, 2001; McEwen & Taxman, 1995; Paulsen & Robinson, 2004; Taxman & McEwen, 1997; Weisburd & McEwen, 1997). While the spatial dimensions of data have not previously been explored by criminal careers research, there is reason to believe that offenders may not be randomly distributed geographically.

Table 1-1: Risk and Protective Factors

Risk Factors				
Child Factors	Family Factors	School Context	Life Events	Community and Cultural Factors
Prematurity Low birth weight Disability Prenatal brain damage Birth injury Low intelligence Difficult temperament Chronic illness Insecure attachment Poor problem solving Beliefs about aggression Attributions Poor social skills Low self-esteem Lack of empathy Alienation Hyperactivity/disruptive behaviour impulsivity	*Parental characteristics* Teenage mothers Single parents Psychiatric disorder, especially depression Substance abuse Criminality Antisocial models *Family Environment* Family violence and disharmony Marital discord Disorganised Negative interaction / social isolation Large family size Father absence Long term parental unemployment *Parenting Style* Poor supervision and monitoring of child Discipline style (harsh or inconsistent) Rejection of child Abuse Lack of warmth and affection Low involvement in child's activities Neglect	School failure Normative beliefs about aggression Deviant peer group Bullying Peer rejection Poor attachment to school Inadequate behaviour management	Divorce and family break-up War or natural disasters Death of a family member	Socio-economic disadvantage Population density and housing conditions Urban area Neighbourhood violence and crime Cultural norms concerning violence as acceptable response to frustration Media portrayal of violence Lack of support services Social or cultural discrimination

Protective Factors				
Child Factors	Family Factors	School Context	Life Events	Community and Cultural Factors
Social competence Social skills Above average intelligence Attachment to family Empathy Problem solving Optimism School attachment Easy temperament Internal locus of control Moral beliefs Values Self-related cognitions Good coping style	Supportive caring parents Family harmony More than two years between siblings Responsibility for chores or required helpfulness Secure and stable family Supportive relationship with other adult Small family size Strong family norms and morality	Positive school climate Pro-social peer group Responsibility and required helpfulness Sense of belonging / bonding Opportunities for some success at school and recognition of achievement School norms about violence	Meeting significant person Moving to new area Opportunities at critical turning points or major life transitions	Access to support services Community networking Attachment to the community Participation in church or other community group Community / cultural norms against violence A strong cultural identity and ethnic pride

Source: Homel et al., 1999

Studies examining the spatial and temporal distribution of crime are essentially descriptive and typically based on cross-sectional data obtained for short periods of time (Chakravorty & Pelfrey, 2000; Eck, Gersh & Taylor, 2000; Sherman & Rogan, 1995; Weisburd & Green, 1994; Weisburd & McEwen, 1997). Evidence from these studies indicates that, regardless of the unit of analysis, crime is concentrated in hot-spots rather than being randomly distributed (Brantingham & Brantingham, 1999; Crow & Bull, 1975; Pierce, Spaar & Briggs, 1986; Roncek, 2000; Sherman, Gartin & Buerger, 1989; Weisburd & Green, 1994; Weisburd, Bushway, Laum & Yang, 2004; Weisburd, Maher & Sherman, 1992). Sherman, Gartin and Buerger (1989) found that three percent of addresses in their study were responsible for half of the calls to police. Sherman (1995, pp. 36-37) argues that future crime is "six times more predictable by the address of the occurrence than by the identity of the offender". While there is limited research examining how crime is temporally distributed, available evidence suggests that crime hotspots are relatively stable over time (Griffiths & Chaez, 2004; Kubrin & Herting, 2003; Weisburd et al., 2004).

While there is less evidence about how offenders are spatially distributed, studies conducted in the United States and United Kingdom focused on the journey to crime indicate that most crimes are committed close to the offender's place of residence. On average, offender's travelled less than 5 kilometres from their home address to commit offences (Gabor & Gottheil, 1984; Phillips, 1980; Rhodes & Conly, 1981; Townsley & Sidebottom, 2010; Wiles & Costello, 2000). Young offenders and black offenders have been found to travel less distance to commit offences (Baldwin & Bottoms, 1976; Carter & Hill, 1979; Davidson, 1984; Phillips, 1980; Rand, 1986; Reiss & Farrington, 1991; Rengert & Wasilchick, 1985; Reppetto,1974). When the locations of crimes and place of residence are aggregated, evidence suggests that most offenders commit crimes within their own neighbourhoods. Gabor and Gottheil (1984) found that three-quarters of a stratified random sample of offences in Ottawa during 1981 were committed by residents rather than out-of-towners or transients. Pyle (1976) found that 61% of those arrested for crimes against the person and 48% of those arrested for property crimes in Cleveland over a two year period resided in the same census tract as where the crime occurred. Others have found that the proportion of crimes committed by local residents varied based on the kind of area, with crimes in the outer city more likely to be

committed by local residents than crimes in the inner city (Hesseling, 1992; Wikstrom & Dolmen, 1990).

The notion that offenders are not randomly distributed geographically is also supported by the findings of studies that have adopted an ecological approach. The ecological environments in which individuals are embedded have been found to exert pervasive influences on behaviour independently of individual factors (Kelling, 2005; Kubrin & Weitzer, 2003; Oberwittler, 2004; Triplett, Gainey & Sun, 2003). Research that has adopted an ecological approach is based on aggregate level data such as neighbourhoods (Katzman, 1981), cities (Harries, 1976), or regions (Dienes, 1988) and typically involves the use of widely available Census data (Swartz, 2000). There is a large body of research indicating that high crime rates are typically concentrated in small geographical areas characterised by structural disadvantage, including low economic status, poverty, segregation, a high proportion of single parent families, residential instability and a large proportion of racial/ethnic minority groups (Bursik, 1986; Oberwittler, 2004; Sabol, Coulton & Korbin, 2004; Shaw & McKay, 1969; Silver & Miller, 2004; Swartz, 2000; Triplett et al., 2003). In their meta-analysis of 214 studies exploring the macro-level predictors of crime, Pratt and Cullen (2005) found that 11 of the 31 predictors had a high independent mean effect size: *strength of non-economic institutions, unemployment (length considered), firearm ownership, percent non-white, incarceration effect, collective efficacy, percent black, religion effect, family disruption, poverty and unsupervised local peer groups.* Nine of the predictors were reported as having a medium effect: *household activity ratio, social support/truism, inequality, racial homogeneity index, urbanism, residential mobility, unemployment (with age restriction), southern effect and arrest ratio.*

Findings suggesting that offenders are not randomly distributed geographically hold great promise for the targeting not only developmental/early intervention programs but also other forms of crime prevention based on geographic location, such as situational crime prevention and community crime prevention. Situational crime prevention focuses on highly specific problems such as types of offending behaviour and the opportunities in specific environments that facilitate offending at particular times and places (Clarke & Felson, 1993). The approach identifies 25 techniques that aim to increase the effort, increase the risks, reduce the rewards, reduce provocations or remove excuses (Table

2). These techniques are based on opportunity theories of crime including rational choice, routine activities and crime pattern theories that view crime as a product of the interaction between an individual and the characteristics of the setting (Felson & Clarke, 1998). While evaluations that have assessed the impact of situational crime prevention on crime are typically short-term and methodologically weak, evidence indicates that this approach can result in reductions in crime (Clarke, 1997; Eck, 2006). Within Australia, this approach has been successfully employed to reduce substance misuse among Indigenous Australians in a range of geographic locations (d'Abbs & Shaw, 2008; d'Abbs & Togni, 2000; Kennedy, 1999; Ray & McFarland, 2010; Richards, Rosevear & Gilbert, 2011).

Community crime prevention aims to confront crime at a 'grass roots' level in particular local contexts to address those factors within that context that may be causing or maintaining crime (Hope, 2001; Kelly & Caputo, 2006; Labonte, 1997). The factors that ecological studies have found to be related to offending are viewed as contributing to, creating or maintaining offending (Oberwittler, 2004). This has led to a range of theories and mechanisms being proposed to explain the relationship between structural disadvantage and crime, such as how specific social processes lead to crime (Oberwittler, 2004; Sabol et al., 2004). Some of the interventions based on this approach are focused on the entire community while others are focused on the individual. Many aim to facilitate the development of social resources so that communities can effectively address problems (Laverack, 2001). Although interventions based on this approach are appealing, few studies have explored their impact on offending or there are conflicting findings. International evidence indicates that mentoring and vocational and educational training programs may be effective for reducing offending (Burghardt et al., 2001; Tolan, Henry, Schoeny & Bass, 2008). There is some evidence suggesting that community economic development programs reduce property crimes and that recreational programs may reduce crime (McCord, Widom & Crowell, 2001; Sherman et al., 1997). There is insufficient evidence to conclude that community policing, community mobilisation (such as Neighbourhood Watch) or school after-hours programs reduce crime (Gottfredson, Gottfredson & Weisman, 2001; Grinc, 1994; Kerley & Benson, 2000). While community based programs operate in many Indigenous communities within Australia, few have been adequately evaluated (see

Table 1-2: 25 Situational Crime Prevention Techniques

Increase the Effort	Increase the Risks	Reduce the Rewards	Reduce Provocations	Remove Excuses
1. Target Harden: Steering column locks and immobilisers Anti-robbery screens Tamper-proof packaging	*6. Extend guardianship:* Take routine precautions: go out in group at night, leave signs of occupancy, carry phone "Cocoon" neighbourhood watch	*11. Conceal targets:* Off-street parking Gender-neutral phone directories Unmarked bullion trucks	*16. Reduce frustrations and stress:* Efficient queues and polite service Expanded seating Soothing music / muted lights	*21. Set rules:* Rental agreements Harassment codes Hotel registration
2. Control access to facilities: Entry phones Electronic card access Baggage screening	*7. Assist natural surveillance:* Improved street lighting Defensible space design Support whistleblowers	*12. Remove targets:* Removable car radio Women's refuges Pre-paid cards for pay phones	*17. Avoid disputes:* Separate enclosures for rival soccer fans Reduce crowding in pubs Fixed cab fares	*22. Post instructions:* "No Parking" "Private Property" "Extinguish camp fires"
3. Screen exits: Ticket needed for exit Export documents Electronic merchandise tags	*8. Reduce anonymity:* Taxi driver IDs "How's my driving?" decals School uniforms	*13. Identify property:* Property marking Vehicle licensing and parts marking Cattle branding	*18. Reduce emotional arousal:* Controls on violent pornography Enforce good behaviour on soccer field Prohibit racial slurs	*23. Alert conscience:* Roadside speed display boards Signatures for customs declarations "Shoplifting is stealing"
4. Deflect offenders: Street closures Separate bathrooms for women Disperse pubs	*9. Utilize place managers:* CCTV for double-deck buses Two clerks for convenience stores Reward vigilance	*14. Disrupt markets:* Monitor pawn shops Controls on classified ads License street vendors	*19. Neutralize peer pressure:* "Idiots drink and drive" "It's OK to say No" Disperse troublemakers at school	*24. Assist compliance:* Easy library checkout Public lavatories Litter bins
5. Control tools/weapons: "Smart" guns Disabling stolen cell phones Restrict spray paint sales to juveniles	*10. Strengthen formal surveillance:* Red light cameras Burglar alarms Security guards	*15. Deny benefits:* Ink merchandise tags Graffiti cleaning Speed humps	*20. Discourage imitation:* Rapid repair of vandalism V-chips in TVs Censor details of modus operandi	*25. Control drugs and alcohol:* Breathalyzers in pubs Server intervention Alcohol-free events

Source: Cornish & Clarke (2003, p. 90).

Allard, 2011). Available evidence does, however, suggest that night patrols may be an effective way to reduce offending (Blagg, 2003; Lui & Blanchard, 2001).

One final point that must be considered when focusing on the location of offenders is their mobility. A substantial proportion of the Australian population is mobile and change household address. In 2010, 42% of Australians aged over 18 and who lived in private dwellings moved within the previous five years, with younger age groups, people renting through private landlords (83%) and the unemployed (62%) more likely to move (ABS, 2010). While many of these people may have moved within the same postal area (POA) or Statistical Local Area (SLA), this information is not available. Moreover, evidence indicates that individuals are more likely to offend if they have a high number of address changes (Gendreau, Goggin & Little, 1996; Hoffman, 1994; Worthington, Higgs & Edwards, 1999). Therefore, it is essential that research examining where offenders reside explores their mobility. It makes little sense to target government resources and crime prevention resources if hotspots randomly fluctuate over time without intervention (Spelman, 1995).

1.2. Current Study

This project draws on methods and findings from research focused on offender trajectories and crime and place. Findings from trajectory studies indicate that a small proportion of offenders account for a large proportion of offending and costs. While this group of offenders has been retrospectively identified by studies employing trajectory modelling techniques, there is difficulty identifying chronic offenders prospectively. For example, there is no research that has adequately differentiated between identified trajectory groups based on risk and protective factors. Despite this, recent findings indicate that Indigenous Australians are most over-represented in chronic offender groups. Research focused on crime and place has found that the geographic locations of crime and offenders are not randomly distributed.

Given these findings, the project aimed to assess whether communities could be identified which generated chronic offenders and carried substantial cost burdens associated with offending. If such communities could be identified, they would be ideal locations to target early/developmental crime prevention programs. These programs

target potential offenders and aim to move them off of a chronic offender trajectory by addressing risk and protective factors. Evidence indicated that these programs are a cost-effective way of reducing offending for non-Indigenous populations. Communities generating chronic and costly offenders would also be ideal locations to target situational and community crime prevention interventions. These interventions aim to reduce crime by altering the immediate or contextual environment in which crime occurs. In assessing whether communities generate chronic offenders, the project focused on the offenders first recorded residential postal area when they had contact with the criminal justice system but acknowledges the importance of and examines the extent of offender residential mobility. There were six research questions addressed by this project:

1. How many distinct offender trajectories can be identified?
2. What are the demographic, offence, and criminal justice system event characteristics associated with trajectory group membership?
3. What are the costs of offender trajectories?
4. Are some communities more likely than others to generate chronic offenders?
5. How residentially mobile are chronic offenders?
6. Which communities carry the cost burden of the chronic offenders?

Chapter 2. Methods

In this Chapter, an overview of the longitudinal offender cohort that was used in this project will be provided. The five phases involved in the research will then be outlined. First, the process used to establish the offender cohort will be examined. Second, the analytical strategy adopted to assess the number of offender trajectories and their characteristics will be described. Third, the costing approach that was used to assess the cost of individuals in the different offender trajectories will be outlined. Fourth, the approach that was used to assess whether some communities were more likely to generate chronic offenders and to explore the extent of residential mobility will be reported. Finally, the approach that was adopted to determine whether communities could be identified which generated the most costly chronic offenders will be outlined.

2.1. Longitudinal Offender Cohort

The longitudinal offender cohort consisted of all individuals born in 1990 who committed an offence (other than traffic and breach offences) in Queensland and were formally cautioned, referred by police to a youth justice conference, had a finalised youth court appearance, or had a finalised adult court appearance when aged 10 to 20 years old. There were 14,171 individuals in the final research sample, of which 9,949 (70.2%) were male and 1,895 (13.4%) were identified as Indigenous. The average age of offending onset was 16.21 years (*SD*=2.38). These individuals were responsible for 71,413 offences. Most offences committed by cohort members were property or public order related (Table 1-1).

For these offences, individuals had 33,455 criminal justice system events (Table 2-2). A criminal justice system event involves a caution or police referred conference taking place or a finalised youth/adult court appearance. Of the 14,171 individuals, 7,215 had at least one caution, 824 had at least one police referred conference, 2,337 had at least one finalised youth court appearance and 12,097 had at least one finalised adult court appearance. About one-third (34.5%) of individuals only had contact with the youth justice system, with two-fifths (43.2%) only having contact with the adult system and one-fifth (22.3%) having contact with both the youth and adult systems (Table 2-3).

Table 2-1: Offences committed by cohort members

Offence Types	N	%
Theft and related offences	20,651	28.9
Unlawful entry with intent/burglary, break and enter	10,585	14.8
Public order offences	10,479	14.7
Property damage and environmental pollution	8,069	11.3
Offences against justice procedures, government security and government operations (excluding breaches)	5,763	8.1
Illicit drug offences	4,870	6.8
Acts intended to cause injury	3,567	5
Dangerous or negligent acts endangering persons	2,051	2.9
Deception and related offences	1,984	2.8
Miscellaneous offences	1,139	1.6
Weapons and explosives offences	863	1.2
Sexual assault and related offences	638	0.9
Robbery, extortion and related offences	553	0.8
Abduction and related offences	194	0.3
Homicide and related offences	7	0.0
Total	71,413	100

Table 2-2: Number of criminal justice system events involving the cohort

Event Type	Number of events	Number of distinct individuals
Caution	9,799	7,198
Police referred conference	984	822
Childrens court appearance (finalised)*	6,199	2,130
Magistrates court appearance (finalised)	15,959	9,201
District court appearance (finalised)	471	433
Supreme court appearance (finalised)	43	42
Total Events	33,455	14,171

* Childrens court includes Childrens Court and Childrens Court of Queensland

Table 2-3: Number of individuals in cohort who had different types of events

Event Type	N	%
Caution Only	3,799	26.81
Youth Justice Conference Only	104	0.73
Youth Court Only	436	3.08
Adult Court Only	6,123	43.21
Caution and Youth Justice Conference	150	1.06
Caution, Youth Justice Conference and Youth Court	78	0.55
Caution, Youth Justice Conference, Youth Court and Adult Court	261	1.84
Caution, Youth Justice Conference and Adult Court	140	0.99
Caution and Youth Court	307	2.17
Caution, Youth Court and Adult Court	800	5.65
Caution and Adult Court	1,663	11.74
Youth Justice Conference and Youth Court	14	0.10
Youth Justice Conference, Youth Court and Adult Court	23	0.16
Youth Justice Conference and Adult Court	52	0.37
Youth Court and Adult Court	221	1.56
Total	14,171	100.00

2.2. Research Phases

2.2.1. Phase One: Establishing the offender cohort

The offender cohort was created by linking between the cautioning dataset (Queensland Police Service), police referred conferencing dataset (QPS), youth court dataset (Department of Communities) and adult court dataset (Department of Justice and Attorney General). The process used has been described elsewhere (Allard et al., 2009), but involved three steps:

1. Agencies provided identifying information (but not case information) to the Office of Economic and Statistical Research (Queensland Treasury) and case information (but not identifying information) to Griffith University. These datasets included agency identification numbers that was used to link between the identifying and case information datasets.

2. Within OESR, a researcher linked within and between the datasets based on identifying information, including name, surname, date of birth and sex. Each unique person was assigned a Griffith University identification code. Agency and Griffith University identification codes were then released to Griffith University.
3. Griffith University identification codes were assigned to the case information to identify distinct individuals for the purposes of analyses.

After linking, there were 90,785 offences finalised across systems, involving 16,558 distinct individuals. The data were cleaned to resolve inconsistencies between systems in the core demographic variables of age, sex and Indigenous status, and missing values were propagated from the known values in another record based on the balance of probabilities. After resolving discrepancies, sex was missing for 11 (0.1%) individuals and Indigenous status was missing for 1,217 (7.4%) individuals. All missing data for sex related to contacts that individuals had with the adult court system. Most individuals who did not have an assigned Indigenous status were from either the cautioning dataset or the adult court dataset. Individuals who were not identified as Indigenous were assumed to be non-Indigenous.

Given that an offender cohort was being created, all offences that resulted in a not guilty (n=1,445) finding were excluded because they did not represent offending. Two offence types were also excluded from the dataset. Traffic and related offences (n=15,077) were excluded because most are dealt with by Infringement Notice and individuals can elect to have a court hearing. Breaches of court orders (n=2,850) were excluded because they may not represent additional offending. After these exclusions, there were 71,413 offences committed by 14,171 offenders.

2.2.2. Phase Two: Exploring the number of trajectory groups and their characteristics

A dataset was created to address the first research question *How many distinct offender trajectories can be identified?* The dataset had the annual number of offences for each of the 14,171 offenders in the cohort based on their age at the time of offence. To calculate age at time of offence, the individual's date of birth and the earliest recorded date for each offence were used because the actual date of offence was not recorded.

For cautioning and conferencing data, the date of offence was usually the date when the offence was reported to police. For court matters, the earliest date was either the date of lodgement or the earliest court appearance relating to the matter.

Nagin and Land's (1993) Semi-Parametric Group-based Method (SPGM) was used to model offence frequency annually over the life-course when individuals were aged 10 to 20 years old. The SPGM analysis was undertaken using the SAS procedure "PROC TRAJ" developed by Jones, Nagin and Roeder (2001). As the majority of individuals in the cohort offended for short periods of time, there was an excess of data cells with zero counts for offending. Because of this, the offending count data was distributed according to the Zero-Inflated Poisson distribution (Fergusson et al., 2000; Nagin, 1999). Additionally, several individuals had high annual offence counts which exceeded 20 offences in a given year (n=279, 2%). These outliers were scaled to enable the trajectory analysis to converge.

Given the non-parametric nature of the procedure being used, it was necessary to specify the number of trajectory groups being modelled and their form prior to analysis. Thus, the development of the final model was necessarily iterative, with the process being repeated a number of times to determine the parameters that produced the best fit for the data. The final number of trajectories for the model was determined based on both the Bayesian Information Criterion (BIC) and the average probability of group assignment. The BIC increases as the model fit improves (incorporating the penalty for increases in the number of trajectories) while the average probability of assignment is higher for models with more distinct trajectories (Nagin, 1999; Piquero, 2008). Thus, the model with the optimum number of trajectories needed to have a high BIC (relative to other model options) and an average probability of group membership that was as close to one as possible.

The trajectory group membership that was assigned to individuals was then linked to case information to explore the second research question *What are the demographic, offence, and criminal justice system event characteristics associated with trajectory group membership?* Demographic characteristics examined included sex and Indigenous status. The types of offences committed by individuals in each trajectory group were explored. Criminal justice system event characteristics examined included

type of event and number of days sentenced to community based supervision and detention/incarceration.

2.2.3. Phase Three: Assessing the costs of offender trajectories

Two approaches were used to address the third research question *What are the costs of offender trajectories?* Criminal justice system costs of individuals in the trajectory groups were assigned based on the interactions they had with the criminal justice system, while wider social and economic costs of crime were assigned by updating Rollings (2008) assessment and applying costs based on offence type.

Criminal Justice System Costs

Criminal justice system costs were estimated based on the costs of criminal justice system events and supervision costs. These were assessed using the Transactional and Institutional Cost Analysis (TICA) (Carey, Waller & Marchand, 2006). This approach views offenders as consuming resources when they have transactions with, and are processed through, the criminal justice system. One strength of this approach is that it enables an assessment to be made about the cost of resources invested by multiple agencies. Although TICA is frequently used to assess costs at the micro-level, the approach was used to determine the average cost of practices as individuals flowed through the criminal justice system.

Figure 2-1 on page 20 presents a schematic diagram of the transactions individuals have as they flow through the criminal justice system. The average cost of police, court and supervision practices were assessed for youth and adults. Average police costs were calculated based on publically available information and an internal police time-in-motion study which assessed how long particular practices took for youth and adults. Five steps were used to assess the cost of police responses:

1. 35% of the 2010-2011 police budget was directed towards crime management ($624,796,550) (QPS, 2009, 2011a).
2. Examination of police practices indicated that 9.3% of offences were dealt with by ‘other’ and this proportion was subtracted from the crime management budget (leaving $566,440,552) (QPS, 2011b).
3. The number of youths and adults cautioned, conferenced and processed through the courts during 2010/2011 were examined, and total hours was calculated

based on how long practices took in the QPS time-in-motion study (DJAG, 2011a, 2011b; QPS, 2005, 2011b).

4. The average hourly rate was assessed as $245.1, calculated by dividing the remaining crime management budget ($566,440,552) by the total time police spent processing offenders (2,311,118 hours).
5. The cost per event was calculated by multiplying the length of time that processes took police by the hourly rate.

Average costs per court finalisation in the Childrens, Magistrates, District and Supreme courts were based on figures provided in the Report on Government Services (Productivity Commission, 2012). The average cost of youth conferencing was determined by dividing the overall youth conferencing operating budget ($9.3 million) by the number of referrals (2,614) (Department of Communities, 2009). The cost of community-based supervision and detention for youth was assessed based on the most recent costing information which was available (Bleijie, 2012; CAIR, 2008), while these costs were assessed for adults using costs provided in the Report on Government Services (Productivity Commission, 2012).

Figure 2-1 presents average costs for the main transactions that individuals had with the criminal justice system. Transaction costs were added to calculate the cost per finalisation. For example, police cautioning only involves police expenditure (either $1,275 per youth or $1,103 per adult). However, the cost of individuals appearing in court requires police expenditure ($3,701 per youth or $2,696 per adult), court expenditure (depending on the level of the court) and possibly supervision costs which were assessed per day.

As information was only available about the number of days that individuals were sentenced to various forms of supervision, it was assumed that youth would serve 60% of their detention sentence while adults would serve 80% of their incarceration sentence before being released. These assumptions were based on advice provided by the relevant agencies about the applicable average proportions that would be subject to early release. Consistent with practice in Queensland, individuals were assumed to serve 100% of time sentenced to community-based orders. Where more than one court outcome was recorded at an event because several offences were finalised, it was

assumed that sentences would be served concurrently and the most serious outcome for the event was used.

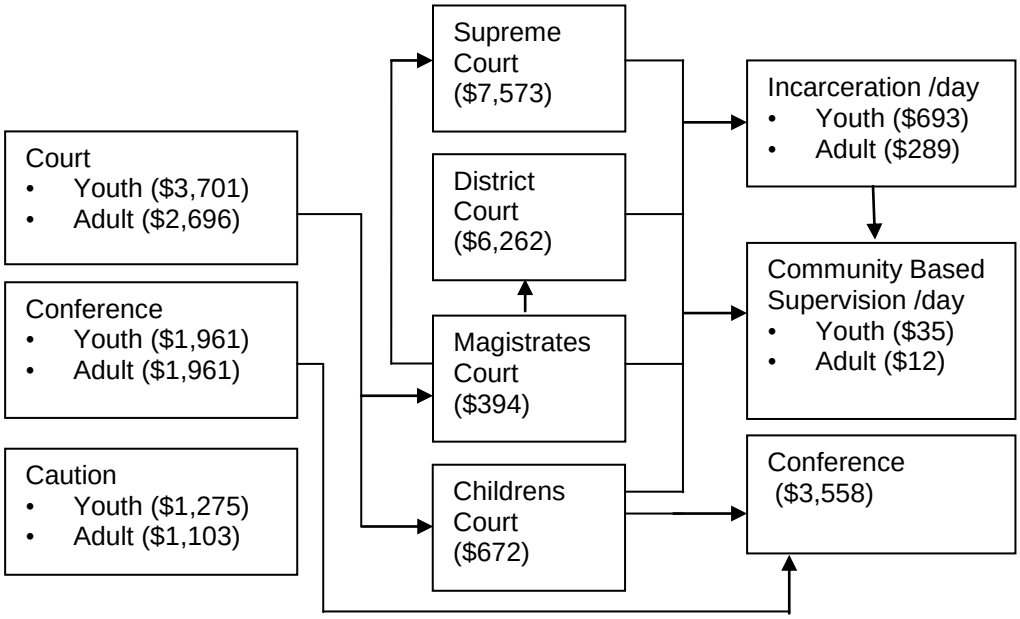

Figure 2-1: Criminal justice system transactions and costs as individuals flow through the system

Wider economic and social costs

Estimating the wider economic and social costs of crime is challenging and there is considerable variability in these costs depending on whether a bottom-up or top-down approach is used. While bottom-up approaches include a range of specified tangible and intangible costs, they result in lower estimates than top-down approaches (i.e., willingness-to-pay). Given the absence of published estimates based on willingness-to-pay in the Australian context, a bottom-up approach was used which involved updating an assessment about what these costs were in Australia during 2005. Rollings (2008) estimated the average economic and social costs of crime for 12 offence categories. These costs included medical costs, costs of property loss or damage, costs of lost output and intangible costs. Costs that were excluded from the study were justice system costs, costs related to providing government services to victims, and security industry and insurance administration costs. The study acknowledged that there was likely to be considerable variation in costs within each offence category, so offence

characteristics were taken into account when assessing costs. For example, most offences against the person involved assessing the number that would have resulted in injury requiring medical treatment or hospitalisation. Property offences were assessed separately for residential and commercial offences and took into account the number of offences that resulted in insurance claims.

Table 2-4 presents the social and economic costs of crime based on an update of Rollings (2008) assessment. In mapping the costs from the original assessment to the Australian Standard Offence Classification (ASOC), assault was mapped to two ASOC categories “Acts intended to cause injury” and “Dangerous and negligent acts intended to cause injury”. Six offence types in the original assessment were subsumed by two other ASOC codes: “Theft and related offences” included four theft types and “Property damage and environmental pollution” included criminal damage and arson. Where more than one offence category in the original assessment was included in one ASOC offence code, average costs for the offence code were calculated. Average costs were based on ratios developed to account for the frequency of each offence category in Queensland during 2010/11 (QPS, 2011b). The 2005 cost of each offence was then adjusted for inflation to determine the 2012 cost (RateInflation, 2011).

Unfortunately, the average cost per offence type was not assessed by Rollings (2008) for six ASOC categories. Offences that were not costed include: (1) Public order offences (n=10,479, 14.7%), (2) Illicit drug offences (n=4,870, 6.8%), (3) Offences against justice procedures, government security and government operations (n=5,763, 8.1%), (4) Miscellaneous offences (n=1,139, 1.6%), (5) Weapons and explosives offences (n=863, 1.2%), and (6) Abduction and related offences (n=194, 0.3%). Therefore costs for these offences were not able to be included in the projected costs for the offender trajectories discussed in this report.

Table 2-4: Mapping cost of offences from Rollings' assessment to ASOC

2005 Assessment in Australia	ASOC	Cost per Offence	
		2005 ($)	2012 ($)
Homicide	Homicide and related offences	1,915,323	2,293,376
Sexual assault	Sexual assault and related offences	7,500	8,980
Assault	Acts intended to cause injury		
	Dangerous or negligent acts endangering persons	1,695	2,030
Robbery	Robbery, extortion and related offences	2,300	2,754
Burglary	Unlawful entry with intent	2,869	3,435
Theft of vehicles (n=4,095)	Theft and related offences	1,241	1,486
Thefts from vehicles (n=4,949)			
Shop theft (n=14,453)			
Other theft (n=7,563)			
Fraud	Fraud, deception and related offences	21,370	25,588
Criminal damage (n=12,565)	Property damage and environmental pollution	3,357	4,020
Arson (n=232)			

2.2.4. Phase Four: Exploring whether some communities generated chronic offenders and their residential mobility

Given that chronic offenders are likely to commit a high number of offences and be costly, the fourth research question was *Are some communities more likely to generate chronic offenders than others?* To explore this question, the proportion of the population in each postal area (POA) who were chronic offenders was explored, based on each offenders first recorded residential postal area. Chronic offenders included individuals in the moderate and two chronic offender trajectory groups, who had a higher level of contact with the criminal justice system and committed more offences than members of the two low trajectory groups. From the trajectory analysis, 2,234 offenders were classified as chronic (as described in Section 3.2 of the Results Chapter). Chronic offenders represented 15.8% of offenders, but accounted for 67.0% of offences. Indigenous offenders were much more likely to be chronic offenders than non-Indigenous offenders, with two-fifths (39.9%) of Indigenous offenders compared to less than one-fifth (15.8%) of non-Indigenous offenders classified as chronic offenders.

Therefore, exploring whether some communities are more likely to generate chronic offenders than others may be an efficient way of targeting crime prevention interventions to reduce offending, crime, victimisation and Indigenous over-representation in the criminal justice system.

The geographic measure used to assess community location was the post code where the offender resided when they first had contact with the criminal justice system. Each offender had their usual residential post code recorded for each offence in the cautioning, conferencing, youth court and adult court datasets. These corresponded to Postal Areas (POAs) which are the ABS equivalent of the Australia Post defined postal codes[1] (ABS, 2006a). The first recorded postal area was selected in recognition of the importance placed on the early years of life from a developmental perspective and the cumulative nature of risk and protective factors.

In Queensland, there were 432 POAs in 2006 (4000 to 4999). POAs differ substantially in both geographical size and population. The average size of a POA was 4,080.2 square kilometres (*SD* = 16,621.7 sq km). The minimum area covered by a POA was just 0.4 square kilometres (4229 - Bond University). However, the maximum area covered by a postal area was 219,415 square kilometres. The POA that had the largest geographic size was 4871. This POA is located in far north Queensland and includes 58 different locations, one of which was the remote Aboriginal community Aurukun (see Appendix 1).

ABS statistics from the Census were used to determine the population of each POA who were aged 16 years old in 2006 (ABS, 2011a). These data were used because they were the most recent census data available at the postal area level, covered the time when individuals born in 1990 would have been 16 years old and the average age of onset for offending was 16.21 years old. There was considerable variability in the base population of the 432 POAs, ranging from zero to 1,675 16 year olds (*M*=130.03, *SD*=187.14). POAs that had a population of 10 or less 16 year olds in 2006 (23.8% of

[1] While the ABS provides a number of standardised methods for measuring geographic location along with concordance files, postal areas were used as the base measure of geographic location. POAs were used because the standardised geographical measures do not correspond directly to postal areas. Alternating to these standardised measures would necessitate the random allocation of chronic offenders within single postal areas to one of multiple standardised divisions. While probability derived concordance tables enable for this to occur, doing so would introduce another layer of uncertainty into the data

postal areas) were excluded from analyses. This was because of the difficulties associated with small cell size and the random allocation process used by the ABS to prevent individual identification. After excluding these POAs, there were 329 POAs that had a population of more than 10 (*M*=169.42, *SD*=198.73, medium = 96, maximum = 1675). The POA with the highest population of 16 year olds was 4350 which included the regional town of Toowoomba. It is obvious from these figures that the population is not evenly distributed across the postal areas.

ArcGIS was used to map the proportion of the population in POAs who were chronic offenders to determine whether some communities appeared to generate chronic offenders. POAs were categorised into four groups based on the proportion of the population who were chronic offenders using an average split (Table 2-5). Additionally, the top 10% of POAs with the highest proportions of chronic offenders (33 POAs) were identified as locations where targeted interventions could be explored.

Table 2-5: Proportion of population who were chronic offenders by number of postal areas

Category	% of population chronic offenders	N of postal areas	% of postal areas
Nil	0	74	22.5
Low	0.1-4.72	150	45.6
High	4.73-9.09	72	21.9
Very High	>9.09	33	10.0
Total		329	100.0

Because the project focused on the residential postal area of chronic offenders when they first had contact with the criminal justice system, it was important to consider the potential role that offender residential mobility may have in limiting the usefulness of the findings for targeting interventions towards particular locations. The fifth research question was *How residentially mobile are chronic offenders?* To address this question, the number of times that chronic offenders changed POAs was examined.

2.2.5. Phase Five: Exploring which communities carry the burden of chronic offenders

The sixth research question was *Which communities carry the burden of chronic offenders?* As detailed in Section 3.3 of the Results Chapter, individuals in the moderate and chronic trajectory groups cost, on average, between $58,116 and $262,057. While representing 3.8% of the population and 15.8% of offenders, they accounted for 68.6% of costs. Therefore, exploring whether communities could be identified which generate the most costly chronic offenders may provide additional information that will be useful for targeting crime prevention programs towards particular communities. This question was addressed by ranking POAs based on the total cost of chronic offenders and exploring the top 10% of locations. Total costs per chronic offender were established using the costing methodology described in Section 2.2.3. These costs were aggregated for each POA. Once again, only the 329 POAs that had a population of more than 10 were included and costs were assigned to the offender's usual residential POA when they first had contact with the criminal justice system. Across the 329 POAs with more than 10 individual, the average total cost of chronic offenders was $808,491 (*SD*=$1,441,216, range $0 to $14,041,855).

Chapter 3. Results

In this Chapter, the results of the project are presented in five sections addressing each of the research questions. First, the number of offender trajectory groups that were identified will be reported. Second, the demographic, offence, and criminal justice system event characteristics of the trajectory groups will be discussed. Third, the overall cost of and cost per individual in the offender trajectories will be examined. Fourth, whether some communities were more likely to generate chronic offenders than others and the extent of residential mobility will be explored. Finally, the 10% ranked communities that carried the cost burden of chronic offenders will be identified.

3.1. Number of Offender Trajectory Groups

The first research question sought to determine how many distinct offender trajectories could be identified in the criminal careers of individuals in the 1990 cohort. Models with two to seven trajectories were created and the BIC and average group membership probabilities for each of the models were examined (Table 3-1). The optimal model included five or six groups, as the seven group model had false convergence. The six group model had a higher value for BIC while the five group model had a relatively high value for BIC and a slightly higher probability of group membership (>0.75). Examination of the form of the trajectories indicated that the six group model split the chronic offender trajectory into two groups, but did not add to interpretation. Consequently, the model with the smaller number of groups was selected for ease of interpretation (Fergusson et al., 2000). Estimates of each component were examined to ascertain the form (i.e., cubic, quadratic, linear and intercept terms) of the five trajectories. Most terms were significant at the 0.5 level and all trajectories had a significant cubic term (Table 3-2), so all five groups were assumed to be described best by cubic functions because of the possible impacts of truncation at age 20 and incarceration for this older group.

Table 3-1: BIC and average group membership probability of trajectory models

Number of groups	BIC (1)	BIC (2)	AIC	Avg. Group Membership Prob.
2	-105950.3	-105935.9	-105890.5	0.96
3	-103267.5	-103247.1	-103182.8	0.91
4	-102299.8	-102273.4	-102190.3	0.92
5	-101663.7	-101631.3	-101529.2	0.79
6	-101049.7	-101010.1	-100885.4	0.78
7	-100810.5	-100764.9	-100621.3	0.73

Table 3-2: Significance of parameter estimates for final trajectory model

Group	Parameter	p-value
Group One	Intercept	0.8998
	Linear	0.5294
	Quadratic	0.2258
	Cube	0.0488
Group Two	Intercept	0.0000
	Linear	0.0000
	Quadratic	0.0000
	Cube	0.0000
Group Three	Intercept	0.2789
	Linear	0.0163
	Quadratic	0.0000
	Cube	0.0000
Group Four	Intercept	0.0000
	Linear	0.0000
	Quadratic	0.0000
	Cube	0.0000
Group Five	Intercept	0.0000
	Linear	0.0000
	Quadratic	0.0000
	Cube	0.0000

Figure 3-1 presents the five offender trajectories identified by the model. Individuals in groups one and two offended less frequently, with individuals in group one averaging 2.1 offences (*SD*=1.4) and individuals in group two averaging 1.9 offences (*SD*=1.5). Group one peaked during adolescence when individuals were aged 14 to 16 while group two had adult onset where individuals were aged over 17 years old. These groups accounted for most of the offender cohort, with 29.3% of the cohort in group one and 54.9% in group two. Group one was labelled "adolescent peaking (low)" while group 2 was labelled "adult onset (low)". The third group involved early onset and high levels of offending (*M*=46.9 offences, *SD*=46.2 offences), with offending peaking when individuals were aged 15 years old. This group included 3.0% of the cohort and was labelled "early onset (chronic)". Group four had adolescent onset when youth were aged 11 to 14 years old with moderate offending. On average, each individual in group four was convicted of 11.2 offences (*SD*=6.2). This group included 10.5% of the cohort and was labelled "adolescent onset (moderate)". The fifth group had adolescent onset of offending when individuals were aged 12 or 13, with high levels of offending which peaked when individuals were aged 20 to 21 years old. On average, individuals in the fifth group were convicted of 35.0 offences (*SD*=29.7). Only a small proportion of the cohort was in this group (2.2%), which was labelled "adolescent onset (chronic)".

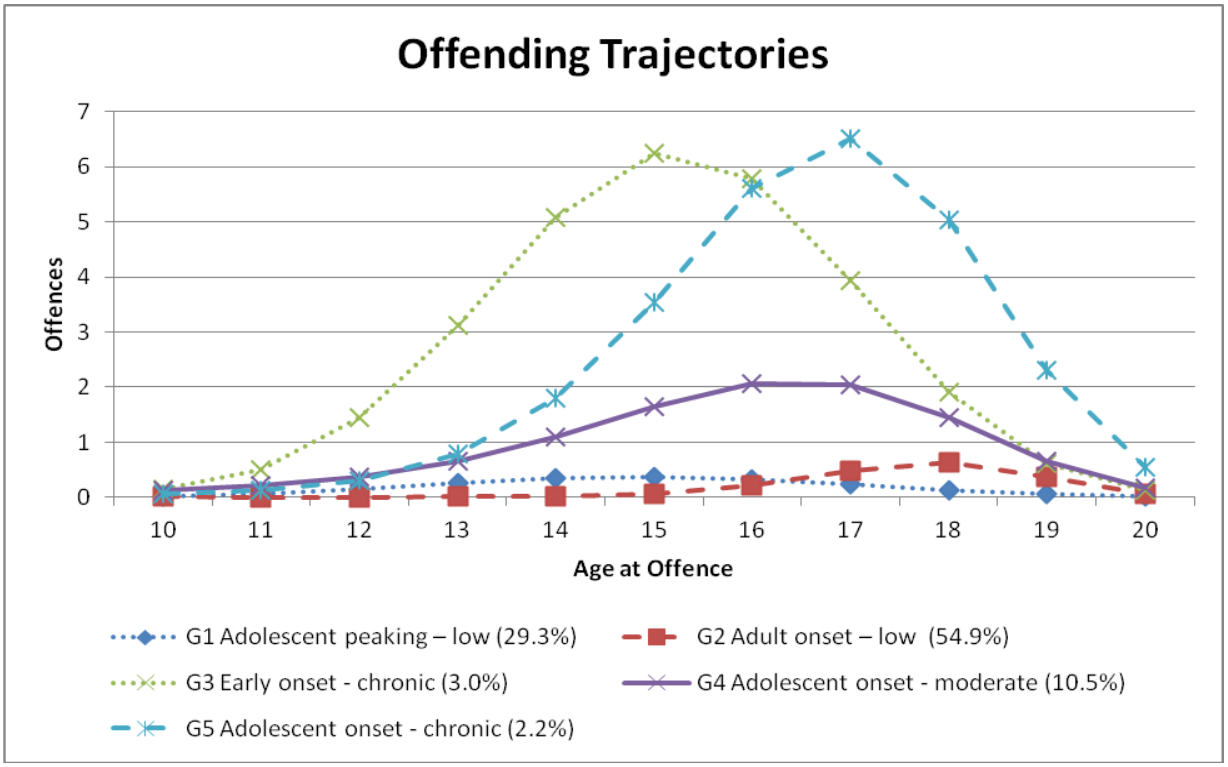

Figure 3-1: Number of offender trajectories in the offender cohort

3.2. Characteristics of Offender Trajectory Groups

The second research question sought to determine *What are the demographic, offence, and criminal justice system event characteristics associated with trajectory group membership?* Table 3-3 presents the demographic characteristics of the offender trajectory groups. Almost one-quarter (24.5%) of the population offended, although one-fifth (20.6%) were in the two low offending groups. Between 75% and 80% of each trajectory group were male, with the exception of the adolescent peaking (low) group which comprised nearly 60% males. About one-tenth of the two low offending groups were Indigenous, while one third of the two adolescent onset groups and nearly half of the early onset (chronic) offender group were Indigenous.

Table 3-3: Demographic characteristics of offending trajectories

Trajectory Group	Offenders		Male		Indigenous		% of total
	N	%	N		%	N	Population[1]
G1 Adolescent peaking – low	4,159	29.3	2,394	7.2	57.6	479	11.5
G2 Adult onset – low	7,778	54.9	5,824	13.4	74.9	660	8.5
G3 Early onset - chronic	428	3.0	336	0.7	78.5	211	49.3
G4 Adolescent onset - moderate	1,488	10.5	1,138	2.6	76.5	443	29.8
G5 Adolescent onset - chronic	318	2.2	257	0.5	80.8	102	32.1
Total	14,171	100.0	9,949	24.5	70.2	1,895	13.4

[1] Total estimated population of 16 year olds in 2006: 57,954 (ABS, 2011a)

The number of offences committed by members of each trajectory group and types of offences committed are presented in Table 3-4 and Table 3-5. Individuals in the two low offending trajectories accounted for 84.2% of offenders and 33.0% of offences. Members of the moderate group were 10.5% of offenders and were responsible for 23.4% of offences. Members of the two chronic groups were 5.2% of offenders and committed 43.7% of offences.

Table 3-4: Number of offences committed by each trajectory group

Trajectory Group	Offenders		Offences	
	N	%	N	%
G1 Adolescent peaking – low	4,159	29.3	8,923	12.5
G2 Adult onset – low	7,778	54.9	14,626	20.5
G3 Early onset - chronic	428	3.0	20,069	28.1
G4 Adolescent onset - moderate	1,488	10.5	16,680	23.4
G5 Adolescent onset - chronic	318	2.2	11,115	15.6
Total	14,171	100.0	71,413	100.0

Visual inspection of the data (Table 3-5) indicated that members of the adolescent peaking (low) trajectory were more likely than members of the overall offender cohort to have committed *Theft and related offences* and less likely to have committed *Unlawful entry offences*. Members of the adult onset (low) group were more likely to have committed *Public order offences*, *Offences against justice procedures* and *Dangerous or negligent acts endangering persons*. They were less likely to have committed *Theft and related offences*, *Unlawful entry offences* and *Property damage offences*. Members of the two chronic groups were more likely to have committed *Unlawful entry offences.* Additionally, members of the early onset (chronic) group were more likely to have committed *Theft and related offences* and were less likely to have committed *Public order offences*.

Table 3-5: Offence types committed by trajectory group members

ANZSOC Offence Type	G1 Adolescent peaking – low		G2 Adult onset – low		G3 Early onset - chronic		G4 Adolescent onset - moderate		G5 Adolescent onset - chronic		Total	
	N	%	N	%	N	%	N	%	N	%	N	%
Theft and related offences	3,319	37.2	2,564	17.5	7,351	36.6	4,369	26.2	3,048	27.4	20,651	28.9
Unlawful entry with intent/burglary, break and enter	750	8.4	431	2.9	5,111	25.5	2,008	12.0	2,285	20.6	10,585	14.8
Public order offences	1,212	13.6	4,462	30.5	1,249	6.2	2,466	14.8	1,090	9.8	10,479	14.7
Property damage and environmental pollution	1,055	11.8	987	6.7	2,481	12.4	2,003	12.0	1,543	13.9	8,069	11.3
Offences against justice procedures, government security and government operations (excluding breaches)	375	4.2	1,950	13.3	1,107	5.5	1,559	9.3	772	6.9	5,763	8.1
Illicit drug offences	721	8.1	1,385	9.5	600	3.0	1,462	8.8	702	6.3	4,870	6.8
Acts intended to cause injury	568	6.4	698	4.8	741	3.7	1,136	6.8	424	3.8	3,567	5.0
Dangerous or negligent acts endangering persons	197	2.2	1,218	8.3	179	0.9	332	2.0	125	1.1	2,051	2.9
Deception and related offences	119	1.3	388	2.7	459	2.3	318	1.9	700	6.3	1,984	2.8
Miscellaneous offences	239	2.7	117	0.8	278	1.4	370	2.2	135	1.2	1,139	1.6
Weapons and explosives offences	144	1.6	242	1.7	112	0.6	237	1.4	128	1.2	863	1.2
Sexual assault and related offences	159	1.8	94	0.6	168	0.8	179	1.1	38	0.3	638	0.9
Robbery, extortion and related offences	47	0.5	58	0.4	156	0.8	203	1.2	89	0.8	553	0.8
Abduction and related offences	16	0.2	28	0.2	76	0.4	38	0.2	36	0.3	194	0.3
Homicide and related offences	2	0.0	4	0.0	1	0.0	0	0.0	0	0.0	7	0.0
Total	8,923	100.0	14,626	100.0	20,069	100.0	16,680	100.0	11,115	100.0	71,413	100.0

Shaded indicates that the offence type was included in the assessment of the wider economic and social costs of offending

Table 3-6 presents the number of criminal justice system events and days supervision based on trajectory group membership. After taking into account the proportion of the cohort that each offender trajectory group comprised, visual inspection of the data indicated that members of the adolescent peaking (low) trajectory were more likely to have been cautioned and were less likely to have had a court appearance. Members of the adult onset (low) trajectory were less likely to have been cautioned, conferenced or to have had a Children's Court appearance and were more likely to have had a Magistrates Court appearance. Members of the two chronic offender trajectories and the moderate offender trajectory were more likely to have had all criminal justice system events. Members of these three groups were also found to have been sentenced to a higher number of days detention/incarceration and community-based supervision than would have been expected given the proportion of the offender cohort that each group represented.

3.3. Cost of Offender Trajectory Groups

The third research question sought to determine the costs of individuals on different offender trajectories. Table 3-7 presents these costs. Over four-fifths (84.2%) of the cohort were in the two low offending groups, but these groups accounted for less than one-third (30.4%) of total costs. Approximately one-tenth (10.5%) of the cohort were in the adolescent onset (moderate) group, who accounted for 22.4% of the costs. Each individual in the moderate group generated a total cost $58,116, with criminal justice system costs accounting for two-thirds (59.9%) of this cost. While 5.2% of the cohort was in the two chronic groups, they accounted for 47.3% of the total costs. Each individual offender in the chronic groups cost more than three times as much as someone in the moderate group and over 20 times more than individuals in the two low offending groups. On average, each individual in the adolescent onset (chronic) group generated a total cost of $221,602 while each individual in the early onset (chronic) group cost $262,057.

Table 3-6: Number of criminal justice system events and days supervision based on trajectory group membership

		Trajectory Group										Total	
		G1 Adolescent peaking – low		G2 Adult onset – low		G3 Early onset - chronic		G4 Adolescent onset - moderate		G5 Adolescent onset - chronic			
		N	%	N	%	N	%	N	%	N	%	N	%
Criminal Justice System Events	Cohort Members	4,159	29.3	7,778	54.9	428	3.0	1,488	10.5	318	2.2	14,171	100.0
	Caution	4753	48.5	1646	16.8	709	7.2	2256	23.0	435	4.4	9,799	100.0
	Police referred conference	323	32.8	68	6.9	136	13.8	372	37.8	85	8.6	984	100.0
	Childrens court appearance[2]	698	11.3	328	5.3	2187	35.3	2120	34.2	866	14.0	6,199	100.0
	Magistrates court appearance	855	5.4	9571	60.0	976	6.1	3318	20.8	1239	7.8	15,959	100.0
	District court appearance	13	2.8	118	25.1	80	17.0	165	35.0	95	20.2	471	100.0
	Supreme court appearance	4	9.3	18	41.9	7	16.3	8	18.6	6	14.0	43	100.0
	Total Events	6646	19.9	11749	35.1	4095	12.2	8239	24.6	2726	8.1	33,455	100.0
Number of days - sentenced	Youth Detention	2,385	3.0	2,545	3.2	49,673	62.0	14,170	17.7	11,408	14.2	80,181	100.0
	Adult Incarceration	6,010	3.3	26,483	14.4	41,489	22.5	52,184	28.3	58,357	31.6	184,523	100.0
	Youth community-based supervision[3]	24,580	4.1	14,720	2.5	283,740	47.7	168,059	28.3	103,151	17.4	594,250	100.0
	Adult community-based supervision	18,716	4.1	156,795	34.1	54,950	11.9	157,191	34.2	72,542	15.8	460,194	100.0

[2] Children's court includes Children's Court and Children's Court of Queensland
[3] Assessed as the most serious outcome for the finalisation

Table 3-7: Criminal justice system and wider economic and social costs of offender trajectories

Group	Cohort Members		Justice System Costs			Wider Economic and Social Costs			Total Costs		
	%	N	Mean ($)	Group Costs ($ mil)	% Cost	Mean ($)	Group Costs ($ mil)	% Cost	Mean ($)	Group Costs ($ mil)	% Cost
G1 Adolescent peaking – low	29.3	4,159	4,127	17.16	8.5	5,408	22.49	12.2	9,535	39.66	10.3
G2 Adult onset – low	54.9	7,778	5,695	44.30	22.0	4,275	33.25	18.0	9,971	77.55	20.1
G3 Early onset - chronic	3.0	428	130,520	55.86	27.7	131,537	56.30	30.4	262,057	112.16	29.0
G4 Adolescent onset - moderate	10.5	1,488	34,780	51.75	25.7	23,337	34.73	18.8	58,116	86.48	22.4
G5 Adolescent onset - chronic	2.2	318	101,497	32.28	16.0	120,106	38.19	20.6	221,602	70.47	18.2
Total	100.0	14,171	14,209	201.35	100.0	13,052	184.96	100.0	27,261	386.31	100.0

3.4. The Extent that Communities Generated Chronic Offenders and the Level of Residential Mobility

The fourth research question sought to determine whether some communities were more likely to generate chronic offenders. For the purposes of this analysis offenders were classified as chronic if they had been identified in the moderate or chronic offender trajectories (15.7% of the offender cohort). Figure 3-2 graphically displays the proportion of the 16 year old population in each postal area identified as chronic offenders. It is evident that chronic offenders are not randomly distributed geographically. About two-thirds of POAs (n=224, 68.1%) had none or a low proportion of the population that were chronic offenders. One-fifth (n=72, 21.9%) of locations were found to have a high proportion of the population who were chronic offenders, where between 5.7 and 9.1% of the population were chronic offenders. One-tenth (n=33, 10.0%) had a very high proportion of the population who were chronic offenders, where over 9% of the population were chronic offenders.

The POAs were then ranked based on the proportion of the population that were chronic offenders. Table 3-8 presents the top 10% POAs where over 9% of the population were chronic offenders. While these 33 locations represents 10% of all POAs with over 10 individuals aged 16 years old at the time, they accounted 458 (20.5%) of all chronic offenders. Also presented in this table is the percentage of 16 year olds in the postal area that were Indigenous, the Index of Relative Socio-economic Disadvantage (IRSD) decile and the Australian Standard Geographical Classification – Remoteness Areas (ASGC-RA). The IRSD is an index developed by the Australian Bureau of Statistics (ABS, 2006b) that summarises census data about low income, high unemployment and low levels of education. The index scores are presented as deciles, that is, an index score of 1 indicates the postal area is in the 10% of most disadvantaged areas in Australia. The ASGC-RA (ABS, 2011b) classifies areas into five broad geographical categories based on access to goods and services. These categories include ‘Major Cities’, ‘Inner Regional’, ‘Outer Regional’, ‘Remote’ and ‘Very Remote’.

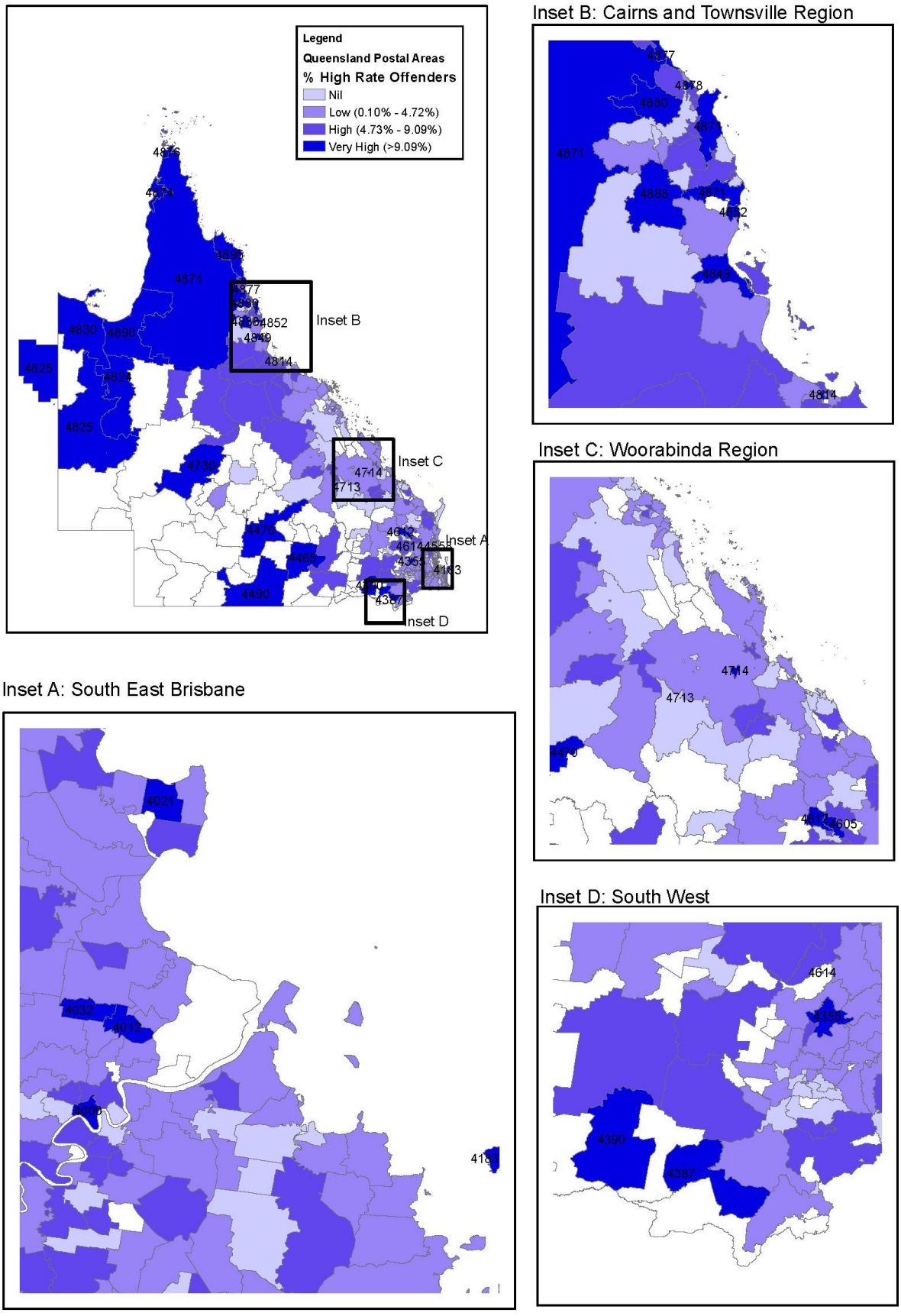

Figure 3-2: Proportion of chronic offenders by Queensland POAs

Table 3-8: POAs with the highest proportion of chronic offenders

POA	% of population Indigenous	IRSD decile	ASGC-RA
4713	100.0	7	Remote Australia
4890	62.5	1	Very Remote Australia
4000	0.0	4	Major Cities of Australia
4824	29.0	1	Remote Australia
4605	45.5	9	Outer Regional Australia
4490	59.1	2	Very Remote Australia
4714	26.1	3	Outer Regional Australia
4830	100.0	1	Very Remote Australia
4465	25.0	4	Remote Australia
4470	10.0	7	Remote Australia
4849	0.0	6	Outer Regional Australia
4387	0.0	1	Outer Regional Australia
4874	55.8	3	Very Remote Australia
4852	0.0	2	Outer Regional Australia
4032	5.0	2	Major Cities of Australia
4876	100.0	2	Very Remote Australia
4825	56.9	4	Remote Australia
4730	0.0	1	Very Remote Australia
4183	27.6	7	Inner Regional Australia
4877	23.5	1	Outer Regional Australia
4888	20.0	2	Outer Regional Australia
4871	53.3	6	Very Remote Australia
4021	3.2	1	Major Cities of Australia
4614	12.0	5	Inner Regional Australia
4880	17.5	1	Outer Regional Australia
4895	46.3	7	Remote Australia
4558	2.4	3	Major Cities of Australia
4355	0.0	1	Inner Regional Australia
4012	0.0	1	Major Cities of Australia

4390	10.1	2	Outer Regional Australia
4814	10.7	2	Outer Regional Australia
4878	7.1	6	Outer Regional Australia
4612	0.0	6	Outer Regional Australia

POA locations are provided in Appendix 1

Examination of the information presented in Table 3-8 indicates that the majority of these POAs had a high proportion of Indigenous 16 year olds. Twenty two of the 33 POAs had higher than average (5.38%) populations of Indigenous 16 year olds. In two of these POAs (4713 and 4876) 100% of the 16 year olds were Indigenous. These POAs were also classified by high levels of disadvantage. Eleven (33%) were classified as being in the lowest decile of disadvantage (mean = 3.34). However, a substantial number of POAs with high proportions of chronic offenders were classified as not disadvantaged. When these POAs are examined they include the Brisbane city central business district, the inner suburbs of Brisbane and the coastal suburbs around Cairns. A substantial number of POAs (13 of the 33) with high proportions of chronic offenders were classified as remote and very remote. These are areas where it is difficult and costly to deliver goods and services. Additionally, 12 POAs were classified as outer regional. Interestingly, one of the very remote postal areas (4730) that had a high proportion of chronic offenders had no officially identified Indigenous 16 year olds (based on the Census data) and was not classified as disadvantaged (IRSD decile = 6). This POA was in western Queensland and included Longreach.

The fifth research question sought to assess the extent of residential mobility among chronic offenders. On average, each chronic offender had 17.7 (*SD*=19.5) valid postal areas recorded. The number of times that chronic offenders changed postal areas is presented in Table 3-9. About one-third (31.7%) of chronic offenders only had one postal area, while about 32.1% had three or more postal area changes. Hence, chronic offenders appear to be substantially mobile in terms of the number of times they change residential address after their initial contact with the criminal justice system.

Table 3-9: Number of times chronic offenders changed postal areas

No of Postal area Changes	N	%
0	708	31.7
1	423	18.9
2	387	17.3
3	225	10.1
4 - 5	279	12.5
6+	212	9.5
Total	2234	100.0

3.5. Communities Carrying the Cost Burden of Chronic Offenders

The sixth research question sought to determine which communities carried the cost burden of chronic offenders. Table 3-10 presents the top 10% of POAs identified based on the total cost to the community of chronic offenders and these are graphically presented in Figure 3-3. When aggregated and totalled, chronic offenders in each POA were found to cost between $2.4 and $14.0 million. Despite representing 10% of POAs, the top 33 POAs accounted for 40.4% of the chronic offenders, 47.0% of offences committed by chronic offenders, 50.5% of the total cost of chronic offenders and 35.2% of the total cost of the all offenders in the cohort. These areas differed from the areas with the highest proportion of chronic offenders as these estimates do not take into account total population. Consequently these POAs have the highest *number* of chronic offenders but not necessarily the highest *concentration* of chronic offenders.

Table 3-10: Postal areas with the highest total costs associated with chronic offenders

Postal area	Total cost of chronic offenders	% 16 year old population Indigenous	IRSD decile	ASGC-RS
4350	14,041,855.4	5.9	5	Inner Regional Australia
4870	9,490,998.2	14.2	5	Outer Regional Australia
4814*	6,880,943.4	10.7	7	Outer Regional Australia
4500	5,526,594	2.4	8	Major Cities of Australia
4605*	5,219,528.5	45.5	1	Outer Regional Australia
4740	5,142,393.2	6.8	6	Inner Regional Australia
4825*	4,980,879.6	56.9	4	Remote Australia
4114	4,486,789.6	7.5	1	Major Cities of Australia
4871*	4,433,063.8	53.3	1	Very Remote Australia
4000*	4,145,758	0	9	Major Cities of Australia
4680	4,083,812	3.6	7	Inner Regional Australia
4815	4,073,432.8	14.9	5	Outer Regional Australia
4701	3,906,402.2	9.4	4	Inner Regional Australia
4650	3,870,516.31	3.2	2	Inner Regional Australia
4300	3,771,011.6	4.9	4	Major Cities of Australia
4700	3,718,443.5	5.8	3	Inner Regional Australia
4305	3,633,307.6	5.8	3	Major Cities of Australia
4405*	3,633,085	8.6	5	Inner Regional Australia
4207	3,287,461.2	5	4	Major Cities of Australia
4655	3,118,401	4.4	3	Inner Regional Australia
4077	3,071,191.4	7.3	1	Major Cities of Australia
4152	2,966,410	2	9	Major Cities of Australia
4053	2,909,976.11	2.4	8	Major Cities of Australia
4880*	2,687,249.3	17.5	2	Outer Regional Australia
4510	2,644,249.8	5.3	2	Major Cities of Australia
4021*	2,6040,52.4	3.2	3	Major Cities of Australia
4557	2,601,894	1.3	7	Major Cities of Australia
4280	2,598,683	2.4	8	Major Cities of Australia
4713*	2,530,978.8	100	1	Remote Australia

4503	2,521,033	1.7	7	Major Cities of Australia
4869	2,470,170.8	15.4	6	Outer Regional Australia
4551	2,467,375	2	5	Major Cities of Australia
4812	2,421,583.6	13.4	4	Outer Regional Australia

* Also identified as a postal area with a high proportion of chronic offenders

POA locations are provided in Appendix 1

A different picture emerged when the costs of chronic offending were examined (Figure 3-3). Regional Queensland appears to be carrying the major cost burden of chronic offenders. Almost half of the high cost postal areas were classified as regional. The POA that incurred the highest cost of chronic offenders was 4350 with the cost estimated at over $14 million dollars. This POA includes the regional city of Toowoomba. Only three of the areas were classified as remote or very remote. These POAs had high proportions of Indigenous young people, and high levels of disadvantage. The cost of crime in these areas is considerable.

Finally both the concentration of chronic offenders (Top 10% proportion of population chronic offenders) and the cost of chronic offenders (Top 10% total cost of chronic offenders) were mapped to examine the spatial distribution of these postal areas (Figure 3-4). Eight POAs were identified that experienced high concentrations of chronic offenders and high costs of chronic offenders. These postal areas are predominantly located in north and far north Queensland and contain a high proportion of Indigenous young people. The outer regional postal area in Inner South West (Insert D) includes Cherbourg a large Indigenous community. This map also clearly indicates that the costly postal areas include the outer suburbs of Brisbane and the regional areas of Rockhampton, Gladstone and Toowoomba. However, the areas where high rates of chronic offenders are located are predominately in the remote and very remote areas of Queensland.

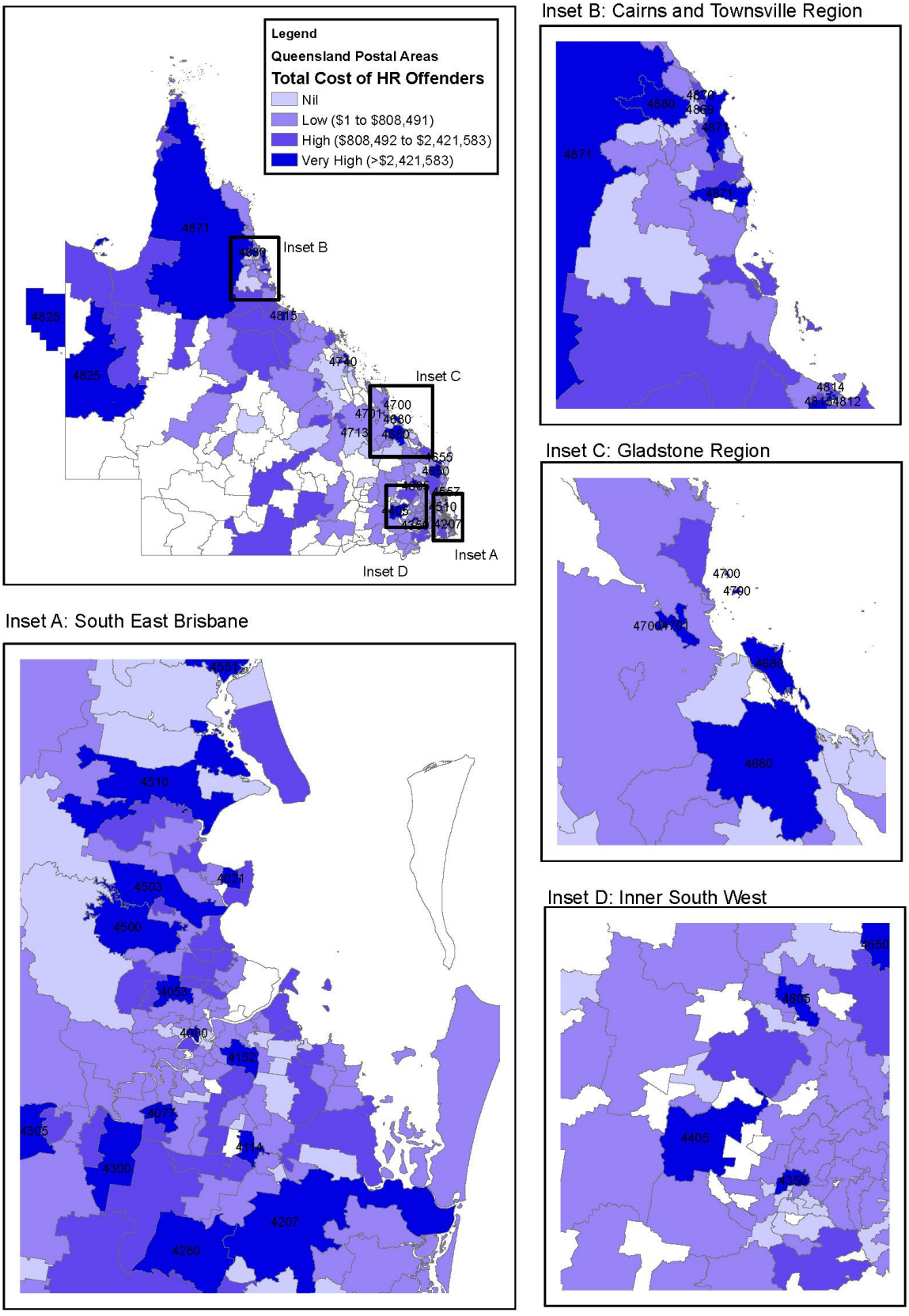

Figure 3-3: Distribution of total costs for chronic offenders by Queensland POAs

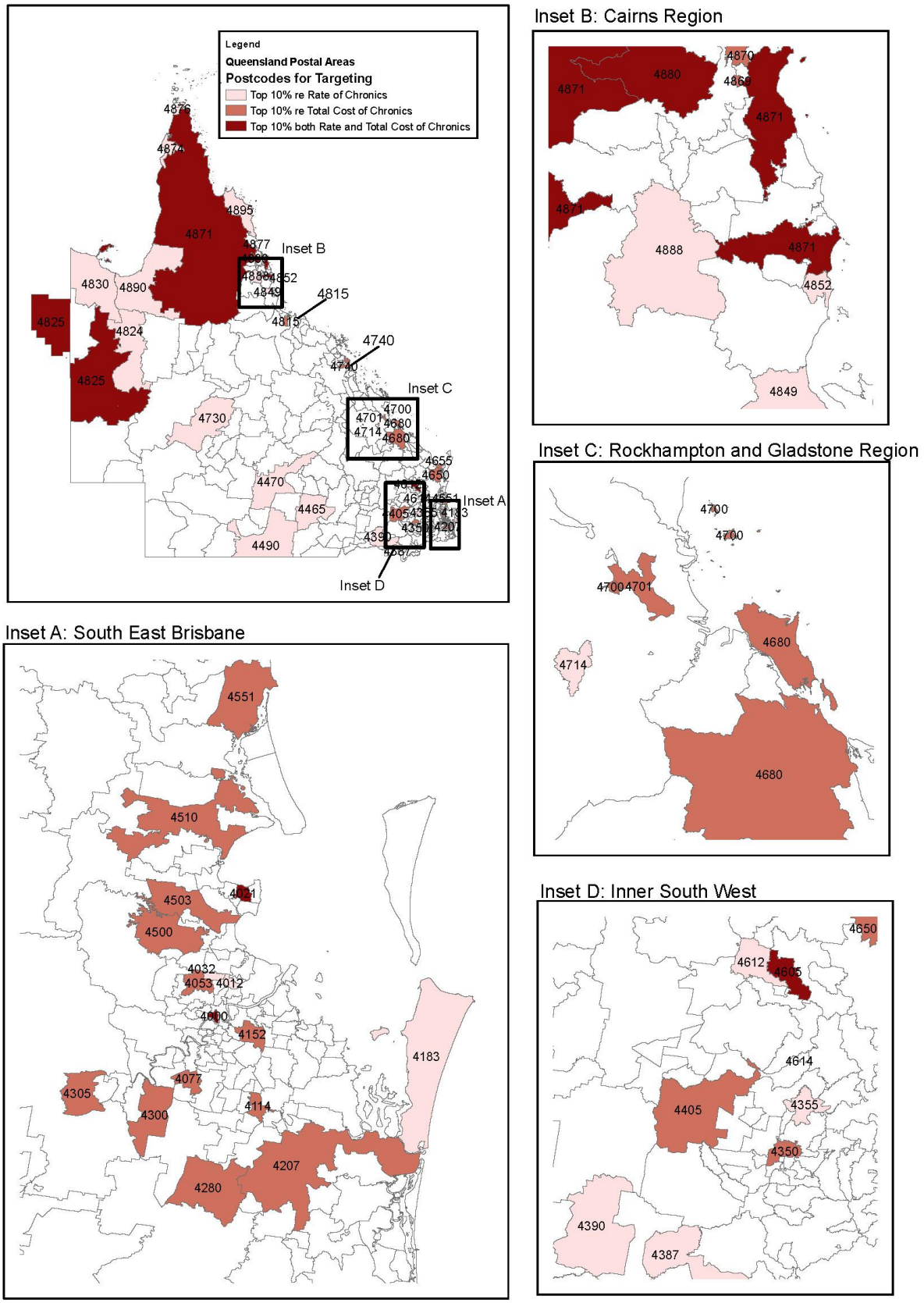

Figure 3-4: Top 10% of locations based on proportion in population who were chronic offenders and the top 10% of most costly high-rate offender postcodes

Chapter 4. Discussion

In this Chapter, an outline of the rationale for the project will firstly be presented. Second, the findings of the project will be summarised in the context of previous findings. Third, the implications for policy arising from the project will be discussed. Fourth, the limitations of the research will be reported. The chapter will conclude by outlining directions for future research.

4.1. Rationale for Project

This project aimed to assess whether communities could be identified which generated chronic offenders and carried substantial cost burdens associated with offending. If such communities could be identified, costly interventions may be targeted towards these locations to reduce offending, crime, victimisation and Indigenous over-representation. The project drew on methods and findings from research focused on offender trajectories and crime and place. Trajectory research finds that there is a small group of chronic offenders who account for a disproportionate amount of offending and costs (Piquero, 2008). While this group can be retrospectively identified, research has not adequately been able to prospectively identify individuals who may be on this trajectory based on risk and protective factors. Findings from crime and place research suggest that these offenders are not randomly distributed geographically and highlight the importance of understanding the temporal aspects of locational data such as offender residential mobility (Gabor & Gottheil, 1984; Oberwittler, 2004; Sabol, et al., 2004; Schwartz, 2010; Wiles & Costello, 2000). Given these findings, the project firstly explored the number of offender trajectories, their nature and cost. The project then focused on individuals in the moderate and chronic offender groups and explored how individuals and costs were geographically distributed. The six research questions addressed by the study were:

1. How many distinct offender trajectories can be identified?
2. What are the demographic, offence, and criminal justice system event characteristics associated with trajectory group membership?
3. What are the costs of offender trajectories?

4. Are some communities more likely to generate chronic offenders than others?
5. How residentially mobile are chronic offenders?
6. Which communities carry the cost burden of chronic offenders?

4.2. Summary of Findings

Consistent with Piquero's (2008) review of trajectory research, five offender trajectory groups were identified. The offending patterns of these groups were similar to those found by prior research. There was an adolescent-peaked group that offended at low levels (29.3% of cohort; 12.5% of offences) and two groups which offended at chronics: early-onset chronic offenders (3.0% of cohort; 28.1% of offences) and adolescent-onset chronic offenders (2.2% of cohort; 15.6% of offences). Additionally, there was an adult-onset group that offended at low levels (54.9% of cohort; 20.5% of offences) and an adolescent onset group that offended at moderate levels (10.5% of cohort; 23.4% of offences). About one-tenth of the two low offending groups were Indigenous, while between one-third and one-half of the moderate and chronic groups were Indigenous. Therefore, targeting offenders in these three groups is likely to be a useful approach for reducing Indigenous over-representation. Chronic offenders were more likely to have committed *Unlawful entry offences* and *Theft and related offences.* They were also more likely to have been subjected to each of the criminal justice system events that were examined and found to account for a disproportionate number of days sentenced to detention/incarceration and community-based supervision.

Costs were applied to the five offender trajectory groups and findings were consistent with previous research, with chronic offender trajectory groups found to account for a disproportionate amount of costs. Early onset (chronic) and adolescent onset (chronic) offenders were 5.2% of the cohort, but these two types of offenders combined accounted for 47.2% of total costs. On average, each chronic offender cost over $220,000 by the time they turned 21. Approximately one-tenth (10.5%) of the cohort were in the adolescent onset (moderate) group, but 22.4% of the costs were accrued by members of this group. Each adolescent onset (moderate) offender cost $58,116 by the time they turned 20. Four-fifths (84.2%) of the cohort were

adolescent peaking (low) or adult onset (low) members, and 30.4% of total costs were accrued by members of these groups. On average, each offender in these low offending groups cost $9,535 or $9,971 respectively by the time they turned 21. Differences between the actual costs of the offender trajectories in the current study and previous research may be explained by the length of criminal careers captured by studies, the offences included and costed in the studies and the overall costing method which is applied (Allard et al., under review).

While information about the trajectory groups and their costs provides useful information about the small group of offenders who account for a large proportion of offences, it does not enable crime prevention interventions to be targeted towards chronic and costly offenders. When the moderate and chronic groups were combined as chronic offenders, they represented 3.8% of the population and 15.8% of offenders. However, they accounted for 67.0% of offences and 68.6% of the costs. Because the residential location of chronic offenders may prove useful for targeting interventions, the proportion of the population in each postal area (POA) who were chronic offenders was explored. The POA where chronic offenders resided when they first had contact with the criminal justice system was used because of the emphasis placed on the early years of life by developmental crime prevention and ABS Census statistics were used to determine the populations of POAs. It was evident that these chronic offenders were not randomly distributed, with two-thirds (n=224, 68.1%) of POAs having none or less than 5% of the 16 year old population identified as chronic offenders and one-tenth (n=33, 10.0%) of postal areas having over 9.1% of the 16 year old population identified as chronic offenders.

Given that the residential postal area when offenders first had contact with the criminal justice system was used to assign location, it was considered important to investigate offender residential mobility. About one-third (31.7%) of chronic offenders only had one postal area while one-third (32.1%) had three or more postal area changes. While a significant proportion of chronic offenders were not residentially mobile, overall chronic offenders were substantially mobile in terms of the number of times they changed residential postal code after their initial contact with the criminal justice system.

Finally, the project identified communities that carried the burden of costly chronic offenders. The top 10% of POAs were identified based on total cost of chronic offenders and these postcodes were found to account for 50.5% of the total cost of chronic offenders. Within each of these POAs, chronic offenders cost between $2.4 and $14.0 million.

4.3. Implications for Policy

The findings from this project indicate that chronic offenders represented 15.9% of offenders but accounted for 67.0% of offences and 68.6% of costs. Three-quarters (77.5%) of chronic offenders were male while one-third (33.8%) were Indigenous. On average, they committed 21.4 offences and had 6.7 finalised criminal justice system events. Chronic offenders were not found to be randomly distributed geographically and there was a substantial cost for some communities. The top 10% of POAs where chronic offenders resided accounted for 50.5% of the total cost of chronic offenders.

These findings suggest a need for universal early/developmental interventions to be implemented and made available for the entire population of some communities. These types of programs include parental training, home visiting, day-care/pre-school and home/community programs (Farrington & Welsh, 2003). In addition, multi-modular programs that focus on the family or ecological environments should also be available in these communities. While such programs vary in their target populations and involve different practices, evidence from meta-analyses indicates that programs focusing on the family reduce offending by between 13.3% and 52.0% (Aos, Phipps, Barnoski & Lieb, 2001; Drake, Aos & Miller, 2009; Latimer, 2001; Lipsey & Wilson, 1998; Woolfenden, Williams & Peat, 2002). Programs which adopt a Multi-Systemic Therapy (MST) framework reduce offending by between 7.7% and 46.0% (Aos et al., 2001; Curtis, Ronan & Borduin, 2004; Lipsey & Wilson, 1998; Littell, Popa & Forsythe, 2005). While these programs are expensive, they should be economically efficient if made available to individuals who are potentially on chronic offender trajectories. Family based programs typically cost between US$2,000 and US$10,000 per participant, while MST costs about US$6,500 per participant (Aos et al., 2006).

The locations identified could also be targeted with place-based crime prevention programs to reduce crime and victimisation within these communities. These interventions aim to alter the immediate environment in which crime occurs or address factors within the context which may be causing or maintaining offending. While situational techniques need to be developed with knowledge of highly specific problems in highly specific places, these techniques can result in reductions in crime (Clarke, 1997; Eck, 2006). Within Australia, situational crime prevention has been successfully used to reduce substance abuse in several Indigenous communities (Richards et al., 2011). Further, community-based approaches which have been adopted overseas and show promise include community economic development programs and recreational programs (McCord et al., 2001; Sherman et al., 1997).

Such programs would need to be tailroed to address the specific needs of indivdiuals and communities. Many of the communities where a substantial proportion of the population were chronic offenders had a high Indigneous population. As such, programs would need to: (i) adopt an holistic approach which incorporate multiple components to address multiple and extensive needs; (ii) involve significant others including the family and community, (iii) be culturally appropriate, and (iv) involve Indigenous people, organisations and elders as well as other well trained and culturally sensitive staff (Bonta, LaPrairie & Wallace-Capretta, 1997; Day, 2003; Jones et al., 2002; Spivakovsky, 2009). Moreover, many communities were in remote or very remote locations. The provision of programs in remote communities would therefore need to overcome the challenges resulting from poor access to services and infrastructure (Schwartz, 2010).

Given the apparent usefulness of understanding geographic location for targeting crime prevention resources, other jurisdictions should consider using this approach to target interventions to reduce offending, crime, victimisation in Indigenous over-representation in the criminal justice system. A similar place-based approach for targeting resources which is gathering traction internationally and in Australia is justice reinvestment (Allen, 2011; Clear, 2011; Guthrie, Adock & Dance, 2011; House of Commons, 2009; Queensland Government, 2011; Schwartz, 2010; Young & Solonec, 2011). This approach involves using ‘justice mapping’ or ‘prisoner geographies’ to redirect a proportion of corrections budgets to the communities that

generated the most costly prisoners. Mapping has enabled million dollar blocks to be identified in some neighbourhoods and evidence is emerging that the approach is an effective way of reducing crime and expenditure on imprisonment (Schwartz, 2010).

4.4. Limitations of the Project

Despite the potential importance of the findings, they should be interpreted in light of seven main limitations. First, the study was based on administrative data which is of variable quality and does not include offending that is not reported to justice agencies or attributed to an offender. Second, the study was not able to take into account cohort attrition (through death or population mobility) or migration into the cohort in assessing the offender trajectories. Taking migration and attrition into account may result in some variation in the final trajectory models identified (Eggleston, Laub & Sampson, 2004). Third, the study did not control for the effects of exposure time when assessing the number of offender trajectories. Individuals in the cohort were in detention/incarceration for 62,870 days. When the number of days available for individuals in each offender trajectory group to offend is considered, the two low offender trajectory groups had the most time available to offend (<.01% of the time). Members of the moderate group were detained/incarcerated for 0.9% of the time, while members of the early onset and adolescent onset chronic groups were detained/incarcerated for 4.0 and 4.6 of the time respectively.

Fourth, criminal justice system costs were assessed based on the average cost of finalised events taking into account how individuals flowed through the system while the wider social and economic costs were assessed based on an update of Rollings (2008) assessment. In assessing criminal justice system costs, average costs were used although costs would vary based on factors such as whether the offender pleaded guilty, the offence type and the location of the offence. The cost of responding to offending in rural and remote areas is likely to be significantly higher for each event and individual than in cities. In assessing wider economic and social costs, six offence types were not assigned a cost. While these offence types could be considered less expensive, there were a large number of offences (32.7%) that were not assigned a cost. Inclusion of these costs would increase the wider economic and social costs of the trajectory groups, but particularly the adult onset

(low) and adolescent peaking (low) groups. Members of these two groups had the highest proportions of the six offence categories that were not able to be included in the assessment of cost.

Fifth, the project was reliant on the POA recorded for each chronic offender when they first had contact with the criminal justice system and ABS Census population data. As the project found, there was considerable mobility among offenders with two-thirds of high risk offenders changing postal areas at least once based on their contacts with criminal justice agencies and about one-tenth (9.5%) changing six or more times. However, there was no way of determining how frequently the chronic offenders moved residential address in the years prior to having contact with the criminal justice system or whether changes in postal area location were not captured by criminal justice system data.

Sixth, POAs are a very crude approximation for communities. Some POAs are geographically very large with very small populations. Furthermore, while population data were available based on Postal Areas (POAs), it should be noted that these are only approximations of postal areas and that these data were subject to random allocation processes used by the ABS to prevent individual identification (ABS, 2006a). Finally, there were also numerous challenges using the Census data. The number of 16 year olds in 2006 was assumed to be an approximation for the cohort population. While the offender cohort would have been 16 in 2006, there was no way of determining the attrition from or migration into the cohort. .

4.5. Directions for Future Research

Additional research focused on the cost of offender trajectories and considering their geographic distribution is clearly needed to promote the use of this evidence within policymaking environments. The need for this research is apparent given that jurisdictional differences in criminal justice practices, economic conditions, monetary values and geographic locations makes it difficult to generalise findings from one context to another. Moreover, there is considerable difficulty assigning market values to intangible costs and surprisingly little research has adopted a top-down costing approach based on methods such as willingness-to-pay. Additional research which

assesses the costs of crime and assesses intangible costs will enable researchers to develop more valid and reliable cost estimates. The need for research which predicts future offending and differentiates offender trajectories based on risk factors and locations is also essential to further assist targeting of crime prevention programs.

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Appendix 1: Postal areas and locations

PCODE	LOCATIONS	Percent ATSI	IRSD Decile	ARIA category	ASGC category	Target Flag
4000	Brisbane Adelaide Street, Brisbane City, Petrie Terrace, Spring Hill	0	9	Highly Accessible	Major Cities of Australia	Both Top 10%
4012	Nundah, Toombul, Wavell Heights, Wavell Heights North	0	7	Highly Accessible	Major Cities of Australia	Top 10% Proportion
4021	Kippa-Ring	3.25	3	Highly Accessible	Major Cities of Australia	Both Top 10%
4032	Chermside, Chermside Centre, Chermside South, Chermside West	5	6	Highly Accessible	Major Cities of Australia	Top 10% Proportion
4053	Brookside Centre, Everton Hills, Everton Park, Mcdowall, Mitchelton, Stafford, Stafford Dc, Stafford Heights	2.41	8	Highly Accessible	Major Cities of Australia	Top 10% Costs
4077	Doolandella, Durack, Inala, Inala East, Inala Heights, Richlands	7.34	1	Highly Accessible	Major Cities of Australia	Top 10% Costs
4114	Kingston, Logan Central, Logan City Dc, Woodridge	7.47	1	Highly Accessible	Major Cities of Australia	Top 10% Costs
4152	Camp Hill, Carina, Carina Heights, Carindale	1.99	9	Highly Accessible	Major Cities of Australia	Top 10% Costs
4183	Amity, Amity Point, Dunwich, North Stradbroke Island, Point Lookout	27.59	2	Highly Accessible	Inner Regional Australia	Top 10% Proportion
4207	Alberton, Bahrs Scrub, Bannockburn, Beenleigh, Belivah, Buccan, Cedar Creek, Eagleby, Edens Landing, Holmview, Logan Village, Luscombe, Mount Warren Park, Stapylton, Steiglitz, Windaroo, Wolffdene, Woongoolba, Yarrabilba, Yatala, Yatala Dc	5.04	4	Highly Accessible	Major Cities of Australia	Top 10% Costs
4280	Jimboomba, North Maclean, South Maclean, Stockleigh	2.42	8	Highly Accessible	Major Cities of Australia	Top 10% Costs
4300	Augustine Heights, Bellbird Park, Brookwater, Camira, Carole Park, Gailes, Goodna, Springfield, Springfield Central, Springfield Lakes	4.91	4	Highly Accessible	Major Cities of Australia	Top 10% Costs

4305	Basin Pocket, Brassall, Bremer, Churchill, Coalfalls, East Ipswich, Eastern Heights, Flinders View, Ipswich, Leichhardt, Limestone Ridges, Moores Pocket, Newtown, North Ipswich, North Tivoli, One Mile, Raceview, Sadliers Crossing, Tivoli, West Ipswich, Woodend, Wulkuraka, Yamanto	5.79	3	Highly Accessible	Major Cities of Australia	Top 10% Costs
4350	Athol, Blue Mountain Heights, Centenary Heights, Charlton, Clifford Gardens, Cotswold Hills, Cranley, Darling Heights, Drayton, Drayton North, East Toowoomba, Finnie, Glenvale, Gowrie Mountain, Harlaxton, Harristown, Kearneys Spring, Middle Ridge, Mount Kynoch, Mount Lofty, Mount Rascal, Newtown, North Toowoomba, Northlands, Prince Henry Heights, Rangeville, Redwood, Rockville, South Toowoomba, Toowoomba, Toowoomba City, Toowoomba Dc, Toowoomba East, Toowoomba South, Toowoomba Village Fair, Toowoomba West, Top Camp, Torrington, Wellcamp, Westbrook, Wilsonton, Wilsonton Heights, Wyalla Plaza	5.91	5	Highly Accessible	Inner Regional Australia	Top 10% Costs
4355	Anduramba, Crows Nest, Emu Creek, Glenaven, Jones Gully, Mountain Camp, Pierces Creek, Pinelands, Plainby, The Bluff, Upper Pinelands	0	3	Highly Accessible	Inner Regional Australia	Top 10% Proportion
4387	Brush Creek, Bybera, Coolmunda, Greenup, Inglewood, Mosquito Creek, Terrica, Warroo, Whetstone	0	2	Accessible	Outer Regional Australia	Top 10% Proportion
4390	Billa Billa, Calingunee, Callandoon, Goodar, Goondiwindi, Kindon, Lundavra, Wondalli, Wyaga, Yagaburne	10.13	5	Moderately Accessible	Outer Regional Australia	Top 10% Proportion
4405	Blaxland, Bunya Mountains, Dalby, Ducklo, Grassdale, Pirrinuan, Ranges Bridge, St Ruth, Tipton	8.56	5	Accessible	Inner Regional Australia	Top 10% Costs
4465	Dunkeld, Forestvale, Mitchell, V Gate, Womalilla	25	2	Remote	Remote Australia	Top 10% Proportion
4470	Charleville, Langlo	10	4	Very Remote	Remote Australia	Top 10% Proportion

4490	Barringun, Coongoola, Cunnamulla, Cuttaburra, Humeburn, Jobs Gate, Linden, Noorama, Tuen, Widgeegoara, Yowah ,	59.09	1	Very Remote	Very Remote Australia	Top 10% Proportion
4500	Bray Park, Brendale, Brendale Bc, Cashmere, Clear Mountain, Joyner, Strathpine, Strathpine Centre, Warner	2.4	8	Highly Accessible	Major Cities of Australia	Top 10% Costs
4503	Dakabin, Griffin, Kallangur, Kurwongbah, Murrumba Downs, Whiteside	1.65	7	Highly Accessible	Major Cities of Australia	Top 10% Costs
4510	Beachmere, Bellmere, Caboolture, Caboolture Bc, Caboolture South, Donnybrook, Meldale, Moodlu, Rocksberg, Toorbul, Upper Caboolture	5.29	2	Highly Accessible	Major Cities of Australia	Top 10% Costs
4551	Aroona, Battery Hill, Bells Creek, Caloundra, Caloundra Dc, Caloundra West, Currimundi, Dicky Beach, Golden Beach, Kings Beach, Little Mountain, Meridan Plains, Moffat Beach, Pelican Waters, Shelly Beach	1.97	5	Highly Accessible	Major Cities of Australia	Top 10% Costs
4557	Mooloolaba, Mountain Creek	1.27	7	Highly Accessible	Major Cities of Australia	Top 10% Costs
4558	Cotton Tree, Kuluin, Maroochydore, Maroochydore Bc, Sunshine Plaza	2.37	4	Highly Accessible	Major Cities of Australia	Top 10% Proportion
4605	Barlil, Byee, Cherbourg, Cloyna, Cobbs Hill, Crownthorpe, Glenrock, Kitoba, Manyung, Merlwood, Moffatdale, Moondooner, Murgon, Oakdale, Redgate, Silverleaf, Sunny Nook, Tablelands, Warnung, Windera, Wooroonden	45.45	1	Accessible	Outer Regional Australia	Both Top 10%
4612	Hivesville, Kawl Kawl, Keysland, Stonelands, Wigton	0	6	Accessible	Outer Regional Australia	Top 10% Proportion
4614	Neumgna, Upper Yarraman, Yarraman	12	1	Accessible	Inner Regional Australia	Top 10% Proportion

4650	Aldershot, Antigua, Bauple, Bauple Forest, Beaver Rock, Bidwill, Boonooroo, Boonooroo Plains, Duckinwilla, Dundathu, Dunmora, Ferney, Glenorchy, Gootchie, Grahams Creek, Granville, Gundiah, Island Plantation, Maaroom, Magnolia, Maryborough, Maryborough Dc, Maryborough West, Mount Urah, Mungar, Netherby, Oakhurst, Owanyilla, Pallas Street Maryborough, Pilerwa, Pioneers Rest, Poona, Prawle, St Helens, Talegalla Weir, Tandora, Teddington, The Dimonds, Thinoomba, Tiaro, Tinana, Tinana South, Tinnanbar, Tuan, Tuan Forest, Walkers Point, Yengarie, Yerra	3.2	2	Accessible	Inner Regional Australia	Top 10% Costs
4655	Booral, Bunya Creek, Craignish, Dundowran, Dundowran Beach, Eli Waters, Great Sandy Strait, Hervey Bay, Hervey Bay Dc, Kawungan, Nikenbah, Pialba, Point Vernon, River Heads, Scarness, Sunshine Acres, Susan River, Takura, Toogoom, Torquay, Urangan, Urraween, Walliebum, Walligan, Wondunna	4.44	3	Accessible	Inner Regional Australia	Top 10% Costs
4680	Barney Point, Beecher, Benaraby, Boyne Island, Boyne Valley, Boynedale, Builyan, Burua, Byellee, Callemondah, Calliope, Clinton, Diglum, Gladstone, Gladstone Bc, Gladstone Central, Gladstone Dc, Gladstone Harbour, Glen Eden, Heron Island, Iveragh, Kin Kora, Kirkwood, Mount Alma, New Auckland, O'Connell, River Ranch, South End, South Gladstone, South Trees, Sun Valley, Tablelands, Tannum Sands, Taragoola, Telina, Toolooa, Ubobo, West Gladstone, West Stowe, Wooderson, Wurdong Heights	3.59	7	Accessible	Inner Regional Australia	Top 10% Costs
4700	Allenstown, Depot Hill, Fairy Bower, Great Keppel Island, Port Curtis, Rockhampton, Rockhampton City, Rockhampton Hospital, The Keppels, The Range, Wandal,	5.8	3	Highly Accessible	Inner Regional Australia	Top 10% Costs

	West Rockhampton					
4701	Berserker, Central Queensland University, Frenchville, Greenlake, Ironpot, Kawana, Koongal, Lakes Creek, Limestone Creek, Mount Archer, Nankin, Nerimbera, Norman Gardens, Park Avenue, Red Hill Rockhampton, Rockhampton Dc, Rockyview, Sandringham, The Common	9.4	4	Highly Accessible	Inner Regional Australia	Top 10% Costs
4713	Woorabinda	100	1	Moderately Accessible	Remote Australia	Both Top 10%
4714	Baree, Boulder Creek, Fletcher Creek, Hamilton Creek, Horse Creek, Johnsons Hill, Leydens Hill, Limestone, Moongan, Mount Morgan, Nine Mile Creek, Oakey Creek, Struck Oil, The Mine, Trotter Creek, Walmul, Walterhall, Wura	26.09	1	Accessible	Outer Regional Australia	Top 10% Proportion
4730	Camoola, Chorregon, Ernestina, Longreach, Maneroo, Morella, Stonehenge, Tocal, Vergemont	0	6	Very Remote	Very Remote Australia	Top 10% Proportion
4740	Alexandra, Alligator Creek, Andergrove, Bakers Creek, Balberra, Balnagowan, Beaconsfield, Belmunda, Blacks Beach, Cape Hillsborough, Chelona, Cremorne, Dolphin Heads, Dumbleton, Dundula, Dunnrock, East Mackay, Eimeo, Erakala, Foulden, Glenella, Grasstree Beach, Habana, Haliday Bay, Hay Point, Homebush, Mackay, Mackay Caneland, Mackay Dc, Mackay Harbour, Mackay North, Mackay South, Mcewens Beach, Mount Jukes, Mount Pleasant, Munbura, Nindaroo, North Mackay, Ooralea, Paget, Racecourse, Richmond, Rosella, Rural View, Sandiford, Slade Point, South Mackay, Te Kowai, The Leap, West Mackay	6.81	6	Moderately Accessible	Inner Regional Australia	Top 10% Costs
4812	Currajong, Gulliver, Hermit Park, Hyde Park, Hyde Park Castletown, Mundingburra, Mysterton, Pimlico, Rosslea	13.41	4	Accessible	Outer Regional Australia	Top 10% Costs

4814	Aitkenvale, Annandale, Cranbrook, Douglas, Garbutt, Garbutt East, Heatley, Mount Louisa, Murray, Vincent	10.74	7	Moderately Accessible	Outer Regional Australia	Both Top 10%
4815	Condon, Gumlow, Kelso, Rasmussen	14.88	5	Accessible	Outer Regional Australia	Top 10% Costs
4824	Cloncurry, Oorindi	29.03	3	Very Remote	Remote Australia	Top 10% Proportion
4825	Breakaway, Buckingham, Carrandotta, Dajarra, Duchess, Fisher, Georgina, Gunpowder, Happy Valley, Healy, Lawn Hill, Menzies, Mica Creek, Miles End, Mornington, Mount Isa, Mount Isa City, Mount Isa Dc, Mount Isa East, Parkside, Pioneer, Piturie, Ryan, Soldiers Hill, Sunset, The Gap, The Monument, Townview, Waverley, Winston	56.92	4	Remote	Remote Australia	Both Top 10%
4830	Burketown, Doomadgee	100	2	Very Remote	Very Remote Australia	Top 10% Proportion
4849	Cardwell	0	2	Moderately Accessible	Outer Regional Australia	Top 10% Proportion
4852	Bingil Bay, Carmoo, Djiru, Garners Beach, Midgeree Bar, Mission Beach, South Mission Beach, Wongaling Beach	0	6	Moderately Accessible	Outer Regional Australia	Top 10% Proportion
4869	Bentley Park, Edmonton, Mount Peter, Wrights Creek	15.38	6	Accessible	Outer Regional Australia	Top 10% Costs
4870	Aeroglen, Brinsmead, Bungalow, Cairns, Cairns City, Cairns Dc, Cairns North, Earlville, Edge Hill, Freshwater, Kamerunga, Kanimbla, Manoora, Manunda, Martynvale, Mooroobool, Parramatta Park, Portsmith, Redlynch, Stratford, Westcourt, Whitfield	14.21	5	Accessible	Outer Regional Australia	Top 10% Costs

4871	Almaden, Aloomba, Aurukun, Basilisk, Bellenden Ker, Bellevue, Bombeeta, Boogan, Bramston Beach, Camp Creek, Chillagoe, Coen, Cowley, Cowley Beach, Cowley Creek, Croydon, Crystalbrook, Currajah, Deeral, Desailly, East Trinity, Edward River, Einasleigh, Fishery Falls, Forsayth, Gamboola, Georgetown, Germantown, Glen Boughton, Green Island, Gununa, Julatten, Kowanyama, Kurrimine Beach, Lakeland, Laura, Lockhart, Lower Cowley, Mena Creek, Mirriwinni, Moresby, Mount Carbine, Mount Molloy, Mount Mulligan, Mount Surprise, Nychum, Petford, Pormpuraaw, Sandy Pocket, Southedge, Stockton, Thornborough, Utchee Creek, Wangan, Warrubullen, Waugh Pocket, Woopen Creek, Yarrabah	53.28	1	Remote	Very Remote Australia	Both Top 10%
4874	Evans Landing, Mapoon, Mission River, Nanum, Napranum, Rocky Point, Trunding, Weipa, Weipa Airport	55.77	2	Very Remote	Very Remote Australia	Top 10% Proportion
4876	Bamaga, Injinoo, New Mapoon, Seisia, Umagico	100	1	Very Remote	Very Remote Australia	Top 10% Proportion
4877	Craiglie, Killaloe, Mowbray, Oak Beach, Port Douglas, Wangetti	23.53	7	Moderately Accessible	Outer Regional Australia	Top 10% Proportion
4878	Barron, Caravonica, Holloways Beach, Machans Beach, Smithfield, Yorkeys Knob	7.09	7	Accessible	Outer Regional Australia	Top 10% Proportion
4880	Arriga, Biboohra, Chewko, Glen Russell, Mareeba, Paddys Green	17.46	2	Moderately Accessible	Outer Regional Australia	Both Top 10%
4888	Evelyn, Kaban, Millstream, Ravenshoe, Tumoulin	20	1	Moderately Accessible	Outer Regional Australia	Top 10% Proportion
4890	Normanton	62.5	1	Very Remote	Very Remote Australia	Top 10% Proportion
4895	Bloomfield, Cooktown, Hope Vale, Rossville, Wujal Wujal	46.34	1	Remote	Remote Australia	Top 10% Proportion