

Misuse of nitrous oxide for non-medical purposes: has the law adopted in France curbed consumption ?

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Poisonings from nitrous oxide (N₂O) used for recreational purposes have increased in France since 2018. **A law was passed on 01 June 2021 to combat this misuse, including the prohibition of sales to minors and the restriction of quantities sold [1].**

Objective: present the trend in poisoning cases over the past five years and the observed medical complications in minors, in light of the regulations implemented in France.

Methods: Retrospective study of non-medical N₂O poisoning cases in the context of misuse in France, based on data from the Poison Control Centers' information system between 2019-2023. Poison Severity Score was used to assess the severity [2]. **The impact on minors was assessed between 2 study periods depending on the law's adoption: [2019-May 2021] and [June 2021-2023].** Statistical analyses : GraphPad Prism 10 software.

Result

Trend in the number of calls to PCC in France

↓ Change in N₂O regulation

Items / Year	2019	2020	2021	2022	2023
Total nb of cases	52	150	↗ 303	256	305
Median age (years)	21	20	21	21	21
Nb of minors (N, %)	12 (23%)	36 (24%)	41 (13,5%)	41 (16%)	51 (16,7%)
Sex ratio (minors)	1,2	1,6	1,6	1,2	1

Before the law, there was a consistent increase in the total number of cases

Total number of cases in minors (2019-2023): 170

PSS 0: 2%, PSS1: 49%, PSS 2: 40%, PSS 3 : 9% → no difference in case severity according to gender

Although the proportion of minors decreased between the 2 study periods (19,6% versus 15,9%), this difference was *not statistically significant*. The **proportion of girls was significantly higher** in this population in the 2nd study period, after the law was passed (p=0,01).

Complications observed in minors :

- Mainly neurological disorders (65%), including 11 myelopathies, 63 mentions of paresthesia and 3 cases of convulsion.
- Digestive (11%), psychiatric (5%), pulmonary disorders (3,5%) or cardiovascular disorders (3,3%) and were also reported.

Note: 2 additional cases of maternal-fetal exposure to N₂O, with complications observed in the baby.

Conclusion

The law adopted in 2021 does not appear to have impacted the misuse of N₂O. Since January 2024, the sale or distribution of N₂O tanks has been banned for public on the French market. The misuse of N₂O persists, and a new legislation is under consideration in France.

References:

- [1] Legifrance. LOI n° 2021-695 du 1er juin 2021 - usages dangereux du protoxyde d'azote.
- [2] Persson H et al. Poisoning Severity Score: Grading of acute poisoning. Clin Toxicol; 36:205-13.

↗ x6
2019-2021

Prevention efforts must continue, particularly on social media. Young patients require close support in adhering to medical care

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