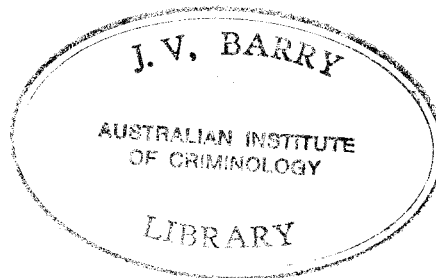




# **Mortality and Morbidity in prisoners after release from prison in Western Australia 1995-2003**

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## **Acknowledgements**

This study was supported by a grant from the Criminal Research Council of Australia. The Unit of Clinical Epidemiology is supported by a grant from the Department of Health of Western Australia. Additional financial support for the study was provided by the Department of Justice of Western Australia.

We wish to thank the Department of Health and Department of Justice for allowing us access to the information required for the study. Data-linkage for the study was undertaken by the Data Linkage Unit in the Health Information Centre in the Department of Health.

We wish to thank the many people who provided us with helpful comments on the manuscript. The ideas expressed in the report are however attributable entirely to the authors of the study.

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## **1. Summary of principal findings and conclusions**

The purpose of the study was to describe the health problems experienced by prisoners after release into the community to provide information to guide preventative and clinical services for this vulnerable group of individuals.

Through the linkage of selected information relating to individual prisoners from Department of Justice (DoJ) records and health data extracted from the Western Australian Data Linkage System (WADLS) maintained by the Department of Health, we described and compared the risk of death, hospitalisation and contact with Mental Health Services (MHS) in ex-prisoners and in the general population of Western Australia. We also described hospitalisation and MHS contacts in the five years before the first release from prison.

### **1.1 The study cohort**

1. The study included 13,667 individuals who were released from prisons in Western Australia in the six years 1995-2001 inclusive. Subjects were followed for a minimum period of two years (to the end of 2003). The average time of follow-up in the community, excluding further spells in prison, was 4.61 years.
2. Male offenders greatly outnumbered female offenders who comprised only 11.7% of the total. Aboriginal offenders comprised 36.1% of the cohort. The detailed composition of the cohort was female Aboriginal prisoners: 6.3%; male Aboriginal prisoners: 29.8%; female non-Aboriginal prisoners: 5.4%; male non-Aboriginal prisoners: 58.5%.
3. The age of subjects at the date of first release ranged from 16 years to 87 years, with a mean age 30 years and median of 28 years. The median age of female and male non-Aboriginal prisoners was 29 years compared with 27 years in female and male Aboriginal prisoners. Members of the study cohort underwent a total of 28,439 imprisonments of which 29.5% were first imprisonments. The number of times individual prisoners were released during the study period ranged from one to 20 with the majority (56.9%) of prisoners being released once only. This varied from 73.0% in female non-Aboriginal prisoners, to 65.3% in male non-Aboriginal prisoners, 56.0% in female Aboriginal prisoners and 38.2% in male Aboriginal prisoners. The mean number of releases in all prisoners was 2.0 per person, but was higher in Aboriginal prisoners (2.07 and 2.76 for females and males, respectively) than in non-Aboriginals (1.61 and 1.78 for females and males, respectively).

## 1.2 Mortality after release from prison

1. Ex-prisoners living in the community were found to have substantially higher risks of death than the general population after adjustment for age. These differences were particularly large in those under 30 years of age and were greater in females than males. In female prisoners under 30 years of age the risk of death was over eight times greater than in the general population. In male prisoners it was five times greater in Aboriginal males and four times greater than in the general population.
2. In general, the greatest differences between the risk of death in prisoners and the general population occurred in Aboriginal prisoners, but the differences were less when Aboriginal prisoners were compared with the Aboriginal population of Western Australia, reflecting the higher death rates in Aboriginal people in Western Australia compared with the non-Aboriginal population. Especially notable was the 12-fold risk of death in female non-Aboriginal prisoners aged 20-39 years when compared with non-Aboriginal women in the general population of the same age.
3. Deaths due to injury or poisoning or acute and chronic effects of alcohol or drug addiction accounted for over 60% of all deaths and were therefore likely to account for much of the excess risk in mortality in released prisoners.
4. The risk of death was related inversely to time from the date of first release from prison, being nearly four times greater in the first six months after first release than after one year. In the case of deaths related to alcohol and drug addiction, the risk of death in the first six months was 11 times greater than after one year, while for injury and poisoning it was nearly five times greater in the first six months than after one year. In contrast, the risk of death in the first six months for all other conditions combined was less than two times greater than after one year. This temporal relationship supports the suggestion that the excess mortality in prisoners was due principally to deaths from injury and poisoning or the effects of alcohol and drug addiction.
5. Multivariate analysis of risk factors for deaths in all released prisoners found that the risk of death increased with age and was significantly higher in Aboriginal prisoners and in multiple offenders. In multiple offenders the risk of death was nearly twice as great as in first offenders. The risk of death was also found to increase by 29% following each additional release.

### **1.3 Morbidity after release from prison**

Variations in the probability of hospitalisation or MHS contacts after the date of first release were found to be similar in many respects to those for mortality. For example:

1. Released prisoners had substantially higher hospital admissions rates or contacts with the MHS than the general population after adjusting for age. Rates of hospitalisation in male and female Aboriginal prisoners were three times higher than in the general population of the same age and sex. In non-Aboriginal prisoners, rates of hospitalisation were nearly twice expected rates in those aged 20-39 years and about 50% greater in those aged 40-49 years.
2. In general, the greatest differences in morbidity in prisoners and the general population were seen in Aboriginal prisoners, but when compared with their respective Aboriginal or non-Aboriginal populations of Western Australia, the difference between Aboriginal and non-Aboriginal prisoners was reduced. This reflects the higher rates of hospital admissions in Aboriginal people generally, when compared with the non-Aboriginal population of Western Australia.
3. The relative risk of hospitalisation was highest for Injury and Poisoning and Mental disorders (including acute and chronic effects of alcohol and drug addiction). These disorders were also among the commonest conditions leading to hospitalisation or MHS contacts. In the five years after first release, 31% of Aboriginal women and 24% of non-Aboriginal women had at least one hospital admission or MHS contact for mental disorders. In male prisoners the respective proportions were 19% and 17%. In the case of admissions for injury, 38% of Aboriginal female prisoners and 31% of male Aboriginal prisoners had at least one hospital admission. For non-Aboriginal prisoners the respective figures were 12% and 16%.
4. In addition to Injury and Poisoning and Mental disorders, Aboriginal prisoners had high relative and absolute risks of hospitalisation for a wide range of health problems including Infectious and Parasitic disease, Endocrine, Cardiovascular, Respiratory and Skin diseases.
5. The risk of first health service contacts after the date of first release was greatest in the first year after admission and then progressively decreases with time up to six years after release. Nearly half of all female Aboriginal prisoners and 35% of female

non-Aboriginal prisoners were admitted to hospital at least once in the first year after first release. For male prisoners the respective figures were 24% and 19%.

6. Hospital admissions and MHS contacts after release occur more frequently in multiple offenders than in first offenders. Prisoners who subsequently re-offend also had higher hospital admission rates and contacts with MHS before imprisonment, particularly for Mental problems or Injury and Poisoning. This tendency was greater in non-Aboriginal prisoners than Aboriginal Health service contacts for mental health problems and Injury or Poisoning before first release were strongly predictive of health service contacts for the same conditions after release.

#### **1.4 Morbidity before imprisonment**

In addition to the observations on morbidity following release from prison described above, we found that levels and patterns of morbidity in the five years before the date of first release were similar to those after release over approximately the same time (average follow-up period of 4.61 years).

1. The percentage of prisoners affected by different conditions before and after first release from prison were similar, as were variations by gender and Aboriginality.
2. Hospital admission or MHS contact before first release was strongly predictive of morbidity after release; prisoners who had hospital admissions or MHS contacts in the five years before release were nearly twice as likely to have had such contacts after release. Prisoners who had admissions or MHS contacts for poisoning before first release were five times more likely to have such contacts after release, compared with other prisoners, while prisoners who had admissions for injury or mental problems before release were twice as likely to have such admissions after admission.
3. Multiple offenders had higher levels of morbidity prior to imprisonment. This was greater in non-Aboriginal prisoners (both males and females) than in Aboriginal prisoners and was particularly marked for Injury and Poisoning and Mental disorders.

#### **1.5 Conclusions**

Our study has several policy implications relating to the provision of preventive and clinical services for released prisoners and has identified areas in which further research is required.

With regard to policy implications, four issues stand out:

i) Prisoners are at substantially greater risk of death and illness leading to hospitalisation and contact with MHS than the general population. They also have higher levels of hospitalisation and contacts with MHS in the five years prior to the date of their first release, suggesting that many of their health problems are long-standing and related to social disadvantage throughout life. This is consistent with evidence linking both poor health status and criminal behavior to social disadvantage. Success in reducing ill-health in prisoners will ultimately depend on reducing the same social inequalities that lead to offending behaviour.

ii) Mental problems, including addictive behaviour and consequent injury and poisoning, are a major cause of death and morbidity in released prisoners. There is also a strong link between these conditions and re-offending. The successful management of such problems requires appropriate assessment and treatment of mental disorders during imprisonment as well as measures to ensure continuity of care after release into the community.

iii) Aboriginal prisoners are particularly at risk of death and hospitalisation from a wide range of acute and chronic health disorders. In addition to reducing social disadvantage that leads to chronic diseases, the health problems of Aboriginal prisoners need to be addressed through culturally appropriate health services. Wherever possible this should involve the participation of Aboriginal Medical Services.

iv) While female prisoners account for only 11% of prisoners, they have extensive health problems, including gynaecological disorders, that require special attention. It is important however, to recognise the different needs of Aboriginal and non-Aboriginal women.

The study has identified areas where further research is required using the current linked data set. The most important of these are:

v) To describe in more detail the spectrum of mental health problems in prisoners and hence assess requirements for formal management by MHS.

vi) To undertake regional studies to assess in greater detail the nature of medical problems in Aboriginal prisoners released in different locations.

vii) To describe more fully patterns of illness in prisoners in early life

viii) To examine the extent of discrepancies in assigning Aboriginality in Health Department and Department of Justice records.



## 2 Introduction

The difficulties facing ex-prisoners after release into the community are many. They include problems relating to housing, employment and gaining access to appropriate supportive services.(1) Released prisoners are widely recognised as having poor health compared with members of the general population. Access to health services in general and maintaining continuity with treatment programs that may have been initiated while in prison may thus be particularly important. Several previous studies, including a recent study in Western Australia, have shown that released prisoners or those serving community correction orders are at greater risk of death compared with the general population, particularly in the first few months after release.(2-13)

Many have described the relatively poor health of prisoners during imprisonment. These have emphasised high prevalences of mental disorders, addictive behaviours and infectious diseases including HIV-AIDS, hepatitis C and tuberculosis (TB).(14-20). Other studies have described the difficulties in obtaining compliance with medication for long-term medical problems after release from prison.(1, 16, 21-23)

Fewer studies have been able to examine the extent of non-fatal illness in prisoners following release into the community as there are few jurisdictions in which it is possible to link information from the criminal justice system to health records. One study in Finland, which linked information from the 1966 birth cohort to the Finnish National Hospital Discharge Register to the National Crime Register, demonstrated increased rates of injury in male offenders and of poisoning in female offenders compared with non offenders. In Western Australia linkage of Department of Justice data to the State Mental Health register has been used to study the relationship between drug abuse, schizophrenia and a history of offending.(24). We are unaware, however, of previous studies that have systematically documented use of the health services by representative cohort of prisoners after release or factors that may influence this such as previous health status or recidivism.

In Western Australia this is possible because of the development of the Western Australian Data Linkage Study (WADLS). The WADLS enables data extracted from the major statistical health collections in Western Australia, including hospital separation abstracts, the MHS Register and Death records to be linked for approved studies.(25) Providing relevant identifying information is available additional information from other jurisdictions can be linked to core health data. We have used this facility previously to document excess

mortality in released prisoners in Western Australia.(13) In this report we extend the analysis of mortality to define risk factors for death including the possible effects of recidivism, and examine rates of hospitalization and contact with MHS in ex-prisoners.

The objectives of the present study were thus to:

- i) Identify risk factors for early deaths after release from prison;
- ii) Describe the use of hospital and MHS prior to and following release from prison.

### **3 Subjects and methods**

The study cohort consisted of all persons who were in prisons in Western Australia on 1<sup>st</sup> January 1995 or were imprisoned after that date up to and including 31<sup>st</sup> December 2001. Persons with a prison release code of 'deportation' or 'extradition' or 'Australian Protective Services' or 'interstate transfer' were excluded from the study as they were not released into the Western Australian community.

Information relating to prisoners was extracted from the records of the Department of Justice (DoJ) of Western Australia and linked to selected health information extracted from the WADLS. The latter consisted of records of death, admission to general hospitals, admissions to MHS hospitals or attendances at MHS outpatient clinics occurring at any time from 1980 to the end of 2003. This enabled us to create a cumulative record for each prisoner of all hospital admissions or MHS contacts for at least 15 years prior to 1995 and also provided a minimum follow-up period of two years for hospitalisation, MHS contacts or deaths for each member of the study cohort following release from prison.

Linkage between DoJ records and WADLS records was effected by the Data Linkage Unit (DLU) in the Health Information Centre in the Department of Health using a protocol designed to ensure protection of privacy.(26) Under this protocol, the DoJ first provided the DLU with identifying information for each individual prisoner together with a DoJ unique identifier but no information relating to reasons for or other details of imprisonment. The DLU established a master linkage file (MLF) for the study containing a study specific personal identifying number (Study PIN), and DoJ and Health Information Centre (HIC) unique identifying numbers but no other identifying information. This enabled the respective custodians of data in the DoJ and the Health Department to provide the study team with information relating to each prisoner identified by study PIN only. The study team then used the study PIN to merge data from the two jurisdictions for analysis.

### 3.1 Data items

The following information was extracted from the relevant record sources for each episode of imprisonment or health services contact for all persons in the study:

i. **Department of Justice records:**

- Gender
- Date of birth
- Aboriginality
- Dates of imprisonment and release
- Place of release (Metro / Country)
- Flag for "First-ever imprisonment"
- Mode of Discharge (Freedom, Parole, Extradition, Deportation etc.)

ii. **Mortality data**

- Date of death
- Aboriginality
- Coded cause of death (or death certificate free text of causes of death)

iii. **Hospital Morbidity data**

- Hospital admission and separation dates
- Sex
- Date of birth
- Aboriginality
- Hospital type
- Principal diagnosis
- Other diagnoses
- External cause of Injury or Poisoning (E-codes)

iv. **MHS data**

- Dates of admission and separation from MHS hospitals
- Date of attendance at MHS clinics
- Sex
- Aboriginality
- Principal diagnosis (for both hospital admissions and out-patient clinic visits)

### 3.2 Statistical analyses

#### 3.2.1 Mortality

Analysis of total mortality and broad causes of death in prisoners was undertaken separately for broad demographic groups defined by age, gender and Aboriginality. Prisoners were also classified as "first offenders" or "re-offenders". First offenders (including those imprisoned before 1<sup>st</sup> January 1995) were defined as those whose first release in the study period followed an imprisonment for which the DoJ record contained a positive "First-ever imprisonment" identifier. All remaining prisoners were classified as "re-offenders". First offenders who were subsequently re-imprisoned were included in both groups.

### **3.2.1.1 Person-years of follow-up**

As the objective of the study was to examine the mortality of prisoners while living in the community (i.e, excluding deaths in custody), the total days spent in the community by each prisoner was estimated from the total days from the date of first release from prison in the study period until date of death or the censoring date (1/1/2004), but excluding days for any subsequent periods of imprisonment. A time-dependent variable denoting the number of prior imprisonments was also created allowing the total days in the community to be separated into episodes corresponding to the first and each subsequent period of release.

### **3.2.1.2 Standardised mortality ratios (SMRs)**

In order to compare the risk of death in released prisoners with the general population, age and period standardised mortality ratios (SMRs) over the period of 1 January 1995 to 31 December 2003 were calculated for each of four demographic groups: female Aboriginal, female non-Aboriginal, male Aboriginal and male non-Aboriginal prisoners and three broad age groups: 20-39 and 40-59 and 20-59 combined. Because of small numbers of deaths SMRs for other age groups were not estimated.

Two sets of SMRs ( $SMR_1$  and  $SMR_2$ ) were calculated for all cause mortality.  $SMR_1$  compared observed mortality in both female and male Aboriginal and non-Aboriginal prisoners with expected deaths based on death rates in the total female and male population of Western Australia  $SMR_2$  compared observed deaths in female and male Aboriginal and non-Aboriginal prisoners with expected deaths based on mortality in the equivalent population sub-groups in WA. Separate calculations of  $SMR_1$  and  $SMR_2$  were also obtained for first offenders and re-offenders.

To estimate the expected numbers of deaths used in calculating SMRs, age and sex specific death rates in the Aboriginal and non-Aboriginal populations of Western Australia were first estimated for each year of the study, using the number of deaths in WA obtained from death registry data and equivalent population data for WA provided by the Department of Health. Population death rates were then multiplied by person-years of exposure (i.e., while living in the community) in each prisoner group by the mortality rate of the equivalent demographic group in the general population. 95% confidence intervals for SMRs were calculated using the formula:  $SMR \pm 1.96\sqrt{(SMR/exp)}$  where 'exp' = the total number of expected deaths. Deaths in custody and the person-years spent in prison were excluded from the calculation of SMRs.

### **3.2.1.3 Survival analysis**

Time-dependent Cox regression analysis was used to identify risk factors associated with deaths in released prisoners while living in the community as described above. The endpoint was death by the end of follow-up while living in the community. In the case of prisoners who died in custody during the study period, the follow-up time was censored at the date of the re-imprisonment during which death occurred (i.e., the endpoint alive).

Two sets of time-dependent Cox analyses were conducted to identify risk factors for death in released prisoners including multiple imprisonments. The first was based on all prisoners in the study cohort and included age, gender, Aboriginality, place of release (metropolitan or country) and first or subsequent release from prison as explanatory variables. In this analysis the first or subsequent imprisonments was defined by a time-dependent variable based on the "first release" code in DoJ records. For example, in prisoners who had a first and a subsequent release, the value of the code changed on the date of the second release.

The second analysis was designed to determine if the risk of death changed as the number of releases increased. This was necessarily restricted to prisoners in whom the first release in the study period was also the first-ever release. The analysis was similar to the first except that the release variable assumed the value 1, 2, 3 or 4+ for each subsequent release.

The results were reported as hazard ratios, with 95% confidence intervals and p-values. The analyses were carried out using SPSS 11.0 for Windows.

### **3.2.2 Morbidity**

Morbidity in released prisoners was assessed from records of general hospital admissions and Mental Health Service (MHS) hospital admissions or clinic attendances, which for the purpose of this study are termed collectively "Health Service Contacts" (HSC). HSC before and after the date of first release were analysed separately for broad demographic groups defined by age gender and aboriginality and for first offenders and re-offenders as previously defined for the analysis of mortality.

#### **3.2.2.1 Conditions leading to health service contacts.**

To determine the commonest conditions leading to HSC, the distributions of principal diagnoses leading to such contacts before or after the date of first release were first examined at the level of three digit diagnostic codes and External Cause of Injury or Poisoning codes (E-codes) of the ninth revision of International Classification of Diseases Clinical Modification (ICD-9-CM). These were then aggregated into broad groups following the

general structure of ICD-9-CM chapters. The major condition groups identified in this way were then examined in more detail using E-codes or principal diagnosis to define clinically meaningful sub-groups (as shown for example in Table 15).

As prisoners could have multiple contacts we used record linkage to set flags in each prisoner record indicating the number and date of contacts for each of the specified conditions in the five years before the date of first release. Similar flags were set indicating the number of times and date of each type of HSC from the date of first release to the end of the follow-up period. In constructing the 'previous' admission flags no account was undertaken of days spent in prison during the five years before release.

### **3.2.2.2 Standardised morbidity ratios**

In order to compare morbidity in prisoners after release with that in the general population, age and period standardised morbidity ratios (SMbRs) for the period of 1 January 1995 and 31 December 2003 were calculated for each of four demographic groups (female Aboriginal, female non-Aboriginal, male Aboriginal and male non-Aboriginal prisoners) and three broad age groups: 20-39 and 40-59 and 20-59 years combined. Two sets of SMbRs (SMbR<sub>1</sub> and SMbR<sub>2</sub>) were calculated for all cause morbidity following the same methods used for estimating SMR<sub>1</sub> and SMR<sub>2</sub> in the analysis of mortality. SMbR<sub>1</sub> compared observed morbidity in both female and male Aboriginal and non-Aboriginal prisoners with expected hospital admission rates in the total female and male population of Western Australia. Similarly SMbR<sub>2</sub> compared observed hospital admissions in female and male Aboriginal and non-Aboriginal prisoners with expected admissions based on rates in the respective Aboriginal and non-Aboriginal populations of Western Australia. (27)

Expected numbers of hospital admissions required for calculating SMbRs for each demographic group were estimated by multiplying person years of follow-up in each group by rates of hospital admission for broad chapters of the ICD as published by the Epidemiology Branch of the Health Department of Western Australia, which were available as age and sex specific rates for the Aboriginal and non-Aboriginal populations of Western Australia by calendar year. As in the case of mortality, SMbRs were estimated for three broad age groups, 20-39 and 40-59.

### **3.2.2.3 Survival analysis**

Kaplan-Meier survival analysis was used to determine the cumulative probability of HSC for each of the four demographic groups of prisoners and each of five major condition groups:

“All conditions”, “All conditions excluding admissions related to pregnancy and gynaecology”, “Injury and Poisoning”, “Mental disorders including acute and chronic manifestations of alcohol or drug addiction”, and “All other conditions”. Analyses were also conducted for broad age categories within each of the above groups. As these demonstrated only minor differences with age that were similar for all major condition and demographic groups, formal age adjustment of the results was not undertaken. The results are presented as a series of charts and summary results for the probabilities of HSC at two years and five years and are also presented in tabular form.

## 4 Results

### 4.1 The study cohort

Demographic characteristics and summary imprisonment details of the study cohort are given in Table 1. Including those already in prison on 1st January 1995, there were 14,039 individuals were in prison at some time in Western Australia between 1st January 1995 and 31 December 2001. Of these, 372 (2.6%) of were not released during the study period, leaving 13,667 prisoners in the study.

Table 1. Demographics and basic imprisonment statistics

Characteristic	Female Aboriginal	Female non-Aboriginal	Male Aboriginal	Male non-Aboriginal	TOTAL
WA population in 1999	31,576	892,403	31,623	898,907	1,854,509
Persons ever in prisoner in 1995-2001	888	763	4,180	8,208	14,039
Released in study period	887	740	4,149	7,891	13,667
First offenders	495	620	2,504	2,604	8,374
% first offenders	55.8%	81.5%	40.1%	68.2%	59.7%
Mean age	28.6	31.1	28.3	31.1	30.1
Median age	27	29	27	29	28
Total releases 1995-2001	1,749	1,137	11,537	13,215	26,674
Mean releases per prisoner	1.97	1.54	2.78	1.67	1.95
Times released in study period					
1	56.0%	73.0%	38.2%	65.3%	56.9%
2	20.3%	14.9%	23.1%	17.9%	19.5%
3+	23.7%	12.2%	38.6%	16.8%	23.6%
Releases from non-metro. prisons (%)	59.1%	22.6%	71.6%	25.1%	44.8%
Total person-years of follow-up	4,323	3,596	21,737	40,058	69,714
Person-years of community follow-up	3,982	3,371	18,763	36,546	62,662
Follow-up time in the community (%)	92.1	93.7	86.3	91.2	89.9
Mean years of community follow-up	4.49	4.42	4.49	4.63	4.58

Of these 13667 prisoners, 6.3% were female Aboriginals, 5.4% female non-Aboriginals, 29.8% male Aboriginals and 58.5% male non-Aboriginals. Age at the date of first release during the study period ranged from 16 years to 87 years, with mean age 30 years and median age 28 years. The median age of female and male non-Aboriginal prisoners was 29 years compared with 27 years in female and male Aboriginal prisoners.

The number of times individual prisoners were released during the study period ranged from one to 20 times with the majority (56.9%) of prisoners being released once only. The



percentage of prisoners released once only however varied from 73.0% in female non-Aboriginal prisoners, to 65.3% in male non-Aboriginal prisoners, 56.0% in female Aboriginal prisoners and 38.2% in male Aboriginal prisoners. In total there were 28,439 imprisonments during the study period. The mean numbers of releases was 1.95 for all prisoners but was higher in Aboriginal prisoners (1.97 and 2.78 for females and males, respectively) than in non-Aboriginals (1.54 and 1.67 for females and males, respectively). Of the 28,439 imprisonments, 29.5% were first-time imprisonments and 70.5% were re-imprisonments. Aboriginal prisoners accounted for 25.0% of first imprisonments and 54.4% of re-imprisonments.

#### 4.1.1 Follow-up time

The mean and median follow-up times were 5.4 years 5.3 years respectively. The total person-years of follow-up were 69,714, of which 62,662 (89.9%) were spent in the community. This was highest in female non-Aboriginal prisoners (93.7%) and lowest in male Aboriginal prisoners.

## 4.2 Mortality in released prisoners

### 4.2.1 Summary of deaths by demographic group

Table 2. Summary of deaths by sex and Aboriginality

Place of Death	Female Aboriginal	Female non-Aboriginal	Male Aboriginal	Male non-Aboriginal	Total
Total number of deaths	31	24	201	275	531
Deaths in custody	1	2	12	35	50
Total deaths in the community	30	22	189	240	481
Community deaths in first offenders	7	14	31	129	181
Community deaths in re-offenders	23	8	158	111	300
Mortality rate* in general population of WA in 1999	11.1	4.6	14.3	7.3	
Mortality rate* in general population at 20-39 years	1.4	0.5	4.6	1.2	
Mortality rate* in prisoners in the community 20-39 years	4.5	7.0	7.9	4.8	
Mortality rate ratios 20-39 years	3.07	14.00	1.77	4.00	

\* Age standardised mortality rates / 1000 person years.

During the study period, 531 prisoners died; 50 while in custody and 481 while living in the community (Table 2). Of the later, 181 occurred in first offenders with 300 in re-offenders. The majority of deaths (317 or 66%) occurred in prisoners aged 20-39 years. Table 2 also shows age standardised mortality rates and rate ratios in prisoners and the general Aboriginal

and non-Aboriginal populations in Western Australia 20-39 years. The latter indicate that the risk of death in prisoners is greatly increased, particularly in female non-Aboriginal prisoners (rate ratio 14.0), male non-Aboriginal prisoners (rate ratio 4.0) and female Aboriginal prisoners (rate ratio 3.1).

#### 4.2.2 Relative risk of death in prisoners compared with the general population

SMRs for total deaths in released prisoners compared with the general population of Western Australia by Aboriginality and broad age group are shown in Table 3.

Table 3. Age and period standardised mortality ratios comparing released prisoners cohort with the general population in Western Australia in 1995-2003.

Demographic sub-group	Age	No. deaths	SMR <sub>1</sub> *	95% CI	SMR <sub>2</sub> <sup>+</sup>	95% CI
Female Aboriginal	20-39	21	9.13	(5.22, 13.03)	2.25	(1.29, 3.21)
	40-59	8	8.40	(2.58, 14.21)	1.79	(0.55, 3.02)
Female non-Aboriginal	20-39	15	10.98	(5.42, 16.54)	12.43	(6.14, 18.73)
	40-59	5	3.20	(0.40, 6.01)	3.46	(0.43, 6.49)
Male Aboriginal	20-39	126	5.12	(4.22, 6.01)	1.50	(1.24, 1.76)
	40-59	56	6.20	(4.61, 7.80)	1.23	(0.91, 1.55)
Male non-Aboriginal	20-39	155	4.17	(3.52, 4.83)	4.55	(3.83, 5.26)
	40-59	55	2.20	(1.62, 2.78)	2.37	(1.75, 3.00)

SMR<sub>1</sub>\* compares mortality in male and female Aboriginal and non-Aboriginal released prisoners with the total male and female populations of Western Australia.

SMR<sub>2</sub><sup>+</sup> compares mortality in male and female Aboriginal and non-Aboriginal prisoners with the respective Aboriginal and non-Aboriginal populations of Western Australia.

When compared with the total population of Western Australia (SMR<sub>1</sub>), the relative risk of death in all prisoner groups is grossly elevated, particularly in females, with the lower limit of the 95% confidence intervals exceeding unity in all groups except female non-Aboriginal prisoners aged 40-59 years in whom there were only five deaths. In both female and male Aboriginal prisoners, SMR<sub>1</sub> was roughly the same in both age groups (females 9.13 and 8.40; males 5.12 and 6.20), but in non-Aboriginal prisoners SMRs were higher in those aged 20-39 than in those aged 40-49 years (females 10.98 and 3.20; males 4.17 and 2.20).

When observed deaths in Aboriginal and non-Aboriginal prisoners were compared with the expected numbers of deaths based on death rates in the Aboriginal or non-Aboriginal groups populations in Western Australia respectively (SMR<sub>2</sub>), the relative risks in female and male Aboriginal prisoners were substantially less elevated than suggested by SMR. This reflects

the high mortality rates in the total Aboriginal population of Western Australia compared with the non-Aboriginal population. In non-Aboriginal prisoners, the relative risks of death were slightly increased. Levels of SMR<sub>2</sub> were also lower in prisoners aged 40-59 than in those aged 20-39 with 95% confidence intervals including unity in all except male non-Aboriginal prisoners.

#### 4.2.3 Risk factors for mortality in released prisoners

SMRs were computed separately for first offenders and re-offenders aged 20-39 years. The results, shown in Table 4, indicate that re-offenders have a higher risk of death than first offenders, particularly in Aboriginal prisoners.

Table 4. Age and period standardised mortality ratios comparing first offenders and re-offenders aged 20-39 years with the general population in WA in 1995-2003

First offenders					
Demographic sub-group	No. deaths	SMR <sub>1</sub> *	95% CI	SMR <sub>2</sub> <sup>+</sup>	95% CI
Female Aboriginal	5	5.61	(0.69, 10.52)	1.42	(01.8, 2.67)
Female non-Aboriginal	9	10.71	(4.07, 17.34)	12.14	(4.62, 19.66)
Male Aboriginal	20	3.79	(2.31, 5.28)	1.47	(0.9, 2.05)
Male non-Aboriginal	75	4.06	(3.18, 4.94)	4.37	(3.42, 5.33)
Re-offenders					
Demographic sub-group	No. deaths	SMR <sub>1</sub> *	95% CI	SMR <sub>2</sub> <sup>+</sup>	95% CI
Female Aboriginal	18	11.35	(5.79, 16.91)	2.74	(1.40, 4.09)
Female non-Aboriginal	5	11.58	(1.43, 21.73)	13.07	(1.61, 24.5)
Male Aboriginal	118	5.60	(4.51, 6.69)	1.51	(1.22, 1.80)
Male non-Aboriginal	86	4.31	(3.33, 5.29)	4.75	(3.67, 5.83)

The risk of death after release was explored further in a series of time-dependent multivariate models using Cox regression, with the final model (Table 5) including age at first release during the study period, gender, Aboriginality, first or re-offender status and place of imprisonment at the time of release (metropolitan or country).

Table 5. Risk-factors for death in released prisoners

Variables	Levels	Hazard Ratio	95% CI	P-value
Age at first release	Per year	1.03	(1.03, 1.04)	<0.001
Sex	Males	1.08	(0.81, 1.44)	0.61
	Females	1.00		
Aboriginality	Aboriginal	1.37	(1.13, 1.66)	<0.001
	Non-Aboriginal	1.00		
First-ever release*	No	1.85	(1.56, 2.27)	<0.001
	Yes	1.00		
Location	Metro	1.03	(0.84, 1.26)	0.80
	Country	1.00		

\*First-ever release was a time-dependent variable that changed after a second imprisonment.

The hazard ratio (HR) increased significantly with age ( $p < 0.001$ ), Aboriginality (HR 1.37, 95% CI 1.13, 1.66) but not with gender or location of release. It was significantly higher in re-offenders than in first offenders (1.92; 95% CI 1.56, 2.27).

To explore the effect of increasing numbers of imprisonments on the risk of death, further models were developed for prisoners for whom the date of first release was known (the first offenders cohort) (Table 6). There was again a significantly increased risk of death with increasing age and with increasing numbers of releases, but not with gender, Aboriginality or location at release. With each additional release, the risk of death increased by 29%. The apparent reduction in risk in Aboriginal prisoners in Table 6 compared with Table 5 is due to a high correlation between increasing numbers of releases and Aboriginality.

**Table 6. Risk of death in the community after first release from prison in the period of 1 Jan 1995 to 31 Dec 2003 adjusting for number of previous imprisonments**

Variables	Levels	Hazard Ratio	95% CI	P-value
Age (first release)	Per year	1.03	(1.02, 1.04)	<0.001
Sex	Males	1.14	(0.72, 1.80)	0.59
	Females	1.00		
Aboriginality	Aboriginal	1.04	(0.71 1.53)	0.83
	Non-Aboriginal	1.00		
Number of release*		1.29	(1.04, 1.59)	0.02
Location at release	Metro	1.23	(0.87, 1.75)	0.25
	Country	1.00		

\*Number of releases was a time-dependent variable that could take the values 1, 2, 3 or 4+ .

#### 4.2.4 Causes of death in released prisoners

The main causes of deaths in released prisoners are shown in Table 7. Injury or Poisoning accounted for 47.4% of deaths, all other specified causes for 48.0% and Coroner's verdict pending for 4.6%. Of the deaths not due to injury or poisoning, the leading causes of death were Cardiovascular disease (12.7%) and acute and chronic effects of alcohol and drug addiction (9.6%). Among deaths due to Injury or Poisoning, 17.0% of (total) deaths were due to suicide and self inflicted injury, 11.6% to other poisoning, and 9.4% to transport related injuries. Homicide and purposely inflicted injury accounted for 2.5% of all deaths.

**Table 7. Number and distribution of coded causes of death**

<b>Coded Cause of Death (ICD 9)</b>	<b>Number</b>	<b>% of total</b>
Infectious and Communicable diseases	7	1.5%
Neoplasms	26	5.4%
Diabetes	11	2.3%
Alcohol and drug-dependence	46	9.6%
Cardiovascular disease	61	12.7%
Respiratory	22	4.6%
Diseases of Liver or pancreas	21	4.4%
Renal failure	4	0.8%
Other specified	16	3.3%
Diseases of uncertain origin	17	3.5%
<b>All not due to Injury or Poisoning</b>	<b>231</b>	<b>48.0%</b>
Transport related	45	9.4%
Accidental poisoning by drugs, medicinal substances, and other solids, liquids and gases	56	11.6%
Suicide and self inflicted injury	82	17.0%
Homicide and purposely inflicted injury	12	2.5%
All other Causes of Injury or Poisoning	33	6.9%
<b>All External Causes of Injury and Poisoning</b>	<b>228</b>	<b>47.4%</b>
Coroners verdict pending	22	4.6%
<b>All deaths</b>	<b>481</b>	<b>100.0%</b>

In Table 8 the leading causes of death described above are shown for individual demographic groups.

**Table 8. Principal causes of death by demographic group**

<b>Cause of death</b>	<b>Female Aboriginal</b>	<b>Female non-Aboriginal</b>	<b>Male Aboriginal</b>	<b>Male non-Aboriginal</b>	<b>Total</b>
Total deaths	30	22	189	240	481
Cardiovascular disease, diabetes, renal failure	13.3%	9.1%	23.3%	10.8%	15.8%
Effects of alcohol and other drug dependence	20.0%	22.7%	9.0%	16.3%	13.9%
Other specified, not Injury or Poisoning	23.3%	13.6%	21.7%	15.4%	18.3%
All not Injury or Poisoning	56.7%	45.5%	54.0%	42.5%	48.0%
Transport related	20.0%	0.0%	10.6%	7.9%	9.4%
Accidental poisoning, other exposures	3.3%	22.7%	4.2%	17.5%	11.6%
Suicide, self-inflicted harm, homicide	3.3%	18.2%	19.0%	22.1%	19.5%
All other Injury and Poisoning	6.7%	13.6%	8.5%	5.0%	6.9%
All Injury & Poisoning & Coroner pending	43.3%	54.5%	46.0%	57.5%	52.0%

There was considerable variation in the principal causes of death within the demographic sub-groups. In male and female Aboriginal prisoners, approximately 45% of deaths were due to injury or poisoning compared with 55% in non-Aboriginal prisoners.

In female Aboriginal prisoners in whom there were 30 deaths, the leading causes of death were 'Effects of alcohol and drug dependence' (six deaths each) and 'Transport related accidents' (four deaths). In female non-Aboriginal prisoners in whom there were 22 deaths, the leading causes were 'Effects of alcohol and drug dependence' and 'Accidental poisoning and other exposures' (five deaths each) and 'Suicide and self-harm' (four deaths). In male Aboriginal prisoners (189 deaths) the leading causes were 'Cardiovascular disease, diabetes and renal failure combined' (23.3%), followed by 'Suicide and self-harm' (19.4%) and 'Transport related deaths' (10.6%). In male non-Aboriginal prisoners (240 deaths), the leading groups were 'Suicide and self-harm' (22.1%), followed by 'Accidental poisoning and other exposures' (17.5%), and 'Effects of alcohol and drug dependence' (16.3%).

#### 4.2.5 The risk of death by time from release from prison

The relationship between the risk of death and time from release is examined in Table 9, which shows the number of deaths and crude death rates for the three major cause of death groups within six months, six months to less than one year and over one year. Rate ratios are also shown comparing rates of death within six months and from six months to one year with rates after one year.

Table 9. Principal cause of death groups by time from date of release from prison

	0 - 6 months	6 months - 1 year	1 year	All intervals
<b>Numbers of deaths</b>				
Alcohol and drug-dependence	25	5	16	46
Injury and poisoning	77	39	112	228
All other conditions	34	28	145	207
Total	136	72	273	481
<i>Person years of follow-up</i>	6,834	6,834	48,995	62,662
<b>Rates per 1000 PYs</b>				
Alcohol and drug-dependence	3.7	0.7	0.3	0.7
Injury and poisoning	11.3	5.7	2.3	3.6
All other conditions	5.0	4.1	3.0	3.3
Total	19.9	10.5	5.6	7.7
<b>Rate ratios</b>				
Alcohol and drug-dependence related	11.2	2.2	1.0	
Injury and poisoning	4.9	2.5	1.0	
All other conditions	1.7	1.4	1.0	
Total	3.6	1.9	1.0	

Crude death rates after release vary inversely with time from release. The death rates from all causes in the first and second six months after release were respectively 3.6 and 1.9 times

greater than the rate after one year. This inverse relationship is particularly marked in deaths related to alcohol and drug-dependence in which the rate ratio for the first six months is 11.2 times greater than after one year. In the case of injury and poisoning, there was a nearly five-fold risk of death in the first six months compared with after one year. In contrast, the death rate in the first six months for all other conditions is only 1.7 times greater than the rate after one year.

Table 10 shows the risk of death by time from release by demographic sub-group. In all sub-groups the risk of death is greatest in the first six months after release. Compared with the risk of death after one year, the risk of death in the first six months after release is nearly four-fold in male non-Aboriginal prisoners, approximately three-fold in male Aboriginal prisoners and female non-Aboriginal prisoners, and twice as great in female Aboriginal prisoners.

**Table 10. The relative risk of death by interval from release from prison by demographic group**

	0-6 months	> 6 - 12 months	>12months	All years
<b>Numbers</b>				
Female Aboriginal	6	4	20	30
Female non-Aboriginal	6	1	15	22
Male Aboriginal	47	39	103	189
Male non-Aboriginal	77	28	135	240
Total	136	72	273	481
<b>Rates/ 1000 PYs</b>				
Female Aboriginal	13.53	9.02	6.46	7.53
Female non-Aboriginal	16.22	2.70	5.70	6.53
Male Aboriginal	22.66	18.80	7.05	10.07
Male non-Aboriginal	18.76	6.82	4.76	6.57
Total	19.90	10.54	5.57	7.68
<b>Rate ratios</b>				
Female Aboriginal	2.09	1.40	1.00	
Female non-Aboriginal	2.84	0.47	1.00	
Male Aboriginal	3.21	2.67	1.00	
Male non-Aboriginal	3.94	1.43	1.00	
Total	3.57	1.89	1.00	

### 4.3 Hospitalisation and contact with Mental Health Services in released prisoners

#### 4.3.1 Overview of hospital admissions and MHS contacts

Table 11 shows the numbers of prisoners having general hospital (GH) or Mental Health Service hospital (MHH) admissions or contacts with MHS clinics within five years prior to the first release date or following first release. Overall 54.6% of prisoners had a pre-imprisonment GH or MHS contact, 51.1% had a post-release contact and 70.2% had both pre- and post-imprisonment contacts. The great majority of contacts were general hospital admissions. Of the prisoners having any health service contact, 97.6% had either a pre- or post-imprisonment hospital admission. While 18.0% of prisoners had at least one MHS contact, only 2.3% had MHS contacts alone.

Table 11. Numbers of prisoners having general hospital (GH) admissions or MHS (MHS) contacts before and after date of first release from prison.

	GH No. (%) <sup>*</sup>	MHH No. (%)	MH clinic No. (%)	Any MHS No. (%)	Any HS No. (%)
Previous 5 years	7,358 (52.4)	611 (4.4)	1,263 (9.0)	1,446 (10.3)	7,659 (54.6)
Post-release	6,907 (49.2)	236 (1.7)	1,662 (11.8)	1,719 (12.2)	7,175 (51.1)
Ever	9,624 (68.5)	755 (5.4)	2,366 (16.9)	2,538 (18.0)	9,858 (70.2)
Never	4,416 (31.5)	944 (94.6)	11,672 (83.1)	11,511 (82.0)	4,181 (29.3)

\* Percentage of total prisoners, N= 14,039

Of the 7659 prisoners who had pre-release health service contacts, 65.0% also had a post-release contact, compared with 34.5% of those who had no pre-release contacts. In the case of MHS contacts, 44.0% of prisoners with pre-release contacts had post-release contacts, compared with 8.6% of those who had no pre-release MHS contacts. Those with pre-release contacts thus had a nearly two-fold risk of having a post-release contact.

Table 12. Health services contact by demographic sub-group

	Female Aboriginal	Female Aboriginal	Female Aboriginal	non- Aboriginal	Male Aboriginal	Male Aboriginal	non- Aboriginal	All Prisoners		
Five years prior to first release	713	80%*	569	75%	2,202	53%	4,175	51%	7,659	55%
Post first release	682	77%	499	65%	2,249	54%	3,745	46%	7,175	51%
Pre and Post	630	71%	413	54%	1,574	38%	2,359	29%	4,976	35%
Any admission	765	86%	655	86%	2,877	69%	5,561	68%	9,858	70%
Total # of Prisoners	888		763		4,180		8,208		14,039	

\* percentage of sub-group total



Table 12 shows the distribution of total HSC within each of the four major demographic sub-groups of prisoners. The frequency of any hospital admission or contacts with MHS facilities either before or after first-release was greater in female prisoners (86%) than in male prisoners (approximately 70%). Female Aboriginal prisoners had the highest frequency of HSC after release (77%) followed by female non-Aboriginal prisoners (65%), male Aboriginal prisoners (54%) and male non-Aboriginal prisoners (46%).

Of the Aboriginal female prisoners, 71% had both pre- and post-release HSC, followed by non-Aboriginal female prisoners (54%), male Aboriginal prisoners (38%) and male non-Aboriginal prisoners (29%). Prisoners with any hospital admission or MHS contact in the five years before first release had a nearly two-fold risk (1.89) of contacts after first release. This varied from 2.97 in female Aboriginal prisoners, to 2.01 in male Aboriginal prisoners to 1.64 in both female and male non-Aboriginal prisoners.

Table 13(a) shows the number of admissions to general hospitals by ex-prisoners in the five years prior to and following date of first release by principal demographic sub-group.

**Table 13 (a). Hospital admissions before and after date of first release.**

	Female Aboriginal	Female-non- Aboriginal	Male Aboriginal	Male-non- Aboriginal	All Prisoners
<i>Before first release</i>					
Admissions	5,775	2,300	7,964	11,178	27,217
Mean per prisoner	6.5	3.0	1.9	1.4	1.9
Mean per admitted prisoner	8.1	4.1	3.7	2.8	3.7
<i>Post first release</i>					
Admissions	7,114	2,002	14,241	12,960	36,317
Mean per prisoner	8.0	2.6	3.4	1.6	2.6
Mean per admitted prisoner	10.5	4.1	6.5	3.3	5.0

In the five years prior to their date of first release, prisoners collectively had 27,217 hospital admissions, an average of 1.9 per prisoner or 3.7 per admitted prisoner. This varied from 6.5 (8.1) for female Aboriginal prisoners, 3.0 (4.1) for female non-Aboriginal prisoners, 1.9 (3.7) for male Aboriginal prisoners and 1.4 (2.8) for male non-Aboriginal prisoners. Following first-release, the ex-prisoners had between them 36,317 hospital admissions, with an average of 2.6 per prisoner or 5.0 per admitted prisoner. The variation between demographic sub-groups followed the same pattern as admissions prior to release with the exception that Aboriginal male prisoners had nearly twice as many admissions per prisoner as before release. As in the case of pre-release admissions, female Aboriginal prisoners had very high numbers of repeat admissions (8.0 per prisoner or 10.5 per admitted prisoner).

**Table 13 (b). Admissions to mental hospitals before and after first release**

	Female Aboriginal	Female Aboriginal	non-Male Aboriginal	Male Aboriginal	non- All Prisoners
<i>Before first release</i>					
Admissions	53	88	221	866	1,228
Affected prisoners	27	46	136	402	611
Mean per prisoner	0.1	0.1	0.1	0.1	0.1
Mean per affected prisoner	2.0	1.9	1.6	2.2	2.0
<i>Post first release</i>					
Admissions	29	61	99	232	421
Affected prisoners	19	11	69	137	236
Mean per prisoner	0.0	0.1	0.0	0.0	0.0
Mean per affected prisoner	1.5	5.5	1.4	1.7	1.8

The number of admissions to mental hospitals before and after the date of first release is shown in Table 13(b). There were 1,228 admissions before and 421 following release. There was little variation between demographic sub-groups, with the exception of female non-Aboriginal prisoners in whom the average number of admissions per admitted prisoner (5.5) was substantially greater than the average of 1.8 for all admitted prisoners

The numbers of MHS clinic attendances before and after date of first release are shown in Table 13(c).

Study subjects total made a total 20,308 visits before their first release, an average of only 1.5 per prisoner but 16.1 per affected prisoner. The highest average attendance per prisoner or per affected prisoner occurred in male non-Aboriginal prisoners. Following release, ex-prisoners made 41,235 visits during the study period. Again the highest number occurred among male non-Aboriginal prisoners. The higher number of post-release MHS clinic visits compared with pre-release visits is in contrast to MHS admissions in which pre-release admissions outnumbered post-release admissions.

**Table 13 (c). Number of Mental outpatient visits before and after first release**

<i>Services within 5 years of first release</i>	Female Aboriginal	Female Aboriginal	non-Male Aboriginal	Male Aboriginal	non- All Prisoners
Visits	725	1,187	2,379	16,089	20,380
Mean per prisoner	0.8	1.6	0.6	2.0	1.5
Mean per affected prisoner	9.4	12.4	9.9	18.9	16.1
<i>After first release</i>					
Visits	2,289	2,797	8,618	27,531	41,235
Mean per prisoner	2.6	3.7	2.1	3.4	2.9
Mean per affected prisoner	13.5	22.9	21.8	28.3	24.8

### 4.3.2 Principal conditions leading to hospital admission or MHS contacts before and after first release

The most common conditions leading to health services contact before the date of first release are shown in descending order of frequency in Table 14.

Table 14. Conditions leading to Hospital admissions and Mental Health Service contacts in the five years before the date of first release from prison

Diagnosis	Female Aboriginal	Female non-Aboriginal	Male Aboriginal	Male non-Aboriginal	All Prisoners
<b>Total Prisoners</b>	<b>888</b>	<b>763</b>	<b>4,180</b>	<b>8,208</b>	<b>14,039</b>
Female reproductive	50.9%	43.1%	NA	NA	47.3%
Injury	43.8%	13.8%	30.2%	19.7%	24.0%
Mental (GH or MHS)	19.7%	29.5%	12.5%	16.8%	16.4%
Digestive	14.1%	10.5%	8.7%	8.0%	8.7%
Genito-urinary	14.1%	10.5%	8.7%	8.0%	8.7%
Other Health Care	31.3%	11.3%	5.7%	4.3%	6.8%
Ill defined; Symptoms	16.9%	8.4%	7.1%	5.2%	6.7%
Respiratory	16.2%	5.1%	8.7%	3.9%	6.2%
Joint disorders	7.0%	5.1%	4.3%	6.3%	5.7%
Poisoning	7.5%	15.3%	3.1%	5.5%	5.5%
Skin	12.4%	3.9%	7.9%	3.3%	5.3%
Infections	9.0%	4.1%	3.0%	1.8%	2.7%
Other injury poisoning	4.3%	3.1%	2.1%	1.9%	2.2%
CNS	4.1%	2.9%	2.6%	1.5%	2.0%
CVD (not veins)	2.4%	1.4%	1.8%	1.7%	1.8%

Apart from admissions for conditions relating to pregnancy (47.3% of all women), the most common conditions leading to admission before first release were for injury (24.0% of prisoners), mental health problems (16.4%), digestive system disorders (8.7%), genito-urinary problems (8.7%), respiratory problems (6.2%), disorders of joints (5.7%), poisoning (5.3%) and skin diseases (5.3%). This ordering tended to be the same for each of the demographic sub-groups, but notable exceptions were the very high prevalence of previous admissions or MHS contacts for mental disorders (29.5%) and poisoning (15.3%) in non-Aboriginal women. In general, a greater percentage of female prisoners had previous hospital admissions than male prisoners and Aboriginal prisoners had more admissions than non-Aboriginal prisoners of the same sex.

Admissions for injury were particularly high in Aboriginal prisoners (43.8% and 30.2% in females and males respectively) compared with 19.7% in male non-Aboriginal prisoners and 13.8% in female non-Aboriginal prisoners. Previous admissions or MHS contacts for mental

problems was highest in female non-Aboriginal prisoners (29.5%), followed by female Aboriginal prisoners (19.7%), male non-Aboriginal prisoners (16.8%) and male Aboriginal prisoners (12.5%).

Admissions for respiratory problems were notably higher in Aboriginal prisoners (16.2% in females, 8.7% in males) than non-Aboriginal prisoners (5.9% and 3.1% respectively in females and males). Prior hospital admissions for skin conditions were also notably higher in Aboriginal women and men (12.4% and 7.9%) than in non-Aboriginal women and men (3.9% and 3.3%)

Table 15 shows equivalent data for hospital admissions or MHS contacts after first release from prison. The general pattern is similar to that shown for pre-release health service contacts, with female reproductive disorders, injury and poisoning, mental health problems and digestive system disorders again the predominating conditions. The principal exception is genitourinary disease, which occurred in only 2.6% of prisoners following release compared with 8.7% before first release.

**Table 15. Summary of principal conditions leading to hospital admission of prisoners following their first release from prison**

	Female Aboriginal	Female Aboriginal	non-Male Aboriginal	Male Aboriginal	non- All Prisoners
<b>Total Released Prisoners</b>	<b>888</b>	<b>763</b>	<b>4,180</b>	<b>8,208</b>	<b>14,039</b>
Female Reproductive	38.5%	35.4%	NA	NA	37.1%
Injury	38.2%	11.5%	31.1%	16.0%	21.7%
Mental - GH or MHS	31.0%	23.6%	17.8%	16.6%	18.3%
Mental - GH	17.2%	14.0%	8.7%	11.1%	10.9%
Digestive	14.0%	11.1%	10.4%	8.2%	9.4%
Other health care	28.7%	11.0%	8.2%	5.7%	8.2%
Respiratory	17.2%	4.1%	10.6%	3.3%	6.4%
Ill defined; Symptoms	13.3%	6.7%	8.1%	4.8%	6.4%
Skin	12.8%	3.7%	9.2%	3.5%	5.8%
Musculoskeletal	5.6%	5.1%	4.1%	6.3%	5.6%
Poisoning	7.8%	10.7%	3.2%	5.1%	5.0%
CVD (not veins)	3.7%	1.4%	3.9%	2.1%	2.7%
Genito-urinary	9.6%	2.9%	2.2%	1.9%	2.6%
Other Injury/Poison.	3.5%	2.0%	2.9%	2.1%	2.4%
Infections	5.4%	2.4%	2.7%	1.8%	2.3%
CNS	4.4%	3.1%	3.4%	1.5%	2.3%

Apart from admissions for conditions relating to pregnancy (37.1% of all women), the most common conditions leading to admission or MHS contacts were for injury (21.7% of prisoners), mental health problems (18.3%), digestive system disorders (9.4%), respiratory problems (6.4%), skin diseases (5.8%), disorders of joints (5.6%) and poisoning (5.0%).

In general, a greater percentage of female prisoners had admissions compared with male prisoners and Aboriginal prisoners had more admissions than non-Aboriginal prisoners of the same sex. Admissions for injury were particularly high in Aboriginal prisoners (38.5% and 35.4% in females and males respectively), compared with non-Aboriginals (approximately 15% in both males and females). Admissions for poisoning were however higher in female prisoners (10.8% non-Aboriginal, 7.8% Aboriginal), compared with males (approximately 3%).

Hospital admissions for mental disorders or MHS contacts were also notably higher in Aboriginal women (31.07%) followed by non-Aboriginal women (23.6%), Aboriginal men (17.8%) and male non-Aboriginal men (16.6%).

Admissions for respiratory problems were also higher in Aboriginal prisoners (17.2% in females, 10.7% in males) than non-Aboriginal prisoners (4.1% and 3.3%).

### 4.3.3 External causes of Injury and Poisoning

In Table 16 selected causes of admission for injury and poisoning are shown before and after date of first release.

**Table 16. Principal external causes of Injury and poisoning in hospital admissions prior to and following date of first release from prison: Percentage of prisoners with HSC**

Cause of injury or poisoning		Female Aboriginal	Female non-Aboriginal	Male non-Aboriginal	Male Aboriginal	All Prisoners
<b>Total Prisoners</b>	<b>Period</b>	<b>888</b>	<b>763</b>	<b>4,180</b>	<b>8,208</b>	<b>14,039</b>
Transport related	Before	5.4%	4.5%	6.1%	5.3%	5.5%
	After	3.6%	3.0%	5.6%	4.0%	4.4%
Accidental Poisoning (Medicinal)	Before	2.3%	4.1%	0.6%	1.4%	1.4%
	After	2.6%	4.7%	1.2%	2.0%	2.0%
Falls	Before	9.5%	1.8%	5.6%	3.0%	4.1%
	After	7.8%	1.0%	5.9%	2.8%	3.9%
Sports related	Before	2.0%	0.5%	2.7%	1.7%	2.0%
	After	2.5%	0.1%	3.3%	1.2%	1.9%
Other specified	Before	13.1%	3.7%	10.0%	5.9%	7.4%
	After	10.8%	4.6%	10.0%	5.6%	7.2%
Self-harm						
Medicinal	Before	5.7%	12.6%	2.1%	4.3%	4.2%
	After	5.5%	7.7%	1.6%	3.4%	3.3%
Other	Before	5.0%	2.8%	2.0%	1.8%	2.1%
	After	4.8%	1.4%	3.0%	1.5%	2.2%
Victim of Assault	Before	36.7%	6.3%	17.2%	7.1%	11.9%
	After	32.8%	4.6%	21.1%	6.3%	12.3%

Overall, the percentages of total prisoners admitted to hospital before and after release for each cause of admission were similar but there was considerable variation between demographic sub-groups. The largest single cause of admissions was 'assault' which occurred in approximately 12% of prisoners before and after first release. It was particularly high in Aboriginal women (37% and 33% respectively) and Aboriginal men (17% and 21%), but much less in non-Aboriginal men and women. 'Other specified' causes of injury, which includes injury due to machinery, cutting or piercing instruments, occurred in just over 7% of all prisoners but over 10% of Aboriginal prisoners. Transport related injuries occurred in about 5% of prisoners before and after release but without great variation between the demographic groups.

Self-harm due to medicinal agents occurred in 4% of prisoners before release and 3% after release but was particularly high in female non-Aboriginal prisoners (12.6% and 7.7%)

followed by female Aboriginal prisoners (5.7% and 5.5%). Self-harm due to other means (5%) was highest in female Aboriginal prisoners. Injuries due to falls were more frequent in Aboriginal women (9.5% and 7.8%) and Aboriginal men (5.6% and 5.9%) compared with non-Aboriginal prisoners of either sex.

#### 4.3.4 Contacts with MHS.

Table 17 shows the place of treatment of prisoners with mental disorders before and after first release.

**Table 17. Place of treatment of mental disorders**

Place Of Treatment		Female Aboriginal	Female Aboriginal	non-Male Aboriginal	Male Aboriginal	non- All Prisoners
<b>Total prisoners</b>		<b>888</b>	<b>763</b>	<b>4,180</b>	<b>8,208</b>	<b>14,039</b>
General Hospital	Before	16.0%	23.6%	9.6%	11.3%	11.8%
	After	25.7%	17.0%	14.8%	12.0%	14.0%
MHS outpatient	Before	7.4%	10.6%	4.9%	9.1%	7.8%
	After	17.2%	14.0%	8.7%	11.1%	10.9%
MHS hospital	Before	3.0%	5.6%	3.1%	4.6%	4.1%
	After	2.1%	1.4%	1.5%	1.6%	1.6%
All Gen. Hosp. + MHS	Before	19.7%	29.5%	12.5%	16.8%	16.4%
	After	31.0%	23.6%	17.8%	16.6%	18.3%

Overall, 16.4% of prisoners had admissions to general hospitals or contacts with the MHS before first release compared with 18.3% after release. Admission to general hospitals was the most common type of service received (14% of all released prisoners), followed by attendances at MHS clinics (11%) and admissions to MHS hospitals (less than 2%). Female prisoners were much more likely to have such contacts than men. Hospital admission or MHS contacts occurred in 30% of non-Aboriginal female prisoners before release and 24% after release, while in Aboriginal women the respective figures were 20% and 31%. Overall, admissions to MHS hospitals were lower after first release than before but attendance at MHS clinics increased after release, particularly in Aboriginal women (from 7% to 17%).

### 4.3.5 Nature of mental health problems

The nature of mental health problems leading to hospital admission or MHS contacts before and after first-ever release is examined in more detail in Table 18.

**Table 18. Principal diagnostic groups in patients with mental health problems in the five years before and following first release from prison. Percent of prisoners with HSC**

Principal condition	HSC	Female Aboriginal	Female non-Aboriginal	Male Aboriginal	Male non-Aboriginal	All Prisoners
<b>Total prisoners</b>		<b>888</b>	<b>763</b>	<b>4,180</b>	<b>8,208</b>	<b>14,039</b>
Alcohol, drug related psychosis	Before	5.4%	5.1%	3.7%	2.7%	3.3%
	After	7.3%	4.1%	5.7%	3.8%	4.6%
Other Psychosis	Before	4.5%	3.9%	3.2%	4.2%	3.9%
	After	10.7%	5.8%	5.8%	5.3%	5.9%
Other drug and alcohol related	Before	9.7%	17.8%	7.1%	7.3%	8.0%
	After	15.4%	10.9%	9.6%	7.2%	8.7%
All other mental conditions	Before	9.5%	13.6%	4.0%	9.1%	7.8%
	After	15.5%	12.3%	5.7%	8.5%	8.3%
All mental conditions	Before	19.7%	29.5%	12.5%	16.8%	16.4%
	After	31.0%	23.6%	17.8%	16.6%	18.3%

Approximately 8% of all prisoners had services for “Other” (non-psychotic) drug and alcohol related problems and “Other mental health problems”. Such problems were more common in female prisoners. Overall, 4.6% of prisoners had admissions for alcohol or drug related psychoses after release and 5.9% had admissions for ‘other’ psychoses. These diagnostic groups are not mutually exclusive and there was considerable cross-over between groups. Within each of these categories, the highest frequency of contacts occurred in female Aboriginal prisoners, followed by female non-Aboriginal prisoners, with approximately equal frequencies of admissions.

### 4.3.6 The relationship between hospital admissions or MHS contact before and after release for selected conditions

Previous Tables have indicated that the major causes of admission to hospital both before and after date of first release are ‘injury and poisoning’ and ‘mental disorders’, which include problems related to acute and chronic alcohol and drug addiction. Table 19 shows the relative risk of admission following first date of release in prisoners who had previous admissions for each of these conditions compared with those without previous admissions. Prisoners who had previous admissions were twice as likely to have them after release than those with no previous admissions.



In the case of poisoning, while the numbers are much smaller, prisoners with admissions before first release were five-times more likely to have admissions after release than those with no previous admissions. This increased risk was greatest in male Aboriginal prisoners (RR 7.6) but was also more than three times greater in all groups.

Admission for mental health problems after first release was twice as likely in those with such admissions before release and is again greatest in male Aboriginal prisoners (RR= 3.43).

Table 19. Relative risk\* of HSC after release if HSC before release

	Female Aboriginal	Female Aboriginal	non-Male Aboriginal	Male Aboriginal	non- All Prisoners
Total cohort	887	740	4,149	7,891	13,667
<b>Injury</b>					
Before	389	105	1,262	1,617	3,373
After	339	88	1,301	1,315	3,043
Bef. & after	225	21	584	424	1,254
<i>Relative risk*</i>	<i>2.53</i>	<i>1.49</i>	<i>1.86</i>	<i>1.85</i>	<i>2.14</i>
<b>Poisoning</b>					
Before	67	117	130	455	769
After	69	82	132	418	701
Bef. & after	15	39	26	93	173
<i>Relative risk</i>	<i>3.40</i>	<i>4.83</i>	<i>7.58</i>	<i>4.68</i>	<i>5.50</i>
<b>Mental illness</b>					
Before	175	225	524	1,381	2,305
After	230	157	573	1,273	2,233
Bef. & after	75	69	190	349	683
<i>Relative risk</i>	<i>1.97</i>	<i>1.79</i>	<i>3.43</i>	<i>1.78</i>	<i>2.17</i>

\* RR=( % HSC after release if HSC before)/( %HSC after release but no HSC before)

### 4.3.7 The relative risk of hospitalisation in released prisoners compared with the general population

The relative risk of hospital admission compared with expected rates of hospital admission in the general population after adjustment for age, gender and race is shown in Table 20. The Table shows standardised morbidity ratios (SMbR<sub>1</sub>) as described in Subject and Methods.

Table 20. The risk of hospital admission in released prisoners compared with the population of Western Australia relative to (SMbR<sub>1</sub>)

Principal Diagnosis	20-39		40-49		20-39		40-49	
	Aboriginal		Non-Aboriginal		Aboriginal		Non-Aboriginal	
	Male	Female	Male	Female	Male	Female	Male	Female
Infectious, parasitic disease	<b>3.4</b>	<b>6.2</b>	2.3	2.8	<b>5.7</b>	<b>16.5</b>	2.4	3.2
Cancer	<b>3.8</b>	<b>2.5</b>	0.9	0.6	<b>2.6</b>	<b>1.5</b>	0.4	0.8
Endocrine & nutritional	<b>7.7</b>	<b>5.4</b>	1.7	1.4	<b>9.7</b>	<b>6.4</b>	1.4	3.4
Blood diseases	0.8	2.0	0.8	0.4	1.8	2.4	1.5	0.4
Mental disorders	<b>5.6</b>	<b>6.6</b>	<b>4.6</b>	<b>5.8</b>	<b>6.9</b>	<b>6.5</b>	<b>4.8</b>	<b>2.6</b>
Nervous system diseases	<b>5.1</b>	2.5	1.4	1.7	<b>9.1</b>	<b>3.9</b>	1.2	2.3
Circulatory diseases	<b>3.2</b>	3.2	1.0	0.6	<b>4.0</b>	<b>7.4</b>	1.3	1.5
Respiratory diseases	<b>5.2</b>	<b>7.7</b>	1.0	0.9	<b>15.5</b>	<b>11.1</b>	1.8	1.7
Digestive diseases	<b>2.2</b>	<b>2.1</b>	0.9	1.0	<b>2.0</b>	<b>2.6</b>	1.0	1.4
Genitourinary diseases	1.3	1.7	1.0	1.2	1.5	1.5	1.0	1.0
Pregnancy related	0.0	1.9	0.0	1.4	0.0	1.0	0.0	0.8
Skin diseases	<b>4.7</b>	<b>11.4</b>	1.8	3.2	<b>7.0</b>	<b>5.1</b>	<b>2.2</b>	<b>2.9</b>
Musculoskeletal diseases	0.6	1.3	0.9	1.2	0.9	0.9	1.0	2.6
Congenital anomalies	0.7	0.0	1.1	0.0	0.0	0.0	0.3	0.0
Perinatal conditions	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ill-defined conditions	<b>3.1</b>	<b>2.6</b>	1.5	1.5	<b>3.6</b>	<b>5.2</b>	1.6	1.5
Injury and poisoning	<b>5.6</b>	<b>16.6</b>	<b>3.0</b>	<b>7.0</b>	<b>8.8</b>	<b>21.1</b>	<b>3.0</b>	<b>4.2</b>
Other affecting health status	0.9	4.9	0.5	1.2	1.0	1.1	0.6	0.5
All-causes	<b>3.1</b>	<b>3.5</b>	<b>1.7</b>	<b>1.9</b>	<b>3.5</b>	<b>3.7</b>	<b>1.4</b>	<b>1.5</b>

Table 20 summarises SMbR<sub>1</sub> for ages 20-39 and 40-49 by main chapters of ICD9-CM, omitting chapters based on small numbers of admissions. Figures shown in bold are instances in which 95% confidence intervals around the estimated SMbR do not include unity and are therefore statistically significant at the 5% level or less.

In Aboriginal prisoners there is a greater than three-fold risk of hospital admissions for all causes compared with the general population in both males and females and in both age groups. In non-Aboriginal prisoners, SMbRs are also significantly increased but to a lesser

extent than in Aboriginal prisoners, varying from 1.9 in females aged 20-39 to 1.4 in males aged 40-49 years.

When examined by principal condition leading to admission, the greatest and most consistent increases in SMbRs are seen in admissions for injury and poisoning, mental disorders, infectious and communicable diseases and skin diseases. In all of these, the increases are greater in Aboriginal than in non-Aboriginal prisoners and tend to be greater in females than males. Particularly notable is the very high relative risk (16.5) of admission for infectious and communicable disease in Aboriginal female prisoners aged from 40-49 years.

In Table 21, relative risk of hospital admission are shown for Aboriginal and non-Aboriginal prisons with comparisons based on respective rates for the total Aboriginal and non-Aboriginal populations (SMbR<sub>2</sub>)

**Table 21. The risk of hospital admission relative to equivalent demographic sub-groups in the population of Western Australia (SMbR<sub>2</sub>).**

Principal diagnosis	Age 20-39				Age 40-49			
	Aboriginal		Non-Aboriginal		Aboriginal		Non-Aboriginal	
	Male	Female	Male	Female	Male	Female	Male	Female
Infectious, parasitic disease	1.1	1.5	2.4	3.1	1.5	2.6	2.4	3.8
Cancer	6.5	3.6	0.8	0.6	4.6	2.4	0.3	0.7
Endocrine & nutritional	2.1	2.6	2.0	1.5	1.0	1.2	1.7	3.8
Blood diseases	0.6	1.1	0.8	0.4	0.9	1.1	1.5	0.4
Mental disorders	2.3	3.8	4.9	6.1	2.7	3.8	5.0	2.6
Nervous system diseases	1.3	0.9	1.5	1.8	2.1	2.0	1.2	2.4
Circulatory diseases	1.2	1.3	1.0	0.7	1.2	2.1	1.3	1.6
Respiratory diseases	1.3	1.8	1.1	1.1	2.2	1.3	2.1	2.0
Digestive diseases	1.4	1.8	0.9	1.0	1.4	1.9	1.0	1.4
Genitourinary diseases	0.9	1.3	1.0	1.2	0.8	1.3	1.0	1.0
Pregnancy related	0.0	1.3	0.0	1.4	0.0	1.3	0.0	0.8
Skin diseases	1.3	2.3	2.0	3.8	1.5	1.2	2.3	3.2
Musculoskeletal diseases	0.9	1.4	0.9	1.1	1.4	1.0	1.0	2.6
Congenital anomalies	2.1	0.0	1.1	0.0	0.0	0.0	0.3	0.0
Perinatal conditions	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ill-defined conditions	1.2	1.3	1.5	1.6	1.5	2.1	1.7	1.5
Injury and poisoning	1.8	2.7	3.2	8.6	2.2	4.0	3.2	4.6
Other affecting health	0.2	1.1	0.5	1.4	0.2	0.1	0.7	0.7
All-causes	1.2	1.7	1.8	1.9	1.0	1.0	1.5	1.6

The magnitude of the increase in risk for Aboriginal prisoners in Table 21, while significantly increased for all causes, injury and poisoning and mental disorders, is much less

than in Table 20. This is because of higher hospital admission rates in the Aboriginal population compared with the non-Aboriginal population. Conversely, the relative risks of admission in non-Aboriginal prisoners tend to be marginally higher in Table 21 than in Table 20 because hospital admission rates in the non-Aboriginal population tend to be lower than in total population of Western Australia with Aboriginals included. For example, in Table 21, all cause SMBRs in male and female Aboriginal prisoners aged 20-39 years are 1.2 and 1.7 respectively, compared with 3.1 and 3.5 in Table 20, while in non-Aboriginal prisoners the equivalent figures in Table 21 are 1.8 and 1.9 compared with 1.7 and 1.9 in Table 20. As in Table 20, the most consistent increases in risk across all prisoner groups were seen in injuries and poisoning and in mental disorders due to the relatively large numbers of admissions that occurred for these conditions. While based on relatively small numbers, significant and greater than two-fold increases in risk were seen for cancer admissions in both male and female Aboriginal prisoners from 40-49 years, in CNS diseases in Aboriginal prisoners (40-49 years), in circulatory disease in female Aboriginal prisoners (40-49 years), and respiratory disease in both Aboriginal and non-Aboriginal males 40-49 years.

### 4.3.8 Time to admission

In this section we examine the cumulative probability of admission to hospital from the date of first release for all causes and for 'injury and poisoning', 'mental disorders', and all remaining conditions combined. In the following Figures 1-5, the survival function shows the percentage of persons in each demographic group not yet admitted to hospital or having a MHS contact after the date of first release. The converse of this, the cumulative percentage having hospital admission or HSC over time is summarised from Figures 1-5 in Table 22.

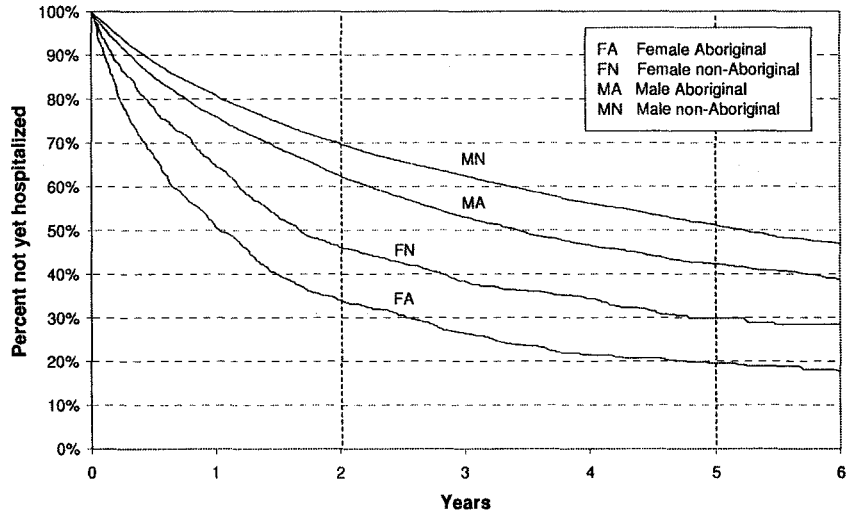
Table 22. Hospitalisation or MHS Contact at 1, 2 and 5 years

Condition	Percentage with HSC by:		
	Demographic group	One year	Two years
<i>Any condition (Figure 1)</i>			
Female Aboriginal	49.4%	66.0%	80.4%
Female non-Aboriginal	35.2%	54.0%	70.0%
Male Aboriginal	24.0%	37.6%	57.7%
Male non-Aboriginal	19.1%	30.1%	48.8%
<i>Any condition(non-gynae.) (Figure 2)</i>			
Female Aboriginal	40.8%	57.3%	74.1%
Female non-Aboriginal	25.8%	39.1%	56.1%
Male Aboriginal	24.0%	37.5%	57.7%
Male non-Aboriginal	19.0%	30.1%	48.7%
<i>Injury or Poisoning (Figure 3)</i>			
Female Aboriginal	17.3%	29.6%	45.4%
Female non-Aboriginal	9.8%	14.8%	21.0%
Male Aboriginal	11.4%	20.0%	36.5%
Male non-Aboriginal	7.0%	12.0%	22.2%
<i>Mental problems (Figure 4)</i>			
Female Aboriginal	10.4%	17.7%	33.1%
Female non-Aboriginal	10.2%	16.4%	25.9%
Male Aboriginal	5.7%	10.4%	19.3%
Male non-Aboriginal	6.8%	11.3%	18.7%
<i>Other conditions (Figure 5)</i>			
Female Aboriginal	29.1%	41.8%	61.2%
Female non-Aboriginal	14.4%	22.2%	40.6%
Male Aboriginal	17.7%	22.6%	40.6%
Male non-Aboriginal	10.1%	17.3%	33.0%

From Figure 1, which shows time to first HSC for any condition, it is apparent that the probability of HSC is clearly greater and occurs more rapidly in Aboriginal women of whom

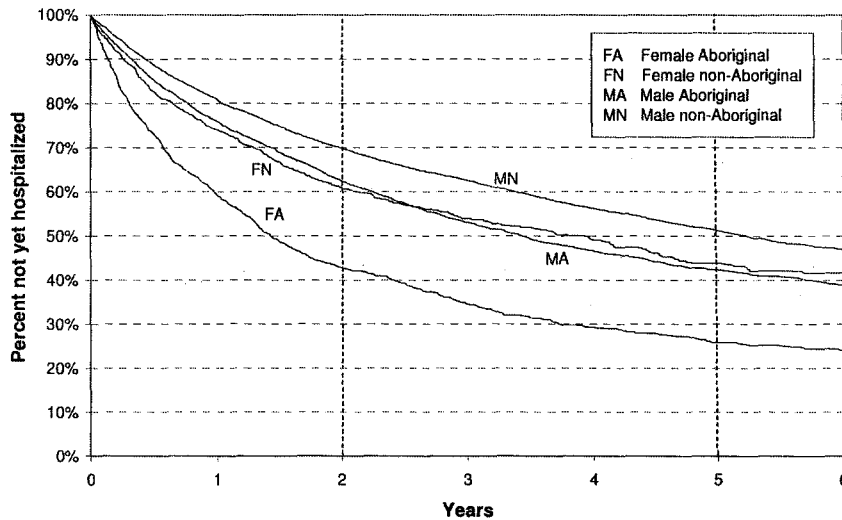
67% had admissions by two years. This is followed by 54% in non-Aboriginal women, 38% in Aboriginal men and 30% in non-Aboriginal men.

**Figure 1: Prisoners - Time to First Hospitalization After Release**



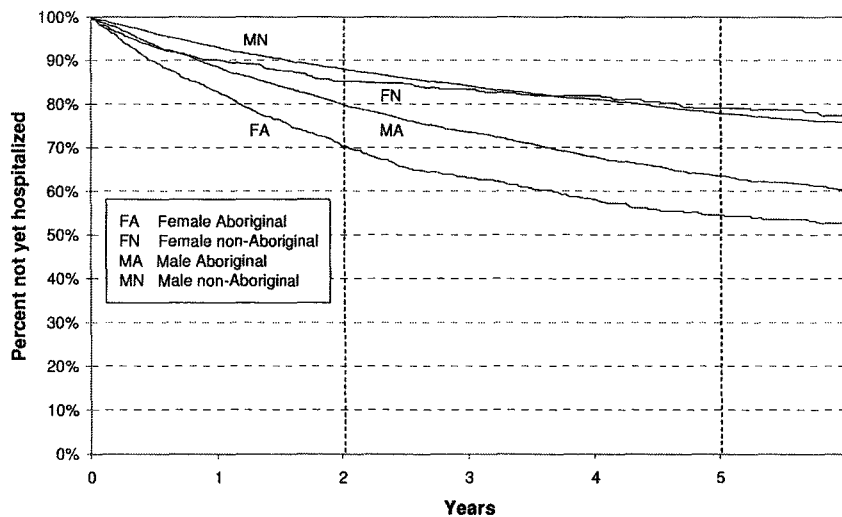
The high percentage of female prisoners who had hospital admissions for obstetric and gynaecological conditions after first release was noted previously in Table 15. Admissions for these conditions have been excluded in Figure 2, with consequent reduction in the two year probability of admission to 57% (from 66%) in Aboriginal women and 39% (from 54%) in non-Aboriginal women (see Table 22). In both Figures 1 and 2, the greatest separation between groups occurs in the first two years and thereafter remained relatively unchanged.

**Figure 2: Prisoners - Time to First (non-gynae) Hospitalization After Release**



The time to first admission for injury and poisoning is shown by demographic sub-group in Figure 3.

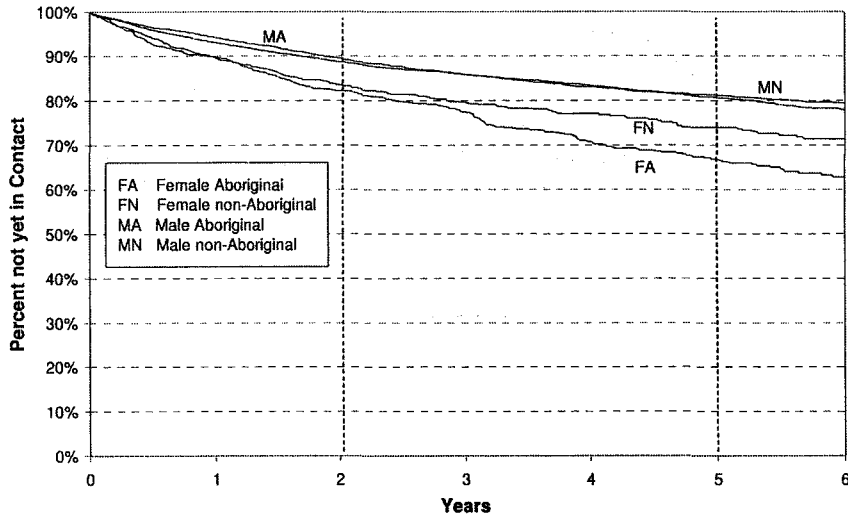
**Figure 3: Prisoners - Time to First Hospitalization for Injury/Poisoning After Release**



The probability of admission for injury and poisoning is again highest in Aboriginal women (30% at two years) followed by non-Aboriginal women (20%), Aboriginal men (15%) and non-Aboriginal men (12%). As in Figures 1 and 2, the risk of admission is greatest in the first two years after release, particularly in Aboriginal women.

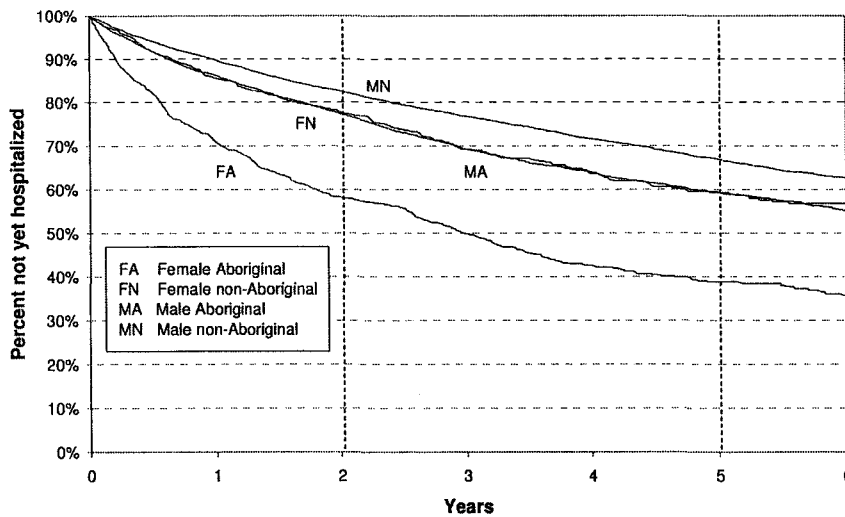
The cumulative probability of admission or MHS contact for 'mental' disorders is shown in Figure 4.

**Figure 4: Prisoners - Time to Contact with MHS After Release**



Aboriginal female prisoners and non-Aboriginal female prisoners have approximately the same probability of admission or MHS contact at two years (17%) but thereafter it increases more rapidly in Aboriginal women (to 33% at five years compared with 26% in non-Aboriginal women). In males, the probability of contact at two years is 10% in both Aboriginal and non-Aboriginal men, gradually increasing to approximately 20% at six years.

**Figure 5: Prisoners - Time to First "Other" Hospitalization After Release**





Finally, Figure 5 shows the cumulative probability of admission for all remaining conditions. This is again notable for a rapid increase in cumulative admission in Aboriginal women to over 40% at two years and nearly 65% at six years. In non-Aboriginal women and Aboriginal men, the probability of admission is about 22% at two years and nearly 45% at six years. In non-Aboriginal men the respective figures are 17% and 37%.

The extent to which the probability of admission varies with age was determined for each of the above condition and demographic sub-groups separately, but differences with age were found to be small in virtually all instances. We have therefore not attempted to make adjustments for age.

### 4.3.9 The relationship between morbidity and re-offending

In this section we examine the relationship between a previous history of HSC contact and subsequent re-offending and the relationship between re-offending and HSC following release from prison. We initially compared HSC contacts in known first offenders who did not re-offend within two years of first release with known first offenders who re-offended within two years and multiple re-offenders. As there was little difference between HSC in the latter two groups they have been combined in the Tables that follow.

Table 23. Hospital admission or mental health service contact (HSC) in the five years before first release in re-offenders and prisoners who did not re-offend within two years of first release

Re-offender status	Female Aboriginal	Female Aboriginal	non-Male Aboriginal	Male Aboriginal	non- All Prisoners
<i>Number of prisoners</i>					
Did not re-offend	346	506	902	4,329	6,083
Did re-offend	542	257	3,278	3,879	7,956
<i>HSC in five years before release</i>					
<i>Any condition</i>					
Did not re-offend	69.1%	56.7%	45.9%	43.4%	46.3%
Re-offended	76.2%	70.3%	53.3%	54.4%	55.8%
Prevalence ratio	1.10	1.24	1.16	1.26	1.20
<i>Mental Health problem</i>					
Did not re-offend	15.9%	24.9%	10.1%	13.1%	13.8%
Re-offended	22.1%	38.5%	13.2%	21.0%	18.4%
Prevalence ratio	1.39	1.55	1.31	1.61	1.34
<i>Injury or poisoning</i>					
Did not re-offend	43.9%	20.6%	27.7%	19.1%	21.9%
Re-offended	48.7%	34.6%	32.7%	28.4%	31.8%
Prevalence ratio	1.11	1.68	1.18	1.49	1.45

Table 23 compares the prevalence of a history of HSC in the five years before first release in known first offenders who did not re-offend within two years with that in all re-offenders. Re-offenders were 20% more likely to have such a history than non re-offenders. This trend was present in all demographic groups but was greater in both male and female non-Aboriginal prisoners than Aboriginal prisoners.

The prevalence of previous HSC for mental problems was 34% greater in re-offenders than non-re-offenders. This trend was also present in all demographic groups but was again greater in non-Aboriginal prisoners (61% greater in males; 55% greater in females).

The prevalence of previous admission for injury or poisoning was 45% greater in re-offenders than non-re-offenders. As in the case of mental problems, this propensity was again greater in female non-Aboriginal prisoners (68%) and male non-Aboriginal prisoners (49%) than in female Aboriginal prisoners (39%) and male Aboriginal prisoners (18%).

The probability of HSC contact in the two years after the first release during the study period is shown for non re-offenders and re-offenders in Table 24.

Table 24. Hospital admission or mental health service contact (HSC) in the two years following first release in the study period in re-offenders and prisoners who did not re-offend within two years of first release

Re-offender status within two years of release	Female Aboriginal	Female Aboriginal	non-Male Aboriginal	Male Aboriginal	non-All Prisoners
<i>Number of prisoners</i>					
Did not re-offend	346	506	902	4,329	6,083
Did re-offend	542	257	3,278	3,879	7,956
<i>HSC within two years of release</i>					
<i>Any condition</i>					
Did not re-offend	52.6%	30.8%	28.2%	22.9%	26.0%
Re-offended	55.5%	44.7%	33.0%	29.0%	33.0%
Prevalence ratio	1.06	1.45	1.17	1.27	1.27
<i>Mental Health problem</i>					
Did not re-offend	14.2%	12.6%	8.0%	6.8%	7.9%
Re-offended	18.3%	19.5%	9.1%	13.4%	12.2%
Prevalence ratio	1.29	1.54	1.14	1.97	1.54
<i>Injury or poisoning</i>					
Did not re-offend	22.8%	9.3%	12.3%	7.4%	9.2%
Re-offended	29.5%	21.0%	17.4%	12.5%	16.0%
Prevalence ratio	1.29	2.26	1.41	1.68	1.74

The pattern is similar to that shown in Table 23. Re-offenders had a 27% greater probability of admission for all conditions than those who did not re-offend but this was much greater in

non-Aboriginal women in whom health service contact was 45% more likely than in those who did not re-offend and in non-Aboriginal men who re-offended (27% greater). In the case of mental health problems, admissions were 54% more likely in re-offenders than non-re-offenders. This trend was present for all groups but greater in non-Aboriginal men (97%) and women (54%). Finally it is seen that admissions for injuries or poisoning are 74% more likely in re-offenders than non-re-offenders. This excess risk in re-offenders was again more marked in non-Aboriginal prisoners (126% greater in women and 68% more likely in men).

#### **4.4 Synthesis of results.**

In this section we examine the similarities of factors associated with excess deaths and high use of hospital and MHS. As these factors vary with gender and Aboriginality we have brought together information relating to death and morbidity for each of the sub-groups of prisoners separately.

##### **4.4.1 Female Aboriginal prisoners**

The risk of death in released female Aboriginal prisoners is 8-9 times higher than in women in the general population Western Australia of the same age and approximately twice that of Aboriginal women in the general population. In the age group 20-39 years the risk of death in Female Aboriginal and non-Aboriginal prisoners is approximately the same but in the age group 40-59 years the risk is substantially higher in female Aboriginal prisoners than in non-Aboriginal prisoners. It is likely that this difference is due to higher death rates from chronic diseases in older Aboriginal prisoners. Approximately three quarters of the 30 deaths in female Aboriginal prisoners were due to the effects of Alcohol and drug addiction, or to Injury and Poisoning. The majority of the latter, amounting to one-fifth of all deaths, were related to Transport accidents with few attributed to Suicide, self-harm or homicide.

Female Aboriginal prisoners also had higher relative and absolute risks of hospital admission or contacts with MHS than all other demographic groups. Compared with all women in Western Australia, female Aboriginal prisoners were three to four times more likely to be admitted to hospital or have MHS contacts and over 60% more likely than Aboriginal women in the general population to receive such services. Approximately 80% had at least one admission or MHS contact both before and after the date of first release. Moreover, female Aboriginal prisoners had an average of 6.5 admissions per person before and 8.0

admissions after release, which is more than three times the average number of admissions for all prisoners.

With the exception of admissions for Poisoning, which were highest in female non-Aboriginal prisoners, female Aboriginal prisoners had the highest level of admission or MHS contact for all major conditions investigated. While levels of hospitalisation were particularly high for pregnancy and gynaecological conditions as well as mental disorders and injury, levels of admission were also relatively high for Respiratory, Digestive, Genitourinary, Skin conditions and Infectious and Parasitic diseases, indicating that female Aboriginal prisoners suffer from a broad range of health problems, many of which may have an infectious aetiology.

Female Aboriginal prisoners had particularly high levels of admission for injury with approximately 40% having at least one such admission both before and after the date of first release, but with many having multiple admissions. The largest single cause of admission was injury due to assault (approximately 35%), followed by falls (nearly 10%), self-harm due to medicinal agents (over 5%), other forms of self-harm (5%), and transport related injury (nearly 5%). It should be noted that these categories are not mutually exclusive because of the high proportion of subjects who had multiple admissions for injury or poisoning.

#### **4.4.2 Female non-Aboriginal prisoners**

Female non-Aboriginal prisoners aged 20-39 years had a risk of death approximately ten times greater than women in the general population of the same age, while for those aged 40-59 years the risk was three times greater. The very high risk of death in younger women was greater than the risk of any of the other groups of prisoners of the same age. While there were only 22 deaths in female non-Aboriginal prisoners, it is nevertheless clear that their excess mortality was due largely to deaths related to Injury or Poisoning or alcohol or drug addiction, which collectively accounted for three quarters of the deaths. External cause of Injury and Poisoning codes (E-codes) indicated that self-harm (mainly by poisoning) or accidental poisoning were the main individual causes of death.

This pattern of causes of death was paralleled by high relative and absolute risks of hospitalisation or contact with MHS for the same conditions. The overall risk for all conditions after release compared with all non-Aboriginal women in Western Australia was 1.9 times greater in those aged 20-39 years and 1.6 times greater in those aged 40-59 years.

In the case of services for Mental disorders (including acute and chronic effects of alcohol and drug addiction), the respective relative risks were considerably higher (6.1 and 2.6 respectively) and higher again for Injury and Poisoning (8.6 and 4.6 respectively). These conditions were also among the commonest reasons for admission to hospital or MHS contacts in this group of ex-prisoners. For example, the percentages of women who received such services for Mental disorders in the five years before and following the date of first release were 30% and 24% respectively. For Poisoning the respective figures were 15% and 11% and for physical injury 15% and 11% respectively. When External Cause of Injury and Poisoning codes were examined, 13% and 8% respectively were coded as 'Self-harm due to medicinal agents' while approximately 5% had admissions for Accidental Poisoning before and after release.

There is thus close agreement between the major causes of morbidity and mortality, with evidence of long-standing mental problems including alcohol and drug addiction, in non-Aboriginal female prisoners.

#### **4.4.3 Male Aboriginal prisoners**

Male Aboriginal prisoners had five times the risk of death compared with males of the same age in the general population of Western Australia. Unlike male non-Aboriginal prisoners, the risk of death in those aged 40-59 years is higher than in those aged 20-39 years. It is likely that this was due to higher rates of death from chronic disease. For example, deaths due to cardiovascular disease, diabetes and renal failure together accounted for 23% of deaths in male Aboriginal prisoners compared with 11% of deaths in male non-Aboriginal prisoners, despite the younger average age of Aboriginal male prisoners. While injury and poisoning are major causes of death in male Aboriginal prisoners, they accounted for only 46% of deaths in this group compared with 58% in non-Aboriginal males. Deaths due to self-harm accounted for 19% of total deaths, while over 10% were related to transport accidents.

Male Aboriginal prisoners had over three times the risk of hospital admission than the male population of Western Australia and over six times greater risks of admission for mental disorders (including acute and chronic effects of alcohol) and for injury and poisoning, over three times the risk of admission for circulatory diseases, seven times for endocrine diseases, and five times for respiratory and skin diseases. Thus, as in the case of female Aboriginal prisoners, males Aboriginal prisoners are subject to a broad range of medical problems that pre-date first imprisonment. When the same comparisons were made with the general male

Aboriginal population, the relative risks of both mortality and hospital admission were less, but still at least twice as great for mental disorders and injury and poisoning, both of which were major causes of hospital admission. Over 30% of subjects had at least one admission for injury and poisoning before and after date of first release and 13% and 18% respectively having admissions or MHS contacts for mental disorders. Assault was the most common cause of admission for injury for which approximately 20% had admissions before or after release, followed by transport related injuries (approximately 6%).

#### **4.4.4 Male non-Aboriginal prisoners**

Male non-Aboriginal prisoners aged 20-39 years had four times the risk of death of males in the general population of Western Australia. In those aged 40-59 years the risk was twice as great. Deaths due to effects of alcohol and drug addiction or Injury and Poisoning accounted for approximately three quarters of all deaths and were therefore likely to account for a major part of the excess of deaths in this group. The largest single cause of death was suicide, self inflicted harm and homicide which accounted for 22% of total deaths followed by acute and chronic effects of alcohol and drug addiction (16%). Transport related deaths accounted for a further 8% of total deaths.

Compared with males in the general population of Western Australia, non-Aboriginal male prisoners had between 1.5 and twice the risk of hospitalisation or contact with MHS after release from prison. In the case of mental disorder however, the risk was five times greater and for injury and poisoning it was approximately three times greater.

Approximately 50% of male non-Aboriginal prisoners had at least one hospital admission or MHS contact both before and after the date of first release. Admission for Injury was the largest single reason for admission to hospital, occurring in approximately 20% of prisoners, both before and after the date of first release, followed by admission for mental disorders (17%). About 5% were admitted because of poisoning before and after release. The largest single reason for admission for injury or poisoning was Assault (approximately 7%), followed by transport related accidents (5%) and self-harm (5%).

In summary, the excess mortality and morbidity in non-Aboriginal male prisoners is predominately due to mental disorders (including addiction to alcohol and drugs) or injury and poisoning which may also often be due to the use of alcohol or illicit drugs.

#### **4.4.5 Time to death or hospitalisation following release**

The results of the study suggest that prisoners were particularly vulnerable to death or hospitalisation in the period immediately after release. This was most apparent for deaths. The crude death rate for all causes of death in the six months after release was nearly four times higher than after one year, while in the second six months it was twice as great. This pattern was similar for all demographic sub-groups, but the gradient with time from release was particularly marked for deaths related to addiction to alcohol and drugs, and deaths due to injury and poisoning. The numbers of deaths were too small (particularly in women) to analyse time to death for specific causes of death in demographic sub-groups. Nevertheless, it is reasonable to assume from these results that problems related to alcohol and drug addiction and injury and poisoning, account for much of the excess risk of deaths in individual groups of prisoners, including non-Aboriginal female prisoners in whom the risk of death after release was particularly high. It suggests the possibility that some deaths are due to increased sensitivity to drugs after a period of abstinence.

Kaplan-Meier survival analysis for time to first hospital admission following release demonstrated that the probability of admission was much higher in the first year after release and appeared to decline exponentially with time up to six years from date of release. This was particularly apparent for female Aboriginal and non-Aboriginal prisoners and least apparent for male non-Aboriginal prisoners.

The results from both the mortality and morbidity studies suggest the need to facilitate access to health care in the period immediately after release.

#### **4.4.6 The risk of mortality and morbidity in repeat offenders**

The risks of both death and hospitalisation are higher in re-offenders than in first offenders. From the information on hospital admissions or MHS contacts before date of first release, it was seen that this prisoners who ultimately became re-offenders had higher levels of service use before imprisonment as well as after the period of first release. This trend was particularly strong for mental disorders and Injury and Poisoning in both male and female non-Aboriginal prisoners. It suggests that behaviours leading to use of health services for mental disorders or Injury and Poisoning, particularly alcohol or drug abuse, may also be associated with re-offending.

## 5 Discussion

Our study has shown that released prisoners, have higher risks of death and hospital admission than the general population after adjustment for age, gender and Aboriginality. Released prisoners also have a higher prevalence of hospital admission and contacts with MHS before imprisonment, suggesting that many of their health problems are long-standing. There are moreover strong similarities between risk factors and causes of death and hospitalisation both before and after imprisonment. For example, 'mental disorders', including problems related to the effects of alcohol and drug addiction, and injury and poisoning account for much of the excess mortality and morbidity in released prisoners. Moreover, a history of hospital admission or MHS contacts before imprisonment is strongly predictive of the use of the same services after release. Suicide, drug and alcohol related death, accidental poisoning and transport related deaths were the leading causes of death, while 'injury and poisoning' and problems associated with alcohol and drug abuse were the principal conditions leading to hospital admission or contact with MHS. It is likely that many death and episodes of hospital admission attributed to physical injury are associated with alcohol or drug abuse even if not coded as such.

The findings above are consistent with studies of causes of death in released prisoners conducted elsewhere. Harding-Pink and Fryc found an increased risk of sudden death in released prisoners in Geneva and noted, as in the present study, that the risk of death was particularly high in the weeks soon after release. (3) Early deaths were more likely to occur in prisoners with a record of substance abuse and were often attributed to opiates, including methadone. The authors concluded loss of tolerance to opiates while in prison may have led to death in prisoners who resumed to pre-imprisonment drug practices.(2) A study of injecting drug users in UK found an eight-fold risk of death in the first two weeks after release from prison compared with the following ten weeks. (6) In the State of Victoria in Australia a retrospective cohort study of young offenders found the risk of death from all causes and from drug-related causes to be nine times and 25.7 greater respectively than in the general population. Davies and Cook also examined mortality in released female prisoners in Victoria and found that 45 of 62 deaths were due to drug-related causes. (9) In a further study of unnatural deaths in people released from prisons in Victoria, Graham also found a relative risk of death that was ten times greater than in the general population, with the greatest risk occurring in the first few weeks after release. Over half of unnatural deaths were related to the use of due to heroin, while heroin-related deaths in released prisoners



accounted for 25% of all such deaths in Victoria. (11). A study in death in prisoners serving community correction orders in Victoria found that of 198 deaths, 62 were related to use of drugs or alcohol and a further 29 were due to suicide. (8), 1999 #104] In Finland, Joukamaa found a nearly four-fold risk of all cause mortality in a representative sample of 900 released male prisoners compared with age-matched community controls. For 'natural' diseases (predominately cardiovascular disease) the risk was nearly three times greater and for deaths due to injury or poisoning (including suicide and homicide) it was more than five times greater. (5) Other studies in Finland in violent offenders found a five-fold risk of death in males and 17 times greater risk in females compared with the general population after adjustment for age. (7, 10) Lattimore *et al* examined mortality in two cohorts of young Californian males paroled during the 1980s, and found a particularly high rate of death due to homicide. (4) Alcohol and illicit drug abuse is thus a likely link between poor health outcomes and offending behaviour.

Re-offenders have notably higher risks of death and hospital admission than first offenders, particularly for mental problems and injury and poisoning as noted in other studies(28). The higher risk of hospital admission in re-offenders is particularly noticeable in non-Aboriginal prisoners in whom the relative risk of admission for mental health problems within two years was 1.97 in males and over 1.54 in females compared with prisoners who did not re-offend. In Aboriginal prisoners who re-offended, the relative risks were 1.14 and 1.30 in males and females respectively. In the case of injury and poisoning, the relative risks in non-Aboriginal re-offenders were 1.68 in males and 2.26 in females, compared with 1.41 in Aboriginal male prisoners and 1.29 in female Aboriginal prisoners.

The high prevalence of mental problems both before imprisonment and after release demonstrated in this study are consistent with studies in prisoners in the United Kingdom (UK). For example, a survey of mental health in prisoners conducted by the Office of National Statistics on behalf of the Department of Health and Social Security found that 14% of women and 10% of men on remand had experienced psychotic episodes in the previous year while 39% of men and 75% of women had significant neurotic symptoms, which the authors note, is well above the prevalence found in similar household surveys. Even larger proportions (69% of women and 85% of men) admitted to ever-using illicit drugs. Moreover approximately 40% of women and 20% of men on remand reported receiving medical help for mental problems in the previous year. This investigation was consistent with previous studies in representative samples of prisoners carried out in the UK the early 1990s, and is

cited as a major reason for the subsequent transference of responsibility for prisoner health from the Prison Service to the National Health Service to ensure equal standards of care in prisons and the general community. (29-33)

The new arrangements in the UK should improve the prospects of continuity treatment after release. A study of mental problems and drug abuse in remand prisoners noted that while important opportunities existed for treatment and rehabilitation of prisoners, the possibility of early release meant that particular efforts were required to ensure continuity of care in the community. (21, 34) The problems in ensuring continuity of care and compliance with medication in prisoners with other chronic diseases such as tuberculosis (TB) and HIV-AIDS after release have been noted by other research workers. (23) Hammett *et al* have identified five requirements to help prisoners with mental conditions make a successful transition to community living which may well apply to the majority of prisoners. They include effective discharge planning to ensure community linkage and continuity of care; adherence to treatment regimes; availability of appropriate transitional and permanent housing; quick access to other benefit programs; and recognition of the particular needs of prisoners with multiple problems. (1)

Apart from the importance of including ongoing health care as one facet of release planning, this can only be relevant if adequate resource exist in the community to meet assessed health needs. For example, a study of the use of community MHS following release in mentally ill offenders in Washington State found that while over 70% of prisoners received social or MHS after release, few received these at a meaningful level. Charges for new crimes or supervision violations were common (in 70% of prisoners).

A major finding of the present study is the greater risk of both death and hospitalisation in Aboriginal prisoners than in non-Aboriginal prisoners when both are compared with the general population of Western Australia. These differences are reduced when Aboriginal prisoners are compared with the Aboriginal population of Western Australia, indicating that Aboriginal prisoners share the same health disadvantages of Aboriginal people generally. Evidence for excess mortality in Aborigines in Western Australia compared with the general population, has been well documented. In the age groups 15-29 years and 30-49 years, corresponding to the age of the majority of prisoners included in the study, the relative risks of death in Aboriginal males compared with the general population were 3.3 and 6.4 respectively and in females 3.4 and 5.5 respectively. (35) Similar relative risks for death in Aboriginal infants and children in the same study are indicative of the social deprivation that

affects the health of Aboriginal people throughout life. Studies elsewhere have stressed the importance of social disadvantage in early life on both ill-health and offending behaviour. (36) Notwithstanding these results, Aboriginal prisoners are at greater risk of death than other members of the general Aboriginal population. Similarly, part of the increased risk of hospitalisation in Aboriginal prisoners is due to the greater risk of hospitalisation in Aboriginal people in the general population as demonstrated in a recent comparative study of hospitalisation for five major health problems.(37). Even allowing for this Aboriginal prisoners had higher risks of hospital admission for a wide range of disease conditions in addition to mental disorders and injury and poisoning including infectious and parasitic diseases, cancer, endocrine and nutritional diseases, circulatory disease, respiratory disease, digestive disease, and skin conditions, most of which are associated with social disadvantage. As noted previously, Aboriginal prisoners were more likely to be re-imprisoned than non-Aboriginal prisoners and it is possible that their poor health outcomes may be related to greater levels of social disadvantage that also predispose prisoners to multiple offending.

The present study found that all female prisoners are at substantially greater risk of death and hospitalisation than male prisoners. Not only were female prisoners more likely than male prisoners to have multiple hospital admissions, they were also admitted to hospital much sooner after release than male prisoners, with 66% of Aboriginal women and 54% of non-Aboriginal women being admitted to hospital within two years after first release compared with 38% of Aboriginal males and 30% of non-Aboriginal males. Female non-Aboriginal prisoners had the highest rate of hospital admission for 'mental disorders' and 'poisoning', while female Aboriginal prisoners had the highest rates of admission for all other conditions. Of particular concern is that over 40% of female Aboriginal prisoners had hospital admissions for Injury with over one-third having admissions for injury due to 'Assault'. This finding is consistent with a national study that compared hospital admissions for injury in Aboriginal and Torres Strait Islanders with non-Aboriginals and found that interpersonal violence accounted for 31% of admissions for injury in Aboriginal women and 50% in men. Compared with the non-Aboriginal population, age standardised rate ratios for admissions due to interpersonal violence were 11 times greater in male Aboriginal prisoners and probably many times greater in females although the authors note that this is difficult to determine precisely because of possible under-reporting of domestic violence in non-Aboriginal women. (38) In addition, female prisoners have rates of hospital admission for

pregnancy and other conditions related to reproduction that are probably substantially higher than in women of the same age in the general population.

While women constitute only 11% of released prisoners, the extent of their health problems is of particular concern, particularly in view of the high prevalence of mental illness and attempted self-harm reported in female prisoners elsewhere. (19, 39) Anderson in particular has drawn attention to historical neglect of the health of female prisoners. She emphasises their special health needs, including physical and mental problems related to drug dependence such as HIV and hepatitis, and a high prevalence of gynaecological problems. (39)

### **5.1 Implications for policy**

The current study has several implications for preventive and clinical services for released prisoners. Four points stand out:

First the study provides evidence that prisoners have long-term health problems that pre-date imprisonment and probably originate in early life. This is consistent with the evidence linking both poor health status and criminal behavior to social disadvantage. Success in tackling ill-health in prisoners will ultimately depend on reducing the same social inequalities that lead to offending behaviour.

The second issue is the importance of mental problems, including addictive behaviour and injury and poisoning, as causes of both death and morbidity and the strong link between these conditions and re-offending, as noted in other studies.(40) The successful management of such medical problems, which requires long-term treatment and counseling, is difficult even under ideal conditions, but even more so in uncertain social circumstances that many released prisoners find them themselves.

The third issue is the seriousness of the extent of higher risks of death and hospitalisation in Aboriginal prisoners. In the long-term these can only be reduced by addressing social disadvantage that leads to chronic ill health. In the interim, the health problems need to be addressed through culturally appropriate health services. These need to be structured to ensure continuity of care on re-entry into the community, and, as recommended by the Royal Commission on Aboriginal Deaths in Custody, should involve Aboriginal Medical Services in locations wherever this is possible. (41)

Finally, while female prisoners account for only 11% of all prisoners, they have extensive health problems that warrant special attention. In doing so however, it is important to recognise the different needs of Aboriginal and non-Aboriginal women.

These issues thus raise a number of questions that must be considered by policy makers if the health problems of released prisoners are to be addressed:

- i. Are the present structural arrangements between prison health services and other part of the health care system, including Aboriginal Medical Services, appropriate for meeting the long-term health care needs of released prisoners?
- ii. Do existing prison health services have sufficient resources for assessment of health needs and assessment of risk factors for acute and chronic health problems after release as well as management of current health problems as while in prison?
- iii. Is there adequate communication between prison and general health services to ensure continuity of health care, particularly in prisoners with mental problems, those with addiction to alcohol and illicit drugs or infections such as HIV-AIDS and hepatitis-C.
- iv. Are sufficient resources available for adequate pre-release planning to connect prisoners to appropriate health care and supportive services after release, having particular regard to the needs of Aboriginal and female prisoners?
- v. Are the ongoing health needs of prisoners adequately recognised in pre-release planning and the parole process?

## **5.2 Limitations and scope for further study**

We acknowledge that our study has several limitations and also poses questions that can only be answered by further studies.

One of the most important concerns is that of possible errors in estimating relative risks of death or health service contact in Aboriginal prisoners relative to the general Aboriginal populations. For the purpose of the Quinquennial Census, enumeration of the Aboriginal population is based on the principles of self identification and acceptance by the Aboriginal communities. The extent to which the same criteria are used to identify persons of Aboriginal origin in various health records, death records or the criminal justice system is uncertain. Lack of consistency in this regard could lead to numerator-denominator mismatch leading to unpredictable errors in rates. In this study, Aboriginality is based on

Department of Justice records. While misclassification of Aboriginality may have occurred, this is unlikely to greatly affect comparisons of health outcomes within the prisoner cohort. On the other hand, comparisons of health measures in Aboriginal prisoners and the general Aboriginal population in Western Australia may be inaccurate. Because of the relatively small size of the Aboriginal population, comparisons between non-Aboriginal prisoners and the non-Aboriginal population of Western Australia are unlikely to be affected to the same extent.

A further limitation is that our study does not take into account differences in the health of prisoners from different communities. For example, a comparative study of Aboriginal health by regions of Western Australia found marked regional differences in mortality and hospitalisation for the five most important health problems (cancer, diabetes, cardiovascular disease, respiratory disease and injury and poisoning). For all conditions except cancer, both mortality and hospital admissions tend to be highest in the North West and lowest in the Perth metropolitan area. By not recognising this heterogeneity, our study may have over-generalised the health problems of released Aboriginal prisoners. To be of practical value, further studies of the existing data should examine the extent to which there are particular health issues in released prisoners who come from different regions of the State.

To determine the relative risk of death between prisoners and the general population, we estimated age, sex and cause specific death rates for the total population from coded death data provided by the Health Department or, for later years, from monthly, free-text abstracts of death, which were then coded by the study team. The latter may differ from the eventual official coded causes of death. In approximately 6% of records, the coroner's verdict on the final cause of death was pending. It is likely that the majority of these will eventually be coded as 'Injury or Poisoning' so that deaths due to the latter causes may have been underestimated.

To compare the risk of hospitalisation in prisoners compared with the general population, we were dependent on routine tabulations of hospital admission rates produced by the Epidemiology Department of the Department of Health of Western Australia. Age and sex specific rates were available for broad chapters of the ICD for the Aboriginal and non-Aboriginal populations of Western Australia.<sup>(27)</sup> Unfortunately, more detailed population data relating to specific causes of hospitalisation that may have provided greater insights into the health problems leading to hospitalisation in prisoners were not available. Such an analysis would involve detailed analysis of causes of hospital admission for a major

proportion of the population of Western Australia, which while feasible was beyond the scope of this research study. Nor did we have access to population data relating to use of MHS. Finally, the available data on hospitalisation were based on total admissions rather than persons, which would have provided a more satisfactory basis for comparison. For example, if ex-prisoners are more likely to have multiple admissions to hospital for the same conditions, their risk of such admissions relative to the general population will have been overestimated.

The study has shown that released prisoners have hospital admissions and contacts with MHS in the five years prior to the date of first release with about the same frequency as in the approximately five years (on average) following first release. While this is strong evidence that ex-prisoners have long-standing health problems before imprisonment, we have not made a direct comparison between rates of hospitalisation rates in prisoners before release and rates in the general population. Nor did take into account days spent in prison during the five years prior to date of first release. As hospitalisation for particular conditions, particularly injury and poisoning, is probably less likely to occur while in prison than the community, the frequency of hospitalisation prior to imprisonment may have been underestimated. The comparison between pre and post-release hospitalisation has also not taken account of the fact that the members of the study cohort would have been on average five years younger in the period prior to first release, which may have led to further bias. As the study has shown that pre-imprisonment health status of prisoners is an important issue, a more detailed study that recognizes imprisonment time and age differences is required. This should also take advantage of the opportunity that exists in Western Australia of extending the study backwards in time for a minimum of fifteen years prior to the date of first release.

The diagnostic groups used to study the causes of death and hospitalisation were very broad and more detailed analysis is required, particularly of mental disorders and admissions for injury and poisoning which accounted for much of the excess mortality and morbidity in prisoners. The accuracy of diagnostic coding of mental disorders in particular needs to be verified so that a more accurate picture can be given of the nature and severity of mental problems experienced by prisoners. Closer examination should also be made of the reasons for admissions to MHS hospitals and attendances at clinics. An attempt should also be made to distinguish between admissions to psychiatric units in general hospitals from admissions to general wards in cases coded as having mental illness.

Finally our study has not attempted to relate mortality or morbidity to the nature of offending behaviours that led to imprisonment although such information is available. For example it would be logical to look more specifically at health outcomes in persons who had drug related offences or those imprisoned because of violent behaviour. Nor have we taken into account the effects of duration of imprisonment on health outcomes. Further studies integrating imprisonment details as explanatory variables for health status should be undertaken.

## **6 Conclusions**

Our study has several policy implications relating to the provision of preventive and clinical services for released prisoners and has identified areas in which further research is required.

With regard to policy implications, four issues stand out:

- i) Prisoners are at substantially greater risk of death and illness leading to hospitalisation and contact with MHS than the general population. They also have higher levels of hospitalisation and contacts with MHS in the five years prior to the date of their first release, suggesting that many of their health problems are long-standing and related to social disadvantage throughout life. This is consistent with evidence linking both poor health status and criminal behavior to social disadvantage. Success in reducing ill-health in prisoners will ultimately depend on reducing the same social inequalities that lead to offending behaviour.
- ii) Mental problems, including addictive behaviour and consequent injury and poisoning, are a major cause of death and morbidity in released prisoners. There is also a strong link between these conditions and re-offending. The successful management of such problems requires appropriate assessment and treatment of mental disorders during imprisonment as well as measures to ensure continuity of care after release into the community.
- iii) Aboriginal prisoners are at particularly high risk of death and hospitalisation from a wide range of acute and chronic health problems. In addition to reducing social disadvantage that leads to chronic disease, the health problems of Aboriginal prisoners need to be addressed through culturally appropriate health services. Wherever possible this should involve the participation of Aboriginal Medical Services.
- iv) While female prisoners account for only 11% of all prisoners, they have extensive health problems, including gynaecological disorders, that require special



attention. It is important however, to recognise the different needs of Aboriginal and non-Aboriginal women.

The study has identified areas where further research is required using the current linked data set. The most important of these are:

- v) To describe in more detail the spectrum of mental health problems in prisoners and hence assess requirements for formal management by MHS.
- vi) To undertake regional studies to assess in greater detail the nature of medical problems in Aboriginal prisoners released in different locations.
- vii) To describe more fully patterns of illness in prisoners in early life
- viii) To examine the extent of discrepancies in assigning Aboriginality in Health Department and Department of Justice records.

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