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‘Krokodil’ and what a long strange trip it’s been

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Grund et al. should be applauded for their exhaustive review of krokodil, a previously under-described and excessively harmful home-produced opioid that is new in Ukraine, Russia, and Georgia (United States Department of State, 2010). The adverse medical consequences of well-known as well as new illicit homemade drugs continue to remain part of our evolving lexicon, including “shirka”, “vint”, “crank”, “bath salts”, “lemon drop”, and now “krokodil”, to name a few. To our knowledge, the first complication associated with illicit drug injection appeared in 1876 in the *Lancet* that described a case of “tetanus” after injection of “morphia” (Anonymous, 1876). Since this brief report of a woman who had practiced injection to alleviate the vomiting of pregnancy, medical literature has abounded with reports on the adverse sequelae of illicit drug injection. Thus, injection of new “non-prescribed” substances should not be considered an unusual or aberrant behavior, but rather, a significant social phenomenon with major public health, and societal consequences.

The relatively new introduction of krokodil reported in this issue reminds us “what a long, strange trip it’s been” since the earliest reports of medical complications from illicit drug injection. Medical consequences among people who inject drugs (PWIDs) were first reviewed in the 1960s (Cherubin, 1967) and again a quarter century later (Cherubin & Sapira, 1993). What appears to have emerged since that time are explosive epidemics of blood-borne viruses like HIV and viral hepatitis among PWIDs as well as newly introduced illicit street drugs, oftentimes manufactured inexpensively at home, each with its own set of social and medical costs (Altice, Kamarulzaman, Soriano, Schechter, & Friedland, 2010). Emerging from the Soviet tradition of homemade substances, the production of new substances like krokodil has been necessitated by PWIDs to ensure continuously accessible and affordable drugs. Due to its frequent administration and the variability in chemical formulations, the health effects of krokodil have been particularly dramatic. Exaggerated injection site reactions, including skin and soft-tissue infections (SSTIs) and necrosis are common (Demidova & Mokhachev, 2011; Gahr et al., 2012).

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To address these medical complications, it is necessary to focus our scarce resources toward drug treatment and prevention. Our internationally failed efforts in the War on Drug Users remind us that evidence-based drug treatment services are either insufficient or completely unavailable throughout much of the world. Considering now decades of unsuccessful attempts to control drug use through interruption in drug transportation routes, levying harsh criminal penalties for drug users, and demonizing people with serious underlying medical and psychiatric disorders, it is high time to redirect our efforts. In countries like Ukraine and Russia where extrajudicial policing practices are a barrier to effective drug treatment (Mimiaga et al., 2010; Sarang, Rhodes, Sheon, & Page, 2010), it is no surprise that PWIDs resort to homemade production of drugs like krokodil in spite of its debilitating effects on health. In Ukraine, <2% of PWIDs receive opioid substitution therapy (OST) while OST remains completely unavailable in nearby Russia where one of the fastest growing HIV/AIDS epidemics remains unbridled (Bojko, Dvoryak, & Altice, 2013; Wolfe, Carrieri, & Shepard, 2010). Of those who do survive injection of krokodil in these countries, many will experience the consequences of HIV/AIDS.

How is it possible that public health authorities are not outraged with the current insufficient treatment and prevention options available in the emerging economies of Ukraine and Russia? For example, it is untenable that clinicians would discharge a hospitalized patient admitted for a minor cerebrovascular accident without an aftercare plan that minimally includes control of their hypertension and physical rehabilitation. PWIDs, however, are frequently discharged from the hospital after a course of antibiotics for endocarditis or SSTIs without direct provision of or linkage to OST or other types of evidence-based addiction treatment. This unequal treatment of PWIDs by healthcare providers and policy-makers reminds us that harsh, sanctions-based attitudes prevail (Wolfe, 2007). This remains particularly problematic when drug addiction is a chronic, relapsing disease that is often treatable, but requires long-term strategies to facilitate treatment retention through improved access and removal of structural barriers to care (Izenberg & Altice, 2010). The emergence of krokodil use is a case in point: the urgent need for treatment becomes even more apparent in the context of the homemade production of a substance associated with such dramatic harms.

It is true that not all PWIDs choose rehabilitation, even when readily available. For these individuals, harm reduction strategies have proven remarkably effective at reducing the negative consequences of drug injection. This alternative to punitive approaches to controlling drug use includes a number of effective strategies, including needle and syringe exchange programs (NSEPs), bleach distribution, drug treatment such as OST on demand, alternatives to incarceration and court diversion programs for minor drug-related offenses, safer injection rooms, heroin maintenance, or, as suggested by Grund et al., the introduction of safer homemade opioid injectable recipes (Klous, Van den Brink, Van Ree, & Beijnen, 2005; Mathers et al., 2010). Such programs, however, must have sufficient coverage, and scaled to need.

If reducing the medical and social harms from illicit drug injection are not compelling in themselves, even in today's flailing global economy, expansion of OST within Ukraine is the single most cost-effective strategy for controlling a volatile HIV epidemic. Expanding

antiretroviral therapy (ART) to PWIDs would also increase efficacy, but at a modestly increased price (Alistar, Owens, & Brandeau, 2011). This treatment is particularly relevant in a homemade drug culture like that of the former Soviet Union which engenders a high HIV risk environment. Adequate ART expansion, however, remains elusive with ART coverage being <10% for PWIDs in Ukraine and Russia (Wolfe et al., 2010).

History teaches us that necessity is the mother of invention and there will be many “new” drug fads that emerge over time. Until there is universal access to harm reduction treatment, however, it is crucial for clinicians and those who interact with PWIDs to recognize these agents and bring them to public attention in order to stimulate a debate on effective ways to obviate the adverse social and medical costs that will otherwise result.

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