



Published in final edited form as:

*Int J Drug Policy*. 2009 July ; 20(4): 347. doi:10.1016/j.drugpo.2008.09.003.

## Boltushka: A Homemade Amphetamine-Type Stimulant and HIV Risk in Odessa, Ukraine

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### Abstract

**Background**—Homemade amphetamine-type stimulants (ATSs) have been reported in Russia and Eastern Europe for decades. Recipes differ geographically and over time producing differing active ingredients. *Vint* and *jeff* (active ingredients methamphetamine and methcathinone, respectively) are two such homemade ATSs originally produced from over-the-counter cold medications and household chemicals.

**Methods**—During a Rapid Policy Assessment and Responses (RPAR) project in Odessa, Ukraine, researchers found use of *boltushka*, a novel homemade ATS. Fourteen supplemental qualitative interviews were conducted, including ten interviews with *boltushka* injectors and four interviews with pharmacists. We report patterns of *boltushka* use among local injection drug users (IDUs) as well as the role of laws, regulations, and current pharmacy practices.

**Results**—Legal restrictions on over-the-counter cold medicines in Ukraine led to products containing phenylpropanolamine (PPA), which oxidized with  $\text{KMnO}_4$  (potassium permanganate), produces a weak ATS, cathinone, called *boltushka*. *Boltushka*'s ingredients are easily available in pharmacies or on the black market. IDUs reported a mean age at first use of 16 years old (range 12–21). While published data are scant, anecdotal evidence reported here include amphetamine-like effects on energy and appetite, bingeing patterns of use, and some reports of shaking and other neurological damage consistent with earlier reports from exposure to  $\text{KMnO}_4$ . Users reported sharing syringes and other non-sterile injection practices. No users reported specific treatment or prevention programs for *boltushka* users.

**Conclusions**—Although Ukrainian government regulations have limited access to precursor chemicals, IDUs have continued to make and use *boltushka*. The actual extent and demographics of *boltushka* use are unknown. Besides risk of bloodborne disease, the health effects of injected homemade ATSs and their constituent chemicals are poorly documented. Interventions beyond available harm reduction efforts may be required. Education/treatment specific to *boltushka* users and screening for other physical harms are critical interventions.

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## Keywords

Methamphetamine; amphetamine; injection drug use; cathinone; Ukraine; HIV; drug abuse

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## Introduction

This paper describes evidence of an epidemic of injected homemade amphetamine-type stimulant (ATS), called *boltushka*, which was identified in Odessa, Ukraine in 2005 during the Rapid Policy Assessment and Response (RPAR) research project. Odessa (population 1,122,000), located in southern Ukraine on the Black Sea, experienced one of the first rapidly escalating HIV epidemics in Eastern Europe, with most infections attributed to injection drug use. According to the World Health Organization (WHO) “at the end of December of 2004 there were 66,529 HIV cases officially registered in the Ukraine, while UNAIDS estimated that the actual number was between 180,000 and 590,000 people constituting between 0.7% and 2.3% of adult population aged 15–49” (Matic, Lazarus, & Donoghoe, 2006).

Between 1987 and 2001, 16,845 HIV cases were registered in Odessa; most infections were injection drug use-related. The number of drug users officially registered in Odessa is 7,822 although estimates suggest the real number is four to five times higher (31,288 – 39,110) (Matic, Lazarus, & Donoghoe, 2006).

A 2006 WHO report estimates that, world-wide, ATSs are the most commonly abused drugs after cannabis (WHO, 2006). ATSs include amphetamines and methamphetamines as well as methcathinone, cathinone, fenetylline, ephedrine, pseudoephedrine, methylphenidate and 3, 4-methylenedioxymethamphetamine (MDMA, also known as Ecstasy) (WHO, 2006). According to the United Nations Office of Drug Control (UNODC), primary sites of large scale production of ATSs in Europe have shifted eastward in recent years to include Poland and the Baltic States (UNODC, 2004). UNODC also reports that illegal laboratories in Ukraine manufacture ATSs and their precursor chemicals, as well as other synthetic drugs (UNODC, 2004).

A Rapid Assessment and Response among IDUs (RAR-IDU) project conducted in the Vinnitsya, Ukraine in 2001 reported substantial changes in drug use since the Soviet era including an overall increase in drug use, especially in homemade drugs. The Vinnitsya RAR-IDU reported use of *vint*, a homemade ATS that required only chemicals that could be purchased in local pharmacies (Barcal, Schumacher, Dumchev, & Moroz, 2005).

In Ukraine rapid economic changes since independence have led to increases in unemployment, drug use, drug trafficking, and HIV, and to decreases in the capacity of the health and social welfare systems to cope with substance abuse (Kelly JA, Amirkhania YA., 2003; Egorov, 1995). Ukraine’s HIV epidemic is still primarily injection drug use-related (World Bank & International HIV/AIDS Alliance, 2006). In 2006 45% of new cases of HIV infection were attributable to injection drug use, 35% to heterosexual transmission, and 16% to mother-to-child transmission (International HIV/AIDS Alliance, 2006). Those most at risk are IDUs, commercial sex workers (CSWs), men who have sex with men (MSM), prisoners, and street children aged 10–18 (International HIV/AIDS Alliance, 2006). Odessa region has the highest HIV prevalence in Ukraine (World Bank & International HIV/AIDS Alliance, 2006).

## METHODS

The Odessa RPAR was part of a five country study (Poland, Ukraine, Russia, Kazakhstan; and India). U.S. investigators trained a team of local researchers (social workers, lawyers, physicians and NGO staff) to document how laws, policies and practices structured HIV risk

among marginalized populations. The Odessa research team worked in collaboration with a Community Action Board to collect data and design locally appropriate interventions. Team members documented relevant laws and regulations related to drug use and collected secondary data on the epidemiology of drug use, blood-borne infections, and criminal justice data. Actual implementation of laws was evaluated using qualitative data collected through three focus groups and interviews with 26 key informants (judges, prison officials, senior police or militia, directors of public health and drug treatment programs, street level police, prison guards, defense attorneys and prosecutors, clinicians treating IDUs, and NGO staff), as well as fourteen IDUs from a variety of backgrounds and risk behaviors.

The research protocol was reviewed and approved by the relevant research ethics committees at University of Connecticut Health Center, Temple University, and the V.P. Komisarenko Institute of Endocrinology and Metabolism at the Academy of Medical Sciences of Ukraine.

Based on preliminary reports from the main RPAR research that young, poor IDUs were making and using *boltushka*, we added an additional fourteen interviews (with Institutional Review Board approval) specifically to investigate the use and manufacture of *boltushka*, policing of *boltushka* users, and legal issues associated with sale of precursors commonly used to make *boltushka*. These fourteen additional interviews included ten IDUs who had used *boltushka* at least once in the last three months and were between 18 and 25 years old, and four pharmacists. IDU recruitment began with enrollment of six respondents at the needle exchange program (NEP). The other four respondents were friends or associates of the first six and were interviewed elsewhere. Interviews were private, lasted from 1.5 to 2 hours and focused on *boltushka* use in Odessa, attitudes of police and other law enforcement agencies towards *boltushka* users, self reports of the experience and consequences of *boltushka* use, and HIV/AIDS risk behaviors among *boltushka* users. IDUs between the ages of 18 and 25 were interviewed specifically because *boltushka* use was identified in our main research as most prevalent among young people. Four pharmacists, were interviewed in private locations in the pharmacy (3) or in a hotel room (1) using a separate interview guide to determine their level of knowledge of homemade ATs in Odessa and their impressions of *boltushka* users. Three out of four pharmacist respondents were referred by staff of a local NGO. The fourth pharmacist was recruited by the first author during field work in Odessa.

Following informed consent, all interviews were conducted in Russian and audio recorded. IDU and pharmacist respondents were given a USD \$10.00 (in Ukrainian currency) cash reimbursement for their time. All interviews were transcribed and later analyzed in Russian by the first author, using a thematic approach. Key quotations were translated into English.

## RESULTS

### Demographic characteristics of *boltushka* users

The majority of respondents were male (70%); median age of respondents was 21 (range: 19 – 25 years) and the median age of first *boltushka* use was 16 (range: 12 –21 years). Six out of ten IDU respondents had jobs at the time of interview (as restaurant or construction workers, or security guards). All ten respondents lived at home, either with family or friends. Nine out of ten respondents had attended and graduated from high school.

### Making *boltushka*

In the mid-1990s, Ukrainian regulations governing over-the-counter sale of medications containing ephedrine and pseudoephedrine were changed to require a prescription (original regulation replaced by 2003 Order of Ministry of Health) (Ministry of Health, 2003). These regulations made it difficult for IDUs to obtain ephedrine and pseudoephedrine, precursors

originally used to make homemade methamphetamine, called *vint*, or homemade methcathinone. In Ukraine, homemade methcathinone is usually called *jeff* or *jaff*, but was reportedly called *boltushka* in Odessa. Cold medications containing phenylpropanolamine (PPA) were still widely available over-the-counter in Odessa pharmacies and throughout Ukraine. As a result, drug users continued using the same cold medications (now containing PPA rather than ephedrine or pseudoephedrine) to produce a mixture containing cathinone, a weak ATS. Confusingly, the drug is still called *boltushka*, although it is now made with different ingredients and results in a different drug.

The word “*boltushka*” translated from Russian means “a shake” or “a mix”. Users report that the drug is made by shaking crushed or ground tablets of PPA-containing cold medicine (such as “Teffedrin”, “Koldack”, or “Effect”) together with warm water, household vinegar, and potassium permanganate (KMnO<sub>4</sub>) until it becomes dark brown, and according to one respondent, “*smells of cherries*,” a characteristic scent of ketones (Aretha, 2005). Some users substitute aspirin for vinegar or use both in half doses.

While some of the ingredients necessary to make *boltushka* are reportedly easily available in stores (cold medicines, aspirin, vinegar), at least one item, potassium permanganate (KMnO<sub>4</sub>), is now somewhat difficult to obtain legally. Potassium permanganate, commonly called *marganzovka* (марганцовка) in Russian, is widely used as a disinfectant in Eastern Europe. It was sold openly in drug stores until a few years ago when, according to one pharmacist, the local authorities became concerned that youth were using it to make explosives. In 2005 the Ukrainian Ministry of Health issued a decree that required pharmacies to obtain a special certificate in order to sell potassium permanganate (Ministry of Health, 2005). One pharmacist key informant reported that only one pharmacy in Odessa had completed the paperwork and received the required certificate to legally sell potassium permanganate. Legal sale is limited to one bottle per customer (3–5 grams).

All respondents confirmed that currently only one pharmacy in Odessa openly sells potassium permanganate. Most *boltushka* users purchase this necessary ingredient “under-the-table” from other pharmacies, on the black market, or from drug dealers at much higher prices than the market price for the disinfectant. One pharmacist admitted to “*doing business with drug users*”, specifically *boltushka* users. According to this pharmacist,

“...the drug store makes its profit by selling cold medicine and potassium permanganate over-the-counter to drug users.”

Several IDU respondents confirmed this practice, one saying:

“Pharmacies selling *boltushka* ingredients “under-the-table” are known well around the town and it is not hard to find them” (Female, 19 years old).

### Using *boltushka*

Respondents said that *boltushka* is generally prepared by small groups of users for personal use rather than being sold, with the cost per dose estimated as less than USD \$1.00. Respondents reported that *boltushka* can only be injected, and that when taken orally it has little effect other than bloating and nausea. One respondent said,

“Drinking *boltushka* does not get you high; you feel like throwing up, but not high” (Female, 19 years old).

*Boltushka* is most commonly injected into veins in the arms or legs. Negative health effects related to injected *boltushka* were reported. All respondents reported that if *boltushka* is accidentally injected under the skin, it can cause an abscess and is extremely painful. One person said,

*“I had several abscesses myself and it was very painful. I saw other guys cry when boltushka got under their skin”* (Female, 19 years old).

Respondents noted that *boltushka* can be injected up to ten times a day depending on how long the user has been using it; most users inject five to six times a day using a 20 cc syringe. The initial effect, called “*prihod*” (or “rush” in English), lasts approximately 15–20 minutes. One respondent described the rush as,

*“I feel my body being lifted from the ground and an incredible sense of peace”* (Male, 22 years old).

Following “*prihod*” the users experience a period of high energy and activity. This state does not last long (maximum of two hours) causing users to want to inject more *boltushka*. According to most respondents, one can inject *boltushka* for two to three days, going without sleep and food, and then resting for a day or two before resuming injection. The long-term effects of such a pattern of use may be grim. Several users reported that following such a regimen may lead to death in six months to a year.

All ten IDU respondents reported having used other drugs in addition to *boltushka*, primarily *shirka* (a homemade methamphetamine solution known elsewhere in the country as *vint* or *perventin*) and *kompot* (usually a homemade opiate derived from poppy straw or stalks); rarely reporting use of other drugs. Seven respondents reported *boltushka* was the first drug they ever used at or around the age of sixteen. Three other respondents reported having switched to *boltushka* from other drugs, mainly opiates, when the other drugs became too difficult or too expensive to obtain. As one respondent reported,

*“It was getting too difficult to find opiates”* (Male, 25 years old).

Most of the users had heard of *boltushka* from their friends or classmates. When asked why they used *boltushka*, or drugs in general, most gave curiosity as the first reason, followed by lack of entertainment, the poor economic situation, and few opportunities for young people. As one respondent reported,

*“I finished school and did not know what to do with myself. The only available jobs paid very little; There was no money to go out or travel and I needed something to decompress after long work hours”* (Male, 19 years old).

Interestingly, most male respondents stated that *boltushka* is more popular among young female users, whereas all female users said it was more of a “*male drug*”. Six male and female *boltushka* users agreed that *boltushka* is becoming increasingly popular among very young IDUs, those less than 14 years old.

### Police and *boltushka* users

When asked if pharmacies that sell potassium permanganate or cold medicines are targeted by police or other law enforcement agencies, both IDUs and pharmacists reported that PPA-containing cold medicines are often put in boxes from other over-the-counter medications, such as aspirin, to disguise them from police. This practice was confirmed in all ten IDU interviews and by two pharmacists. When asked if *boltushka* users are targeted more or less by police than other drug users, one respondent said:

*“Boltushka is such a cheap drug and so only poor people use it. These people don’t have money to pay off the police”* (Male, 22 years old).

Many IDUs felt that the police know users are poor and rarely arrest them. However, while police detention of *boltushka* users is rare because of their inability to pay, it sometimes happens. One young male user described being detained by police and released six hours later without paying any bribes (Male, 22 years old).

## Health and behavioral effects of boltushka use

Health effects of injecting the crude, unfiltered *boltushka* solution were described by participants. Some respondents reported that *boltushka* users “*shake wildly*”. Others reported grinding teeth and developing abscesses and skin burns when injecting under the skin. One interviewee reported having lost the ability to speak clearly:

*“My tongue was not listening to me; words came out as mumbles and it was difficult to move my jaw”* (Female, 20 years old).

Four other respondents reported no visible health effects that would identify *boltushka* users. All reported strong behavioral effects such as high levels of activity, energy, talkativeness, and a “*desire to do things*”. Most said *boltushka* was popular precisely because it helped them work longer hours; with loss of appetite reported as a related reason. Some users said that appetite loss makes the drug quite appealing for homeless children and adults. One respondent said,

*“Kids who live on the streets use boltushka a lot because it gives them a high and suppresses hunger”* (Male, 25 years old).

A local clinician with experience treating *boltushka* users observed what she believes are cognitive effects. She reported that long-term users of *boltushka* can experience partial loss of cognitive function, Alzheimer-type symptoms (i.e. decline in mental function and memory), and possible brain damage (Dr. Elena Kuleshova, psychologist, “The Way Home” personal communication, 2006).

## Risk of bloodborne diseases

Syringes are available for sale in Odessa pharmacies without prescription. An NGO also operates a NEP that provides harm reduction and social services in addition to sterile needles and syringes. However *boltushka* users reported substantial HIV risk behaviors.

All ten IDU respondents stated that *boltushka* was most often used by a group of three or more IDUs who combine resources to make a batch of *boltushka* with each user drawing the drug from a common container, leading to the possibility of contamination and transmission of bloodborne pathogens. Nine IDU respondents confirmed “front-loading”, the practice of using syringes to measure and transfer drugs in solution to another person's syringe after removing the needles from the syringes, and using shared rinse water containers. These practices can increase risk of HIV if the transfer syringe or rinse water is contaminated with HIV or other bloodborne pathogens.

All respondents reported having shared syringes at least once in their lifetime with other people. According to one respondent,

*“Needles and syringes are the last thing to worry about; you need to find money for pills – that’s what’s important. In most cases after having gone a long way to buy the pills and hurrying back home to make boltushka you don’t even remember to think about syringes. There’s at least one person in the group who will have the syringe if you don’t have yours”* (Male, 19 years old).

Eight out of ten respondents reported they were HIV positive and said they stopped giving their syringes to others when they found out they were infected. However, three respondents said that the risk of HIV infection does not scare most people in their groups; IDUs will still ask for a syringe, even if they know the prior user has HIV. According to this respondent,

*“...when you have to shoot it you have to shoot it – HIV does not scare you when you are craving drugs”* (Female, 20 years old).

Several respondents reported engaging in sexual intercourse following the injection of *boltushka*. When asked if they used condoms, all responded negatively. One respondent stated that *boltushka* is popular among young and uneducated female commercial sex workers

“to make their work easy” (Male, 25 years old).

Another respondent stated,

“I don’t carry condoms around. We are all HIV positive anyway” (Male, 19 years old).

### Availability of drug treatment for *boltushka* users

All respondents and a local clinician agreed that there are no education, prevention, or treatment programs targeted at *boltushka* users in Odessa. Two respondents described having been involuntarily sent to a generic short-term detoxification program by medical authorities. One person reported that her parents made her attend a faith-based support group at a church. Apparently, both short-term treatment and the support group were ineffective as all three had returned to *boltushka* use. Two respondents reported that they had seen friends “overdose” and be taken to a detoxification program, but that each friend had returned immediately to *boltushka* use upon returning home. None of our respondents voluntarily sought treatment for their *boltushka* use.

## DISCUSSION

In this study respondents attributed the popularity of cheap and easily manufactured homemade ATSS in Odessa partly to overall increases in poverty among youth in Ukraine, partly to periodic shortages of liquid poppy straw caused by police pressure on drug markets, and partly to lack of options for work and entertainment.

While injection of ATS solutions is common in the Ukraine, in the case of *boltushka*, a cascading series of policy changes regulating precursors has resulted in temporal changes to the drug itself. Current users report preparing the drug with the same ingredients, from the same cold medications, using the same recipe as previously reported in the literature, but resulting in different end products; methcathinone when ephedrine and pseudoephedrine were available (Rhodes, et al., 1999) and later cathinone, when PPA replaced earlier ingredients in cold medications. Respondents in 2005 reported no effect from *boltushka* unless it was injected, most likely because cathinone is too weak to have an effect unless injected. Thus, policy changes may have had unintended consequences in yielding a drug that must be injected with subsequent risk of HIV.

IDUs’ health risks increase when IDUs lack knowledge, understanding, and access to basic prevention methods. With rapidly increasing rates of HIV infection throughout Eastern Europe *boltushka* users are at risk of becoming infected with HIV, hepatitis B and C and other bloodborne diseases through contaminated injection equipment and by engaging in unprotected sexual activities (Ibanez, et al, 2005; Novoa, et al, 2005). These risks are compounded by the users’ overall poverty and lack of resources to meet their basic needs.

Encounters with law enforcement can also negatively impact IDUs in Odessa. In Ukraine possession of a small amount of illegal drugs is punishable as an administrative offense (up to 15 days imprisonment or fine of approximately USD \$1,100 to \$2,600) (Code of Ukraine, 1984). However, IDUs interviewed during the main RPAR study reported that police sometimes used force or threats of force against suspected IDUs to obtain money, sex, or information about other drug users. Even IDUs who were not handled roughly or threatened by police could still be delivered directly to narcological authorities for evaluation, registration

as a drug user, and or mandatory treatment. Although the *boltushka* users interviewed reported that police rarely sought bribes from them, at least one instance of police detention was reported.

A troubling suggestion in the literature is that *boltushka* users may also be at risk for permanent encephalopathy. Parkinsonism related to manganese toxicity has been previously associated with occupational hazards found in welding (Bowler, Koller, & Schulz, 2006) and also identified in case reports related to drug use. Manganese-induced Parkinsonism associated with injected homemade methcathinone has been identified in the literature (De Bie, et al, 2007; Stepens, et al., 2008). This apparently persistent, rapid onset, levodopa resistant Parkinsonism is presumed to result from injecting unreacted  $\text{KMnO}_4$  present in the homemade solution that results from an oxidation of ephedrine and potassium permanganate (Stepens, et al., 2008; Sanotsky et al., 2007; Degner, et al., 2000) and is reported as occurring in drug users elsewhere who injected a similar solution of ephedrine,  $\text{KMnO}_4$ , vinegar and acetic salicylic acid (Meral, et al, 2007).

*Boltushka*, as currently made in Odessa, contains cathinone, a weak ATS and residual  $\text{KMnO}_4$ . It is possible that the neurological effects reported by users and the brain damage alluded to by health professionals are a result of manganese toxicity rather than the effect of the cathinone itself. This is a grave possibility as the resultant Parkinsonian syndrome is not reversible. Occurrence in youth would yield a lifetime of medical complications and reduced quality of life.

The findings reported here have several important limitations due to the small sample size and qualitative nature of the data, including possible informant bias. While we believe that our data accurately reflect the experiences and knowledge of some *boltushka* users and pharmacists in Odessa, they are not generalizable. Finally, this discussion of short and long-term physical effects of *boltushka* use are necessarily based on anecdotal reports of users' physical symptoms and apparent long-term consequences and on documented reports of the effects of manganese toxicity. In further studies it will be important to disentangle the possible effects of poly-drug use, the distinction between the effects of the active ingredient and the contaminants, possible environmental factors, and the possibility that co-morbidities may leave some users more vulnerable than others to long-term damage.

Use of this street drug poses important health risks to the vulnerable population using it both from the potentially harmful effects of the drug preparation itself and from the risk of transmission of HIV and other bloodborne diseases. Too little is currently known about the prevalence of *boltushka* use, the frequency of symptoms in users, the social course of addiction, and other social and legal factors to clearly define the magnitude the problem of *boltushka* use.

Interventions beyond available harm reduction efforts are required. Available treatment for opiate users cannot be transferred easily to *boltushka* users who may require longer detoxification and more intensive treatment both for drug dependence and co-occurring physical conditions. Very few *boltushka* users can afford these treatment programs. There is a paucity of data on the non-HIV risks of *boltushka* use, both short and long-term. Screening for other physical harms may be an important intervention and may assist documentation of the drug's other effects.

## Acknowledgments

This research was supported by NIDA/NIH Grant R01 DA17002-05, "Rapid Assessment of Drug Law and Policy in the FSU and CEE" (Zita Lazzarini, PI). The findings and conclusions expressed are those of the authors and not necessarily of NIH, NIDA, or the US Government.



The authors want to thank the men and women in Odessa, Ukraine who were interviewed for this project for being generous with their time and being willing to share their experiences. We would also like to thank Mr. Dmitri Lutsenko of Odessa for help setting up initial interviews and collecting background information, Dr. Robert Heimer, Yale, for help with the chemistry of *boltushka*, and the U.S. and Ukrainian research teams for the Rapid Policy Assessment and Response Project.

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