Reviewer's report

Title: Determinants of hospitalization for cutaneous injection-related infections among injection drug users: a cohort study

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Reviewer: Dan Ciccarone

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Determinants of hospitalization for cutaneous injection related infections among injection drug users: a cohort study.

The objective of this study was to investigate the determinants of hospitalization among a cohort of IDU attending a supervised injection facility (SIF). The authors quickly guide the analysis to the affect of nurse intervention upon receipt of hospital admission and length of stay. The study is successful in showing the common sense outcome, that nurse screening and referral leads to successful admission for injection related infections. Unfortunately, the study's findings on length of stay are premature given the current analysis.

Major Compulsory Revisions

A. Mixing differentially treatable conditions into the category of CIRI (cutaneous injection related infections) is the most problematic. Clearly, the authors did this to enhance analytic power, but at the expense of heterogeneity, which affects one of the principle outcomes, i.e., length of hospital stays. The selection bias is in favor of nurses screening out visible injection conditions (some of which are not necessarily infections) while leaving occult, or sub-acute, conditions to manifest longer. The latter, which include endocarditis and osteomyelitis, result in greater, perhaps much greater, hospital stays. The evidence for this is in the current data: those referred had 8 visits to the nurse for CIRI, suggesting less serious, recurrent skin infections as opposed to endocarditis (hopefully no one had 8 non-hospital visits for this!). The 8 day difference between nurse referred hospitalization and non-nurse-referred hosp. is also evidence for selection bias and heterogeneity. One would not expect an 8 day difference in treatment of common cellulitis or abscess, but perhaps one or two days. Medical screening for sub-acute conditions requires more through medical history and physical examination. There is no mention in the paper on the depth of medical history and examination. For example, are temperatures measured on each SIF participant? This would be the minimum for screening for occult conditions, but I doubt this happens on every participant given the volume of this successful injection facility. If only “complaining” IDU are screened, then occult conditions may go un-noticed by the nurse. No data on frequency of visitation to the SIF is given, so these occult infections may not be picked up between infrequent visits to the SIF.

I do not know how to “fix” this problem analytically, since power for the analysis
likely depends on the lumped outcome. Perhaps a stratified analysis looking at visible vs. occult infections would suffice. Alternatively, weighing each individual diagnosis by avg. length of stay based on pre-study (or pre-SIF) data.

A less concerning problem with the aggregate outcome is the categorization of all theses injection related outcomes as “infections.” Thrombophlebitis likely has more of an injury/inflammation etiology than infectious. “Ulcer” is a mixed diagnosis as is “myositis,” both implying, but not requiring infectious etiologies. A more clinical approach would either rename the aggregate outcome or more carefully delineate infectious diagnoses.

B. It is unclear how the coding of diagnoses was accomplished. Does the Canadian system have discharge summaries that entail “primary” and “secondary” discharge diagnoses? If so, which diagnoses are used is necessary information. If multiple diagnoses are used it is useful to know how far down the discharge list the analysis goes. The farther down one goes to get a CIRI outcome the less that diagnosis reflects the current hospitalization and its requisite length of stay.

C. The confounding variables used in the analyses are limited in conception. For example, these predictors of hospitalization for injection related infections seem more relevant: length of drug habit and depth of injection use (i.e., both proxies for number of skin intrusions – a good theoretical predictor of injection related injuries); site of infections (Binswanger); type of drug used (several are mentioned, but they overlap, e.g. heroin and speedball; prior infections (this is a real confounder given the likelihood of skin commensalization!). Personally, I believe heavy heroin and cocaine use are both predictors of abscess, so all the drug mentions could be lumped together at least in exploratory analyses). For length of hospitalization, confounders that are more accurate would include co-morbidities (HIV is included, but what about diabetes and liver disease?); prior hospitalization (a very good predictor in many hospitalization studies); depth and breadth of injection career, etc.

D. Another point regarding the heterogeneity of the outcome: some of the CIRI diagnoses have higher treatment costs than others.

Minor Essential Revisions

Consider citing some of the soft tissue infection literature from the US. For example, several good papers describe the magnitude and cost (MMWR, Ciccarone; Chen CID 2001) and predictors (Binswanger et al, Murphy et al) of this problem.

Measurements, para, 4: citation #17 seems to be missing in the first sentence.

Several times, the dyad “to hospital” is used. It sounds better to say, “to the hospital.”

It is stated: “all patients admitted…from the ED.” How else?

Discretionary Revisions

In proving the value of the SIF (already demonstrated in the impressive array of
published data) why did the authors not examine the protective effects of the SIF itself on preventing these recurrent infections? E.g., does number of SIF visits or number of nurse interventions limit recurrence? Does being a high vs. low utilizer of the SIF predict hospitalization controlling for length and depth of habit?

Going further (for the Discussion section), given the data could the authors recommend changes to the SIF to enhance medical treatment; e.g., on-site incision and drainage of abscess? The ISIS clinic is SF is an outpatient facility that reduces hospitalization. Although run by MDs, many abscesses can be managed by non-MD personnel. Can the SIF have a CIRI preventive function, e.g., screen and treat MRSA, or provide enhanced skin prevention based on recent CIRI to prevent recurrence? The SIF is an incredible foundation for many prevention interventions in addition to its primary HIV/HCV prevention role. In addition, occult infection, e.g., osteomyelitis and endocarditis require extensive periods of antibiotic treatment. Many users do not complete the required treatments leading to recurrence. Why not use the SIF for enhanced adherence to long course antibiotic treatments?

Conclusion:

This paper is from a team with an impressive record of accomplishment documenting the benefits of an impressive and avant-garde harm reduction facility. To document the clinical benefits of nurse intervention on reducing hospitalization for injection related injuries more vigilant in-depth analyses are required.

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Needs some language corrections before being published

Statistical review: No, the manuscript does not need to be seen by a statistician.

Declaration of competing interests:

I declare that I have no competing interests.