

Changes in the geographic distribution of opioid-related deaths in Australia: Exploratory Spatial Data Analysis

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Introduction: Studies have demonstrated changes in the geographic distribution of opioid deaths in Australia; however, more nuanced and contemporary analyses are needed. Understanding where opioid deaths are occurring is important to inform targeted public health interventions.

Methods: Data were drawn from Australia's National Coronial Information System (NCIS). Data were stratified by opioid type (heroin vs pharmaceutical opioids [PO]) and four-year time periods (2001–2024). Overall (2001–2024) death counts and age-standardised mortality rates (ASMRs) were calculated at the Statistical Area 2 and 3 (SA2/3) level. Percentage change between 2001–2004 to 2021–2024 in ASMRs were calculated at the SA3 level. Moran's *I* was used to assess spatial clustering of ASMRs at the SA2 level, identifying areas of elevated mortality (hotspots) relative to neighbouring regions.

Results: Overall, heroin ASMRs at the SA2 level were highest in Melbourne CBD – North (VIC) (53.1 per 100,000), St Kilda – Central (VIC) (30.5 per 100,000), and Richmond (South) – Cremorne (VIC) (29.8 per 100,000). PO ASMRs were highest in Coombs (ACT) (77.1 per 100,000), Lyons (NT) (36.9 per 100,000), and Cairns City (QLD) (34.8 per 100,000). Heroin mortality increased across more SA3s (n=44) than Pos (n=20), predominantly in NSW and VIC. PO mortality declined across most regions, with increases primarily observed in QLD and WA. Significant heroin mortality hotspots were concentrated in VIC, WA, and NSW, while PO hotspots were fewer and more geographically dispersed across jurisdictions.

Discussions and Conclusions: Heroin and PO deaths demonstrated distinct spatial distribution patterns that changed over time. PO mortality was more geographically dispersed but generally declining, whereas heroin mortality remained concentrated around metropolitan areas, likely reflecting differences in drug supply, availability, and market dynamics. These findings highlight the need for geographically targeted and opioid-specific public health responses.

Disclosure of Interest Statement: None to declare. Data Source: The National Coronial Information System. Organisational source: Victorian Department of Justice and Community Safety.