HOME MANUFACTURE OF DRUGS: A NETNOGRAPHIC INVESTIGATION AND A TOXICOLOGICAL REALITY CHECK OF ONLINE DISCUSSIONS ON DRUG CHEMISTRY

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ORCID ID:

Jean-Paul Grund, 0000-0003-2074-8406

Emanuele Alves, 0000-0003-1220-1443

ABSTRACT

Public health concern is evident in current and emerging trends new psychoactive substance (NPS) use and markets, aside from the regulatory status. One novel area of investigation is the availability of homemade opioids, amphetamines and dissociatives, and the potential fueling of interest into clandestine home manufacture of drugs via the Internet. We conducted an netnographic study on home manufacture discussions of three commonly homemade drugs, methamphetamine and desomorphine – both scheduled drugs – and Gamma -hydroxybutyrate (GHB) hosted on publically available, English language drug fora located on the Surface Web. We investigated whether the communal folk pharmacology of homemade drugs on these fora may actually inform home manufacture practices or contribute to the reduction of harms associated with this practice. Additional work centered on the discrepancies between online information around purification and making homemade drugs safer, and the synthesis of the same substances in a proper laboratory environment. Of note was the moderation and shutdown of synthesis queries and discussions, with fora adhering to harm reduction principles by facilitating discussions around purification of homemade drugs only. The work is intended to contribute to ongoing discussions around online indigenous harm reduction discourse within cyber communities.

Keywords: Homemade drugs, (meth)amphetamines, opiates, desomorphine, gamma–hydroxybutyrate or GHB, netnography, clandestine.

Alle Ding' sind Gift, und nichts ohn' Gift; allein die Dosis macht, daß ein Ding kein Gift ist.

Philippus Aureolus Theophrastus Bombastus von Hohenheim (1490-1541)

Some values must be universal, like human rights and the equal worth of every human being.

Björn Kristian Ulvaeus (1945)

Harm reduction is about working with the immediate goals and issues people have.

Anonymous

INTRODUCTION

The United Nations Office on Drugs and Crime (UNODC) and the European Union (EU) define new psychoactive substances (NPS) as "Substances of abuse, either in a pure form or a preparation, that are not controlled by the 1961 Single Convention on Narcotic Drugs or the 1971 Convention on Psychotropic Substances, but which may pose a public health threat" (UNODC 2013).. In 2014, 101 new substances were notified to the EU Early Warning System (EWS), an increase of 25% compared to 2013 (UNODC 2013). But elsewhere UNODC (UNODC 2013, 2014) notes that, "*the term 'new'* [psychoactive substance] *does not necessarily refer to new inventions but to substances that have been recently become available,*" extending the concept of NPS to *emerging drug trends*. But new drug trends may well concern substances which in some countries are completely new, but well known in others, independent of their scheduling status. For example, primarily used in the United States (US) (Maxwell and Rutkowski 2008), the Czech Republic (Csemy, Kubicka, and Nociar 2002, Zabransky 2007) and the western parts of the former Soviet Union (Grund 2005, Grund et al. 2009), homemade methamphetamine emerged in Athens, Greece in 2011 under the moniker of "Sisha" (Nikolaou et al. 2014). For the development of appropriate harm

reduction and treatment responses, actual scheduling status may be less relevant than a proper understanding of new substances and the communities in which these emerge. New, 'alien' drugs may provoke drastic changes in the risk environment of drug use (Rhodes 2009) heralding a new set of drug related problems, untypical of the period before its emergence.

Recently reports on home manufacture by people who use drugs (PWUD) of both scheduled substances, including desomorphine and methamphetamine, and unscheduled substances, such as Gammahydroxybutyrate (GHB), have surfaced from an increasing number of countries, emphasizing the potential harms of these practices (Van Hout 2014, Zabransky, Grund, et al. 2012, Zabransky, Latypov, et al. 2012). This paper reports our netnographic investigation of experiential discussions in public, English-language online drug fora on web on home manufacture of three commonly homemade drugs, methamphetamine, desomorphine and GHB.

HOMEMADE DRUGS

Methamphetamine, a psychostimulant, comes as a base, colorless, insoluble volatile oil and as hydrochloride salt, a crystalline white powder that dissolves in water (De-Carolis et al. 2015). Illegally produced, its color varies. The drug is taken orally, inhaled or injected. Homemade methamphetamine is known in the Czech Republic and in the western Soviet Union since the 1980s (Grund et al. 2009) and since the early 1990s in the US (De-Carolis et al. 2015) and in Asia (Farrell et al. 2002, McKetin et al. 2008).

Krokodil is the street name for an injectable opioid mixture containing desomorphine and related morphinans (Alves, Grund, et al. 2015). Pharmaceutical desomorphine is is ten times more potent than morphine (Alves, Grund, et al. 2015) and colorless in solution. Krokodil is a dark yellow liquid that is mostly injected

intravenously (Alves, Grund, et al. 2015, Grund, Latypov, and Harris 2013, Grund et al. 2009). The color of homemade desomorphine and methamphetamine is generally an indication of substandard synthesis.

Gamma hydroxybutyrate (GHB), a transparent, syrupy and salty liquid, is a central nervous system depressant with euphoric and hypnotic properties. It is mostly ingested for recreational purposes (Brennan and Van Hout 2014), but e.g. in the Netherlands there are an estimated 2000-3000 people dependent on GHB (van Gaalen et al. 2015). While banned in many countries, GHB's precursor, GBL, remains legal because of its wide industrial use.

HARMS RELATED TO HOMEMADE DRUGS

These three drugs are used for their euphoric, relaxing and energizing effects, but compulsive use is associated with serious drug related health problems and increased morbidity (Brennan and Van Hout 2014, Grund, Latypov, and Harris 2013, Van Gaalen, De Bruin, and Grund 2015). Both desomorphine and GHB are potent CNS depressants while methamphetamine is one of the most potent stimulants known.

Injecting homemade desomorphine and methamphetamine or (meth)cathinone is associated with significant drug related harms including localized damage around injection sites, systemic damage to internal organs, HCV and HIV infection, mental health problems and fatal overdose (Alves et al. 2015, Biesk 2013, Chintalova-Dallas et al. 2009, De-Carolis et al. 2015, Dinis-Oliveira et al. 2012, Grund 2002, 2005, Grund et al. 2009, Grund et al. 2010, Grund, Latypov, and Harris 2013, Katselou et al. 2014, Mueller et al. 2015, Soares, et al. 2015, Van Hout 2014). GHB, is generally used orally but associated with equally disturbing harms, including mental health problems, repeated comatose intoxication and lethal overdose (Brennan and Van Hout 2014, Degenhardt, Darke, and Dillon 2003, Grund et al. n.d., Kohrs, Mann, and Greenberg

2004, Li, Stokes, and Woeckener 1998, Schep et al. 2012, van Amsterdam et al. 2014, Zvosec et al. 2011, Van Gaalen, De Bruin, and Grund 2015).

THE RISK ENVIRONMENT OF HOME DRUG PRODUCTION AND POTENTIAL FOR DRUG RELATED HARM

Homemade drug production and consumption entails an atypical risk environment (Miovský et al. 2015, Rhodes 2009). They are mostly synthesized outside of a proper laboratory environment, in kitchens and basements under primitive circumstances, with substandard ingredients and equipment and in the absence of a formal synthesis protocol (Chintalova-Dallas et al. 2009, David et al. 2010, De-Carolis et al. 2015, Grund 2002, Grund et al. 2009, Heimer 2013).

Prepared in small groups of PWID revolving around a 'drug cook,' precursors and reactants are generally obtained collectively outside of traditional drug dealing structures (Grund 2005, Grund et al. 2009, Miovsky 2007, Miovský et al. 2015). This may decrease macro risk factors, e.g. exposure to law enforcement, but engenders micro injecting risk factors (Grund et al. 1996, Grund et al. 1991, Jose et al. 1993) (Koester et al. 2003) and has been associated with HIV infection among PWID in Russia (Dumchev et al. 2009, Hagan et al. 2001, Rhodes et al. 2002).

The use of toxic reactants in the synthesis and absence of proper purification methods may result in harmful concoctions that are potentially more damaging than commercially produced NPS (Alves, Soares, et al. 2015, Grund, Latypov, and Harris 2013). The skills required for cooking drugs are learned from more experienced peers, through oral instruction, observational learning and participation in cooking sessions (Grund 2002, Grund et al. 2009). This 'master-apprentice' relationship has likely added to the variations in homemade drug chemistry described in field (Van Hout 2014) and

laboratory studies (Alves, Soares, et al. 2015). The increasing influence of the Internet is bound to change that oral history and social learning process.

HOME DRUG MANUFACTURE, MEDIA AND INTERNET

Interest in the home manufacture of drugs whilst certainly not new, is driven by media reporting, drug user fora information exchange and availability of online advice (Van Hout and Hearne 2015b). Homemade drugs, clandestine drug production and drug trafficking are increasingly attracting media attention and featuring in popular TV series, such as “Breaking Bad,” (methamphetamine), “Weeds” (marijuana) or “The Wire” (crack). The Internet is now regarded as the main source of information about novel illicit drugs (Van Hout and Hearne 2015b, Zheluk, Quinn, and Meylakhs 2014) and information on the synthesis of various drugs is available widely on the Web.

Homemade drugs are an increasingly popular topic on various online drug discussion fora and this information is at the fingertips of everyone potentially interested. This will likely affect the master-apprentice relationship by which the knowledge and skills needed to produce these drugs was traditionally transferred. Various popular and public drug fora, such as bluelight.ru or drugsforum.com are considered “online harm-reduction communities” (Moro and Racz 2013, Soussan and Kjellgren 2014).

We utilized a netnographic approach to investigate user trend interest in home manufacture of GHB, opiate and amphetamine based drugs. Netnography is an increasingly popular and novel method of qualitative research underpinned by the adaptation of traditional ethnographic research techniques within the cyber world (Kozinets 2002). We investigated whether the communal folk pharmacology of homemade drugs on these fora may actually inform home manufacture practices themselves or contribute to the reduction of harms associated with this practice. Where

possible, we addressed discrepancies between the clandestine syntheses described and the queries and advice offered online with the synthesis of the same substances in a proper laboratory environment. Our objective was to contribute to an improved understanding of the online discourse on home drug manufacture and to effective public health responses to the significant harms associated therewith, to the peer driven harm reduction potential of these *Leading edge* drug fora (Deluca et al. 2012) in particular. Whilst reviews of home manufacture of drug solutions using widely available pharmaceuticals have been published (Alves, Grund, et al. 2015, Van Hout 2014), internet based studies on the home preparation of drugs remain scant (Van Hout and Hearne 2015b). We present here the first known attempt to illustrate Internet activity as underpinning the dissemination of information around the mounting practice of home drug manufacture.

METHODOLOGY

The internet is increasingly utilized to monitor trends in diverted pharmaceuticals, novel psychoactive and, performance and image enhancement drugs, consumer interest, patterns of use, communal folk pharmacology, user experiences and indigenous harm reduction efforts. We adhered to a netnographic approach according to Kozinet's protocols for conducting cyber-ethnographic research (Kozinets 2002). Sampling of online data was grounded in principles relating to scale, interactivity, and heterogeneity (Chenail 2011, Van Hout 2015). Systematic internet searches were conducted using terms like '*Krokodil', 'Desomorphine', 'GHB', 'Methamphetamine', 'Pervitin',* and *'Shake n bake meth'* in combination with the words *'homemade'* and *'forum'*. The combined searches generated 977,900 hits associated with sites wherein these terms have been quoted. The combined searches that discussed the use of and production of these homemade substances were scrutinized in Table 1.

Five websites presenting forum activity discussing the use of and production of homemade substances were identified. Subsequent methodical searches for discussions relating to use of and production of these homemade substances were performed, through the internal search engine of the websites and by using the previous search terms. This search continued until no further information relating to use of and production of these homemade substances could be located. A total of 614 identified threads related to use of and production of these homemade substances, were generated as a result of this internal search. Following the application of exclusion criteria (incomprehensible language, polls, news or media reports) and elimination of any duplicates, 36 discussion threads remained. 104 distinct user pseudonyms were documented in the data set (Table 2).

Confidentiality measures included storage in a password-protected computer and removal of screen pseudonyms, URLs, country and city identifiers (Wilkinson and Thelwall 2011). The data set was transferred to a Word document, and 13,124 words were analyzed analysis using the Empirical Phenomenological Psychological (EPP) method. The EPP is a five step manual method underpinned by phenomenological principles illustrating the users 'lived real life' (Husserl 1970). This approach is increasingly utilized in the field of netnographic studies on NPS and PIEDs (Kjellgren, Henningsson, and Soussan 2013, Kjellgren and Jonsson 2013, Van Hout and Hearne 2014, Van Hout and Hearne 2015b, c, a). The process is cognizant of absence of preconceived hypotheses or generalizations (Wertz 2005). Four themes with 20 categories emerged from the analysis.

We subsequently compared the domestic chemistry and homemade drug discussion themes hosted online with the synthesis of the drugs under investigation in a controlled laboratory environment, explaining how domestic chemical drug synthesis may expose both consumers and producers (often the same people) to serious health hazards.

RESULTS

Home Manufacture of Methamphetamine, Desomorphine & GHB

The street synthesis of methamphetamine consists of a simple extraction of the active principle using pipe cleaning substances, its further extraction to an organic solvent and reduction to obtain the derivative. The process is known as the Nagai route and includes a simple reduction using hydriodic acid (HI) and red phosphorus as reagents (Alves, Grund, et al. 2015, Kunalan, Kerr, and Daeid 2012).

The second method most used is the *one-pot* method, also known as *shake n bake*. Mostly used in home methamphetamine manufacture, in this simplified variation of the Birch reduction, commercially available alkaline metals are mixed to ephedrine or pseudoephedrine in anhydrous ammonia to produce small quantities of low quality methamphetamine. All the ingredients are added into a PET bottle and multiple simultaneous chemical reactions convert the pseudoephedrine hydrochloride into methamphetamine. The methamphetamine base obtained is an insoluble oil and it is converted to its hydrochloride salt by funneling hydrogen chloride gas (Caldicott et al. 2005). The hydrochloride salt formed precipitates and is collected by filtration. Hydrochloric acid can be used in place of gas with almost no modification of the process.

The process of Krokodil synthesis is almost identical to that of methamphetamine synthesis from ephedrine. Indeed, PWID in the Russian speaking region have copied the Nagai reduction in illicit methamphetamine production (Alves, Grund, et al. 2015, Grund, Latypov, and Harris 2013, Kunalan, Kerr, and Daeid 2012) to cook up Krokodil. In Krokodil synthesis, codeine tablets are used as the starting material. Codeine based medications are basified and dissolved in a solvent (mostly gasoline, sometimes paint

thinner) (Alves, Grund, et al. 2015, Alves, Soares, et al. 2015). Subsequently the codeine base is acidified precipitating codeine hydrochloride crystals. These crystals are mixed with iodine and red phosphorus to form desomorphine. The resulting liquid drug may or may not contain desomorphine or any of its derivates (Alves, Soares, et al. 2015), depending on the skills of the cook and the starting materials. The drug is usually injected on the spot, right after the production.

In comparison, GHB production involves the simplest synthesis; it starts and ends with mixing gamma butyrolactone (GBL) with sodium or potassium hydroxide and water in equal parts at room temperature (Brennan and Van Hout 2014).

Discussions Of Homemade Drugs In Online Drug Fora

The netnographic research distinguished 614 drug forum threads centering on the use of and production of homemade methamphetamine, desomorphine and GHB posted on public internet drug discussion fora. Fora members offered harm reduction advice based on their own personal experiences whether positive or negative, so as, to inform others and influence harm reduction tactics (Table 3).

Theme 1: Recipes and Cooking Experiences of Homemade Drugs

This theme concerns information related to the production of homemade substances: desomorphine, methamphetamine and GHB; recipes, ingredients and precursors, and to how and where to obtain such products. Methamphetamine related threads were primarily questions and/or warnings about the possibility of explosions and dangers in the cooking of the methamphetamine and its cheaper street version, *"shake n bake".* Threads related to desomorphine were generally discussions centered on ways in which to make desomorphine and not the more crude version, Krokodil, as

it was felt desomorphine was a "safer" drug *"When synthesized correctly with proper equipment and purified correctly it doesn't cause any damage"*. Threads on GHB were primarily centered on how to acquire the ingredient 'gamma-butyrolactone' which is less easily obtained nowadays. Otherwise GHB was noted as being *"quite easy to make at home, and the precursors are fairly easy to get"*.

Theme 2: Harm Reduction and Advice relating to physical harm and injuries incurred during the cooking process.

This theme illustrates how discussions centered on harm reduction in home manufacture of drugs amongst the online drug user community. Harm reduction guidance within the community also focused on the avoidance *and* reduction of negative outcomes that could occur during the production process. The more experienced users and long-standing members were quick to recommend those with less experience and knowledge not to attempt synthesis of home produced substances.

"Newbie synthing meth sounds like a recipe for disaster as well as the opposite of harm reduction"

The volatile nature of some of the products used in the synthesis of these substances, particularly methamphetamine or the "*shake n bake*" method, was highlighted by fora members and attempting to produce this substances was highly frowned upon by most.

"Picture a plastic bottle filled with deathly poisonous gas building up more and more pressure. Gas that can burn your skin and lungs on contact. Along with liquid that can burn you. Now imagine holding this bottle in your hands, shaking it vigorously while the pressure builds and you sit there praying it doesn't explode in your face and melt your lungs and skin. In other words, it's pretty safe" But practical advice for reducing the risks associated with home drug production was rare.

Theme 3: Advice centered on chemistry and cooking of homemade substances.

This theme discusses chemistry related information and sharing within the drug user fora community. Discussion threads mostly centered on how to correctly purify homemade substances prior to using these.

"How would you go about washing/purifying the meth that has accumulated to a substance that's clean enough where you would happily bang it?"

Some fora members disputed the use of certain precursor chemicals particularly the use of *"kitchen"* or *"hardware store"* chemicals as replacement for NaOH (Sodium hydroxide/Caustic soda) in the production of GHB.

"Red Devil Lye is _not_ suitable for making GHB or anything else you want to ingest. Yes, it contains NaOH, but it's not pure. You can get pure NaOH without problems from several sources (Vegan Soapworks come to mind), so don't bother with the lye it's bad, bad, bad."

Discussions and advice around the quality of the final product of some substances was not deemed to be *"not worth the effort".* It was suggested that the quality was only for those who were desperate for profit or simply personal use.

"*Any teenager could pull off a shake n bake in his bathroom but the end result I can't imagine being all that significant. Shake n bake methods are used for quick, cheap cookups for people wanting to make a quick buck*." In fact, as we describe in the next theme, the online drug fora in this work do not allow detailed discussions of drug chemistry as they pertain to drug synthesis, and instead focus on purification techniques and how to make homemade drugs safer.

Theme 4: Fora rules and guidelines centered on reducing harm by not permitting discussions of synthesis of any substances.

This theme focuses on general rules and guidelines of the fora that are aimed at maintaining the fora status as a *"harm reduction board".* Discussion of synthesis of any substance is strictly prohibited, with fora moderators quickly *"closing"* any discussion related to this. Overall 14 threads in the dataset that related directly to synthesizing substances, were closed down.

"No synth questions allowed on BL so I suspect this thread will be closed soonest. Drug synthesis is not something to even attempt unless you know exactly what you're doing and it certainly ain't harm reduction hence, no synth discussion"

Fora members showed negative attitudes towards those who were enquiring about synthesizing a product. Many sarcastically replied to those requests and posts that clearly showed lack of knowledge and experience of the individual.

"If you have to ask a forum what drugs you could synthesize at home you really shouldn't synthesize drugs at home"

Fora members were also directed to other more suitable websites by moderators to find the information they required, however threads were still closed down.

"Due to recent attention we have been getting, and because you were very clear with 'intent' in your post, this must be closed. There are a number of chemistry sites online that can help you with your academic research, but we can't teach you how to make a CI [Class I-scheduled drug] drug... sorry."

A Toxicological Reality Check

The outcomes of homemade drug synthesis – the purity of the drugs produced and their potential for harm – relies on various factors: the complexity of the synthesis and availability of suitable recipes; the technical skills of the producer; the purity of precursors and reagents used; the equipment and laboratory environment and purification techniques used in (and required for properly) synthesizing drugs.

The complexity of the synthesis. None of these reactions requires a high level of chemistry expertise and recipes are easily accessed online. Nonetheless, production under official laboratory standards includes precise quantities of the reactants, temperatures, varying reaction times and purification at each step of the process.

The technical skills of the producer. According to Caldicott et al. (2005) less than 5% of clandestine drug cooks had received any formal training in organic and synthetic chemistry and most of them were apprentices of older more experience cooks. Most methamphetamine cooks learn the process from friends and produce for personal use (Brzeczko, Leech, and Stark 2013). The same process underlies the skills of Krokodil or GHB cooks (Grund et al. 2013).

While producing GHB requires only mixing the ingredients in the right amounts and order, the production of a relatively pure methamphetamine or desomorphine does require a basic understanding of organic chemistry and, outside the laboratory context, a high level of creativity and flexibility.

Thread discussions around purification, potentially enhancing safety of bootleg drugs were evident. However, site moderators' discouragement of questions and threads on synthesis details appeared supported by more experienced site members, with members commenting, often in a derogatory manner, toward novice 'cooks' who wish to synthesize a drug. *"*[…] *if you know so little about chemistry,* […]*, than you will not be making any drugs anytime in your lifetime. It is also very dangerous, take some*

organic chemistry courses and lab courses, otherwise leave this type of thing to the experts."

The purity of the precursors and reagents used. Chemical substances come in different purity grades. Legal laboratories and industries work only with laboratory or technical grade chemicals, depending on the reaction conducted. The precursors used in home drug production are commonly extracted from cleaning products, in which contain less purified substances and often various contaminants and additives, potentially resulting in very low purity precursors.

However, despite legislative controls, GHB's and its precursors " γ -butyrolactone" (GBL) and "1,4-butanediol"(1,4-BD) remain available and can be easily synthesized from research chemicals and kits sold online, using online instructions. Forum postings and queries often concerned the purity grade and where to purchase high grade precursors and reagents. But once thread discussions moved into the specifics of drug synthesis, moderators intervened and threads were closed.

The equipment used in (and required for properly) synthesizing the drug. Professional laboratory equipment conforms to high quality standards and, manufactured by specialized companies, passes through extensive quality control to guarantee a safe (and efficient) laboratory environment. Used properly, certified laboratory equipment is resistant to reagents and does not contaminate the reaction media. But household bottles glass, plastics, pots and pans used in home drug production may not be reagent proof, harbor remnants of reactants and leave the final product impure. In particular the use of PET bottles in Shake 'n Bake is criticized online and often warnings describe ghastly consequences in uncut terms: *"That's a huge fucking risk of the whole bottle failing and exploding sending all the chemicals everywhere and once that lithium is in the air long enough it will spark and you have a huge fire going."* Perhaps well intended, few commenters go beyond giving general advice: *"Just don't fucking do anything stupid man.* […] *I don't think it's ever a good*

idea to make bathtub meth with redneck supplies, but if you're gonna do it at least take as much precaution as you can man." Specific suggestions for safer equipment, procedures and techniques were rare, which, as noted, is likely the result of forum policies.

Purification techniques used after the synthesis. Purification relies on resources, equipment and substances available. In a lab, preparative chromatographic columns and crystallization methodologies are standard for the purification of the chemicals produced. Well-equipped clandestine drug labs usually apply single crystallization methods for extracting psychoactive material – a relatively simple process based on the different melting points of drugs and reagents. But, with exceptions, people concocting drugs for personal use are drug *cooks*, not *chemists*. Most purification techniques standard in the lab environment are simply beyond their reach. Perhaps less of a risk in GHB production, the absence of proper purification in home manufacture of *bathtub meth* or *krokodil* would almost guarantee a contaminated final product. Forum discussions centered on purification and how to make drugs safer, with peripheral discussions relating to contemporary drug policy on home manufacture of drugs.

Laboratory environment. OSHA regulations stipulate laboratories to be properly ventilated and hazardous reactions should be conducted in separated environments, while lab staff wear protective clothing and eyewear. In contrast, homemade drugs are often synthesized in kitchens, living rooms or basements under rudimentary conditions, without proper ventilation, which is of particular concern in methamphetamine and krokodil production. These syntheses expose those present to toxic gasses and reactants and, with regular production, may result in environmental pollution of dwellings where the drug is cooked regularly or, worse, explosions and fires (Caldicott and Duff 2005). As one poster graphically noted: "*One mistake and you're dead and possibly those within 1000 ft of you as well."*

DISCUSSION

We described the domestic production of methamphetamine, Krokodil and GHB and presented the first in depth examinations of activity pertaining to home manufacture of these three drugs. The internet acts as focal point for clandestine chemists, consumers and criminals to engage in sourcing of products, communal folk pharmacological knowledge exchange around drug use and cyber supported indigenous harm reduction (Moro and Racz 2013, Soussan and Kjellgren 2014, Van Hout and Hearne 2015b).

We showed where home drug manufacture deviates from laboratory standards and produces an atypical risk environment, and how, as a result, homemade drugs are likely to contain highly toxic reagent remnants, stimulants and opioids in particular (Alves, Soares, et al. 2015, Grund, Latypov, and Harris 2013). While not without risk, home production of GHB may be less of a health risk than domestic production of stimulants or opioids.

The netnographic study (Kozinets 2010) investigated and described drug user discussions on use and home manufacture of drugs through systematic collection and analysis of online phenomena (DiMaggio et al. 2001, Markham 2005, Wilson and Peterson 2002). Drug fora members illustrated interest in purification techniques and harm reduction practices involved in making generated drugs safer, with site moderation effective in discouraging the posting of interest in synthesis details. On balance, forum postings illustrated communal views around the inferiority of and toxicity potential of homemade drugs, and the potential risks relating to their production as a “recipe for disaster.” Such discussions appear to be instigated by peoples’ concerns for contamination in the synthesis process, which explains the resultant interest in purification techniques (Grund, Latypov, and Harris 2013, Harris 2013). This brings up

the uncomfortable question of whether and how to apply the harm reduction approach to not only the use of homemade drugs, but also to their harmful production. In contrast to studies highlighting the capacity of cyber communities of drug users to share *'best practices'* within the contact of indigenous harm reduction (Moro and Racz 2013, Van Hout and Hearne 2014, Van Hout and Hearne 2015b), parties interested in clandestine chemistry were less willing to support and engage with 'novice home cookers on the sharing of purification techniques or how to reduce the harms from domestic drug syntheses. The quality of the harm reduction advice was actually of limited value to those who are not deterred by the mostly graphic warnings against home drug production and use, regularly couched in pejorative terms. Here we found a potent effect of the moderation of drug fora. Moderators only permit threads around the purification of particular products and shut down discussions relating to product synthesis, which are not considered harm reduction. We illustrate this point using a Bluelight moderation comment : "*it certainly ain't harm reduction hence, no synth discussion."*

But *the dose makes the poison* while values like human rights are not incremental but universal. This equally applies to harm reduction, which considers the immediate goals and issues people have as its starting point. Policies discouraging or banning discussions on how to make home drug manufacture less hazardous seem therefore actually at odds with the non-judgmental harm reduction mission of the fora.

Limitations of our study center on the restriction to English language drug fora operating on the Surface Web, lack of participant detail and restrictions of publicly available material, however, trustworthiness of the resultant data was optimized by verification of extensive horizontal and vertical similarities across fora (Lincoln and Guba 1985) pertaining to discussions on recipes, cooking experiences, harm reduction, chemistry processes and fora rules and moderation of discussions. Validity in employment of the EPP approach centered on horizontal and vertical consistency in

interpretation of data, and partial phenomenological psychological reduction (Karlsson 1995).

However, given the informational supremacy of the Internet, we cannot discount the need for enhanced harm reduction tactics given displacement and diversion between available pharmaceuticals and the required reagents and the lingering desire to home manufacture stimulants, opioids and other drugs.

CONCLUSIONS

The research presents the first known attempt to investigate and illustrate DU interest in home manufacture of opiate, stimulant and dissociative type drugs, harm reduction moderation tactics to deter synthesis discussions, whilst permitting purification and drug safety information exchange. The unfavorable reputation of homemade drugs in this cyber context does not imply that factual discussions of ways to reduce the harms in domestic drug production would lead to increases in their use and the harms associated therewith in environments where access to other drugs is less cumbersome. We therefore suggest that the potential for peer driven harm reduction of these drug discussion fora is presently underutilized. These drug discussion fora should consider reevaluating their policies on chemistry discussions in aiming to reach people who cannot or will not refrain from cooking their own drugs with credible information that may contribute to reductions in the harms associated with this practice. Such a bold harm reduction approach may raise objections from opponents but, considered the leading edge (Deluca et al. 2012), we think that these online drug communities are best positioned to explore the boundaries of online peer driven harm reduction.

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CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest, particularly no financial and personal relationships with other people or organizations that could inappropriately influence (bias) this work.

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Table 1 Search Terms

Search Term used in combination with 'homemade' and 'forum'	*Hits*
Krokodil	562,000
Desomorphine	13,500
GHB	189,000
Methamphetamine	116,000
Pervitin	23,700
Shake n Bake Meth	73,700
Total	**977,900**

Table 2 Sites containing Trip Reports and Thread Discussions, and remaining records after application of exclusion criteria.

Website Link	Website name	Initial search result number of users reports/threads	Threads excluded	User Discussion Threads After exclusion	Distinct pseudonyms per site recorded
www.drugsforum.com	Drugs Forum	101	95	6	12
www.bluelight.org	Bluelight	177	154	23	79
www.partyvibe.org	Party Vibe	113	109	4	9
www.psychonaut.com	Psychonaut	43	43	0	0
www.shroomery.org	Shroomery	180	178	2	4
	Totals	**614**	**578**	**36**	**104**

Table 3 Themes and Categories emerging from the content textual analysis as per EPP protocols.

Theme	Categories
Theme 1: Discussions centred on Recipes, and cooking experiences of home produced substances.	1. What ingredients/precursors required? 2. Where to obtain ingredients/chemicals/precursors? 3. Cost of ingredients/chemicals/precursors? 4. Sharing of recipes. 5. Experiences shared of cooking. 6. Advantages and Disadvantages of home cooking.
Theme 2: Harm Reduction and Advice relating to physical harm and injuries incurred during the cooking process.	7. Harm Reduction Advice. 8. Harm & Injuries. 9. Explosions and Death.
Theme 3: Advice centred on chemistry and cooking of homemade substances.	10. Chemistry advise re: Purification methods. 11. Equipment necessary for cooking. 12. Preferred Chemicals/Precursors particularly NaOh (sodium Hydroxide). 13. Poor quality substandard end product. 14. Advise and alternative methods/chemicals for cooking. 15. Potency Advice.
Theme 4: Fora rules and guidelines centred on reducing harm by not permitting discussions of synthesis of any substances.	16. Community negative attitude and sarcasm at Fora users with no chemistry experience/knowledge enquiring about homemade drugs/recipes. 17. Synthesis Discussions not allowed. 18. Fora members adherence to *"no synth*

	discussion" rules. 19. Threads Closed. 20. Advised to go to other websites for recipes and information not allowed on drug user fora.