Hepatitis C virus (HCV) prevalence has reached epidemic proportions in the United States and is endemic among persons who inject drugs (PWID). HCV now ranks as the leading cause of chronic liver disease in the United States and it is estimated that 16,000 persons are newly infected each year. Persons with a history of injection drug use (IDU) - including current use - account for 55.8% (2.2 million) of positive antibody cases in the U.S. and the CDC estimates that IDU accounts for 50% of all acute infections.

HCV is a bloodborne virus that is spread primarily by percutaneous exposure to blood (e.g. intradermal, intramuscular or intravenous injection) and this is why IDU is the leading cause of incidence in the U.S. At the population level, a conservative estimate (at the time of writing) locates HCV prevalence among PWID to be somewhere between 30 and 70%, depending on frequency and duration of use, and incidence levels in the range of 16% to 42% per year. Studies on HCV transmission among young injectors (<30 years old) report lower prevalence, with rates ranging between 10 and 36%, although this still translates to more than 1/3 of young injectors being exposed to the virus.

These figures paint a harrowing picture of an epidemic running roughshod over people who inject drugs. Any virus that has a prevalence rate upwards of 70% in a given population should give us great pause. Yet, the fact that PWID make up a majority of those at-risk for infection means that, like HIV, the pause may linger for much too long. Be that as it may, it’s still quite possible that the lessons learned from HIV/AIDS can help prompt a national response to the hepatitis C epidemic, one that can avoid the types of political moralism that stymied America’s reflex to AIDS during the 1980s and 90s.

In the early days of the AIDS epidemic, as countries faced the initial threat of an unknown contagion, many states supported the forced quarantine of HIV-infected persons as an
effective tactic to prevent future spread of the disease. With AIDS, however, the practice of *cordon sanitaire* came to be seen as a dubious response for two reasons: First, although AIDS is a fatal disease, HIV, the virus that causes it, is not, which means there is the likely potential that a long time period will elapse between when a person first acquires the virus and when that person may die from AIDS-related causes. And second, HIV is not a communicable, air-borne contagion, but bloodborne, so besides unprotected anal and vaginal sex, drug injection with a contaminated syringe, blood and organ transplants, and semen donation, it’s not easily transmitted.

Fortunately, these discoveries led to a rather straightforward set of interventions for preventing future infections, whereby screening organ, semen, and blood donations, offering safer sex education, expanding condom distribution and increasing access to sterile syringes were found to significantly reduce the number of infections, especially as people began to think and act differently with regard to their sex and drug-using practices. While these characteristics make prevention—rather than the containment—an effective and relatively inexpensive strategy for protecting civil society from HIV/AIDS, they also make it unlike any other modern disease epidemic; that is, until HCV entered the picture and presented a myriad of analogous characteristics. Here are nine of them:

1. Both HIV and HCV are *not* communicable, air-born contagions, but blood-borne, and thus acquired through an exchange of contaminated blood.
2. There are currently no vaccines for the prevention of either infection;
3. Both viruses have prevention, i.e. harm reduction, as the primary strategy to reduce individual exposure;
4. Both diseases have treatment regimens that are limited by high costs and the demanding effects of anti-viral therapy;
5. Both viruses disproportionately affect PWID and as such are not democratically acquired;
Both viruses have needles, syringes and preparation equipment (e.g. cookers, filters, water, etc.) as transmission vectors;

Both viruses can retain their infective capacity on injection equipment (under the right conditions) for extended periods of time;

Both viruses have a protracted time-period between when a person is first exposed to the pathogen and when the onset of symptoms arrive from a subsequent illness;

Both viruses are disproportionately acquired by groups that are independently unpopular.\textsuperscript{11}

With these factors in common it seems plausible that tactics proven to reduce injection-related HIV transmission –like making sterile syringes more easily accessible– could have comparable results with HCV. This logic is based on three decades of scientific research establishing an inverse and causal relationship between increased syringe access and decreases in new HIV infections; a correlation most succinctly demonstrated by a substantial drop in injection-related HIV prevalence from more than 50\% to less than 10\% in regions with syringe service programs (SSPs).\textsuperscript{12} In the teeth of such evidence it’s easy to why researchers have started to examine whether SSPs can be just as successful in preventing HCV as they have with HIV.

At this point, however, it is still an open question. A few \textit{bona fide} studies have demonstrated reductions in HCV incidence due to SSPs\textsuperscript{13} while many other, equally reputable studies have found little or no effect.\textsuperscript{14} This wooliness notwithstanding, what is unequivocally true is that HCV prevalence has now surpassed HIV across all prevalence studies: recent data\textsuperscript{15} indicate that HIV prevalence among PWID is between 1\% and 10\% while HCV prevalence ranges between 30\% and 70\%.\textsuperscript{16} These results, it is sobering to say, clearly demonstrate that successes in the field of HIV prevention have not translated to HCV as comparable and reproducible outcomes have yet to be observed.\textsuperscript{17}
Hope persists, however, and appears in the form of studies reporting increased effectiveness when prevention efforts focus attention on preparation equipment in addition to syringes. The possibility that the sharing of cookers, filters and water play a formative role in HCV transmission (more than they do with HIV) is particularly instructive because it highlights the potential for there to be significant differences in how HIV and HCV function outside the body. The fact that HIV needs an airtight environment to survive—it can live only momentarily in the open air—is the principle reason why the syringe, with its hermetically sealed barrel, provides an ideal environment for HIV. It is also why HIV prevention efforts have hitherto focused on syringes as the riskiest of all transmission vectors.

Regrettably, this syringe-centered logic has had a tendency to identify the sharing of preparation equipment as being less risky than syringe sharing (and thus of lesser concern) on the basis that cookers and filters do not provide a closed-enough environment for HIV to subsist for more than a few moments. But when HCV is figured more heavily into the equation, this ‘hierarchy of risk’ will perhaps need to be modified seeing that scientists have recently demonstrated significant differences between HIV and HCV’s infective capacity. If accurate, these differences may account, in part, for why HCV infections exceed HIV across all prevalence studies.

The Exceptional Virulence of HCV

Ever since its official discovery in 1992 (formerly categorized as non-A/non-b hepatitis) scientists have characterized HCV as a virulent and easily transmissible pathogen. This is mainly attributed to the fact that it is ten times more concentrated in the blood than HIV and thus more effectively transmitted when any infected blood is involved. To investigate transmission capacity and the manner in which HCV behaves on injection equipment, researchers have begun to simulate the way syringes, cookers and surfaces are used in the drug preparation process. And the preliminary results are striking.
Contrary to HIV's fleeting lifespan, infectious quantities of HCV were detected on inanimate surfaces for more than two weeks after initial contamination. Like many viruses, hepatitis C is gradually inactivated when outside the body but the presence of heat has been shown to speed up the inactivation process and negatively impact its lifespan. When heating HCV in a spoon, for example, viral infectivity started to decrease when the solution reached 112°F and was only below the detection limit when the solution reached 136-144°F; though it generally took between 80-95 seconds of heating to have such an effect. On inorganic surfaces, infectious quantities of HCV were found for up to seven days after initial contamination and were reported to remain infectious under certain conditions for as long as sixteen days.

The high probability of HCV transmission has also been attributed to the virus's potential to remain infective in both needles and syringes for protracted periods of time. With syringes, hepatitis C virus has been shown to survive in the barrel of a syringe for up to 63 days. High dead-space syringes (HDSS), in particular, are especially worrisome due to their capacity to retain over 1000 times more blood after rinsing than low dead-space syringes (LDSS). The continued use of HDSS, when seen from the angle of prolonged infectivity, may contribute to why HCV infections resulting from contaminated syringes are estimated to be 5 to 20-fold higher than HIV.

When researchers compared syringes to preparation equipment, however, they reported differences that, if accurate, are quite astounding. Researchers discovered that infectious levels of HCV in syringe barrels tended to be lower than levels found on surfaces and cookers, suggesting a greater possibility of becoming infected through the use of contaminated preparation utensils and surfaces than through a tainted syringe. The decisive insight here is that preparation equipment, when coming in contact with infectious blood, may serve as viral reservoirs and be directly associated with HCV transmission even when using a sterile syringe.
A New Kit for Every Hit

Up until this point I have insisted on the importance of identifying both similarities and differences between HIV and HCV on grounds that our experience with the former can help inform our understanding and response to the latter. Even so, the fact that there is a high prevalence of HCV and a low prevalence of HIV, simultaneously, and within the same population, highlights the importance of narrowing in on their differences, particularly when trying to grasp the gravity of our present-day situation. Before proposing a few suggestions for how to modify existing safer injection (SI) protocols, let’s recap the above-mentioned differences between HIV and HCV so as to remind ourselves of the implications they have for how we design SI protocols intended for HCV prevention.

- HCV infections resulting from exposure to a contaminated syringe is estimated to be 5-to 20-fold higher than HIV transmission.
- HCV has been detected in syringe barrels two months after contamination.
- While a syringe barrel is a hermetically sealed and friendly environment for bloodborne viruses to thrive, infective levels of HCV were found to be lower in the barrel than on cookers and surfaces.
- While HIV is compromised quite rapidly by low temperature heat, HCV-contaminated solution needs to be heated for almost a minute-and-a-half and reach temperatures of 144°F for infectivity to be at undetectable levels.
- While HIV’s survival on inanimate objects is short-lived, HCV has been shown to survive on cookers and surfaces for up to sixteen days after contamination.

The foremost lesson to be drawn from comparing viruses is that HCV presents a unique set of behavioral risks for PWID by its ability to transform every piece of injecting equipment (syringes, cookers, filters, rinse water, mixing water, alcohol swabs and tourniquets) into a primary
transmission vector. In effect, the combination of protracted infectivity and environmental stability has the potential to transform the entire injection episode into a substantial risk factor since the setting itself contains a plethora of mandatory equipment that can harbor and transmit HCV.28

Now, suggesting we need to expand the boundaries that circumscribe “the risk environment”29 is not intended as hyperbole, nor is it meant as a ‘doom and gloom’ scheme to scare people straight, but instead posited as a reasonable explanation for why there is such a high prevalence of hepatitis C among former and current injectors. If this hypothesis is indeed accurate – even a little bit – then it’s essential for PWID to be aware that the reuse of contaminated cookers, filters, swabs, tourniquets and water can lead to the acquisition of HCV even when using a sterile syringe.30 It also highlights the need to incorporate preparation equipment into the “safety” equation and to modify our current SI protocols accordingly. Both efforts will require incorporating HCV’s behavioral risk profile into SI protocols originally based on HIV’s risk profile. Since there has yet to be a collective attempt to update existing protocols, let me propose, in what follows, a few suggestions to initiate this effort.

First and foremost, the syringe itself needs to be dethroned as the principle source of infectious contamination for the sole reason that it is manifestly not true. Instead, the risks accompanying the sharing of preparation equipment need to be considered on par with the risks associated with sharing syringes; otherwise, SSPs that continue to prioritize syringes will be less effective in reducing HCV infections than programs that place an equivalent importance on preparation equipment. Many programs spend copious amounts of time discussing syringe types and injection angles but deliberations on preparation equipment are often just a point to the shelf accompanied by the directive: “take what you need.” To complement the discussion surrounding syringes, service workers need to talk to their participants about HCV’s behavioral risk profile and the specific hazards involved when sharing preparation equipment. “A new kit for every hit” is an appealing catchphrase to popularize this effort.
Next, SSPs should explain to participants the health benefits of using LDSS. Harm reduction workers can explain that HDSS pose significantly greater risks and strongly suggest the use of LDSS whenever possible. This style of interaction is consistent with the non-judgmental ethos that characterizes the harm reduction philosophy. Being tolerant and open-minded towards a participant’s drug use, i.e. “meeting them where they’re at,” is intended to help service workers conceptualize and discuss a person’s drug use without sneering at their rationale or having contempt for their way of life. But a non-judgmental approach should never prevent workers from being frank and forthright when discussing injecting techniques with participants nor should it impede them from suggesting safer and more efficient ways to inject.

It is entirely acceptable for service workers to have straightforward discussions with program participants about their injection practices so long as both parties are committed to similar goals, like reducing the chance of acquiring bloodborne infections, avoiding bacterial infections and abscesses, maintaining healthy veins, etc. Stated somewhat differently, there is a substantial difference between confronting participants about their drug use in a haughty and contemptuous manner on the one hand, and having candid and pointed discussions on the hazards of certain injection techniques on the other. However, when having these discussions it’s important to keep in mind that a person’s decision to use a specific type of syringe is not always the result of individual choice but influenced by geography, culture, drug type, resource access, solution requirements, etc. Here in the U.S., for instance, PWID generally use fixed-needle syringes, most of which are LDSS, though with drugs requiring solutions greater than 1mL, such as speedball, steroid, or pill injections, PWID have been shown to employ –and need – high volume, high dead-space syringes.

Third, HCV’s lengthy infective period provides further evidence for the need to expand syringe access as SSPs have been shown to reduce the circulation time of syringes, i.e. the amount of time the average syringe remains in circulation before its disposed or exchanged, by twenty days.\textsuperscript{31} This, along with the fact that IDU is the primary ‘motor’ of HCV incidence, are just
two more reasons why SSPs should be supported and expanded at the state and municipal level.32

Fourth, safer injection education needs to tailor injection messages to PWID based on their drug-of-choice and the drug using trends of their social networks. These protocols must be flexible enough to adapt to the particular circumstances under which people acquire, prepare and inject their drugs while also being able to account for the limitations that paltry resources and milieu place on their ability to perform hygienic injections. To see why, it is useful to look at prescription opioid injection insofar as pill injections provide a window into how drug-type affects the drug preparation process and the choice of injecting techniques.33

Preparing prescription pills for injection requires more water than is typically needed to dissolve powdered (white or brown) heroin or even black tar. This is due to the fact that many tablet formulas include an assortment of “inactive” ingredients as binding agents, and with opioids these often include additional contents for controlling release or preventing diversion (or both). When mixed with water these inert ingredients have a tendency to coagulate the solution, turning it into a gelatinous and unwieldy concoction: the mixture turns gooey, filters are easily clogged and the solution becomes impossible to draw-up with a 1ml, fixed needle, insulin syringe. To prevent such a misfortune, folks will often divide-up pills (in crushed, powdered form) and prepare multiple solutions - by adding more water and less powder to each share - in an effort to produce a less viscous and more manageable solution. This process, albeit effective, nevertheless bodes ill for risk reduction for the reason that multiple solutions - when brought back together to make a singular, robust shot - yield a more voluminous final measure (>1ml) and often require the use of syringes with capacious barrels, most of which possess high dead-space. PWID need to appreciate the complexities associated with injecting pills and recognize the risks involved when sharing mixing-water and HDSS during the preparation process.34
The fifth is the need to educate participants on the high prevalence of HCV-infected persons already in the general population of PWID and to explain why this increases the likelihood of becoming exposed to HCV when sharing injection equipment. Tragically, many injectors perceive HCV infection as ubiquitous amongst their peers and many go so far as to see it as an inevitable outcome, a consequence of injecting.\textsuperscript{35} It is important to recognize that this belief is not the result of specious thinking given that 7-out-of-10 PWID, in some regions of the country, have been exposed to the virus; and since the chance of injecting with an HCV-infected partner is now greater than the likelihood of injecting with someone who is HIV-positive; and because a person can be exposed to HCV from just one instance of equipment sharing.\textsuperscript{36} All these factors, in totality, are what contribute to the overall perception that “everybody has Hep-C.” While PWID need to understand this state of affairs and be mindful of the potential harms that can result from equipment sharing, it is important to note that \textit{HCV infection is certainly avoidable and by no means inevitable}, especially when PWID are armed with knowledge and unsparing about not sharing injection equipment.

And lastly, we need to draw lessons from our experiences with HIV/AIDS and develop prevention strategies from the level of personal experience. (The early history of AIDS activism where drug injectors provided clean needles to fellow injectors to the dissatisfaction of health departments is a case in point.) After all, PWID were central to the development of SI protocols designed to prevent HIV transmission and their insights were decisive in making sure injection messages were appropriate to the actually-existing conditions on the ground. So clearly, involving PWID will help ensure that HCV-based protocols are both effective and practical. But we also need protocols whose practicality and efficacy can be tested, replicated and documented. The requirement that protocols be evidence-based and field tested highlights the key role that scholarship and scientific research need to play in the development process. The lessons ethnographers have acquired from observing \textit{in situ} injections should be combined with
drug user acumen and fused into a set of practical and effective recommendations for how to intervene - or not intervene - in people’s injection practices.

This deliberate mingle-mangle of science and experience is critical if SI protocols are to be both evidence-based and applicable to real life situations. To get PWID to truly amend their injection techniques, it is essential, as Greg Scott reminds us, that SI recommendations be region-specific and relative to the material conditions under which people inject their drugs. For Scott, this means supplanting a one-size-fits-all model of SI for what he describes as micro-interventions: behavioral interventions that are place-based and take into account the systemic barriers and limitations posed by real-life situations. This ecological approach to injection-related harm not only enriches our understanding of the public health challenges we face, but its pragmatic application furnishes us with the tools to confront the HCV epidemic head-on.

Conclusion

Out of the crooked tree of humanity no straight thing can ever be made.

–Immanuel Kant

The fact that people inject many types of substances under different conditions with varied resources and by way of personally unique tactics makes the process of generating a universal set of SI protocols an arduous and challenging undertaking. The eminent philosopher, Theodor Adorno, once warned that it is ideologically dangerous to think in universal terms when evaluating human behavior since the development of any social phenomenon is a product of an antagonism between what is universal to the human condition and what is particular to specific polities, cultures and individuals.37
For our purposes the universal is categorized as the “total hygiene model of safer injection” and defined as a set of techniques derived from a strict interpretation of HCV’s behavioral risk profile, and the particular is classified as the actually existing conditions under which people inject their drugs, meaning the real-life circumstances that serve to limit people’s capacity to pull-off sterile injections. The inherent tension between these two poles is what makes it dangerous to assume that hygienic outcomes can be achieved merely by ‘teaching’ PWID to perform an explicit number of steps in the proper order; because, following Adorno, the assumption rests on a disregard for the very factors that prohibit such an outcome from happening.

Ethnographic research teaches us that most people who inject drugs do so under circumstances well beyond their immediate control. Whether this concerns a lack of privacy, the threat of getting caught, persistent police presence, a lack of resources, or other outside influences, there are countless factors that can limit a person’s ability to perform hygienic injections. When these obstacles are taken into account, drug-using behaviors normally considered precarious and irresponsible can, under certain conditions, be regarded as entirely rationale and measured. Sadly, traditional injection messages tend to ignore these real life situations and the restrictive affect they have on people’s injection practices.

So here is the paradox that confronts us: On the one hand we need to design SI protocols based on the way HCV acts on injection equipment so we can interrupt the potential for contamination and prevent transmission, but on the other we need to identify the limitations people face in real-life situations and recognize how these barriers impede their ability to administer hygienic injections. The challenge, then, to creating realistic and effective interventions is to figure out how to incorporate what we know about HCV – that it’s an insidious and hearty virus and really easy to transmit – into prevention messages that take into account the unpredictable and inhospitable realities of the street. Such an effort will no doubt require that we get out of the office, the classroom, or the clinic and head-out into the street to further
engage PWID in conversations about their drug use so we can better understand their health needs and pleasure-seeking goals. This is the first step toward making sense of people's drug-using practices.

In the meantime, though, we need to act, as the situation before us is critical and requires a rapid and deliberate response. Broadly speaking, we need to come together as harm reductionists to figure out how a wide spectrum of injecting techniques can be incorporated into a set of SI recommendations that can be employed in diverse locations under varying circumstances and still be able to achieve meaningful results. I have described at length elsewhere how PWID, by employing the skills acquired from years of injecting, have been serving their communities as “hit doctors” and teaching their peers how to inject more safely and with greater effectiveness. It is in this role (as injection experts) that PWID have been central to the development of HIV-based safer injection protocols – and with HCV it should be no different. Concerned dopefiends need to be key players in coming up with techniques to inject more safely in an era of endemic hepatitis C, as they are in the most favorable position to gather evidence for such a breakthrough. After all, their health and the health of their junkie comrades depend on it. On this front, let's hope the past is predictive.

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† Dr. Zibbell was a visiting professor of anthropology at Skidmore College during the writing of this manuscript. The arguments and conclusions in this essay are therefore his and do not represent the Centers for Disease Control and Prevention.
I would like to acknowledge Dr. Greg Scott for making me aware of the moniker “beyond the point.” I promised myself, long ago, that I would no longer use gratuitous point slogans in my writing. But given how poignantly this one captures the essence of my argument when used literally, I found myself unable to resist. I hope readers accept this explanation and afford me a well-deserved mulligan for contributing to the pungent overuse of a word that is, as Shakespeare put it in Macbeth,” full of sound and fury yet signifying nothing.”

HCV is the most common bloodborne infection in the United States with an estimated 4.1 million Americans (anti-HCV) infected and 75-80% of those living with chronic HCV infection (see Armstrong et al. 2006, n.4). That this number represents an epidemic is self-evident when compared to the estimated 1.2 million persons infected with HIV.


Quite recently, in certain rural and suburban regions of the country, HCV infections have increased significantly within networks of young persons (aged 20-29 years) who inject drugs together. Lower HCV prevalence among younger injectors (10-36%) illustrates the need for prevention strategies designed specifically for freshman dopefiends given that the probability of being exposed to HCV increases every year after the transition to injecting. Perhaps the suppositions presented in this article can shed some light on the reasons why neophyte injectors are increasingly being increasingly exposed to hepatitis C.

What I mean to suggest here is that since drug injecting and gay sex were socially and politically demonized well before the onset of both HIV and HCV, people’s ability to sympathize with those most at-risk for infection is always already poisoned by the moral judgments of society.


20 This means that a person preparing an injectable solution would need to heat that solution for approximately a minute-and-a-half just to inactivate the virus to make it safer for injection. I lament suggesting that the majority of PWID would resist such a practice as most heroin injectors heat their solution for as little time as possible – if at all – in order not to “boil away” the drug from the solution. Nevertheless, the use of constant heat might be employed in ways that do not ‘compromise’ the drug and this should be explored when developing safer injection protocols specifically designed for HCV.


23 All syringes retain small amounts of fluid when the plunger is fully depressed. Researchers have described this area, the space where this fluid remains, as its “dead-space.” More specifically, the term “dead-space” refers to the space between the tip of the syringe, i.e. the hub of the needle, and the needle itself. Syringes have different degrees of “dead-space” depending on whether needles are fixed or detachable. Syringes with detachable needles are often referred to as high dead-space syringes (HDSS) since they contain a relatively high degree of space between the needle and the syringe tip, whereas low dead-space syringes (LDSS) refer to syringes with permanently attached needles and therefore very little (dead) space between the needle and the syringe. Researchers have discovered that HDSS retain small amounts of fluid in the “dead-space” when the plunger is fully depressed, while LDSS only retain fluid in the needle itself when the plunger is fully depressed and thus retain significantly less. “Experiments have shown that 1-ml high dead-space insulin syringes with 26-gauge 0.5-in. detachable needles retain approximately 84 _µl_ of fluid with the plunger fully depressed. In contrast, 1-ml low dead-space insulin syringes with 28-gauge, permanently attached needles retain approximately 2 _µl_ of fluid” (Zule, W.A., Ticknor-Stellato, K.M., Desmond, D.P., Vogtsberger, K.N., 1997. Evaluation of needle and syringe combinations. *J. Acquir. Immune Defic. Syndr. Human Retrovir.* 14, 294–295). This is a striking 82 point difference! For more on syringe types and the correlation between HDSS syringes and bloodborne viral transmission, see *World Health Organization*/HIV AIDS Programme, Guidance on Prevention of Viral Hepatitis B and C Among People Who Inject Drugs. July 2012, [http://www.who.int/hiv/topics/idu/](http://www.who.int/hiv/topics/idu/); and Strauss, K., van Zundert, A., Frid, A., Costigliola, V., 2006. Pandemic influenza preparedness: the critical role of the syringe. *Vaccine* 24, 4874–4882.
The use of HDSS has been shown to substantially increase a person’s chance of becoming HCV infected. Zule and Bobashev’s (2009) study in North Carolina, for example, found an independent association between a history of sharing HDSS and HCV prevalence among PWID. Their observations are consistent with experimental studies in HIV. (Zule WA, Bobashev G. High dead-space syringes and the risk of HIV and HCV infection among injecting drug users. Drug Alcohol Depend 2009 100:204–213). For a similar analysis see: Abdala N, Stephens PC, Griffith BP, Heimer R. Survival of HIV-1 in syringes. J Acquir Immune Defic Syndr HumRetrovirol 1999; 20:73–80.


For more on both the lifting of the 25 year federal ban on funding for syringe exchange programs in 2010 and its reinstatement in 2012, see http://www.washingtonpost.com/wp-

34 Making multiple solutions also increases the number of preparation steps that transpire during the injection episode, which, in turn, has been shown to increase the number of contamination points that may occur during the injection episode. For an informative discussion on this topic, see Greg Scott’s essay in the previous issue of this journal. (*Harm Reduction Communication*, 2011, issue 16)


36 For more on the high probability of transmission as a result of high HCV prevalence in the population of PWID, see: Hagan H, Enrique R, Pouget E, Des Jarlais D. A Systematic Review and Meta-Analysis of Intervention to Prevent Hepatitis C Virus Infection in People Who Inject Drugs, *J Infect Dis*, 2011, 204: 74-83, 1 July
