Adverse events reported following alkyl nitrite use

Analysis of Australian Poisons Information Centre and NSW Ministry of Health data

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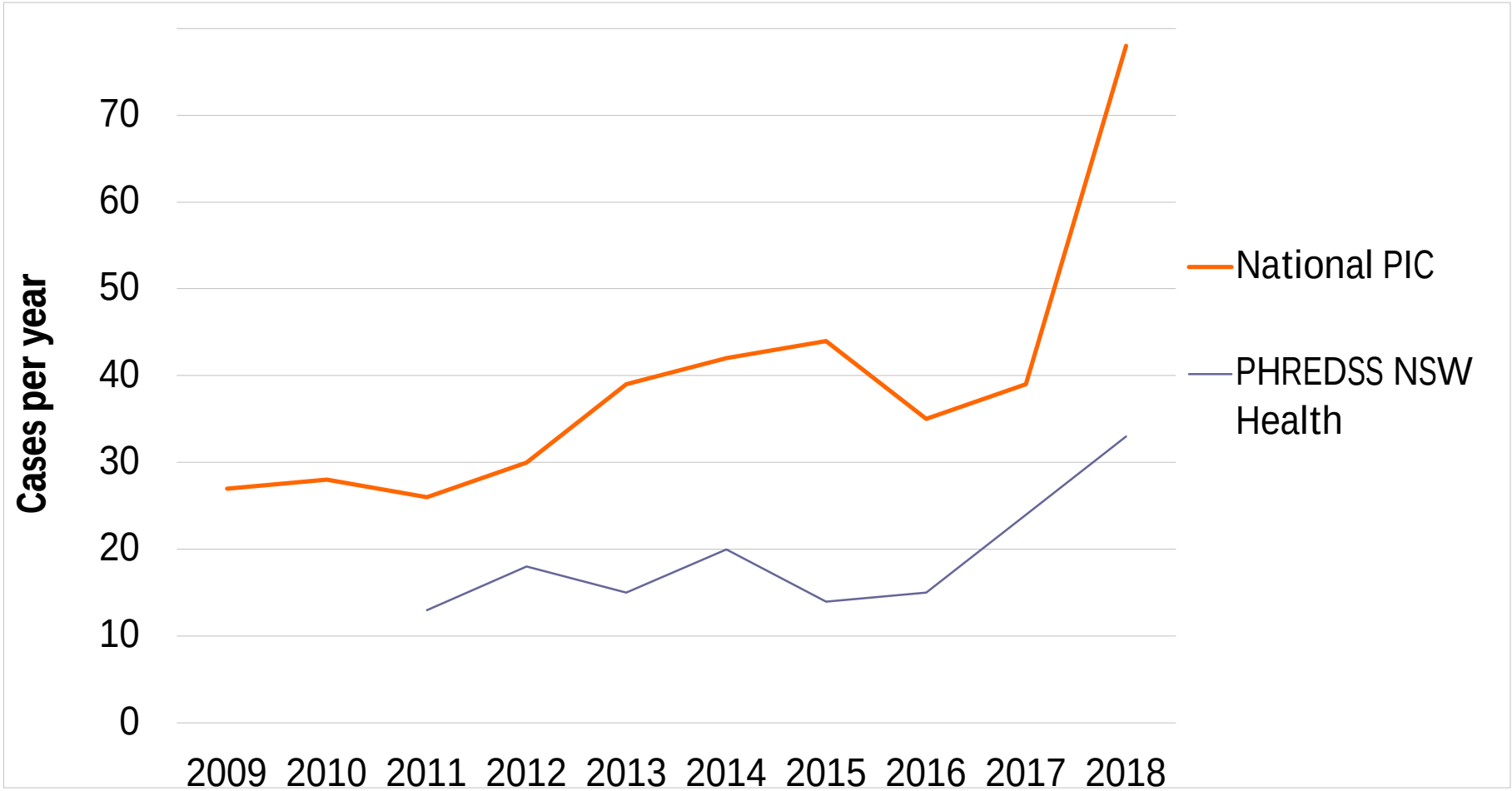
Methods

- To examine Australian Poisons Information Centre (APIC) case consultations to all four Australian PICs 2009-18 (NSW, QLD, VIC, WA), using the substance code: nitrites and nitrates. Calls from the general public and health professionals were included. 2015-18 was subject to individual case review to identify additional free text information and correct miscoding. 2017-18 from NSWPIC calls were subject to medical record review.

- To examine emergency department (ED) presentations to 64 NSW public hospital EDs mentioning exposure to alkyl nitrites in persons aged 16 years and above, using a keyword search on diagnosis, presenting problem and triage text fields, from January 2011 to December 2018. Source: Public Health Rapid, Emergency, Disease and Syndromic Surveillance (PHREDSS) system, NSW Ministry of Health.

2009 – 2018 Alkyl Nitrite Adverse Events



NB: An additional case in 2016 and 3 in 2017 were identified in the Princess Alexandra Hospital toxicology database

Public Health Rapid, Emergency, Disease and Syndromic Surveillance (PHREDSS) system, NSW Ministry of Health

Key findings

- Majority of cases in PHREDSS datasets are from hospitals which do not routinely contact PIC (as they have local toxicologist support). Confirms expected missing data from PIC datasets from NSW, VIC, QLD, WA, SA (with toxicology support).
- >100 cases of potential toxicity with the majority requiring hospitalisation in 2018. If usage is estimated at 100,000 people annually, this is at least 1 in 1,000.
- Doubling of cases from 2016-7 to 2018.
- Changing demographics from NSWPIC data:
  - 2004 0% female
  - 2015 24% female
  - 2018 31% female
- 67% aged between 16-34 years (PHREDSS)
- 89% of females are 16-34 vs 58% of males are 16-34 (PHREDSS)

Geographic analysis (2015-18 APIC Data)

Australian Capital Territory	5
New South Wales	85
Northern Territory	1
Queensland	13
South Australia	13
Tasmania	1
Unknown	6
Victoria	67
Western Australia	5

Key findings - severity

- Poisoning Severity Score for 2018 APIC data (NB: No follow-up):
  - 17 None
  - 44 Minor
  - 12 Moderate
  - 2 Severe
  - 3 Unknown
- 41% arrived by ambulance and 23% were assigned triage category 1 or 2, 17% were admitted (PHREDSS)
- 3 yo boy ingested unknown quantity of isobutyl nitrite (Rush) from a 9 ml bottle. Child is well but has evidence of methaemoglobinaemia with blue lips. ABG machine at hospital unable to report methaemoglobin. Later bloods showed peak 15%. Received oxygen therapy, intensive care observation and retrieval.

Disposition by route (2018 APIC Data)

Disposition/ Route	Aural	Buccal/ sublingual	Dermal	Ingestion	Inhalation	Nasal	Ocular	Rectal	Grand Total
At GP			1		1		1		3
GP Refer						2			2
Hospital Refer			1	16	1	4	1	1	24
In Hospital		1		12	12	3			28
Other	1			1			1		3
Stay at Home			2	8	2	3	3		18
Grand Total	1	1	4	37	16	12	6	1	78

Key findings – detailed case review (n=15)

- Review of 20 medical records requested from 2017-18 from calls to NSWPIC.
  - 3 had incomplete patient information and 2 were unable to be provided in time
- 2 discharged against medical device after 1-2h
- All recovered within short time, most within 4h and all discharge <24h
- Methaemoglobin levels unavailable in one lab
- 2 received methylene blue on advice of toxicologist
- 1 severe flare of asthma
- 4 cases of spillage into nostrils resulting in accidental snorting and ingestion of liquid
- Majority described use as a recreational drug: mixture of use as a party drug of sole abuse
- More than half were alcohol-affected at the time of exposure
- Mixture of regular users and first-time use

Key points – alkyl nitrites

- Increasing diversity in use patterns – party drug vs sex aid
- Exposures have tripled in past decade, 2 deaths in Australia captured in NCIS:
- Currently more calls than synthetic cannabinoid exposures to PICs
- Risk of hospitalisation is high after accidental exposure (2 in 3)
- ‘Unintentional misuse’ (accidental snorting/ingestion) tends to occur with intoxication or unfamiliarity
- Methylene blue as antidote is not stocked by smaller hospitals and carries risks of serotonin toxicity and in those with G6PD deficiency

Toxicity

- Ingestion (including through accidental nasal administration) carries a high risk of significant acute toxicity, as such clinical guidelines recommend medical observation for practically all exposures

- Inhalation can cause significant acute toxicity and close observation is necessary; can be difficult to predict who will become unwell

- How do we manage these risks?
  - Packaging redesign to prevent accidental ingestion snorting
  - Limits on container size
  - Education

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