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Identifying emerging trends in recreational drug use; outcomes from the Psychonaut Web Mapping Project

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ABSTRACT

Background: This paper presents the outcomes of the 2-year European Union funded Psychonaut Web Mapping Project which aimed at developing and implementing an integrated web mapping system to promptly identify and learn about novel psychoactive substances (NPS; "legal highs") through the regular monitoring of the Internet.
Methods: More than 200 discussion forums, social media, online shops, websites and other Internet resources (e.g. YouTube, eBay, Google, Google Insight) have been extensively and regularly monitored in 7 European countries (UK, Finland, Norway, Belgium, Germany, Italy and Spain) for emerging trends of NPS throughout the period of the study.
Results: Key online resources have been identified as "leading edge" which have provided accurate and timely information on novel emerging compounds. In total more than 400 substances/products have been recorded. NPS have been noted online before reaching wider audiences.
Discussion: Although a high number of novel psychoactive substances have been identified in the 2-year duration of the project, not all have become trends that needed public health response. Conversely, new recreational drug phenomena such as "spice drugs," mephedrone and naphyrone were all identified as emerging trends in forums and websites. In addition, it has been possible for the first time to collate detailed information on these and several more compounds even though no or limited scientific publications were available. It is therefore recommended that these monitoring activities are to be continued, that more countries, researchers and health professionals are involved, and that the findings are widely shared with all the relevant agencies, health professionals and future research projects.
Implications, advantages and limitations of using the Internet as primary source for identifying emerging trends are also discussed.

1. Introduction

Is it possible, using the Internet, to identify emerging trends in recreational drug use and learn about novel psychoactive substances? Over the past few years there has been increasing recognition from the European Monitoring Centre for Drugs and Drug Addiction (EMCDDA, 2009, 2010a, 2010b, 2011a, 2011b), International Narcotics Control Board (INCB, 2008, 2009, 2010), governments and regulatory bodies (e.g. ACMD, 2011), the scientific community (e.g. Hillebrand et al.,

Abbreviations: EMCDDA, European Monitoring Centre for Drugs and Drug Addiction; INCB, International Narcotics Control Board; ACMD, Advisory Council of the Misuse of Drugs; NPS, Novel psychoactive substances; EWS, Early Warning System; MDAI, 5,6-methylenedioxy-2-aminoindane; MDPV, methylenedioxypyrovalerone; GBL, Gamma-butyrolactone; EU, European Union.

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2010; Lott et al., 2009; Measham et al., 2010; Ramsey et al., 2010; Schmidt et al., 2011) as well as the public and media (e.g. Jack, 2009; Townsend, 2010) of the major role that the Internet is now playing in shaping the recreational drugs market. Various surveys and studies have shown that the Internet is the most popular source of information about illicit drugs and their use (e.g. Eurobarometer, 2011) and that this information is often biased and potentially inaccurate (Deluca et al., 2007; Schifano et al., 2006). More recently these trends have expanded to include novel psychoactive substances (NPS), which are widely discussed (Davey et al., 2012) and available for purchase online (EMCDDA, 2011a, 2011b).

NPS, also known as 'designer drugs', 'herbal highs', 'synthetic drugs', 'research chemicals' and 'legal highs' are a relatively new phenomenon and they often are marketed as legal substitutes for more common illicit drugs. These include for example mephedrone, methylenedioxypyrovalerone (MDPV), synthetic cannabimimetics "Spice drugs", GBL, methoxetamine, and salvia divinorum, that are, or were when they emerged onto the drug market, not controlled by relevant drug legislation.

In recent years the novel psychoactive market has expanded rapidly and has become highly innovative and dynamic and able to adapt quickly to new legislations (Brandt et al., 2010). Indeed, in 2011, 49 new psychoactive substances have been reported to the EMCDDA via the EU Early Warning System (EMCDDA, 2012). However, this constant innovation and production limits the knowledge of both the pharmacodynamics, and the acute and chronic toxicity of these substances (Schifano et al., 2011a; Wood et al., 2011). Moreover, polysubstance use involving NPS (e.g. pregabalin with either mephedrone or Salvia divinorum) adds further uncertainty in terms of the medical consequences of this combined intake (Schifano et al., 2011b).

Traditional early warning and monitoring systems tend to have or collect data from different sources, which are then used to validate and complement their findings (Griffiths et al., 2000; Mounteney et al., 2010). Although much still needs to be done to improve earlier detection and precision of such systems (Mounteney et al., 2010), these systems were set up to monitor trends in illegal substances using mostly official data from national surveys, police, and customs, which might well not be appropriate to monitor the legal highs phenomenon.

However, over the past few years these drug monitoring/information systems (e.g. DMIS, Brunt and Niesink, 2011; EU Early Warning System/EWS, EMCDDA, 2007) are increasingly sensitive and open to the Internet as a resource for identifying trends and triangulating data collected from other sources (e.g. EMCDDA, 2010b, 2011b).

Monitoring the Internet is therefore becoming essential to identifying and understanding new trends. Indeed, in the case of NPS the Internet should be regarded as the main resource and trend indicator. NPS are widely available and aggressively marketed online, with online shopping opportunities being on the increase and more people being accustomed to it (Corazza et al., 2011, 2012). Through online drug related forums, the Internet also provides a unique opportunity to access a range of user generated content on the use, positive and negative effects, subjective experience, popularity, and availability of NPS (Davey et al., 2012). Therefore, we argue here that it might be possible to understand this challenging phenomenon of NPS on the web and identify emerging trends by monitoring online shops, their marketing strategies, and other key online resources and communities.

The paper presents the main outcomes of the 2-year European Union funded Psychonaut WebMapping Project (2008–2010).

1.1. Main objective

The main objective of the project was to develop and implement an integrated and multi-lingual web mapping system to promptly identify and learn about novel psychoactive substances (legal highs) through the regular monitoring of the Internet.

1.2. Specific objectives

The specific objectives of the project were as follows:

1. To develop and implement an integrated multilingual web scanning system which takes into account both suggestions from the web and qualitative information given by groups of identified 'key informants/sentinel networks'.
2. To monitor the Internet (i.e., websites, chatrooms, newsgroups) with respect to novel (synthetic and herbal) drugs of misuse and novel combinations and emerging trends.
3. To technically evaluate the novel compounds/novel combinations, and to prepare technical reports for a set of shortlisted compounds.

2. Methods

The methodology used by the Psychonaut Web Mapping project is articulated in two main steps.

2.1. Monitoring of the web

This step involved an extensive and regular monitoring of the Internet (i.e., websites, online shops, chatrooms, newsgroups, forums, eBay, YouTube, Facebook, Twitter, Google Insights for Search) with respect to novel (synthetic and herbal) drugs of misuse, combinations, and methods of administration (e.g., tampering with pharmaceutical products) for emerging trends.

Emerging trends are broadly defined here to include the emergence of a new psychoactive substance, or combination of substances, or a new way of using an existing substance/combination of substances. The focus was primarily on novel psychoactive substances.

Qualitative exploratory online searches were conducted between 1 and 5 times per week during the first year of the project in each of the eight participating research centers using the Google search engine. Generic search queries with terms such as 'legal highs', 'herbal highs', 'smart drugs', and 'research chemicals' were formulated in 8 languages (English, Finnish, Norwegian, Dutch, Italian, German, Spanish, Swedish).

Of the thousand websites and Internet resources identified, 203 websites were selected and searched internally for any information/discussion related to the recreational use, sale, or availability of novel psychoactive compounds/combinations. Of these, 106 websites were monitored on a regular basis i.e., daily (n = 21), weekly (n = 32), or monthly (n = 53) depending on their relevance, for the whole duration of the project.

In addition, the full content of the most popular websites and other Internet resources (e.g. YouTube videos) were copied onto a dedicated server. This was done primarily for historical archiving and for allowing a more thorough and flexible content search.

The novel compounds identified were entered into local databases in each of the participating research centers with the following descriptive information in order to identify and categorize the compounds with regard to their contents, novelty, and diffusion:

- Name (binomial/chemical/common/slang/trade)
- Active constituents/ingredients
- URL of website page
- Number of hits on PubMed/Medline (searched in English)
- Available information on the Erowid website (Erowid, 2012)
- Google Insights snapshot

The local databases were consolidated into one single online database, and the entry for each compound/combination was reviewed.

2.2. Preparation of technical reports

The technical evaluation of the novel compounds relied primarily on Internet-based resources, but was integrated with medical/scientific