Estimating populations of people who inject drugs to understand the epidemiology of hepatitis C
Acknowledgements

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• No interests to declare
It’s important to know how many people who inject drugs

• Service planning

• Burden of disease

• Secular trends
But hard to figure out

UNODC World Drug Report estimates:

12 million
But hard to figure out

UNODC World Drug Report estimates:

8-19 million
But hard to figure out

8-19 million

??? Million ever injected?
“Recent” and “non-recent” injecting

Recent PWID

Non-recent PWID
“Recent” and “non-recent” injecting

Recent PWID

Non-recent PWID
Population surveys underestimate people who inject drugs

• By an unknown margin
• Exclude people in unstable housing, institutions
• If asked, may not disclose
• Small numbers in the general population – considerable uncertainty around estimate
Indirect prevalence estimation methods preferred for ‘hidden’ populations

• Use indicator data e.g.:
  • Drug-related deaths
  • Needle and syringe program activity
  • Drug treatment registries (opioid substitution therapy – OST – is a common one)
Indirect prevalence estimation methods preferred for ‘hidden’ populations

- Scale up indicator using multiplier
  - Multiplier sourced from surveys of people who inject drugs
  - But survey may not be representative – multiplier may be incorrect
  - Only estimating ‘recent’ injecting
Indirect prevalence estimation methods preferred for ‘hidden’ populations

- Link indicator data for capture-recapture
  - Proportion in multiple datasets provides information about probable true population size
  - But data sources may not be independent, biasing estimate
  - Only estimating ‘recent’ injecting
Indirect prevalence estimation methods preferred for ‘hidden’ populations

- Validation important
  - Compare estimate to other data sources not used for estimate
  - Does it seem feasible? Probable?
  - What biases may be affecting the estimate?
Multi-parameter evidence synthesis is the way forward for population estimation

- Uses all available information, direct and indirect
- Estimates past injecting as well as current
  - But still considerable uncertainty due to lack of data to inform this parameter!
- See Hickman, Jones, De Angelis
Estimates of people who inject drugs in Australia
Australian estimates are outdated

Razali et al., 2007
Multiplier-based estimates

- Indicator data: National Opioid Pharmacotherapy Statistics Annual Data Collection (NOPSAD)
- Multiplier data: Australian Needle and Syringe Program Survey
- Multipliers for each state/territory applied to indicator for each state/territory
- Summed for national estimate
People who inject drugs, Australia, 2014

<table>
<thead>
<tr>
<th>Lower</th>
<th>Mid</th>
<th>Upper</th>
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<tbody>
<tr>
<td>68,000</td>
<td>93,000</td>
<td>118,000</td>
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# People who inject drugs, Australia, 2014

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<tr>
<th></th>
<th>Lower</th>
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<tbody>
<tr>
<td>Men</td>
<td>46,000</td>
<td>63,500</td>
<td>80,500</td>
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<td>Women</td>
<td>22,000</td>
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### People who inject drugs, Australia, 2014

<table>
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<th>Age Group</th>
<th>Lower</th>
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<tbody>
<tr>
<td>15-24</td>
<td>2,500</td>
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<td>35-44</td>
<td>26,000</td>
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<td>45,000</td>
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<td>45-54</td>
<td>17,000</td>
<td>23,500</td>
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<td>55-64</td>
<td>6,000</td>
<td>8,500</td>
<td>10,500</td>
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Validation suggests underestimation

• Assume mortality rate of 0.53% (MIX cohort)

• Expect 360-626 drug-induced deaths if estimate is ‘correct’

• 846 actual deaths (ABS)
  • Underestimate
  • Or not all overdose deaths related to injecting
  • Or mortality rate not applicable nationally
Sources of bias to consider

• Under-inclusion of methamphetamine injectors in needle and syringe program survey
  • Would give a multiplier that is too low

• Lack of data on injecting in OST
Summary

- Important to know how many people inject drugs
- But doing it well is technically complex
- These estimates provide the basis for a more comprehensive exercise in population estimation
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