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### REPLY TO RUAN ET AL. (2017): NON-MEDICAL USE OF PRESCRIPTION OPIOIDS IS ASSOCIATED WITH HEROIN INITIATION AMONG US VETERANS

We thank Ruan and colleagues for their letter and appreciate their comments regarding our recent study [1], which demonstrated an independent association between non-medical use of prescription opioids (NMUPO) and heroin initiation among US veterans [2]. Our results indicate that participants who reported prior or concurrent NMUPO had 5.43 times the adjusted hazard of heroin initiation, compared to participants who reported no NMUPO [95% confidence interval (CI) = 4.01–7.35]. While we acknowledge in our paper that these results are not necessarily generalizable to all US veterans, given the inclusion of participants who are HIV-infected and/or hepatitis C virus (HCV)-infected, the observed effect of NMUPO on risk for heroin initiation was robust to sensitivity analyses. For example, as described in our published study, excluding the 701 HCV-positive participants did not affect the result [adjusted hazard ratio (AHR) = 6.21, 95% confidence interval (CI) = 4.54–8.51] meaningfully. In light of the concerns

raised by Ruan and colleagues, we repeated the analysis excluding HIV-infected individuals, and in fact found that the relationship between NMUPO and heroin initiation was stronger (AHR = 7.01, 95% CI = 5.40–9.09). Thus, although the observed absolute rate of heroin initiation may be greater than in the general US veteran population due to the specific inclusion of higher-risk patients, it does not appear that the relationship between NMUPO and heroin initiation is affected by HCV or HIV prevalence.

Ruan and colleagues also highlighted the increase in heroin-related deaths from 2013 to 2014, with the concurrent decrease in people reporting non-medical use of prescription opioids. This inverse relationship may, in fact, be attributable to the fact that large numbers of people who developed opioid use disorder (as a result of non-medical use of prescription opioids) have transitioned subsequently to heroin use [3,4]. The trend between increased rates of death associated with heroin use and decreased rates of death associated with use of prescription opioids thus speaks to the potential role of transitioning from the misuse of prescription opioids to the use of heroin in many parts of the country [5,6]. This phenomenon is consistent with the findings of our paper, given that NMUPO may be one step in a complex, multi-step cascade that increases risk of transition to heroin use in the population [7,8].

Additionally, while Compton and colleagues noted that: ‘only a small percentage of non-medical users of prescription opioids initiate heroin use’, they also go on to say that: ‘given the large number of nonmedical users, even a small percentage who initiate heroin use translates into several hundred thousand new heroin users’ [9]. Ruan *et al.* cite a statistic that 3.6% of the people reporting NMUPO initiated heroin use within 5 years of beginning NMUPO. Indeed, even this small percentage, if correct, would result in approximately 370 800 individuals initiating heroin use by 2019. Prior and subsequent years would contribute similar proportions of individuals initiating heroin due to NMUPO [10].

In conclusion, we appreciate that the rates of heroin initiation in our study are potentially higher compared to rates of heroin initiation among studies that do not include HIV- and HCV-infected veterans. However, this limitation does not obscure the primary findings of our study, which speaks to the observed increased relative risk of heroin initiation among participants who report prior/concurrent NMUPO compared to participants who report no prior/concurrent NMUPO.

#### Declaration of interests

None.

**Keywords** Epidemiology, heroin, longitudinal study, NMUPO, non-medical use of prescription opioids, veterans.

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## DRUG TESTING IN FORENSIC MENTAL HEALTH SETTINGS

The use of illicit substances is extremely common among forensic psychiatry populations and is recognized widely as one of the most potent risk factors for interpersonal violence. Detection and management of substance misuse in patients prone to behave violently is critical for maintaining the safety of patients, staff members and the public at large. The most commonly used specimen type in UK mental health settings is urine [1]. This was, until recently, the case at the State Hospital, the high-security psychiatric hospital for Scotland and Northern Ireland.

In 2013 we reported on the results of a pilot study in which patients in high security were offered the choice of either urine or oral fluid testing (OFT) [2]. The pilot was successful, with oral fluid testing being generally preferred by both patients and staff members. The additional financial cost at that time was considered to be outweighed by the significant benefits arising from offering patients choice, preservation of patient dignity and staff time savings. As a result of the successful pilot, since 2010 all patients at the State Hospital have been offered the choice of either urine or OFT for routine testing for illicit substances, a move which was viewed positively by the Mental Welfare Commission.

We provide an update on our experience since 2010 as, to our knowledge, we are the only secure psychiatric setting which routinely offers patients the choice of drug-testing method. Prior to the pilot study, urine testing represented more than 99% of testing. In 2010 testing by