

Harms arising from the use of synthetic cannabinoid products

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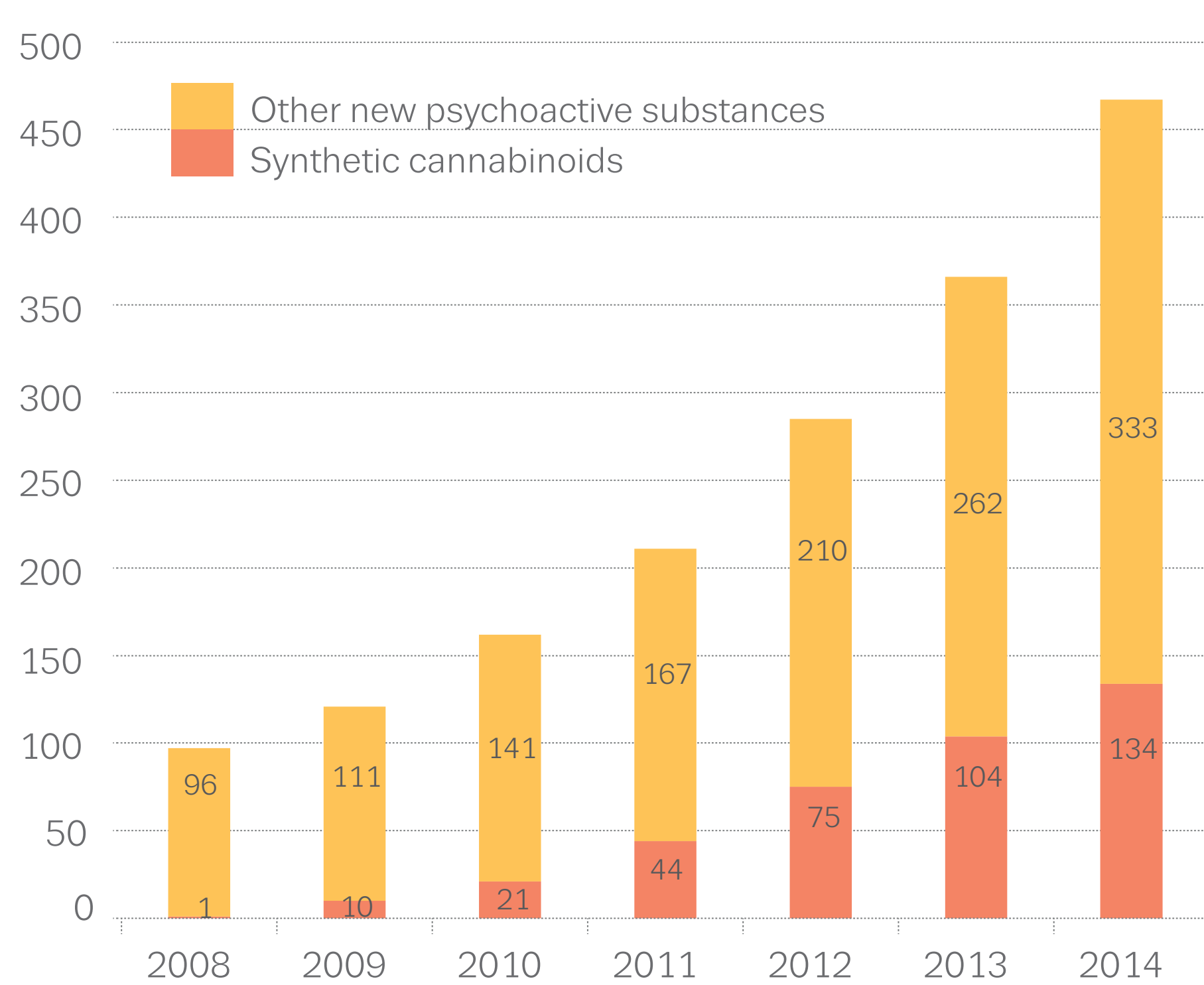
Introduction

'Synthetic cannabinoids' or, more correctly, synthetic cannabinoid receptor agonists (SCRAs), are synthetic chemicals that mimic the effects of the natural psychoactive substances found in cannabis. 'Legal high' products containing SCRAs have been sold as herbal smoking mixtures since at least 2006. Recently, new products containing SCRAs have emerged such as a 'resin' resembling cannabis resin and liquids suitable for use in electronic cigarettes. The products have been marketed in innovative ways and may be sold openly on the internet and in specialist 'smoke' shops.

The number of distinct SCRA compounds detected through the EU Early Warning System (EWS), which monitors the emergence of new psychoactive substances in Europe, continues to grow, with a total of 134 having been notified to the EMCDDA between 2008 and 2014 (Figure 1).

Their chemical diversity and the rate of emergence, makes the detection and monitoring of this group of compounds particularly challenging, especially in terms of the harms associated with their use.

FIGURE 1 | Synthetic cannabinoids and other new psychoactive substances reported to the EWS: cumulative yearly totals

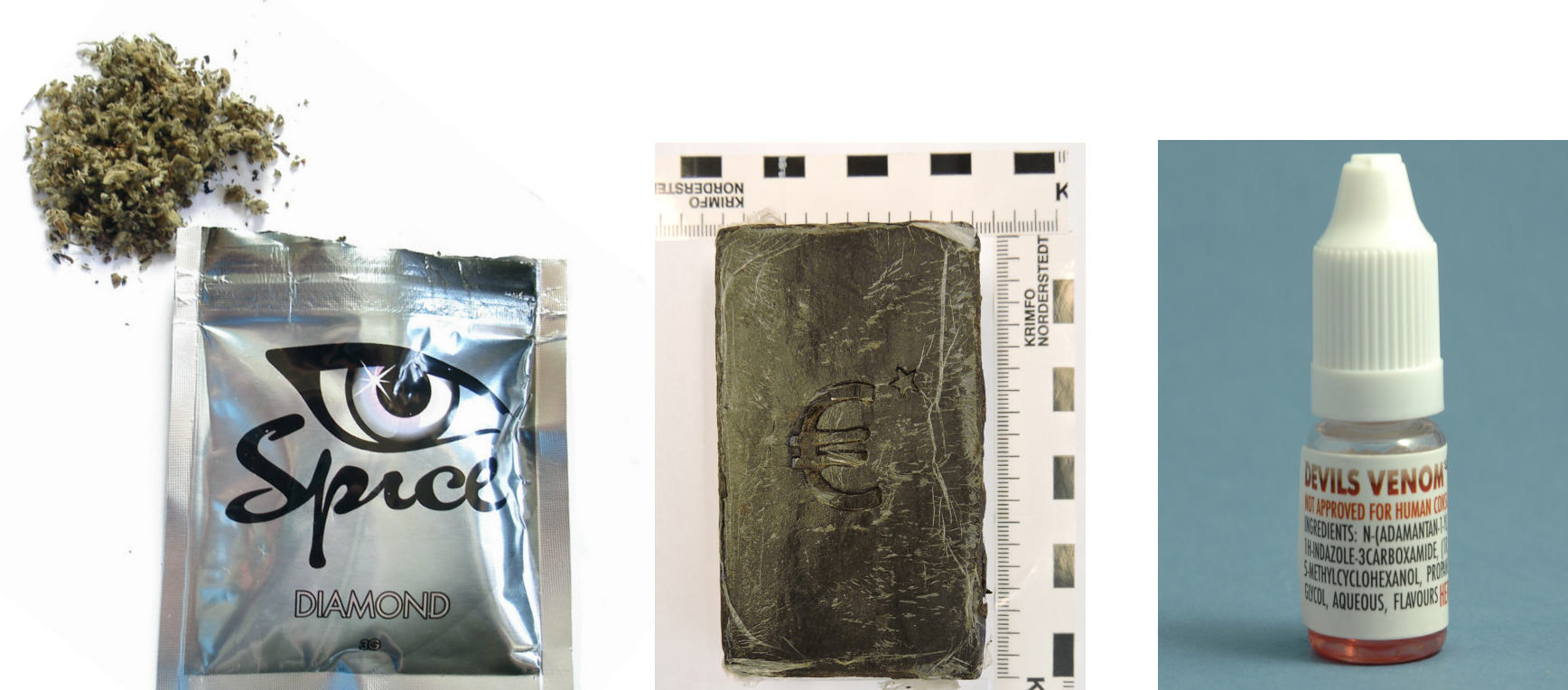


Manufacture, production and distribution

China is the main source country for SCRAs, which are shipped as bulk powder to Europe and other destinations using established, legitimate transport and distribution networks. The purity of the substances is rarely reported, but one study from South Korea reported purities of between 75 % and 90 % for bulk powder samples. In 2013, more than 21 000 seizures of SCRAs were reported to the EWS, amounting to more than 1.5 tonnes of material, of which almost 600 kilograms was bulk powder.

The consumer products are assembled in Europe for local sale or export. Herbs such as damiana (*Turnera diffusa*) are used as a base, into which the active synthetic chemicals are crudely mixed, using solvents to dissolve the chemicals first. Once mixed, the herbs are dried and packaged for sale in units typically containing 1–3.5 grams of herbal substance and a small quantity of the active SCRA.

Products containing SCRAs (herbal, resin and liquid)

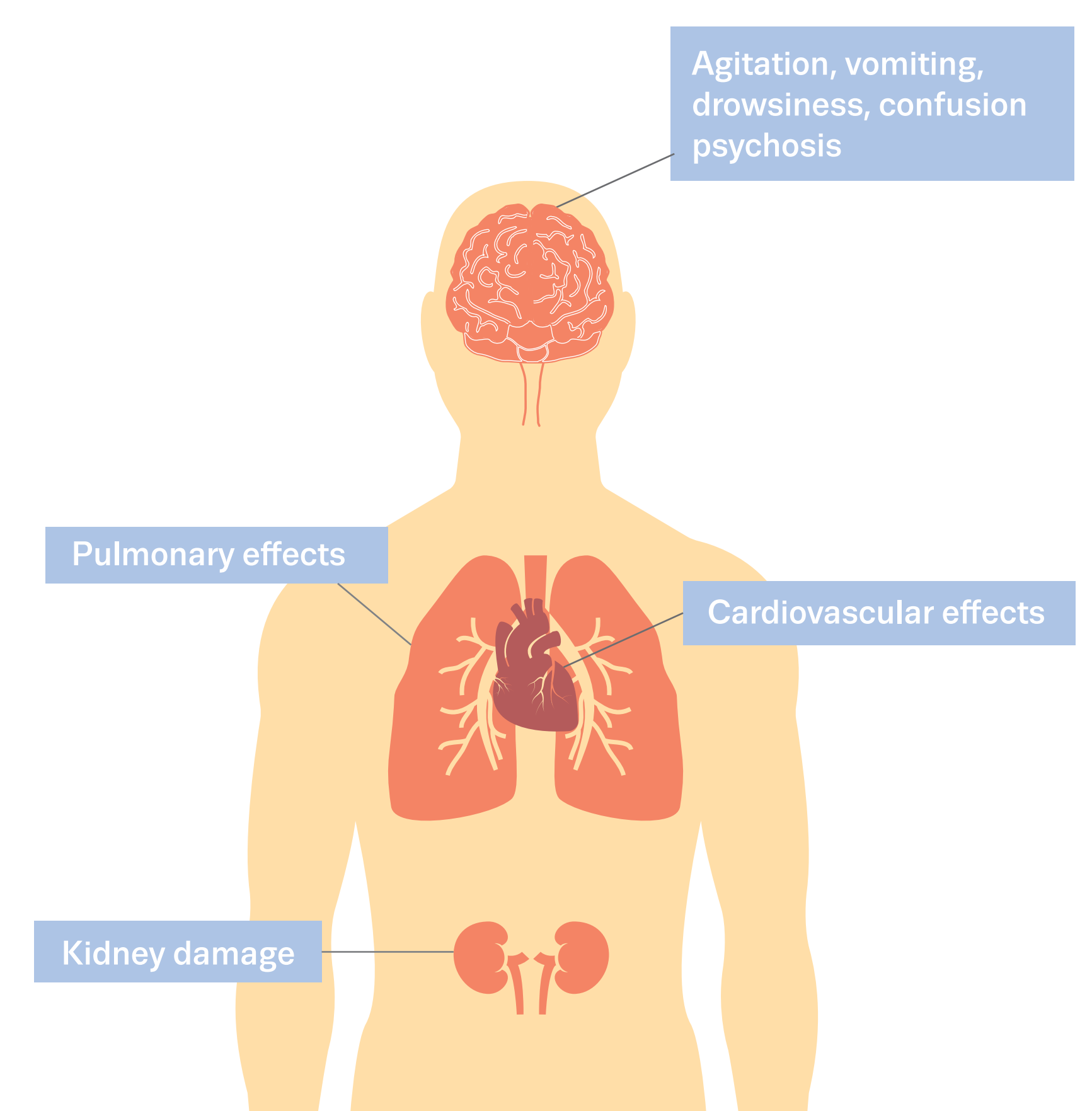


Credit: Wikimedia Commons (left); Finnish National Bureau of Investigation, Forensic laboratory (middle); TICTAC Communications Ltd (right).

Hazards and harms

The adverse effects of SCRA products (Figure 2) may be linked to both the properties of the chemicals and the way the products are produced. The high potency of some SCRAs means that the potential for toxic effects can be substantial. This is compounded by the potential for uneven distribution of the active compound, leading to some samples containing higher doses. The pharmacology and toxicology of SCRAs is not well understood, and it is difficult to monitor the harms related to individual substances due to the absence of analytical confirmation in many cases. However, several outbreaks of serious acute intoxications involving SCRAs have been reported.

FIGURE 2 | Adverse effects associated with SCRA products



Credit: iStock.

During 2013, five deaths associated with the use of 5F-PB-22 were reported in the United States. In 2014, an outbreak of intoxications was linked to ADB-PINACA in Colorado. Towards the end of 2014, the media in Russia reported two large outbreaks of serious adverse events which were linked to the smoking of a 'legal designer drug' or 'spice', most probably containing an SCRA.

In Europe, reports are limited, but the EMCDDA has issued public health-related alerts after receiving analytically confirmed reports of four deaths and 13 non-fatal intoxications associated with the use of an SCRA called MDMB-CHMICA.

Conclusions

The EWS plays a key role in the information exchange and continuous monitoring of new psychoactive substances in Europe. The synthetic cannabinoid receptor agonists are the largest group monitored, and they pose particular challenges as their detection in body fluids is not routinely performed. From our current understanding of adverse events, based on monitoring a wide range of data sources, it is clear that these substances carry the potential to cause harm to human health, although the mechanisms of how this happens are poorly understood.

emcdda.europa.eu/topics/pods/synthetic-cannabinoids