

**A study of hospitalisation and
mortality due to alcohol use
in the Kimberley health region
of Western Australia, 1988-1992**

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Introduction

This report has been produced as part of an ongoing strategy formulated by Dr Andrew Penman, Chief Health Officer,¹ to reduce the impact of excessive alcohol use in Western Australia. This study provides a summary of alcohol-caused health data for the Kimberley Health Region, by sex and Aboriginality, to assist local planners, health care providers, key departments and community-based groups to identify trends and features of alcohol-caused problems and to support initiatives encouraging less harmful alcohol use.

Note

The original report was converted into a Pagemaker publication by Susan Jones at the Task Force on Drug Abuse. Permission for the reproduction of this report was given by Dr Ian Rouse, General Manager Health Information Centre, Health Department of WA.

The text of this report and other publications by the Central Drug Coordination Office are available as downloadable PDF documents from its web page at <http://www.wa.gov.au/cdco/>.

Methodology

The methodology of aetiologic fractions used in this report to estimate hospitalisation and mortality attributable to the use of alcohol was developed by Holman, Armstrong and colleagues.² This indirect method requires the application of separate sets of probability measures of the contribution to hospitalisation and mortality from the use of alcohol.

While some hospitalisation and mortality is wholly attributable to the use of alcohol, for example alcoholic liver cirrhosis, in which case the probability (or aetiologic fraction) is 1.0, most causes of hospitalisation and mortality cannot be attributed wholly to the use of alcohol.

To overcome these limitations Holman et al undertook a detailed analysis of the scientific literature of the health effects of the use of all drugs. This analysis provided sex and age-specific estimates of the proportion of hospitalisation and mortality from particular causes which could be attributed to the use of different types of drugs. For example, the analysis concluded that for males of all ages 35 per cent of deaths from falls could be attributed to the use of alcohol. The application of the probability (or aetiologic fraction) of 0.35 to the number of deaths of males resulting from falls (for example, 100) estimates that a number (35) of such deaths could be attributed to the use of alcohol. Thus, for causes of hospitalisation and mortality not wholly attributable to the use of alcohol, the aetiologic fractions method does not identify individual deaths, but provides an estimate of the number of hospitalisations and mortality attributable to the use of that drug.

The health data for the period 1988-1992 were extracted by principal diagnosis from the Hospital Morbidity Data System (HMDS)³ and the Mortality Data System, and analysed to provide measures of the short-term and long-term effects of alcohol use on the health of the residents of the Kimberley Health Region.

The short-term effects of alcohol use were determined by the application of aetiologic fractions to estimate the number of alcohol-caused injuries;⁴ long-term consequences were determined by the number of cases for specific conditions known to be wholly attributable to alcohol use: see Appendix 1.

Aborigines constitute a significant proportion of the population of the Kimberley Health Region which enabled comparisons to be made of the impact of alcohol use on Aboriginal and non-Aboriginal populations in the region. Analysis by Aboriginality was not undertaken at the health district level, as these resident populations are too small to obtain reliable estimates of hospitalisation or mortality.⁵

Table 1: Estimated resident populations of the East Kimberley and West Kimberley Health Districts and of the Kimberley Health Region

	East Kimberley	West Kimberley	Kimberley Health Region
Males			
1988	4,359	7,637	11,996
1989	4,438	7,760	12,198
1990	4,548	7,936	12,484
1991	4,576	7,973	12,549
1992	4,608	8,017	12,625
Females			
1988	3,664	6,536	10,200
1989	3,744	6,672	10,416
1990	3,851	6,862	10,713
1991	3,893	6,933	10,826
1992	3,938	7,010	10,948
Persons			
1988	8,023	14,173	22,196
1989	8,182	14,432	22,614
1990	8,399	14,798	23,197
1991	8,469	14,906	23,375
1992	8,545	15,027	23,572

The population of the Kimberley Health Region is small so there were insufficient numbers of cases to analyse data at the postcode level. Data were therefore analysed by the region's two health districts, the West Kimberley Health District (postcodes 6725, 6728 and 6765), and the East Kimberley Health District (postcodes 6740, 6743 and 6770).⁶

As postcode estimates of population were only available from the 1991 Census⁷, it was necessary to estimate the intercensal population of each of the postcode areas that formed the East and West Kimberley Health Districts. This was done by applying the rate of change in the size of the population of the Kimberley Health Region over the period of the study, to interpolate the population for each year between 1988 and 1991, and to extrapolate the population for 1992 (Table 1).

Trends in the incidence of alcohol-caused injuries and conditions were estimated by Poisson regression. Using the GLIM package⁸, average year-to-year ratios were used to establish the nature and significance of trends in rates over the period studied. Age-specific rates were used as the dependent variable.

Major findings

1. Hospitalisation due to injuries attributable to alcohol

1.1 Kimberley Health Region

Over the period 1988-1992 an estimated 280 non-Aborigines (male 224; female 55)⁹ and 858 Aborigines (male 434; female 424) in the Kimberley Health Region were admitted to hospital due to injuries attributable to alcohol. Assaults were the most common type of alcohol-caused injury among male and female Aborigines, falls the most common in male non-Aborigines, and road injuries the most common in female non-Aborigines (Table 2).

The age standardised rates (ASRs) for alcohol-caused injuries were higher for Aborigines than for non-Aborigines, and the ASRs for males were greater than for females (Table 3; Figures 1 and 2).

Kimberley Health Region

Postcode Boundaries
(ABS 1991)

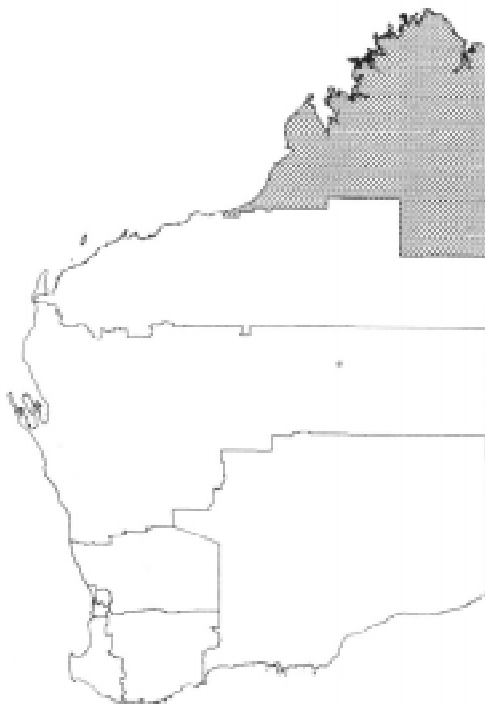
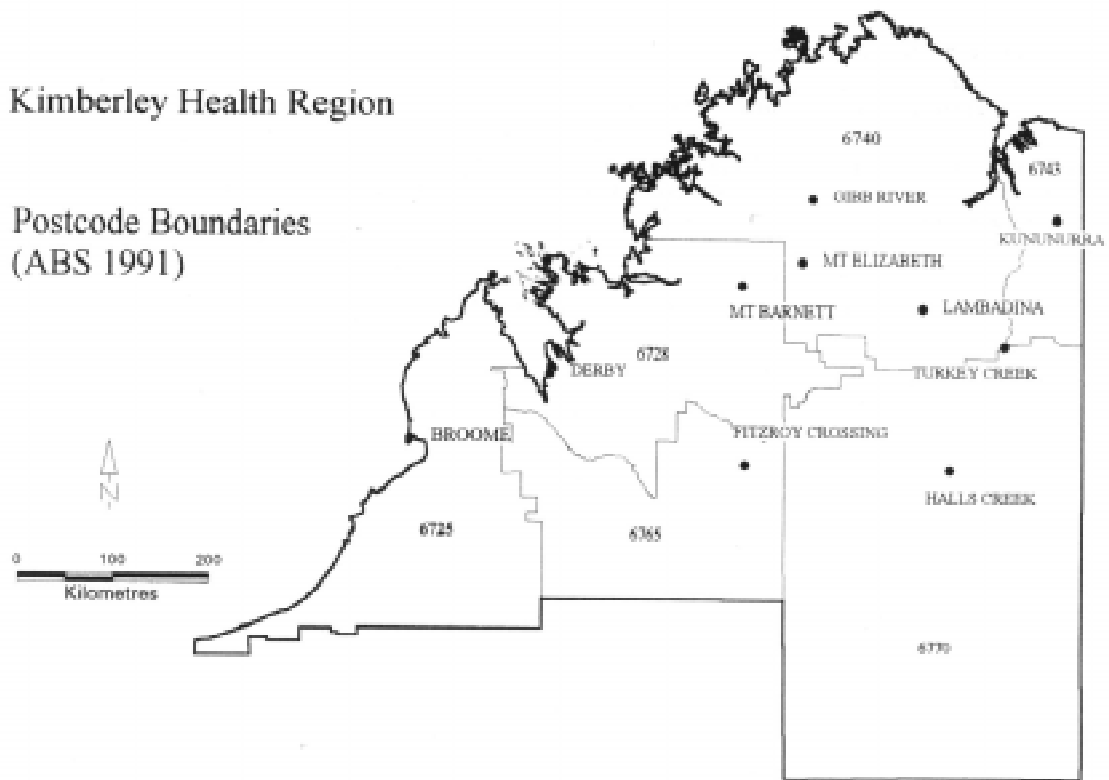


Table 2: Estimated number of hospital admissions due to injuries attributable to alcohol, by Aboriginality, Kimberley Health Region, 1988-1992

	Non-Aborigines						Aborigines					
	1988	1989	1990	1991	1992	Total	1988	1989	1990	1991	1992	Total
Males												
Road injuries	12	12	13	9	9	54	16	13	12	12	18	71
Machine injuries	2	1	1	2	2	8	1	1	1	2	2	7
Suicide	1	1	1	2	3	8	3	2	4	3	4	15
Assault	11	8	8	15	14	56	22	32	43	48	54	199
Falls	12	19	18	23	17	88	25	31	27	27	23	132
Other E-codes	2	5	1	1	2	12	2	2	3	1	1	10
All injuries	38	46	42	52	46	224	69	81	90	93	101	434
Females												
Road injuries	2	7	2	3	4	19	3	7	7	8	7	32
Machine injuries	0	0	0	0	1	2	0	1	1	1	1	4
Suicide	1	3	2	2	1	9	1	2	2	4	4	12
Assault	4	2	2	1	4	12	47	43	68	67	87	313
Falls	3	2	3	2	2	13	14	11	11	9	9	54
Other E-codes	0	0	0	0	0	1	2	2	2	1	2	9
All injuries	11	14	9	9	12	55	68	66	90	90	110	424
Persons												
Road injuries	14	19	15	12	13	73	19	20	19	20	25	103
Machine injuries	2	1	1	2	3	10	2	2	2	3	2	11
Suicide	2	4	3	4	4	17	4	4	6	6	7	28
Assault	14	10	10	16	17	67	70	75	111	115	140	512
Falls	15	21	21	25	19	101	38	42	38	36	32	186
Other E-codes	2	5	2	1	2	12	4	3	5	3	3	18
All injuries	49	61	52	60	58	280	137	147	180	183	211	858

Note: As aetiological fractions are less than 1.00, due to rounding, row and column totals may not always equal the sum of the cases.

Table 3: Age-standardised rates of hospital admissions due to injuries attributable to alcohol, Kimberley Health Region, 1988-1992

	1988		1989		1990		1991		1992	
	ASR	SE	ASR	SE	ASR	SE	ASR	SE	ASR	SE
Non-Aborigines										
Males	439	78	630	107	849	317	775	131	582	98
Females	218	73	344	112	243	87	152	64	284	97
Persons	451	86	515	83	507	129	628	109	449	77
Aborigines										
Males	1479	183	1714	194	1761	194	1815	200	2001	206
Females	1366	170	1178	150	1582	172	1643	181	1861	183
Persons	1416	125	1427	122	1667	129	1748	135	1921	137
Total population										
Males	835	84	1024	94	1017	94	1167	103	1129	102
Females	759	92	719	85	835	89	869	96	1004	99
Persons	814	63	866	64	950	66	1042	72	1078	72

Note: ASR = age standardised rate per 100,000 person years; SE = standard error.

Table 4: Rate ratios of age standardised hospitalisation rates for injuries attributable to alcohol, Kimberley Health Region, 1988-1992

Rate ratio	1988	1989	1990	1991	1992
Aboriginal:non-Aboriginal	3.1	2.8	3.3	2.8	4.3
Non Aboriginal male:female	2.0	1.8	3.5	5.1	2.0
Aboriginal male:female	1.1	1.5	1.1	1.1	1.1

The Aboriginal:non-Aboriginal rate ratios for all alcohol-caused injuries were between 2.8 and 4.3 over the period 1988-1992, with the highest rate ratio occurring in 1992 (Table 4).

Table 5: Average annual percentage change in hospitalisation rates for injuries attributable to alcohol, by Aboriginality, Kimberley Health Region, 1988-1992

	Non-Aborigines		Aborigines		Total population	
	%	Significance	%	Significance	%	Significance
Males	5.9	NS	6.3	NS	6.2	S
Females	-3.8	NS	10.2	S	9.2	S
Persons	2.2	NS	8.6	S	7.6	S

Note: The rate of change of ASRs is the average per year over the period 1988-1992
 NS = not significant ($p > 0.05$); S = significant ($p \leq 0.05$)

Figure 1: Male age standardised rates of hospitalisation due to injuries attributable to alcohol, by Aboriginality, Kimberley Health Region, 1988-1992

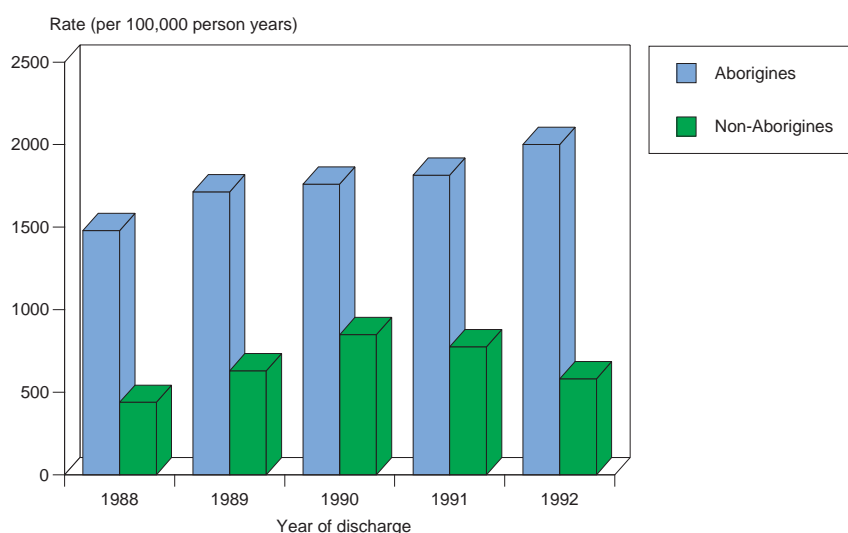
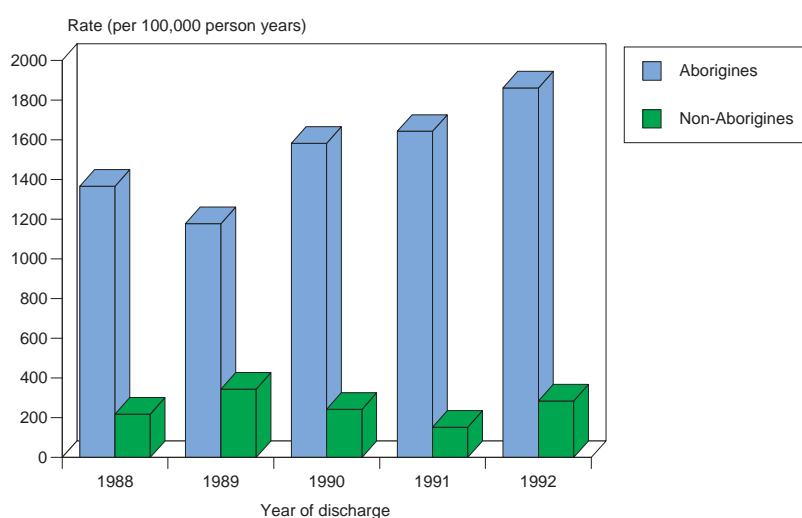


Figure 2: Female age standardised rates of hospitalisation due to injuries attributable to alcohol, by Aboriginality, Kimberley Health Region, 1988-1992



The male:female rate ratios were greater than one in both races but were lower in Aborigines (1.1 to 1.5) than for non-Aborigines (1.8 to 5.1).

Trend analysis of the hospitalisation rates for alcohol-caused injuries over the five-year period found statistically significant increases in the rates for females and persons in the Aboriginal population and males, females and persons in the total population (Table 5).

1.2 West and East Kimberley Health Districts

Over the period 1988-1992, there were an estimated 646 hospital admissions (male 366; female 280) for alcohol-caused injuries in the West Kimberley Health District and 484 (male 287; female 197) admissions in the East Kimberley Health District. Assaults were the most common cause of hospitalisation due to alcohol-caused injuries in both districts and for both sexes (Table 6).

Table 6: Estimated number of hospital admissions due to injuries attributable to alcohol, West Kimberley Health District and East Kimberley Health District, 1988-1992

	West Kimberley Health District						East Kimberley Health District					
	1988	1989	1990	1991	1992	Total	1988	1989	1990	1991	1992	Total
Males												
Road injuries	17	13	9	7	13	60	11	11	15	13	13	62
Machine injuries	2	1	1	2	2	9	1	1	1	2	1	6
Suicide	2	2	4	3	5	15	1	1	1	2	2	8
Assault	17	22	35	35	42	150	16	18	17	28	25	104
Falls	21	27	25	25	22	119	15	23	20	25	17	99
Other E-codes	3	4	3	2	2	13	2	3	2	1	1	8
All injuries	62	69	76	73	87	366	45	57	55	71	59	287
Females												
Road injuries	3	8	4	7	6	29	2	7	5	4	5	22
Machine injuries	0	1	1	1	1	3	0	0	0	1	1	3
Suicide	2	3	2	3	4	15	0	1	1	2	1	6
Assault	28	27	41	42	50	188	23	18	29	26	40	136
Falls	10	9	8	6	6	39	7	4	6	5	5	27
Other E-codes	2	1	1	0	2	5	1	1	1	1	0	4
All injuries	46	49	57	60	68	280	33	31	42	38	53	197
Persons												
Road injuries	21	21	13	15	20	89	13	17	19	16	18	84
Machine injuries	2	2	2	3	3	12	1	2	1	2	2	9
Suicide	4	5	6	6	9	30	2	3	3	4	3	14
Assault	45	48	76	77	92	339	39	36	45	54	65	239
Falls	31	36	32	31	28	158	22	27	26	29	22	126
Other E-codes	4	5	4	2	4	18	3	4	2	2	2	12
All injuries	107	118	132	133	155	646	78	88	97	109	112	484

Note: As aetiologic fractions are less than 1.00, due to rounding, row and column totals may not always equal the sum of the cases.

Table 7: Age standardised rates of hospital admissions due to injuries attributable to alcohol, West Kimberley Health District and East Kimberley Health District, 1988-1992

	1988		1989		1990		1991		1992	
	ASR	SE	ASR	SE	ASR	SE	ASR	SE	ASR	SE
West Kimberley Health District										
Males	760	100	806	100	900	109	904	112	1048	119
Females	685	109	638	98	747	104	829	116	883	115
Persons	726	73	751	73	857	78	865	80	994	85
East Kimberley Health District										
Males	991	158	1342	190	1213	172	1597	208	1281	187
Females	826	158	725	136	914	145	893	154	1304	199
Persons	958	116	1058	123	1092	117	1262	132	1279	137

Note: ASR = age standardised rate per 100,000 person years; SE = standard error.

Table 8: Average annual percentage change in hospitalisation rates for injuries attributable to alcohol West Kimberley Health District and East Kimberley Health District, 1988-1992

	West Kimberley Health District		East Kimberley Health District	
	%	Significance	%	Significance
Males	6.9	NS	6.3	NS
Females	9.5	S	11.8	S
Persons	8.1	S	7.7	S

Note: The rate of change of ASRs is the average per year over the period 1988-1992
NS = not significant ($p > 0.05$); S = significant ($p \leq 0.05$)

Higher ASRs for alcohol-caused injuries were reported for both males and females in the East Kimberley Health District than for males and females residing in the West Kimberley Health District. The ASRs for males were greater than those for females, except for 1992 for the East Kimberley (Table 7).

Trend analysis of the hospitalisation rates for alcohol-caused injuries over the five-year period found statistically significant increases in the rates for females and persons in both health districts (Table 8).

2. Hospitalisation due to conditions wholly attributable to alcohol

2.1 Kimberley Health Region

Over the period 1988-1992, 228 non-Aborigines (male 185; female 43) and 560 Aborigines (male 429; female 131) in the Kimberley Health Region were admitted to hospital due to conditions wholly attributable to alcohol. Of these conditions, alcoholic psychosis was the most common cause of admission for male Aborigines, non-dependent alcohol abuse the most common for female Aborigines, and alcohol dependence the most common for male and female non-Aborigines (Table 9).

The ASRs for conditions wholly attributable to alcohol were higher for Aborigines than for non-Aborigines, and the ASRs for males were greater than for females (Table 10; Figures 3 and 4).

The Aboriginal:non-Aboriginal rate ratios for all conditions wholly attributable to alcohol were between 2.0 and 5.0 over the period 1988-1992, with the highest rate ratio occurring in 1992 (Table 11).

Table 9: Number of hospital admissions due to conditions wholly attributable to alcohol, by Aboriginality, Kimberley Health Region, 1988-1992

	Non-Aborigines						Aborigines					
	1988	1989	1990	1991	1992	Total	1988	1989	1990	1991	1992	Total
Males												
Alcoholic psychosis	6	7	10	8	9	40	9	29	28	35	56	157
Alcohol dependence	21	19	22	33	11	106	21	16	34	23	16	110
Alcohol non-dependent abuse	3	4	6	2	4	19	7	11	13	24	12	67
Alcoholic cardiomyopathy	0	0	0	0	0	0	0	1	2	0	2	5
Alcoholic gastritis	3	2	2	2	2	11	5	13	14	24	15	71
Alcoholic liver cirrhosis	2	1	2	3	1	9	6	1	3	1	8	19
All conditions	35	33	42	48	27	185	48	71	94	107	109	429
Females												
Alcoholic psychosis	0	1	0	0	2	3	2	1	6	5	7	21
Alcohol dependence	4	5	6	1	3	19	3	4	6	8	12	33
Alcohol non-dependent abuse	3	2	2	2	2	11	5	8	13	14	17	57
Alcoholic cardiomyopathy	0	0	0	0	0	0	0	1	0	0	0	1
Alcoholic gastritis	0	0	1	0	0	1	2	3	0	2	6	13
Alcoholic liver cirrhosis	2	1	3	1	2	9	2	1	2	0	1	6
All conditions	9	9	12	4	9	43	14	18	27	29	43	131
Persons												
Alcoholic psychosis	6	8	10	8	11	43	11	30	34	40	63	178
Alcohol dependence	25	24	28	34	14	125	24	20	40	31	28	143
Alcohol non-dependent abuse	6	6	8	4	6	30	12	19	26	38	29	124
Alcoholic cardiomyopathy	0	0	0	0	0	0	0	2	2	0	2	6
Alcoholic gastritis	3	2	3	2	2	12	7	16	14	26	21	84
Alcoholic liver cirrhosis	4	2	5	4	3	18	8	2	5	1	9	25
All conditions	44	42	54	52	36	228	62	89	121	136	152	560

Table 10: Age standardised rates of hospital admissions due to conditions wholly attributable to alcohol, Kimberley Health Region, 1988-1992

	1988		1989		1990		1991		1992	
	ASR	SE	ASR	SE	ASR	SE	ASR	SE	ASR	SE
Non-Aborigines										
Males	443	78	415	75	643	105	992	369	360	73
Females	221	85	175	63	229	76	50	25	174	69
Persons	354	57	322	52	502	75	603	200	295	54
Aborigines										
Males	1120	166	1443	176	1897	200	2176	214	2197	217
Females	291	80	365	90	537	107	568	112	785	126
Persons	694	91	887	97	1196	112	1348	119	1464	124
Total population										
Males	664	75	771	79	1050	95	1150	96	997	92
Females	234	52	258	53	339	58	271	51	442	67
Persons	475	48	539	50	733	59	755	58	748	59

Note: ASR = age standardised rate per 100,000 person years; SE = standard error.

Table 11: Rate ratios of age standardised hospitalisation rates for conditions wholly attributable to alcohol, Kimberley Health Region, 1988-1992

Rate ratio	1988	1989	1990	1991	1992
Aboriginal:non-Aboriginal	2.0	2.8	2.4	2.2	5.0

Table 12: Average annual percentage change in hospitalisation rates for conditions wholly attributable to alcohol, by Aboriginality, Kimberley Health Region, 1988-1992

	Non-Aborigines		Aborigines		Total population	
	%	Significance	%	Significance	%	Significance
Males	-1.5	NS	16.8	S	11.9	S
Females	-7.4	NS	27.0	S	17.6	S
Persons	-2.5	NS	19.0	S	13.0	S

Note: The rate of change of ASRs is the average per year over the period 1988-1992
 NS = not significant ($p > 0.05$); S = significant ($p \leq 0.05$)

Figure 3: Male age standardised rates of hospitalisation due to conditions wholly attributable to alcohol, by Aboriginality, Kimberley Health Region, 1988-1992

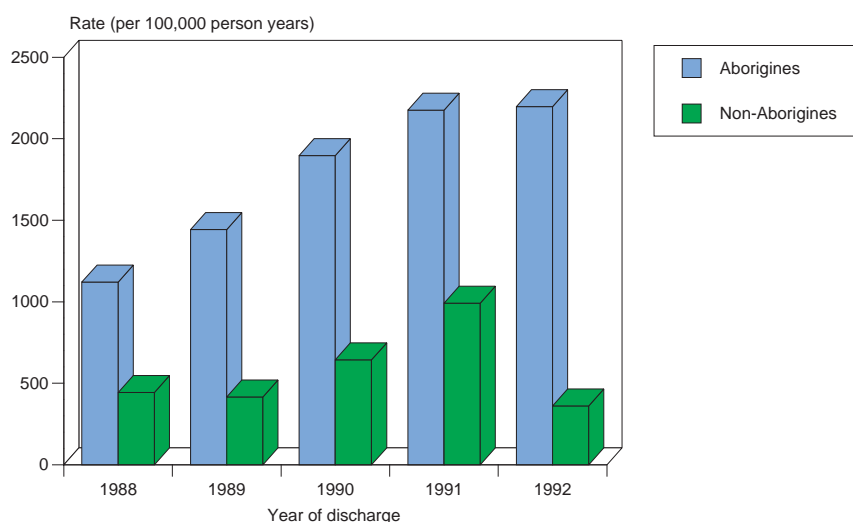
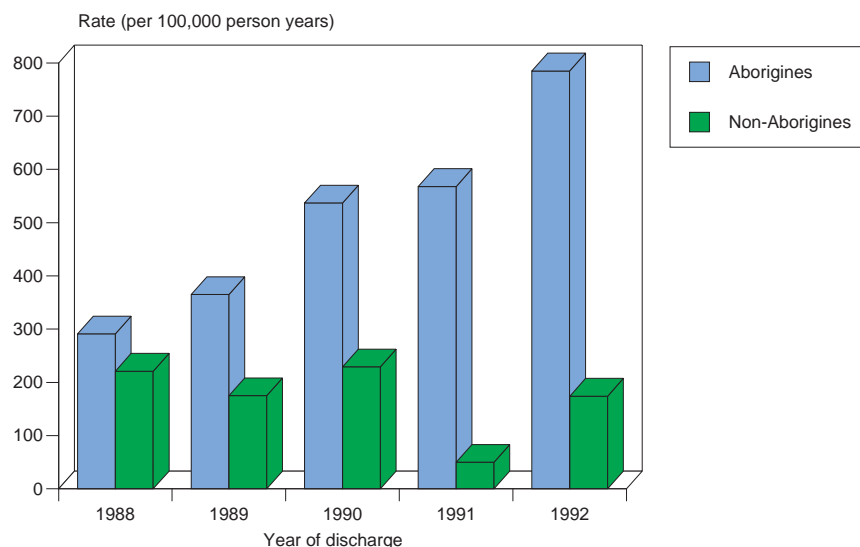


Figure 4: Female age standardised rates of hospitalisation due to conditions wholly attributable to alcohol, by Aboriginality, Kimberley Health Region, 1988-1992



Trend analysis of the hospitalisation rates for conditions wholly attributable to alcohol over the five-year period found statistically significant increases in the rate for males, females and persons in the Aboriginal and total populations (Table 12).

2.2 West and East Kimberley Health Districts

Over the period 1988-1992, there were 507 admissions (male 410; female 97) due to conditions wholly attributable to alcohol in the West Kimberley Health District, and 272 admissions (male 203; female 69) in the East Kimberley Health District. The most common cause of hospitalisation due to conditions wholly attributable to alcohol use in the West Kimberley Health District was alcohol dependence for both males and females. In the East Kimberley Health District, however, the most common causes of hospitalisation from such conditions were alcoholic psychosis for males and non-dependent alcohol abuse for females (Table 13).

Overall, rates of hospitalisation for conditions wholly attributable to alcohol use were similar for the two districts. However, males in the West Kimberley Health District had higher rates of hospitalisation than males residing in the East Kimberley Health District, and females in the West Kimberley Health District had lower rates of hospitalisation than females in the East Kimberley Health District (except for 1990). The ASRs for males were greater than those for females (Table 14).

Trend analysis of the hospitalisation rates for conditions wholly attributable to alcohol use over the five-year period found statistically significant increases in the rates for males, females and persons in the West Kimberley Health District and for males and persons in the East Kimberley Health District (Table 15).

Table 13: Number of hospital admissions due to conditions wholly attributable to alcohol, West Kimberley Health District and East Kimberley Health District, 1988-1992

	West Kimberley Health District						East Kimberley Health District					
	1988	1989	1990	1991	1992	Total	1988	1989	1990	1991	1992	Total
Males												
Alcoholic psychosis	12	25	18	25	47	127	3	11	20	18	18	70
Alcohol dependence	33	30	41	42	19	165	8	5	15	14	8	50
Alcohol non-dependent abuse	3	9	7	15	8	42	7	6	12	11	8	44
Alcoholic cardiomyopathy	0	0	1	0	2	3	0	1	1	0	0	2
Alcoholic gastritis	5	9	12	22	10	58	3	6	4	4	7	24
Alcoholic liver cirrhosis	5	1	2	2	5	15	3	1	3	2	4	13
All conditions	58	74	81	106	91	410	24	30	55	49	45	203
Females												
Alcoholic psychosis	2	1	6	2	5	16	0	0	0	3	3	6
Alcohol dependence	3	5	8	8	8	32	3	2	3	1	7	16
Alcohol non-dependent abuse	3	1	9	10	8	31	5	9	6	6	11	37
Alcoholic cardiomyopathy	0	1	0	0	0	1	0	0	0	0	0	0
Alcoholic gastritis	0	1	1	1	5	8	2	2	0	1	1	6
Alcoholic liver cirrhosis	3	1	4	0	1	9	1	1	1	1	0	4
All conditions	11	10	28	21	27	97	11	14	10	12	22	69
Persons												
Alcoholic psychosis	14	26	24	27	52	143	3	11	20	21	21	76
Alcohol dependence	36	35	49	50	27	197	11	7	18	15	15	66
Alcohol non-dependent abuse	6	10	16	25	16	73	12	15	18	17	19	81
Alcoholic cardiomyopathy	0	1	1	0	2	4	0	1	1	0	0	2
Alcoholic gastritis	5	10	13	23	15	66	5	8	4	5	8	30
Alcoholic liver cirrhosis	8	2	6	2	6	24	4	2	4	3	4	17
All conditions	69	84	109	127	118	507	35	44	65	61	67	272

Table 14: Age standardised rates of hospital admissions due to conditions wholly attributable to alcohol, West Kimberley Health District and East Kimberley Health District, 1988-1992

	1988		1989		1990		1991		1992	
	ASR	SE	ASR	SE	ASR	SE	ASR	SE	ASR	SE
West Kimberley Health District										
Males	714	97	863	103	1045	120	1241	124	1079	120
Females	173	55	118	40	352	71	254	60	352	74
Persons	474	60	525	60	743	75	796	74	743	73
East Kimberley Health District										
Males	567	119	633	125	1003	143	1003	156	858	132
Females	297	92	391	113	272	92	309	101	519	119
Persons	448	78	529	87	671	89	695	99	721	94

Note: ASR = age standardised rate per 100,000 person years; SE = standard error.

Table 15: Average annual percentage rates of change in hospitalisation rates for conditions wholly attributable to alcohol, West Kimberley Health District and East Kimberley Health District, 1988-1992

	West Kimberley Health District		East Kimberley Health District	
	%	Significance	%	Significance
Males	11.5	S	14.8	S
Females	22.8	S	13.5	NS
Persons	13.3	S	14.3	S

Note: The rate of change of ASRs is the average per year over the period 1988-1992
 NS = not significant ($p > 0.05$); S = significant ($p \leq 0.05$)

3. Mortality due to alcohol use, Kimberley Health Region

3.1 Fatal injuries attributable to alcohol

Over the period 1988-1992, an estimated 25 deaths (male 21; female 4) in the Kimberley Health Region were due to injuries attributable to alcohol. Twenty of these deaths involved Aborigines (male 16; female 4), and five involved non-Aborigines (all males) (Table 16).

The most common causes of alcohol-caused fatal injuries was road injuries, which claimed 10 lives (7 Aborigines; 3 non-Aborigines). There were five deaths due to suicides (4 Aborigines, 1 non-Aborigine) and five deaths due to assaults (all Aborigines).

3.2 Conditions wholly attributable to alcohol

Over the period 1988-1992, there were a total of 29 deaths (male 21; female 8) in the Kimberley Health Region due to conditions wholly attributable to alcohol. Twenty-four deaths involved Aborigines (male 16; female 8), and five involved non-Aborigines (all males) (Table 17).

Two conditions were responsible for most of these deaths, claiming 11 lives each: alcohol dependence (10 Aborigines, 1 non-Aborigine) and liver cirrhosis (8 Aborigines, 3 non-Aborigines).

Endnotes

¹ Formerly General Manager, Public Health Services.

² Holman CDJ, Armstrong BK, Arias LN, Martin CA, Hatton WM, Hayward LD, Salmon MA, Shean RE, Waddell VP. The quantification of drug caused morbidity and mortality in Australia 1989. Canberra: Australian Government Publishing Service, 1990.

³ The HMDS covers all public and private hospitals in Western Australia, including the detoxification program run by the Western Australian Alcohol and Drug Authority, but excluding psychiatric hospitals. Only episodes of treatment requiring an inpatient stay are captured on the HMDS, therefore alcohol-caused conditions which received outpatient treatment are not included in this report.

⁴ The specific conditions and injuries known to be causally related to alcohol use, and the associated sets of age and sex-specific aetiologic fractions used in this report, were those devised by Holman, Armstrong and colleagues: Holman CDJ, Armstrong BK, Arias LN, Martin CA, Hatton WM, Hayward LD, Salmon MA,

Table 16: Estimated number of deaths due to injuries attributable to alcohol, by Aboriginality, Kimberley Health Region, 1988-1992

	Non-Aborigines						Aborigines					
	1988	1989	1990	1991	1992	Total	1988	1989	1990	1991	1992	Total
Males												
Road injuries	1	1	0	0	1	3	1	2	0	2	1	6
Machine injuries	0	0	0	0	0	0	0	0	0	0	0	0
Suicide	0	0	1	0	0	1	1	1	1	1	0	4
Assault	0	0	0	0	0	0	1	1	1	0	0	3
Falls	0	0	0	0	0	0	0	0	0	0	0	0
Other E-codes	0	1	0	0	0	1	0	1	1	0	1	3
All injuries	1	2	1	0	1	5	3	5	3	3	2	16
Females												
Road injuries	0	0	0	0	0	0	0	0	0	1	0	1
Machine injuries	0	0	0	0	0	0	0	0	0	0	0	0
Suicide	0	0	0	0	0	0	0	0	0	0	0	0
Assault	0	0	0	0	0	0	1	0	1	0	0	2
Falls	0	0	0	0	0	0	0	0	0	0	0	0
Other E-codes	0	0	0	0	0	0	1	0	0	0	0	1
All injuries	0	0	0	0	0	0	2	0	1	1	0	4
Persons												
Road injuries	1	1	0	0	1	3	1	2	0	3	1	7
Machine injuries	0	0	0	0	0	0	0	0	0	0	0	0
Suicide	0	0	1	0	0	1	1	1	1	1	0	4
Assault	0	0	0	0	0	0	2	1	2	0	0	5
Falls	0	0	0	0	0	0	0	0	0	0	0	0
Other E-codes	0	1	0	0	0	1	1	1	1	0	1	4
All injuries	1	2	1	0	1	5	5	5	4	4	2	20

Table 17: Number of deaths due to conditions wholly attributable to alcohol, by Aboriginality, Kimberley Health Region, 1988-1992

	Non-Aborigines						Aborigines					
	1988	1989	1990	1991	1992	Total	1988	1989	1990	1991	1992	Total
Males												
Alcoholic psychosis	0	0	0	0	0	0	1	0	0	0	0	1
Alcohol dependence	0	0	0	0	1	1	1	0	2	1	2	6
Alcohol non-dependent abuse	0	0	0	0	0	0	0	0	0	0	0	0
Alcoholic cardiomyopathy	0	1	0	0	0	1	0	1	0	2	1	4
Alcoholic gastritis	0	0	0	0	0	0	0	0	0	0	0	0
Alcoholic liver cirrhosis	0	1	0	0	2	3	2	0	0	1	2	5
All conditions	0	2	0	0	3	5	4	1	2	4	5	16
Females												
Alcoholic psychosis	0	0	0	0	0	0	0	0	0	0	0	0
Alcohol dependence	0	0	0	0	0	0	0	1	1	1	1	4
Alcohol non-dependent abuse	0	0	0	0	0	0	0	0	0	1	0	1
Alcoholic cardiomyopathy	0	0	0	0	0	0	0	0	0	0	0	0
Alcoholic gastritis	0	0	0	0	0	0	0	0	0	0	0	0
Alcoholic liver cirrhosis	0	0	0	0	0	0	2	0	0	1	0	3
All conditions	0	0	0	0	0	0	2	1	1	3	1	8
Persons												
Alcoholic psychosis	0	0	0	0	0	0	1	0	0	0	0	1
Alcohol dependence	0	0	0	0	1	1	1	1	3	2	3	10
Alcohol non-dependent abuse	0	0	0	0	0	0	0	0	0	1	0	1
Alcoholic cardiomyopathy	0	1	0	0	0	1	0	1	0	2	1	4
Alcoholic gastritis	0	0	0	0	0	0	0	0	0	0	0	0
Alcoholic liver cirrhosis	0	1	0	0	2	3	4	0	0	2	2	8
All conditions	0	2	0	0	3	5	6	2	3	7	6	24

Shean RE, Waddell, VP. The quantification of drug caused morbidity and mortality in Australia 1988 (Parts 1 and 2). Canberra, Australian Government Publishing Service, 1990.

⁵ The Health Statistics Calculator (Dr J Codde, Epidemiology and Health Statistics Section, Health Department of Western Australia, 1993) was used to calculate the age standardised rates (ASRs). The estimated resident populations contained in this program were developed by Moroz P, Codde J (1994). Estimated resident populations by age, sex and Aboriginality: 1981-1991. Metropolitan and country health regions of Western Australia. Health Department of Western Australia, Perth.

⁶ Slight discrepancies may occur for totals based on aggregates for the West and East Kimberley Health Districts compared to the Kimberley Health Region, as postcode districts 6731 (Cockatoo Island and Yampi Sound) and 6733 (Koolan Island) were defined for only the health region, but for neither health district.

⁷ In the 1986 Census population data was only enumerated by Statistical Local Area.

⁸ Payne CD (ed) (1985). The Generalised Linear Interactive Modelling System, release 3.77. Numerical Algorithms Group, Oxford

⁹ As estimates are not whole numbers, discrepancies in totals will occur due to rounding.

¹⁰ For a full list of age-specific aetiologic fractions see Swensen G (1993). Mortality attributable to drug use in Western Australia, 1981-1991. Health Department of Western Australia, Perth.

Appendix 1

List of ICD9 code groups used for injuries and conditions attributable to alcohol

Injuries¹⁰

E810-E819	Road injuries
E860.0, E860.1, E860.2	Alcohol and ethanol poisoning
E880-E888	Fall injuries
E890-E899	Fire injuries
E910	Drowning
E911	Aspiration
E919-E920	Machine injuries
E950-E959	Suicide
E960, E965, E966, E968, E969	Assault
E967	Child abuse

Conditions wholly attributable to alcohol use

291	Alcoholic psychosis
303	Alcohol dependence
305	Alcohol non-dependent abuse
357.5	Alcoholic polyneuropathy
425.5	Alcoholic cardiomyopathy
535.3	Alcoholic gastritis
571.0-571.3	Alcoholic liver cirrhosis