

# New designer drugs from the web

The illicit drugs market has changed in recent years, and the Internet has become increasingly important as a distribution channel. During the first six months of 2015, more than 200 000 user doses of novel psychoactive substances (NPS) were impounded in Norway. Many of these substances are toxic and their use has led to fatalities. Knowledge about these new drugs and the challenges associated with them is especially important for health personnel.

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These new drugs have a number of different designations. The online shops tend to refer to them as «legal highs» or «herbal highs», terms giving the impression that these substances are safe, legal and/or of natural origin (1). The media often refer to them as «synthetic drugs» or «designer drugs», while the medical community uses the designation «novel psychoactive substances» (NPS). The term NPS encompasses a large number of different substances with effects that are similar to, and often stronger than, those of the classical drugs of abuse. Some NPS are chemical modifications of existing drugs, while others are well known substances that have been relaunched.

NPS are divided into chemical groups, such as piperazines, cathinones, phenethylamines, tryptamines, synthetic cannabinoids and others. This issue of the Journal of the Norwegian Medical Association presents a separate overview of these substances (2).

## Creative online marketing

The users obtain knowledge about NPS on the Internet, where users and sellers share their often subjective experiences. The users have a high degree of trust in this information (3). There is a considerable need for unbiased information on the risks associated with the use of these substances.

NPS are sold in the form of powder, pills, paper blotters, liquids, herbal material etc., which are frequently wrapped in small packages labelled with apparently legal applications, for example as research chemicals, bath salts or plant nutrients (4). This

product labelling, combined with printed warnings, such as «not for human consumption», is a deliberate strategy on the part of the distributors to circumvent legislation and avoid responsibility.

The products have appealing names (e.g. Pink Panther, Black Diamond, Charly Sheen, Arctic Dust) and tend to come in colourful, attractive and innocent-looking packaging. They are marketed as harmless and legal, and combined with a low price and anonymous sending, this is intended to tempt young people to use them (2).

Monitoring of the Internet has uncovered a huge increase in the number of online shops that sell NPS – altogether 651 such shops were recorded in 2013 (5). With such

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easy access to NPS, it is not necessary for the buyers to contact an established community of drug users to obtain these substances. Use of NPS has been reported in rural areas as well as the major cities (6). The new drug landscape is not only a matter of new psychoactive substances, it is equally a question of new forms of distribution.

## Prevalence

Over the last ten years, the number of NPS has increased significantly. Since 2005, the EU's drug monitoring centre (European Monitoring Centre for Drugs and Drug Addiction (EMCDDA) has registered 450 new substances, and 101 hitherto unknown substances were registered in 2014 alone.

The health services, the judicial system and the customs agencies have difficulty keeping abreast of this development, and this tendency is disquieting. In Norway, a number of deaths associated with NPS have already been reported (7–9). The most serious example is that of the amphetamine-like intoxicant paramethoxymethamphetamine (PMMA) (10), which has caused more than 30 deaths in this country since 2010. In Sweden, 20 people recently died after intake of the morphine-like substance acetylfentanyl.

The deaths that have been caused by NPS represent no more than the tip of the iceberg – the total extent of use is unknown, in Norway as well as internationally. Reports from Norwegian hospitals and emergency rooms, statistics on impounded material and web forums all indicate widespread use even in Norway.

Since 2001, Norway has been a member of the EMCDDA, which monitors the drug situation in Europe. One of the most important tasks to which Norway has committed itself is identification and alert through the Early Warning System whenever NPS are detected. Reporting of serious incidents, mainly deaths and serious poisonings, to the EMCDDA is a key element in the work related to early warning, while all new findings of NPS are reported.

Despite the major increase in the use of NPS in recent years, the «classic» drugs of abuse remain the cause of the vast majority of all drug-related deaths in Norway (11).

The number of seizures made by the police and customs authorities has increased significantly in recent years, from 23 in 2005 to 738 in 2013 (12). Altogether 99 different NPS were discovered in Norway in the period 2010–2014 (13). The number of seizures levelled off from 2012 to 2014, but it is unclear how this development will proceed and whether this is due to fewer drugs being imported to the country or to fewer successful seizures being made.

There is little knowledge available regarding the buyers of NPS, but it is reported that young people, athletes and certain

occupational groups that are subject to drug testing use them (3). Data on apprehended drivers in Norway, most of whom are men, have shown that even experienced and older drug users also take NPS (14–16).

### Identification

#### of NPS upon admission to hospital

Documentation on the type of drugs that cause hospitalisation is required to be able to prevent further drug incidents. Over time, such data may help provide patients with better treatment. A new project at the Norwegian Institute of Public Health, ETORA (Evaluering av Toksisitet av nyere Rusmidler bestemt ved Analyser) [Evaluation of the toxicity of novel drugs, as determined by analyses], provides analyses of blood or urine samples free of charge when there is suspicion of poisoning by NPS.

The ETORA project is structured in the same way as the Swedish STRIDA project (Samverkansprosjekt kring Toxicitetsutredning och Riskbedömning av InternetDroger baserat på laboratorieAnalyser) [Collaborative project on toxicity and risk assessment of Internet drugs, based on laboratory analyses], which was launched in 2010 and continuously generates new knowledge. During Christmas 2014, seven deaths related to PMMA occurred in Sweden (17). Prompt warning through media helped halt this outbreak within one week, and further deaths were most likely prevented.

Information on the risk involved in using drugs available on the illegal drug market may prevent overdoses and deaths. In Norway, little information on poisonings caused by NPS is currently available, since the hospital laboratories rarely provide such analyses.

### Painstaking analyses

Most screening tests, immunoassays and point-of-care testing cannot detect NPS. Because of the large number of different drugs, it is impossible to devise rapid tests that can detect all of them. For example, most immunoassays for cannabis will not detect synthetic cannabinoids, since the latter encompass a large group of different compounds whose molecular structure differs completely from the substances found in natural cannabis products (hashish and marijuana).

Even with the aid of sophisticated instruments of analysis found in pharmacological laboratories, NPS may be difficult to detect. This is because NPS may be extremely potent and hence are present in very low concentrations in biological samples. Some of them are nearly completely transformed into known or unknown metabolites. For an analysis to detect a specific substance with

certainty, the laboratory needs legally produced reference substances, and this production invariably lags behind the illicit one.

The Norwegian Institute of Public Health and the major clinical pharmacological hospital laboratories possess methods of analysis that can detect many NPS in different sample media, but the substances that are

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detected constitute no more than a fraction of those that are in use at any given time, and there will most likely be large numbers of undetected cases.

### What is the impact of legislation?

The large growth in the number and chemical diversity of the NPS gives rise to problems for legislators (5). The authorities attempt to update legislation in pace with developments, but will invariably lag behind. In 2013, the Norwegian Ministry of Health and Care Services introduced new drug regulations that defined ten groups of substances (18). All substances classified in these groups are defined as illicit drugs. This provides the authorities with better opportunities to be a step ahead of the development, since the inclusion of individual substances each time a new one is reported is time-consuming. This notwithstanding, these ten groups of drugs encompass only a few of the NPS that have entered the market in recent years. In some cases, as soon as a substance had become subject to regulation, new ones would appear. There have been discussions as to whether this type of legislation is counterproductive and helps encourage the production of further NPS. The prosecuting authorities have limited resources, and cases involving seizure of such substances in Norway have mostly been dismissed. This sends the unfortunate signal that the risk of punishment for using NPS is lower than for traditional drugs.

Small changes to the molecular structure can have major legal implications. If changes to parts of the drug molecule are made, this may result in a formerly illegal substance suddenly becoming legal. Most of the novel designer benzodiazepines fall outside the definition of illicit drugs. Substances that are not encompassed by the regula-

tions on illicit drugs will instead be subject to the provisions pertaining to the import, sales, marketing etc. of medicinal drugs. Violations of the legislation on illicit drugs entail consequences that are far more severe than for violations of the laws regulating medicinal drugs: the maximum penalties are 21 years and six months imprisonment respectively.

An alternative to current legislation – which defines illegal substances – could be to prepare a list of legal medicinal drugs. All other substances would thus be deemed as illegal.

NPS represent an increasing problem. To counter this, we need more knowledge about these drugs. Whenever poisoning by NPS is suspected, analysis of biological material should be given higher priority, thus to increase the knowledge about their prevalence and effects.

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