

# Trends in nitrous oxide use amongst people who regularly use ecstasy and other illicit stimulants in the Greater Brisbane region, Queensland, 2003-2020

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## Key finding:

- Compared to 2003, recent (past 6 month) use of nitrous oxide more than doubled in 2018 and remained elevated in 2019 and 2020.

## Introduction

- Nitrous oxide (N<sub>2</sub>O) is a drug used in clinical settings for the purposes of anaesthesia and sedation.<sup>1,2,3</sup> Because of these effects, nitrous oxide is also used recreationally. Gas cartridges (also known as bulbs, nangs, or whippets) containing a clear, colourless gas are typically discharged into another object such as a balloon, or inhaled directly, creating effects such as euphoria, heightened consciousness, disassociation and excitement shortly after ingestion.<sup>2,3</sup>
- While the majority of people who use N<sub>2</sub>O do so infrequently and do not experience harm, potential harms from heavy nitrous oxide use can include depletion of Vitamin B12 and associated potential for peripheral neuropathy.<sup>1,4</sup> While deaths from nitrous oxide use are rare, those that do occur are mainly due to hypoxia, or accidents or injuries.<sup>2, 5</sup>
- Research indicates that the use of nitrous oxide may be increasing, and calls have been made for further research into the prevalence of its use and associated harms amongst people who use drugs.<sup>1,2,3</sup>
- This bulletin examines trends in N<sub>2</sub>O use among samples of people who regularly use ecstasy and other illicit stimulants surveyed as part of the Queensland (QLD) Ecstasy and Related Drugs Reporting System (EDRS) between 2003-2020.

## Method

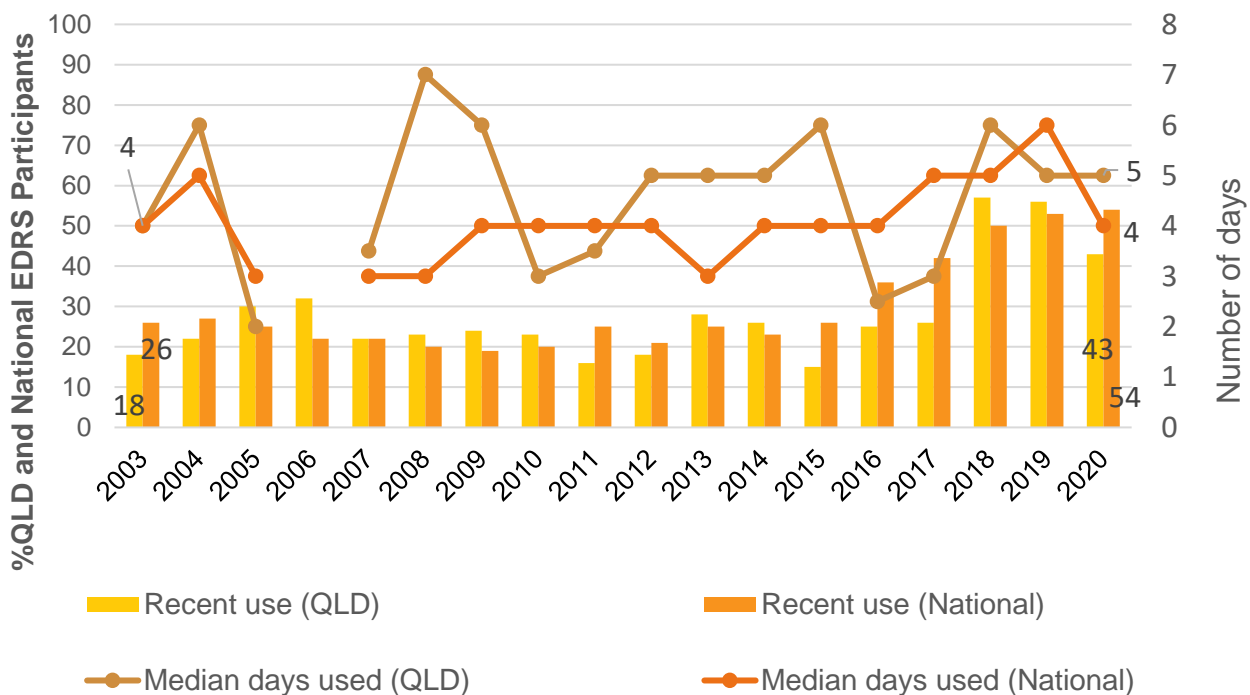
- The EDRS is an annual cross-sectional survey of people who regularly use ecstasy and related stimulant drugs. Participants are recruited from all capital cities in Australia via social media and peer referral, and complete a one-hour structured interview.
- Prior to 2020, interviews were conducted face-to-face. Due to COVID-19, interviews in 2020 were completed via phone or videoconference (instead of face-to-face) and participants were reimbursed electronically to manage risk of COVID-19 transmission.

- This bulletin draws on Queensland data from the 2003-2020 EDRS studies. Interviews were conducted in Brisbane and the Gold Coast.
- We used  $\chi^2$  tests, Spearman's rho ( $\rho$ ) correlation tests and regression analyses to assess changes since 2003 in recent (past 6 month) nitrous oxide use, frequency of use (number of days used in the past 6 months), and amount used in a 'typical' session. Statistical significance was considered as  $p < 0.05$ .

## Results

- In 2020, recent use of nitrous oxide was reported by 43% of the QLD sample. Although this is slightly lower than 2019 (56%;  $p = 0.065$ ), it is significantly higher than earlier years [such as 18% in 2003:  $\chi^2 (16, N = 1723) = 118.495, p < 0.001$ ].
- Regression analysis, using 2003 as the reference year, showed that apart from a significant increase in 2005 ( $p = 0.043$ ), the percentage of participants reporting  $N_2O$  use remained stable from 2003-2017 until significant increases in 2018, 2019 and 2020 ( $p < 0.001$  each, respectively).
- In 2020, participants reported using nitrous oxide on a median of five days (IQR=2-12) in the last 6 months, similar to 2019 (5 days; IQR=2-10;  $p = 0.738$ ). There was no overall increase over time in the number of days used in the past 6 months ( $p_s = 0.058, p = 0.206, n = 477$ ), but regression analysis using 2003 as the reference year found significantly more days of nitrous oxide use for 2008 (7 days,  $p = 0.045$ ) and 2018 (6 days,  $p = 0.047$ ).
- Patterns are similar for National data.

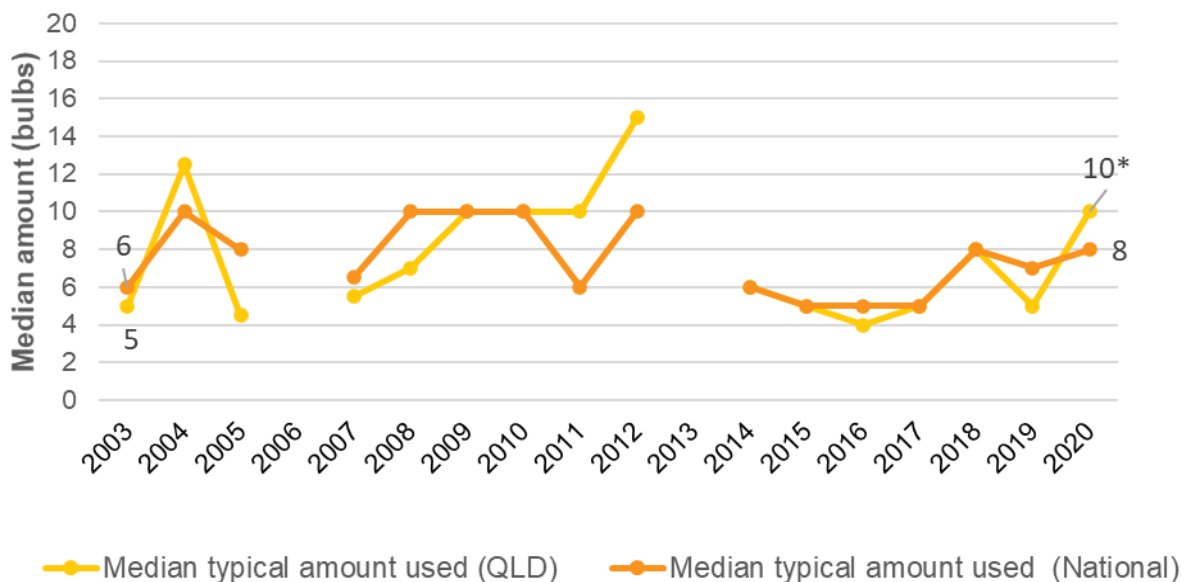
**Figure 1. Recent (past 6 months) and median days of use of nitrous oxide amongst the EDRS sample, Queensland and National, 2003-2020**



Note. Secondary Y axis reduced to 8 days to improve visibility. Number of days used nitrous oxide not specifically asked in 2006.

- In 2020, QLD participants reported using a median of 10 bulbs in a ‘typical’ session, (IQR=4-20; n=42), compared to five bulbs in 2019 (IQR=3-10,  $p=0.035$ ) and five in 2003 when monitoring began.
- For most years, fewer than 5% of the sample used 20+ bulbs in a session.
- Spearman’s correlation test showed no overall link between year of interview and number of bulbs used in a typical session ( $p=0.780$ ); regression analysis showed no significant difference in the median number of bulbs used in a typical session since 2003, except for an increase in 2004 (12.5 bulbs,  $p=0.007$ ).
- Amounts used are similar to National figures.

**Figure 2. Typical amount of nitrous oxide used per session amongst the EDRS sample, Queensland and National, 2003-2020**



Note. Number of bulbs per session not specifically asked in 2006. Data for median typical amount used missing for 2013. Y axis reduced to 20 to improve visibility. \* $p<0.05$

## Implications

The percentage of participants reporting past 6 month nitrous oxide use increased overall between 2003-2020 to more than two in five Queensland EDRS participants, largely due to a significant increase in use from 2018. There was no overall increase in the frequency of recent nitrous oxide use (approximately monthly) or in the median number of bulbs (5-10) used in a ‘typical’ session. The increased use of nitrous oxide in recent years warrants more detailed monitoring of patterns of use and harms, particularly for those who reported using more than 20 bulbs per session, to help inform public health interventions to reduce harm associated with this substance.

## References

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## Participating researchers and research centres

- Antonia Karlsson, Julia Uporova, Daisy Gibbs, Rosie Swanton, Olivia Price, Roanna Chan, Dr Rachel Sutherland, Professor Louisa Degenhardt, Professor Michael Farrell and Dr Amy Peacock, National Drug and Alcohol Research Centre, University of New South Wales, New South Wales;
- Amy Kirwan, Cristal Hall, Dr Campbell Aitken and Professor Paul Dietze, Burnet Institute Victoria;
- Tanya Wilson and Associate Professor Raimondo Bruno, School of Psychology, University of Tasmania, Tasmania;
- Dr Jodie Grigg and Professor Simon Lenton, National Drug Research Institute, Curtin University, Western Australia; and
- Catherine Daly, Dr Natalie Thomas, Dr Jennifer Juckel and Dr Caroline Salom, Institute for Social Science Research, The University of Queensland, Queensland.

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