



Determining the impact of opioid substitution therapy (OST) on mortality post-release

Medicine

National Drug and Alcohol Research Centre

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Collaborators and funding sources

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- Pia Salmelainen, NSW Ministry of Health
- NSW Bureau of Crime Statistics and Research
- Australian Institute of Health and Welfare
- **NHMRC fellowships:** Louisa Degenhardt (#1041742), Sarah Larney (#1035149), Richard Mattick (#1045318)
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Mortality post-release

- High risk of death following release from prison
 - Compared to the general population, 3+ times greater for men, 7+ times greater for women
- Large proportion of deaths in the 2 weeks after release are drug-induced
 - Meta-analysis: 76% of deaths in the first 2 weeks were drug-related (Merrall et al. 2010)
 - Risk of overdose in the first 2 weeks is 3-11 times that in weeks 5-12 post-release

Mortality post-release

- Opioid substitution therapy (OST): maintenance pharmacotherapy with opioid agonists e.g. methadone, buprenorphine
- Reduces mortality of opioid-dependent people by more than one-half
- Does OST reduce risk of death among released opioid-dependent prisoners?

Method

- Setting:
 - New South Wales, Australia
 - Health care provided by unit of the Ministry of Health
 - Long-established OST program
 - Continuation of community treatment or commence treatment if clinically indicated
 - Pre-release planning to ensure continuity of care

Method

- Data sources:
 - Pharmaceutical Drugs of Addiction System (Ministry of Health) (from 1985 onwards)
 - Records all episodes of methadone and buprenorphine maintenance in NSW
 - Re-offending Database (Bureau of Crime Statistics and Research) (from 2000 onwards)
 - Records all court proceedings and incarcerations in NSW
 - National Death Index (Australian Institute of Health and Welfare)
 - Records dates and causes of death nationally.

Method

- Data from PHDAS probabilistically linked to the ROD and NDI:
 - Full name
 - DOB
 - Sex
 - Date and state of last known contact
- Linkage undertaken by data custodians
- De-identified linked data files provided to research team for analysis

Method: Post-release cohort definition

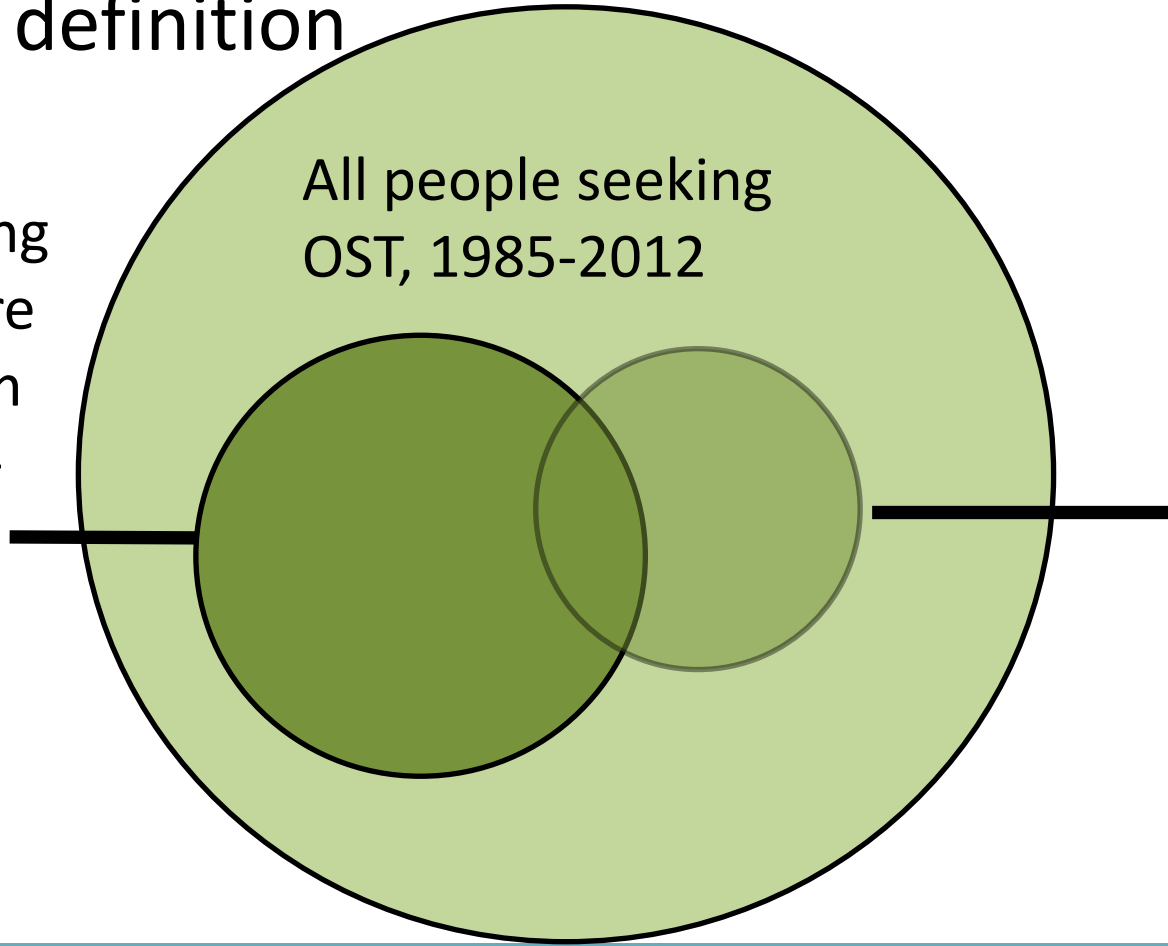
- Cohort: people with an episode of OST who had also been released from prison at least once
- Only those releases from prison during or after the first episode of OST were included
- Assumes chronic opioid dependence
 - Any resulting bias would produce more conservative results, as people no longer using opioids would have lower baseline mortality risk

Cohort definition

People seeking OST who were released from prison, 2000-2012

All people seeking OST, 1985-2012

People seeking OST who died, 1985-2012



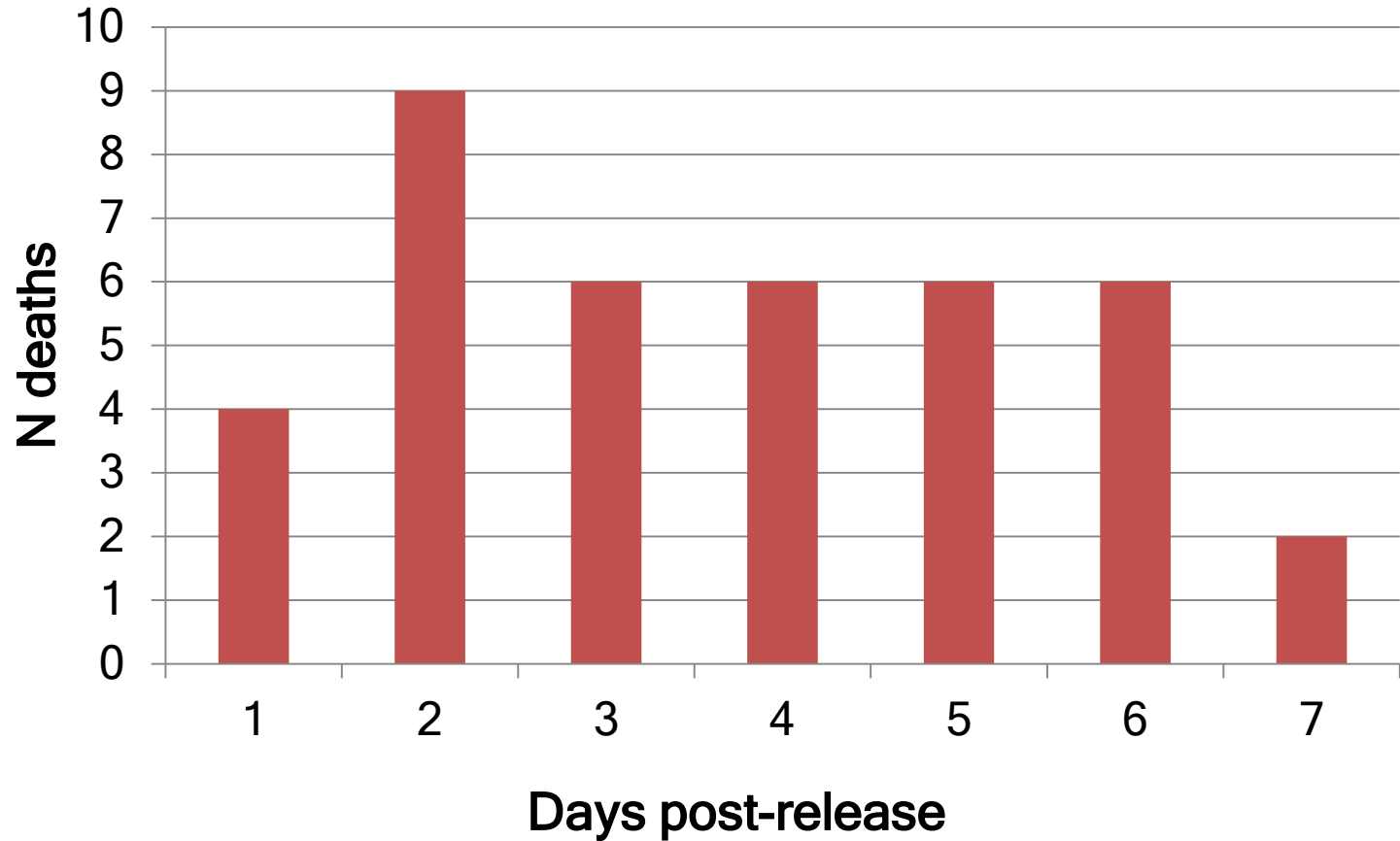
Method

- Crude mortality rates in and out of treatment
- Association between OST and mortality:
 - Extended Cox models that allowed for discontinuous risk intervals
 - Post-release OST exposure coded as time-dependent variable

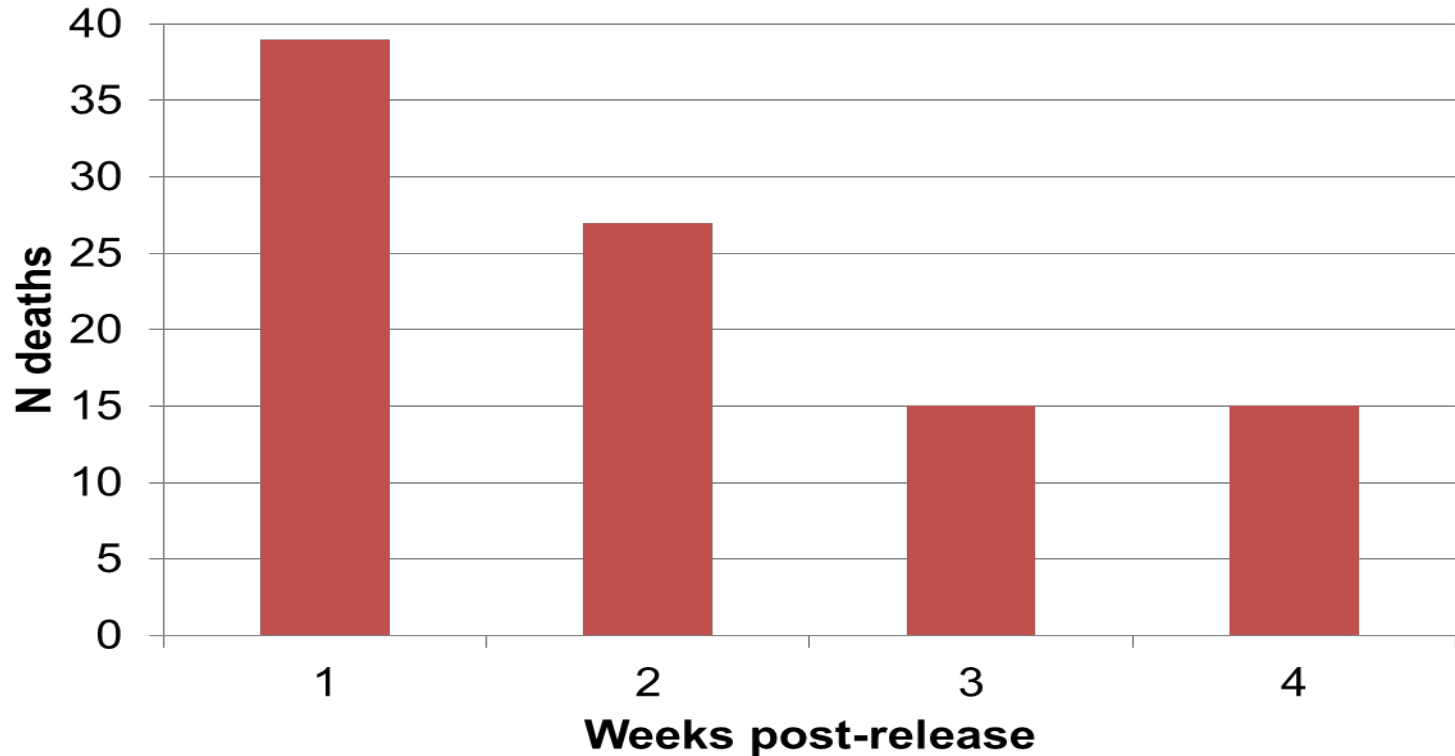
Results: Post-release mortality, 2000-2012

- N=16,453
 - 79% (n=12,945) men
 - 30% (n=4,919) Indigenous
- 60,161 releases from prison
- OST was prescribed in 51% of releases (n=30,397)
- 1,050 deaths after a prison release

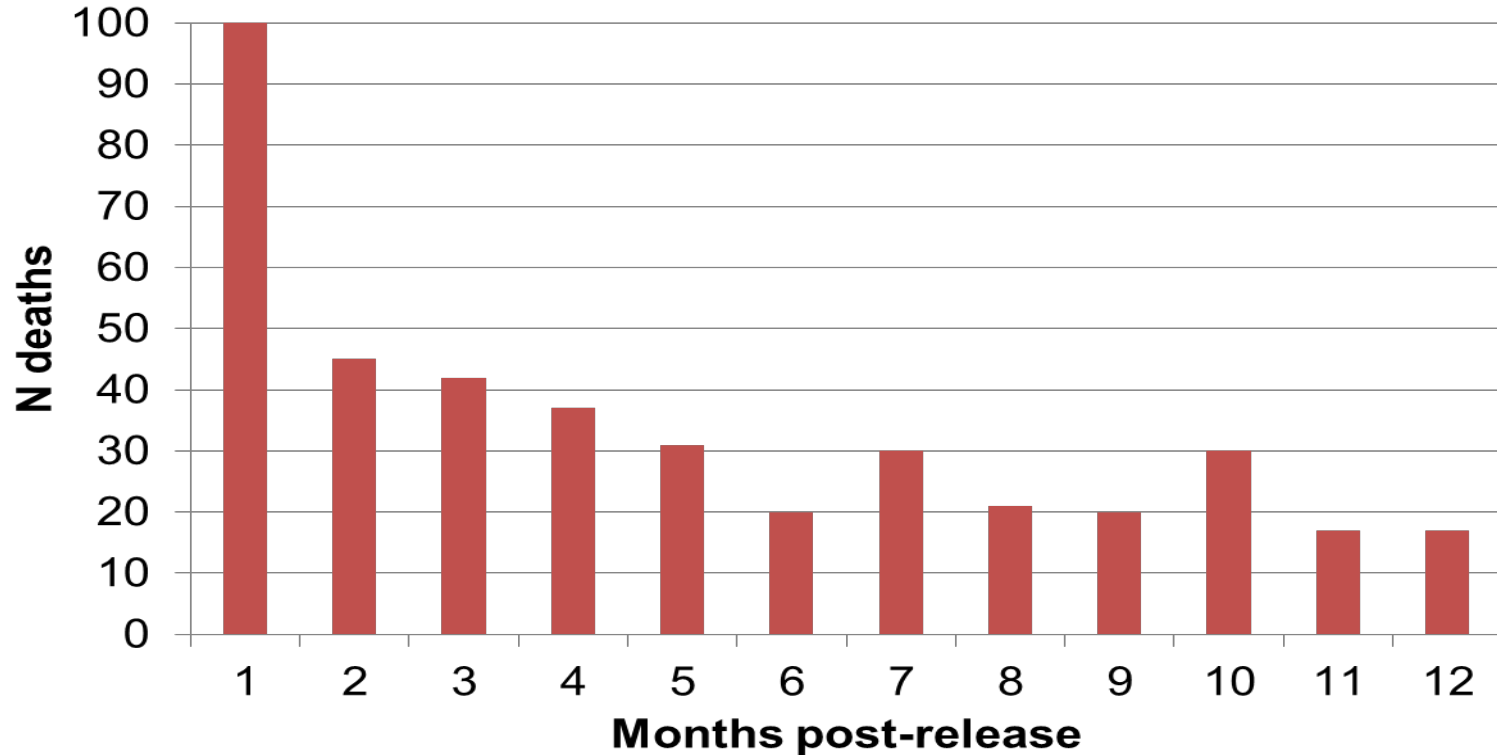
Mortality after release, first day (n=39)



Mortality after release, first month (n=96)



Mortality after release, first year (n=411)



Number of deaths in the first 4 weeks post-release

	OST exposure		
	Full	Partial	None
All-cause	16	5	75
Accidental drug-induced	6	4	46
Suicide	0	0	3
Accidental injury	2	1	2
Violence	2	0	0

Crude mortality rates per 1000PY in the first 4 weeks post-release

	OST exposure		
	Full	Partial	None
All-cause	8.8	11.5	36.7
Accidental drug-induced	3.5	10.4	26.5
Suicide	1.0	-	0.8
Accidental injury	1.6	-	1.3
Violence	0.6	-	0.5

Predictors of mortality 4 weeks post-release

	4 weeks post-release	
	Unadjusted HR (95% CI)	Adjusted HR (95% CI)
Male	1.87 (1.00, 3.52)	1.33 (0.69, 2.55)
Indigenous	0.78 (0.50, 1.20)	0.81 (0.51, 1.28)
Age at prison release*log(time)		0.96 (0.95, 0.97)
Post-release exposure to OST ¹	0.22 (0.13, 0.37)	0.25 (0.12, 0.53)
OST during most recent incarceration*log(time)		1.47 (1.16, 1.87)
Number of prior OST episodes ²	0.94 (0.85, 1.04)	0.97 (0.87, 1.07)
Juvenile offending history	0.93 (0.58, 1.47)	0.88 (0.48, 1.61)
Length of most recent incarceration ²		
Less than 1 month	Referent	Referent
1-6 months	1.93 (1.17, 3.18)	2.65 (1.56, 4.51)
6-12 months	1.45 (0.78, 2.68)	1.93 (0.98, 3.78)
More than 12 months	1.28 (0.61, 2.70)	1.79 (0.79, 4.04)
Number of prior incarcerations ²	1.00 (0.92, 1.08)	1.00 (0.92, 1.10)
Any property offence prior to release ³	1.28 (0.61, 2.68)	2.56 (0.99, 6.63)
Any violent offence prior to release ³	1.11 (0.70, 1.75)	1.07 (0.65, 1.77)
Any drug offence prior to release*log(time)		0.64 (0.53, 0.79)

OST and mortality in the first 4 weeks post-release

- Time in OST associated with a **75% reduction** in hazard of death (adj. HR 0.25; 95% CI: 0.12, 0.53)

Discussion

- OST is critical to minimising post-release mortality among opioid-dependent prisoners
- Also dramatically reduces deaths *in* prison (see Larney et al. (2014), *BMJ Open*)
- Reduces injecting, drug charges in prison
- Higher rates of post-prison OST if someone is maintained on OST during incarceration