Drug and Alcohol Office
Government of Western Australia

Delivering a Healthy WA

Confirmed Deaths Caused by Opioids Western Australia: 1995 - 2004

Introduction

This report summarises annual and quarterly trends in the number of deaths in Western Australia (WA) between 1995 and 2004, where the underlying cause of death was due to opioids. The time series data in this report updates information published in *Statistical Bulletin No. 2* (August 1996), *Statistical Bulletin No. 4* (July 1997), *Statistical Bulletin No. 8* (May 2000) and Statistical *Bulletin No. 15* (December 2003).

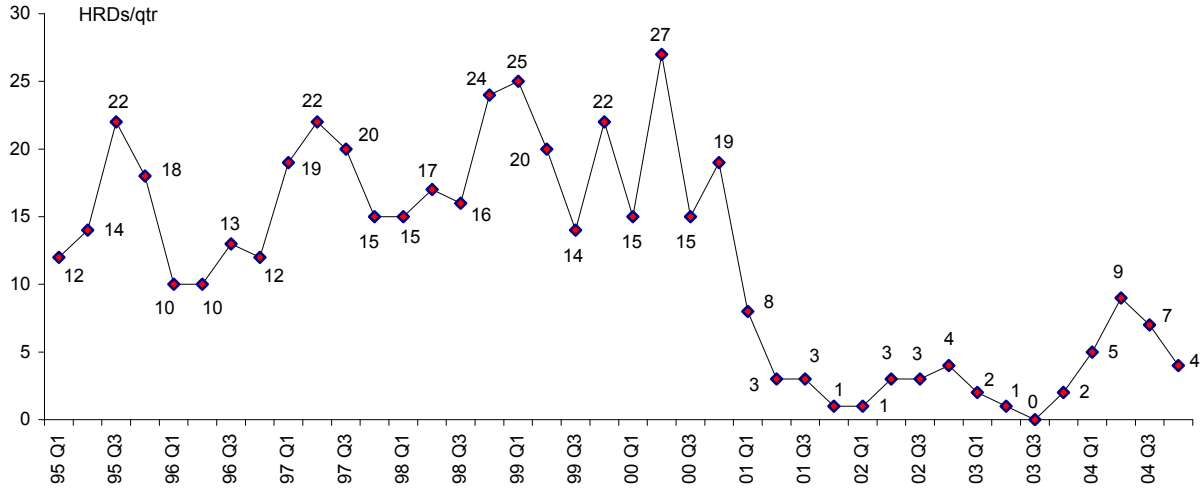
The data summarised in this report is based on information from the Coronial Database, which contains detailed information about the circumstances of drug related deaths in WA.

The report separately considers accidental heroin related (HRDs) from other types of 'opioid' related deaths caused by other opioids, such as morphine, methadone, oxycodone, dextromoramide, codeine, propoxyphene, pethidine or buprenorphine. *(For a description of the Coronial Database and approaches to the classify causes of death see the Methods section in the Appendix.)*

In Brief

- A total of 472 accidental HRDs between 1995 and 2004 - an average of 47 per year.
- Annual average of 69 accidental HRDs from 1995 to 2000.
- Annual average of 14 accidental HRDs from 2001 to 2004.
- Two thirds (67.9%) of all accidental HRDs between 1997 and 2004 occurred at a private dwelling, 8.6% occurred at public accommodation and 13.3% occurred in a carpark or street.
- A total of 716 opioid related deaths occurred in WA from 1995 to 2004 - nearly two thirds (65.9%) were accidental HRDs and a further 16.1% involved illicit use of opioids other than heroin.

Figure 1
Quarterly accidential heroin related deaths, WA, 1995 - 2004



Version: April 2008

1. Accidental Heroin Deaths

Total deaths

From 1995 to 2004 there was a total of 472 accidental HRDs in WA due to an overdose where the underlying cause of death was determined by a Coroner to have been primarily due to heroin. There was a further 18 HRDs where the Coroner had determined that the death was intentionally caused and therefore the death was classified as suicide (Table A-8).

Annual deaths

Table 1 shows that the greatest annual number of HRDs occurred between 1995 and 2000, when there was an average of 69 HRDs per year, compared to the last 4 years up to 2004 when there was an average of 14 HRDs per year.

Overall, the annual number of accidental HRDs peaked with 81 deaths in 1999 and then declined to 5 by 2003. Since 2003 the number of HRDs has increased to 25 deaths in 2004 (Table 1).

Quarterly deaths

Over the 10 year period there has been a series of short term peaks in quarterly accidental HRDs, with the most frequent number of deaths (27) occurring in the June quarter 2000. Other peaks occurred in the September quarter 1995 (22), the June quarter 1997 (22), the March quarter 1999 (25), the June quarter 2004 and the June quarter 2004 (9) (Figure 1, page 1).

Figure 1 (page 1) demonstrates that in WA there was an upward trend in quarterly HRDs from 1995 up to mid 2000 followed by a decline up to the September quarter 2003, when there were no deaths. It can also be seen that since late 2003 there has been a modest increase in quarterly HRDs, to a similar level as has occurred since 2001.

Table 1
Quarterly accidental heroin related deaths WA, 1995 - 2004

	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Total
1995	12	14	22	18	66
1996	10	10	13	12	45
1997	19	22	20	15	76
1998	15	17	16	24	72
1999	25	20	14	22	81
2000	15	27	15	19	76
2001	8	3	3	1	15
2002	1	3	3	4	11
2003	2	1	-	2	5
2004	5	9	7	4	25

Age & sex

Out of 472 accidental HRDs, a total of 390 (82.6%) involved males and 82 (17.4%) involved females, ie one in six of all HRDs involved females.

The mean age of HRDs in WA typically has involved those in their early 30s, with a mean age of just over 30 years of age since 1995 (Table 2). However, there have been exceptions to this pattern, such as in 1997, 1999 and 2000 with mean ages just below 30, whereas in 2002 and 2003 mean ages were higher.

A comparison of the age profile of males and females over the 10 year period shows that females were usually younger, with 43.9% of all female HRDs aged between 20 and 29, whereas 46.0% of all male HRDs were aged between 25 and 34 (Figure 2, page 3).

Day of incident

Data about the day of incident has only been available in the Coronial Database since 1997. This data shows that the most frequent number of HRDs occurred on Wednesdays and Saturdays, accounting for a total of 66 (18.3%) and 69 (19.1%) of the 361 HRDs in this period, respectively (Table A-2). Overall, the least number of deaths occurred on Mondays which accounted for a total of 40 (11.1%) of all HRDs.

A frequency distribution of day of incident and sex indicates a greater proportion of female than male deaths occurred close to the weekend (Figure 3, page 3). It can be seen that a higher proportion of female than male deaths occurred on Saturdays (19.7% vs 19.0%), Sundays (14.8% vs 11.7%) and Mondays (16.4% vs 10.0%), whereas a higher proportion of male than female deaths occurred on the remaining days of the week.

Place of incident

Data about place of incident has only been available in the Coronial Database since 1997. Overall, 245 (67.9%) HRDs occurred at a private dwelling (eg house, flat or

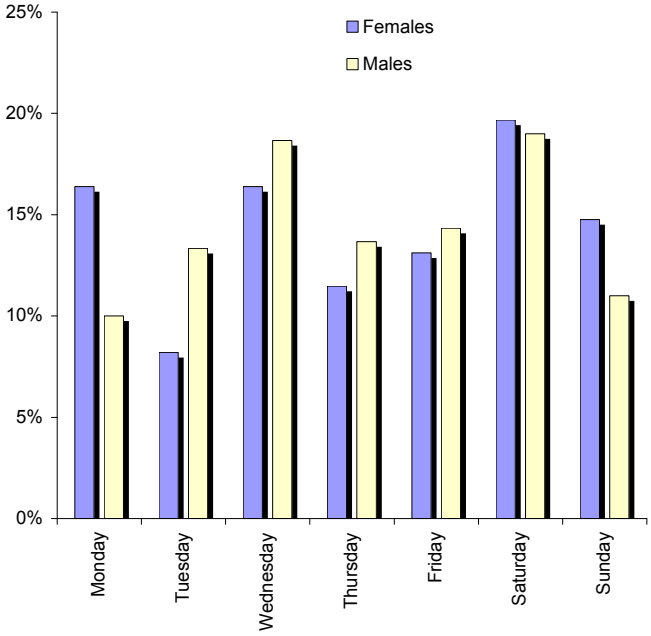
Table 2
Mean age of accidental heroin related deaths, WA, 1995 - 2004

	Males	Females	Persons
1995	31.7	31.9	31.7
1996	31.2	33.5	31.7
1997	30.1	24.8	28.9
1998	31.5	30.2	31.4
1999	29.4	24.9	28.6
2000	29.4	24.9	28.7
2001	31.1	32.2	31.8
2002	36.3	-	36.3
2003	37.8	-	37.8
2004	31.3	30.8	31.2

unit), 31 (8.6%) occurred in public accommodation (eg hotel, motel or hostel), 48 (13.3%) occurred in a carpark or street, 17 (4.7%) in at a public toilet, 3 (0.8%) in a prison and 17 (4.7%) occurred elsewhere (eg vacant land, bush, beach or hospital). See Table A-3.

A breakdown of place of incident by sex in Table A-4 shows a higher proportion of female than male HRDs occurred at private dwellings (77.0% vs 70.7%), whereas a lower proportion of female than male HRDs occurred in a carpark or street (6.6% vs 10.1%) or in public accommodation (4.9% vs 9.4%). See Table A-4.

Figure 3
Frequency (%) of accidental heroin related deaths by day of incident & sex, WA, 1997 - 2004



Locality of incident

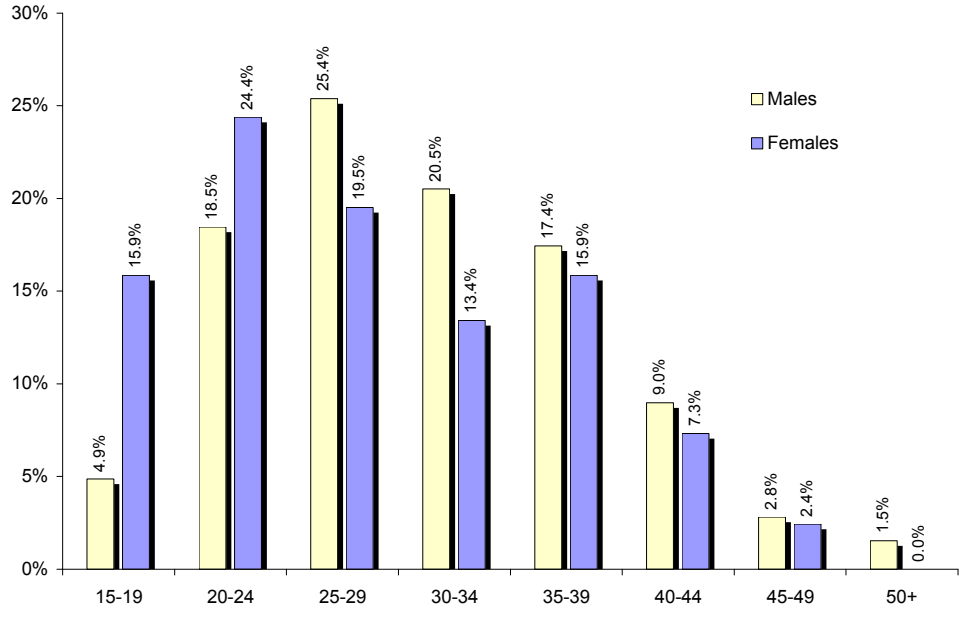
Data about locality of incident has only been available in the Coronial Database since 1997. Of the 361 HRDs that occurred between 1997 and 2004, 311 (86.1%) occurred in the Perth metropolitan area and 50 (13.9%) occurred in non metropolitan localities (Tables A-5 and A-6).

In the Perth metropolitan area the most frequent localities were the Perth inner city (20 HRDs) and Fremantle (12 HRDs).
With the additional of a further 9 cases that occurred in Northbridge, a major late night entertainment area adjoining the central business district (CBD), a total of 29 metropolitan HRDs occurred in the Perth CBD/inner city area.

Other than the Perth CBD/inner city and Fremantle areas, the next most frequent localities were the suburbs of Rivervale (10 deaths), Mount Lawley (8 deaths) and Scarborough (8 deaths).

Out of the 50 HRDs in non metropolitan localities, a total of 20 cases occurred in two localities - in Kalgoorlie-Boulder and in Mandurah, with 10 HRDs each.

Figure 2
Frequency (%) of accidental heroin related deaths by age group & sex WA, 1995 - 2004



2. All Opioid Deaths

Total deaths

Table A-7 shows that from 1995 to 2004 there was a total of 716 opioid related deaths in WA, of which:

- 472 (65.9%) were accidental HRDs;
- 115 (16.1%) were illicit opioid related (ie other than accidental HRDs) which had been caused accidentally or intentionally; and
- 129 (18.0%) were licit opioid related that were caused accidentally or intentionally.

Quarterly deaths

The number of quarterly opioid deaths more than doubled, from 17 in the March quarter 1995 to 38 in the December quarter 1998 and then declined up to the September quarter 2003, when no deaths were recorded.

There has been a small increase in the quarterly number of opioid related deaths since the September quarter 2003, with a total of 16 deaths in the December quarter 2004. See Table 3. It can be seen that from the March quarter 1995 to the March quarter 2001 there were more illicit opioid related deaths which were accidental HRDs, whereas from mid 2001 up to the end of 2003 there was a greater number of illicit opioid deaths that involved opioids other than heroin.

However, since the December quarter 2003 this pattern has reverted to the pattern that existed up to early 2001, with a greater number of deaths use to heroin than deaths due to other types of illicit opioids.

Table 3
Quarterly all opioid related deaths
WA, 1995 - 2004

	Qtr 1	Qtr 2	Qtr 3	Qtr 4	Total
1995	17	17	27	21	82
1996	15	19	16	14	64
1997	23	28	28	16	95
1998	26	23	23	38	110
1999	31	25	21	27	104
2000	19	34	22	25	100
2001	19	19	14	10	62
2002	8	6	10	6	30
2003	11	6	-	2	19
2004	10	14	10	16	50

Type of opioid and cause

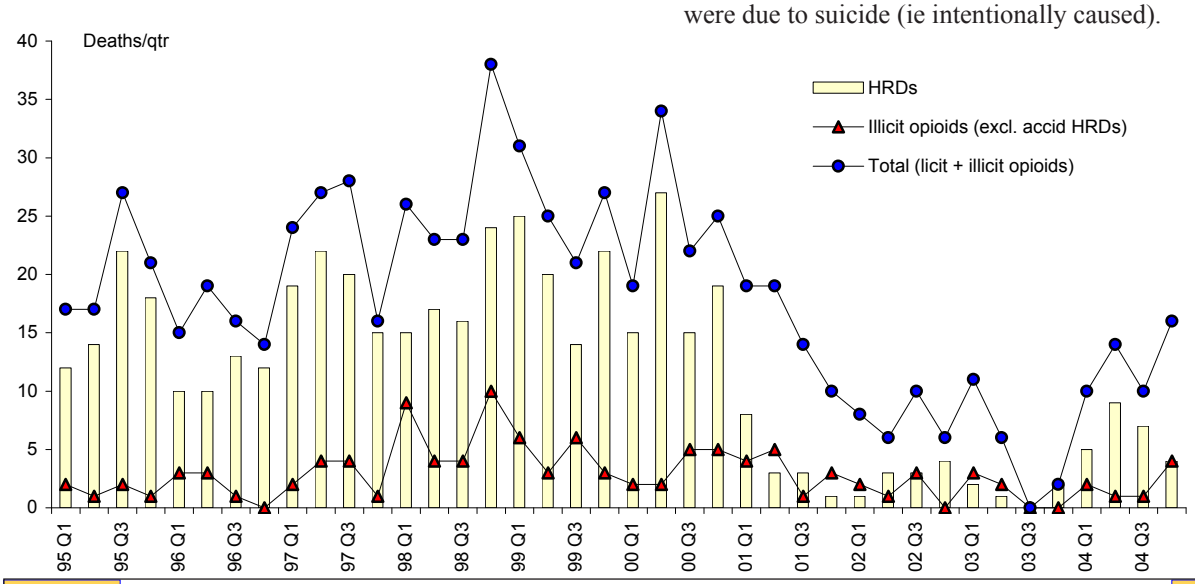
Table A-8 provides a detailed picture of all opioid related deaths broken down by type of opioid and cause of death.

In the ten year period, 490 (68.4%) of the total of 716 opioid deaths were heroin related (ie 472 accidental HRDs and 18 due to suicide), 67 (9.4%) were morphine related, 64 (8.9%) were methadone related, 27 (3.8%) were propoxyphene related and 26 (3.6%) were oxycodone related.

There were few deaths which involved other types of opioids - 15 (2.1%) were codeine related, 15 (2.1%) involved a combination of opioids, 8 (1.1%) were dextromoramide related, 3 (0.4%) were buprenorphine related and there was 1 (0.1%) pethidine related.

Out of the 716 opioid deaths, 658 (91.9%) were found by the Coroner to be accidentally caused and 58 (8.1%) were due to suicide (ie intentionally caused).

Figure 4
Quarterly opioid related deaths, WA, 1995 - 2004



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Appendices: Data Tables & Figures

Table A-1
Annual accidental heroin related deaths by age group & sex, WA, 1995 - 2004

	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50+	Total
Males									
1995	1	10	11	14	11	7	1	-	55
1996	1	7	9	6	7	4	-	1	35
1997	6	10	14	12	7	8	2	-	59
1998	1	11	16	17	12	4	1	3	65
1999	5	15	18	12	9	5	3	-	67
2000	5	10	18	15	14	1	1	-	64
2001	-	2	6	-	-	-	2	-	10
2002	-	1	2	1	2	4	1	-	11
2003	-	-	1	1	1	1	-	1	5
2004	-	6	4	2	5	1	-	1	19
Females									
1995	1	2	2	3	2	-	-	-	11
1996	-	1	1	4	2	2	-	-	10
1997	3	7	4	-	2	1	-	-	17
1998	1	1	1	-	3	1	-	-	7
1999	4	2	4	2	2	-	-	-	14
2000	3	4	3	1	-	-	1	-	12
2001	-	2	-	1	1	-	1	-	5
2002	-	-	-	-	-	-	-	-	-
2003	-	-	-	-	-	-	-	-	-
2004	1	1	1	-	1	2	-	-	6
Persons									
1995	2	12	13	17	13	7	2	-	66
1996	1	8	10	10	9	6	-	1	45
1997	9	17	18	12	9	9	2	-	76
1998	2	12	17	17	15	5	1	3	72
1999	9	17	22	14	11	5	3	-	81
2000	8	14	21	16	14	1	2	-	76
2001	-	4	6	1	1	-	3	-	15
2002	-	1	2	1	2	4	1	-	11
2003	-	-	1	1	1	1	-	1	5
2004	1	7	5	2	6	3	-	1	25

Table A-2
Accidental heroin related deaths by day of incident & sex, WA, 1997 - 2004

	Females		Males		Total	
	n	%	n	%	n	%
Monday	10	16.4	30	10.0	40	11.1
Tuesday	5	8.2	40	13.3	45	12.5
Wednesday	10	16.4	56	18.7	66	18.3
Thursday	7	11.5	41	13.7	48	13.3
Friday	8	13.1	43	14.3	51	14.1
Saturday	12	19.7	57	19.0	69	19.1
Sunday	9	14.8	33	11.0	42	11.6
Total	**61**	**100.0**	**300**	**100.0**	**361**	**100.0**

Table A-3
Accidental heroin related deaths by place of incident & age group, WA, 1997 - 2004

	Car park/ street	Dwelling	Hotel/motel/ hostel	Prison	Public toilet	Other	Total
15-19	1	22	1	1	1	3	29
20-24	14	45	7	-	2	4	72
25-29	16	61	6	-	3	6	92
30-34	4	48	5	1	4	2	64
35-39	5	42	6	-	5	1	59
40-44	4	18	3	1	2	-	28
45-49	3	5	3	-	-	1	12
50+	1	4	-	-	-	-	5
Total	**48**	**245**	**31**	**3**	**17**	**17**	**361**

Table A-4
Accidental heroin related deaths by place of incident & sex, WA, 1997 - 2004

Place of incident	Females		Males		Total	
	n	%	n	%	n	%
Car park/street	4	6.6	30	10.1	34	9.5
Dwelling	47	77.0	212	70.7	259	71.7
Hotel/motel/hostel	3	4.9	28	9.4	31	8.6
Prison	-		3	1.0	3	0.8
Public toilet	2	3.3	15	5.0	17	4.7
Other	5	8.2	12	4.0	17	4.7
Total	**61**	**100.0**	**300**	**100.0**	**361**	**100.0**

Table A-5
Accidental heroin related deaths by locality of incident, metropolitan area, WA, 1997 - 2004

Applecross	2	Forrestfield	4	Midvale	3	Victoria Park	5
Ardross	1	Fremantle	12	Mirrabooka	3	Wanneroo	1
Armadale	4	Girrawheen	5	Mosman Park	3	Waterford	1
Ashfield	1	Glendalough	2	Mt Claremont	1	Wattleup	2
Attadale	2	Gosnells	2	Mt Hawthorn	2	Wembley	5
Atwell	1	Greenwood	1	Mt Helena	1	Wembley Downs	1
Balcatta	2	Guildford	2	Mt Lawley	8	Westfield	1
Balga	6	Hamersley	3	Mt Pleasant	1	West Leederville	1
Bassendean	5	Hamilton Hill	3	Mundaring	2	West Perth	3
Bayswater	3	Helena Valley	1	Nedlands	1	Willetton	1
Beckenham	1	Highgate	1	Nollamara	3	Woodlands	2
Beechboro	1	Hillarys	2	Noranda	1	Yokine	1
Belmont	3	Hilton	1	Northbridge	9		
Bentley	6	Iluka	1	North Fremantle	1		
Bicton	1	Inglewood	1	North Perth	4		
Bullcreek	1	Innaloo	3	Ocean Reef	2		
Cannington	4	Jolimont	1	O'Connor	1		
Carlisle	1	Joondanna	2	Orelia	1		
City Beach	1	Kalamunda	2	Osborne Park	4		
Claremont	3	Kallaroo	1	Padbury	2		
Cloverdale	2	Kardinya	1	Palmyra	1		
Coogee	1	Karrinyup	4	Parmelia	2		
Coolbellup	4	Kenwick	2	Perth	20		
Cooloongup	1	Kingsley	2	Prison	3		
Craigie	1	Koondoola	1	Queens Park	2		
Currambine	2	Langford	1	Red Hill	1		
Daglish	1	Lathlain	2	Rivervale	10		
Dianella	3	Ledge Point	1	Rockingham	2		
Doubleview	3	Leederville	4	Safety Bay	1		
Duncraig	1	Lockridge	2	Samson	1		
East Perth	5	Lynwood	1	Scarborough	8		
East Fremantle	3	Maddington	2	South Perth	6		
East Victoria Park	5	Manning	1	Stirling	1		
Edgewater	1	Marangaroo	2	Subiaco	1		
Ellenbrook	1	Maylands	6	Thornlie	2		
Forrestdale	1	Midland	2	Tuart Hill	6		

Table A-6
Accidental heroin related deaths by locality of incident non-metropolitan area, WA, 1997 - 2004

Albany	2	Esperance	2	Newman	1
Boulder	2	Geraldton	4	Pannawonnica	1
Bridgetown	2	Harvey	1	Port Hedland	2
Broome	1	Kalgoorlie	8	South Hedland	3
Busselton	2	Kununurra	1	Wundowie	1
Carnarvon	1	Laverton	2	Yerecoin	1
Donnybrook	1	Mandurah	10		
Dunsborough	1	Marvel Loch	1		

Table A-7
Quarterly all opioid related deaths by type of opioid, WA, 1995 - 2004

	Illicit opioids		Licit	Total
	Accidental HRDs	Other		
1995				
Qtr 1	12	2	3	17
Qtr 2	14	1	2	17
Qtr 3	22	2	3	27
Qtr 4	18	1	2	21
1996				
Qtr 1	10	3	2	15
Qtr 2	10	3	6	19
Qtr 3	13	1	2	16
Qtr 4	12	-	2	14
1997				
Qtr 1	19	2	2	23
Qtr 2	22	4	2	28
Qtr 3	20	4	4	28
Qtr 4	15	1	-	16
1998				
Qtr 1	15	9	2	26
Qtr 2	17	4	2	23
Qtr 3	16	4	3	23
Qtr 4	24	10	4	38
1999				
Qtr 1	25	6	-	31
Qtr 2	20	3	2	25
Qtr 3	14	6	1	21
Qtr 4	22	3	2	27
2000				
Qtr 1	15	2	2	19
Qtr 2	27	2	5	34
Qtr 3	15	5	2	22
Qtr 4	19	5	1	25
2001				
Qtr 1	8	4	7	19
Qtr 2	3	5	11	19
Qtr 3	3	1	10	14
Qtr 4	1	3	6	10
2002				
Qtr 1	1	2	5	8
Qtr 2	3	1	2	6
Qtr 3	3	3	4	10
Qtr 4	4	-	2	6
2003				
Qtr 1	2	3	6	11
Qtr 2	1	2	3	6
Qtr 3	-	-	-	-
Qtr 4	2	-	-	2
2004				
Qtr 1	5	2	3	10
Qtr 2	9	1	4	14
Qtr 3	7	1	2	10
Qtr 4	4	4	8	16
Total	**445**	**115**	**129**	**716**

Table A-8
Annual opioid related deaths by type of opioid & cause, WA, 1995 - 2004

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	Total
Heroin/morphine											
Accidental	66	45	76	72	81	76	15	11	5	25	472
Suicide	-	-	3	8	2	5	-	-	-	-	18
Morphine											
Accidental	2	2	4	6	4	7	15	6	4	5	55
Suicide	1	-	-	5	1	1	2	1	-	1	12
Methadone											
Accidental	2	3	5	7	11	3	14	5	2	7	59
Suicide	-	-	-	1	-	-	3	-	1	-	5
Oxycodone											
Accidental	1	3	1	-	1	2	3	2	2	6	21
Suicide	-	-	-	3	-	-	1	1	-	-	5
Dextromoramide											
Accidental	3	2	2	-	1	-	-	-	-	-	8
Suicide	-	-	-	-	-	-	-	-	-	-	-
Opiates combination											
Accidental	1	-	4	1	2	1	-	1	1	1	12
Suicide	-	1	-	1	-	1	-	-	-	-	3
Codeine											
Accidental	2	-	-	1	1	-	1	-	-	2	7
Suicide	2	-	-	-	-	-	3	1	2	-	8
Propoxyphene											
Accidental	2	5	-	4	-	3	3	1	2	-	20
Suicide	-	2	-	1	-	1	1	1	-	1	7
Pethidine											
Accidental	-	1	-	-	-	-	-	-	-	-	1
Suicide	-	-	-	-	-	-	-	-	-	-	-
Buprenorphine											
Accidental	-	-	-	-	-	-	1	-	-	2	3
Suicide	-	-	-	-	-	-	-	-	-	-	-
All opioids											
Accidental	79	61	92	91	101	92	52	26	16	48	658
Suicide	3	3	3	19	3	8	10	4	3	2	58
Total	**82**	**64**	**95**	**110**	**104**	**100**	**62**	**30**	**19**	**50**	**716**

Methods

The Australian Bureau of Statistics (ABS) has responsibility for compiling national statistical summaries of all causes of death, based on an internationally standardised system of cause of death codes developed by the World Health Organisation (WHO). The WHO's Tenth Revision of the International Classification of Diseases, referred to as ICD-10, has been used to classify the underlying cause of death from 1999.

The ICD-10 system uses different codes to identify deaths caused by specific pharmacological groups of illicit drugs, such as opioid type (F11.-), cannabinoids (F12.-), cocaine type (F14.-), stimulant type (F15.-) and hallucinogens (F16.-). The ICD-10 codes include a fourth character sub division to determine the level of drug use, harmfulness, dependence and other related disorders. The ICD-10 system also distinguishes between deaths that are externally caused, such as accidental poisoning, deaths due to intentional self harm and assault by poisoning.

Coroners in Western Australia (WA) by law are required to investigate all sudden and unexpected deaths, based on a large range of toxicological and forensic data. Coroner's verdicts are also utilised by the ABS to classify this group of deaths.

The Coronial Database was established in 1995 in collaboration with the Chemistry Centre of WA and the Coroner's Court. It is presently managed by the Drug and Alcohol Office (DAO) and was established to overcome limitations of the ICD system, such as not being able to identify heroin related deaths (HRDs).

The Coronial Database includes information extracted from forensic, demographic and toxicological data and provides comprehensive data about HRDs, amphetamine related drugs and other types of illicit drug related mortality. It also includes data in relation to mortality related to the use of volatile substances, such as the sniffing of petrol, glue, butane and other inhalants.

The data in the Coronial Database is used to monitor the extent to which drugs such as heroin as well as specific licit opioid drugs, such as morphine, oxycodone, dextromoramide, buprenorphine and methadone may contribute to drug related mortality.

As diverted licit opioids may become substitutes for heroin, they are also a cause of death as they have similar actions as heroin and accordingly monitoring of this group of drugs complements other measures to prevent over prescribing of Schedule 8 drugs in particular.

The Coronial Database distinguishes three types of opioid related mortality.

- *Accidental HRDs*, where monoacetylmorphine or other metabolites of heroin were identified and the Coroner determined death was accidentally caused.
- *Other illicit opioid related deaths* caused accidentally or intentionally where there was evidence of self administration, for example, evidence of injection sites, needles and syringes and other information, such as a history of dependence.
- *Iicit opioid related deaths* caused accidentally or intentionally where a person was under medical care for health problems, for example prescribed an opioid for pain relief arising from a medical condition.

It should be noted that there are variations between ABS determined cause of drug related deaths and counts of number of deaths identified from more comprehensive information available from the Coronial Database.

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