

# Using Ambulance attendance data to measure the acute harms resulting from the misuse of alcohol, drugs and pharmaceuticals

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## Background

The harmful use of alcohol and other drugs makes a significant contribution to the global burden of disease (BoD); not all harms are captured within burden of disease frameworks (e.g., treatment only occurring in pre-hospital settings). To understand the impact of drugs within a population, it is important to measure both use and harms (acute and chronic). The diversity of harms arising from AOD consumption are diverse and must be considered to understand the true impact of AOD on health and wellbeing. The acute harms arising from alcohol and other drug use are varied (e.g. injuries while intoxicated, overdoses, or being the victim of violence). Ambulance attendance data is a valuable contribution to acute harms measures.

The National Ambo Project (NAP) complements existing AOD consumption and harms data sources, by secondary recoding of data obtained from ambulance attendances. This recoding differentiates NAP from other datasets based on ambulance attendances, and it is vital to our understanding of AOD-related harms because:

- a significant number of ambulance attendances are related to AOD consumption;
- paramedics are frequently first-responders to AOD-related harm, and/or may be the only contact a patient has with the health system given that not all AOD-related harms in the community will present to a hospital;
- ambulance attendance data allows for examination of different drugs within the same class; and
- data can be captured in a timely manner, allowing for surveillance capability and examination of temporal trends.

## Aim

This paper describes the process used in the National Ambo Project (NAP), a unique Australian project designed to assess the acute pre-hospital harms related to alcohol and other drug use, using Victoria as a case study.

## Method

The National Ambo Project is an expansion on the *The Ambo Project*, that was established in 1998 with funding from the Victorian Department of Health and Human Services. This project began identifying and categorising AOD- (both illicit and pharmaceutical) related ambulance attendances in metropolitan Melbourne, with expansion to regional Victoria in 2011. In 2012, this surveillance system was expanded to become the National Ambo Project, including four Australian states (New South Wales, Queensland, Tasmania and Victoria) and two territories (Australian Capital Territory, Northern Territory), capturing 82.5% of Australia's population; with future plans to include other jurisdictions (South Australia and Western Australia). NAP is centrally administered and managed by Turning Point. Strict protocols are in place for data de-identification, confidentiality, storage, access and reporting.

The National Ambo Project data are sourced from the ambulance electronic patient care records (ePCR). Following primary filtering, these records are provided to Turning Point. The data are internally validated and parsed for import. Data coding occurs in a purpose built system, by a team of specialised research assistants. After the set of ePCR records is manually coded, the dataset is reviewed and cleaned prior to analysis (figure 1)

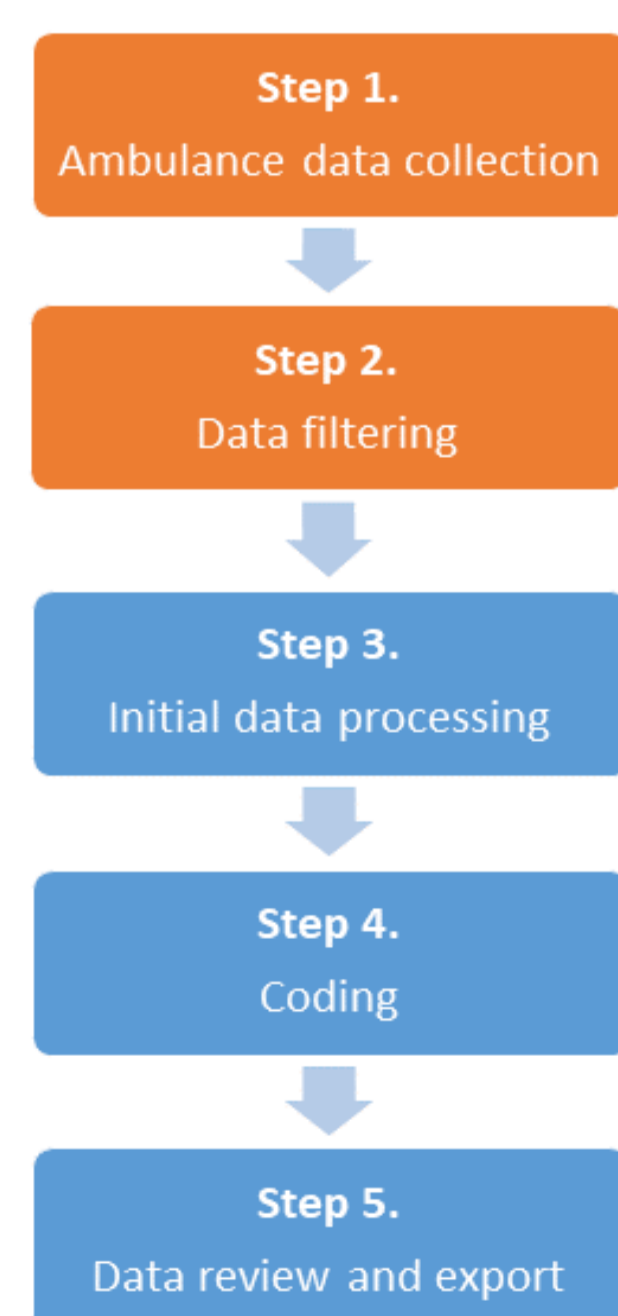


Figure 1 National Ambo Project data collection and coding process

## Data utility

NAP data collection has led to an extensive dataset on AOD-related ambulance attendances across Australia being available for analysis. Victoria has the longest-running dataset; containing approximately 80,000 attendances per year with approximately 400 output variables for each attendance, including demographics, characteristics of the attendance, geospatial data, medical data, and co-occurring issues. Output variables are listed in Table 1. The final column of pharmaceutical medications can be expanded into 82 individual commonly used medications within those broader categories. The system is flexible in that specific drugs can be added as they become of interest.

Data is timely and therefore policy relevant. The data can be utilised for a variety of purposes and reporting. Trends over time for different drug types (figure 2). Importantly this figure could easily look at specific drug preparations such as particular benzodiazepines or antipsychotic preparations.

Geospatial mapping to identify 'hotspot' areas to assist with service provision is also another demonstrated use of the value of these data (figure 3). The most recent policy relevant example of this was providing additional evidence prior to the establishment of the new Medically Supervised Injecting Room in Melbourne's inner east. Also mapping at a wider focus to look at issues at a local government area for example (figure 4).

Table 1: Output variables related to alcohol and other drug (AOD) ingestion

Case details	Patient details	Scene details	Physical condition	Illicit drugs	Other substances	Pharmaceutical preparations
Case number	Gender	Public / private	Patient outcome	Amphetamine	Alcohol involved	Opioid analgesics
Case date	Age	Indoor / outdoor	Pulse rate	Crystal meth	Alcohol intoxication	Other analgesics
Case time	Residential postcode	Event postcode	Blood pressure	Cannabis	Inhalant - spray paint	Benzodiazepines
Transport to hospital		Event coordinates	Respiratory rate	Synthetic cannabinoids	Inhalant - petrol	Anti-depressants
Reason for not transporting		Minors on scene	Skin temperature	Emerging psychoactive substances	Inhalant - other	Anti-psychotics
		Police co-attendance	Skin moisture	Cocaine	Other substance	Anti-convulsants
		Number of patients at scene	Skin colour	3,4-methylenedioxymethamphetamine (MDMA)	Unknown substance	Opioid pharmacotherapy treatments
			GCS eye response	gamma hydroxybutyrate (GHB)		Pharmaceutical stimulants
			GCS verbal response	Heroin		Peer administered naloxone
			GCS motor response	Ketamine		Other medication
			Naloxone administration	Lysergic acid diethylamide (LSD)		
			Naloxone dose	Mushrooms		
			Naloxone response	Other illicit drug		

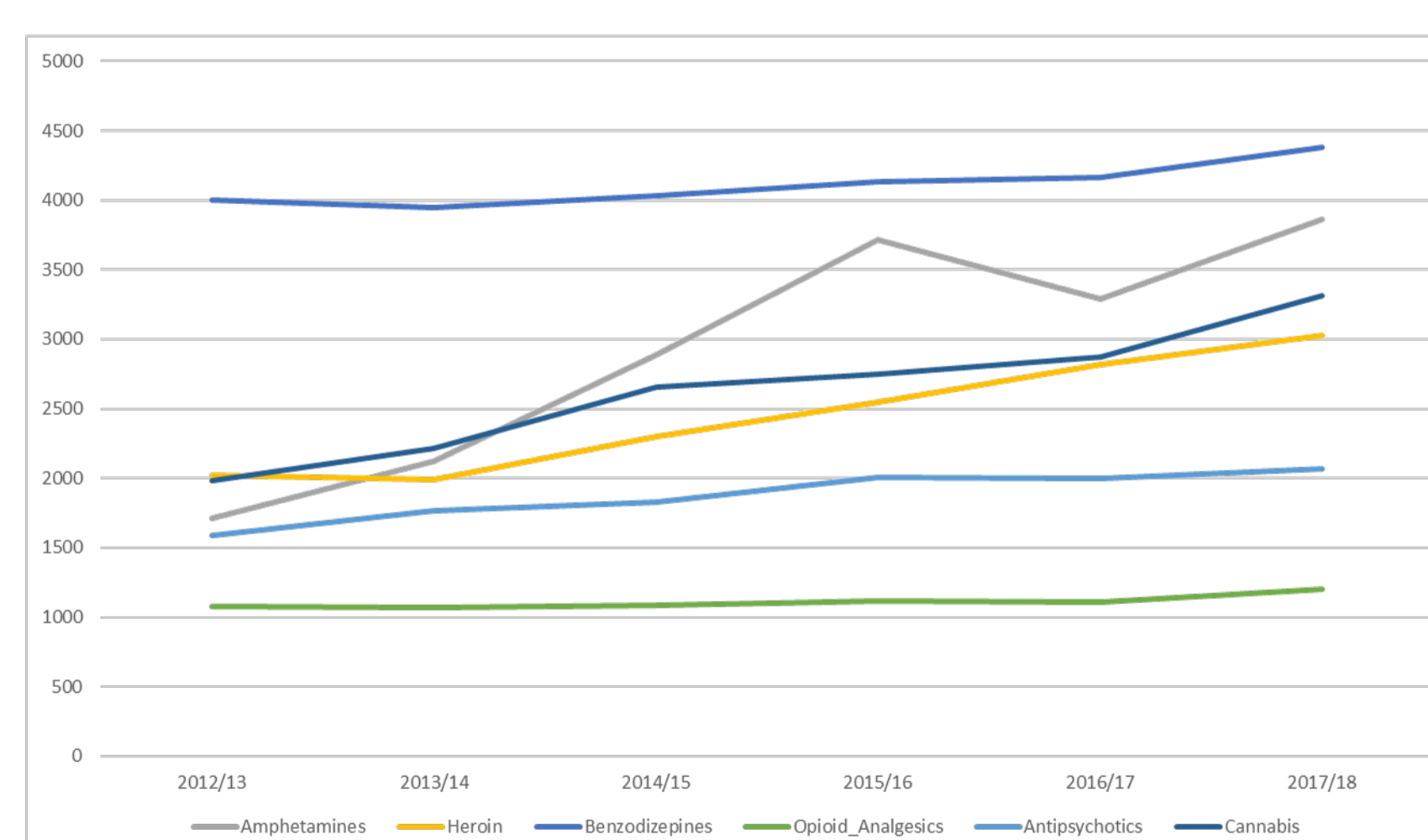


Figure 2: Ambulance attendances 2012-18 for selected drugs

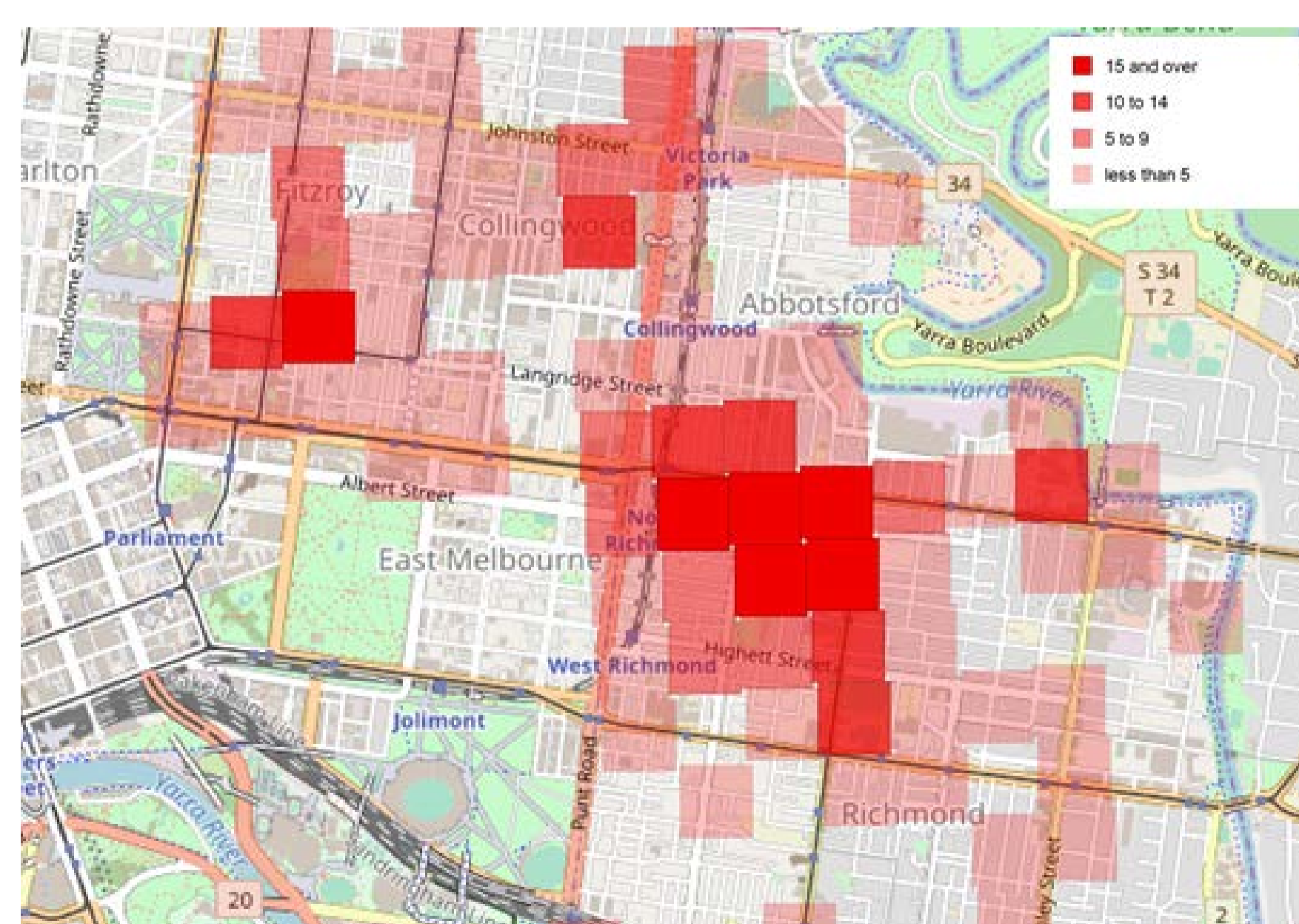


Figure 3: Number of opioid-related ambulance attendances in metropolitan Melbourne

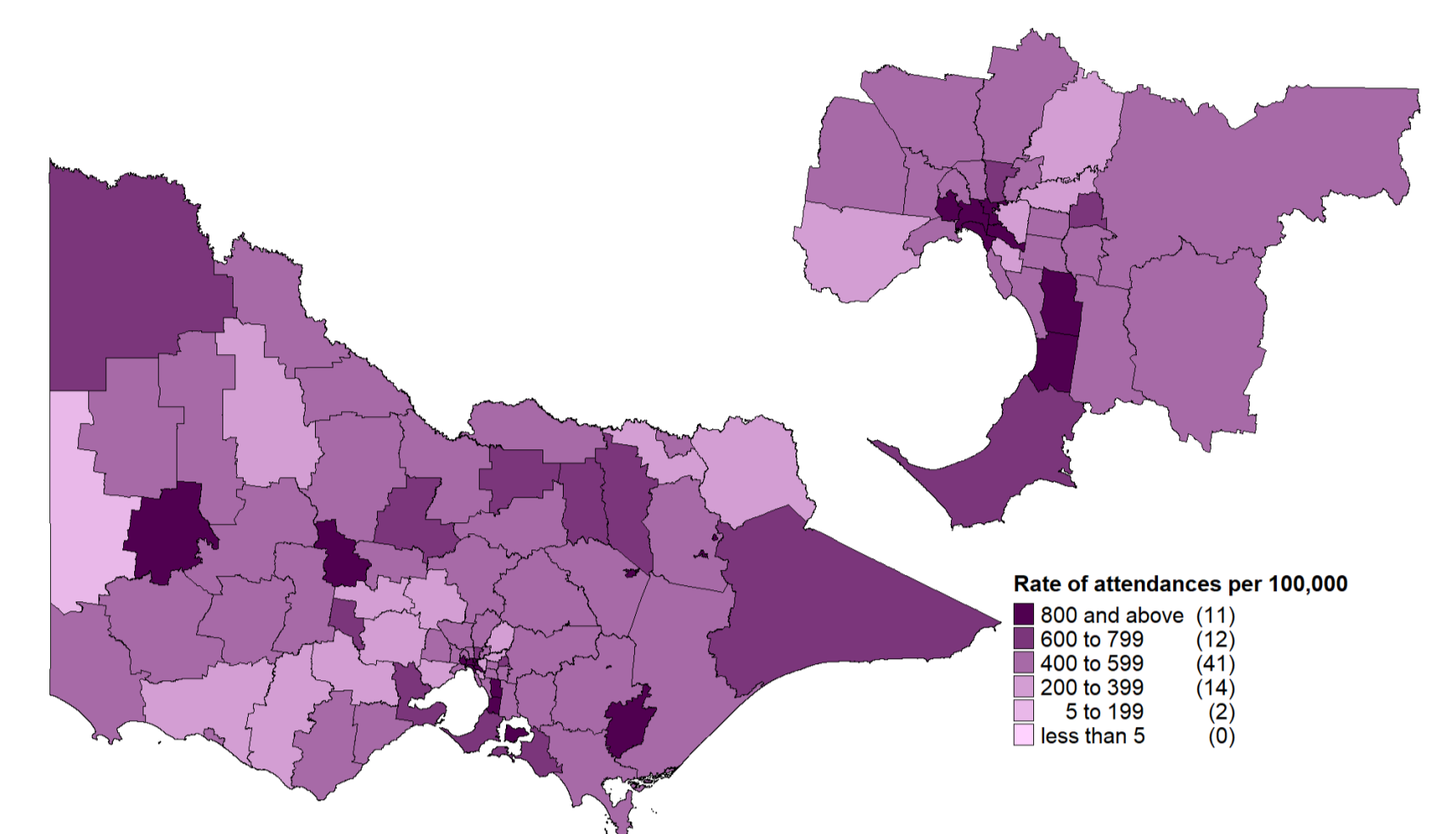


Figure 4: Rate of any AOD-related ambulance attendances in 2016 Victoria

## Conclusions:

- Coding and analysis of ambulance service records provides a strong basis for an ongoing monitoring system of acute harms associated with AOD consumption at a population level
- provides consistent, detailed, and timely data with spatial and temporal analysis capacity, on AOD-related harms, not captured by other systems
- uses secondary patient data from the ePCR, therefore, there is no recruitment or self-selection biases, and there is no added workload for paramedics.
- a centralised coding system at Turning Point is efficient, and does not require duplication across jurisdictions.
- reporting is timely and highly specific with regards to substance type, and therefore policy and practice changes can be informed by examining emerging trends.
- NAP provides an internationally unique resource that sits alongside population measures of AOD use and BoD modelling, to provide an understanding of the impacts of AOD.

## Implications for practice or policy:

Data from the Ambo Project/ NAP has informed public policy and clinical practice related to AOD trends and harm. For example:

- With respect to cannabis and inhalant use (1,2)
- Data are freely accessible by the public, policy makers, clinicians and researchers via Victoria's online interactive monitoring tool of AOD-related ambulance trends ([www.AmboAODstats.org.au](http://www.AmboAODstats.org.au))
- These data have clinical utility, and have been used by researchers to identify an emerging trend for increasing harms related to quetiapine, which highlighted to clinicians that diversion and misuse of this medication was increasing and informed subsequent prescribing practices (3)
- Data have also been used to highlight population sub groups at particular risk of harm, who may be hard to reach via typical population level measures, e.g. substance ingestion and use in young adolescents (4)

## Acknowledgments

The Victorian Department of Human Services and Commonwealth Department of Health funded projects.

## References

- Crossin R, Scott D, Witt KG, Duncan JR, Smith K, Lubman DI. Acute harms associated with inhalant misuse: Co-morbidities and trends relative to age and gender among ambulance attendees. *Drug Alcohol Depend.* 2018;190:46-53.
- Kaar SJ, Gao CX, Lloyd B, Smith K, Lubman DI. Trends in cannabis-related ambulance presentations from 2000 to 2013 in Melbourne, Australia. *Drug Alcohol Depend.* 2015;155:24-30.
- Heilbronn CE, Lloyd B, McElwee P, Eade A, Lubman DI. Quetiapine-related harms are on the rise. *Australian & New Zealand Journal of Psychiatry.* 2012;46(3):279-80.
- Scott D, Crossin R, Ogeil R, Smith K, Lubman DI. Exploring Harms Experienced by Children Aged 7 to 11 Using Ambulance Attendance Data: A 6-Year Comparison with Adolescents Aged 12-17. *International journal of environmental research and public health.* 2018;15(7):1385.

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