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LIFESTYLE AND CHRONIC DISEASES

FACT SHEET

Nitrous oxide (N_2O)

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Epidemiology and Public Health – Lifestyle and chronic diseases

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This fact sheet is mainly based on the script about laughing gas of ARIEC Limburg, the infofiche laughing gas of DJSOC and the Inter-administration working group on laughing gas of FAMHP, FPS VVVL and Sciensano. The content is discussed with and agreed upon by the Belgian Federal Police, Federal Public Service Finance - Customs and Excises, Federal agency for medicines and health products, National institute for Criminalistics and Criminology and Sciensano.

Please refer to this publication as follows:

Factsheet Nitrous oxide (N2O). Brussels, Belgium; Depotnummer D/2020/14.440/91

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A. General information

For some time now, nitrous oxide (N_2O), also known as laughing gas, has received a great deal of media attention and stories have been circulating about its use in nightlife settings and schools environment. An increase in the recreational use of N_2O has been observed, since 2017. However, the use is not completely safe and, in contrast with most other psychoactive substances, no legal barriers are in place to limit the access to N_2O (e.g. for minors). Therefore, it is very important to raise awareness to all authorities and citizens in order to discourage the recreational use of N_2O and to prevent its potentially desastrous effects.

Created
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Type
Volatile substances

B. Alerts

Alerts
None.

C. Pictures

Source: ARIEC Limburg
Source: ARIEC Limburg

Source: ARIEC Limburg

Source: FPS Finance, customs and excise

D. Legal status

Not forbidden by law.

The sale of the gas is legal and does not fall under the drug legislation. The sale of cartridges is subject to the economic legislation of goods. Some municipalities and cities have adapted the 'general police regulations', which allows them to tackle the phenomenon at the administrative level.

E. Chemistry

Systematic chemical name

Nitrous oxide

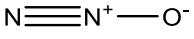
Other names

Distikstofmonoxyde, Dinitrogen oxide, Dinitrogen monoxide, Laughing gas, Nitrogen oxide

Chemical Abstracts Service (CAS) registry number

10024-97-2

Molecular information

Molecular structure: 

Molecular formula: N_2O

Molecular weight: 44.013 g/mol

F. Clinical information

Usage

N_2O is meant to be used in laboratories, hospitals or dentists (e.g. as anesteticum) and the food industry (e.g. as a propellant in canned whipped cream). Nevertheless, N_2O can be used as a narcotic. According to the HBSC 2018 survey, approximately 3% of Walloon and Brussels students enrolled in upper secondary education (2nd and 3rd degrees) have already consumed N_2O at least once in their lives. According to the nightlife survey of VAD, 3.4% of the repsondents used N_2O at least once during the past 12 months in 2018. This is a stable trend compared to the previous wave of the survey.

A few seconds after inhaling the gas, one experiences an intoxication (‘high’) that disappears very quickly (after some minutes). It makes people happy, euphoric and enthusiastic. Laughter is common, hence the commonly used name of ‘laughing gas’. It also quickly gives a narcotic effect and a relaxed feeling. Colourful hallucinations, which can cause both euphoria and agitation, are also typical.

There are multiple common routes for administration; for example, by emptying a N_2O cartridge (also called ‘bonbons’) or even large gas bottles into a balloon in order to inhale the sweet-tasting gas. A cracker may be used, which is a small device that makes a hole in the cartridge through which the gas can be released. Another method which is becoming increasingly common, is to inhale directly from gas cartridges or a gas bottle. N_2O is no longer detectable after use as it is re-excreted by the kidneys within one hour.
N_2O is especially popular with young people between 12 and 25 years of age. N_2O is regularly used at parties, festivals, shishabars and other public places. The price of a cartridge or ‘bonbon’ in regular stores varies around 0.50 - 0.60 euro/piece, depending on the size of the purchase.

Health risks

It is very hard to know what the limits are for safe recreational use. Harmful effects have been reported with one-time excessive use, but also more intensive use can cause harmful effects. Young and inexperienced users, persons with cardiovascular disorders and persons with a low vitamin B12 level are more sensitive and

vulnerable to the short term and long term harmful effects. Besides, the use of supplements to increase again the level of vitamine B12 may not be the solution as resorption may be limited.

Short term harmful effects

Most often, N_2O is used without any clear indication of problems, which is why it is often perceived as safe. Nevertheless, irritation of the nose, throat, eyes, skin and respiratory tract are typical consequences of recreational use of N_2O.
It causes a lack of oxygen and works as an anaesthetic in the brain, which may cause a delay in reaction capability, headache, dizziness, blurred vision, confusion, nausea, vomiting, diarrhoea, balance disorders, coordination problems, holes in the short-term memory, hallucinations, numbness and fainting. It is possible that the intoxication causes reckless and dangerous behaviour, making the user a risk to himself and others. Cardiac and respiratory problems might occur as well, with the risk of unconsciousness, coma and possibly the death of the user. In addition, the gas is highly volatile, which creates a risk of fire and explosion resulting in serious injuries to the hands and face. The description of these risks makes clear that the use of N_2O in certain circumstances such as in traffic or among smokers is even more dangerous.

Combined use (with sleeping pills, sedatives or alcohol) can enhance the effects. Some cases are reported in which the user is very agitated, aggressive, destructive and may show suicidal tendencies.

When N_2O is inhaled directly from the cold gas cylinder, the lips, mouth, throat and lungs may freeze. In addition, harmful metal particles from the N_2O cartridges may end up in the lungs. Moreover, a user with a cold can suffer permanent hearing damage due to the shatter of eardrum because of the pressure.

Although still limited compared to the use of other substances, an increasing number of persons who came in contact with N_2O contacted the Belgian antipoison centre during the past years (2 casualties in 2016, 3 in 2017 and 9 in 2018, 10 in 2019).

Long term harmful effects

Long-term recreational use of N_2O can damage the lungs and N_2O depletes vitamine B12 levels in the human body, which can cause brain damage and damage to the nervous system. A typical symptom is the perception of tingling in the fingers or feet. Neurological disorders, anaemia and cardiovascular diseases are common. In addition, N_2O can lead to impotence and infertility. According to researchers, N_2O is limited addictive. Although, it is reported that people may use longer or more than they intended.

Other uses

None known

G. Advise/recommendations

1) Take restrictive measures (such as restrict circumstances in which capsules can be sold, adapt the packages, adapt the law in order to include N2O in the list of substances that have an impact on driving ability and public drunkenness, etc.) in order to limit the availability and use. Although, we have to prevent that restrictive measures pushes the problem into the illegality where it is more difficult to have control on the phenomenon.
2) Take preventive measures (such as awareness raising to authorities, press, users, vendors, etc.) in order to limit the use and related harms. Regional organisations informs about good practices through brochures (intended for intermediaires and local governments).
3) Monitor the situation more closely to collect data about the number of people using N_2O, users' profile, motivation to use, knowledge of the substance by the users, settings (home, public place, car) and (experienced) harmful effects (number of emergencies, traffic incidents).
4) Monitor the measurements that will be taken to be informed about the expected and unexpected impact.

H. References

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