

Opioid related deaths in Australia (2007-2011)

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PURPOSE

The data contained in this report is provided by the National Coronial Information System (NCIS). The NCIS is a data repository for mortality data from all Australian State and Territory Coroners and from New Zealand¹. The NCIS produces publicly available *NCIS Fact Sheets*² to provide information to the community about mortality trends and changes over time. *NCIS Fact Sheets* are intended for wide use by the public, including media outlets, to raise awareness of mortality risks and for the development of strategies for the prevention of death. NCIS Fact Sheets are generated for the purpose of presenting statistical evidence only and the NCIS does not seek to provide interpretation of the data.

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NCIS DISCLAIMER

This dataset does not claim to be representative of all relevant cases within the time period specified. This may be due to; cases still under coronial investigation, missing data, occasional processing and coding errors. The Department of Justice accepts no liability for any loss or damage that may arise from any use of or reliance on the data.

The data entered into the NCIS is collected from source material such as the police report of death, autopsy reports, toxicology reports and coronial findings from nine jurisdictions. It is acknowledged that quality and consistency of these documents may vary between and within each jurisdiction. There are also differences between jurisdictions as to legislation governing the reporting of a death to a coroner, which can impact on the type, quality and quantity of the information collected and reported by each jurisdiction. These differences will have an impact on the information available in the NCIS. It should also be noted the NCIS is the result of an administrative data set and data collection is the result of operational processes which differ between jurisdictions. Contributing data to the NCIS is not the primary purpose of the operational processes which can result in data limitations.

¹ Data collection commenced in July 2000 for all Australian jurisdictions except Queensland which commenced in January 2001. New Zealand data is collected from July 2007.

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Key Findings

An opioid drug was found to have made a primary contribution to death in 4,102 fatalities reported to an Australian Coroner across a 5 year period (2007-2011). This equates to an average of over 820 deaths each year³. The previous fact sheet published in February 2013 included data over a three year period (2007-2009), showing an average of approximately 800 cases per year.

The identified opioid drug deaths had the following characteristics:

- The majority of deaths were deemed unintentional (71.2%), while almost one-sixth were due to an act of intentional self-harm (15.8%).
- Over two-thirds of deaths involved males (67.1%), with the highest proportion aged between 35-44 years (28.4%).
- A slightly higher proportion of females compared with males were involved in deaths involving codeine-containing products.
- Heroin was the opioid drug most frequently involved in death (particularly in cases of sole drug involvement), with 84.4% of all heroin-related deaths involving males. 87.6% of all heroin related deaths were unintentional in nature.
- Methadone and oxycodone were the second and third most frequently identified opioids involved in death.
- Almost three quarters of opioid drug deaths occurred in combination with non-opioid drugs (74.5%). Of the drug classes examined, benzodiazepines and alcohol were the non-opioid drug classes most frequently identified.
- Codeine-containing products, morphine, oxycodone and tramadol were more likely to be involved in intentional self-harm deaths than heroin or methadone.

³ Only cases completed with the Coroner and closed on the NCIS as at 29th March 2014 were included.

From 2007 to 2009, the number of opioid drug deaths identified on the National Coronial Information System (NCIS) increased by 25.0% (744 deaths in 2007 compared to 934 in 2009), with an apparent subsequent decrease in opioid related fatalities in 2010 and 2011 (Table 1).

Table 1: National opioid drug deaths, by year of death (n=4,102)

Year of Death	Opioid as sole drug	Opioid one of multiple drugs	Total
2007	221	523	744
2008	230	633	863
2009	249	685	934
2010	219	630	849
2011*	128	584	712
TOTAL	1,047	3,055	4,102

*The number of opioid related deaths in 2011 is likely to be an underestimation due to comparatively low case closure rates. Several cases are still open under coronial investigation and not included in this report. Numbers are to be interpreted with caution. Please refer to the 'Limitations' section of this fact sheet for further information.

The majority of opioid drug deaths were unintentional (71.2%; Table 2), however a higher proportion of deaths involving codeine-containing products, morphine, oxycodone and tramadol were deemed intentional compared with those involving other opioid drugs, especially amongst females

For detailed data on intentional self-harm deaths please see Appendix 1

Table 2: National opioid drug deaths 2007-2011, by intent and opioid drug *

Intent of deceased	Heroin	Methadone	Oxycodone	Tramadol	Morphine (without codeine detected)	Codeine (without morphine detected)	Morphine and codeine detected together	Possible codeine combination product	All opioid drugs
	(N=1,127)	(N=845)	(N=762)	(N=328)	(N=630)	(N=573)	(N=515)	(N=769)	(N=4,102)
Unintentional	87.6%	78.6%	63.9%	62.8%	70.3%	53.8%	70.5%	59.7%	71.2%
Intentional Self-Harm	4.6%	6.4%	23.6%	24.1%	15.1%	31.4%	15.3%	26.5%	15.8%
Other	0.0%	≤1%	≤1%	≤1%	1.1%	≤1%	0.0%	≤1%	≤1%
Natural Causes (no intent) ^	≤1%	3.2%	3.7%	4.0%	4.8%	4.2%	5.4%	4.5%	3.6%
Undetermined / Unlikely to be known	6.8%	11.6%	8.4%	8.5%	8.6%	9.9%	8.3%	8.7%	9.0%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

* – Not mutually exclusive for each opioid drug when multiple opioids were involved (e.g.: heroin may be combined with alcohol, benzodiazepines and other non-opioid drugs within the same individual case)

^ – Natural cause deaths were deaths resulting from a natural disease but considered to be primarily contributed to by an opioid drug

Heroin was the most frequently identified opioid drug, found in 1127 deaths during this period (Table 3). Multiple drugs were identified in more than half of the deaths involving heroin (676 of 1127 deaths; 60.0%; Table 3). Heroin was also the most commonly detected opioid drug in deaths attributed to one drug only (451 of 1127 deaths; 40.0%; Table 3).

Methadone and oxycodone were the next most frequently identified opioid drugs (Table 3).

Table 3: National opioid drug deaths 2007-2011, by opioid drug (n=4,102)

Opioid drug *	Opioid as sole opioid and sole drug	Opioid one of multiple drugs	Total
Heroin	451	676	1127
Methadone	146	699	845
Oxycodone	92	670	762
Morphine (without codeine detected)	141	489	630
Codeine (without morphine detected) ^	42	531	573
Morphine and codeine detected together ^	79	436	515
Tramadol	36	292	328
(Dextro)propoxyphene	13	110	123
Other #	13	48	61
Fentanyl	26	104	130
Buprenorphine	5	49	54
Hydrocodone	0	15	15
Pethidine	3	11	14

* – Not mutually exclusive for each opioid drug when multiple opioids were involved (e.g.: heroin may be combined with alcohol, benzodiazepines and other non-opioid drugs within the same individual case)

^ – A proportion of cases (n=769) involved the possible use of a codeine combination product with paracetamol, ibuprofen, aspirin or doxylamine detected alongside the presence of codeine

– “Other” includes pholcodine, (dextro)methorphan, hydromorphone, dihydrocodeine, loperamide, oxymorphone, remifentanyl or an opioid drug that was unspecified in the details of the case

The majority of deaths involved only **one** type of opioid drug⁴ (3,161 of 4,102 deaths; 77.1%; Table 4), whilst 19.5% involved two opioids.

Oxycodone, methadone and codeine-containing products were most commonly identified in deaths involving multiple opioid drugs. Combinations of methadone/heroin, codeine/oxycodone and codeine/tramadol were frequent, as was morphine (with or without codeine) in combination with oxycodone or tramadol (Table 5).

Table 4: National opioid drug deaths 2007-2011, by number of opioid drugs detected together

Number of opioid drugs detected together	Frequency	Percentage [%]
Solitary opioid drug (1)	3162	77.1
2	800	19.5
3	123	3.0
4 or more	17	0.4
TOTAL	4,102	100

⁴ With or without non-opioid drugs

Table 5: Multiple opioid drug deaths 2007-2011, by opioid drug

Opioid drug	Oxycodone	Methadone	Codeine (without morphine detected)	Heroin	Tramadol	Morphine (without codeine detected)	Morphine and codeine detected	(Dextro)-propoxyphene	Fentanyl	Buprenorphine	Hydrocodone	Other*	Pethidine
	372	346	286	211	225	181	162	72	74	38	15	26	10
<i>Used with 1 other opioid drug</i>	284	286	232	183	157	153	131	55	53	26	8	16	5
<i>Used with 2 other opioid drugs</i>	73	53	44	25	56	26	26	12	17	10	5	8	5
<i>Used with 3 other opioid drugs</i>	13	7	8	<3	11	<3	5	4	3	<3	<3	<3	0
<i>Used with 4 other opioid drugs</i>	<3	0	<3	<3	<3	0	0	<3	<3	0	<3	<3	0
Oxycodone													
Methadone	59												
Codeine (without morphine detected)	119	51											
Heroin	27	95	46										
Tramadol	70	45	61	31									
Morphine (without codeine detected)	71	66	<3	<3	34								
Morphine and codeine detected	62	62	<3	<3	39	0							
(Dextro)propoxyphene	18	8	24	14	9	11	5						
Fentanyl	27	11	13	<3	10	15	13	<3					
Buprenorphine	5	5	9	14	3	4	<3	<3	<3				
Hydrocodone	5	0	10	<3	0	0	4	0	<3	<3			
Other*	7	7	4	4	<3	4	3	0	<3	5	<3		
Pethidine	3	0	5	0	0	<3	<3	<3	3	0	0	0	

* – “Other” includes pholcodine, (dextro)methorphan, hydromorphone, dihydrocodeine, loperamide, oxymorphone, remifentanyl or an opioid drug that was unspecified in the details of the case

More than three-quarters of opioid drug deaths occurred amongst persons aged between 25 and 54 years (3,229 of 4,102 deaths; 78.8%; Table 6), with the highest frequency of death in the subset of 35 and 44 year olds (28.4%). Deaths involving heroin were most frequent amongst 25-34 year olds, whilst opioid drug deaths involving oxycodone, tramadol and codeine-containing products more frequently occurred amongst older age groups (35-54 year olds; Table 6).

Table 6: National opioid drug deaths 2007-2011, by age and opioid drug

Age of deceased	Heroin	Methadone	Oxycodone	Tramadol	Morphine (without codeine detected)	Codeine (without morphine detected)	Morphine and codeine detected together	Possible codeine combination product *	All opioid drugs
	(N=1,127)	(N=845)	(N=762)	(N=328)	(N=630)	(N=573)	(N=515)	(N=769)	(N=4,102)
15-24	7.1%	6.3%	4.9%	2.7%	4.3%	5.1%	5.8%	4.7%	5.8%
25-34	41.3%	29.6%	20.3%	20.1%	21.1%	15.3%	25.9%	17.9%	27.2%
35-44	32.7%	30.2%	26.2%	26.5%	26.5%	27.7%	24.9%	25.6%	28.4%
45-54	14.8%	26.2%	26.5%	25.3%	26.0%	28.7%	25.3%	28.2%	23.2%
55-64	4.2%	6.4%	13.9%	15.5%	13.2%	14.5%	13.5%	15.6%	10.0%
65+	0.0%	1.3%	8.0%	9.5%	8.6%	8.5%	4.4%	7.7%	5.3%
Other	0.0%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

* – The possible use of a codeine combination product has been identified where paracetamol, ibuprofen, aspirin or doxylamine was detected or mentioned (within toxicology reports or Coronial documentation) alongside the presence of codeine

Males outnumbered females at a ratio of around 2:1 overall (2,754 to 1,348 deaths, respectively), with pronounced difference between the sexes noted for deaths involving heroin, methadone and morphine (Table 7). There was a slightly higher proportion of females than males in deaths involving codeine-combination products.

Table 7: National opioid drug deaths 2007-2011, by gender and opioid drug

Gender of deceased	Heroin	Methadone	Oxycodone	Tramadol	Morphine (without codeine detected)	Codeine (without morphine detected)	Morphine and codeine detected together	Possible codeine combination product	All opioid drugs
	(N=1127)	(N=845)	(N=762)	(N=328)	(N=630)	(N=573)	(N=515)	(N=769)	(N=4,102)
Male	84.4%	66.5%	60.8%	52.4%	67.3%	47.9%	57.3%	49.4%	67.1%
Female	15.6%	33.5%	39.2%	47.6%	32.7%	52.1%	42.7%	50.6%	32.9%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

The majority of opioid drug deaths occurred at a home (3,478 of 4,102 deaths; 84.4%; Table 8). Heroin was the only opioid drug analysed that showed fatal overdoses occurring outside a home at a notable rate (280 of 1,127 deaths; 24.8%). Commercial areas, transport areas and recreational areas were often the non-home locations for heroin deaths.

Table 8: National opioid drug deaths 2007-2011, by incident location and opioid drug

Incident Location	Heroin	Methadone	Oxycodone	Tramadol	Morphine (without codeine detected)	Codeine (without morphine detected)	Morphine and codeine detected together	Possible codeine combination product	All opioid drugs
	(N=1127)	(N=845)	(N=762)	(N=328)	(N=630)	(N=573)	(N=515)	(N=769)	(N=4,102)
Home	75.2%	89.8%	89.5%	90.2%	87.1%	87.3%	86.4%	87.5%	84.8%
Commercial Area (Non-Recreational)	6.3%	1.4%	2.0%	2.1%	2.7%	2.8%	3.7%	2.6%	3.5%
Transport Area: Public Highway, Freeway, Street Or Road	5.6%	1.9%	1.2%	1.2%	0.8%	1.2%	2.5%	1.7%	2.5%
Recreational Area, Cultural Area, Or Public Building	5.2%	1.8%	1.8%	<1%	1.3%	2.1%	1.7%	1.6%	2.5%
Medical Service Area	1.1%	1.2%	2.4%	2.4%	4.6%	2.6%	2.3%	2.9%	2.2%
Transport Area: Other	3.9%	1.3%	1.0%	<1%	1.3%	1.0%	1.2%	<1%	1.8%
Other*	2.8%	2.6%	2.1%	2.4%	2.2%	3.0%	2.1%	3.1%	2.7%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

*'Other' – involves areas such as School and Educational Areas, Sports and Athletic Areas, or Industrial or Construction Areas

When opioid drugs were found in combination with other drug classes, the most common (of the classes examined) involved benzodiazepines or alcohol.

Benzodiazepines were most commonly combined with hydrocodone, methadone, oxycodone and fentanyl whilst amphetamines and cocaine were most frequently found in combination with heroin (Table 9).

Alcohol was also most commonly identified in deaths involving heroin and buprenorphine, and was not as frequent in deaths involving tramadol, dextropropoxyphene or methadone (Table 9). Alcohol was either rarely or not noted amongst deaths involving fentanyl, pethidine or “other” opioid drugs⁵.

NOTE: Additional NCIS searches indicate that there are at least an additional 121 deaths during this time period still under investigation with the Coroner which could be opioid drug deaths (101 of these deaths directly refer to an opioid within the cause of death).

⁵ “Other” includes pholcodine, (dextro)methorphan, hydromorphone, dihydrocodeine, loperamide, oxymorphone, remifentanyl or an opioid drug that was unspecified in the details of the case

Table 9: National opioid drug deaths 2007-2011, with drug combination (with categorised drug groups)

Opioid drug *	Number of cases involving opioid drug in combination with categorised group	Alcohol [%] ^	Amphetamines [%]	Benzodiazepines [%]	Cocaine [%]	Other non-opioid drug [%]ⁿ	Detected cannabis [%] #
Heroin	676	28.1	17.8	54.1	5.8	19.5	9.8
Methadone	699	11.9	15.5	66.8	1.1	29.5	14.7
Oxycodone	670	19.0	7.0	65.7	0.7	30.4	10.3
Morphine (without codeine detected)	489	18.0	12.1	64.8	1.2	24.1	12.7
Codeine (without morphine detected) @	531	17.7	4.0	59.3	0.2	49.9	5.6
Morphine and codeine detected together @	436	18.6	10.1	67.0	2.1	24.3	14.2
Tramadol	292	11.0	9.6	64.0	0.7	42.1	8.9
(Dextro)propoxyphene	110	11.8	4.5	62.7	0.9	34.5	8.2
Other £	48	4.2	4.2	83.3	0.0	22.9	14.6
Fentanyl	104	4.8	7.7	63.5	0.0	17.3	17.3
Buprenorphine	49	20.4	6.1	55.1	0.0	18.4	6.1
Hydrocodone	15	13.3	13.3	73.3	0.0	60.0	13.3
Pethidine	11	0.0	0.0	54.5	0.0	36.4	0.0

* – Not mutually exclusive for each opioid drug (e.g.: heroin may be combined with alcohol, benzodiazepines and other non-opioid drugs within the same individual case)

^ – ‘Alcohol’ = external cause deaths involving alcohol concentration equal to or greater than 0.05%

– Detection of cannabis was identified when cannabis was listed as one of the drugs under the object code of Pharmaceutical Substance for Human Use (PSHU)

@ – A proportion of cases (n=769) involved the possible use of a codeine combination product with paracetamol, ibuprofen, aspirin or doxylamine detected alongside the presence of codeine (674 of these cases involved a combination with another categorised drug group)

£ – “Other” includes pholcodine, (dextro)methorphan, hydromorphone, dihydrocodeine, loperamide, oxymorphone, remifentanyl or an opioid drug that was unspecified in the details of the case

ⁿ - ‘Other non-opioid drug’ includes compounds such as antipsychotic drugs, antidepressants and non-opioid analgesics

Coronial recommendations about opioid drug deaths

There were thirty-five opioid drug deaths reported during 2007 to 2011 where Coroners made recommendations pertaining to these cases. Common themes to these recommendations included:

- Improved recordkeeping, security and checking of opioid medication held in hospitals
- Recording of patient medication in Ambulance records and subsequent checking and recording of this medication by the hospital/facility receiving the patient
- Increased oversight and training for doctors about the prescription of opioid drugs (including dangers and practices surrounding the prescription of take-away methadone)
- Medical practitioners such as registered clinical psychologists and emergency medicine staff being vigilant about identifying patients with possible overmedication
- Improved warnings on medication about the dangers of combining opioid drugs with each other
- Changing the product information for fentanyl transdermal patches to ensure that it contains no potential anomalies
- Appropriate warnings for prisoners identified as suffering from drug dependency issues that are to be released from Corrective Services as to the danger of using illicit substances where their tolerance to such substances has been reduced by their period of incarceration
- Other mechanisms to reduce the abuse of Schedule 8 drugs such as:
 - tightening and auditing the prescription of opioid drugs
 - sharing of patient information amongst practitioners for patients who are suspected of abusing such prescriptions
 - a real-time prescription monitoring system accessible to prescribers and disseminators
 - a periodic review of patients with chronic non-malignant long term pain by a pain management specialist

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Appendix 1: Detailed data about opioid drug deaths

Table A: National opioid drug deaths 2007-2011, by year of death and opioid drug (n=4,102)

NOTE: The possible use of a codeine combination product has also been estimated where paracetamol, ibuprofen, aspirin or doxylamine was detected or mentioned (within toxicology reports or Coronial documentation) alongside the presence of codeine.

Opioid drug *	2007		2008		2009		2010		2011 ⁶	
	Sole drug	Multiple drug	Sole drug	Multiple drug	Sole drug	Multiple drug	Sole drug	Multiple drug	Sole drug	Multiple drug
Heroin	85	101	101	161	113	165	98	130	54	119
Methadone	31	134	28	137	38	149	36	134	13	145
Oxycodone	7	109	18	115	16	156	28	136	23	154
Morphine (without codeine detected)	42	93	36	95	31	105	24	110	8	86
Codeine (without morphine detected) ^	12	111	9	124	12	145	<3	82	7	69
Morphine and codeine detected together ^	22	62	19	102	24	90	11	102	3	80
Tramadol	7	62	8	61	6	75	10	49	5	45
(Dextro)propoxyphene	6	17	3	24	<3	31	<3	30	0	8
Other #	6	13	3	13	3	4	0	5	<3	13
Fentanyl	<3	4	<3	13	3	17	7	21	13	49
Buprenorphine	<3	8	<3	9	<3	11	<3	11	<3	10
Hydrocodone	0	5	0	4	0	6	0	0	0	0
Pethidine	<3	5	<3	<3	0	<3	0	<3	0	<3
TOTAL	221		230		249		219		128	

* – Not mutually exclusive for each opioid drug when multiple opioids were involved (e.g.: heroin may be combined with alcohol, benzodiazepines and other non-opioid drugs within the same individual case)

^ – A proportion of cases (n=769) involved the possible use of a codeine combination product with paracetamol, ibuprofen, aspirin or doxylamine detected alongside the presence of codeine

– “Other” includes pholcodine, (dextro)methorphan, hydromorphone, dihydrocodeine, loperamide, oxymorphone, remifentanyl or an opioid drug that was unspecified in the details of the case

⁶ The number of opioid related death in 2011 is likely to be an underestimation due to comparatively low case closure rates. Numbers are to be interpreted with caution. Please refer to the ‘Limitations’ section of this fact sheet for further information.

Chart A: National opioid drug deaths 2007-2011⁶, by year of death and selected opioid drug

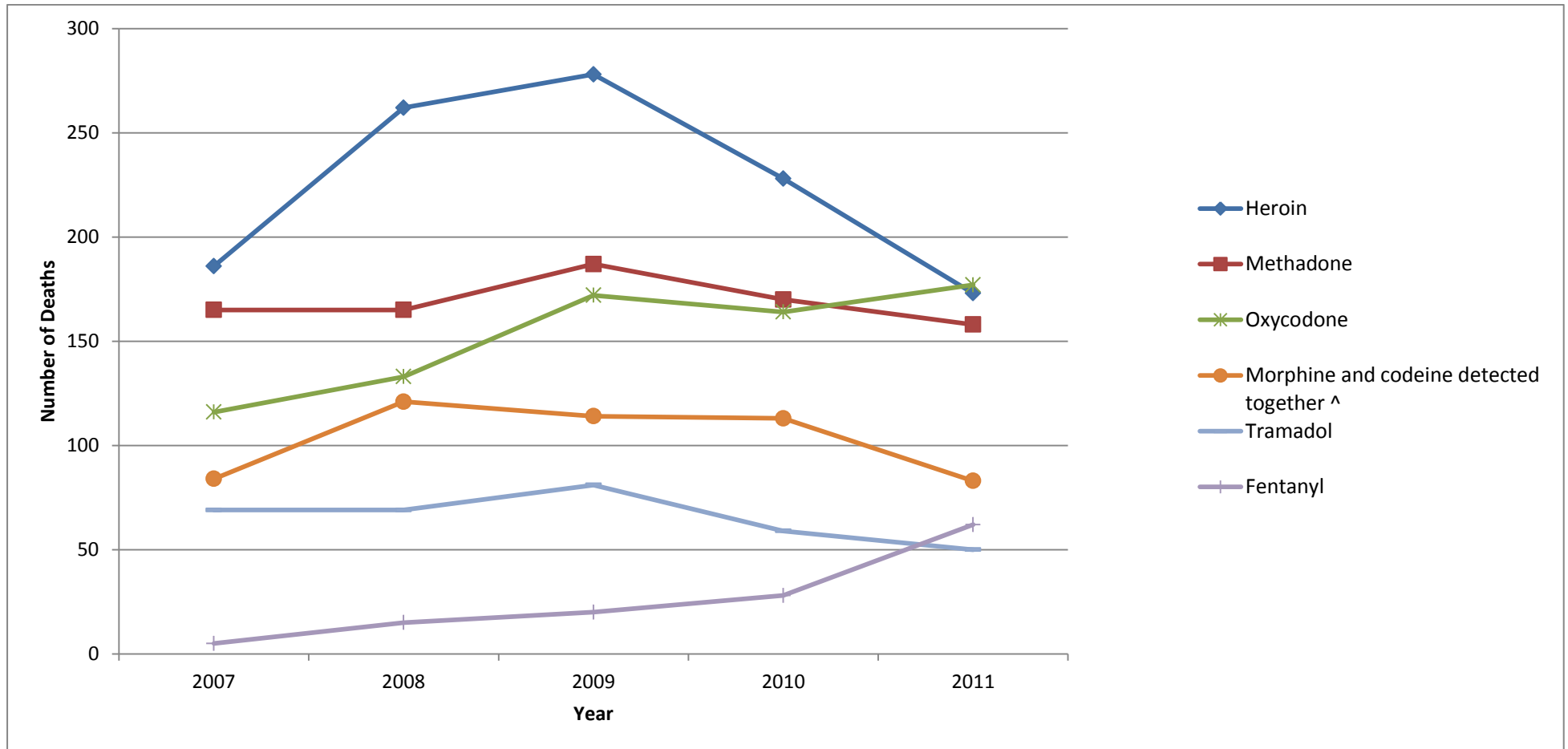


Table B: National *intentional self-harm* opioid drug deaths 2007-2011, by opioid drug (n=647)

Opioid drug *	Opioid as sole opioid and sole drug	Opioid one of multiple drugs	Total
Codeine (without morphine detected)	9	171	180
Oxycodone	22	158	180
Morphine (without codeine detected)	28	67	95
Tramadol	8	71	79
Morphine and codeine detected together	9	70	79
(Dextro)propoxyphene	11	43	54
Methadone	10	44	54
Heroin	19	33	52
Other #	6	15	21
Fentanyl	4	16	20
Buprenorphine	0	5	5
Hydrocodone	0	<3	<3
Pethidine	0	<3	<3
TOTAL	126		

* – Not mutually exclusive for each opioid drug when multiple opioids were involved (e.g.: heroin may be combined with alcohol, benzodiazepines and other non-opioid drugs within the same individual case)

– “Other” includes pholcodine, (dextro)methorphan, hydromorphone, dihydrocodeine, loperamide, oxymorphone, remifentanyl or an opioid drug that was unspecified in the details of the case

Table C: National intentional self-harm opioid drug deaths 2007-2011, by age and opioid drug* (n=647)

Age of deceased	Heroin	Methadone	Oxycodone	Tramadol	Morphine (without codeine detected)	Codeine (without morphine detected)	Morphine and codeine detected together	Possible codeine combination product	All opioid drugs
	(N=52)	(N=54)	(N=180)	(N=79)	(N=95)	(N=180)	(N=79)	(N=204)	(N=647)
15-24	3.9%	1.9%	0.0%	2.2%	2.5%	4.2%	5.6%	6.3%	4.4%
25-34	14.4%	34.6%	24.1%	7.8%	11.4%	10.5%	13.3%	19.0%	16.2%
35-44	22.6%	40.4%	37.0%	15.6%	16.5%	16.8%	25.6%	16.5%	22.1%
45-54	26.0%	15.4%	29.6%	29.4%	30.4%	28.4%	26.7%	31.6%	29.4%
55-64	18.2%	7.7%	7.4%	26.7%	20.3%	20.0%	17.8%	19.0%	17.2%
65+	14.8%	0.0%	1.9%	18.3%	17.7%	20.0%	11.1%	7.6%	10.8%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

* – Not mutually exclusive for each opioid drug when multiple opioids were involved (e.g.: heroin may be combined with alcohol, benzodiazepines and other non-opioid drugs within the same individual case)

Table D: National intentional self-harm opioid drug deaths 2007-2011, by gender and opioid drug (n=647)

Gender of deceased	Heroin	Methadone	Oxycodone	Tramadol	Morphine (without codeine detected)	Codeine (without morphine detected)	Morphine and codeine detected together	Possible codeine combination product	Opioid drugs overall
	(N=52)	(N=54)	(N=180)	(N=79)	(N=95)	(N=180)	(N=79)	(N=204)	(N=647)
Male	76.9%	57.4%	43.9%	38.0%	55.8%	43.3%	40.5%	39.7%	49.8%
Female	23.1%	42.6%	56.1%	62.0%	44.2%	56.7%	59.5%	60.3%	50.2%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Appendix 2: Data Source and Method

The NCIS

The National Coronial Information System (NCIS) is administered by the Victorian Department of Justice on behalf of the NCIS Board of Management.

The NCIS is funded by each State and Territory Justice / Attorney-General's Department, the New Zealand Ministry of Justice, and the following Australian federal agencies:

- Australian Department of Health and Ageing
- Australian Institute of Criminology
- Safe Work Australia
- Australian Competition and Consumer Commission
- Australian Department of Infrastructure and Transport

Data is provided by each of the Coronial Offices around Australia, the Australian Bureau of Statistics (ABS) and Safe Work Australia.

Method

To identify opioid drug deaths on the NCIS, a search was undertaken of all closed cases where death or notification of death occurred between 1st January 2007 and 31st December 2011⁷, where the object code was "Pharmaceutical Substances for Human Use" (PSHU).

Cases were manually reviewed for the confirmation of drug-related mortality⁸, and were further identified as an opioid drug death when an opioid was referred to within a cause of death or a free-text object field, or when an object was coded within an opioid related category within PSHU.

Cases were only retained within the dataset when the opioid drug was considered to be a **primary contributor to death**. This was determined when:

- Drug toxicity was noted within sections 1a through to 1d of the cause of death, or
- Aspiration of gastric contents was noted within the cause of death AND drug toxicity was noted anywhere in the cause of death, or

The detection or mention of paracetamol, ibuprofen, aspirin or doxylamine (within toxicology reports or Coronial documentation) alongside the presence of codeine was recorded as the possible involvement of a codeine combination product for each case.

If the death was noted as being contributed to by a combination of multiple coded drugs (such as "mixed drug toxicity" or "multiple drug overdose"), the drugs that were part of the "multiple drug" combination were recorded (e.g.: heroin and alcohol toxicity).

⁸ Cases were only considered to be drug-related when an object was coded as PSHU and there was also reference to a drug (other than alcohol or cannabis) within the medical cause of death

The dataset was then manually reviewed to determine which opioid drugs were involved in each case. It must be noted that missing documentation may lead to an underrepresentation of heroin related deaths in the data set.

For the purposes of this analysis, each opioid was considered as a separate drug (e.g.: heroin and tramadol toxicity would be classed as a multiple drug fatality). An exception to this rule was the detection of **both** morphine and codeine (without any other opioid drug), in which heroin involvement remained unproven, due to complex intertwining metabolic and toxicological profiles pertaining to morphine, codeine and heroin⁹.

⁹ Konstantinova SV, Normann PT, Arnestad M, et al. Morphine to codeine concentration ratio in blood and urine as a marker of illicit heroin use in forensic autopsy samples. *Forensic Sci Int* 2012 Apr 10; 217(1-3): 216-21.

Limitations

Toxicological techniques

Rates and frequencies of these deaths may be influenced by whether a toxicological screen for specific opioid drugs was included in a standard screen, and whether toxicological techniques were sensitive enough to detect low levels of certain opioids (e.g.: fentanyl).

Availability of case documentation

In some cases, reports associated with a death may not be available on the NCIS to confirm the details surrounding the fatality, and the level of detail contained in these reports can vary.

For more information about document attachment, please refer to the NCIS Website (<http://www.ncis.org.au/data-collection-2/operational-statistics/>).

Open cases

The proportion of open cases on the NCIS may impact the dataset, especially for cases identified in more recent years. The percentage of closed cases for each relevant calendar year at the time of data extraction was as follows:

Year	% closed
2007	96%
2008	96%
2009	94%
2010	93%
2011	88%

Population growth and Reporting of “Frequencies only”

When comparing frequencies of certain types of fatalities (such as intentional self-harm deaths) between geographical locations (such as Jurisdictions or Local Government Areas), population numbers should be taken into consideration when drawing conclusions. An increase in case frequency might be impacted by an increase in population rather than an increase in incident. Please refer to the ABS website for population data.

<http://www.abs.gov.au/websitedbs/D3310114.nsf/home/home?opendocument#from-banner=GT>