International Journal of Drug Policy 46 (2017) 99–106

Contents lists available at ScienceDirect

International Journal of Drug Policy

journal homepage: www.elsevier.com/locate/drugpo

Research paper

How does the use of multiple needles/syringes per injecting episode impact on the measurement of individual level needle and syringe program coverage?

Daniel O'Keefe[a,b,*], Angus McCormack[a], Shelley Cogger[a], Campbell Aitken[a,b], Lucinda Burns[c], Raimondo Bruno[d], Jenny Stafford[c], Kerryn Butler[c], Courtney Breen[c], Paul Dietze[a,b]

[a] Centre for Population Health, Burnet Institute, 85 Commercial Rd, Melbourne, VIC 3004, Australia
[b] School of Public Health and Preventive Medicine, Monash University, 99 Commercial Rd, Melbourne, VIC 3004, Australia
[c] National Drug and Alcohol Research Centre, University of New South Wales, 22-32 King St, Randwick, NSW 2031, Australia
[d] School of Medicine, University of Tasmania, Churchill Avenue, Hobart,Tasmania 7005, Australia

ARTICLE INFO

Article history:
Received 5 January 2017
Received in revised form 1 May 2017
Accepted 30 May 2017

Keywords:
Needle and syringe coverage
Harm reduction
Injecting drug use

ABSTRACT

Background: Recent work by McCormack et al. (2016) showed that the inclusion of syringe stockpiling improves the measurement of individual-level syringe coverage. We explored whether including the use of a new parameter, multiple sterile syringes per injecting episode, further improves coverage measures.
Methods: Data comes from 838 people who inject drugs, interviewed as part of the 2015 Illicit Drug Reporting System. Along with syringe coverage questions, the survey recorded the number of sterile syringes used on average per injecting episode. We constructed three measures of coverage: one adapted from Bluthenthal et al. (2007), the McCormack et al. measure, and a new coverage measure that included use of multiple syringes. Predictors of multiple syringe use and insufficient coverage (<100% of injecting episodes using a sterile syringe) using the new measure, were tested in logistic regression and the ability of the measures to discriminate key risk behaviours was compared using ROC curve analysis.
Results: 134 (16%) participants reported needing multiple syringes per injecting episode. Women showed significantly increased odds of multiple syringe use, as did those reporting injection related injuries/diseases and injecting of opioid substitution drugs or pharmaceutical opioids. Levels of insufficient coverage across the three measures were substantial (20%–28%). ROC curve analysis suggested that our new measure was no better at discriminating injecting risk behaviours than the existing measures.
Conclusion: Based on our findings, there appears to be little need for adding a multiple syringe use parameter to existing coverage formulae. Hence, we recommend that multiple syringe use is not included in the measurement of individual-level syringe coverage.

Introduction

Needle and syringe programs (NSPs) are a cost-effective, low-threshold intervention that reduces the transmission of blood-borne viruses (BBVs) via the provision of sterile injecting equipment to people who inject drugs (PWID) (Laufer, 2001; Strathdee & Mailman, 2001). NSP coverage can be measured at both the population-level and at the individual-level and both methods have advantages and disadvantages. Population-level coverage measurements (often defined as the proportion of PWID utilising a service within a given geographic area (Burrows, 2006), or the average number of syringes distributed across an estimated PWID population (WHO, 2012)), are more commonly utilised as they are relatively easier to calculate in comparison to individual-level measures, but their reliance on population estimates leads to wide margins of error, and the practice of aggregating data means that poor coverage among the most at-risk individuals can be masked by the coverage of less risky individuals. For example, the WHO recommends that an average of 200 sterile syringes be

* Corresponding author at: Centre for Population Health, Burnet Institute, 85 Commercial Rd, Melbourne, VIC 3004, Australia.
E-mail addresses: daniel.okeefe@burnet.edu.au (D. O'Keefe), angus.mccormack@burnet.edu.au (A. McCormack), shelleycogger@gmail.com (S. Cogger), campbell.aitken@burnet.edu.au (C. Aitken), l.burns@unsw.edu.au (L. Burns), raimondo.bruno@utas.edu.au (R. Bruno), j.stafford@unsw.edu.au (J. Stafford), kerryn.butler@unsw.edu.au (K. Butler), courtney.breen@unsw.edu.au (C. Breen), paul.dietze@burnet.edu.au (P. Dietze).

http://dx.doi.org/10.1016/j.drugpo.2017.05.055
0955-3959/

distributed per PWID per annum to curtail HIV transmission (WHO, 2012). Though conceived as a method of evaluating service delivery, in practical terms, there may be PWID who far exceed this benchmark and may therefore overshadow those who fail to meet it. These shortcomings have previously been identified (Wiessing et al., 2001). In response, individual-level measures have been developed. Whilst these measures are more difficult to calculate, they better capture injecting risk for individual PWID and potentially provide a more accurate picture of programmatic shortfalls and better identify target populations. Most widely used is the Bluthenthal, Anderson, Flynn, and Kral (2007) "one-shot-for-one-syringe" method. This method defines coverage as the percentage of an individual's injecting episodes (the single injection of a drug, including drug preparation) that utilise a sterile needle and syringe (hereafter referred to as "syringe/s"). Less than 100% coverage suggests individuals have insufficient sterile syringes to cover their injections and are therefore risking harm (such as BBV infection through sharing injecting equipment). It is a method that, in contrast to population-level measures, accounts for individual variation and sets a benchmark that PWID should be facilitated to meet.

However, Bluthenthal et al.'s measure relies upon limited parameters (occasions of syringe acquisition, number of syringes acquired and injecting frequency). McCormack, Aitken, Burns, Cogger, and Dietze (2016) explored the addition of syringe stockpiling. Unlike in many countries, NSP policy across much of Australia effectively allows for unlimited syringe acquisition without the corresponding exchange of used syringes (Bluthenthal, Ridgeway et al., 2007). McCormack et al. showed that many PWID utilise this unlimited policy; three quarters of their sample reported stockpiling at least one sterile syringe within the month preceding interview and, on average, participants reported stockpiling 56 syringes (interquartile range (IQR): 6–51). When this parameter was included within their variant of the Bluthenthal et al. measure, the proportion of PWID sufficiently covered increased from 76% to 84% (McCormack et al., 2016) due to the higher number of syringes compared to injecting episodes. This research showed how extending the basis of coverage measurement can affect coverage levels and hence assessment of intervention efficacy.

McCormack et al.'s findings nevertheless accord with previous Australian research suggesting that, despite comprehensive levels of service, insufficient individual-level syringe coverage remains substantial. An estimated 16–37% (Bryant, Paquette, & Wilson, 2012; Iversen, Topp, Wand, & Maher, 2012; McCormack et al., 2016; O'Keefe, Scott, Aitken, & Dietze, 2016) of Australian PWID do not acquire sufficient syringes to cover their injecting episodes. In Australia and elsewhere, this insufficiency has been associated with high-frequency injecting, failure to utilise primary PWID services, hepatitis C virus (HCV) infection, and injecting risk practices such as syringe reuse and receptive syringe sharing (Allen et al., 2012; Bluthenthal, Anderson et al., 2007; Bryant et al., 2012; Iversen et al., 2012). In this paper, we explore the effect of adding a fourth parameter to McCormack et al.'s coverage measure: the use of multiple sterile syringes per injecting episode.

PWID may require more than one syringe per successful injection due to poor venous access, as a consequence of either small surface veins or injection-related vein damage (Koester, 2012). The reuse of unsterile syringes increases the risk of skin and soft tissue infections (Brett, Hood, Brazier, Duerden, & HahnÉ, 2005; Dahlman, Hakansson, Bjorkman, Blome, & Kral, 2015), sepsis development (Dahlman et al., 2015), scarring and bruising (Dolinar, 2009), painful injections via needle blunting (Harris & Rhodes, 2012), and the use of veins (femoral, jugular) that pose greater risk of harm (Harris & Rhodes, 2012). Research among Australian PWID found 43% reported difficulty with injecting (Dwyer et al., 2009; Topp, Iversen, Conroy, Salmon, & Maher, 2008), and this difficulty impels many PWID to use multiple sterile syringes during their injecting episodes. For these individuals, the relationship between syringe acquisition and injecting frequency is distorted, resulting in an overestimation of aggregate coverage. Excluding multiple syringe use may therefore weaken coverage measurement, as does the exclusion of syringe stockpiling.

In this paper, we utilised cross-sectional data from the 2015 Illicit Drug Reporting System (IDRS) survey and replicate the methodology of McCormack et al. to assess the effect of inclusion of multiple syringes per injecting episode in measuring syringe coverage. Our primary aims were to:

1) describe the prevalence and frequency of multiple syringe use among a sample of PWID,
2) construct a measure of individual syringe coverage that includes both stockpiling and use of multiple syringes and compare coverage levels against the Bluthenthal et al. and the McCormack et al. measures,
3) test predictors of multiple syringe use and insufficient coverage under the new measure, and
4) test the discriminative ability of the new coverage measure compared to existing coverage measures using receiver operating characteristic (ROC) curve analysis.

Methods

The IDRS is an Australian nationwide annual surveillance survey. Conducted since 1999, the survey monitors emerging trends among Australian PWID (Stafford & Burns, 2016). The questionnaire covers drug use, service utilisation, drug purchasing characteristics, injecting risk practices and criminal activity. Eligibility criteria are at least 18 years of age, injecting at least once a month in the six months prior to interview, residing in the city of survey administration for at least 12 months prior to interview, and ability to provide informed consent. Interviews typically take 45–60 min and participants are compensated for their time. The survey methodology has been described in detail elsewhere (Hando, Darke, O'Brien, Maher, & Hall, 1998). This study uses data from the 2015 IDRS, conducted between June/July 2015.

Ethics approval was obtained from the University of New South Wales Research Ethics Committee and local equivalents as required.

Sample

The IDRS recruits approximately 100 active PWID from all Australian capital cities (except Melbourne and Sydney where, due to larger PWID populations, 150 participants are recruited) via convenience sampling at NSPs and community health centres. The final sample size in 2015 was 888 participants. Fifty participants who reported no injecting within the month prior to interview were excluded, resulting in an amended sample of 838 participants for analysis.

Measures

To measure individual levels of syringe coverage in the month prior to interview, the following questions were asked:

"In the LAST MONTH how many new (needles and) syringes in total did you get?"

"In the LAST MONTH how many (needles and) syringes did you give away or sell to others?"

"Thinking about it overall, about how many times did you inject in the LAST MONTH?"