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Violent Criminal Careers: A retrospective longitudinal study

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Aims: *To determine: (1) the long-term risk that someone charged with a violent offence will commit another violent offence (2) what factors influence the likelihood of desistance and the length of time to the next violent offence for those who do re-offend.*

Method: *All 26,472 offenders who were born between 1986 and 1990 (inclusive) and who had at least one violent offence proved against them in New South Wales (NSW) before December 31st, 2014 were followed up to December 31st, 2015. An offence was counted as proved if at the index contact it resulted in a caution, a youth justice conference or proven court appearance. The mean follow-up time for offenders in the study was 6.35 years (range = 21.3 years; interquartile range = 4.7 years). Bivariate correlates of time to re-offend were identified using log-rank tests. Multivariate analysis of survival time was undertaken using a cure fraction model with a loglogistic distribution of survival time.*

Results: *In the median case, after 20 years, an estimated 23 per cent of violent offenders committed a further violent offence. However the risk of violent re-offending varies greatly across different offender groups, being much higher for Indigenous offenders, those who were aged 17 and under at the time of their index contact and those whose first contact with the criminal justice system occurred when they were 12 years of age or younger. There is little evidence of specialisation among violent offenders in the sample. Most have committed a wide variety of different offences prior to their conviction for a violent offence and those who do re-offend commit a wide variety of offences.*

Conclusion: *Authorities charged with responsibility for making bail, sentencing and parole decisions in relation to violent offenders need to pay close attention to the characteristics of the violent offenders they are dealing with. Evaluations of violent offender programs should include both short-term and long-term follow up. Prison is not a very effective instrument through which to reduce violent offending.*

Keywords: *Violence, longitudinal study, survival, cure model, re-offending, loglogistic*

INTRODUCTION

The last two decades in Australia have seen a significant growth in public and political concern about violence. That concern is reflected both in the passage of tougher sentencing laws and in the imposition of tougher penalties on persons convicted of violent offending. Several States, for example, have passed laws permitting the continued detention of sex or violent offenders deemed 'high risk' (Tulich 2015). Courts have also adopted harsher sentencing practices in relation to violent offenders (Freeman 2015). Similar long-term trend data are difficult to obtain from other States and Territories but the number of inmates in Australian prisons serving time for 'acts intended to cause injury' increased by more than 160 per cent (from 2,930 to 7,651) between 2001 and 2015 (ABS 2006; 2015). Offenders convicted of offences in this category now make up more than one in five sentenced prisoners in Australia (ABS 2015).

Although official responses to violent offending place a great deal of emphasis on deterrence and incapacitation, the effectiveness of conventional sanctions, especially imprisonment, is open to question. Reviews of research on the special deterrent effects of prison generally find that prison is not an effective deterrent to violent re-offending (Nagin, Cullen & Jonson, 2009). Research on the general deterrent effects of tougher penalties on violent offending is fairly limited but it suggests that prison has very modest general deterrent effects on violent crime rates (Menendez & Weatherburn, 2015). Prison undoubtedly has some level of incapacitation effect but the scale of that effect obviously depends on the frequency of re-offending and the length of a violent offender's criminal career. If rates of violent re-offending are low, the incapacitation effect of prison on violent offending will be fairly limited. If, on the other hand, rates of re-offending are high, the incapacitation effect of prison may be substantial.

Piquero, Jennings and Barnes (2012) have conducted the most recent review of research on the criminal careers of violent offenders. They concluded that (1) only a small proportion of offences committed throughout most criminal careers are violent

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(2) violent offenders tend to be generalists rather than specialists (3) the majority of persons convicted of a violent offence have only one such conviction in their criminal career (4) convictions for violent offending tend to occur later in a criminal career than convictions for non-violent offending and (5) because repeat violent offending is rare, it is difficult to construct reliable actuarial tools to predict violent offending.

It is difficult to determine whether and to what extent these conclusions apply to Australia, as very few long-term follow up studies of violent offending have been conducted on Australian samples of offenders. Broadhurst and Loh (2003) estimated the likelihood of re-arrest for 116,151 male offenders arrested between 1984 and 1995. Offenders were followed up for an average of 5.7 years. They were interested in estimating the ultimate risk of re-arrest for (a) another sex offence (b) another violent offence and (c) any offence. Their results indicated that the risk of a repeat sex offence was 0.33, the risk of a repeat violent offence was 0.51 and the risk of a repeat offence of any sort was 0.61. They found that younger offenders, Indigenous offenders and those with a prior arrest for non-sex offences had higher probabilities for any and for violent re-arrest but older offenders tended to have higher probabilities of repeat sex offending.

Broadhurst, Maller, Maller and Bouhours (2016) examined the criminal careers of a sample of 1,088 homicide offenders spanning the period 1 January 1984 to 31st December 2005. As with Broadhurst and Loh (2003), they were interested in three events: (a) commission of another homicide offence (b) commission of another grave or serious offence (robbery, blackmail/extortion, assault, sexual assault, abduction and related offences, burglary, arson, child pornography and homicide) and (c) commission of any other offence. They found that the proportion committing another homicide offence over the 22 year follow-up period was extremely low (less than 1%) but the proportion committing another serious or grave offence was comparatively high (21.9%) and the proportion committing any other offence was even higher (40.3%). Rates of re-offending were higher for Indigenous offenders than for non-Indigenous offenders, for males compared with females and for younger offenders compared with older offenders.

Fitzgerald, Heybroek, Plotnikova and Cherney (2016) examined 15 year recidivism rates amongst a sample of 5,024 violent offenders born in the 1 year period from 1 July 1977 to 30th June 1978 who had their first correction order (prison or supervised non-custodial order) as a young adult (i.e. aged between 17 and 21 years). The definition for re-offending used in the study was return to custody or placement on some form of supervised order for a new offence. Using Latent Class Analysis (LCA) they identified four groups of recidivists. Two of these groups (labelled 'high-risk rapid' and 'high-risk delayed') had a high rate of re-offending (92% of the high-risk rapid and 79% of the high-risk delayed were predicted to have returned to corrections at the end of the 15 year follow-up period). The other two groups (low-risk gradual and low-risk rapid) had much lower rates of re-offending (44% of the low risk gradual and 15% of the low risk rapid group were predicted to have returned to corrections at the end of the 15 year follow-up period). Notwithstanding these differences in the frequency and timing of re-offending revealed by LCA, the study found few factors that could be used to prospectively identify membership of each of the groups. The strongest predictors of membership of the moderate to high-risk groups were being male, being Indigenous and having a history of drug use.

The purpose of this study is to build on the limited Australian research into the criminal careers of violent offenders. The study is directed toward answering two key questions:

1. What is the long-term risk that someone charged with a violent offence will commit another violent offence?
2. What factors influence the likelihood of desistance and the length of time to the next violent offence for those who do re-offend?

METHOD

DEFINITION OF VIOLENCE

The criterion for entry into the study was that the offender was born between 1986 and 1990 (inclusive) and had a proven violent offence recorded against them (at a caution, conference or court appearance) between the age of 10 and December 31st, 2014. Where the offender had multiple contacts during the period, one contact was selected at random as the 'index contact'. A violent offence was defined as an offence falling into one or more of the ANZSOC categories 01, 02, 03, 05 or 06. Broadly speaking these categories encompass homicide and related offences; assault; sexual assault and related offences; abduction and harassment; and robbery.

ANZSOC category 04 (dangerous or negligent acts endangering persons) was not used as a sample selection criterion because, in practice, most offences in this category involve dangerous or negligent driving rather than violence deliberately perpetrated by one person against another. It should be noted, however, that offenders who had proven offences involving dangerous or negligent acts *were* included in the sample if they *also* had a proven offence falling into one of the target categories (01, 02, 03, 05 or 06).

DATA SOURCE

The data source for the study was the NSW Bureau of Crime Statistics and Research (BOCSAR) re-offending database (ROD). ROD links all cautions, all conferences, all finalised criminal court appearances and all movements in and out of custody in NSW for each individual from January 1994 to the present (Hua & Fitzgerald, 2006).

DEPENDENT VARIABLE

The two primary dependent variables:

1. REOFF_VIOL: coded '1' if the offender committed a proven offence[1] after the index contact offence falling into one of the ANZSOC categories listed above.

2. REOFFREETIME: days spent out of custody between date of index contact and the first proven violent offence, death or 31st December 2014, whichever came first.

INDEPENDENT VARIABLES

An exploratory approach was taken to the selection of independent variables with the aim of including variables measuring demographic factors, features of the index contact and features of the offender's prior criminal record. The independent variables included in the study are listed in Table 1.

ANALYSIS

Since we seek to estimate the long-term risk that someone charged with a violent offence will commit another violent offence and determine what factors influence this risk and the speed of any re-offending, the first issue we must address is whether all offenders eventually re-offend (if given sufficient time) or some desist from offending altogether (in the language of medical treatment, some are 'cured'). A number of studies have shown that models which assume some fraction of offenders desist from crime generally give a better fit to the observed data than models that assume with sufficient time, all offenders re-offend (see, for example, Schmidt & Witte 1989; Tarling 1993; Maller & Zhou 2001; Broadhurst, Maller, Maller & Bouhours 2016; Broadhurst & Loh 2003). Preliminary analysis of the survival data used in this report revealed that models which assumed every offender eventually re-offended gave implausibly long estimates of the median time to re-offend. The models of survival time data in this report, therefore, assume that a proportion of violent offenders eventually desist. Such models are commonly known as 'cure fraction' models.

Two types of cure fraction model have been extensively used in the literature on survival times; the mixture cure fraction model and the non-mixture cure fraction model. The former is used in this analysis because its simpler function form allows us to accommodate a large number of independent variables in the model. The details of the model can be found in Schmidt and Witte (1989) and Sposto (2002). In the mixture cure fraction model, an additional parameter is specified to estimate the cure fraction (i.e. the proportion that do not re-offend). If this probability varies amongst different groups of offenders, a link function of explanatory variables can be used to estimate the effect of each explanatory variable on the cure fraction. A distribution of survival time is also specified for those offenders who will eventually re-offend. The specification of the survival function for the eventual recidivist is the same as that specified in the parametric survival model. The mixture cure fraction model is therefore ideally suited to our purposes.

Model construction began by using log-rank tests to identify the bi-variate relationships between time to the next violent offence and the factors listed above. Factors significant at the bi-variate level were then included in the cure mixture models. Two models were constructed. In the first, a mixture model (referred to below as "Cure 1") with a non-constant cure fraction function for the proportion cured was fitted to test if the cure fraction varies across groups of offenders (i.e. different combinations of covariate values). In the second model (referred to below as "Cure 2") we allowed the covariates to influence both the cure fraction and the survival time for those who did re-offend. Selection of the survival time distribution was carried out using Akaike's Information Criterion (AIC). The model with the smallest AIC was chosen as the best model. Five possible distributions were examined for the distribution of survival time: the exponential, Weibull, lognormal, loglogistic and gamma distributions. All five distributions except the exponential contain a scale parameter and a shape parameter. These two parameters can be assumed constant if the distribution of survival time does not vary across groups of offenders; otherwise the two parameters can be respectively log-linked to a set of explanatory variables. The loglogistic distribution was chosen as the distribution for the survival time with the smallest AIC amongst all the five distributions.

RESULTS

SAMPLE DESCRIPTION

The mean follow-up time for offenders in the study was 6.4 years (median = 6.3 years; range = 21.3 years; interquartile range = 4.7 years). Twenty-two per cent of the total sample committed another violent offence. About half (50.06%) of those who committed another violent offence committed the same violent offence as at their index contact. Table 2 provides descriptive statistics for the independent variables included in the study. Inspection of the table reveals two noteworthy features of the sample.

First, in addition to the violent offence that resulted in their inclusion in the study sample, offenders at their index contact were convicted of offences falling into a wide range of other categories, including: justice procedure offences (e.g. breach of a suspended sentence) (20.3%), public order (15.4%), malicious damage to property (14.6%), robbery/extortion (8.6%), theft (6.0%) and abduction/harassment (4.5%). Second, this pattern of involvement in a broad range of offences is reflected in their prior criminal record. A large proportion (16.7%) had been convicted of a prior violent offence but 26.3 per cent had been convicted of offences in two or more categories of crime.

Table 3 shows the principal re-offence type among those who were convicted of having committed another violent offence. If the offender had multiple further convictions, the first conviction is taken as long as it was for an offence committed following the index contact. The offences listed in the table account for 95 per cent of all the principal offences amongst the sample.

The key point to note about the table is that when violent offenders re-offend, their next offence is not usually another violent offence. In fact none of the top four re-offences (which together account for nearly 40 per cent of the principal offences amongst the sample) involve violence. Instead, violent offenders who re-offend are found committing a wide variety of offences,

Table 1. Independent variables, descriptions and coding

VARIABLE	DESCRIPTION
AGE_GP	Age coded '0' if aged 17 or under, '1' if aged 18-20, '2' if aged 21-22, '3' if aged 23 or over
GENDER	Gender of the offender, coded '1' if male, zero otherwise
ATSI	Indigenous status of the offender, coded '1' if Indigenous at the index contact, '0' if non-Indigenous at the index contact and '99' if Indigenous status is unknown.
REMOTENESS	Relative isolation of offender's postcode of residence at index, coded '1' if inner metropolitan, '2' if inner regional, '3' if outer regional, '4' if remote and '5' if very remote[2]
SEIFA_Q	A five point scale of economic/social disadvantage with low scores indicating higher levels of disadvantage[3], coded '99' if the score is missing.
CONCURR	Number of offences proved against the offender at the index contact (including the principal offence), coded '1' if only one proven offence, '2' otherwise
DVRELATED	Whether or not one or more of the proven offences at the index contact had domestic violence flag against it, coded '1' if yes, zero otherwise
INDEXACTINJ[4]	Whether or not the offender had an index offence involving an act intended to cause injury (ANZSOC 02), coded '1' if yes and '0' otherwise
INDEXSEXREL	Whether or not the offender had an index sexual or related offence (ANZSOC 03), coded '1' if yes and '0' otherwise
INDEXDANGNEG	Whether or not the offender had an index offence involving a dangerous or negligent act (ANZSOC 04), coded '1' if yes and '0' otherwise
INDEXABHARASS	Whether or not the offender had an index offence involving abduction, harassment or other offences against the person (ANZSOC 05), coded '1' if yes and '0' otherwise
INDEXROBEXT	Whether or not the offender had an index offence involving robbery, extortion or related offences (ANZSOC 06), coded '1' if yes and '0' otherwise
INDEXBES	Whether or not the offender had an index offence involving unlawful entry with intent/burglary, break and enter (ANZSOC 07), coded '1' if yes and '0' otherwise
INDEXTHEFT	Whether or not the offender had an index offence involving theft (other than break and enter) (ANZSOC 08), coded '1' if yes and '0' otherwise
INDEXFRAUD	Whether or not the offender had an index offence involving fraud (ANZSOC 09), coded '1' if yes and '0' otherwise
INDEXDRUG	Whether or not the offender had an index offence involving illicit drugs (ANZSOC 10), coded '1' if yes and '0' otherwise
INDEXWEAPONS	INDEXWEAPONS: Whether or not the offender had an index offence involving weapons (ANZSOC 11), coded '1' if yes and '0' otherwise
INDEXMALDAM	Whether or not the offender had an index offence involving property damage or environmental pollution offences (ANZSOC 12), coded '1' if yes and '0' otherwise
INDEXPUBORD	Whether or not the offender had an index offence involving public order (ANZSOC 13), coded '1' if yes and '0' otherwise
INDEXTRAFFIC	Whether or not the offender had an index offence involving a traffic offence (ANZSOC 14), coded '1' if yes and '0' otherwise
INDEXJUSPROC	Whether or not the offender had an index offence involving an offence against justice procedures (ANZSOC 15), coded '1' if yes and '0' otherwise
VARIETY_GP	Coded '0' if offender has committed no other prior proven offence of the same type or only one other prior proven offence of the same type, '1' if the offender has been previously convicted of two or three different offence types, '2' if the offender has previously committed four or more different offence types. Each offence type for this purpose is defined as one of the ANZSOC categories 1 to 15.
AGEFIRST_GP	Age having the first caution, conference or court appearance, coded '0' if aged 12 or under, '1' if aged 13-14, '2' if aged 15-16, '3' if 17 and over and '99' if age is missing
PRIORVIOL_GP	Coded '0' if the offender has committed no prior proven violent offence and '1' if the offender has committed one or more prior proven violent offences.
PRIORCJS_GP	Coded '0' if the offender has had either no prior conviction or only one prior conviction and '1' if the offender has two or more prior conviction episodes.
PRINCIPAL REOFF	The principal (ANZSOC) offence at the first court appearance following the index contact at which the offender is convicted of having committed a further offence.
INDEXYEAR	The year in which the offender had their index contact (included to control for possible changes over time in the rate of violent re-offending)

Table 2. Descriptive Statistics (independent variables)

	Freq.	Percent		Freq.	Percent
AGE_GP			**ROBBERY/EXTORTION**		
17 or under	3,027	11.43	No	24,204	91.43
18 to 20	8,443	31.89	Yes	2,268	8.57
21 to 22	5,758	21.75	**SEX RELATED OFFENCES**		
23 or over	9,244	34.92	No	25,763	97.32
ATSI			Yes	709	2.68
non-ATSI	19,737	74.56	**THEFT**		
ATSI	3,631	13.72	No	24,881	93.99
Unknown	3,104	11.73	Yes	1,591	6.01
GENDER			**TRAFFIC OFFENCES**		
female	5,418	20.47	No	25,558	96.55
male	21,054	79.53	Yes	914	3.45
REMOTENESS			**BREAK AND ENTER**		
Inner metropolitan	15,986	64.11	No	25,801	97.47
Inner regional	6,327	25.37	Yes	671	2.53
Outer regional	2,195	8.80	**PUBLIC ORDER**		
Remote	266	1.07	No	22,399	84.61
Very remote	160	0.64	Yes	4,073	15.39
SEIFA_Q			**WEAPONS**		
Highly disadvantaged	7,771	29.36	No	26,278	99.27
Disadvantaged	7,777	29.38	Yes	194	0.73
Advantaged	5,977	22.58	**DV-RELATED OFFENCE**		
Highly advantaged	3,402	12.85	No	21,886	82.68
Missing	1,545	5.84	Yes	4,586	17.32
ABDUCTION/HARASSMENT			**CONCURRENT OFFENCES**		
No	25,283	95.51	No	12,498	47.21
Yes	1,189	4.49	Yes	13,974	52.79
ACT CAUSING INJURY			**PRIOR VIOLENCE**		
No	3,485	13.16	No	22,052	83.30
Yes	22,987	86.84	Yes	4,420	16.70
DANGEROUS/NEGLIGENT			**PRIOR CONVICTIONS**		
No	26,081	98.52	0 to 1	17,025	64.31
Yes	391	1.48	2 or more	9,447	35.69
DRUG			**AGE AT FIRST OFFENCE**		
No	25,893	97.81	12 or under	1,344	5.08
Yes	579	2.19	13 to 14	3,385	12.79
FRAUD			15 to 16	4,174	15.77
No	26,289	99.31	17 or over	7,371	27.84
Yes	183	0.69	Missing	10,198	38.52
JUSTICE PROCEDURE			**PRIOR CONVICTIONS (TYPE)**		
No	21,089	79.67	0 to 1	19,502	73.67
Yes	5,383	20.33	2 to 3	4,859	18.36
MALICIOUS DAMAGE			4 or more	2,111	7.97
No	22,601	85.38			
Yes	3,871	14.62			

Table 3. Principal re-offence profile of offending amongst violent offenders who re-offended

Rank	ANZSOC code	Offence	Frequency	%	cum %
1	1431	Drink-driving	1,675	12.58	12.58
2	1411	Drive while disqualified	1,242	9.33	21.91
3	1041	Possess illicit drugs	1,218	9.15	31.06
4	1219	Property damage	1,129	8.48	39.54
5	213	Common assault	877	6.59	46.13
6	1412	Drive without a licence	800	6.01	52.14
7	211	Serious assault resulting in injury	684	5.14	57.28
8	1562	Resist or hinder police/justice official	424	3.18	60.46
9	1332	Offensive behaviour	409	3.07	63.53
10	711	Break and enter	384	2.88	66.41
11	823	Theft from retail premises	352	2.64	69.05
12	829	Theft (except motor vehicles)	345	2.59	71.64
13	412	Dangerous/negligent driving	343	2.58	74.22
14	1313	Riot and affray	330	2.48	76.70
15	831	Theft from the person	324	2.43	79.13
16	291	Stalking	320	2.40	81.53
17	1331	Offensive language	264	1.98	83.51
18	1311	Trespass	219	1.64	85.15
19	1439	Regulatory driving offences	196	1.47	86.62
20	611	Defamation and libel	156	1.17	87.79
21	212	Serious assault not resulting in injury	140	1.05	88.84
22	812	Illegal use of a motor vehicle	132	0.99	89.83
23	911	Obtain benefit by deception	126	0.95	90.78
24	532	Threatening behaviour	102	0.77	91.55
25	411	Drive under the influence	89	0.67	92.22
26	1569	Offences against justice procedures	88	0.66	92.88
27	1322	Liquor and tobacco offences	81	0.61	93.49
28	1022	Export illicit drugs	74	0.56	94.05
29	1099	Other illicit drug offences	68	0.51	94.56

including driving without a licence, drive while disqualified, possess illicit drugs and property damage. About 15 per cent were found to commit another violent offence, including common and serious assault and riot and affray offences.

SURVIVAL ANALYSIS

Mixture cure fraction model

As noted earlier, a mixture model with a non-constant cure fraction function for the proportion cured was fitted to test if the cure fraction varies across groups of offenders. The results of this first model are shown in the second column of Table 4. A significant positive coefficient against an offender/offence characteristic indicates that the proportion with this characteristic that desists from violent offending is significantly higher than the proportion in the reference group (when all other variables are held constant). A significant negative coefficient against an offender characteristic indicates that the proportion with that characteristic who never commit another violent offence is significantly *lower* than among those in the reference group. To illustrate, the proportion that desists from further violent offending is higher among those aged 18-20, 21-22 and 23+ than it is among those aged 17 and under (all other factors held constant). Conversely, offenders who were convicted at their index contact for an offence involving abduction or harassment are *less likely* to desist than those in the reference group (viz. those who were not convicted of such an offence). All coefficients in the mixture cure fraction function are significant except DVRELATED. Being convicted of a domestic violence related offence (compared with a non-domestic violence offence) has no effect on the risk of further violent offending.

The row labelled 'CONSTANT' in the second column shows the estimated 'cure' fraction when the coefficients on all factors have been set to their reference group values. In other words it is the cure fraction for non-Aboriginal females aged 17 or under who (at the time of their index contact) resided in an area of higher socioeconomic disadvantage; had their first caution, conference

Table 4. Parameter estimates of the two mixture cure fraction models

Model	Cure 1		Cure 2	
Function	**Cure fraction**	**Scale**	**Cure fraction**	**Scale**
Variable	**Coefficient**	**Coefficient**	**Coefficient**	**Coefficient**
AGE_GP				
17 or under				
18 to 20	0.103*		0.075*	-0.359*
21 to 22	0.190*		0.133*	-0.827*
23 or over	0.201*		0.136*	-0.979*
ATSI status				
non-ATSI				
ATSI	-0.136*		-0.140*	0.034
Unknown	0.009		0.006	-0.079
Male vs Female	-0.058*		-0.056*	0.516*
SEIFA_Q				
Highly disadvantaged				
Disadvantaged	0.032*		0.019	-0.044
Advantaged	0.037*		0.030*	-0.041
Highly advantaged	0.058*		0.076*	-0.185
Missing	0.100*		0.129*	0.087
INDEXABHARASS	-0.044*		-0.016	0.361*
INDEXDRUG	-0.094*		-0.057	0.286
INDEXJUSTPROC	-0.060*		-0.061*	0.014
INDEXMALDAM	-0.076*		-0.060*	0.128
INDEXTHEFT	-0.114*		-0.050*	0.478*
DVRELATED	-0.015		-0.017	0.211*
AGEFIRST_GP				
12 or under				
13 to 14	0.100*		0.078*	0.046
15 to 16	0.167*		0.114*	-0.068
17 or over	0.251*		0.161*	-0.357*
Missing	0.314*		0.293*	-0.324*
PRIORVIOL_GP	-0.120*		-0.116*	0.109
PRIORCJS_GP				
0 to 1				
2 or more	-0.134*		-0.102*	0.288*
VARIETY_GP				
0 to 1				
2 to 3	-0.054*		-0.054*	0.098
4 or more	-0.240*		-0.120*	0.513*
CONSTANT	0.424*	-6.335*	0.458*	-6.613*
Function		**Shape**		**Shape**
Variables		**Coefficient**		**Coefficient**
Male vs Female				0.159*
INDEXJUSPROC				-0.077*
AGEFIRST_GP				
12 or under				
13 to 14				0.046
15 to 16				-0.068
17 or over				-0.357*
Missing				-0.324*
CONSTANT		0.0004		-0.050
AIC		102766.8		102271.8

* indicates that the coefficient is significant at 5% significance level

or court appearance when they were aged 12 or under; were not convicted of an offence with a domestic violence flag; had no prior proven violent offences; had less than two prior proven offences of any sort, had committed less than two different types of offence and had not been convicted at the index contact of an offence in any of the following categories: abduction or harassment; illegal drugs, justice procedures (e.g. breach of a suspended sentence), malicious damage to property or theft. The constant in this model is 0.424, which tells us that the estimated cure fraction for offenders with these characteristics is 42.4 per cent. As we will see shortly, this is much lower than the cure fraction for the 'average' violent offender.

The first mixture cure model confirmed that the proportion that never re-offended does vary across groups of offenders. A more general mixture cure fraction model with non-constant cure fraction and non-constant scale and shape functions for the distribution of failure time is presented in columns four and five of Table 4. This time all the independent variables used in the first mixture cure fraction model were incorporated in the cure fraction function as well as into the scale and shape functions for the distribution of survival time. Insignificant variables were then removed from the shape function to obtain a final reduced model. Loglogistic distribution was again chosen as it gave the smallest AIC. In this second model, the coefficients for the cure fraction have the same interpretation as the coefficients for the cure fraction in the first model. This is **not** the case, however, for the sign of the coefficients in the scale function of the mixture cure fraction model. The parameterization of the scale function is such that a significant positive coefficient indicates a **shorter** time to reconviction for a violent offence, compared to the reference group. A significant negative coefficient indicates that associated group of offenders result in a **longer** time to reconviction for a violent offence, compared to the reference group. The scale function coefficient for Indigenous offenders, for example, is positive; indicating that Indigenous offenders who commit another violent offence tend to do so faster than non-Indigenous offenders who commit another violent offence (other things being equal). On the other hand, the scale function coefficients for ages 18-20, 21-22 and 23 or over are all negative; indicating that offenders in these age groups who commit a violent offence, generally take longer to re-offend than those in the age group 17 or under.

Comparison of the AIC values in the final row of the table shows that the second model provides a somewhat better fit to the data than the first model. Inspection of the signs on the cure fraction and scale coefficients in the second model confirms what one would expect—any factor that increases the cure fraction either has no effect on the survival time or increases it. Conversely, any factor that reduces the cure fraction either has no effect on the survival time or reduces it. In this second model, several factors that affected the cure fraction in the first model now either have no effect on the cure fraction or the survival time, or have an effect on the cure fraction or the survival time only, or affect both. These include INDEXABHARASS (which now reduces the survival time but has no effect on the cure fraction), INDEXDRUG (which now has no effect on either the cure fraction or survival time), INDEXTHEFT (which affects both the cure fraction and the survival time) and DVRELATED (which no longer affects the cure fraction but does affect the survival time).

Summarizing the results, they indicate that violent offenders are less likely to commit another violent offence if they:

- Are aged over 17 at the time of the index contact;
- Reside in an area of higher socioeconomic disadvantage; or
- Have their first caution, conference or court appearance when they are older.

On the other hand, they are more likely to commit another violent offence if:

- They are Aboriginal or Torres Strait Islanders;
- They are male;
- They have been convicted at the index contact of an offence in any of the following categories: justice procedures (e.g. breach of a suspended sentence), malicious damage to property and theft;
- They have committed one or more prior proven violent offences;
- They have two or more prior proven offences (of any sort); or
- They have committed two or more different types of offence.

The final column of Table 4 indicates that violent offenders who eventually commit another violent offence take longer to commit that offence if they:

- Are aged over 17 at the time of the index offence; or
- Have their first caution, conference or court appearance when they are 17 or over.

On the other hand, they commit another violent offence more quickly if:

- They are male;
- They have been convicted at the index contact of an offence in any of the following categories: abduction or harassment or theft;
- One of their index offences carries a domestic violence flag;
- They have two or more prior proven offences (of any sort); or
- They have committed four or more different types of offence.

To get a clearer picture of the effect of different offender/offence characteristics on the proportion that never re-offend, we use the final model to estimate the proportion that never commits another violent offence for four different groups of offenders. This is done by taking the constant value for the cure fraction in Table 4 and then adding or subtracting (depending on the sign of the variable) the coefficient associated with the factor of interest. For example the constant for the cure fraction in the second cure model is 0.458. If we wish to know the cure fraction for an offender aged 15-16 at their first CJS contact, we simply add the coefficient for this variable value (0.114) to 0.458 to obtain a revised cure fraction of 0.572. Some sample illustrations of this process are shown in Table 5.

Table 5. Estimated percentage not committing another violent offence by offence/offender characteristics

BASE CASE	Variable of interest	Category	Estimated % not re-offending
Non-ATSI Male Resided in area with some socioeconomic disadvantage None of the proven offences at the index contact had domestic violence flag against it Has not been convicted at the index contact of an offence in any of the following categories: abduction/harassment, drug offence, justice procedures, malicious damage to property and theft Had no prior proven violence offence Had no or only one prior conviction Has committed no other prior proven offence of the same type or only one other prior proven offence of the same type Aged 17 or over at first caution, conference or court appearance	AGE_GP	17 or under	58.10%
		18 to 20	65.60%
		21 to 22	71.50%
		23 or over	71.80%
Non-ATSI Male Resided in area with some socioeconomic disadvantage Aged 23 or above None of the proven offences at the index contact had domestic violence flag against it Has not been convicted at the index contact of an offence in any of the following categories: abduction/harassment, drug offence, justice procedures, malicious damage to property and theft Had no prior proven violence offence Had no or only one prior conviction Has committed no other prior proven offence of the same type or only one other prior proven offence of the same type	AGEFIRST_GP	12 or under	55.70%
		13 to 14	63.50%
		15 to 16	67.10%
		17 or over	71.80%
Male Resided in area with some socioeconomic disadvantage Aged 23 or above None of the proven offences at the index contact had domestic violence flag against it Has not been convicted at the index contact of an offence in any of the following categories: abduction/harassment, drug offence, justice procedures, malicious damage to property and theft Had no prior proven violence offence Had no or only one prior conviction Has committed no other prior proven offence of the same type or only one other prior proven offence of the same type Aged 17 or over at first caution, conference or court appearance	ATSI	Non-ATSI	71.80%
		ATSI	57.80%
Non-ATSI Male Resided in area with some socioeconomic disadvantage Aged 23 or above None of the proven offences at the index contact had domestic violence flag against it Has not been convicted at the index contact of an offence in any of the following categories: abduction/harassment, drug offence, justice procedures, malicious damage to property and theft Had no or only one prior conviction Has committed no other prior proven offence of the same type or only one other prior proven offence of the same type Aged 17 or over at first caution, conference or court appearance	PRIORVIOL_GP	No prior	71.80%
		1 or more prior proven violent offence	60.20%

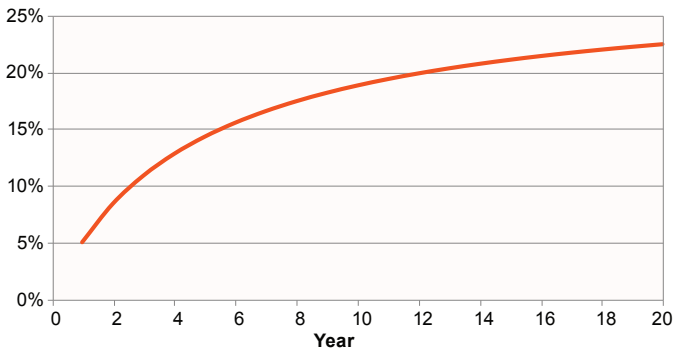
Each panel in Table 5 explores a different offender characteristic (respectively: age at index contact, age at first criminal justice system contact, Indigenous status and prior violence). In the first panel, for example, we show the effects of changing offender age on the risk of a further violent offence for (see column 1) an offender who is non-ATSI, male, resides in an area with some socioeconomic disadvantage, has no previous domestic violence offence, has not been convicted at the index contact of an offence in any of the following categories: abduction/harassment, drug offence, justice procedures, malicious damage to property and theft, has no prior proven violent offence, has only one or no prior convictions, has committed no (or only one) prior offence that is of the same type as the index offence and is aged 17 or over at their first caution, conference or court appearance. Holding all other factors constant, the estimated proportion of offenders aged 17 or under at their index contact that **never** re-offends is about 58 per cent. By contrast, the corresponding proportion aged 23 or above is 14 percentage points higher (72%).

Looking down the final column of Table 5 two things are evident. Firstly, variation in the risk of another violent offence is generally low but varies markedly across offenders. Secondly, all the variables listed in the second column have substantial effects. Other things being equal: nearly 56 per cent of offenders aged 12 or under when they had their first caution, conference or court appearance are estimated to never re-offend. The estimated proportion is 16 percentage points higher (72%) for those aged 17 or over when they had their first caution, conference or court appearance. For non-Indigenous offenders, the estimated proportion that never commits another violent offence is 14 percentage points higher than that of the Indigenous offenders (72% vs 58%). For those offenders who had no prior proven violent offence before the index contact, the estimated proportion is about 12 percentage points higher than those who had one or more prior proven violent offences (72% vs 60%).

As noted earlier, most of the covariates in the second cure model that increase the risk of another violent offence tend to reduce the time to the next violent offence for those who do commit another violent offence (and vice versa). For this reason we do not separately examine the effects of different covariates on the time to the next offence. What is of interest is the overall time taken before the next violent offence for the average violent offender. Figure 1 below shows the proportion of this group re-convicted of another violent offence as a function of time since the index contact. For the purposes of this graph an 'average violent offender' is defined (in terms of the modal values of our covariates) as a non-Indigenous male, aged 23 or over, who resides in an area of socioeconomic disadvantage, who did not commit a domestic violence offence at his/her index contact, who has not been convicted at the index contact of an offence in any of the following categories: abduction/harassment, drug offence, justice procedures, malicious damage to property and theft, who has no prior proven violent offence, who has no or only one prior conviction, who has committed no other violent offence of the same type or only one such offence and was aged 17 or over at the time of his first caution, conference or court appearance.

The figure confirms what many other studies have shown; namely that the risk of another proven violent offence is comparatively low. Twenty years after the index contact, only about 23 per cent have been reconvicted of another violent offence. Put another way, more than 20 years after their index contact for a violent offence, the vast majority of those who fit the profile of an 'average violent offender' will have no further violent offence proven against them. Figure 1 also shows, however, that rates of re-conviction for violent offending are higher than might have been expected from studies with short follow-up periods. One year after the index contact only five per cent of the average violent offender cohort have committed a further violent offence. Within three years this rises to 10.9 per cent. Within 20 years, the proportion convicted of a further violent offence is more than four times higher than the proportion after one year.

Figure 1. Estimated proportion re-offended for average violent offenders



DISCUSSION

The aim of this report was to determine: (1) the long-term risk that someone charged with a violent offence will commit another violent offence and (2) what factors influence the likelihood of desistance and the length of time to the next violent offence for those who do re-offend. The results presented here support past research (Mclean & Beak 2012; Reiss & Roth 1993). In the average case, after 20 years, around 23 per cent of those convicted of a violent offence will have been convicted of a further violent offence (i.e. 77 per cent will never commit another violent offence). This said, for some groups of offenders the risk of another violent offence is substantially higher than in the average case. Higher rates of re-offending were found for younger offenders, Indigenous offenders, offenders living in disadvantaged areas and offenders whose index offences included convictions for justice procedure offences, malicious damage to property or theft (although not, interestingly enough, offenders whose index offences involved domestic violence). Age at the index contact, age at first contact, Indigenous status and prior conviction for violence are particularly strong predictors of further violent offending. An estimated 69 per cent of Indigenous offenders aged 17 or under at the time of their index contact, whose first contact with the criminal justice system occurred when they were 12 years or younger but whose other characteristics

fit our earlier definition of the 'average violent offender' will be convicted of another violent offence after 20 years.

This last finding has important policy implications. Although it is possible to compute the average risk of violent re-offending for a cohort of violent offenders, knowing this average risk is of little practical use for those charged with responsibility for making decisions about bail, sentencing and parole. The fact that violent offenders differ greatly in their risk of re-offending means that the appropriate response to a violent offender (in terms of bail, sentence or parole decisions) is likely to differ greatly from one violent offender to another. There is a world of difference in terms of violent recidivism risk, between a violent offender aged 23 and over whose first and only criminal conviction occurred when they were over the age of 17 and who has no concurrent offence; and one the same age who has multiple convictions for a wide variety of offences and whose first proven offence occurred as a juvenile. It may be entirely appropriate to grant parole to the first offender and refuse parole to the second, even if they have both been convicted of the same violent offence. These facts highlight the important role discretion plays in the decision-making of judicial officers and parole authorities.

The analysis of time to reconviction for those who do commit a further proven violent offence is also revealing. It is not uncommon for evaluations of the effectiveness of programs to reduce violent offending to have comparatively short follow-up periods (e.g. one to three years). This is understandable. Policy makers usually want to know whether their programs are working as soon as possible after they have been implemented. A three-year follow-up period would be regarded by most in Government as the maximum time they could wait to find out whether a new re-offending reduction program is effective. The fact that the violent re-offending rate at three years is only half what it will be at the 20 year mark, however, suggests a need to supplement short-term evaluations with long-term evaluations to see whether the gains established after one to three years are still present after 10 or more years. Indeed, when it comes to programs to reduce violent re-offending, continuous monitoring of program effectiveness may be warranted.

For convenience we have spoken about violent offenders as if they were a distinctive group. In fact, the research reported here confirms earlier research (e.g. Mclean & Beak, 2012; Piquero, Jennings & Barnes, 2012; Fitzgerald et al., 2014) by showing that violent offenders tend to be generalists rather than specialists. The predictors of violent re-offending include past involvement in violent offences but they also include involvement in non-assaultive offences such as malicious damage to property or theft. The same applies to subsequent offending. As we noted in connection with Table 3, the four most common next offences among the violent offenders who were convicted of another offence were drink-driving, drive while disqualified, possess illicit drugs and property damage. To be sure, the profile of offences proved against an offender may not accurately reflect their actual profile of offending because some offences are more easily detected than others. Even so, the overall impression generated by this sample of violent offenders is that their violent offending is just one aspect of a general pattern of antisocial behaviour. These findings complement the findings of Mazerolle, Piquero and Brame (2010) who found that serious juvenile offenders whose first offence was violence-oriented do not have distinctive criminal careers.

The present results raise questions about the conclusion reached by Piquero, Jennings and Barnes (2012, p. 177) that 'attempts to predict the violent recidivist are virtually impossible regardless of the makeup of individual risk and protective factors available to researchers and policy makers'. The results of our parametric survival analysis show that it is possible to predict future violent offending using information which would be readily accessible to most law enforcement agencies, courts and correctional agencies. Further work is required to assess the accuracy of those predictions (in terms of false positive and miss rates) but the coefficients in Table 4 (and their associated confidence intervals) indicate that the factors identified in several cases exert quite strong effects on the timing of violent re-offending.

Our findings have one other implication that should be of interest to policy makers. In the introduction of this report we noted the deterrent effect of prison is very low and that, if rates of violent re-offending are also low, the incapacitation effect of prison on violent offending is likely to be fairly limited. The present results suggest that rates of violent re-offending are low for most offenders. Long periods of incarceration, therefore, are unlikely to do much to bring down the violent crime rate. Justice may demand the imposition of substantial prison terms on those who commit or repeat serious violent offending but the main focus of prevention efforts should be on addressing the underlying causes of violence in our community. Restricting the availability of alcohol, for example, would seem to be a far more effective way of reducing rates of violent crime than the imposition of long prison sentences on those who commit violent offences (see, for example, Menendez et al. 2015; Chikritzhs & Stockwell 2002; Stockwell & Chikritzhs 2009; Douglas 1998; Voas, Lange & Johnson 2002; Voas, Romano, Kelly-Baker & Tippetts 2006; Dualibi et al 2007; Kypri, Jones, McElduff, & Barker 2011).

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NOTES

1. 'Re-offences' were restricted to offences proved in a court
2. ABS (2005)
3. ABS (2011)
4. No variable was created for ANZSOC category 1 (Homicide and Related Offences) because the numbers were too small.

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