



## Commentary

## The 'do-it-yourself' New Zealand injecting scene: Implications for harm reduction

Magdalena Harris\*

Centre for Research on Drugs and Health Behaviour, London School of Hygiene and Tropical Medicine, 15-17 Tavistock Place, London WC1H9SH, United Kingdom

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## ABSTRACT

The review in this issue of the *International Journal of Drug Policy* (Grund, Latypov, & Harris, 2013) highlights the disturbing harms caused by the increasing use of 'krokodil' by people who inject drugs (PWID) in Eurasia. The growing use of this home produced injectable opiate poses a number of challenges for harm reduction policy, particularly when situated in restrictive regulatory environments where initiatives such as Opioid Substitution Treatment (OST) are prohibited or limited. In such contexts where OST access is restricted, how can these harms be minimised, and what alternatives can be offered? This commentary addresses these questions, by offering the rarely researched case of home produced injectable opioid use in New Zealand as an example.

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## Background

Home produced opioid injectables have been a mainstay of the New Zealand injecting scene since the early 1980s. New Zealand is an island nation characterised by geographic isolation and a small population (currently 4.4 million), and therefore holds limited attraction to international traffickers. Organised heroin importation into New Zealand, from 1976, was severely disrupted by law enforcement interventions in the early 1980s, resulting in high prices and uncertain supply (Kemp & Aitken, 2004). Since this time New Zealand can be described as in a state of 'heroin drought', with importation at negligible levels. This does not mean, however, that opioid injecting ceased. It just changed form. Heroin users at the time of the 1980s interdiction responded by producing 'home-made' injectables from pharmaceutical opioids, such as codeine and morphine based tablets.

Apart from the injection of diverted methadone and buprenorphine (Robinson, Dukes, Robinson, Cooke, & Mahoney, 1993; Robinson, Kemp, Lee, & Cranston, 2000) injectable opioids in New Zealand have, since this time, been primarily manufactured from three sources: morphine sulphate tablets, codeine based tablets, and the opium poppy *Papaver somniferum*. An overview of the manufacturing process and resulting product are outlined below:

*Morphine sulphate tablets (MST or "misties")*

MST's come in a variety of strengths, ranging from 10 to 200 mg and on the black market are generally referred to by either their

strength or colour. For personal use, 30 mg ('30s', 'purples' or 'dirty thirties'), 60 mg ('60s' 'oranges') and 100 mg ('hundies' or 'greys') MSTs are the most common. These are obtained on the black market, either through chemist burglaries or diversion from individuals on pain relief prescriptions (a common cancer medication). The street price for MSTs ranges from NZ\$1 to \$2 per mg. The conversion process is simple, requiring only a spoon, a heat source (candle, stove element, etc.), baking soda, citric acid, water and acetic anhydride. Acetic anhydride is the key chemical in the conversion process from morphine substrate to diacetylmorphine (heroin) and as a precursor chemical it is strictly regulated (cf. UNODC, 2011). This chemical is readily available on the black market in New Zealand, sold in small bottles and commonly referred to as 'AA' or 'double'. The conversion process from MST to injectable diacetylmorphine can take as little as 10 minutes (longer for a better yield), is conducted on a small scale (one tablet at a time), generally for personal use and therefore by an individual user several times a day. New Zealand heroin users are reported as using this process from the 1990s (Kemp & Aitken, 2004), and it remains the most frequently and easily accessed form of injectable opioid (Wilkins, Girling, & Sweetsur, 2008). Other pharmaceutical morphine based tablets used by New Zealand PWID for acetylating into heroin are LA Morph, Sevredol and Kapanol capsules. Depending on the skill of the cook, this process can yield medium to high quality diacetylmorphine with relatively few impurities.

*Codeine-based tablets*

Converting codeine-based tablets to diacetylmorphine is more complex, takes place on a larger scale and commonly involves the chemicals pyridine, chloroform, hydrochloric acid, sodium hydroxide and acetic anhydride. The equipment required, available

\* Tel.: +44 020 79272172.

E-mail address: [magdalena.harris@lshtm.ac.uk](mailto:magdalena.harris@lshtm.ac.uk)

from chemical supply companies, comprises beakers, a separating funnel, a filter pump and tap attachments, a Buchner flask and funnel, a boiling tube with rubber bung or cork and an evaporating basin. Heat sources can include Bunsen or methalated spirits burners, also modified stove elements. Sources of codeine include over-the-counter codeine and paracetamol products as well as codeine phosphate tablets from chemist burglaries and diverted prescriptions. The first stage involves extracting a white crystalline codeine base solid from the crushed tablets using sodium chloride and chloroform. The O-demethylation of this codeine base involves the use of pyridine hydrochloride (derived from heating pyridine and hydrochloric acid), sodium hydroxide and chloroform. The resulting morphine product is recovered as a powder, ranging in colour from beige to dark brown. The final stage involves the acetylation of the morphine power into diacetylmorphine using acetic anhydride as above. This 'homebake' is either sold in a powder form (with the individual user conducting the final acetylation with AA), or in its final liquid form. 'Homebake' morphine is reported to be of high quality, at approximately 80% purity, with little or no codeine contamination (Bedford, Nolan, Onrust, & Siegers, 1987). The acetylation process can result in up to 60% conversion to heroin, with the final product often containing distinctively high levels of 3-O-monoacetylmorphine. The entire process from extraction of the codeine tablets through to the preparation of useable heroin solution can be conducted in a few hours and the simplicity of the laboratory equipment allows easy portability (Bedford et al.). However, this process does not lend itself to a large scale operation, with percentage yield dropping as the quantities of the codeine used increase. The first laboratory using the process was seized in Auckland in January 1983. Homebake is still a mainstay of New Zealand opioid injecting, although reported to be less accessible in recent years (Wilkins et al., 2008).

#### *Papaver somniferum*

The opium poppy is utilised by New Zealand PWID in a variety of ways. An injectable opioid is produced by drying the poppy latex and acetylising it with AA. The resulting tar can then be smoked or prepared into an injectable solution with the addition of water, heat and a small amount of citric acid. Poppy availability is determined by season, and they are illegal to grow for personal use in New Zealand. Opium poppies are generally obtained during the season by 'poppy raids' at night on private gardens or other places where they are spotted during the day. While it is possible to grow poppies under lights (as with cannabis) there few reports of this practice taking place. Poppy seed tea is also a feature of the New Zealand drug scene, prepared by washing commercially available poppy seeds in a slightly acidic solution, straining and boiling down the resulting liquid to form a long acting medium-high potency opioid drink. This solution is not injectable and is often used as a cheap oral alternative to injectables or a missed dose of methadone. Laboratory studies of poppy seed tea have observed concentrations of morphine of 10–105 mg/kg poppy seed and codeine at 3–11 mg/kg (Braye, Harwood, Inder, Beasley, & Robinson, 2007).

#### **Harm reduction implications?**

PWID living in New Zealand responded to police interdiction in the early 1980s by adapting the New Zealand 'do-it-yourself' ethos to the homemade manufacture of injectable opioids. These are of varying quality, dependant on the raw product and the skill of the 'cook'. They have however, maintained a sizable population of opioid injectors in New Zealand for the past three decades. Current estimates of people with opioid dependency in New Zealand stand at 9142, of which 4537 are receiving OST (Adamson et al.,

2012). It is important to note that Adamson et al., define opioid dependency as the daily or almost daily use of opioids, therefore this figure is a very conservative estimate of regular opioid users in New Zealand. While venous damage has been reported in relation to the injecting of diverted oral methadone prescriptions (Robinson et al., 2000) minimal research has been conducted in New Zealand in regard to the harms and/or benefits associated with the use of homemade opioid injectables. Having no other references to draw on, the author can report that during a decade living with diverse groups of long term daily opioid injectors in New Zealand, injecting related soft tissue infections, significant venous damage and transitions to groin injecting were rarely observed. This is in contrast to reports from countries such as Russia where the domestic production of krokodil is associated with severe physical complications such as abscesses, gangrene and thrombophlebitis as well as limb amputations and high mortality (Gahr et al., 2012).

Krokodil is characterised by high potency and a short half-life, creating a need for multiple injections and the capacity for quick dependence. It is relatively easy and cheap to prepare involving the use of readily available codeine-based pharmaceuticals, and chemicals such as iodine, lighter fluid and industrial cleaning oil. A particular set of social and structural circumstances have led to the increasing production and use of krokodil in Eurasia over the past five years, including rising heroin prices and decreasing availability, poverty, high unemployment, the prohibition of harm reduction initiatives such as OST and substandard medical and social supports for PWID (Grund et al., 2013; Shuster, 2011; Walker, 2011). While the New Zealand and Eurasian contexts are distinct, New Zealand PWID for example having access to well established OST, NSP and income support, it is worth asking if any grass-root harm reduction initiatives in Eurasia could learn from the New Zealand experience.

New Zealand is one of few countries which have maintained small scale domestic production of heroin substitutes from over-the-counter codeine-based pharmaceuticals. There may be a number of reasons why PWID in Russia, and other countries experiencing heroin drought (such as the UK 2010–2011 and Australia 2001) have not adopted the New Zealand 'homebake' recipe, but salient factors are unclear. While insurmountable acetic anhydride restrictions are an obvious potential barrier, it is evident that Eurasian drug users have access to this precursor chemical. The Russian Federation is a producer country for the legitimate acetic anhydride industrial market (UNODC, 2011) and Eurasian PWID are reported as using the chemical to acetylate poppy straw or opium into the injectable opioid 'cheornaya' (Abdala, Grund, Tolstov, Kozlov, & Heimer, 2006; Grund, 2001; UNODC, 2011). The reasons why Eurasian PWID moved away from cheornaya production to krokodil are unclear, but may include the seasonal nature of opium poppy availability and/or potential decreases in availability. Research is necessary to explore these questions as well as to further explore the harms and benefits associated with home produced opioids in New Zealand and other countries. This is vital in order to assess the potential barriers and facilitators to introducing at a Eurasian grass-roots level, user-based safer recipes for homemade injectables. This is a contentious suggestion, but in a context of prohibited OST and minimal humane rehabilitation facilities, the introduction of safer home produced opioid recipes can be seen as a pragmatic harm reduction initiative that may have the capacity to curtail the growing use of krokodil, a dangerous drug which is currently decimating the lives and health of Eurasian PWID.

#### **Conflict of interest statement**

None declared.

## References

- Abdala, N., Grund, J.-P., Tolstov, Y., Kozlov, A. P., & Heimer, R. (2006). Can home-made injectable opioids contribute to the HIV epidemic among injection drug users in the countries of the former Soviet Union? *Addiction*, *101*(5), 731–737.
- Adamson, S. J., Deering, D. E., Sellman, J. D., Sheridan, J., Henderson, C., Robertson, R., et al. (2012). An estimation of the prevalence of opioid dependence in New Zealand. *International Journal of Drug Policy*, *23*(1), 87–89.
- Bedford, K. R., Nolan, S. L., Onrust, R., & Siegers, J. D. (1987). The illicit preparation of morphine and heroin from pharmaceutical products containing codeine: 'Homebake' laboratories in New Zealand. *Forensic Science International*, *34*(3), 197–204.
- Braye, K., Harwood, T., Inder, R., Beasley, R., & Robinson, G. (2007). Poppy seed tea and opiate abuse in New Zealand. *Drug and Alcohol Review*, *26*, 215–219.
- Gahr, M., Frudenmann, R., Hiemke, C., Gunst, I., Connemann, B., & Schonfeldt-Lecuona, C. (2012). "Crocodile": A new drug? *Nervenheilkunde*, *31*(1–2), 69–72.
- Grund, J.-P. (2001). A candle lit from both sides: The epidemic of HIV infection in central and eastern Europe. In K. McElrath (Ed.), *HIV and AIDS: A global view*. Westport: Greenwood Press.
- Grund, J.-P. C., Latypov, A., & Harris, M. (2013). Breaking Worse: The emergence of krokodil and excessive injuries among people who inject drugs in Eurasia. *International Journal of Drug Policy*, <http://dx.doi.org/10.1016/j.drugpo.2013.04.007>
- Kemp, R., & Aitken, C. (2004). The development of New Zealand's Needle and Syringe Exchange Programme. *International Journal of Drug Policy*, *15*(3), 202–206.
- Robinson, G. M., Dukes, P., Robinson, B., Cooke, R., & Mahoney, G. (1993). The misuse of buprenorphine and a buprenorphine-naloxone combination in Wellington New Zealand. *Drug and Alcohol Dependence*, *33*(1), 81–86.
- Robinson, G. M., Kemp, R., Lee, C., & Cranston, D. (2000). Patients in methadone maintenance treatment who inject methadone syrup: A preliminary study. *Drug and Alcohol Review*, *19*, 447–450.
- Shuster, S. (2011). The curse of the crocodile: Russia's deadly designer drug. *Time*. 20 June 2011.
- United Nations Office on Drugs and Crime (UNODC). (2011). *The Global Afghan opium trade: A threat assessment*. <http://www.unodc.org/documents/data-and-analysis/Studies/Global.Afghan.Opium.Trade.2011-web.pdf> Accessed 12.03.12.
- Walker, S. (2011). Krokodil: The drug that eats junkies. *The Independent*. 22 June 2011.
- Wilkins, C., Girling, M., & Sweetsur, P. (2008). *Recent trends in illegal drug use in New Zealand, 2005–2007: Findings from the 2005, 2006 and 2007 Illicit Drug Monitoring System*. Wellington, New Zealand: Massey University Centre for Social and Health Outcomes Research and Evaluation., pp. 13–20