How can we prevent heroin/opiate overdose deaths?: the contribution of pre-provided naloxone

Professor John Strang
National Addiction Centre, London, UK
Declaration (personal & institutional)

- DH, NTA, Home Office, NACD, EMCDDA, WHO, UNODC, NIDA

- NHS provider (community & in-patient); also Phoenix House, Lifeline, Clouds House, KCA (Kent Council on Addictions)

- Work with pharmaceutical companies re development of new medicines for use in the addiction treatment field, including (past 3 years) Viropharma (Auralis), Martindale (Catalent), Reckitt-Benckiser, Schering-Plough, Lundbeck, UCB, Napp/MundiPharma, Alkermes, Teva, iGen and also discussions with Lightlake, Lanacher, Rusan, Fidelity International and Titan.

- UKDPC (UK Drug Policy Commission), SSA (Society for the Study of Addiction); and two Masters degrees (taught MSc and IPAS) and an Addictions MOOC.

- Work also with several charities (and received support) including Action on Addiction, and also with J Paul Getty Charitable Trust (JPGT) and Pilgrim Trust.

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<table>
<thead>
<tr>
<th>Time</th>
<th>SESSIONS</th>
<th>SPEAKERS</th>
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</table>
| 13:00 – 13:20 | *Introduction to the day*  
  How can we prevent heroin/opiate overdose deaths?  
  Interventions we need to harness | Professor John Strang                         |
| 13:20 – 13:40 | *Session 1: Understanding risk*  
  Clustering of deaths on prison release (and other contexts) | *Session Chair: Professor John Marsden*  
  Speaker: Professor Sheila Bird |
| 13:40 – 14:30 | *Session 2: Responses – Pre-Supply of Naloxone*  
  History of the concept of take-home naloxone  
  Training in overdose management and naloxone | *Session Chair: Dr Ed Day*  
  Speaker: Professor John Strang  
  Speaker: Dr Anna Williams |
| 14:30 – 14:55 | Tea/Coffee                                                               |                                               |
| 15:00 – 15:40 | *Session 3: Making it actually happen*  
  Activism to deliver naloxone to people in need  
  Scotland – the first national naloxone initiative | *Session Chair: Dr Emily Finch*  
  Speaker: Dan Bigg  
  Speaker: Kirsten Horsburgh |
| 15:40 – 16:20 | *Session 4: Ongoing Studies*  
  Naloxone initiatives across the US  
  N-ALIVE randomised prison release naloxone trial | *Session Chair: Professor John Strang*  
  Speaker: Assistant Professor Erin Winstanley  
  Speaker: Dr Angela Meade |
| 16:20 – 16:30 | *Closing Comments*                                                       | Professor John Strang                         |
Structure of today’s introductory talk:
heroin/opiate overdose deaths

• Why do people die?
• When does it occur?
• Does treatment /rehab make a difference?
• Could we improve interim emergency care?
Structure of today’s talk:
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# Drug use prevalence and Drug-related deaths: England &Wales 2011/12 (ONS)

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<tr>
<th>Drug</th>
<th>Prevalence in general population (use in last year, age 16-59)</th>
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<tbody>
<tr>
<td>Cannabis</td>
<td>6.9%</td>
<td></td>
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<td>2.2%</td>
<td></td>
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<tr>
<td>Cannabis</td>
<td>6.9%</td>
<td>7</td>
</tr>
<tr>
<td>Cocaine</td>
<td>2.2%</td>
<td>112</td>
</tr>
<tr>
<td>Amphetamine</td>
<td>0.8%</td>
<td>62</td>
</tr>
<tr>
<td>Ecstasy</td>
<td>1.4%</td>
<td>13</td>
</tr>
<tr>
<td>Opiates (inc heroin &amp; methadone)</td>
<td>0.3%</td>
<td>1,082</td>
</tr>
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</table>
Oxygen saturation: IV versus IM

Minutes post-injection

SpO2 (%)
Oxygen saturation: IV versus IM

Minutes post-injection

SpO2 (%)

IV

IM

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Oxygen saturation: case study

Male, age 49
Intravenous diamorphine (6 years)
This dose = 120 mg
Daily dose = 400 mg

SpO2 (%)

Minutes post-injection

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Structure of today’s talk:
heroin/opiate overdose deaths

• Why do people die?
• When does it occur?
• Does treatment /rehab make a difference?
• Could we improve interim emergency care?
When in particular excess?

• During methadone early treatment
• Post-detox/rehab
• Prison release
Singleton et al, 2002

Excess mortality ratio

Time since release (weeks)

Not drug-related
Drug-related deaths

...
Meta-analysis of drug-related deaths soon after release from prison

Elizabeth L. C. Merrall¹, Azar Kariminia², Ingrid A. Binswanger³,⁸, Michael S. Hobbs⁴, Michael Farrell⁵, John Marsden⁵, Sharon J. Hutchinson⁶,⁷ & Sheila M. Bird¹,⁷

MRC Biostatistics Unit, Cambridge, UK,¹ National Centre in HIV Epidemiology and Clinical Research, Sydney, NSW, Australia,² Division of General Internal Medicine, University of Colorado at Denver School of Medicine, Denver, CO, USA,³ School of Population Health, The University of Western Australia, Crawley, WA, Australia,⁴ National Addiction Centre, Division of Psychological Medicine and Psychiatry, Institute of Psychiatry, King's College London, London, UK,⁵ Health Protection Scotland, Glasgow, UK,⁶ Department of Statistics and Modelling Science, Strathclyde University, Glasgow, UK⁷ and Denver Health Medical Center, Denver, CO, USA⁸

ABSTRACT

Aims The transition from prison back into the community is particularly hazardous for drug-using offenders whose tolerance for heroin has been reduced by imprisonment. Studies have indicated an increased risk of drug-related death soon after release from prison, particularly in the first 2 weeks. For precise, up-to-date understanding of these risks, a meta-analysis was conducted on the risk of drug-related death in weeks 1 + 2 and 3 + 4 compared with later 2-week periods in the first 12 weeks after release from prison. Methods English-language studies were identified that followed up adult prisoners for mortality from time of index release for at least 12 weeks. Six studies from six prison systems met the inclusion criteria and relevant data were extracted independently. Results These studies contributed a total of 69 093 person-years and 1033 deaths in the first 12 weeks after release, of which 612 were drug-related. A three- to eightfold increased risk of drug-related death was found when comparing weeks 1 + 2 with weeks 3–12, with notable heterogeneity between countries: United Kingdom, 7.5 (95% CI: 5.7–9.9); Australia, 4.0 (95% CI: 3.4–4.8); Washington State, USA, 5.6 (95% CI: 3.9–8.0); and New Mexico, USA, 1.8 (95% CI: 1.2–2.7).
a) In weeks 1-2 versus weeks 3-12

<table>
<thead>
<tr>
<th>Region</th>
<th>Relative Risk (95% CI)</th>
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<tbody>
<tr>
<td><strong>UK</strong></td>
<td></td>
</tr>
<tr>
<td>Scotland</td>
<td>7.4 (4.6, 12.0)</td>
</tr>
<tr>
<td>England &amp; Wales</td>
<td>7.5 (5.4, 10.5)</td>
</tr>
<tr>
<td>Subtotal (I-squared = 0.0% (0.0-99.8%), ( P = 0.958 ))</td>
<td>7.5 (5.7, 9.9)</td>
</tr>
<tr>
<td><strong>Australia</strong></td>
<td></td>
</tr>
<tr>
<td>Western Australia</td>
<td>4.4 (2.0, 9.5)</td>
</tr>
<tr>
<td>New South Wales</td>
<td>4.0 (3.3, 4.8)</td>
</tr>
<tr>
<td>Subtotal (I-squared = 0.0% (0.0-99.6%), ( P = 0.838 ))</td>
<td>4.0 (3.4, 4.8)</td>
</tr>
<tr>
<td><strong>USA</strong></td>
<td></td>
</tr>
<tr>
<td>Washington State</td>
<td>8.4 (5.0, 14.2)</td>
</tr>
<tr>
<td>New Mexico State</td>
<td>3.1 (1.3, 7.1)</td>
</tr>
<tr>
<td>Subtotal (I-squared = 74.8% (0.0-94.3%), ( P = 0.046 ))</td>
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Risk of death during and after opiate substitution treatment in primary care: prospective observational study in UK General Practice Research Database

Rosie Cornish, statistician,1 John Macleod, professor in clinical epidemiology and primary care,1 John Strang, professor in the psychiatry of the addictions,2 Peter Vickerman, senior lecturer in mathematical modelling,13 Matt Hickman, professor in public health and epidemiology1

ABSTRACT

Objective To investigate the effect of opiate substitution treatment at the beginning and end of treatment and according to duration of treatment.

Design Prospective cohort study.

Setting UK General Practice Research Database.

Outcome measures Deaths in opiate substitution treatment. Further research is needed to investigate the effect of duration of opiate substitution treatment on drug related mortality.

INTRODUCTION

Opiate users have a high risk of death and contribute...
Risk of death during and after treatment

Mortality rate ratio compared to not on treatment

On treatment (days 1-28)  On treatment (remaining days)  Off treatment (days 1-14)  Off treatment (days 15-28)  Off treatment

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London PAI Study #2: 312 injectors

- Personal overdose? - 117 (38%)
- Witnessed overdose? - 157 (50%)
- Witnessed fatal O/D? - 46 (15%)

(Strang, Griffiths, Powis, Fountain, Williamson and Gossop, Drug and Alcohol Review, 1999)
INTERVENTION OPPORTUNITY?

- Sydney - 86% had witnessed O/D
- Adelaide - 70% had witnessed O/D
- London PAI injectors - 50%
- (London treatment sample - 83/97%)
First serious consideration:

• First investigated (>15 years ago): 

Several different types of naloxone – all work
Naloxone saves lives

“I was with a friend who collapsed. We tried to revive him but the ambulance took 20 minutes to arrive, by which time he had died”.

“.....when the medics came I told them I had given him the naloxone. The medics said ‘Wow!’ We had probably just saved the guys life”.

“I used naloxone and it saved his life”.

Ambulance
Breathing
Recovery position
Naloxone
Concluding points to consider
Possible concerns

- Short half-life - does naloxone last long enough?
- What about date-expiry?
- Safety net - might it increase risk-taking?
- Might witnesses be less likely to call ambulance?
- Are witnesses sufficiently skilled?
- Will the naloxone be available?
- Might family be afraid to give injection?
Twelve Scenarios

- (A1) patient commencing OST;
- (A2) patient concluding OST;
- (A3) client finishing rehab or hospital care;
- (B1) named client at syringe exchange scheme;
- (B2) named resident at hostel for homeless;
- (B3) unnamed contact of outreach worker;
- (C1) individual leaving prison;
- (C2) family member (e.g. parent) for their at-risk son/daughter/etc;
- (D1) stock supply for hostel staff or day centre;
- (D2) open availability at a syringe exchange scheme;
- (E1) to be carried by a non-clinical 'first responder';
- (F1) over the counter from a community pharmacy.

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Next steps – ‘to do’ list

• Improve naloxone (route, device, drug)

• Extend to other populations
  - Non-medical drug workers (health)
  - High-risk population agency staff (hostels)
  - Carers
  - High-risk clients (not in Tx, prison release, hostels)

• Danger of ‘Implementation inertia’
Thank you