Reviewer's report

Title: Changes in blood-borne virus notifications and injecting related harms following reduced heroin supply in New South Wales, Australia

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Reviewer: Lucas George Wiessing

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General

This is a highly interesting analysis that potentially can give unique information for drug policy. I enjoyed reading the paper which I think is of good standard, despite some points of clarification listed below.

Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

1. Clarity of key findings:
   a. The title seems to suggest that changes have been found related to the heroin shortage. The abstract states that no changes were found related to the heroin shortage but that hepatitis C notifications in young people decreased (this is difficult to understand the way it is formulated, maybe this can be clarified by inserting onset before heroin shortage and inserting afterwards at the end of this sentence, or otherwise). The conclusion of the abstract mentions that no increase in harm resulted from the marked reduction in heroin supply. In combination these three different formulations, although technically not inconsistent, can confuse at first reading.
   b. The reason for stating no increase in the conclusion suggests an hypothesis-testing approach. However it is not clear why an increase of problems would be expected and this hypothesis is not mentioned in the abstract. In the introduction a suggestion of an hypothesis is made in the opposite direction. Probably it would be better to expect, test and report findings observed either only downwards or in both directions.
   c. The decrease in hepatitis C notifications among young people seems highly relevant for this analysis even if the decline occurred months after the onset of heroin shortage and it should be mentioned in the conclusion of the abstract, not only in the results.
   d. The conclusion of the abstract mentions that there was also a marked reduction in injecting drug use this should be mentioned also under objectives else it surprises the reader. This decrease in injecting drug use is not substantiated in the article other than by a brief mention of declines in distributed needles and a reference to other work of the authors, however this finding seems highly important for the current analysis and should be discussed more in detail in this paper, especially with regard to the month of onset, and if possible by including an extra graph showing these data and if available by discussing other supporting evidence that injecting declined.

2.
   a. On page 5 it is stated that prevalence in young people provides a reasonable approximation of incidence. This is in general and to some extent true but it is very probable that this approximation is not good enough to find sudden changes related to changes in real incidence, on a timescale of months as in this analysis, due to large variability in length of injecting careers even in young people. However it is also not clear why this statement is made as notifications are used not prevalence data.
b. If these notifications are acute cases only then this is related to incidence, not prevalence. If they are acute and chronic cases then they are related to prevalence, but in that case the data are less suited for this analysis. Maybe this could be reformulated into a statement that notifications in young people are more likely to reflect both 1) new cases of infection and 2) infections due to drug injecting as is done in the discussion.

3. It is not explicitly stated that the notifications are not specific for IDUs, this means that they are contaminated by a proportion of non-IDU transmission which will blur changes due to declines in injecting. This proportion will be small for HCV but can be substantial for HBV or HIV (though maybe less so in young people of drug injecting age). Not surprisingly the only indicator where a (lagged) decrease is observed is HCV.

4. It is not explicitly stated if the notifications are recorded by month of diagnosis or month of reporting by the physician. If they are given by month of report changes due to heroin shortage will be less pronounced and possibly lagged.

5. The lagged decline in HCV notifications among young people could partly be due to reporting delay if the data are recorded by month of report.

6. The possibility of a real lagged decline of injecting frequency or incidence of new injectors, and new HCV infections is not discussed. As new hepatitis C infections concern mainly new injectors, and if the heroin shortage would more strongly affect incidence of new injecting rather than injecting frequency among all injectors, one could expect a mean lag time equal to the average time from first injection to infection. This period could well be about 10 months in Australia. Other studies have reported average time to infection from 6 months up to several years in other countries. Alternatively it might be possible that injectors first continued to inject other substances and injecting only started to decline after several months when they started giving up injecting altogether.

7. In Figure 3 it appears that the time series only begins to decline several months after the start of the heroin shortage (about Oct.01). A smoothing function is applied which peaks some months before the heroin shortage. It could be that the position of this peak is biased backwards some months due to the smoothing procedure. Visual inspection of the raw data suggests that these could also be described by an increase up to about Dec.99, a stable period up to about Sept.01 and a significant decrease thereafter. Thus the exact position of a subtle peak among these highly variable data is difficult to determine and the strong decline many months after onset of the shortage is more likely the effect that the authors are looking for.

8. In the discussion it should be mentioned that HIV and HBV can be more easily sexually transmitted and thus would respond less to changes in levels of injecting than HCV.

9. In the discussion, under limitations the quality and coverage of the notifications data are not discussed. These might be very low. Large proportions of hepatitis B and C infections are asymptomatic and will not be diagnosed. Furthermore of those diagnosed only a very small proportion has been found to be reported in another US study, while European studies found strong reporting biases in notifications data. (e.g. see Hagan H, Snyder N, Hough E, Yu T, McKeirnan S, Boase J, Duchin J. Case-reporting of acute hepatitis B and C among injection drug users. J Urban Health 2002;79:579-85. or see Strauss R, Fulop G, Pfeifer C. Hepatitis C in Austria 1993-2000: reporting bias distort HCV epidemiology in Austria. Euro Surveill 2003;8:113-8.)

10. It is unclear why in the discussion and in the conclusions the statement is made that in contexts where injecting equipment would not be as readily available as in Australia the changes in heroin supply are expected to result in increases of injection related harms, this statement seems not to be supported by the analyses nor explained and it should be removed at least from the conclusions.
Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)

11. On page 7 reference to figure 3 is repeated and should be deleted the second time.

12. In figure 2 the vertical line representing the start of the heroin shortage appears to be mispositioned at Sept.00 instead of Jan.01

Discretionary Revisions (which the author can choose to ignore)

What next?: Unable to decide on acceptance or rejection until the authors have responded to the major compulsory revisions

Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: No

Declaration of competing interests:
I declare that I have no competing interests