



1351.0.55.031

New
Issue

Research Paper

**An Analysis of Repeat
Imprisonment Trends
in Australia using
Prisoner Census Data
from 1994 to 2007**

New
Issue

Research Paper

An Analysis of Repeat Imprisonment Trends in Australia using Prisoner Census Data from 1994 to 2007

Jessica Zhang and Andrew Webster

Social Data Integration and Analysis Branch

AUSTRALIAN BUREAU OF STATISTICS

EMBARGO: 11.30 AM (CANBERRA TIME) MON 30 AUG 2010

ABS Catalogue no. 1351.0.55.031

© Commonwealth of Australia 2010

This work is copyright. Apart from any use as permitted under the *Copyright Act 1968*, no part may be reproduced by any process without prior written permission from the Commonwealth. Requests and inquiries concerning reproduction and rights in this publication should be addressed to The Manager, Intermediary Management, Australian Bureau of Statistics, Locked Bag 10, Belconnen ACT 2616, by telephone (02) 6252 6998, fax (02) 6252 7102, or email <intermediary.management@abs.gov.au>.

Views expressed in this paper are those of the author(s), and do not necessarily represent those of the Australian Bureau of Statistics. Where quoted, they should be attributed clearly to the author(s).

Produced by the Australian Bureau of Statistics

INQUIRIES

The ABS welcomes comments on the research presented in this paper.
For further information, please contact Sue Taylor, Social Data Integration and Analysis Branch on Canberra (02) 6252 7187 or email <social.reporting@abs.gov.au>

AN ANALYSIS OF REPEAT IMPRISONMENT TRENDS IN AUSTRALIA USING PRISONER CENSUS DATA FROM 1994 TO 2007

Jessica Zhang and Andrew Webster
Social Data Integration and Analysis Branch

EXECUTIVE SUMMARY

Since 1994 the Australian Bureau of Statistics has collected data, including the National Prisoner Census, from administrative data sources maintained by corrective services agencies in each state and territory. The annual National Prisoner Census provides a snapshot of the prisoner population at 30 June each year. The Census data provides information on certain demographic and sentencing characteristics of the prisoners including age, sex, Indigenous status, most serious offence, and an indicator of prior imprisonment episodes.

To follow the prisoners over time, a longitudinal dataset on the prisoner population was constructed by linking the annual datasets. The longitudinal dataset constitutes a series of snapshots rather than a complete picture of prisoner inflows and outflows over time, however analysis of the dataset provides unique insights into reimprisonment trends.

Because the Prisoner Census does not collect information on the release of prisoners, this paper uses people's disappearance from the Prisoner Census between successive years as a proxy for their release from prison, and their reappearance in the census as a proxy for their reimprisonment. In this paper, the term 'release' is therefore used to refer to 'disappearance' from the Prisoner Census. The two limitations associated with this indirect measurement of release from prison are: 1) that there is no precise date for release available; and 2) that imprisonment episodes of less than one year would be missed if they did not span 30 June. A full explanation of these and other restrictions of the dataset can be found on pages 7–9 of this paper.

Despite the limitations, the 14 year longitudinal dataset (1994–2007) is a valuable source of information for exploring the characteristics of prisoners with multiple imprisonment episodes, especially those imprisoned for a year or more.

This study uses the longitudinal Prisoner Census dataset to investigate two broad topics:

- Factors associated with reimprisonment and whether the rate of reimprisonment has changed over time, and
- Trends in the criminal career paths of prisoners with multiple prison episodes.

These topics are explored by primarily studying the cohort of 28,600 prisoners who were 'released' during the period July 1994 to June 1997. This release cohort were followed from their release until June 2007, a span of at least ten years. To investigate whether the rate of reimprisonment has changed over time, the reimprisonment rate for the 1994–1997 release cohort three years after release is compared with a second release cohort of 26,700 people released from prison in 2001–2004.

Factors associated with reimprisonment

This analysis explores reimprisonment trends displayed by the 1994–1997 and 2001–2004 release cohorts within three years of release, and by the 1994–1997 release cohort within ten years of release. The analysis uses both descriptive based methods and logistic regression models.

Key findings

Reimprisonment was strongly associated with being young, being Indigenous or having been previously imprisoned (that is, being a prisoner who had already served time in prison, prior to the prison episode from which they were released in 1994–1997 or 2001–2004). To a lesser extent reimprisonment was also associated with being male.

Of all the jurisdictions, the Northern Territory had a particularly high rate of reimprisonment. This was due to the demographic characteristics of its prisoners – particularly being young and / or Indigenous.

In all jurisdictions except Queensland, prisoners released in recent years were more likely to be reimprisoned than prisoners released in the mid-1990s.

Criminal career pathways

This analysis examines the volume of prisoners being reimprisoned for the same offence, or for different offences (based on the most serious offence of sentenced prisoners and the most serious charge for unsentenced prisoners). Patterns of specialisation (a tendency to commit the same offence types) and of movements from one type of offence to another were analysed using descriptive methods.

Key findings

Nearly 60% of prisoners released during the period July 1994 to June 1997 had not been reimprisoned by 30 June 2007.

Rates of reimprisonment and specialisation (a high rate of reimprisonment for the same offence) differed considerably by original offence type.

There was a high degree of specialisation in illicit drug offences, sexual assault and road traffic offences. However, prisoners who were originally imprisoned for committing offence types other than illicit drug offences, sexual assault and road traffic offences did not tend to move into these offence types.

There was also a high level of specialisation in acts causing injury, robbery, burglary and theft. A high proportion of prisoners also moved into these offence types for their second and subsequent prison episodes. Therefore, irrespective of their original offence, many repeat prisoners were reimprisoned for committing these offences.

Many offenders were reimprisoned for offences against justice (e.g. breaking parole) at some stage. This may be attributed to breaches of justice orders.

CONTENTS

ABSTRACT	1
1. INTRODUCTION	2
2. THE NATIONAL PRISONER CENSUS DATA	3
2.1 The National Prisoner Census	3
2.2 Data quality assessment	3
2.3 Selected data items	4
2.4 Limitations of measuring repeat imprisonment	7
2.5 Measuring repeat imprisonment	9
2.6 Prisoner cohorts used in the analysis	10
3. DESCRIPTIVE STATISTICS OF THE PRISONER POPULATION	12
3.1 Prisoner population with prior imprisonment	12
3.2 Characteristics of the release cohort and the total prisoner population	14
4. FACTORS ASSOCIATED WITH REIMPRISONMENT	16
4.1 Reimprisonment among the 1994–1997 release cohort — descriptive analysis	16
4.2 Reimprisonment among the 1994–1997 release cohort — logistic regression	21
4.3 Reimprisonment: changes over time — descriptive analysis	25
4.4 Reimprisonment: changes over time — logistic regression	25
4.5 Summary	27
5. ANALYSIS OF CRIMINAL CAREERS	28
5.1 Reimprisonment for the same and different offences	28
5.2 Specialisation by offence type	29
5.3 Offence type changes by repeat prisoners	33
5.4 Summary	37
6. CONCLUSION	39
ACKNOWLEDGEMENTS	39
REFERENCES	40

APPENDIXES

A.	REASONS FOR, AND PROCESSES INVOLVED IN, DATA CLEANING ON PRISONER IDS AND RECEPTION DATE	42
B.	SELECTED PRISONER CENSUS DATA ITEMS	43
C.	AUSTRALIAN STANDARD OFFENCE CLASSIFICATION	44
D.	REIMPRISONMENT TENDENCY BY POTENTIALLY ASSOCIATED FACTORS, BASED ON THE RELEASE COHORT	46
E.	METHODOLOGY AND INTERPRETATION OF THE LOGISTIC REGRESSION MODEL	48
	E.1 Logistic regression model	48
	E.2 Model and variables used in this study	48
	E.3 Interpretation of logistic regression results	48
F.	SCOPE OF THE PRISONER CENSUS	51

AN ANALYSIS OF REPEAT IMPRISONMENT TRENDS IN AUSTRALIA USING PRISONER CENSUS DATA FROM 1994 TO 2007

Jessica Zhang and Andrew Webster
Social Data Integration and Analysis Branch

ABSTRACT

Reducing the number of prisoners who are repeatedly imprisoned is one of the goals of any correctional system. However, while a period of imprisonment may deter some people from re-offending, in others it may foster further criminal behaviour. This paper presents the results of a study based on a longitudinal dataset constructed from 14 successive Prisoner Censuses between 1994 and 2007 to follow, over time, two cohorts of people who were 'released' from prison (where 'release' is a proxy measure derived from the absence of a prisoner's record in a subsequent Prisoner Census). This paper expands on an earlier study by the Australian Bureau of Statistics (Rawnsley, 2003) by using logistic regression models to examine the factors associated with repeat imprisonment and assess whether or not the propensity for reimprisonment has increased over time. This paper also examines trends in criminal career development using descriptive methods, looking at patterns of specialisation, and of movements from one type of offence to another.

The study finds that reimprisonment is strongly associated with being young, being Indigenous, or having been previously imprisoned (that is, being a prisoner who had already served time in prison). In all jurisdictions except Queensland, the rate of reimprisonment in recent years was higher than in the mid-1990s.

1. INTRODUCTION

In 2003 the Australian Bureau of Statistics (ABS) conducted a study of prisoners who were repeatedly imprisoned. In that study, Rawnsley (2003) examined factors associated with repeat imprisonment using a longitudinal dataset constructed from the 1993–2001 annual Prisoner Censuses. He found that prisoners with a high number of different periods of imprisonment (or prison episodes) were more likely to have lower education levels or be Indigenous.

Rawnsley (2003) also investigated patterns of criminal careers. He found some evidence of specialisation (a tendency to commit the same offence types) amongst prisoners who committed robbery or break and enter crimes. However, since the time period covered was relatively short, the author pointed out that a longer time series might give a more comprehensive picture of criminal careers.

In this study, we expand on Rawnsley's analysis using a longitudinal dataset from the 1994–2007 Prisoner Censuses. The use of multivariate regression techniques on this 14 year series enables further analysis of the relationship between prisoners' demographic backgrounds, their criminal histories and the likelihood of being reimprisoned.

These topics are explored by studying a cohort of prisoners who were 'released' during the period July 1994 to June 1997. This cohort were followed from their release until June 2007, a period of at least ten years. Multivariate regressions are used to examine how prisoners' characteristics are associated with their chance of reimprisonment within ten years of release (the ten year model). To investigate whether the propensity towards reimprisonment has changed over time, the reimprisonment rate for the 1994–1997 release cohort within three years after release is compared with that for people released from prison in 2001–2004 (the three year model).

In the next section we describe the data and its limitations, and discuss the methods used to analyse the data. Section 3 presents imprisonment trends between 1994 and 2007 derived from descriptive statistics, and examines the characteristics of the release cohort and the total prisoner population. Section 4 explores factors associated with reimprisonment using descriptive analysis and multivariate models. Section 5 analyses patterns of criminal career development, including specialisation and change in the most serious offence types. Finally, Section 6 summarises the main findings of this research.

2. THE NATIONAL PRISONER CENSUS DATA

2.1 The National Prisoner Census

Each year, the National Prisoner Census collects information on people held in Australian prisons on the night of 30 June. The census covers all prisoners remanded or sentenced to adult custodial corrective services, including periodic detainees in New South Wales and the Australian Capital Territory. The census does not include people held in juvenile institutions, psychiatric custody or police custody.

The National Prisoner Census collection extracts selected information from the administrative records maintained by corrective services agencies in each state and territory. The information collected includes:

- demographic and social characteristics;
- legal status of prisoners including the most serious offence or charge for which the person is in prison; and
- for prisoners serving a sentence, details of the sentence.

Within each state, every prisoner is assigned a unique prisoner identification number (Prisoner ID). This number allows individual prisoners in each state to be tracked over time through successive Prisoner Censuses, and enables the construction of a longitudinal dataset.¹

The ABS has collected Prisoner Census data since 1994, taking over the collection from the Australian Institute of Criminology. Results from the Prisoner Census are published in the official ABS publication *Prisoners in Australia* (ABS, 2009). *Prisoners in Australia* also provides detailed information on the collection, coverage and scope of the National Prisoner Census.

In the rest of this section we discuss the quality and limitations of this data set.

2.2 Data quality assessment

The reliability of statistical analysis depends on the quality of the underlying data. This is especially true for data collected from administrative systems, which are not primarily designed for statistical purposes. The ABS conducted two tests to assess the quality of the relevant data items in the longitudinal dataset: a missing values test and a test for consistency over time.

¹ In preliminary exploration of the original data, several data quality issues were found with Prisoner IDs and another data item (the reception date of prisoners). Since these two data items play key roles in this study, their values were ‘cleaned’ before they were used to construct the longitudinal dataset. Details of the data cleaning process can be found in Appendix A.

Missing value rate

The value for a particular variable can be missing from a data collection. Variables with high rates of missing values can be unreliable and may introduce bias.

Some variables in the Prisoner Census are not collected in all states and territories, leading to high rates of missing values. In New South Wales, corrective services agencies do not record information on educational attainment or employment status. Since New South Wales prisoners comprise around 40% of the national prisoner population, these variables could not be included in our analysis. Therefore, our analysis does not update Rawnsley's (2003) finding that reimprisonment was also associated with lower levels of education. Similarly, in some states the reporting of marital status is not consistent so that variable was also excluded from our analysis.

Consistency across time

There are three types of variable which should remain consistent over time, or follow a logical progression. In this test we check that:

1. time invariant variables (such as date of birth) remain the same over time;
2. variables referring to the details of the prison episode (such as court of sentence and most serious offence) remain the same throughout the episode; and
3. that the prior imprisonment variable follows a logical progression between episodes. If a prisoner has a prior imprisonment recorded in one episode, he / she should be recorded as having prior imprisonment for all later episodes.

Details of the data quality assessment (for selected variables) based on these tests can be found in Appendix B.

2.3 Selected data items

Based on the needs of our research questions, and taking account of the data quality assessment, the variables described in table 2.1 are all highly relevant to this analysis. Some variables are available directly from information collected in the Prisoner Census, while others have been derived.

2.1 Data items used in the analysis

<i>Data item</i>	<i>Source</i>	<i>Notes</i>
Prisoner ID	Data item in the National Prisoner Census	Every prisoner, within each state is assigned a unique identification number. Prisoners keep this number if they are reimprisoned within the same state or territory. This variable can be used to construct a longitudinal dataset. However, it cannot be used to track reimprisonment in other states.
Reception date	Data item in the National Prisoner Census	Date when a prison episode began. In this paper, we use reception date to decide which prison episode a record belongs to. (See Section 2.2 for details.)
Prior imprisonment	Data item in the National Prisoner Census	People known to have been imprisoned under sentence in an adult prison. A previous imprisonment in another state or territory may not be counted.
Age at first reception	Derived data item	<p>This data item is used in our descriptive statistics to measure the representativeness of the release cohorts of the total prisoner population. A person is deemed as having his / her first adult imprisonment when there was no prior imprisonment recorded.</p> <p>It measures the age of a prisoner when starting his / her first adult imprisonment by calculating days from birth to first reception, as follows:</p> $\frac{(\text{reception date of first imprisonment}) - (\text{date of birth})}{365.25}$ <p>This number is divided by 365.25 to give age in years.</p>
Age (at release)	Derived data item	<p>Since we do not observe the actual release date, a proxy for 'age at release' is used — age at last appearance in the Prisoner Census for a prison episode. This age is calculated as:</p> $\frac{((\text{date of the last Prisoner Census}) - (\text{date of birth}))}{365.25}$ <p>For ease of reading, we refer to 'age at release' as 'age' in this paper, unless otherwise noted.</p>
Indigenous status	Modified from data item in the National Prisoner Census	<p>Indigenous status is based on self-identification. In this paper, two broad groupings are used:</p> <p>'Indigenous' includes people of Aboriginal but not Torres Strait Islander origin, people of Torres Strait Islander but not Aboriginal origin, and people of both Aboriginal and Torres Strait Islander origin.</p> <p>'Non-Indigenous' includes people of neither Aboriginal nor Torres Strait Islander origin, and those recorded as 'Not stated / inadequately described'.</p>
Offence type	Known as 'Most serious offence / charge' in the National Prisoner Census	<p>For sentenced prisoners the most serious offence is the offence which has received the longest sentence, except for in Tasmania, where a combined sentence for all offences may be applied, and the most serious offence is determined by applying the National Offence Index.</p> <p>For unsentenced prisoners usually the most serious charge is the charge which carries the longest statutory maximum penalty.</p> <p>Offence type is coded using the Australian Standard Offence Classification.</p> <p>Readers can refer to Explanatory notes 74–76 of <i>Prisoners in Australia</i> (ABS, 2009) for more details.</p>

2.1 Data items used in the analysis (continued)

<i>Data item</i>	<i>Source</i>	<i>Notes</i>
Jurisdiction	Known as 'State' in the National Prisoner Census	<p>In this paper we focus on the state or territory in which a prisoner is held in custody, regardless of which state or territory has imposed the sentence being served.</p> <p>This is because the prisoner id variable is only unique within each state or territory. It cannot be used to track reimprisonment across states, even if the state of court of sentence remains the same.</p> <p>Until late 2008 people sentenced to full-time custody in the Australian Capital Territory have usually been held in New South Wales prisons. Since ACT prisoners held in New South Wales share the same Prisoner ID coding system as New South Wales prisoners we have combined New South Wales prisoners and ACT prisoners held in New South Wales into one category: 'New South Wales / ACT'. Combining this group of prisoners with the New South Wales prisoners reduces the possibility of underestimating reimprisonment. If an ACT prisoner held in New South Wales was released and reimprisoned as a New South Wales prisoner, the Prisoner ID would be retained. On the other hand, if a New South Wales prisoner was released and subsequently reimprisoned as an ACT prisoner in New South Wales, this reimprisonment could also be identified in the 'New South Wales / ACT' dataset.</p> <p>Prisoners held in the Australian Capital Territory (rather than those held in New South Wales) were on remand awaiting a trial and/or sentence. Unless otherwise noted, this group of prisoners are still included in the descriptive analysis as 'ACT'. They are not included in the logistic regression because no reimprisonment cases can be identified in the 'ACT' data. This might be because of the small number of prisoners held in the Australian Capital Territory and the mobile nature of the prisoners.</p> <p>Readers should refer to Explanatory notes 13–15 of <i>Prisoners in Australia</i> (ABS, 2008b) for more details.</p>
Length of previous imprisonment episode	Derived data item, known as 'Expected time to serve' in the National Prisoner Census	<p>'Expected time to serve' for the previous imprisonment episode (the prison episode from which a prisoner was released) was used as a proxy for the length of previous imprisonment episode. It is the period of imprisonment which a convicted prisoner is expected to serve.</p> <p>Readers should refer to Explanatory Notes 46–69 of <i>Prisoners in Australia</i> (ABS, 2009) for more details.</p>

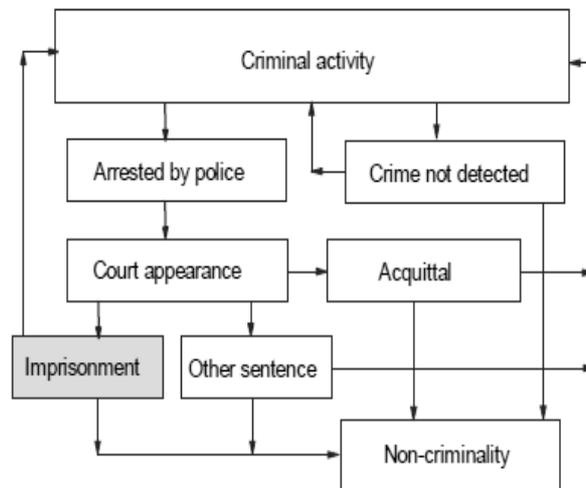
2.4 Limitations of measuring repeat imprisonment

This paper measures repeat imprisonment which is a slightly different concept from recidivism

Studies of recurring criminal behaviour should ideally focus on trends in recidivism (repeated or habitual participation in crime). However, recidivism analysis is limited by the lack of information on people who repeatedly engage in criminal activities.

Individuals who are imprisoned are only a subgroup of individuals who engage in criminal activities. People who have committed an offence may not be imprisoned. For example, they may not be caught. If offenders are caught, they may be diverted out of the criminal justice system and into diversionary programs or other non-court proceedings. Alternatively, even if they are arrested, charged, and convicted, the sentence may be a fine rather than imprisonment. Rawnsley (2003) describes such potential paths of recidivism and repeat imprisonment through a simple model which is reproduced in figure 2.2. The grey box represents the subset of criminal activities which are observed in the Prisoner Census.

2.2 Criminal activities observed in the Prisoner Census



Not all imprisoned people will become convicted criminals. This is because the imprisoned population also includes remandees (persons who have been placed in custody while awaiting the outcome of their court hearing). Though some remandees are already convicted and waiting for a sentence, others may be found not guilty by the court.

The National Prisoner Census does not capture all prison episodes

The Prisoner Census provides a yearly snapshot of adult prisoners in Australia. It does not capture the entire inflow and outflow of prisoners during the year. Prisoners who are imprisoned after 30 June of one year but released before 30 June of the next year are not recorded in the Prisoner Census.

The omission of prisoners who had served short sentences (of less than one year) and who had been released prior to the census day may result in both an underestimate of the number of prisoners serving multiple spells of imprisonment and an underestimate of the number of prison spells for prisoners identified as serving multiple terms. Despite these gaps, the dataset is still a useful basis for investigating trends in reimprisonment, especially for people imprisoned for longer than one year.

The National Prisoner Census does not capture all offence types accounting for a prison episode

There could be more than one offence / charge accounting for a person's imprisonment. However, in the Prisoner Census, information is only available on the most serious offence of sentenced prisoners and the most serious charge for unsentenced prisoners. The counting rules of these variables are elaborated in Explanatory notes 74–79 of *Prisoners in Australia* (ABS, 2009). In this paper, we will analyse reimprisonment behaviours and criminal careers based on the most serious offence / charge. For ease of reading, 'most serious offence / charge' is referred to as 'offence' throughout this paper.

Also for ease of reading, abbreviations of the Australian Standard Offence Classification (ASOC) Divisions are defined and used in this paper. Please refer to Appendix C for a detailed explanation of ASOC.

Date of release is not recorded in the Prisoner Census

In reimprisonment studies, it is important to know the time interval between the release and the subsequent reimprisonment, or the length of time it took for a released prisoner to be re-incarcerated. Since there is no variable giving the precise date of release in the Prisoner Census, we assign the year of release as the last census year when a prisoner was recorded. Similarly, we assign the first census year in which the reimprisoned person appears as the reimprisonment year. The interval between the release and the subsequent reimprisonment is then approximated by the number of years between the release year and the first census year of the reimprisonment.

While this method provides a consistent approximation of the time to reimprisonment, it will generally overestimate the time to reimprisonment. This is because the Prisoner Census date that is used as a proxy for release will tend to be before a prisoner's actual release date, and the Prisoner Census date that is used as a proxy for reimprisonment will most likely fall after a prisoner's actual date of reception.

2.5 Measuring repeat imprisonment

Measurement of release and reimprisonment in this paper

As indicated above, the time between the release and reimprisonment of a prisoner is approximated by the number of years taken for the individual to reappear in the Prisoner Census. For the ease of reading, in this paper the term ‘release’ is used to refer to ‘disappearance’ from the Prisoner Census. The terms ‘reimprisonment’ and ‘repeat reimprisonment’ are used interchangeably to refer to reappearance in the census.

In this paper we identify the occurrence of a person’s release and reimprisonment by two factors:

- changes in the value of ‘reception date’ in two consecutive years, and
- the person’s disappearance from / reappearance into the Prisoner Census.

Table 2.3 describes some example paths between release and reimprisonment and shows the approximated time between prison episodes.

2.3 Examples of release and reimprisonment measurement

	Year of census				Release year (a)	Time before reimprisoned (b)
	1994	1995	1996	1997		
Example 1	In census (Reception date 1)	In census (Reception date 2)	1995	1 year (c)
Example 2	In census (Reception date 1)	Not in census	Not in census	In census (Reception date 2)	1994	3 years (d)
Example 3	Not in census	In census (Reception date 1)	Not in census	Not in census	1995	Not reimprisoned

(a) The last Prisoner Census year when a prisoner is recorded is used as a proxy for release year.

(b) The first Prisoner Census year when a reimprisoned person is recorded is used as a proxy for reimprisonment year.

(c) Actual time to reimprisonment could range from 0–12 months, due to the potential overestimation of time to reimprisonment that arises from using Prisoner Census dates as proxies for release and reimprisonment.

(d) Actual time to reimprisonment could range from just over one year to three years, due to the potential overestimation of time to reimprisonment that arises from using Prisoner Census dates as proxies for release and reimprisonment.

In example 1, the prisoner is recorded in two consecutive years (1994 and 1995), but the two records contain different reception dates. Since the reception date should remain constant during a prison episode, we conclude that the two records do not belong to the same prison episode. We assume that the prisoner was released after the first census date of 30 June 1994 and reimprisoned before the second census date of 30 June 1995.

In example 2, the prisoner disappears from the Prisoner Census for several years before reappearing again. Here the prisoner is recorded in 1994 but not in the 1995 or 1996 censuses. They reappear in 1997 with a different reception date than the one recorded in 1994. This new reception date should be between 1 July 1996 and 30 June 1997. We assume the release happened between 1 July 1994 and 30 June 1995. We also assume that the prisoner stayed out of prison for several years before being reimprisoned on the new reception date. But, it is possible that we have missed some short prison episodes which did not include 30 June in 1995 or 1996.

In example 3, the prisoner appears in the 30 June 1995 Census and does not appear in any Prisoner Census between 1996 and 2007. We assume that this prisoner has not been reimprisoned (although the prisoner may have been reimprisoned for short periods during this time that were not captured by the Prisoner Census).

2.6 Prisoner cohorts used in the analysis

The 1994–1997 release cohort

The reliability of a reimprisonment analysis depends both on the size of the group of people under study and the length of time for which they are observed. In general, the larger the group under study, the more likely it is to be representative of reimprisonment in the population. The longer the follow-up period, the greater the number of criminal activities that can be observed and analysed.

Based on a longitudinal dataset of Prisoner Censuses from 1994 to 2007, this study uses the following approach to optimise group size and follow up period: we define the three year period 1 July 1994 to 30 June 1997 as the ‘reference period’ and the time from release in the reference period until 30 June 2007 as the ‘observation window’.

A person is in the 1994–1997 release cohort if he or she was one of the 28,584 people released at least once during the reference period. The offence relating to the episode of imprisonment from which they were released is called their ‘previous offence’ in the remainder of this paper.

Depending on the year of release, different people may have different start dates to their observation period. Nevertheless, since release must have occurred before 1 July 1997, we can follow each person in the release cohort for at least ten years (1998 to 2007).

In a relatively small number of cases during the reference period, a person was released from more than one episode of imprisonment. In these cases, the person's previous offence was determined based on the offence type for his or her first observed episode. Any imprisonment from the second episode onwards was deemed reimprisonment. For example, between 1 July 1994 and 30 June 1997 a person released from a prison episode for burglary, and then reimprisoned for theft and released, would be included in the burglary group.

The 2001–2004 release cohort

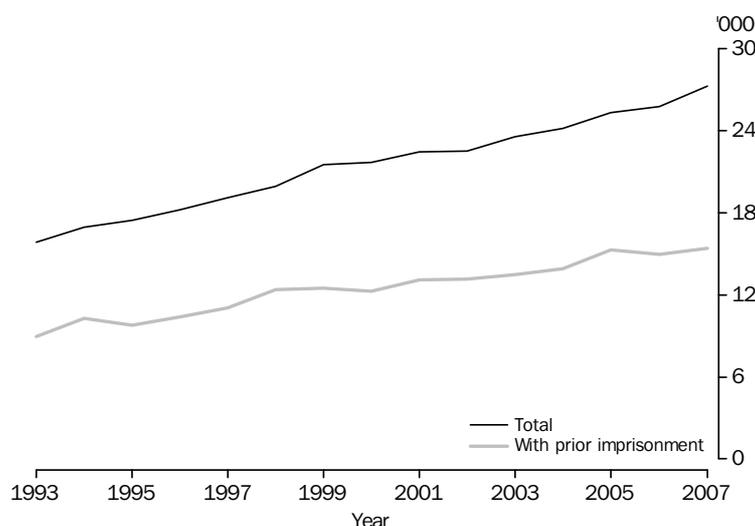
In the multivariate analysis described in Section 4.4, we introduce a second release cohort, consisting of prisoners released at least once in the period 1 July 2001 to 30 June 2004. Repeat imprisonment of this release cohort is compared with that of the 1994–1997 release cohort to investigate whether reimprisonment tendency is changing over time.

3. DESCRIPTIVE STATISTICS OF THE PRISONER POPULATION

3.1 Prisoner population with prior imprisonment

From 1994 to 2007, the size of the prisoner population increased steadily at an average rate of 3.7% per year. Over the same period, the number of prisoners with prior imprisonment increased at 3.2% per year on average. Both of these series grew significantly faster than Australia's total population which increased at about 1.3% per year on average in this period.²

3.1 Prisoner population, 1994–2007

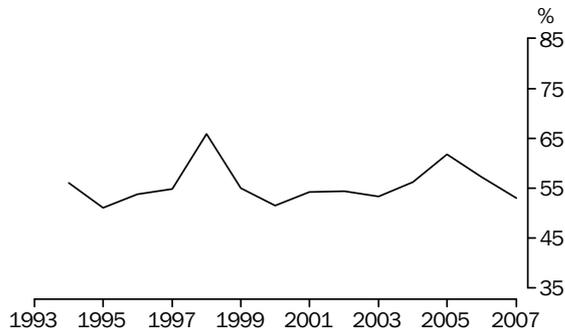


At the national level, the proportion of prisoners with prior imprisonment did not show any clear trend over the period 1994 to 2007, with the rate ranging between 56% and 62% (figure 3.2). However, some clear trends were observed when looking at the state level (figure 3.2). In Victoria and South Australia, the proportion of prisoners with prior imprisonment decreased between 1994 and 2007. In contrast, Queensland saw a moderate increase in this proportion over the same period. In Western Australia, this proportion followed a slight decline from 1994 to 2000, and a slight increase from 2001 onwards.

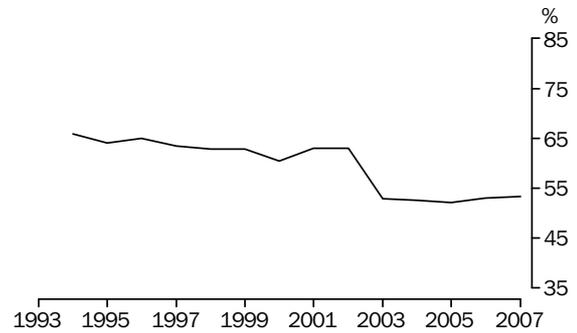
² Estimates based on data from *Australian Historical Population Statistics, 2008* (ABS cat. no. 3105.0.65.001).

3.2 Percentage of prisoners with prior imprisonment, by state and territory and Australia, 1994–2007

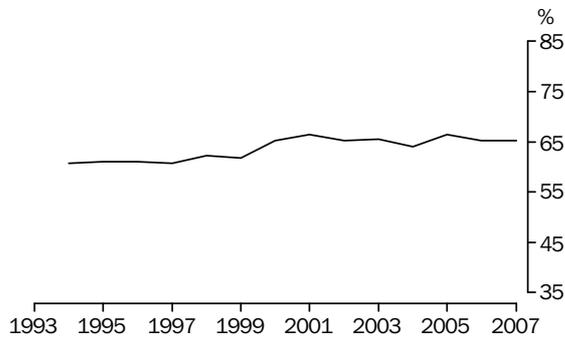
NEW SOUTH WALES / ACT (a)



VICTORIA



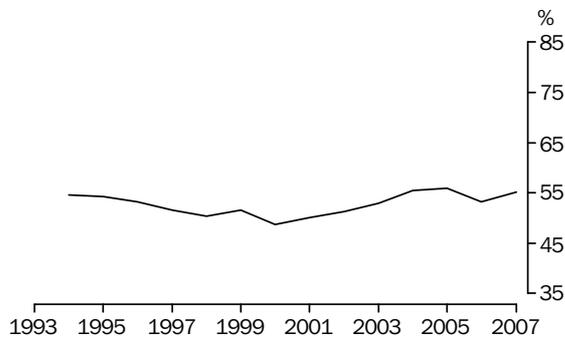
QUEENSLAND



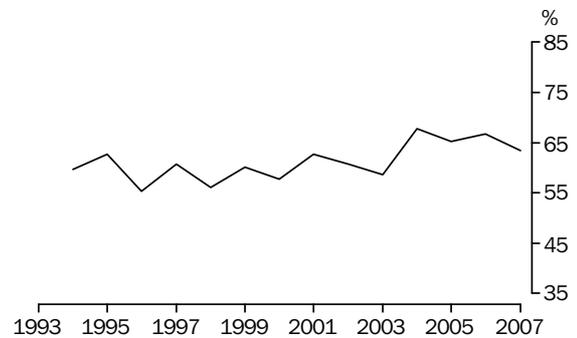
SOUTH AUSTRALIA



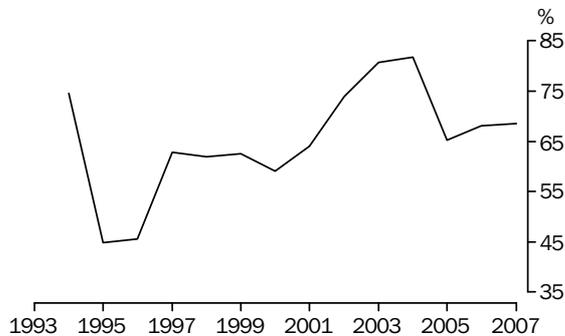
WESTERN AUSTRALIA



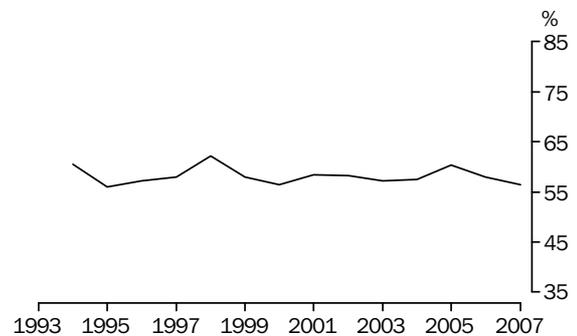
TASMANIA



NORTHERN TERRITORY (b)



AUSTRALIA



(a) The jurisdiction of 'New South Wales / ACT' includes New South Wales prisoners and ACT prisoners held in the Australian Capital Territory. See notes in table 2.1 for more details.

(b) Data in the Northern Territory figure prior to 2005 should be used with caution as the quality was not as robust prior to this period.

It is worth noting that the percentage of the total prisoner population at any one time with prior imprisonment is not necessarily an indicator of reimprisonment levels. Though reimprisonment tendency is one contributing factor, this percentage is more the result of a dynamic system which is made up of many other factors, including the inflow of both first-time and repeat offenders, and their respective imprisonment lengths. Therefore, any change in those factors could lead to a change in this percentage. For example, an increase in the percentage of repeat prisoners in the prison population could be due to fewer first-time offenders being put into the prison system in a year, or increased sentence length for repeat offenders (which tends to hold more repeat offenders in the prison system).

A more useful analysis of reimprisonment can be gained by focusing on a group of people who were previously imprisoned and released. In this way the level of reimprisonment is measured as the proportion of that group who re-enter the prison system at a later date. Based on this rationale, and the analysis of reimprisonment in the criminological literature, this study is focused on previous prisoners through the concept of a release cohort.

3.2 Characteristics of the release cohort and the total prisoner population

Because the multivariate analysis used in this study requires prisoners with missing or unknown independent variables to be removed from the model, it is important to know how representative the cohort used in the model are of all members of the release cohort. Furthermore, it is of interest to know how similar the 1994–1997 release cohort is to the 2001–2004 release cohort, and how they compare with the entire prisoner population. Table 3.3 shows that the distribution of most demographic characteristics is similar in the four groups (that is, the 1994–1997 release cohort used in the descriptive analysis; the 1994–1997 and 2001–2004 release cohorts used in the model; and the total prisoner population). This indicates that the groups used in the analysis are representative in many respects of the total prisoner population.

In both release cohorts and the total prisoner population, most prisoners were male (from 92% to 94%), and about one-fifth were Indigenous (from 18% to 21%). The groups also had a similar geographic distribution, with the largest proportion of prisoners located in New South Wales (from 40% to 46%), and the smallest proportion in Tasmania, the Northern Territory and the Australian Capital Territory. In all groups, the median age of prisoners at the time their first imprisonment started was 28 years. The 2001–2004 release cohort had a slightly older age structure at release than the 1994–1997 release cohort. Under one-third (29%) of prisoners in the 1994–1997 release cohort were aged 35 years and over when they were released, while just over one-third (34%) of those in the 2001–2004 release cohort were aged 35 years and over at release. A small proportion in both release cohorts were released while still being a teenager (from 4% to 7%).

3.3 Characteristics of the release cohorts and all prisoners in the longitudinal dataset

<i>Characteristics</i>	<i>1994–1997 release cohort covered in descriptive analyses</i>	<i>1994–1997 release cohort covered in logistic regression</i>	<i>2001–2004 release cohort covered in logistic regression</i>	<i>All prisoners (d)</i>
<i>Sex (%)</i>				
Male	94%	94%	92%	92%
Female	6%	6%	8%	8%
<i>Indigenous status (%)</i>				
Indigenous	18%	18%	21%	18%
Non-Indigenous	82%	82%	79%	82%
<i>Jurisdiction (%)</i>				
New South Wales / ACT (a)	44%	46%	41%	40%
Victoria	15%	14%	18%	15%
Queensland	15%	15%	18%	20%
South Australia	8%	8%	5%	6%
Western Australia	12%	13%	12%	13%
Tasmania	2%	2%	2%	2%
Northern Territory	3%	2%	4%	3%
Australian Capital Territory	<1%	1%
Median age at first reception (b)	28	28	28	28
<i>Age at release</i>				
17–19 years (c)	7%	6%	4%	..
20–24 years	25%	25%	22%	..
25–29 years	22%	22%	22%	..
30–34 years	17%	17%	19%	..
35 years and over	29%	29%	34%	..
Total prisoners	28,584	24,406	26,696	128,277

.. not applicable

(a) Includes prisoners sentenced in the Australian Capital Territory but held in New South Wales prisons.

(b) Only first-time prisoners (those with no prior imprisonment) are included in the calculation.

(c) In all states and territories except Queensland, people remanded or sentenced to adult custody are aged 18 years and over. People under 18 years are treated as juveniles in most Australian courts and are only remanded or sentenced to custody in adult prisons except in exceptional circumstances. In Queensland 'adult' refers to people aged 17 years and over.

(d) Total number of different prisoners who were in at least one Prisoner Census between 1994 and 2007.

4. FACTORS ASSOCIATED WITH REIMPRISONMENT

In this section, we study a cohort of prisoners who were ‘released’ during the period July 1994 to June 1997. This 1994–1997 release cohort was followed from their release until June 2007, a span of at least ten years. We use descriptive analysis and multivariate logistic regression to explore the effects of socio-demographic and prior imprisonment characteristics on reimprisonment rates during the ten years following release.

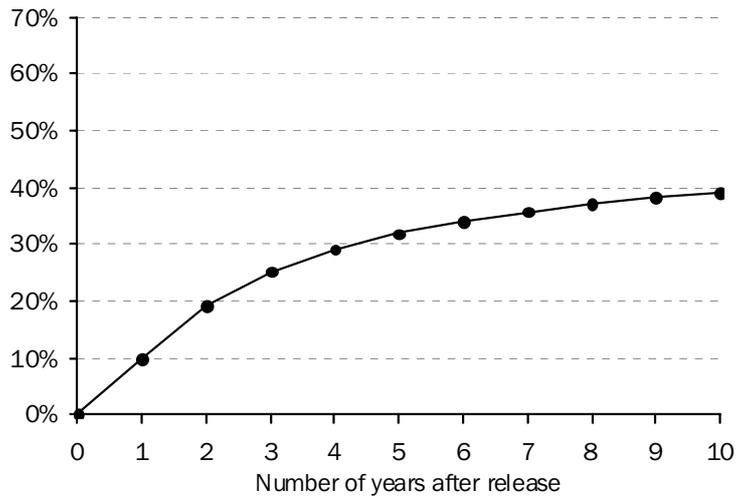
We then introduce a second cohort of prisoners – who were ‘released’ between July 2001 to June 2004. Comparing reimprisonment trends for the two cohorts during the three years following release allows us to address the question of whether prisoners released more recently were more or less likely to be reimprisoned than were those released in an earlier period.

The results from the multivariate logistic regression serve three purposes. First, they provide information that isolates the effect of each individual factor when all other factors are held constant. Second, analysis of the prisoner cohort three and ten years after release may show whether increasing the period after release changes the relative importance of each individual factor associated with reimprisonment. Third, the results may help to address the question of whether the propensity towards reimprisonment has changed over time.

4.1 Reimprisonment among the 1994–1997 release cohort — descriptive analysis

The proportion of prisoners from the 1994–1997 release cohort who were reimprisoned increased relatively rapidly in the years following release, then levelled out with the passage of time. About one in five were reimprisoned in the first two years. In total, one-quarter of prisoners were reimprisoned three years from release and almost 40% by the end of the ten year observation period.

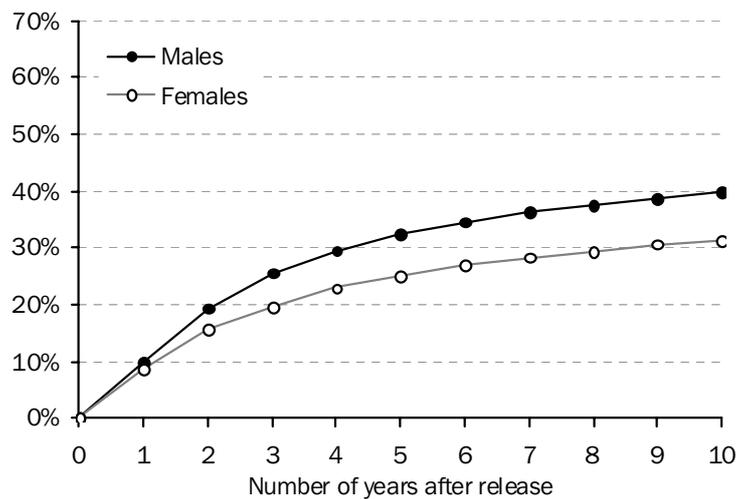
4.1 Cumulative reimprisonment rate, by time to first reimprisonment



Sex

Males were more likely than females to return to prison throughout the observation period. Although the gap was quite small at the beginning (reimprisonment rates of 10% and 9% for males and females respectively by the end of the first year), it increased with the passage of time. By the tenth year, 40% of released male offenders had been reimprisoned at least once, compared with 31% of females.

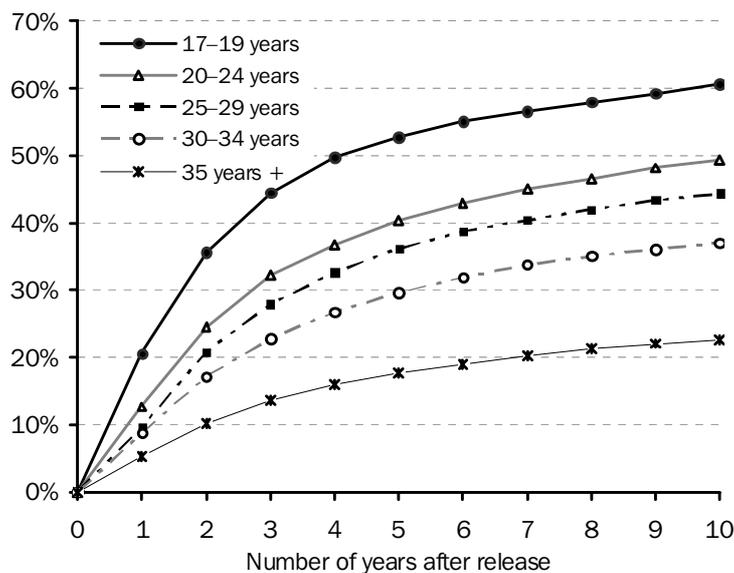
4.2 Cumulative reimprisonment rate, by time to first reimprisonment and sex



Age

Younger prisoners were more likely than older prisoners to be reimprisoned following release. More than one fifth of the youngest age group (those aged 17–19 years³) were reimprisoned within one year of release. This rate was around four times that of the group aged 35 years and over (5%). Ten years after release, the reimprisonment rate for the youngest age group was 61%, compared with 23% for the 35 and over group.

4.3 Cumulative reimprisonment rate, by time to first reimprisonment and age at release

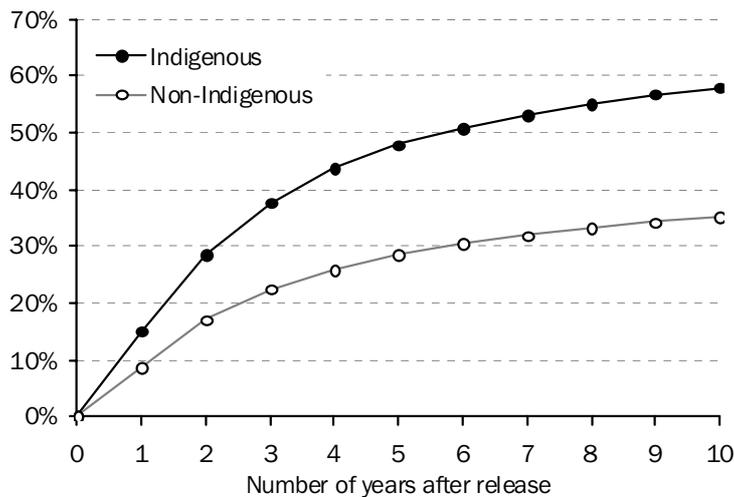


Indigenous status

After release, Aboriginal and Torres Strait Islander people were more likely than non-Indigenous people to be reimprisoned. The reimprisonment rate of Indigenous people in the release cohort was around 1.7 times that of the non-Indigenous group throughout the observation period. About 58% of the Indigenous group were reimprisoned ten years from release, compared with 35% of the non-Indigenous group.

³ In all states and territories except Queensland, people remanded or sentenced to adult custody are aged 18 years and over. People aged under 18 years are treated as juveniles in most Australian courts and are only remanded or sentenced to custody in adult prisons in exceptional circumstances. In Queensland, 'adult' refers to people aged 17 years and over.

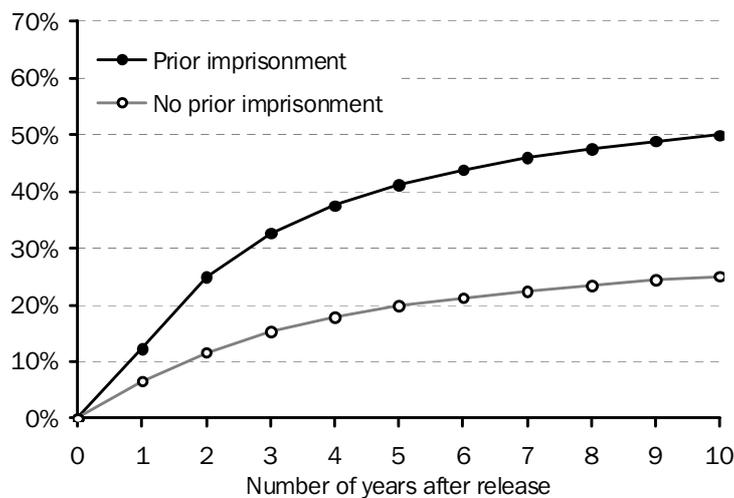
4.4 Cumulative reimprisonment rate, by time to first reimprisonment and Indigenous status



First-time prisoners

Among the release cohort, 56% had been serving their first sentence in an adult prison while the other 44% had been serving second or subsequent sentences. These groups are referred to here as having ‘no prior imprisonment’ and ‘prior imprisonment’, respectively. Throughout the ten year period following release, prisoners with prior imprisonment (or ‘repeat prisoners’) were twice as likely as those with no prior imprisonment (or ‘first-time prisoners’) to be reimprisoned at least once. Half of repeat prisoners were first reimprisoned within ten years of release, compared with one-quarter of first-time prisoners.

4.5 Cumulative reimprisonment rate, by time to first reimprisonment and prior imprisonment

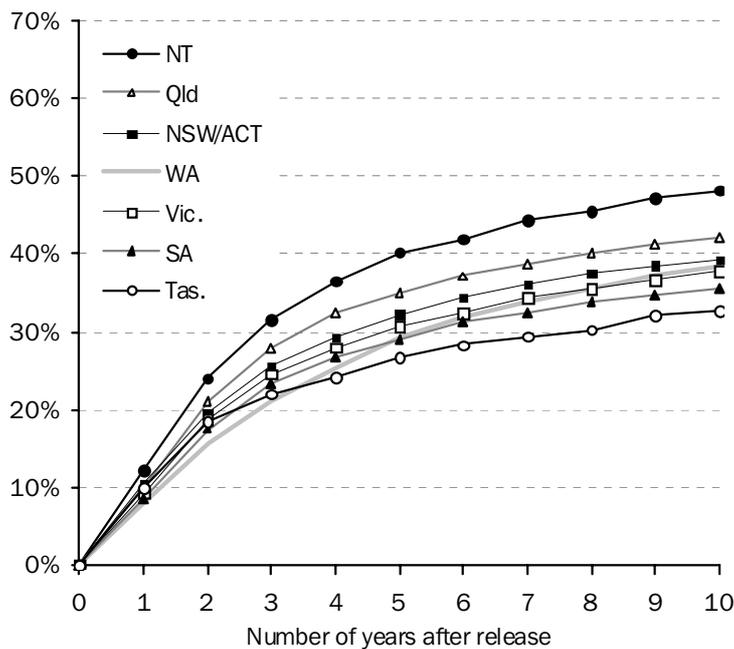


Note: Prisoners with prior adult imprisonment recorded with their first observed episode in the reference period are referred to as having ‘prior imprisonment’. Those with no prior adult imprisonment recorded in the first episode are referred to as having ‘no prior imprisonment’.

States and territories

After release, prisoners in the Northern Territory had a higher reimprisonment rate than did their counterparts in the states. Ten years from release, 48% of prisoners in the Northern Territory had been reimprisoned compared with the national average of 39%. Multivariate analysis suggests that this is related to the demographic characteristics of these populations (see Section 4.2 – States and territories).

4.6 Cumulative reimprisonment rate, by time to first reimprisonment and jurisdiction



Note: No reimprisoned prisoners were identified in the Australian Capital Territory.

Other factors

In addition, reimprisonment is somewhat associated with how long prisoners were previously held in prison and the type of their previous offence. While these factors appear to be less significant than those discussed above, for completeness they are presented in Appendix D.

4.2 Reimprisonment among the 1994–1997 release cohort — logistic regression

In the previous section we saw that reimprisonment was associated with characteristics such as age, sex, Indigenous status, prior imprisonment, and state or territory. However, these characteristics may also be associated with each other. For example, the Northern Territory has a relatively young population and relatively large Indigenous population. In this section we use logistic regression analysis to disentangle the effects of individual factors on reimprisonment.

Logistic regression is a type of multivariate analysis. By assigning a value of 1 if the person is reimprisoned and 0 otherwise we created a binary dependent variable suitable for logistic regression modelling. See appendix E for more information about logistic regression.

The odds ratios obtained from the logistic regression analysis are presented in table 4.7. As the name suggests, odds ratios are the ratio of two odds. The odds ratio for a male is obtained by dividing the odds of males being reimprisoned by the odds of females being reimprisoned (where being female is the comparison group in the odds ratio). Any variable that has an odds ratio of greater than 1.0 indicates an increased propensity to be reimprisoned, while a variable with an odds ratio of less than 1.0 indicates a reduced propensity to be reimprisoned. If the confidence interval for an odds ratio includes the value 1.0, then we consider the estimated odds ratio not to be different from 1.0 (i.e. the results are not significant).

In our analysis we have used two logistic regression models. The first model investigates reimprisonment within ten years of release for the 1994–1997 release cohort. This is referred to as the ten year model in the discussion below. The second model investigates reimprisonment within three years of release. This is referred to as the three year model.

Age

The three year and ten year models both suggest that younger people were more likely to be reimprisoned than older people. In both time frames, the odds that a 17–19 year old prisoner was reimprisoned were about 2.6 times the average level of all age groups. On the other hand, the odds of a prisoner aged 35 years or above being reimprisoned were just under half the average level.

4.7 Odds ratios of reimprisonment within three years and within ten years

Characteristics	Three year model		Ten year model	
	Odds ratio	Confidence interval	Odds ratio	Confidence interval
Sex (compared to females)				
Male	1.41 *	(1.22–1.63)	1.46 *	(1.28–1.65)
Age group (compared to average)				
17–19 years	2.55 *	(2.32–2.81)	2.62 *	(2.38–2.88)
20–24 years	1.22 *	(1.16–1.29)	1.25 *	(1.19–1.32)
25–29 years	0.93 *	(0.88–0.99)	0.96	(0.91–1.02)
30–34 years	0.73 *	(0.69–0.79)	0.71 *	(0.67–0.76)
35 years and over	0.47 *	(0.44–0.50)	0.44 *	(0.42–0.47)
Indigenous status (compared to non-Indigenous)				
Indigenous	1.71 *	(1.57–1.86)	2.03 *	(1.87–2.20)
Prior imprisonment (compared to no prior imprisonment)				
Has prior imprisonment	2.68 *	(2.49–2.89)	2.92 *	(2.74–3.11)
State and territory (compared to average)				
New South Wales / ACT	1.24 *	(1.16–1.33)	1.22 *	(1.15–1.30)
Victoria	1.15 *	(1.05–1.26)	1.15 *	(1.06–1.25)
Queensland	1.23 *	(1.13–1.34)	1.24 *	(1.14–1.34)
South Australia	0.86 *	(0.77–0.96)	0.82 *	(0.74–0.90)
Western Australia	0.79 *	(0.72–0.87)	1.01	(0.93–1.10)
Tasmania	0.84	(0.67–1.06)	0.77 *	(0.63–0.95)
Northern Territory	0.99	(0.83–1.18)	0.90	(0.76–1.06)
Previous offence (a) (compared to average)				
Acts causing injury	1.05	(0.94–1.16)	1.04	(0.95–1.14)
Sexual assault	0.55 *	(0.48–0.65)	0.50 *	(0.44–0.57)
Robbery	0.98	(0.87–1.11)	1.01	(0.91–1.13)
Burglary	1.68 *	(1.52–1.86)	1.62 *	(1.48–1.77)
Theft	1.66 *	(1.49–1.85)	1.56 *	(1.41–1.72)
Deception	0.43 *	(0.20–0.94)	0.57	(0.31–1.06)
Illicit drug offences	0.69 *	(0.61–0.80)	0.76 *	(0.67–0.85)
Weapons offences	0.78	(0.43–1.42)	0.87	(0.53–1.42)
Property damage	0.97	(0.77–1.23)	0.87	(0.71–1.07)
Public order offences	1.23	(0.85–1.79)	1.35	(0.96–1.88)
Road traffic offences	1.16 *	(1.03–1.32)	1.13 *	(1.02–1.26)
Offences against justice	1.23 *	(1.09–1.39)	1.21 *	(1.09–1.35)
Length of previous imprisonment episode (compared to average)				
0 to less than 6 months	0.82 *	(0.77–0.86)	0.77 *	(0.74–0.81)
6–18 months	1.04	(1.00–1.09)	1.05 *	(1.00–1.09)
Over 18 months	1.17 *	(1.11–1.23)	1.24 *	(1.18–1.29)
Number of cases in the analysis	24,406		24,406	

* Indicates that the odds ratios are significantly different from 1.0 at a 95% confidence interval.

(a) People previously imprisoned for homicide are excluded from the regression analysis due to coding errors in the dataset. Backward selection has been used in the modelling process so explanatory variables bearing no statistical significance at the 5% level are dropped out of the models.

Indigenous status

Indigenous people were more likely to be reimprisoned than non-Indigenous people. A comparison between the three year and ten year models suggests the difference between Indigenous and non-Indigenous people increased with time. Within three years of release, the odds that an Indigenous person was reimprisoned were 1.7 times those of a non-Indigenous person. Within ten years of release, this odds ratio increased to 2.

Prior imprisonment

Both the three year and ten year models show that prisoners with prior imprisonment were more likely to be reimprisoned than first-time prisoners. The importance of prior imprisonment to reimprisonment increased with time. Within three years of release, the odds that a prisoner with prior imprisonment would be reimprisoned were 2.7 times those of a first-time prisoner. This odds ratio increased to 2.9 within ten years of release.

Sex

Men were more likely to be reimprisoned than women. The effect of sex on reimprisonment was quite similar between the three year and ten year models. The odds of a male prisoner being reimprisoned was about 1.4 times those of a female prisoner.

Length of previous prison episode

Holding other factors constant, longer previous prison episodes seem to be associated with higher reimprisonment tendency. The effect of the length of the previous prison episode is quite consistent in the two time frames. In both models, the odds ratios increased from 0.8 to 1.2 as previous prison episode increased from 0–6 months to over 18 months.

States and territories

There is a difference in results from the descriptive and multivariate analyses with regard to jurisdiction. The descriptive statistics in figure 4.4 show that, following release, prisoners from the Northern Territory had the highest likelihood of reimprisonment.

Results from both the three and ten year models, however, suggest that a prisoner from the Northern Territory was not significantly different in terms of his / her tendency to return to prison when compared with the average level of prisoners (with similar demographic and prior imprisonment characteristics) in the states and territories. In other words, the high reimprisonment rates observed in the Northern

Territory might be attributed to the demographic composition of the prisoner population (e.g. Indigenous status and age) which are, as shown earlier, associated with higher rates of reimprisonment. For example, among prisoners in the 1994–1997 release cohort, 76% of those from the Northern Territory were Indigenous, compared to an average of 18% across all jurisdictions. Furthermore, 11% of prisoners from the Northern Territory were in the teenager group, compared to an average of 7%.

The odds ratios were quite consistent between the two models for most jurisdictions, except for Western Australia and Tasmania. In Western Australia, prisoners had a below-average reimprisonment propensity within three years of release, but this propensity increased to the average level the longer the period after release. The opposite occurred in Tasmania, where prisoners had an average propensity to reimprisonment within three years of release, and then decreased to below average within ten years of release.

Even though the model accounts for a wide range of socio-demographic and prior imprisonment characteristics, it would not be prudent to draw conclusions directly from table 4.7 that the conditions in a certain jurisdiction lead to more or less reimprisonment than others. The range of odds ratios across states and territories may well reflect jurisdictional differences that were not represented in the model. For example, jurisdictions might differ in their sentencing practices, so that people who committed minor offences after release might be sentenced to a further prison episode in one jurisdiction, but not in another. In addition, prisoners with shorter prison episodes have a lower chance of appearing in the Prisoner Census⁴, therefore jurisdictions which tend to use shorter sentences would seem to have lower reimprisonment than the others.

Previous offences

Holding other factors constant, reimprisonment tendencies differ for prisoners with different previous offences. In addition, prisoners with the same previous offences also showed some differences between the two time frames. Prisoners released from an episode for burglary and theft always had the highest likelihood of returning to prison both in three year and ten year time frames, when compared with the others. On the other hand, prisoners released from a prison episode for sexual assault or illicit drug offences always had a significantly lower than average likelihood of reimprisonment.

These results correspond to the findings in Section 5, which presents a more detailed discussion on reimprisonment by offence types.

⁴ See Section 2.4 for details.

4.3 Reimprisonment: changes over time — descriptive analysis

Table 4.8 presents the results of a descriptive analysis that suggests the reimprisonment rate (within three year of release) for the 2001–2004 release cohort was 17% higher than that of the 1994–1997 release cohort. The results varied by age, from 9% higher for people aged 17–19 years, to 36% higher for people aged 30–34 years.

4.8 Reimprisonment rates for 1994–1997 and 2001–2004 release cohorts, by age

	Age group (years)					Total
	17–19	20–24	25–29	30–34	35 & over	
1994–1997 release cohort (%)	44.5	32.3	27.9	22.8	13.6	25.1
2001–2004 release cohort (%)	48.6	37.2	34.9	31.0	17.9	29.5
2001–2004 to 1994–1997 (rate)	1.09	1.15	1.25	1.36	1.32	1.17

4.4 Reimprisonment: changes over time — logistic regression

To look at whether prisoners released recently were more likely to be reimprisoned than those who were released in the 1990s, members of both the 1994–1997 and 2001–2004 release cohorts were included in the three year model.

Change over time in the propensity towards reimprisonment may vary across states and territories. Therefore, to investigate whether there is a jurisdictional effect on reimprisonment in each state, an interaction term is introduced into the three year model : (state or territory) by (cohort).

The odds ratios obtained from the logistic regression analysis are presented in table 4.9.

States and Territories

The model suggests that the propensity towards reimprisonment has increased over time and varies across jurisdictions. The logistic regression findings are consistent with the descriptive analysis comparing reimprisonment rates between the 1994–1997 release cohort and the 2001–2004 release cohort (albeit higher after adjusting for factors such as age and Indigenous status).

Queensland was the only jurisdiction where people released in 1994–1997 and people released in 2001–2004 showed similar propensities to be reimprisoned. In all the other jurisdictions, people released in the later period were more likely to be reimprisoned than those released in the earlier period.

The odds ratios ranged from 1.10 in Queensland to 1.90 in Tasmania. These results suggest, for example, that a prisoner released in Tasmania during 2001–2004 was 1.9 times as likely to be reimprisoned as a prisoner released in Tasmania during 1994–1997.

4.9 Odds ratios of reimprisonment within three years (a) – changes over time

<i>Characteristics</i>	<i>Odds ratio</i>	<i>Confidence interval</i>
Cohort by state or territory (compared to 1994–1997 cohort)		
New South Wales / ACT: 2001–2004 cohort	1.41 *	(1.32–1.50)
Victoria: 2001–2004 cohort	1.49 *	(1.34–1.65)
Queensland: 2001–2004 cohort	1.10	(0.99–1.22)
South Australia: 2001–2004 cohort	1.81 *	(1.53–2.15)
Western Australia: 2001–2004 cohort	1.54 *	(1.36–1.75)
Tasmania: 2001–2004 cohort	1.90 *	(1.36–2.65)
Northern Territory: 2001–2004 cohort	1.43 *	(1.13–1.81)
Sex (compared to females)		
Male	1.50 *	(1.37–1.65)
Age group (compared to average)		
17–19 years	2.51 *	(2.34–2.70)
20–24 years	1.19 *	(1.14–1.24)
25–29 years	0.93 *	(0.89–0.97)
30–34 years	0.76 *	(0.73–0.80)
35 years and over	0.47 *	(0.45–0.49)
Indigenous status (compared to non-Indigenous)		
Indigenous	1.71 *	(1.62–1.80)
Prior imprisonment (compared to no prior imprisonment)		
Has prior imprisonment	2.72 *	(2.59–2.86)
State and territory (compared to average) (b)		
New South Wales / ACT	1.25 *	(1.17–1.34)
Victoria	1.15 *	(1.05–1.26)
Queensland	1.23 *	(1.13–1.34)
South Australia	0.87 *	(0.78–0.97)
Western Australia	0.79 *	(0.72–0.87)
Tasmania	0.84	(0.66–1.05)
Northern Territory	0.98	(0.83–1.16)
Previous offence (c) (compared to average)		
Acts causing injury	1.07 *	(1.00–1.14)
Sexual assault	0.55 *	(0.49–0.61)
Robbery	1.09 *	(1.01–1.17)
Burglary	1.68 *	(1.58–1.79)
Theft	1.64 *	(1.53–1.76)
Deception	0.31 *	(0.21–0.47)
Illicit drug offences	0.66 *	(0.60–0.72)
Weapons offences	0.98	(0.69–1.40)
Property damage	1.05	(0.90–1.23)
Public order offences	1.26 *	(1.00–1.59)
Road traffic offences	1.10 *	(1.02–1.19)
Offences against justice	1.27 *	(1.18–1.37)
Length of previous imprisonment episode (compared to average)		
0 to less than 6 months	0.84 *	(0.81–0.87)
6–18 months	1.03 *	(1.00–1.06)
Over 18 months	1.15 *	(1.11–1.19)
Number of cases in the analysis	51,102	

* Indicates that the odds ratios are significantly different from 1.0 at a 95% confidence interval.

(a) This three year model is based on 51,102 prisoners combining the 1994–1997 and 2001–2004 release cohorts.

(b) The odds ratios for this variable relate to the 1994–1997 release cohort only. The specification of the interaction term ‘Cohort by state or territory (compared to 1994–1997 cohort)’ means odds ratios calculated on this variable are only relevant to those released in the ‘base period’, i.e. 1994–1997. Please refer to a statistical text on logistic regression, e.g. pages 70–79 of Hosmer and Lemeshow (2000), for more details.

(c) People previously imprisoned for homicide are excluded from the regression analysis due to coding errors in the dataset. Backward selection has been used in the modelling process so explanatory variables bearing no statistical significance at the 5% level are dropped out of the models.

4.5 Summary

Both the descriptive and multivariate analyses found that high reimprisonment was associated with people who were:

- young,
- Indigenous,
- previously reimprisoned, and
- male.

The first three factors appear to be very important in affecting people's reimprisonment tendency. Although the effect of age was quite consistent in different lengths of period after release, the roles of Indigenous status and prior imprisonment became more prominent as this period increased.

The multivariate analysis also isolates individual effects of the following factors:

- length of the prior prison episode,
- jurisdiction, and
- previous offence type.

People who had been jailed for long periods had higher reimprisonment tendency than those who had been jailed for short periods. In addition, prisoners from different jurisdictions or with different previous offences showed different tendencies. A notable point is that the high reimprisonment rate observed in the Northern Territory might be attributed to its prisoner population composition. After adjusting for these factors (such as Indigenous status and age), Northern Territory prisoners showed the average level of reimprisonment tendency when compared to other jurisdictions.

In most jurisdictions, people released in 2001–2004 were more likely than those released in 1994–1997 to return to prison after three years. The only exception was in Queensland where there was no significant difference between these two time periods.

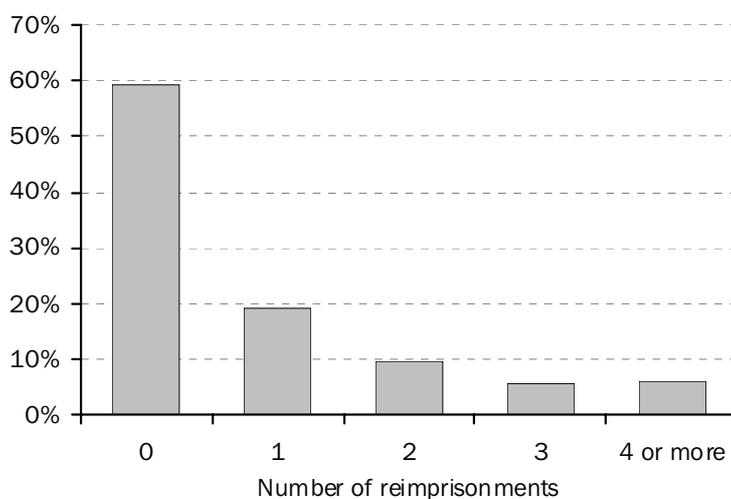
5. ANALYSIS OF CRIMINAL CAREERS

All the analysis of criminal careers in this section is based on the 1994–1997 release cohort. Frequency distributions of the number of times prisoners were reimprisoned and the types of offences for which they were previously imprisoned are discussed below to provide contextual information for the criminal careers analysis. Analysis of criminal career development is based on the most serious offence or charge, referred to as the ‘offence’.

5.1 Reimprisonment for the same and different offences

Of the 28,584 people in the 1994–1997 release cohort, more than half (59%) were not reimprisoned during the observation period (that is, by June 30, 2007). About one-fifth (19%) of this release cohort were reimprisoned only once during the observation period. This proportion decreased with increasing frequency of reimprisonment. Around 6% of the group were reimprisoned four or more times during the observation period.

5.1 Distribution of reimprisonment frequency for the 1994–1997 release cohort



Distribution of previous offence types

‘Previous offence’ refers to the offence related to the episode of imprisonment from which a prisoner was released during 1994–1997. Large proportions of people in the 1994–1997 release cohort had a previous offence in acts causing injury (16%) and burglary (15%). Theft and illicit drug offences were also common categories accounting for the offences of the previous imprisonment (both around 11%). On the other hand, very small numbers of released prisoners were previously jailed for a most serious offence of public order offences or weapons offences (both less than 1%).

5.2 Distribution of previous offence types in the 1994–1997 release cohort

<i>Previous offences</i>	<i>Proportion (a)</i>
Homicide (b)	3.1%
Acts causing injury	15.9%
Sexual assault	8.8%
Robbery	9.3%
Burglary	14.9%
Theft	11.1%
Deception	5.7%
Illicit drug offences	10.7%
Weapons offences	0.3%
Property damage	1.7%
Public order offences	0.6%
Road traffic offences	8.6%
Offences against justice	8.2%
Miscellaneous	1.0%
Total number (c)	28,584

(a) Proportions are calculated with people with ‘unknown’ previous offence types excluded.

(b) Because of the coding errors in the dataset, the estimation for people with homicide is not highly reliable and should be used with caution.

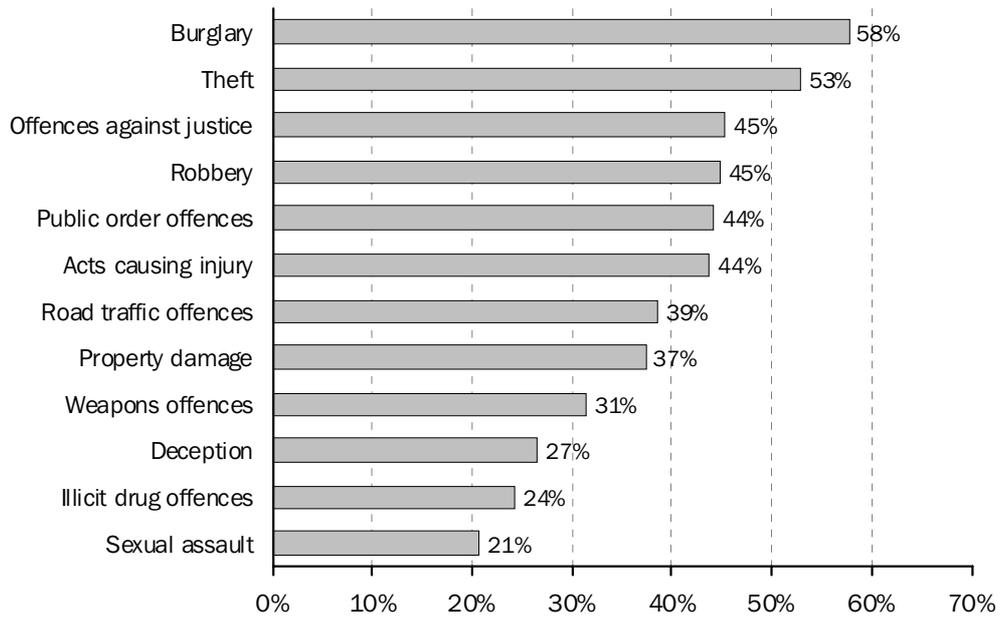
(c) Total number includes people with ‘unknown’ previous offence types.

5.2 Specialisation by offence type

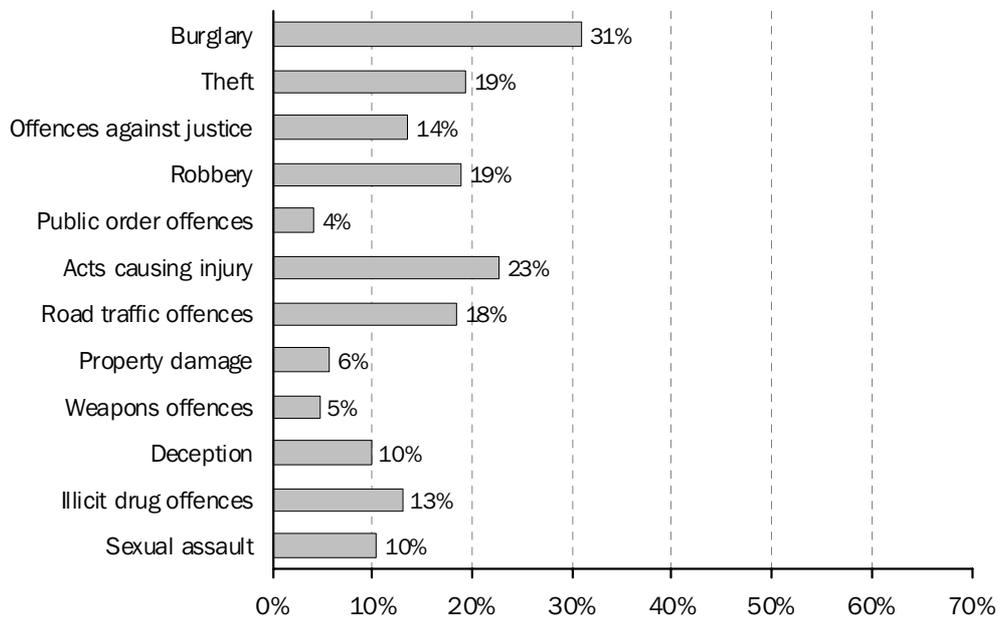
In criminological literature, the question of whether or not offenders tend to specialise in certain offence types has drawn persistent interest. This is often addressed by investigating the volume of prisoners being reimprisoned for the same or related offences. In this paper, we seek to answer this question by examining offence types that have high rates of reimprisonment for the same offence, or other similar offence types.

The reimprisonment rate varies considerably among people with different offence types. Members of the 1994–1997 release cohort who were previously imprisoned for burglary or theft had the highest reimprisonment rates, with more than half (58% and 53%, respectively) reimprisoned within the ten year observation period. At the other end of the spectrum, people whose previous offence was illicit drug offences or sexual assault had the lowest reimprisonment rates (24% and 21% respectively).

**5.3 General reimprisonment rates by 30 June 2007, by previous offence type
1994–1997 release cohort**



**5.4 Same-offence reimprisonment rates by 30 June 2007, by previous offence type
1994–1997 release cohort**



Members of the 1994–1997 release cohort whose previous offence was burglary were the most likely to be reimprisoned for the same offence at some time in the observation period (31%). The second highest rate of reimprisonment for the same offence was 23% among those who were imprisoned for acts causing injury, followed by robbery (19%) and road traffic offences (18%).

To assess specialisation, for each offence type we examine the ratio of reimprisonment for the same offence to total reimprisonment. From figure 5.4 we observe that 58% of people in the 1994–1997 release cohort after imprisonment for burglary were subsequently reimprisoned for some offence during the observation period. In particular, 31% were reimprisoned at least once for burglary. That is, of the people who were reimprisoned after an episode of imprisonment for burglary, just over half (54%) were reimprisoned for the same offence (table 5.5).

5.5 Reimprisonment by previous offence type, prisoners with no prior imprisonment vs prisoners with prior imprisonment in the 1994–1997 release cohort

Offence types	Total reimprisoned (%)			Reimprisoned for same offence / Total reimprisoned (%)		
	Prior imprisonment			Prior imprisonment		
	No (a)	Yes (b)	Total (c)	No (a)	Yes (b)	Total (c)
Acts causing injury	29	54	44	44	54	52
Sexual assault	12	36	21	61	44	50
Robbery	32	54	45	43	42	42
Burglary	45	63	58	53	54	54
Theft	38	60	53	31	38	36
Deception	15	42	27	41	35	37
Illicit drug offences	18	35	24	60	48	54
Weapons offences	17	45	31	n.p.	n.p.	15
Property damage	23	48	37	9	18	15
Public order offences	32	51	44	n.p.	n.p.	9
Road traffic offences	28	44	39	44	48	48
Offences against justice	34	51	45	29	30	30
Total (d)	27	52	41	45	45	45

n.p. not published due to small numbers involved in the calculation.

(a) Prisoners with 'no prior adult imprisonment' recorded with their first observed episode.

(b) Prisoners with 'prior adult imprisonment' recorded with their first observed episode.

(c) Including prisoners whose prior imprisonment information was not recorded with their first observed episode.

(d) Total of the listed offence types only. Those with unknown offences or 'miscellaneous' offences are excluded.

Similarly, acts causing injury, road traffic offences, illicit drug offences and sexual assault showed high rates of reimprisonment for the same offence.

The lowest ratios of same offence to total reimprisonment, and in a sense the lowest degrees of specialisation, were found for public order offences (9%), weapons offences and property damage (both around 15%). These low ratios were driven by low rates of reimprisonment for the same offence despite relatively high rates of total reimprisonment. In particular, total reimprisonment by people who had served a sentence for public order offences was 44%, the fifth ranked of all offence types. Only 4% of this group, however, were subsequently reimprisoned for public order offences as their most serious offence.

Prisoners with no prior imprisonment

Table 5.5 also compares reimprisonment characteristics of prisoners with no prior imprisonment (also referred to as first-time prisoners) with those of prisoners with prior imprisonment (also referred to as repeat prisoners). As noted above, those with prior imprisonment are more likely than first-time prisoners to be reimprisoned. For the offences presented in the table, the total reimprisonment rate for repeat prisoners was about twice that for first-time prisoners (52% compared with 27%). However, the overall degree of specialisation (the ratio of reimprisonment for the same offence to total reimprisonment) was the same for both groups (45%).

Prisoners with no prior imprisonment broadly had a similar pattern of overall reimprisonment by offence type to those with prior imprisonment, albeit at lower levels. For both groups, relatively high rates of reimprisonment followed release from burglary, theft and robbery. Other offences associated with higher reimprisonment were offences against justice and public order offences. Offences with lower proportions of people reimprisoned following release were illicit drug offences, weapons offences, deception and sexual assault. Whereas overall repeat prisoners were about twice as likely as first-time prisoners to be reimprisoned following release, they were around three times more likely to be reimprisoned after release from sexual assault (36% compared with 12%) or deception (42% compared with 15%).

While both first-time and repeat prisoners in the 1994–1997 release cohort showed the same overall level of specialisation, the level of specialisation differed by offence type. For first-time prisoners, the highest ratios of reimprisonment for the same offence to total reimprisonment were for sexual assault (61%) and illicit drug offences (60%), followed by burglary (53%). For repeat prisoners, the highest ratios were for burglary and acts causing injury (both 54%).

5.3 Offence type changes by repeat prisoners

In this section, we investigate patterns of changes in the most serious offences / charges of prisoners. Looking at prisoners by offence type, the previous section attempted to answer the question: “How many repeat the same offence?” In this section, we examine the complementary question: “If people are not reimprisoned for the same offence, what other offence types have they been reimprisoned for?”

Figure 5.6 aims to illustrate the possibility of being reimprisoned at least once for a certain offence type, for people with different previous offences. The size of each circle is proportional to the number of people reimprisoned for one offence sometime in the observation window, as a percentage of the 1994–1997 release cohort members with a certain previous offence. The numbers of the Australian Standard Offence Classification (ASOC) Divisions are used to denote the offence types.

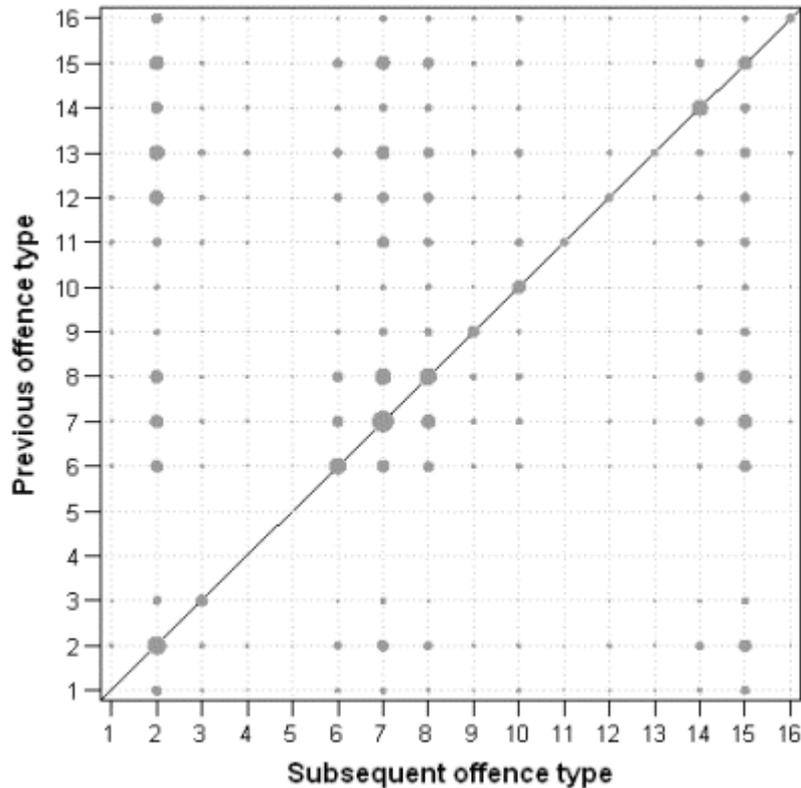
BOX 1: HOW TO READ FIGURE 5.6

The chart plotted in figure 5.6 represents the probability that a prisoner released during 1994–1997 would be reimprisoned for a particular offence given their previous offence type.

Previous offence types are shown along the vertical axis and offence types for reimprisonment in the observation period are shown along the horizontal axis. The size of the circles are proportional to the probability that a person previously imprisoned for an offence on the Y axis was, at some later date, reimprisoned for an offence on the X axis. For example, prisoners whose previous offence was ASOC code 8 (theft) were most likely to be reimprisoned for 8 (theft again), but 2 (acts causing injury), 6 (robbery) and 8 (burglary) were also common reimprisonment offences.

The horizontal axis measures the proportion of people reimprisoned by particular offence types in the observation period. People who had multiple reimprisonment episodes for different offence types will contribute to multiple circles on the same rows. On the other hand, some people were not reimprisoned in the observation period. In this case, these people do not contribute to any circle, although they are part of the denominator in calculating the probability. Therefore, the sum of circles in each row can be less than, equal to, or larger than 100%.

5.6 Reimprisonment rates (of each offence) of the 1994–1997 release cohort,
by previous offence type (a) (b)



Code	Abbreviated offence type (c)	Code	Abbreviated offence type (c)
01	Homicide	09	Deception
02	Acts causing injury	10	Illicit drug offences
03	Sexual assault	11	Weapons offences
04	Dangerous or negligent acts	12	Property damage
05	Abduction	13	Public order offences
06	Robbery	14	Road traffic offences
07	Burglary	15	Offences against justice
08	Theft	16	Miscellaneous

- (a) The reimprisonment rate of repeat homicide offenders is not presented because coding errors in the dataset could yield highly unreliable results.
- (b) There was no prisoner in the 1994–1997 release cohort whose previous offence was dangerous or negligent acts (04) or abduction (05).
- (c) Abbreviation of ASOC Division (see Appendix C for more detailed ASOC definition).

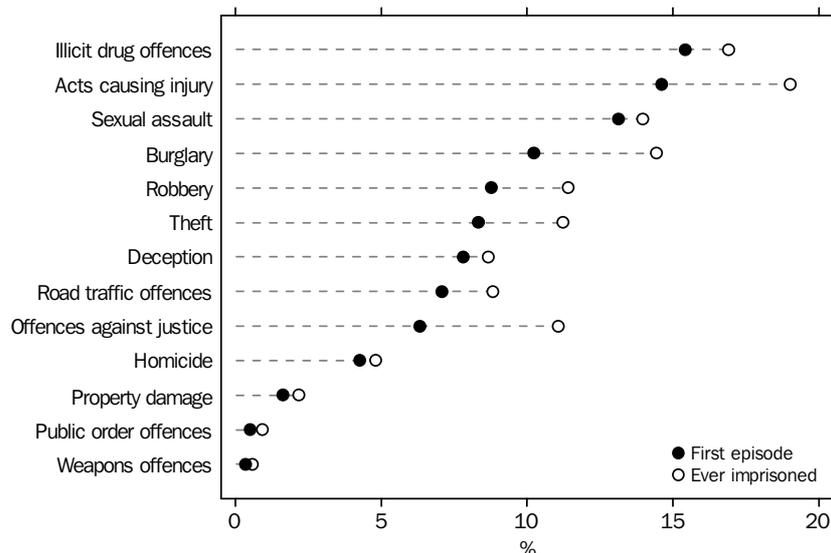
Mirroring the analysis in the previous section, the large bubbles along the diagonal for acts causing injury (2), robbery (6), burglary (7), theft (8), and road traffic offences (9), represent the high repeat imprisonment rates within these offence types. (The proportions are the same as those for repeat imprisonment for the same offence shown in figure 5.4).

The most striking feature of the dynamics of repeat imprisonment that can be observed in the bubble plot is that irrespective of their original offence, many repeat prisoners are reimprisoned for acts causing injury, robbery, burglary or theft (ASOC Divisions 2, 6, 7 and 8, respectively) at some stage. In figure 5.6, there are large sized bubbles along the vertical lines extending from these values along the range of previous offence types. These offences may then be assumed to be common types of offences, for which a large proportion of repeat offenders are imprisoned at least once in their lives.

Offenders also tend to be reimprisoned for offences against justice (ASOC Division 15) at some stage. This can be reasonably assumed as attributable to breaches of justice orders. For example, prisoners may be paroled, seriously breach the parole conditions, and then are returned to prison.

In contrast, offenders released from a prison episode for other offences are less likely to be reimprisoned for sexual assault, deception or illicit drug offences (ASOC Divisions 3, 9, and 10).

5.7 Offence type for first-time prisoners: First prison episode and ever imprisoned (a)



(a) By the end of the observation window (30 June 2007).

First-time prisoners

In order to assess the cumulative effect of the movement of people who were reimprisoned among different offence types, the growth from first episode offence rates to ever committed offence rates is examined over the ten year observation period. Looking at the distribution of first-time prisoners in the release cohort by their first offence, the highest proportions were incarcerated for illicit drug offences (just over 15%), acts causing injury (about 15%) and sexual assault (13%). In addition, there was a considerable proportion of prisoners who were incarcerated for burglary, robbery or theft (10%, 9% and 8% respectively).

By the end of the observation window, that is after a span of at least ten years, the proportion of prisoners for each offence type had increased due to people being reimprisoned for different offences. Note that the proportion for a particular offence will only increase when prisoners who began with a different offence type were subsequently reimprisoned for this offence and would not change if the first-time offenders were reimprisoned for the same offence.

By the end of the observation window, acts causing injury ranked first among offence types for which first-time prisoners from the 1994–1997 release cohort had ever been imprisoned. Almost one-fifth (19%) had been imprisoned for this offence at least once in the period 1994 to 2007. The next ranked offence types were illicit drug offences (17%), burglary (14%) and sexual assault (14%).

Therefore, over the observation period, there were relatively large increases for particular offences, such as acts causing injury, which increased by around four percentage points (from 15% for first imprisoned to 19% for ever imprisoned). In comparison, sexual assault increased by less than one percentage point. Robbery, burglary, and theft were also offences which had relatively large increases over the observation period. There were also increases in the prevalence of offences against justice. This is consistent with our previous observation that these offence types are common for all prisoners who were reimprisoned by June 30, 2007 (both first-time prisoners and repeat prisoners).

On the other hand, despite being relatively common offences for first prison episodes, only small increases were observed for sexual assault or illicit drug offences over the subsequent ten year period. It appears that few people who are first imprisoned for an offence other than sexual assault or illicit drug offences, subsequently were reimprisoned for these offences.

5.4 Summary

Our criminal career analysis has revealed different patterns of reimprisonment behaviour and specialisation for different offence types.

Burglary was ranked fourth among offence types for first-time prisoners in the 1994–1997 release cohort, behind illicit drug offences, acts causing injury and sexual assault. Burglary (and to some extent the related offences of robbery and theft ranked fifth and sixth) was associated with relatively high rates of reimprisonment overall. Prisoners showed a high degree of specialisation in these offences, and a high proportion of prisoners moved to these from other offence types.

As a consequence of movement to burglary from other offence types, burglary was ranked third, ahead of sexual assault, among offences for which the group of first time prisoners had been imprisoned at least once by the end of the observation period. Considering property offences combined, 27% of first time prisoners were released from a prison episode for burglary, robbery or theft in the reference period and ten years later, 32% had served at least one episode for one of these offences.

5.8 Ranking of selected offence types by characteristics of imprisonment

<i>Offence type</i>	<i>First-time imprisonment (a)</i>	<i>Reimprisonment – any offence</i>	<i>Reimprisonment – same offence</i>	<i>Reimprisonment – from other offence types</i>	<i>By end of reference period (b)</i>
Acts causing injury	High	Moderate	High	High	High
Sexual assault / Illicit drug offences	High	Low	High	Low	High
Burglary	Moderate	High	High	High	High
Offences against justice	Low	High	Low	High	Moderate

(a) Among offences by first-time prisoners released between July 1994 and June 1997.

(b) Among offences for which all first-time prisoners released between July 1994 and June 1997 had been imprisoned at least once by June 2007.

Acts causing injury was ranked second behind illicit drug offences as the most common offence type for first-time prisoners released in 1994–1997. Acts causing injury, while associated with moderate rates of reimprisonment overall, was characterised by high rates of specialisation and high rates of people moving to this from other offence types. By the end of the ten year observation period, acts causing injury was the highest ranked among individual offence types for which the group of first-time prisoners had served at least one prison episode.

Sexual assault and illicit drug offences had a different pattern of imprisonment. Both were ranked high among offence types for first-time prisoners, but had relatively low rates of overall reimprisonment or movement to these from other offence types.

Specialisation, however, was high. All of these factors combined meant that over the subsequent ten years, the pool of people who were imprisoned for sexual assault or illicit drug offences for their first prison episode did not increase greatly.

Nevertheless, for sexual assault, reimprisonment among people already serving their second or subsequent prison episode (36%) was three times higher than among first-time prisoners (12%).

Offences against justice had a different pattern again, with a relatively low ranking among the first-time prisoners but a high rate of overall reimprisonment and high movement to this offence from other offence types. Specialisation was low. Offences against justice, such as breaking parole, are the cause of imprisonment for many prisoners over the course of their criminal career, but it appears to occur sporadically and without a high degree of repetition.

6. CONCLUSION

In this paper, we examined factors associated with repeat imprisonment and looked at how different offences are associated with reimprisonment behaviour (referred to as criminal careers or pathways). To do this we expanded on a previous ABS study on this topic (Rawnsley 2003), drawing on a 14 year time series constructed from the National Prisoner Censuses from 1994 to 2007.

As well as demonstrating that a high rate of reimprisonment was associated with particular characteristics of prisoners, the multivariate regression techniques used in this paper showed that jurisdictional differences in observed reimprisonment rates are to some extent influenced by the demographic characteristics of the jurisdictions. In addition, variation in the propensity for reimprisonment among the jurisdictions could also be influenced by differences not represented in the model, such as their sentencing practices. Future research could investigate state and territory differences in the administration of justice and the extent to which these differences influence reimprisonment rates.

In this paper, statistics have also been presented on general reimprisonment rates, same offence reimprisonment rates (i.e. career specialisation), and movement among offence types by repeat offenders. This array of statistics can be combined and permuted to create a large amount of information about 'criminal careers'. While a detailed description of all offence types is beyond the scope of this paper, it is hoped that the examination of the major offence types presented here will be of value to policy makers, researchers, and general readers. The ABS welcomes comment on the methodology and results, and suggestions for future analysis of the data.

ACKNOWLEDGEMENTS

The authors would like to thank the following people, who provided comments on the work reported in this paper: Dr Robert Graham Clark of the Centre for Statistical and Survey Methodology, University of Wollongong; and Peter Rossiter, Joanne Baker, Pramod Adhikari, Soula Macfarlane and Fiona Dowsley of the ABS. Finally, we wish to thank Richard Lund of the ABS for providing data and subject matter knowledge on the Prisoner Census.

REFERENCES

- Afifi, A.; Clark, V.A. and May, S. (2004) *Computer-Aided Multivariate Analysis*, Fourth Edition, Chapman & Hall/CRC.
- Australian Bureau of Statistics (2008a) *Australian Historical Population Statistics, 2008*, cat. no. 3105.0.65.001, ABS, Canberra.
- (2008b) *Prisoners in Australia, 2008*, cat. no. 4517.0, ABS, Canberra.
- (2009) *Prisoners in Australia, 2009*, cat. no. 4517.0, ABS, Canberra.
- Hosmer, D.W. and Lemeshow, S. (2000) *Applied Logistic Regression*, Second Edition, John Wiley & Sons, Inc..
- Rawnsley, T. (2003) “Dynamics in Repeat Imprisonment: Utilising Prison Census Data”, *Working Papers in Econometrics and Applied Statistics*, 2003–02, Australian Bureau of Statistics, Canberra.

APPENDIXES

A. REASONS FOR, AND PROCESSES INVOLVED IN, DATA CLEANING ON PRISONER IDS AND RECEPTION DATE

<i>Data item</i>	<i>Prisoner ID</i>	<i>Reception date</i>
Role in the analysis	Key data item to link the same prisoner's information and construct the longitudinal dataset.	Key data item to determine if several records of the same prisoner belong to the same imprisonment episode.
Issues in original data	The coding format in some jurisdictions changed across years, due to jurisdictions' information system updates. Documentation for these changes is not available.	Some records had a reception date earlier than the most recent census date of a previous episode for the same prisoner. This poses a logic error because a prisoner cannot be reimprisoned before he / she is released from a previous episode. If left unchanged, around 5% of the prison episodes Australia-wide, including 16% in Queensland, would have contained such an error.
Impact if left unchanged	Its inconsistency would prevent prisoners' later imprisonment from being considered together with a previous one, and therefore lead to underestimation of reimprisonment.	This could lead to misclassification of a single prison episode into multiple episodes, which in turn might lead to overestimation of reimprisonment.
Data cleaning method	A linkage by date of birth, sex, and the appearance of a same three-digit combination in Prisoner IDs was conducted to establish knowledge of the rules for coding changes. Other data items (reception date, aggregate sentence length, and conviction date) were also used to assess the possible rules. Based on the rules, relevant Prisoner IDs were recoded to a time consistent format.	The cleaning rule was developed under the assumption that information recorded in a later year is always more reliable than an earlier one, attributed to data collectors' continuous quality assurance work. If the reception date of a record was found to be contradictory to the same person's previous census appearance date, the reception date recorded in the later year was used to replace the reception date of the apparently previous episode. This cleaning rule could not rectify all the data errors in the reception data. However, it has cleaned the internal logic errors of reception date, and made the dataset internally consistent for analysis.

B. SELECTED PRISONER CENSUS DATA ITEMS

<i>Variable</i>	<i>Missing value rate (%)</i>	<i>Inconsistent variables (a) (%)</i>	<i>Additional comments</i>
Variables whose values should remain constant all the time			
Date of birth	0.01%	1.79%	This data item is occasionally missing as offenders may only be in prison for a short time (e.g. overnight) and the information is not collected. Inconsistencies can occur due to inaccurate information being recorded initially, or programming changes.
Sex	0.00%	0.02%	
Indigenous status	0.00%	1.13%	Although Indigenous status relies on self-identification, and may vary over time, the data quality should be good. Main factors affecting quality are: (i) the way in which Indigenous status is collected, and (ii) system / programming inconsistencies in mapping local codes to Prisoner Census codes. If there was a change in Indigenous status between: <ul style="list-style-type: none"> · Aboriginal, · Torres Strait Islander, and · Aboriginal and Torres Strait Islander the variable was still considered constant.
Variables whose values should remain constant in the same episode			
Prior imprisonment	0.00%	2.64% (b) 2.40% (c) 4.16% (d)	Since 2004 a particular emphasis has been placed on the editing of this variable, particularly in terms of consistency between consecutive prisoner censuses. Inconsistencies can still occur due to system or program changes. For example, 2005–2007 New South Wales data has inconsistencies due to system issues. Queensland data was imputed for 2006 & 2007 based on the average proportion with prior imprisonment for 2003–2005.

Notes:

- (a) Variable values that change between 'unknown' and a specific category are deemed constant.
- (b) Percentage of prisoners with inconsistent prior imprisonment values within one episode.
- (c) Percentage of prisoners with contradictory prior imprisonment information between episodes, based on the latest record in each episode.
- (d) Percentage of prisoners with questionable prior imprisonment information, including both (b) and (c).

C. AUSTRALIAN STANDARD OFFENCE CLASSIFICATION

C.1 Australian Standard Offence Classification

<i>Code</i>	<i>Division / Subdivision (a)</i>	<i>Abbreviation in this paper</i>
01	Homicide and related offences Murder Conspiracies and attempts to murder Manslaughter and driving causing death	Homicide
02	Acts intended to cause injury Assault Other acts intended to cause injury	Acts causing injury
03	Sexual assault and related offences Sexual assault Non-assaultive sexual offences	Sexual assault
04	Dangerous or negligent acts endangering persons Dangerous or negligent operations of a vehicle Other dangerous or negligent acts endangering persons	Dangerous or negligent acts
05	Abduction and related offences Abduction and kidnapping Deprivation of liberty / False imprisonment	Abduction
06	Robbery, extortion and related offences Robbery Blackmail and extortion	Robbery
07	Unlawful entry with intent / Burglary, break and enter Unlawful entry with intent / Burglary, break and enter	Burglary
08	Theft and related offences Motor vehicle theft and related offences Theft (except motor vehicles) Receiving or handling proceeds of crime Illegal use of property (except motor vehicles)	Theft
09	Deception and related offences Fraud, forgery or false financial instruments Counterfeiting currency and related offences Dishonest conversion Bribery Other deception offences	Deception

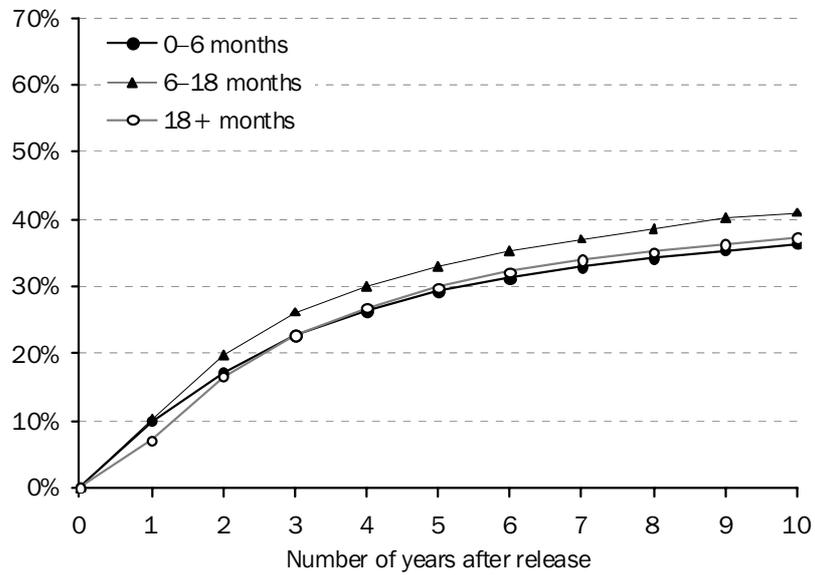
C.1 Australian Standard Offence Classification (continued)

<i>Code</i>	<i>Division / Subdivision (a)</i>	<i>Abbreviation in this paper</i>
10	Illicit drug offences Import or export illicit drugs Deal or traffic in illicit drugs Manufacture or cultivate illicit drugs Possess and / or use illicit drugs Other illicit drug offences	Illicit drug offences
11	Weapons and explosive offences Prohibited weapons / Explosives offences Regulated weapons / Explosives offences	Weapons offences
12	Property damage and environmental pollution Property damage Environmental pollution	Property damage
13	Public order offences Disorderly conduct Regulated public order offences	Public order offences
14	Road traffic and motor vehicle regulatory offences Driving licence offences Road vehicle registration and road worthiness offences Regulatory driving offences Pedestrian offences	Road traffic offences
15	Offences against justice procedures, government security and government operations Breach of justice order Other offences against justice procedures Offences against government security Offences against government operations	Offences against justice
16	Miscellaneous offences Harassment and related offences Public health and safety offences Commercial / Industry / Financial regulation Other miscellaneous offences	Miscellaneous

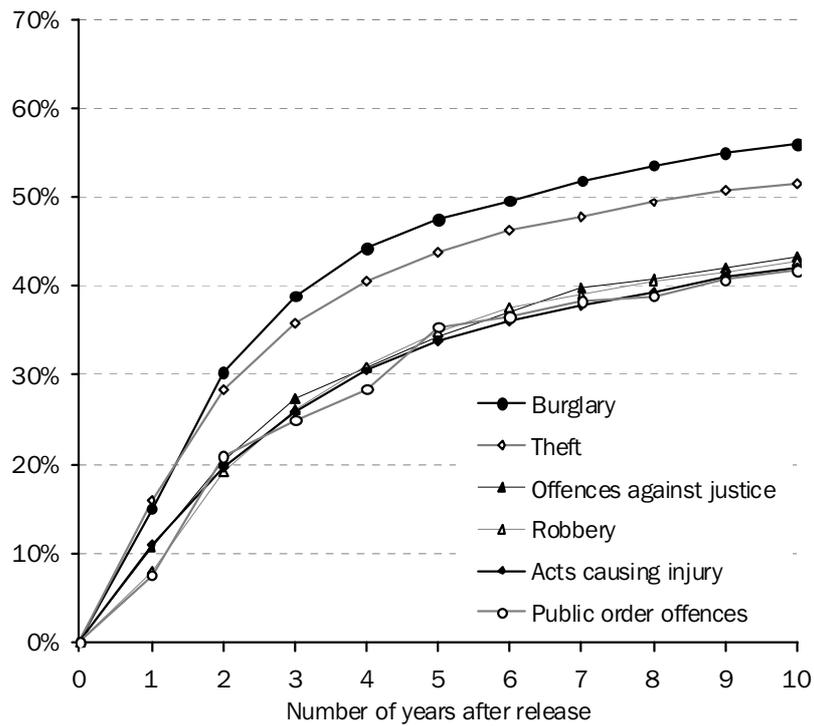
(a) *Australian Standard Offence Classification, 1997* (ABS cat. no. 1234.0)

D. REIMPRISONMENT TENDENCY BY POTENTIALLY ASSOCIATED FACTORS, BASED ON THE RELEASE COHORT

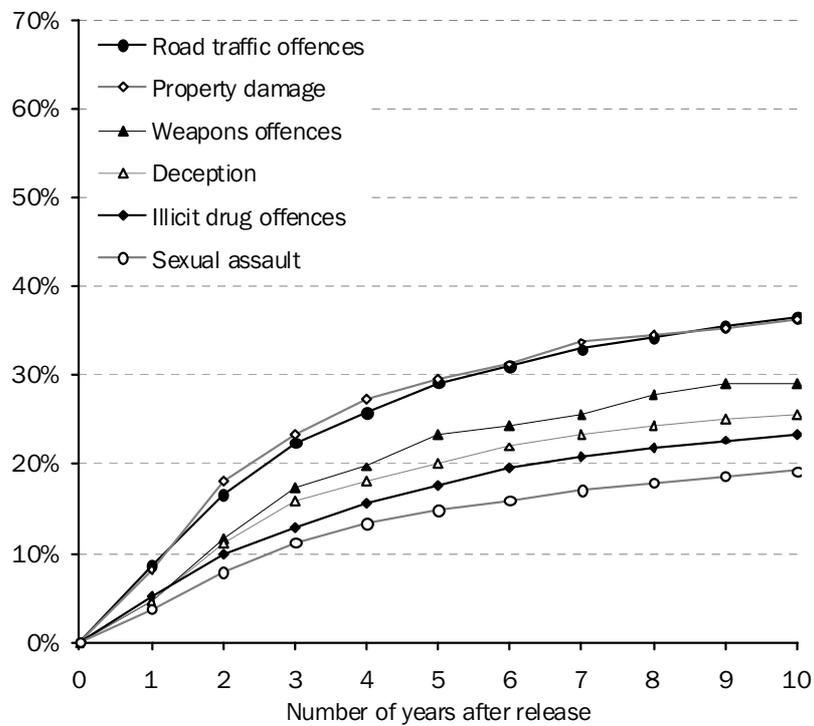
D.1 Reimprisonment rates by time to first reimprisonment and length of original prison episode



D.2 Reimprisonment rates by time to first reimprisonment and original offence type



D.2 Reimprisonment rates by time to first reimprisonment and original offence type (cont.)



E. METHODOLOGY AND INTERPRETATION OF THE LOGISTIC REGRESSION MODEL

E.1 Logistic regression model

Logistic regression is used to model the relationship between a response variable that is binary in nature and a set of explanatory variables. The objective in logistic regression is to model the probability of an event of interest. It is applicable when the response variable has only two values such as yes or no, success or failure, dead or alive, having a disability or not having a disability.

The model is generally expressed in terms of the natural log of the odds of the event.

$$\log\left(\frac{P(Y=1)}{1-P(Y=1)}\right) = \beta_0 + \beta_1 X_1 + \dots + \beta_k X_k \quad (1)$$

where $P(Y=1)$ is the probability of the event occurring, β_0 is the intercept term, β_1, \dots, β_k are the regression coefficients, and X_1, \dots, X_k are the explanatory variables. Logistic regressions are conducted using the Maximum Likelihood Estimation (MLE) approach, as available in most statistical software packages.

E.2 Model and variables used in this study

The event of interest in this logistic model is ‘whether a prisoner was reimprisoned within three years of release’. This is captured by the response variable. Explanatory variables of the model include all the variables discussed in the descriptive analysis part, together with the ‘release period’.

E.3 Interpretation of logistic regression results

There are two critical concepts in understanding logistic regression results:

1. Odds

The odds of an event are the ratio of the probability of the event happening to the probability of it not happening. For example, if the reimprisonment probability for a group of prisoners is 0.2 then their odds of reimprisonment is $0.2 / (1-0.2)$ or 0.25. Higher odds suggest a higher chance of occurrence.

2. Odds ratio

By name, odds ratio means the odds of an event happening among one group divided by odds of another group. In logistic regression results, the odds ratio and its confidence interval are measures of how an individual variable will affect the occurrence of the target event, while assuming other variables always take the same values. If the interval does not include one, this suggests the subjects of the two groups differ in terms of the likelihood that the modelled event will happen to them. Otherwise, we can not see the difference between the two groups from the data under study.

EXAMPLE ON HOW TO INTERPRET ODDS RATIOS AND THEIR CONFIDENCE INTERVALS

The odds ratio of Male vs Female in table 4.7 is 1.50. This means for male and female offenders of the same age, Indigenous status, geographic location, etc., the odds of males to return to prison within three years of release are 1.50 times those of females. The confidence interval [1.37, 1.65] is above one, suggesting males are significantly more likely to be reimprisoned than females. If the confidence interval contained the number one, it would suggest that gender does not make a significant difference in deciding offenders' reimprisonment tendency. On the other hand, if the confidence interval fell below the number one, it would suggest males have a significantly lower reimprisonment tendency than females.

There is always a 'base level' involved in calculating odds ratios for categorical variables. In this study, for categorical variables with only two possible values, we randomly choose one value as the 'base level'. For categorical variables with more than two values, we create an 'average level' whose odds are the geometric average odds for different levels. This 'average level' is then used as the 'base level'. Consequently, the odds ratios resulted from this process can be viewed as the difference between the odds between a particular group and an 'average' odds of all the groups.

Further technical details of logistic regression can be found in, for example, Hosmer and Lemeshow (2000) and Afifi *et al.* (2004).

E.1 Variables in the logistic model

Response variables

Whether reimprisoned within three years of release? (three year model)

Yes

No

Whether reimprisoned within ten years of release? (ten year model)

Yes

No

Explanatory variables

Age

17–19 years

20–24 years

25–29 years

30–34 years

35 years and over

Indigenous status

Indigenous

Other

Prior imprisonment

Has prior imprisonment

No prior imprisonment

Sex

Male

Female

Length of previous prison episode

0 to less than 6 months

6 to less than 18 months

18 months or longer

Jurisdiction

New South Wales / ACT

Victoria

Queensland

South Australia

Western Australia

Tasmania

Northern Territory

Previous offence

Acts causing injury

Sexual assault

Robbery

Burglary

Theft

Deception

Illicit drug offences

Weapons offences

Property damage

Public order offences

Road traffic offences

Offences against justice

Miscellaneous

Interaction variable (only in the three year model)

Jurisdiction × Release period

There are two Release periods: 1994–1997 and 2001–2004

F. SCOPE OF THE PRISONER CENSUS

This section is taken from *Prisoners in Australia* (ABS, 2009: pp. 65–66).

The scope of the Prisoner Census includes all persons remanded or sentenced to adult custodial corrective services agencies in each state and territory in Australia.

Included in the National Prisoner Census are prisoners in the legal custody of corrective services but who, at the time of the census, were:

- absent on an authorised temporary leave permit
- absent from the correctional facility on a work release permit or program
- located in secure wards in a hospital outside the correctional facility
- periodic detainees.

Excluded from the collection are:

- prisoners who were unlawfully absent from corrective services legal custody, e.g. escapees or prisoners who failed to return from an authorised temporary absence from a correctional facility
- prisoners whose legal custody had been transferred to another agency, e.g. police or mental health institutions.

The count of periodic detainees covers the number of persons with an active periodic detainee warrant. However, periodic detainees who have breached orders may be excluded. From 2006, Australian Capital Territory data excludes breaches of orders greater than three months.

The scope of the statistics in this publication includes all persons remanded or sentenced to adult custodial corrective services agencies in each state and territory in Australia.

The types of correctional facilities and programs where prisoners are held varies between the states and territories.

Included in the collection are:

- gazetted adult prisons in all jurisdictions
- periodic detention centres in New South Wales and the Australian Capital Territory
- community custody centres and work camps in Queensland
- cells in court complexes administered by corrective services in New South Wales
- transitional centres in New South Wales
- lock-ups in Western Australia operated by the police but designated as a prison by the Chief Executive Officer of Corrective Services
- gazetted police prisons in the Northern Territory which are administered and controlled by the Director of Corrective Services.

Excluded from the collection are persons held in facilities administered and controlled by other agencies:

- police lock-ups, police prisons and cells in court complexes
- immigration detention centres
- home detention programs
- military prisons
- mental health facilities
- juvenile facilities, including those under the authority of adult corrective services.

FOR MORE INFORMATION . . .

INTERNET **www.abs.gov.au** the ABS website is the best place for data from our publications and information about the ABS.

INFORMATION AND REFERRAL SERVICE

Our consultants can help you access the full range of information published by the ABS that is available free of charge from our website. Information tailored to your needs can also be requested as a 'user pays' service. Specialists are on hand to help you with analytical or methodological advice.

PHONE 1300 135 070

EMAIL client.services@abs.gov.au

FAX 1300 135 211

POST Client Services, ABS, GPO Box 796, Sydney NSW 2001

FREE ACCESS TO STATISTICS

All statistics on the ABS website can be downloaded free of charge.

WEB ADDRESS www.abs.gov.au