Two-years of comprehensive toxicology testing in sentinel Australian emergency departments: type and frequency of novel psychoactive substance detections

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Introduction: Timely access to comprehensive toxicology testing of emergency department (ED) presentations is critical for identifying novel psychoactive substances (NPS) and associated harms. We examined the type and frequency of analytically confirmed NPS reported by the Emerging Drugs Network of Australia (EDNA) between January 2022 and December 2023.

Methods: De-identified demographic and toxicology data from all cases aged 16 years and over with at least one confirmed NPS detection were extracted from the EDNA national dataset. Case biofluid samples (blood) underwent comprehensive toxicology analysis. Descriptive analysis (frequencies and proportions) was used to summarise the data.

Results: At least one NPS was detected in 220 of 2,308 ED presentations (10%) across five states and 14 EDNA participating hospitals between 2022-2023. The median age was 27 years (range 16-90 years) and 162 (74%) were male. A total of 353 NPS detections were reported, comprising 39 different compounds (Figure 1). Novel benzodiazepines predominated, comprising three-quarters of all NPS detections (n=270, 77%), with bromazolam (n=106, 30%) and clonazolam (n=59, 17%) the most frequent. Other prominent NPS included 11 different novel stimulants (n=33 detections, 9%), six opioids (n=26, 7%), four dissociatives/psychedelics (n=14, 4%) and two synthetic cannabinoid receptor agonists (SCRA) (n=4, 1%). Whilst co-detected illicit drug exposure was common in the NPS sub-group (n=171, 78%), 31 (14%) were isolated single NPS detections. The maximum number of NPS confirmed in a single case was six (five novel benzodiazepines and one SCRA).

Discussions and Conclusions: Results from EDNA demonstrates the feasibility of a toxicosurveillance system with sufficient sensitivity to detect NPS in ED presentations across multiple jurisdictions. Exploration of associated clinical data will provide much needed insight into the toxicity profiles of NPS, particularly single exposure cases. Expansion of routine toxicology testing in EDs will enable continued monitoring of emerging drug trends.

Implications for Practice or Policy: Analytically verified data from ED presentations is now a prominent data source on emerging drug-related threats in Australia, and key to informing public health harm minimisation responses (e.g. drug alerts) by state government authorities. Embedding toxicosurveillance systems such as EDNA into Australia's strategic approach to reduce drug-related harms is critical.

Figure 1. Novel psychoactive substance detections, EDNA, 2022-2023

Substance	Count
Bromazolam	106
Clonazolam	59
Phenazolam	25
N-N Dimethylpentylone	22
Flubromazepam	18
Etizolam	16
Protonitazene	15
Flualprazolam	12
Phenazepam	12
2'-fluoro-2-oxo-phenylcyclohexylethylamine	10
Desalkylgidazepam	10
Metonitazene	6
Nitrazolam	4
Deschloroetizolam	4
5-fluoro CUMYL-P7AICA	3
Methylone	2
3-Hydroxyphencyclidine	2
Estazolam	2
N-pyrrolidino etonitazene	2
Dihydrokavain	2
Dihydromethysticin	2
Kavain	2
Desalkylgidazepam	1
2-methyl-4'-(methylthio)-2-Morpholinopropiophenone	1
2-Naphthyl U-47700	1
3,4-Methylenedioxydimethylamphetamine	1
4-Methylmethcathinone	1
Deschloroketamine	1
DesoCodeine	1
Dibutylone	1
Dimethylone	1
Ethylphenidate	1
Isotonitazine	1
4-Fluoroamphetamine	1
4-Fluoromethamphetamine	1
ADB-Butinaca	1
Escaline	1
Eutylone	1
Flubromazolam	1

Legend:
- Benzodiazepine
- Stimulant
- Opioid
- Dissociative / psychedelic
- Synthetic cannabinoid receptor agonist
- Other

Total NPS detections (n = 353)