Use of cross-sectoral data linkage to predict high-rate offenders in WA

Curtin Institute for Computation
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...from criminological literature and experiences in the criminal justice system:

A small proportion of offenders account for a large proportion of crimes

We can think of these offenders as ‘prolific offenders’.
Impact of ‘prolific’ offenders

Source: Royal Canadian Mounted Police, British Columbia, Canada
‘Prolific’ offenders vs. Others

Source: www.analyticscambridge.co.uk/offendersnumbersandneeds.php
Prolific Offenders

Impact negatively on:
• local and state crime rates
• public perception of safety

Place a financial and social burden on communities

Provide an opportunity for government to intervene to either reduce or prevent their emergence.

If we can identify (target) and apply interventions, then everyone is a winner.
WA Labor’s Plan to Target Juvenile Crime

A McGowan Labor Government will introduce Target 120 to focus on the often dysfunctional homes of the State’s worst juvenile offenders to change their behaviour and make communities safer.

The Target 120 response to each home will be co-ordinated by a single, dedicated contact person to ensure efficiency and avoid duplication of effort.

The single point of contact will ensure that there is a more coordinated approach to supporting at risk families who are in contact with multiple government agencies. Enhanced communication across all layers of government is critical to delivering improved outcomes for people with complex issues.

Early intervention with at risk young people will help turn lives around and reduce the rate of offending in our community.

WA Labor will invest $22 million over four years into the Target 120 initiative. This will bring across-government resources together to support the families of the 120 worst juvenile offenders in the State to help stop them offending before they reach the point of imprisonment. This will also help break the cycle of reoffending.
A note on terminology

Other terms used: ‘chronic offenders’ ‘serious repeat offenders’ ‘life-course persistent offenders’ ‘petty persistent offenders’

Common feature = high rate of individual offending, over a long period of time

Note: A ‘high rate’ offender ≠ A ‘high risk’ offender

High risk offender commit fewer offences but with greater associated harm. High risk offenders tend to receive priority in correctional interventions (prisons/offender management programs).
This study investigated the risk factors associated with high-rate or ‘prolific’ offending in Western Australia.

It made use of linked data from health, child-protection, education and the justice sector to:

• **identify and describe the population of prolific offenders** in Western Australia (those born from 1980 to 1995, and followed to 2005).
• **identify the factors that distinguish prolific offenders** from other offenders in Western Australian population
• **examine whether these correlates or predictors of prolific offending** are similar for i) male and female offenders, and ii) Indigenous and non-Indigenous offenders.
Method

1. Get data on offenders
   - Police/justice records of offending (arrests, summonses, juvenile cautions & JJTs)
   - Linked to education, health, child protection + parents & siblings

2. Figure out who is a prolific offender and who isn’t
   - Compare prolific offenders to less prolific offenders

3. Analysis of (linked) data
   - Patterns of offending
   - What factors, if any, emerge as risks or predictive of prolific offending

...then use predictive factors to target early intervention to avoid them becoming prolific offenders ....
“Record linkage” – methods that identify records in different collections that belong to the same person

Commonly used to enable medical and public health research (cradle to grave)

Australia internationally recognised for DL and DL-based research

How possible? Operates through exemptions in privacy laws – needs ethics approval + public benefit must exceed risk to privacy
DATA LINKAGE 101

• “Best practice” protocols
• Separation principle
• Trusted third parties undertake linkage
• Data used for linkage is separated from data needed for research
• Minimal data needed to do the job
• Encryption, project-based key exchange
• NO identifying information to researchers
• There is NO repository of linked data
Cradle to Grave: Health information over the lifespan

Birth Records | Hospital Records | Cancer Registries | Death Records

CRADLE | GP Records | PBS Records | Veterans’ Affairs/Ageing | GRAVE
Cradle to Grave: Human research over the lifespan

Police Records  Court Records  Corrections Records

OFFENDING ONSET  RECIDIVISM  DESISTANCE

CRADLE

Birth Records  Education Records  Health Records

Child Protection

GRAVE

Other  Death Records
Data used in Prolific Offender study

All **offenders**
born in WA
1980-1995

Followed to 2005
N ~ 120,000
Family Connections (unique to WA)

Parents - both mum & dad, derived from birth registrations

Siblings of study cohort

- Perinatal & birth
- Hospital admissions
- Child neglect & maltreatment
- School attainment Yr 3, 5, 7, 9
- Offending history (arrests & diversion)
- Mental health
- SES & Electoral (mobility)
- Death

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Data Synthesis

“Operationalising” variables for analysis based on relevant theories ...

- **Individual factors** – sex, Indigenous status, LBW, birth complications, self-harm, drugs-alcohol, teen parent, abuse/maltreatment, in-care, mental health, victimisation...
- **Siblings** – criminality, mental health, abuse/maltreatment, in-care, victimisation
- **Parents** – mental health, illness, drugs-alcohol, death
- **Family** – family size & structure, mobility
- **School** – attendance, reading, writing, numeracy skills
- **Community** – socio-economic status
Distinguishing Prolific Offenders

Semi-parametric group-based modelling (SPGM), mixed Poisson model (Nagin & Land, 1993)

Variable of interest: \( \lambda = \text{individual frequency of offending over the life course} \)

\( \lambda = \text{no. offences committed per annum} \)

Look for clusters of people with similar \( \lambda \) over life-course

Separate modelling for:
- Males vs females
- Aboriginal vs non-Aboriginal
Who is a Prolific Offender?

**Male** offenders – SPGM reveals 3 groups – high-rate, middle & low.

Males who fell into the ‘blue’ group were classified as prolific. They have a higher rate of offending at every age point, compared with other offenders. They made up 3.1% of the total male offender population.
Who is a Prolific Offender?

Female offenders – 2 groups only – prolific & low

Females who fell into the ‘green’ group were classified as prolific.

They made up 8.5% of the total female offender population.
Who is a Prolific Offender?

- **Indigenous offenders** – 3 groups
- Higher overall frequency of offender, greater % in prolific group

Aboriginal people who fell into the ‘blue’ group were classified as prolific.

They made up 9.4% of the total Aboriginal offender population.
Prolific offenders & their crimes

Female Offenders

Male Offenders

Aboriginal Offenders

Non-Aboriginal Offenders
## Potential Risk Factors associated with Prolific Offending

### Individual factors
- Low birth weight
- Serious obstetric complications
- Has a serious illness
- Has a serious mental health condition
- Was an assault victim
- Has self-harmed
- Allegations of maltreatment
- Child placed in care
- Becoming a teen parent

### Family factors
- Age of mother at birth
- Death of parent
- Mother ill
- Father ill
- Parental stress
- Parent who had been an assault victim
- High Mobility

### School
- Missed schooling in Year 3
- Missed schooling in Year 5
- Missed schooling in Year 7
- Missed schooling in Year 9

### Community
- Neighbourhood disadvantage (at birth)
- Neighbourhood disadvantage (at first offence)

### Criminogenic
- Early onset (first offence < 12 years of age)
- Early violence (in first year of offending)

Each of these factors (and more) were tested but only some were found to be significant.
## Risk Factors associated with Prolific Offending (Aboriginal males)

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Conclusions

• First offending < 12yrs of age is strongest indicator
  o Relatively easy for government to measure/detect
  o Opportunities to intervene exist
  o This is about crime reduction rather than crime prevention

• A poor start in life does matter (maltreatment, exposure to violence, parental stress). Improving these conditions can prevent prolific offending.

• Same, same but different: boys differ from girls, Aboriginal offenders differ from non-Aboriginal offenders. Interventions should be tailored accordingly.

• Aboriginal kids are different to (stronger than?) non-Aboriginal kids (e.g. poor neighbourhoods, failure at school, mobility do not emerge as risk factors)

• Insights from linked data, but also limitations
**Acknowledgements**

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