

The misuse of nitrous oxide, which is increasing sharply and has serious consequences, must be prevented¹

Press release from the French National Academy of Medicine

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Nitrous oxide, mainly used in anesthesia and cooking, is currently being misused as a narcotic as it is inexpensive and easily accessible. Its use among teenagers and young adults is rising sharply, because they are poorly informed about the risks of intoxication, severe neurotoxicity, and hematological disorders. It is included on the list I of toxic substances in the Public Health Code and classified as toxic to reproduction by the European Chemicals Agency (ECHA). Nitrous oxide is also a powerful greenhouse gas that persists in the atmosphere for a long time. According to data from the Centers for the Evaluation and Information on Drug Dependence-Addictovigilance (CEIP-A), this trend is fueled by the availability of large-capacity canisters that allow for massive and repeated consumption. This has resulted in an increase in the frequency and severity of observed complications.

The list of adverse health effects of nitrous oxide, resulting from both acute and chronic exposure, is constantly expanding and diversifying. 80 per cent of reports from the CEIP-A mention neurological disorders (1).

Acute exposure (high doses over a short time) causes the following symptoms:

- *neuropsychiatric*: dizziness, headaches, tinnitus, impaired motor coordination and alertness (confusion, disorientation in time and space, loss of consciousness), panic attacks and “blackouts,” which can last up to 45 minutes and lead to respiratory arrest (2). Altered sensory perception, including a false sense of lucidity and diminished reflexes, is responsible for serious traffic accidents that are being reported with increasing frequency, including fatalities. These major complications may occur if nitrous oxide is consumed in a poorly ventilated environment or in the presence of a preexisting vitamin B12 deficiency, and this risk increases significantly with high doses and repeated consumption;
- *respiratory*: pulmonary edema, asphyxia, irritation of the upper airways;
- *cardiac*: arrhythmias, bradycardia;
- - *thromboembolic*: deep vein thrombosis, pulmonary embolism;
- - *gastrointestinal*;
- - *skin* (sometimes severe frostbite);
- - *fetal*, in cases of significant exposure during pregnancy.

¹ 1 Press Release from the Academy’s Rapid Communication Platform

Chronic use can lead to a genuine addiction (3) and may also cause severe complications, some of which are irreversible even after discontinuing use and correcting the vitamin B12 deficiency:

- *neuropsychiatric disorders*, caused by cerebral hypoxia and neurotoxicity related to vitamin B12 deficiency, which may be irreversible or result in sequelae: aphasia; amnesia; paresthesia-numbness, tingling in the extremities; irritability, hallucinations, delusions, paranoia, psychotic syndrome, self- and hetero-aggression, suicidal thoughts;
- *muscular*: muscle weakness in the limbs, loss of positional sense, difficulty walking, lack of coordination, loss of balance (ataxia);
- *sphincter-related*: loss of bladder and bowel control;
- *hematologic*: megaloblastic anemia, leukopenia, thrombocytopenia, pancytopenia due to bone marrow depression;
- *cardiovascular*: hypotension, arrhythmias, sudden death, atherosclerosis with ischemic heart disease;
- *renal, hepatic, cutaneous, urological issues* (erectile dysfunction).

The misuse of nitrous oxide, which is readily available for purchase online, has not been stopped by the Law of June 1, 2021, which targets “dangerous uses of nitrous oxide” and prohibits its sale to minors, as well as to adults in certain venues such as bars, nightclubs, or party venues.

In light of the public health emergency caused by the significant increase in the misuse of nitrous oxide, which is affecting the youngest and most vulnerable, the French National Academy of Medicine recommends accelerating the measures already underway and to:

- Step up regulatory measures to ban the free sale and import of nitrous oxide;
- Increase enforcement on the ban on sale and distribution of these products;
- Strengthen national awareness campaigns targeting adolescents, young adults, and their social circles to fight the normalization of this substance use and to raise awareness of the risks of permanent neurological damage;
- Support prevention and care programs tailored to teenagers and young adults, particularly through Youth Substance Use Clinics (CJC) (4) (5), the Adolescent Centers (6), and peer-led “outreach initiatives”, all of which are recognized as highly effective for these particularly vulnerable populations.

References

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