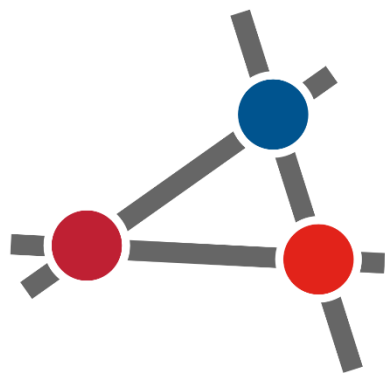




**Does exposure to opioid substitution treatment in prison
reduce the risk of death after release?**

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Acknowledgements

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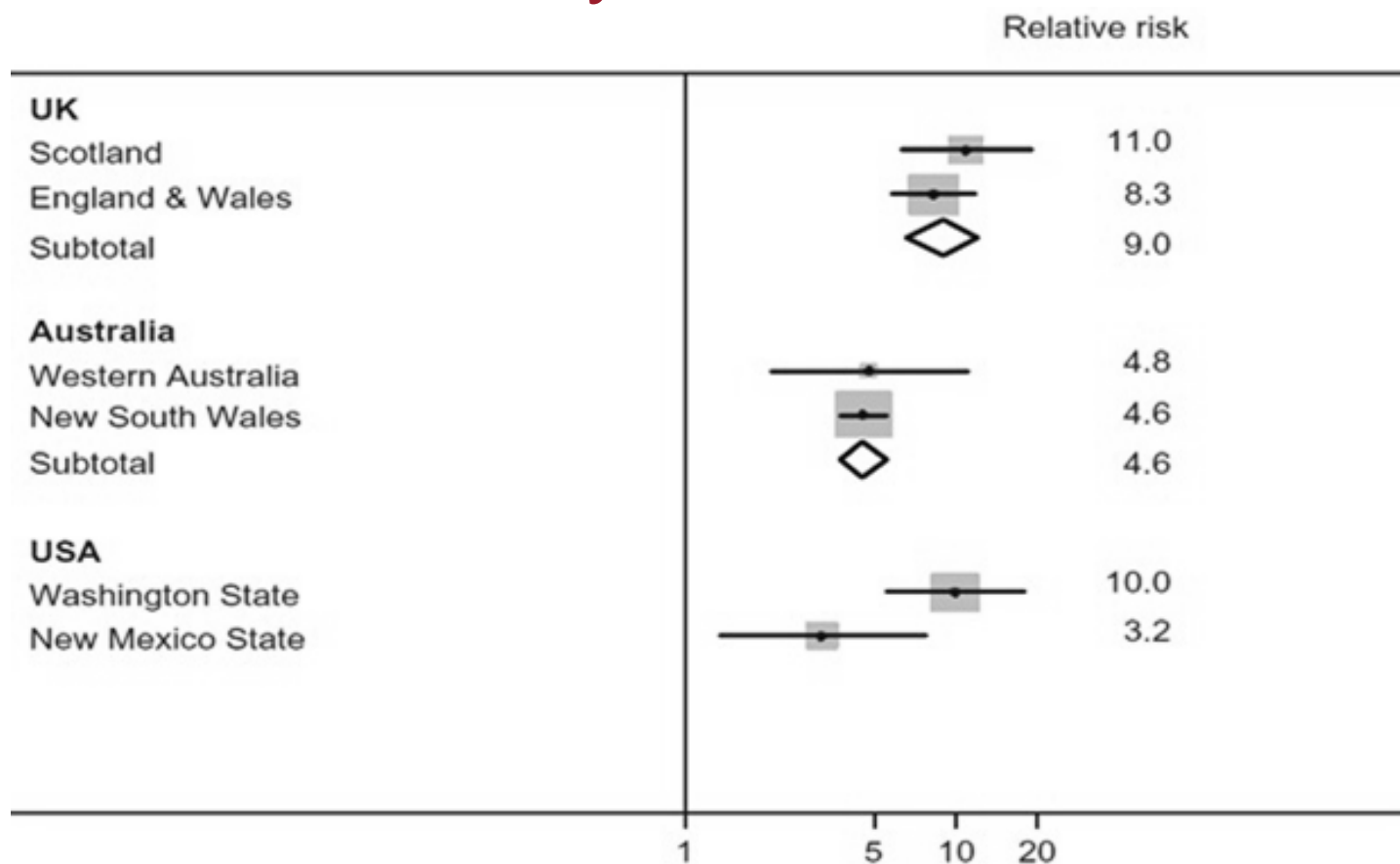
- **IDTS Commissioning Group:** Dr Mary Piper (Senior Public Health Consultant, Health and Justice Team, Health and Wellbeing Directorate, English Department of Health)
- **IDTS Steering Group:** Dr Mary Piper (English Department of Health); Nino Maddalena (PHE); David Sheehan (PHE); Christine Kelly (NHS); Dave Marteau (English Department of Health); Caroline Turley (NATCEN); Michael Wheatley (National Offender Management Service); Caroline Bonds (National Offender Management Service); Kieran Lynch (PHE); John McCracken (English Department of Health)
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- NIHR HPRU in Evaluation; NIHR School of Public Health Research; BRTC
- **The views expressed are those of the author(s) and not necessarily those of the NHS, the NIHR or the Department of Health**

Prisons and substance use

- Globally >10 million imprisoned annually
- In most countries one quarter to half of prisoners have drug dependence problems
- High risk of death in period immediate post-release



Post-release mortality: 1-2 wks v 5-12 wks



Merrall EL *Addiction* 2010; 105(9): 1545-54

Integrated Drug Treatment System (IDTS)

- Introduced in the UK in 2006
 - Rolled out across the whole prison estate from 2010
- A program to increase the volume and quality of treatment available to prisoners, and reinforce continuity of care between prison and community
- Offers enhanced clinical management of drug dependence
 - Substitute prescribing
 - Enhanced psychosocial support
- Multidisciplinary health care team



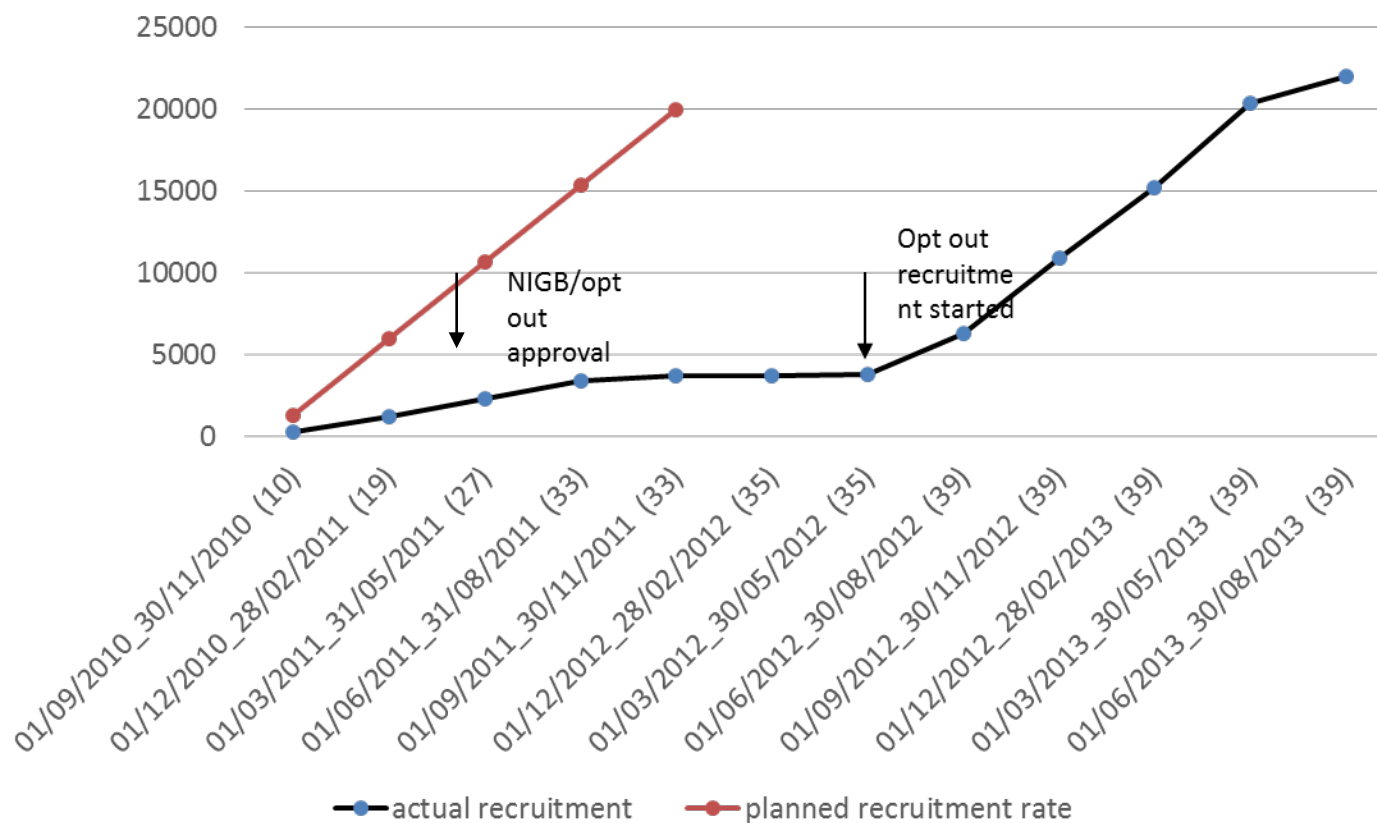
HM Prison Wandsworth, UK

WHO guide to the essentials in prison health. Geneva, 2007. Marteau D et al.
International Journal of Prisoner Health 2010; 6: 117-24

Evaluation of the IDTS

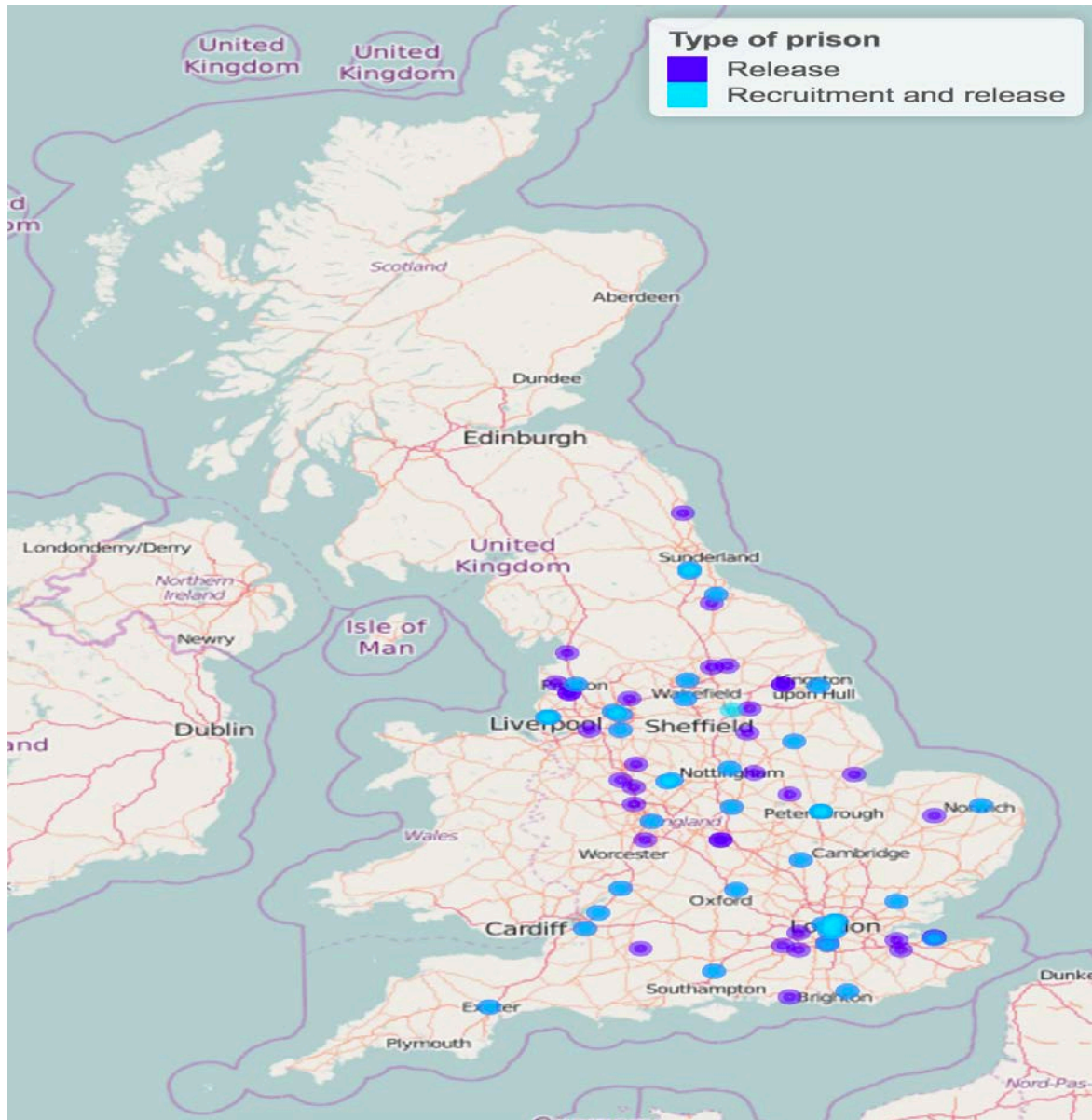
- **Aim:** Compare impact of in-prison OST on risk of death following release
- **Design:** Prospective Clinical Cohort Study.
 - *Intervention:* OST delivered as a continuing treatment on release
 - *Control:* detoxification in which inmate is released with a zero or minimal level of OST
- **Participants:** Adult prisoners (18+) opioid dependent upon entry into prison (sentenced or remand) and in receipt of treatment at entry.
- **Hypothesis:** Intervention reduces risk of death by 4-5 fold in 1st month and 50% by 3-4 months.
- **Null Ho:** there is no difference in mortality between intervention & control
- **Sample:** ~ 20,000 (10,000 exposed/ 10,000 unexposed)

Quarterly recruitment rate at active prisons (09/10 to 08/13)



Record Linkage Methods

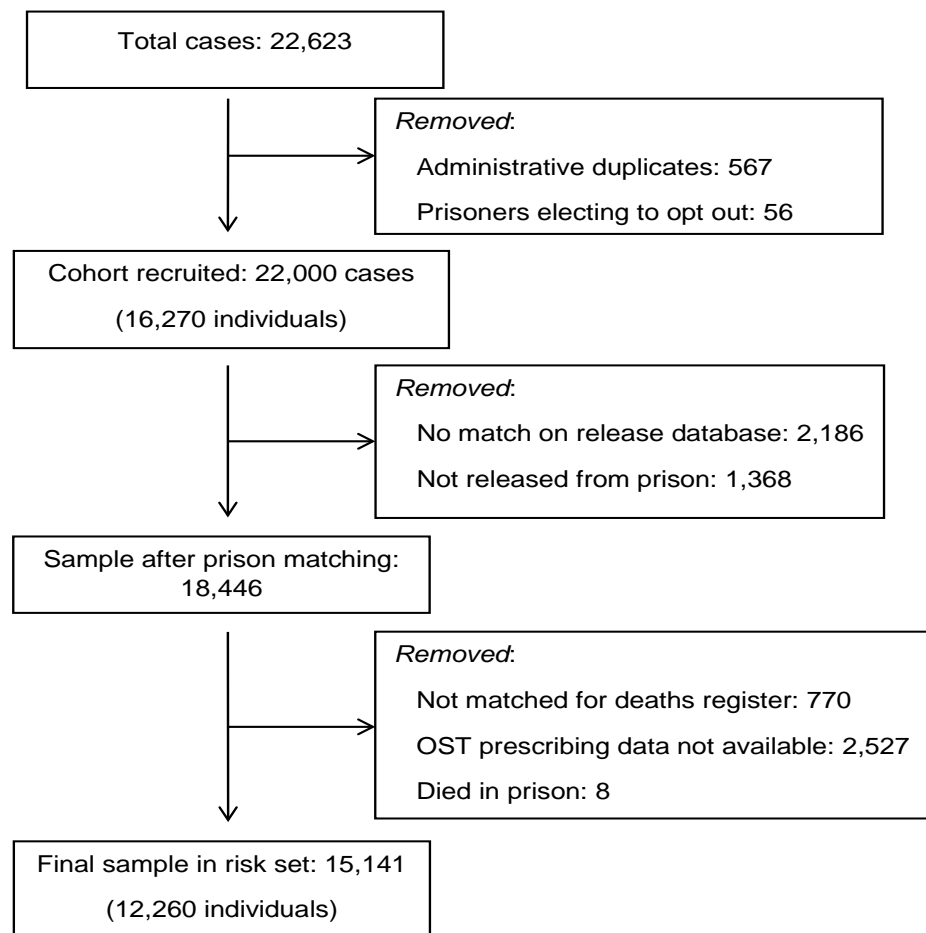
- 43 prisons approached (~95% IDTS throughput in 2009)
- 4 refused
- **Linkage:**
- MOJ/Justice Statistics Analytical Services – prison and date of release (09/10 – 10/14)
- Clinical Records/Prison of release – Exposure: OST on release
- ONS/NHS – Outcome: death record (-06/16)
- NDTMS – Covariate/Outcome: Drug treatment after release



*Prisons of
Recruitment
(light blue n=39)
and additional
prisons of release
(dark blue n=84)
Total=123*

Sample & Risk Set

- 22,623 incarcerations sent by prisons
- 56 Opt out (dissents)
- 567 duplicate reports
- 3469 missing prison of release
- 2527 missing OST exposure data
- 770 unlinked to NHS register/death data
- 15,141 incarcerations/ 12,260 people



Sample

- 15,141 cases / 12,260 individuals
 - 10,061 released once
 - 1697 twice
- 9569 (78%) individuals & 11,752 (78%) incarcerations were men
- Median age at release: 34 years
- Median time from recruitment to release: 60 days
- Exposure: 8645 (57%) of cases released on methadone (median dose 40mg) or buprenorphine (median dose 8mg)

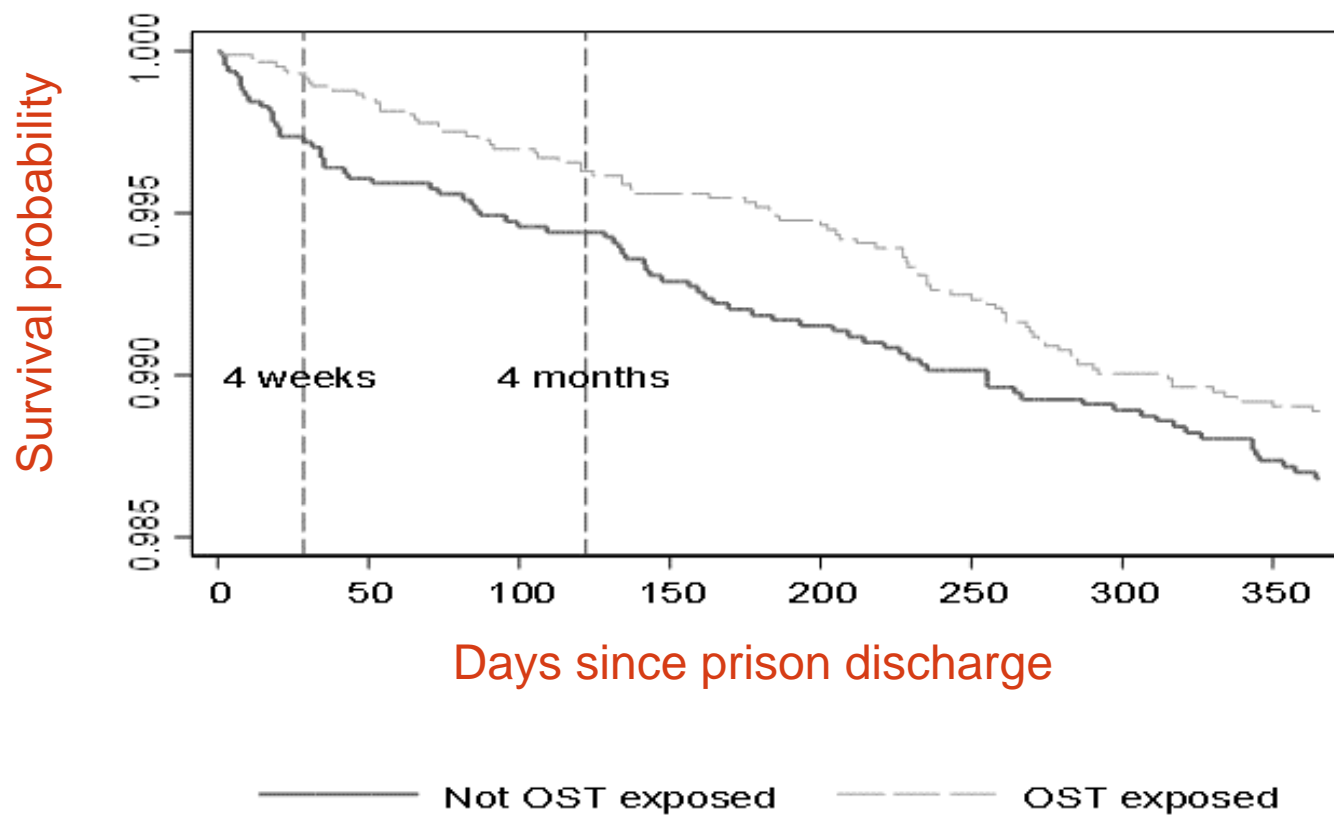


Outcome

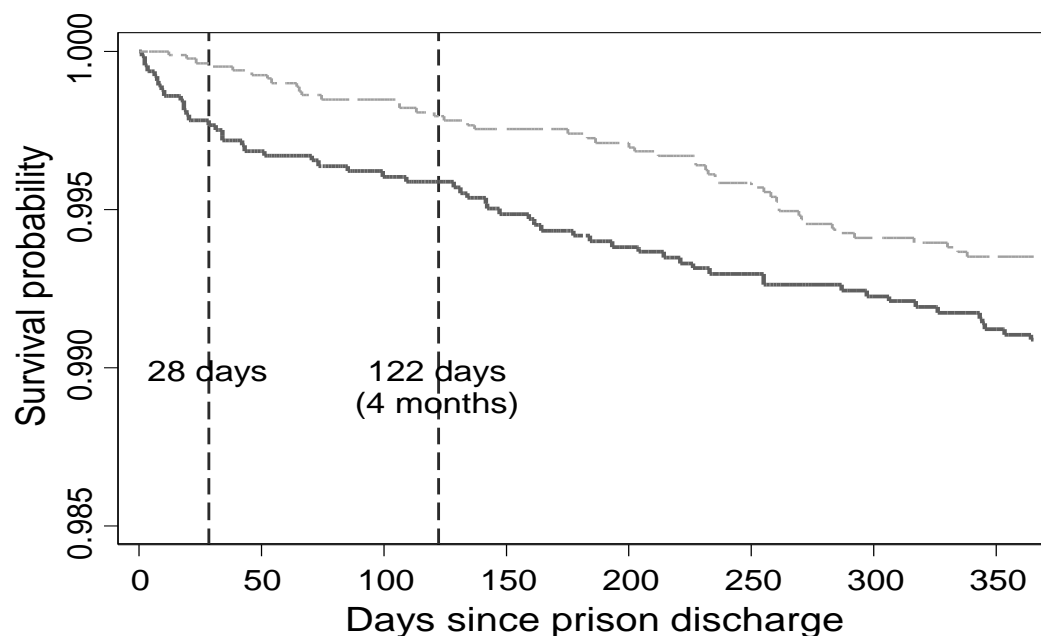
- **401 deaths (from prison release to February 2016)**
- **160 (102 DRP)** occurred within **1 year** of prison release
 - 143 men, 16 women
 - 1.2 per 100 person years (py)/ DRP 0.77 py
- **64 (42 DRP)** of these occurred in the first **4 months**
 - 61 men, 3 women
 - 1.38 py / DRP 0.9 py
- **24 (18 DRP)** of these occurred in the first **4 weeks**
 - 24 men, 0 women
 - 2.12 py/ DRP 1.58 py



Survival plot for opioid dependent people released from prison



DRP survival plot for opioid dependent people released from prison



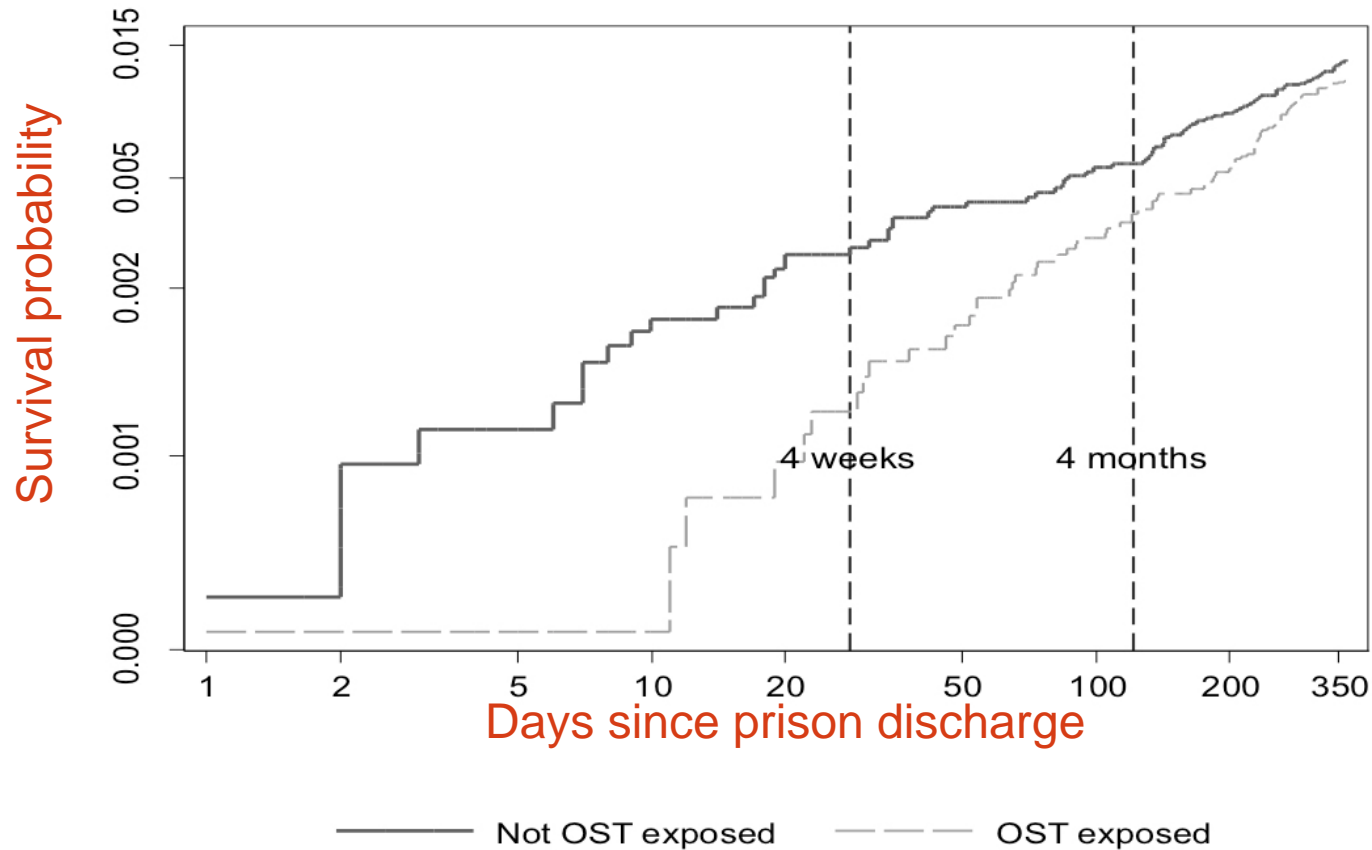
Number at risk

Not OST exposed: 6496 6168 5959 5848 5775 5735 5701 5683

OST exposed: 8645 7874 7445 7177 7049 6960 6916 6868

— Not OST exposed — OST exposed

Plot shows that the hazards get closer to each other over time



Mortality risk leaving prison: OST vs leaving drug free

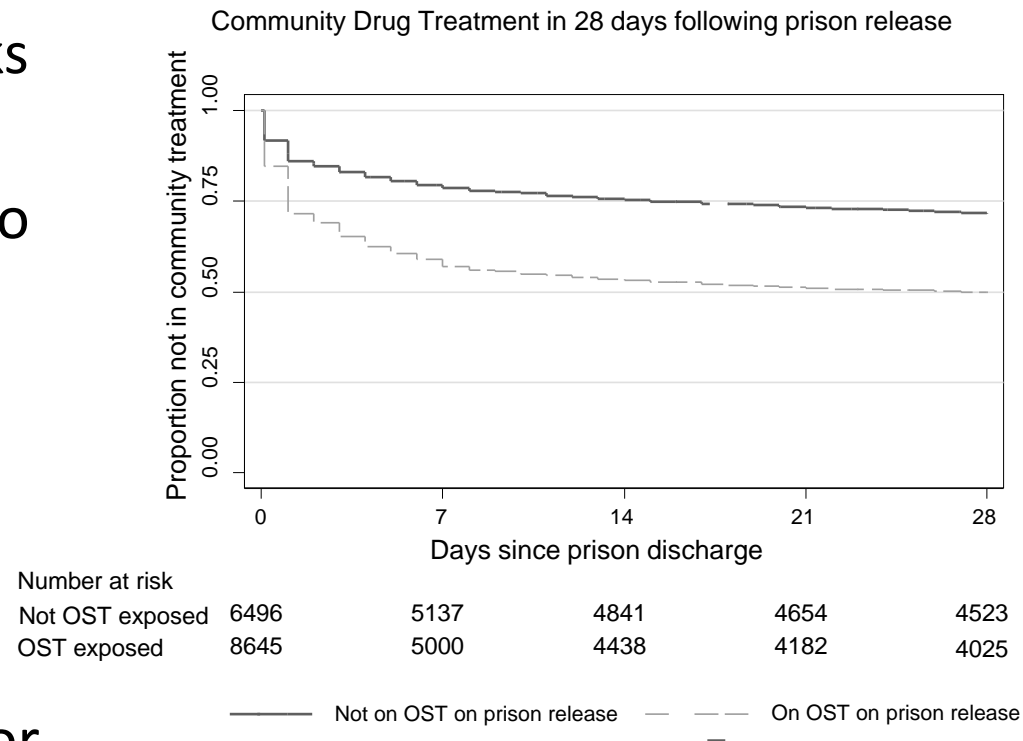
	Exposed to OST at release		Not exposed to OST at release		Hazard Ratio (95% CI)
	PY at risk (n deaths)	Rate per 100 PY (95% CI)	PY at risk (n deaths)	Rate per 100 PY (95% CI)	
0 – 4 weeks	643 (6)	0.93 (0.42-2.08)	490 (18)	3.67 (2.31-5.83)	0.25 (0.10-0.64)
4 weeks – 4 months	1,966 (23)	1.17 (0.78-1.76)	1,555 (17)	1.09 (0.68-1.76)	1.07 (0.57-2.00)
4 months – 1 year	4,654 (52)	1.12 (0.85-1.47)	3,824 (44)	1.15 (0.86-1.55)	0.97 (0.65-1.45)

Drug Related Poisoning Mortality risk leaving prison: OST vs leaving drug free

	Exposed to OST at release		Not exposed to OST at release		Hazard Ratio (95% CI)
	PY at risk (n deaths)	Rate per 100 PY (95% CI)	PY at risk (n deaths)	Rate per 100 PY (95% CI)	
0 – 4 weeks	643 (3)	0.47 (0.15-1.45)	490 (15)	3.06 (1.85-5.08)	0.15 (0.04-0.53)
4 weeks – 4 months	1,966 (13)	0.66 (0.38-1.14)	1,555 (11)	0.71 (0.39-1.28)	0.93 (0.42-2.08)
4 months – 1 year	4,654 (31)	0.66 (0.47-0.94)	3,824 (29)	0.76 (0.53-1.09)	0.88 (0.53-1.46)

Leaving prison on OST & entering community drug treatment : independent effects

- 6295 (42%) people entered drug treatment in 1st 4 weeks after prison release
- Leaving on OST more likely to enter community Rx:
- HR 2.13, (95%CI 2.01-2.25)
- Community Rx reduces DRP:
- HR 0.39 (95% CI 0.1-1.4)
- Mutually beneficial – no evidence of an interaction/ or mediation



no evidence on an interaction between OST Rx on prison release and community Rx (Ratio of hazard ratios risk (ratio of HR 1.26 (95% CI 0.07-21.29), LRT p-value 0.86)

Intervention effect of leaving prison on OST vs leaving drug free on mortality risk at 4 weeks: adjusted analyses

<i>Intervention Effect</i>	<i>ACM (n=15,141)</i>	<i>DRP (n=15,141)</i>
	<i>HR (95% CI)</i>	<i>HR (95% CI)</i>
Unadjusted	0.25 (0.10-0.64)	0.15 (0.04-0.53)
Adjusted for age, injecting, problem alcohol, crack & benzodiazepine use	0.24 (0.09-0.61)	0.14 (0.04-0.47)

Multiply imputed analysis

Intervention effect of leaving prison on OST vs leaving drug free on mortality risk at 4 weeks: adjusted analyses

<i>Intervention Effect</i>	<i>ACM (n=15,141)</i>	<i>DRP (n=15,141)</i>
	<i>HR (95% CI)</i>	<i>HR (95% CI)</i>
Unadjusted	0.25 (0.10-0.64)	0.15 (0.04-0.53)
Adjusted for age, injecting, problem alcohol, crack & benzodiazepine use	0.24 (0.09-0.61)	0.14 (0.04-0.47)
Adjust for community drug treatment within 4 weeks	0.28 (0.11-0.71)	0.17 (0.05-0.59)

Multiply imputed analysis; community treatment within 4 weeks post-release – time varying covariate.

Intervention effect of leaving prison on OST vs leaving drug free on mortality risk at 4 weeks: adjusted analyses

<i>Intervention Effect</i>	<i>ACM (n=15,141)</i>	<i>DRP (n=15,141)</i>
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Fully Adjusted (age, injecting, problem alcohol, crack, benzodiazepine use & community drug treatment)	0.26 (0.10-0.66)	0.15 (0.04-0.54)


Multiply imputed analysis; community treatment within 4 weeks post-release – time varying covariate.

Implications

- 75% reduction in 4 week mortality if released on OST
 - 85% reduction in drug related poisoning
 - Removed excess risk of death post prison
 - Increase ($> 2^*$) in drug treatment in the community
 - Entering treatment in first 4 weeks independent beneficial effect
 - Underscores the importance of providing (maintenance) OST in prison to bridge the transition to the community
 - Decision to withdraw prisoners from OST must be made with care
 - Needs replication – Scotland?
-

- RCT not feasible/ethical
 - Large observational studies/ record linkage/ objective outcomes
 - Prospective cohort – low likelihood of selection bias in relation to outcome
- BUT confounding key problem/issue
 - No IV for leaving on OST in prison
 - Key factors not captured (addiction severity, recovery resilience, treatment engagement)
 - And missing data – especially if moved prison

Does exposure to opioid substitution treatment in prison reduce the risk of death after release? A national prospective observational study in England

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END
