Laurence Thompson
Strategic Consulting

1141 Main Street
Saskatoon, Saskatchewan S7H 0K8
Office: (306) 668-0080 Cell: (306) 230-7753
Fax: (306) 668-0081
Email: thompson@ltsc.ca
Website: www.ltsc.ca

A review of needle exchange programs in Saskatchewan

Final report

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Strategic planning ■ Environmental scanning ■ Partnership and proposal development
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A Reference Group commissioned by the Ministry of Health reviewed the evaluation framework and drafts of the review, providing valuable input. This group consisted of:

- Susannah Fairburn, HIV/BBP/IDU Consultant, Population Health Branch, Saskatchewan Ministry of Health;
- Dr. Maurice Hennink, Deputy Medical Health Officer, Regina Qu'Appelle Regional Health Authority;
- Dr. Leo Lanoie, Medical Health Officer, Prince Albert Parkland Regional Health Authority; and
- Dr. Johnmark Opondo, Deputy Medical Health Officer, Public Health Services, Saskatoon Regional Health Authority.

The following LTSC staff contributed to this review:

- Allyson Clarke, Research Associate, conducted the search of research publications and the initial review of these publications
- Barb Crockford, Administrative Coordinator, scheduled the interviews and provided administrative support;
- Laurence Thompson, President and principal consultant, led the review, designed the research review, interview guides and evaluation framework, conducted some of the interviews, read and summarized the research obtained, summarized the interview results, and wrote this report; and
- Stephen Weiss, Research Associate, conducted many of the interviews, coded interview data, and reviewed draft reports and the final report.

A note on terminology and acronyms

Needles and syringes

In this report, we use "needle" to refer to what are technically a combined needle and syringe. This is the popular usage in Canada; hence needle and syringe exchange programs are referred to in Canada as "needle exchanges." Elsewhere in the world, the terms "needle syringe exchange" and "needle syringe program" (NSP) are commonly used.

Injection drug user (IDU)

This is the preferred term now used to describe drug use by injection. Although most drug use is through intravenous injection, it is possible to inject drugs by other routes; hence "injection drug user".

Needle exchange program (NEP)

Needle exchange programs are harm-reduction programs. They are designed to reduce the risk of the spread of blood-borne diseases among injection drug users. The main program objective is to distribute clean needles with the goal of sufficient needles for a clean needle for every injection. Many programs also have an exchange component. The goal of needle exchange is to remove used needles from circulation, and, secondarily, to remove used needles from the community where they may result in needle sticks to non-injection drug users. Most needle exchange programs are part of broader harm reduction programs that include or are linked to education, immunization, health assessment and counselling, and other programs.

Blood-borne diseases

Blood-borne diseases refer to diseases transmitted through contact with bodily fluids, most often blood. They include Hepatitis B (HBV) Hepatitis C (HCV) and Human Immunodeficiency Virus (HIV.) Hepatitis B can be immunized against; Hepatitis C and HIV cannot. Both Hepatitis C and HIV have serious health effects and can eventually cause death. Hepatitis C infects the liver, leading to cirrhosis and potentially liver cancer. HIV suppresses the immune system, leading to secondary infections and cancers. Treatment for both is possible but very costly. Treatment for Hepatitis C can cure a proportion of those infected. For HIV, treatment is to control and manage the disease only.

Hepatitis B is the most easily transmitted, but also easily prevented through immunization. Hepatitis C is very infectious from person to person through exposure to bodily fluids, such as blood, such that most injection drug users are infected within months of initiating injecting. HIV is less infectious, but still transmissible through shared injection equipment. Both are also transmissible through other routes, most importantly sexual contact.

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Summary

Key points

Saskatchewan's needle exchange programs have done a good job at reducing the spread of deadly disease among the province's 5,000 injection drug users. They have helped Saskatchewan keep its rates of HIV infection lower than the rest of Canada. This has spared lives, reduced HIV risk to all and saved millions of dollars in health care costs.

Despite this success, two challenges loom:

- Saskatchewan's HIV epidemic continues to spread.
- Discarded needles worry Saskatchewan people.

This review recommends two main responses to these challenges:

- A more aggressive, integrated and broadly based approach to reduce disease spread among injection drug users; and
- A province-wide approach to biohazard waste disposal.

This review was asked to answer six questions. Here are the questions and the response from this review:

1. *What works to reduce the spread of blood-borne infections from injection drug use?*

   Needle exchange is part of what works. We could still do more: peer educators, prison needle exchange, stronger links to mental health and addictions treatment and more aggressive HIV testing, contact tracing and education.

2. *How do Saskatchewan programs compare to other programs in Canada?*

   We distribute more needles than other provinces because Saskatchewan's unusual pattern of cocaine injection leads to very high use of needles.

3. *What can we do to reduce the risks of discarded needles?*

   Needle sticks are rare and the risk of infection is extremely low. It is also likely that many discarded needles do not come from needle exchanges. The solution is to make it as easy as possible to dispose of all needles safely.

4. *Do we distribute an appropriate number of needles, and do we get as many returned as possible?*

   Saskatchewan does a good job in coverage of injection drug use with clean needles. The return rate of used needles could be increased a little, but the real issue is making it easier to dispose of used needles.

5. *Is there appropriate oversight to ensure program policies are followed?*

   Needle exchange programs are well run by professional staff with many years of experience. Doctors with specialized training provide medical oversight. Concerns about needle exchange would be best addressed by safer disposal.

6. *What are community concerns and how can we better address them?*

   Most informants we interviewed support or are neutral about harm reduction and needle exchange. Their concern is discarded needles. This can be addressed by better biohazard disposal, public education about safe needle disposal, and needle clean up.

Executive Summary

Background

The Saskatchewan Ministry of Health commissioned an independent review of the province's provincially funded needle exchange programs in June 2008. The terms of reference are described below in the section titled "What this review found".

Injection drug use in Saskatchewan

Saskatchewan has an estimated 5,000 injection drug users, concentrated in the poorest neighbourhoods of the three largest cities. Powdered cocaine and morphine currently are the most commonly used injection drugs. Injection drug users report they can use 20 or more needles per day for short periods. Yearly, the average user uses 1,000 or more needles. Injection drug users use insulin needles -- the same needles used by diabetics. These are widely and legally available in bulk in grocery and drug stores.

Injection drug users are mostly marginalized people who use drugs to escape their bleak reality. As one needle exchange program staff member put it, "the needle in the arm is the symptom of many other issues." Addiction to injection drugs takes root in conditions of poverty, childhood sexual abuse and neglect, lack of education and employment and racism.

Injection drug use is high-risk behaviour for transmission of blood-borne infections. HIV and Hepatitis C are the most serious. For the most part they cannot be cured, are very expensive to treat, and shorten life.

Treatment options

Injection drug addiction is difficult to treat. Users often remain addicted for many years or go through many cycles of treatment and relapse. Success rates for treatment are low. They are almost nil if the user is not motivated to stop using and does not have strong social support.

Because of the low success rate of addiction treatment, two decades ago public health departments introduced harm reduction approaches to injection drug addiction. The purpose was to add to addiction treatment by reducing the harm of drug use before addicts were ready to stop using drugs. Harm reduction programs support and encourage the addict to take small steps to control his or her addiction and its effects. Progress is measured by reduction in the harm to self and others caused by addiction. One such harm reduction strategy is to provide clean needles to addicts to reduce the risk of blood-borne infections.

In Saskatchewan, public health departments in seven health regions now operate harm reduction programs for injection drug users that include clean needle distribution and exchange. Many of these include community outreach through community workers, partnerships with community organizations, and mobile vans. Needle exchange is often offered along with a range of services, such as counselling, health assessment and basic health care, health education, referrals for infection and addiction treatment, transportation, food, and clothing.

Needle exchange

To reduce as far as possible the discarding of used needles in the community, needle exchange programs exchange clean needles for used. They provide plastic boxes (sharps containers) to transport needles. They work with other organizations in the community to set up needle drop boxes in high use locations.

The challenges: climbing infection rates of HIV and handling used needles

Saskatchewan has been very fortunate in keeping the spread of HIV due to injection drug use low compared to the rest of Canada. In the past several years, however, new infections have climbed. This suggests Saskatchewan needs to redouble its efforts to stop the spread of this disease.

At the same time, there has been public concern about discarded needles in the community. This review surveyed the evidence on what works to stop the spread of blood-borne infections, what Saskatchewan could do to improve its efforts and how public safety can best be ensured.

What this review found

The terms of reference for this review are summed up in the following six questions. These are the answers we found to those questions.

1. **Research evidence: What works to reduce the spread of blood diseases from injection drug use?**

The overwhelming scientific consensus is that needle exchange reduces needle sharing that leads to blood-borne infections among injection drug users, especially HIV. Cost analyses show that distributing needles actually reduces total costs for health care, because HIV is so expensive to treat. The best estimate is that needle exchange programs reduce the transmission of HIV by one-third and provide a return on investment of four thousand dollars in health care costs saved for each thousand dollars spent. In Saskatchewan, this means an estimated annual savings in health care costs of four million dollars.

Best practices in reducing the spread of HIV include integrating needle exchange with other services, outreach services, and peer distribution (all of which Saskatchewan has), and peer educators, and prison needle exchange (Saskatchewan uses peer educators on a limited basis, and does not do any prison needle exchange). Recent research also shows that aggressive contact testing, contact tracing, and education of HIV positive injection drug users can reduce spread of HIV.

2. **Cross-Canada comparison: How do Saskatchewan programs compare to other programs in Canada?**

Saskatchewan's pattern of high-frequency injection of cocaine is, for reasons that are not clear, different from many other provinces. Our two neighbouring provinces have shifted towards use of crack cocaine, which is usually smoked. As a result, they distribute many fewer needles for their population than we do in Saskatchewan. If crack cocaine use spreads into Saskatchewan, the frequency of injection and so the demand for needles may well decline here as well.

Programs in Alberta and Manitoba offer drug users safer crack kits -- equipment for smoking cocaine -- because of the use of crack cocaine in those provinces. Saskatchewan does not currently offer such kits. Programs in other major prairie cities encourage needle return, but do not require one-to-one exchange.

3. **Public safety: What can we do to reduce the risks of discarded needles?**

Used needles that appear in the community -- on the ground, or elsewhere -- are a public concern. Discarded needles especially raise public concern when they appear where children can find them and when they appear in business districts where business owners do not like the image they present.

The issue of discarded needles is complex.

Needle exchange programs receive back about 90 per cent of the needles they distribute. Many of the needles that are not returned likely go to rural communities when drug users come to the city to get needles. Needle exchanges are torn between what they know is most effective in reducing the risk of infection -- distributing as many clean needles as asked for -- and public concern about discarded needles.

Needle exchanges are not the only source of needles. The needles injection drug users use are the same as the needles diabetics use for insulin injections. These can be and are bought in bulk in drug and grocery stores. It is very likely that many or most needles discarded in the community do not come from needle exchanges.

A further issue is that many users are reluctant to carry needles back to exchange, as they usually travel on foot and do not want to be hassled by the police for being found with them. A needle drop box in areas where there is high use of needles is an option. However, there are few needle drop boxes in some communities, and not enough to provide safe, easy to use disposal across our cities. Despite these difficulties, injection drug users return most of the needles they use to needle exchange programs.

A final factor is where injection occurs. Most injection drug users inject in their own home or that of a friend or relative. Transient or homeless users do not have this option and so seek public places, such as washrooms, to inject. Increasing homelessness and campaigns to drive injection drug use out of public washrooms spread injection drug use into parks and alleys, where used needles are more likely to be discarded on the ground.

The broader challenge is what to do with biohazard waste, to make it as easy as possible to dispose of needles used for whatever purpose. Other cities have concentrated on making needle drop boxes as widely available as possible, and educating injection drug users to use them, rather than enforcing strict needle exchange requirements.

Further reassuring research evidence is that despite the theoretical risk of infection from an accidental needle stick, the risk of infection from being stuck by a needle point is extremely low where the needle is not fresh and where no injection from the syringe occurs. Australia was unable to identify a single case of blood infection from a community needle stick in the entire country, ever, despite distributing 30 million needles a year. In Canada, of 274 needle sticks of children treated at two Montreal hospitals over an 18-year period, not one resulted in infection. In Saskatchewan, we were able to identify at most a handful of needle sticks that occur per year in the community or to public service workers (outside health care) from handling needles. We were not able to identify any such needle sticks in Saskatchewan, ever, that had resulted in infection.

4. Needle distribution and return: Do we distribute an appropriate number of needles, and do we get as many returned as possible?

Saskatchewan does a good job in providing injection drug use with clean needles for each injection -- as good or better a job as anyone else in the world. Saskatchewan programs now distribute about 4 million needles per year. We estimate that this results in close to full coverage of clean needles for all injections in Regina and Prince Albert, and about 60 per cent coverage in Saskatoon.

The 90 per cent rate of return of needles province-wide can probably be improved a little more. Regina, for example, has achieved a 94 percent return rate. But the real issue is to make it as easy as possible to dispose of used needles by having needle drop boxes in public areas and sharps disposal containers in washrooms throughout Saskatchewan cities.

5. **Oversight: Is there appropriate oversight to ensure program policies are followed?**

Needle exchange programs are well administered, with well developed policies, staffed by professional public health nurses and community workers with many years of experience. Medical and policy oversight is provided by Medical Health Officers, physicians with specialized public health training.

What could be strengthened is overall provincial strategic and technical support for programs, such as standardized injection drug user registration, standardized reporting, statistical analysis, staff training, sharing of best practices and setting of program standards. Different programs have developed some different approaches; these should be shared and evaluated, and the best of each implemented across the province.

The main controversy about policy and oversight is around one-for one-exchange. Saskatchewan needle exchange programs achieve a return rate of 90 per cent. While they generally follow a one-for-one exchange principle, this is relaxed on a case-by-case basis. The overall return record of the user may be considered, or the reason why they do not have returns, such as having lost them in a move, or that they are taking needles back to a rural community for a group of people.

The problem with insisting on one-for-one exchange is that research shows that this can restrict access to clean needles and therefore increase infection rates. It also does nothing to address safe disposal of needles purchased for injecting illicit drugs or other uses, such as insulin injection. Programs in Alberta and Manitoba do not insist on one-for-one exchange; instead they educate users about safe disposal and support a system of needle drop boxes in the community.

6. **Acceptability: What are community concerns and how can we better address them?**

Most informants in Saskatchewan we interviewed support or are neutral about harm reduction and needle exchange. What they worry about is discarded needles, particularly around children. They want fewer discarded needles and more information and education about how to deal with them.

While we could not locate any public opinion surveys on needle exchange in Canada, opinion surveys in Australia and the United States show that the majority of the public supports needle exchange (although not drug use), and that opposition lessens when people are given more information about such programs.

Public concerns can be addressed in several ways: by more public education about what to do when finding needles, including safe needle disposal, and by organized clean-up campaigns, especially following the spring thaw, when many needles appear. Other strategies include exchange programs bolstering their return rates through education, education aimed at service workers about harm reduction and safe needle handling, and, peer-to-peer education to injection drug users about safe needle disposal.

What next?

The challenges

Until recently, Saskatchewan has kept its rates of HIV infection from injection drug use much lower than the rest of Canada. Because of this, many Saskatchewan residents, injection drug users and those who might be infected by them (mainly through sexual contact), are spared a deadly disease. As a bonus, Saskatchewan taxpayers save an

estimated at four million dollars per year in health care costs for HIV treatment because of the investment in an effective needle exchange program.

Despite this success, Saskatchewan faces two challenges:

1. In the last few years, Saskatchewan's HIV epidemic, under control for two decades, has climbed to approach the rates of other large Canadian cities. Harm reduction and infection control programs must step up to the next level to keep the spread of HIV contained.
2. Discarded needles in the community concern the public in general and parents in particular. Although the risk is low, the concern is there. These needles come from many sources, not only needle exchange programs. Saskatchewan must address the broader issue of easy, safe disposal of biohazards such as needles.

The response

This review recommends two main policy initiatives to address the challenges we have identified.

1. A more aggressive and integrated approach to harm reduction among injection drug users.

   Key features of this approach include to:

   - Extend existing best practices across the province, such as tracking users in a registry and partnering with community organizations for service delivery close to where injection drug users live. The goal of tracking users is to be able to "case manage" progress with clients so that every contact has a purpose in reducing the harm of injection drug use and so the overall progress of the blood-borne infection epidemic and of its management can be monitored.
   - Aggressively reach out to test, identify, counsel, contact trace, educate and follow up every HIV-positive injection drug user.
   - Provide a broad range of health care and social services to injection drug users on the street and in the communities where they live. This means integrating primary health care, infection control, addictions, social supports, and public health services around the needs of injection drug users. The goal of this integrated service approach will be to extend and deepen the approach to harm reduction to better limit harm and to provide a door to hope that is easier to open for users.
   - Strengthen provincial strategic support in data collection, analysis and best practice development and staff training.
   - Expand injection drug user registration programs to all consenting users, using of a common electronic database, such as that developed by Saskatoon Health Region.

2. A community-based, province-wide approach to biohazard waste collection and disposal to address all biohazard wastes.

   This will require:

- Waste collection systems that provide readily available access wherever needles and other biohazards are used;
- Public and user education on safe disposal and handling of biohazards;
- Waste pickup and disposal systems.

Both of these policy initiatives will require provincial leadership and a funding plan. The benefits will be worth it. HIV control is one of those rare health programs where investments in prevention pay off in actual savings in health care costs.

1. Introduction

In June 2008, the Population Health Branch, Saskatchewan Ministry of Health, requested an external review of needle exchange programs in Saskatchewan. The Ministry engaged Laurence Thompson Strategic Consulting (LTSC) to carry out this work. This consulting company carries out health services planning, evaluation, and reviews to improve health services and health professional education. The principal consultant, Laurence Thompson, is former CEO of Saskatchewan's Health Services Utilization and Research Commission, former interim CEO of Saskatchewan's Health Quality Council, and an experienced applied health services researcher and evaluator

The review encompassed needle exchange programs in Saskatchewan. It included:

- A review of research evidence on effective practices in harm reduction through needle exchange;
- A comparison of Saskatchewan programs to other programs in Canada; and
- A review of the Saskatchewan programs from the point of view of public safety, maximization of needle exchange, volumes of needles exchanged, program policies and oversight, and community acceptability.

The review included key informant interviews, document review, a review of research evidence, and a survey of programs across Canada. The review commenced in July 2008.

The review is the first to review Saskatchewan's needle exchange programs since a 2002 review commissioned by Saskatchewan Health provided a comprehensive analysis and set of recommendations for a strategy to control blood-borne pathogens and injection drug use. This review focussed on reviewing a specific strategy, needle exchange.

Review questions

Questions addressed in this review, given in the terms of reference, included the following:

Research evidence

What does the research evidence say about effective practices in reducing the harm of blood-borne disease in the population through needle exchange? What are demonstrated effective practices and what are the best practices in implementing those practices?

Cross-Canada comparison

What are the current practices of other needle exchange programs across Canada? How do Saskatchewan programs compare to other programs in Canada?

Public safety

Are there additional steps that can be taken to minimize safety issues posed by discarded needles to the general public and to specific occupational groups, such as health care workers and police?

Volume of needles exchanged

Are the programs structured to ensure safeguards/measures to maximize needle exchange rates? Is the number of needles exchanged appropriate?

Oversight

Are appropriate oversights in place to ensure program guidelines/policies are adhered to?

Acceptability

Is there more work that could be done with community stakeholders (including police) to ensure acceptability of needle exchange practices in the involved communities?

2. Methods

Evaluation framework

LTSC developed a detailed evaluation framework for the review in consultation with the Ministry and a Reference Group established by the Ministry for this review. The Reference Group included the Medical Health Officers of the Regina Qu'Appelle, Saskatoon, and Prince Albert Parkland Health Regions and the HIV/BBP/IDU Consultant of the Population Health Branch, Saskatchewan Ministry of Health. The evaluation framework included:

- A logic model, including proposed indicators and measures (Appendix A);
- Interview guidelines for key informant interviews (Appendix B);
- Protocol for the research review (Appendix C);
- Preliminary identification of major reviews of and best practice guidelines for needle exchange.

The evaluation framework was designed to address the following questions put forward by the Ministry in commissioning the review:

- Are there any best practices not currently being used that should be implemented in needle exchanges in the province?
- Is the current service model appropriate for Saskatchewan? Are there any gaps that need to be addressed?
- What are the issues related to safety (impact of needle exchange on needles found in public (community) settings, and found in police raids on dealers premises)?
- Are needle exchange rates lower than acceptable?
- Are community-based organizations sufficiently accountable?
- The relationship between drug dealers and needle exchange programs (NEPs) in Canada: Are drug dealers included in distribution patterns, (whether it is common in Canadian needle exchanges to supply drug dealers either directly or indirectly with needles/syringes and how common is this pattern in Saskatchewan)? Are drug dealers in Saskatchewan preloading syringes acquired through NEPs?
- Why are Saskatchewan's distribution rates higher than in other jurisdictions, and is this problematic?
- With such high numbers of needles being distributed, why are HIV numbers increasing?

Research review

LTSC conducted a research review to identify and summarize high-quality research evidence on the following topics:

- The effectiveness of needle exchange programs;

- Best practice guidelines developed to guide needle exchange programs.
- Any harms caused by needle exchange programs to the public or to those involved in collecting and disposing of needles; and
- Public acceptability of needle exchange programs.

The search protocol followed, and statistics on the search yields are attached as Appendix C.

Document and data review

LTSC reviewed documents and data shared by the Ministry of Health and obtained from Saskatchewan needle exchange programs and summarized data on current patterns and historical trends of needle exchange. From the logic model for the needle exchange program, we created a table of indicators of program activities, outputs, and outcomes. The completed table is used to report Saskatchewan program data in the Findings section of this report.

Key informant interviews and analysis

In each of the seven Health Regions that conduct needle exchange programs, LTSC conducted in-person or telephone interviews with key informants or their designates, as follows.

- The director and any front-line staff suggested by the director in each regional public health and community-based needle exchange program;
- The chief of police or the RCMP commanding officer for the area covered by the program;
- The fire department chief;
- The mayor;
- The Medical Health Officer;
- The regional executive director of mental health and addictions;
- The directors of each of the public and Catholic school boards;
- The directors of two other community organizations with contact with the population of intravenous drug users, at least one of which will be an Aboriginal organization. These organizations will be agreed upon at the first meeting of the Reference Group;
- Current or former injection drug users in the three major urban sites;
- Other selected key informants;
- Key informants outside of Saskatchewan identified by the Reference Group.

The interview guides are attached as Appendix B.

Survey of Canadian needle exchange programs

LTSC identified, reviewed, analyzed, and summarized existing reports and surveys of operational statistics of Canadian needle exchange programs. The search protocol followed and statistics on the search yield are attached as Appendix D. LTSC also interviewed directors of comparable programs in three other major prairie cities.

Report

During the course of this review, LTSC prepared an interim and final draft version of the report and shared them with the Reference Group for comment and input.

3. Findings

Research review

Risk of transmission of blood-borne disease

Risk of transmission of blood-borne diseases is highest through contact with bodily fluid of an infected person through the broken skin of another person. This is why sharing of injection equipment in drug use is so risky -- it is a highly effective way of transmitting blood-borne disease. The most common transmission risk that occurs in healthcare, public service and community settings is through punctures with a “sharp.” Most frequently this is a needle stick. Needle sticks are most frequent among health care workers, with nurses the most likely to receive them.

The risk of transmission varies by the disease and the form of contact. Contact of fluids with intact skin is a negligible risk. Estimated risk of exposure to non-intact skin or mucous membranes varies in steps by a factor of ten. HIV is the least infective, with 0.3 percent of exposures estimated to result in infection. With Hepatitis C, three to ten per cent of exposures result in infection, and for the most infectious, Hepatitis B, an estimated 30 per cent of exposures result in infections (Health Canada, no date).

Hepatitis B can be completely controlled by immunization. Hepatitis C is therefore the most common and the most difficult to control blood-borne infection among injection drug users. In surveys in seven Canadian cities between 2003 and 2005, two-thirds (65 per cent) of injection drug users were infected with Hepatitis C. Thirteen per cent were infected with HIV (Public Health Agency of Canada, 2006). The common wisdom among needle exchange staff is that most injection drug users will become infected with Hepatitis C within six months of starting injecting. Transmission of Hepatitis C can occur through sharing other injection equipment, such as spoons, water, and filters, increasing the risk of transmission. HIV, on the other hand, is most likely to be transmitted by sharing needles. Because HIV has a lower transmission risk and that risk can be reduced by interventions such as needle exchange, most of the emphasis of harm reduction programs is on reducing the spread of HIV.

Health effects of injection and blood-borne disease

Dependence on injection drugs is a chronic condition that puts the user at high risk of infection with blood-borne diseases with severe health effects, including eventual early death (Institute of Medicine, 2006).

Hepatitis C infection may be asymptomatic for long periods. In the long term, however, it leads to liver cirrhosis, liver failure, and liver cancer. Co-addiction to alcohol and drugs aggravates the liver consequences.

Untreated HIV infection leads to Acquired Immune Deficiency Syndrome (AIDS), in which the immune system is suppressed and the body succumbs to infection or cancer.

Other health effects of injection drug use include skin abscesses, bloodstream bacterial infections and heart valve complications from infections. All these lead to infections requiring aggressive antibiotic treatment and sometimes admissions to hospital for intensive medical care.

Trends and patterns in blood-borne disease

Until recently, Saskatchewan cities had much lower rates of HIV infection than similar cities across Canada.

Overall data on the proportion of injection drug users infected with HIV (prevalence), based on blood samples of injection drug users in various years in selected cities across Canada, show an upward trend during the 1990s and a stabilization of the proportion infected since 2000 (Table 1). During this period, the two Saskatchewan cities included in the surveys (Regina and Prince Albert) both have been consistently well below the HIV infection rates of other surveyed cities. In 2005, for example, Regina's HIV infection prevalence among injection drug users was 2.9 per cent, while Edmonton was 23.8 per cent.

Table 1. Percentage HIV prevalence among injection drug users in Canada, selected surveys

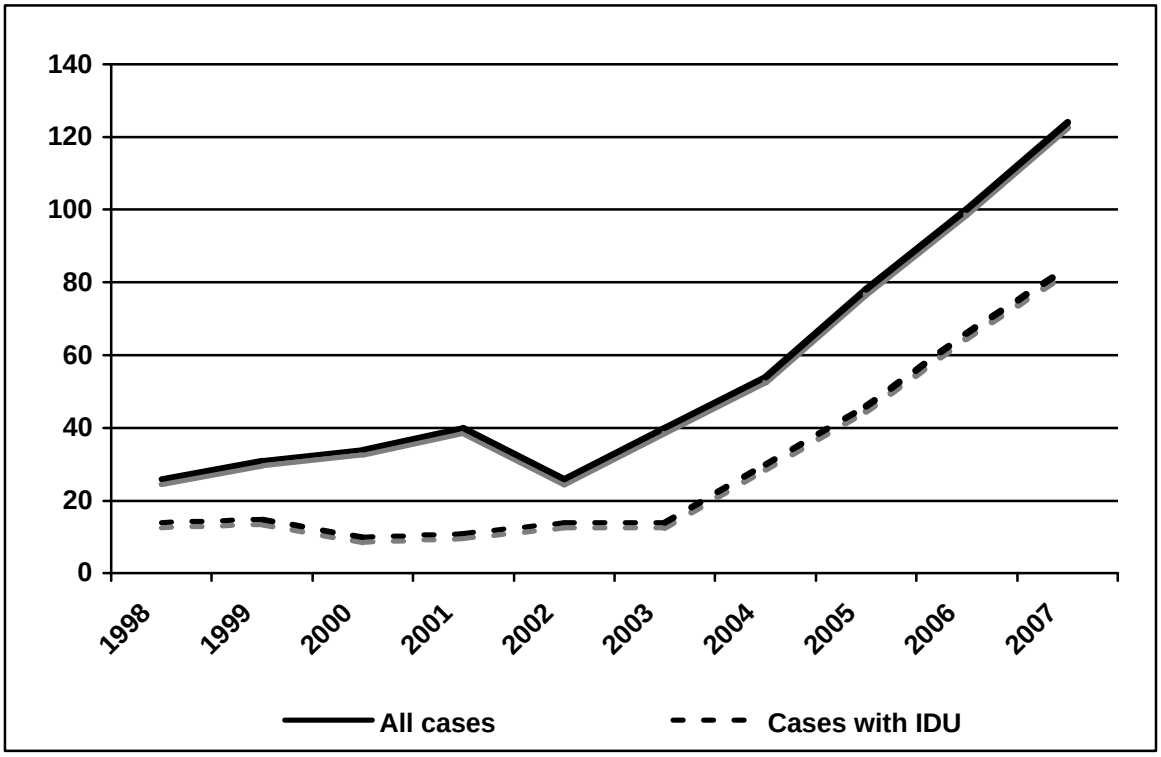
	1986-90	1992-94	1997-98	2000	2002	2003	2004	2005	2006	2007	2008
Eastern Canada											
Province of Quebec (nine sites) and Ottawa						19.6		17.3			
Sudbury					10.1		12.2				
Toronto		5.5	8.6			5.1	7.6				
Western Canada											
Victoria					16.0	15.4		12.5			
Winnipeg	2.3		12.6					13.1			
Edmonton								23.8			
Saskatchewan											
Regina				2.0	1.2			2.9		9.0	
Prince Albert			1.1								
Saskatoon											15.0

Source: adapted from PHAC 2007, p. 72, Table 1 and Prince Albert Health District, no date, p. 43. Regina 2007 prevalence is from the I-tracks study of that year, not yet published and obtained from the Deputy Medical Health Officer of Regina Qu'Appelle Health Region. Saskatoon 2008 prevalence is from the Saskatoon Health Region database of active registered needle exchange clients.

However, the trend in new infections in Saskatchewan is changing this picture. The rate of newly reported HIV infections in Saskatchewan is almost double that for Canada as a whole. There were 124 newly reported HIV infections in Saskatchewan in 2007, or 12.4 per 100,000 people. The rate for Canada as a whole in 2007 was 7.4 per 100,000 people (2,432 new cases reported in a population of 32,976,000 people for Canada; Saskatchewan population 996,900,000) (PHAC, 2008; Statistics Canada, 2007).

Newly reported HIV infections in Saskatchewan have been steadily trending upwards, with a more rapid rise beginning in 2005. The number of new positive cases in 2007 was three times the number in 2003 (Figure 1).

Figure 1.Trends in HIV newly reported cases, Saskatchewan, 1998 - 2007, all cases and cases with injection drug use (IDU)



Source: Saskatchewan Health, no date.

In Saskatchewan, most of this increase can be attributed to injection drug use. The proportion of newly reported HIV cases reporting injection drug use in Saskatchewan is three times as high than for Canada as a whole. Most new HIV cases in Saskatchewan report injection drug use. In Saskatchewan, 68 per cent (84 of 124) of newly reported cases of HIV in 2007 reported previous injection drug use (Saskatchewan Health, no date). For Canada as a whole, 23 per cent of newly reported HIV infections in 2007 occurred among injection drug users (Saskatchewan Health, no date), down from an estimated 35 per cent of new HIV infections in 1996 (PHAC, 2007). The rapid rise in new cases starting in 2004 coincides with the widespread use of cocaine in Saskatchewan.

A detailed study ((Saskatoon Health Region, 2006) of the rapid rise in newly detected HIV cases in Saskatoon indicated the patterns underlying the rapid increase in HIV in the past few years:

- HIV is transmitted through close social networks, in which needle sharing often occurs.
- Few injection drug users access HIV testing. Those infected with HIV are often unaware of their status. The network investigation identified 33 previously undetected cases of HIV infection among injection drug users in Saskatoon.
- Many of those aware of their infection are not connected to healthcare because of lack of symptoms or their reluctance to interact with the health care system. Fewer than half who were

aware of being HIV positive and one-third of those aware they were HCV positive were seeing a doctor for care.

- Many do not get sufficient needles for a clean needle for each injection. Forty-four per cent reported they could not get all the needles they required.

Social aspects of needle sharing

Injection drug users group together in social networks based on common characteristics. There are both social and economic reasons for needle sharing (Somlai et al., 1999). Recent research has expanded on this insight and demonstrated that social networks are significant in initiating and supporting injection drug use. However, networks can also be important routes for reaching injection drug users to control high-risk behaviour, through peer educators and contact tracing (De et al., 2007a; De et al., 2007b; De et al., 2007c; Saskatoon Health Region, 2006; Schoener, Hopper & Pierre, 2002; Shaw et al., 2007; Shaw et al., 2008; Wylie, 2005; Wylie, Shah & Jolly, 2006).

Needle use among injection drug users

The most widely used estimate of the average annual needle use among a population of injection drug users is 1,022, based on national American survey data (Lurie et al., 1998; Lurie, Jones & Foley, 1998). This estimate has since been generally accepted and has been used in a number of economic evaluations of needle exchange. This is an average; the actual use by an individual injection drug user depends on where they are in the lifetime trajectory of drug use, which drug they inject, and how much drug supply they can afford. Cocaine is the drug that leads to the most frequent injection because of the short-lived high.

Approaches to reducing HIV and HCV infection among injection drug users

There are several broad approaches to controlling injection drug use or the spread of blood-borne diseases among injection drug users (Witteveen & Schippers, 2006). Which approach should be followed is a matter of the research evidence about what works, the legal structure, and the political and public opinion climate. Briefly the main approaches proposed and tried for control of injection drug use or its effects are criminalization (incarceration and conditional or coerced treatment), abstinence, medical treatment, and harm reduction. A fifth, broader approach is to address the root causes of injection drug use before use starts -- a preventive approach to address the social conditions in which drug addiction flourishes.

Criminalization, incarceration and/or mandatory treatment

The criminalization approach attempts to apply sufficient penalties to drug use and effective enforcement of those penalties to discourage its use and/or to remove access to drugs through incarceration. This approach links to treatment because of court-ordered treatment for drug offenders, often referred to as mandatory treatment.

Technically, mandatory treatment is not legally possible in Canada for adults. Rather, Canadian treatment programs in the justice system are more accurately described as conditional coerced treatment. That is, under section 742 of the Criminal Code of Canada, a court can apply a sentence conditional on certain actions by the person sentenced, including attending drug treatment. The process requires the defendant to plead guilty and to volunteer for drug treatment (La Prairie et al., 2002; Mugford & Weekes, 2006).

Abstinence

Abstinence-based approaches developed out of the twelve-step (Alcoholics Anonymous) approach to alcohol abuse. This approach dominated addictions treatment until the 1990s. A basic principle of twelve-step programs is that absolute abstinence is required. This contrasts with harm reduction (see below) that recognizes that many addicts cannot or will not abstain. Because addictions treatment has often been led and staffed by those who successfully completed a twelve-step process, addictions services staff have often been strongly opposed to harm reduction approaches. The opposition in addictions services to harm reduction, as well as the disease control aspect of harm reduction, meant that harm reduction approaches to injection drug use developed in public health programs, often in isolation from addictions treatment programs. This was the case in Saskatchewan in the 1990s.

Medicalization

Medicalization approaches began as physician-supervised controlled administration of addictive drugs such as heroin. This approach has been used in some centres in England for decades (Ogborne, Carver & Wiebe, 2001). A more recent and widely used approach for opiate addiction is methadone replacement therapy for opiates. Methadone blocks the opiate receptors and avoids the severe symptoms that accompany opiate withdrawal. It largely blocks the high of opiates, leaving them ineffective. It does not block the effect of stimulant drugs such as cocaine, however.

Harm reduction

Canada's Centre for Addiction and Mental Health (2002) has defined harm reduction as "any program or policy designed to reduce drug-related harm without requiring the cessation of drug use" (p. 1). Harm reduction recognizes that many or most addicted drug users are not prepared to consider immediate abstinence. While harm reduction approaches are aimed at those not willing or able to cease their drug use in the short run, they are compatible with an eventual goal of stopping use.

The focus of harm reduction is to reduce the harm from substance abuse, whatever the level of the substance abuse (Fischer, 2005). The harm reduction approach was originally developed for alcohol and tobacco addiction. By the late 1980s it began to be applied to illicit drug use. The failure of abstinence-based treatments to control injection drug addiction, the growing risk of hepatitis and HIV infection among injection drug users, and the risk that posed to the general population, led to an approach to start by limiting harm rather than aiming immediately to stop drug use. During the 1990s harm reduction was widely adopted as a strategy to limit the effects of illegal drug use. Canada's Drug Strategy set harm reduction as its overall aim. The US National Association for Public Health Policy, the Canadian Centre on Substance Abuse and the World Health Organization endorsed the principles of harm reduction (Centre for Addiction and Mental Health, no date, 2002).

While harm reduction is a different approach from criminal enforcement to stop the use of prohibited drugs. It does not aim to legalize illicit drug use. The basic principles of harm reduction are: pragmatism, focus on harms, prioritization of goals, flexibility and maximization of intervention options, individual autonomy, and evaluation against clear goals. (Centre for Addiction and Mental Health, no date).

The priority of harm reduction is first to decrease the negative effects of drug use. Health care providers work with injection drug users using a hierarchy of goals. The first goals are more immediate and achievable, such as lowering the risks from use, while moving towards eventual reduction and elimination of drug use (Chicago Recovery Alliance, 2005).

The approach of Saskatchewan harm reduction programs is illustrated by the working definition of harm reduction used by the Saskatoon Health Region Street Health Program which:

- "Accepts persons where they are at; . . .
- "Empowers persons to make informed choices . . . .
- "Strives to reduce the health and social harms associated with behaviors, but neither condemns nor condones risk behaviors" (de Bruin, Lindberg & Grauer, 2008, Appendix A.)

The effectiveness of needle exchange programs

There is an overwhelming scientific consensus that needle exchange programs are effective in reducing the risky needle sharing behaviour among injection drug users that leads to transmission of the HIV and Hepatitis C viruses (HCV). While not every study conducted has demonstrated the effectiveness of needle exchange in reducing blood-borne disease, the consensus is that the combined weight of the evidence now indicates its effectiveness. Using criteria typically used to measure the effectiveness of public health programs, the weight of the evidence supports the positive effect of needle exchange in reducing the spread of blood-borne disease. This conclusion reflects an overwhelming consensus in the scientific research community on this question. Although there is dissent on this conclusion (Käll, Hermansson, Amundsen et al., 2007) it tends to come from individual clinicians involved in drug treatment and from organizations with previously declared positions on the issue, rather than from scientific researchers studying the effects of needle exchange programs on populations. Support for the harm reduction approach of needle exchange comes from organizations as diverse as the World Health Organization (2004a, 2004b), Canada's National Collaborating Centre for Infectious Diseases (NCCID), (2008), the Fraser Institute (Erikson, 2001), Health Canada (2001), the Global HIV Prevention Working Group (convened by the Gates and Kaiser Foundations) (2007), the US Institute of Medicine (2006), and the Council on Scientific Affairs (Yoast et al. 2001).

Two recent review documents summarize the evidence for the effectiveness of needle exchange. The first, Wodak and Cooney (2006), conducted for the World Health Organization, is the most comprehensive and recent review of the research. Wodak and Cooney cite seven previous reviews carried out over the past two decades by US government agencies with similar conclusions.

Wodak and Cooney's conclusions are virtually identical to the conclusion of a second major review, that of the (United States) Institute of Medicine (2006), published in the same year as Wodak's review.

Wodak and Cooney reach five overall conclusions based on their review of the research evidence (p. 802):

- "Increasing the availability, accessibility, and . . . utilization of sterile injecting equipment by IDUs [injection drug users] reduces HIV infection substantially."
- There is "no persuasive evidence that NSPs [needle syringe programs] increase the initiation, duration, or frequency of illicit drug use or drug injecting."
- Needle syringe programs are cost-effective;

- Needle syringe programs "can increase recruitment into drug user treatment and possibly also into primary healthcare."
- Needle syringe programs cannot alone control HIV infection among injection drug users.

LTSC reviewed the evidence from the past ten years focussing on research not included in Wodak and Cooney's review, especially research published since that review. Wodak and Cooney's conclusions are supported by a number of studies not included in their review (Badrieva, Karchevsky, Irwin & Heimer, 2007; Des Jarlais et al., 2005a; Des Jarlais et al., 2005b; Des Jarlais et al., 2007a; Huo, Bailey & Ouellet (2006); Huo & Oullett, 2007; Ksobiech, 2006; Wu et al., 2007).

The strongest evidence of effectiveness of any intervention comes from experimental research (also called randomized controlled trials (RCTs)). We identified one such RCT of needle exchange as an intervention. Wu and colleagues (2007) compared the rates of new HIV and HCV infections in randomly selected communities where needle exchange was introduced and without needle exchange. Needle exchange reduced needle sharing by half, reduced incidence (new cases) of HCV, and reduced HIV incidence in one needle exchange community, compared to the communities with no needle exchange.

The most comprehensive estimate of the effect of needle exchange programs in reducing HIV and HCV infections comes from a worldwide comparison (Commonwealth Department of Health and Ageing, 2002). Researchers compared changes in HIV and Hepatitis C infection rates among injection drug users in 103 cities with and without needle exchange programs across the world. They estimated needle exchange programs were associated with a reduction in the rate of new HIV infections per year (incidence) of 33 per cent. Where the existing prevalence of HIV was below ten per cent, as it has been in Saskatchewan, the reduction in incidence of HIV with needle exchange was18 percent. For HCV, needle exchange was associated with two per cent reduction in new infections. The review concluded that needle exchange programs "are effective in reducing the incidence of both diseases and . . . represent an effective financial investment by government" (p. 6).

Cost benefit and cost effectiveness of needle exchange

Once health interventions prove effective, the next question is whether the result obtained is worth the cost. This is a cost-effectiveness analysis.

On the cost-benefit issues, Wodak and Cooney (2005) concluded, "needle syringe programmes reduce HIV transmission effectively, safely and cost effectively. The size of the benefit is substantial" (p. S31).

In our search of the research evidence, we identified five evaluations of the cost effectiveness or cost benefit of needle distribution in avoiding the costs of increased HIV and HCV infection. Two of these used Canadian data. All of these studies reported cost savings in health care or to society as a result of clean needle distribution. These results are based on the research evidence that needle distribution programs reduce the rate of infection of HIV and on the very high costs of HIV treatment compared to needle distribution. The high costs of HIV and HCV treatment have been further documented in three additional reports that estimated the costs of HIV and/or HCV treatment. These cost evaluations and treatment cost estimates are described below.

The most comprehensive study examined national population level costs in Australia. The Australian Commonwealth Department of Health and Ageing (2002) found that needle distribution programs represent an effective financial investment by government. Their

analysis estimated that a total government and consumer investment of $Aus150 million over ten years (87 per cent of that expenditure by government) resulted in a discounted net saving in health care costs to society (almost all of it to government) of $Aus2,500 million.

Reid (2000) conducted the most complete American analysis. He presented a comprehensive framework for estimating the cost benefit of needle distribution. The framework includes estimates of the cost of potential harms, such as increased crime and drug overdoses, and the value of lives saved by avoiding HIV infection. He estimated the discounted cost of needle exchange per participant at $181 in 1993-94 dollars and the total discounted value of the benefits at $367,000 per participant, for a cost benefit ratio of 1:2,000. Most of the benefit was in the value of lives saved, but even if only the discounted value of reduced health care costs is used ($8,350), the cost benefit ratio is 1:41. These ratios indicate that investment in needle exchange is an extremely high-return investment.

In an earlier study, Laufer (2001), using 1996 New York data, estimated an annual needle exchange program cost of $US21,000 per HIV infection avoided. They compared that to an estimated discounted lifetime cost of treating HIV infection of from $US87,000 to $US195,000, for a cost savings ratio of 1 to 4 to 1 to 10.

In a Hamilton, Ontario, study, Gold and colleagues (1997) estimated that clean needle distribution resulted in savings of four times the cost. They concluded that needle exchange programs are an efficient use of financial resources.

In Edmonton, Jacobs and colleagues (1999) estimated needle exchange cost $Cdn9,500 (in 1997 dollars) per HIV infection delayed for one year. They calculated that the present value of paying for needle distribution to avert one case of HIV for the estimated lifetime of a person with AIDS was $116,000, less than the estimate of the present value of the cost of treating a person with AIDS, $150,000.

Later, Krentz and colleagues (2003), also working with Alberta data, estimated the cost of medical treatment for HIV/AIDS patients in 1997-98 at about $12,500 per year.

Shackman and colleagues (2006) provided the most recent estimate of lifetime cost of HIV care in the US: a discounted present value of $US385,000 in 2004 dollars. These costs of HIV care are about double the estimates Jacobs created, using older Canadian data.

Elliott (2007) reported annual treatment cost estimates by the Correctional Service of Canada for HIV case of $29,000 and for HCV of $26,000, considerably higher than Jacob and colleagues' and Krentz and colleagues' earlier estimate.

These estimates of annual and lifetime costs and cost savings, applied to Saskatchewan's injection drug using population, suggest that cost savings to the health system are in the range of four million dollars per year or $130 million over the lifetime of injection drug users using needle exchange. These estimates are based on the following calculations:

- Gold's 1997 estimate of savings four times the cost of needle exchange would give Saskatchewan a net annual saving of $4.2 million due to needle exchange, based on Saskatchewan expenditure of about $1.4 million per year on needle exchange (Table 4);
- Jacob's data indicates a lifetime saving of $34,000 per injection drug user involved in needle exchange. This estimate, multiplied by the estimated 3,850 injection drug users involved in needle exchange in Saskatchewan (5,000 users times 77 per cent needle exchange coverage) suggests $131 million in health care costs saved over the lifetimes of the users.

- The higher, more recent estimates by Shackman and colleagues of lifetime treatment costs and by Elliott of annual treatment costs suggest the estimates derived from Gold and colleagues' and Jacobs and colleagues' data are minimum estimates.

Wodak and Cooney (2006) summarize evidence on cost effectiveness that provides similar cost savings estimates to these. All cost-effectiveness studies reviewed indicated cost savings with needle exchange.

What is the best possible effectiveness of HIV control achievable through needle exchange?

A quick, easy-to-measure indicator of how well HIV infection is under control in a population is population prevalence (the proportion of the population with HIV). A better measure of HIV control is HIV incidence (true incidence, or a proxy measure, new case detection) per 100 person-years at risk. HIV incidence due to drug injection is a good measure of how well HIV spread is controlled in a population of injection drug users.

Table 2 presents data from published research on HIV incidence rates achieved in various populations of injection drug users where interventions to control the spread of HIV have been implemented. Baseline and follow-up incidence after the intervention are both shown where available.

Some major US sites have achieved incidence rates of 1.0 or lower. In Scandinavia, incidence rates of 0.1 are reported from national registries.

Modes of delivery of needle exchange

Policy options for needle distribution and exchange other than dedicated, fixed-site needle-exchange programs include hospital-based (Masson et al., 2007), mobile and pharmacy-based needle distribution and exchange, and syringe dispensing machines. These services are complementary to other ways of delivering needles in that they reach different users, in different ways and at different times (Islam & Conigrave, 2007.) Other harm-reduction policy options for addressing the health risks of drug injection include distribution of equipment for smoking cocaine and heroin, and oral methadone substitution programs for opiate injection. The evidence for each of these options, except for methadone, substitution, which was beyond the scope of this review, is summarized below.

Pharmacy needle syringe distribution and exchange

In Canada, pharmacies are part of the distribution system for needles for injection drug use in that syringes and needles are legally available and readily purchased in pharmacies without a prescription. (This is not the case in many US states.) Pharmacy-based needle exchange is less costly than dedicated needle exchange programs. However, pharmacy-based needle exchange depends on the attitudes of individual pharmacists for its operation. Many pharmacists do not want to participate. It also does not offer links to support services, counselling, and referrals to drug treatment (Deibert et al., 2006; Matheson, Bond & Tinelli, 2007).

In a decade of tracking Scottish pharmacy needle exchange practices, few pharmacies provided needles, the number providing needles changed very little, and the number providing sharps disposal declined (Matheson, 2007). While four-fifths of Scottish pharmacies dispensed methadone, only 12 per cent of pharmacies offered needle exchange in 2006, very little changed from eleven years previously. The proportion of pharmacies willing to sell needles declined from 40 to 33 percent over the same period. In 2006, fewer than half (43 per cent) of pharmacies offered sharps disposal. Services

provided by pharmacies depended on the attitude of the pharmacist towards the service. Three-quarters of pharmacies wanted more training for their staff in drug misuse and prevention of blood-borne disease.

Table 2. Comparative HIV incidence rates* from research

Description	Rate*	Comments	Reference
IDUs in China, 2002-03 - needle exchange intervention - control group	 36.2 47.2	True incidence: new cases were new injectors in the 12 months between baseline and follow-up surveys. Time at risk assumed to be 0.5 year per person	Wu et al., 2007
IDUs in two sites in China / Vietnam - Site 1 – baseline - Site 2 – baseline - Site 1 – after intervention - Site 2 – after intervention	 11-19 20 0 4	Estimated incidence (p. S112, Table 2)	Des Jarlais et al., 2007a
Vancouver Injection Drug Users Study, 1996-1998	8.3	First 15 months of study (p. F47)	Schechter et al., 1999
IDUs in Chicago, 1988-92 - Baseline - Follow-up after intervention	 8.4 2.4	Secondary report of Weibel (1996)	Coyle, Needle & Normand, 1998
Vancouver Injection Drug Users Study, 1996-2004 - all HIV- cases at baseline - daily cocaine injectors	 3.2 5.0	Completed study 133 / 1035 infected over 4 years (p. 175) 20.2% infected over 4 years (p. 175)	Wood et al., 2007
East coast and Midwest US needle exchange sites, 2000	1.0	Approximate rates (p. 120)	Des Jarlais et al., 2007b
Norway, 1996 Sweden, 1996 Denmark, 1996	0.1 0.1 0.3	Estimated national incidence rate (2X semi-annual rate reported (p. 255)); predominant drugs were heroin and amphetamine	Amundsen et al., 2003
New York City, 1999-2002	0.8	Abstract, p. 1439	Des Jarlais et al. 2005b

* new cases per 100 person-years at risk

In New Zealand, one-fifth of pharmacies provide one-quarter of the needles distributed in the country (Sheridan, Henderson, Greenhill & Smith, 2005). Since 2004 needles are provided free by pharmacies on exchange of a used needle. Previously, users had to purchase syringes.

In England, one-fifth of pharmacies provide half the needles distributed in the country, free to users (Sheridan et al., 2000; Sheridan, 2005, Matheson, 2007). Pharmacists' concern about safety, effects on other customers, the negative effect of security staff, and pharmacists' greater comfort with dispensing medicines than with providing other services contributed to the low rates of participation of pharmacies in needle syringe distribution in the UK (Matheson, 2007.)

In separate surveys of pharmacies in England and New Zealand, pharmacists involved in the programs identified as major issues training for pharmacy staff and increasing return rates of needles were (Sheridan, 2000; Sheridan, 2005).

Outreach

Outreach needle exchange programs reach higher-risk users. Injection drug users who access needles at mobile vans are higher-risk users than those that access needles at a fixed site. Those who access needles at pharmacies are the lowest-risk users (Miller et al., 2002; Riley et al., 2000.) Mobile vans make needle distribution more accessible to harder-to-reach and higher-risk groups of injection drug users (Islam, 2007; Miller 2002). Van users are newer users, report more difficulty getting needles, and are more likely to be Aboriginal, to have recently been jailed, and to use cocaine (Miller, 2002).

Syringe-dispensing machines

Syringe-dispensing machines assist in making clean needles more accessible to injection drug users (Islam, 2007.)

Peer and secondary distribution

Secondary distribution of needles and syringes, through users who obtain needles and then redistribute them to other users, is widespread in needle exchange programs. This secondary syringe distribution occurs through existing social networks of users. It provides an opportunity to reach and provide peer education to users who do not interact directly with programs (Snead et al., 2005).

Organized peer distribution of needles and syringes by injection drug users has been undertaken as an all-night street corner exchange in the heart of Vancouver's drug use district. Evaluation indicated that the peer-run exchange reached some of Vancouver's injection drug users at highest risk for HIV infection, particularly due to its night-time hours (Wood et al., 2003.)

Organized use of peer educators in needle syringe exchange has also been successfully used in other countries (Wu, 2007.)

Smoking equipment

Distribution of foil packs for heroin smoking can be successful in switching heroin users' drug use behaviour away from injecting (Pizzey & Hunt, 2008). Some Canadian programs are now distributing safe crack smoking kits (Johnson et al., 2008; Leonard et al., 2008) as a means to encourage safer drug use.

On-demand needle distribution

Needle exchange programs with on-demand needle distribution, rather than one-to-one needle exchange, provide greater coverage of injection drug users (Heimer, 2008). This is likely due to secondary exchange extending coverage, which is restricted by one-to-one needle exchange.

A California study of needle exchange program clients (Bluthenthal, Anderson, Flynn & Kral, 2007) reported that syringe coverage (the number of needles accessed from needle exchange programs as a proportion of the number of needles used) was strongly correlated with needle sharing. Compared to clients with adequate syringe coverage (100 to 149 per cent of needles used), clients with less than 50 per cent syringe coverage had 2.3 times greater odds of using a shared needle. Compared to the same group with adequate coverage, those with 150 per cent or higher coverage of needles had half the odds of using a shared needle.

Barriers to full coverage needle distribution

Klein (2007), from a survey of the Canadian situation of needle syringe programs, identified a number of barriers to access that prevent achievement of the goal of full coverage (one clean needle for each injection). These included:

- Criminal law and its enforcement (legal proscription of drug paraphernalia and used syringes, perceptions by drug users of the law and how it may be enforced, patterns of law enforcement);
- Program design (too short operating hours, inappropriate location and setting, policies that limit exchange to one-for-one);
- Restricted access to syringes at pharmacies;
- Stigma and client concerns about privacy;
- Community resistance; and
- Insufficient funding;

Integration of needle syringe exchange with other health services

The World Health Organization recommends that needle syringe programs be closely linked to other health programs through referrals and outreach from other services. Other services that should be linked include addictions treatment, abscess management, HIV testing and counselling, and treatment of sexually transmitted and blood-borne infections and tuberculosis (WHO, 2004c.)

In a discussion of the development of epidemic HIV among injection drug users in Vancouver despite a needle syringe exchange program, Strathdee et al. (1997, p. F59)) summarizes the lesson as that needle exchange programs should be "one component of a comprehensive programme including counselling, support and education. . . . Appropriate education, counselling and treatment options should be implemented simultaneously." p. F64)

Prison needle exchange

Injection drug users are frequently imprisoned or have been recently incarcerated. This has led to a call for pilot prison needle exchange programs to combat the spread of blood-borne infection in prison through needle sharing (Brahmbhatt, Bigg & Strathdee, 2000; Hughes, 2000; Lines et al., 2006.) A number of such programs have now been introduced in Europe (Lines et al., 2006.) Several organizations have called for introduction of prison-based needle-syringe programs, including the Ontario Medical Association (2004), and the World Health Organization (2007a). The United Nations Office on Drugs and Crime (2006) has set out a set of principles for prison HIV prevention. One of these principles is equivalence of health care for prison populations.

Despite prohibition and close supervision, injection drug use in Canadian prisons does occur. Seven studies of injection drug use in Canadian prisons have produced estimates of from two to 24 per cent of prisoners in various prisons reporting injection drug use in prison. One study queried use of used needles; 32 percent of those injecting reported using used needles (Lines, 2006).

Among almost 900 admissions to federal prisons screened in 2004, 22 percent reported a history of injection drug use (three per cent while incarcerated). Of the three-quarters of screened admissions who agreed to testing, five were HIV positive; two of these were

unaware of their positive status (Smith, 2007). Furthermore, prison incarceration is an independent risk factor for high-risk needle sharing even after release (Wood et al., 2005)

Health evidence

The evaluation evidence on prison needle syringe programs from Europe indicates that prison needle exchange programs:

- Do not endanger staff;
- Do not increase drug use;
- Reduce risky injection behaviour; and
- Virtually eliminate HIV transmission (Dolan, Rutter & Wodak, 2003; Lines, 2006; Canadian HIV/AIDS Legal Network, 2008; Nelles et al., 1998; Stöver, 2000.)

Legal issues

A further case made for prison needle exchange is a legal one, based on human rights legislation and the Charter of Rights. Denial of access to needle syringe exchange in prison may be subject to legal challenge (Elliott, 2003). More recently, the Canadian courts have addressed this issue in a far-reaching decision that, if upheld in higher courts, would broadly affect both needle exchange programs and prison needle exchange.

In the highly publicized "Insite" safe injection site case in Vancouver, BC, the presiding judge, Pitfield ruled on two sections of the federal criminal drug law (the Controlled Drugs and Substances Act) that potentially criminalize the handling of needles used for drug injection and the operating of a safe injection site (PHS Community Services Society v. Canada (A.G.), 2008). The two sections define and criminalize trafficking and allow for ministerial exemptions for research and other reasons. Pitfield ruled that the sections violated the Charter of Rights. According to the judge's ruling, the criminal drug law "contributes to the very harm it seeks to prevent. It is inconsistent with the state's interest in fostering individual and community health, and preventing death and disease." It was "arbitrary," "not in accord with the principles of fundamental justice," and "grossly disproportionate . . . in its application."

The ruling has been appealed by the federal Attorney General and very likely will go to the Supreme Court of Canada for final disposition. The outcome of these appeals will have legal impact beyond the specific case of Insite; the legal arguments and judicial decisions resulting in that case will also apply to needle exchange in general and to prison needle exchange.

Drug treatment courts

A review of evaluations of drug treatment courts (most in the United States) showed that such courts reduced repeat offenses by 14 per cent (Latimer, Morton-Bourgon & Chrétien, 2006). However, evaluations of two Canadian drug court pilot projects showed that rates of completion of court mandated treatment were very low. In Toronto 16 percent of those starting the program graduated, while in Vancouver, it was 14 per cent. In Vancouver, 88 per cent of participants tested positive for drugs within six months (National Crime Prevention Centre, 2007a, 2007b). Werb et al. (2007), in an overview of these two evaluations, commented that "the evaluations of Canadian [drug treatment courts] have so far failed to demonstrate that these programs are effective in reducing rates of recidivism and drug use among program participants" (p. 16).

La Prairie et al. (2002) comments on preliminary results from the Toronto drug treatment court that the stronger sanctions on criminal drug use in the United States may mean that drug courts in the US are more effective in dealing with serious offenders, while less serious, more motivated offenders may do best in the Canadian courts.

Targeting, engagement and outreach

Holtgrave and Anderson (2004) make the argument that targeting counselling and testing on high-risk injection drug users can make a substantial difference in HIV transmission rates. They point out that the overall, annual HIV transmission rate in the US has been a stable four per cent of injection drug users infected per year. However, the annual rate of infection (annual incidence) for users not aware of their HIV status is 11 per cent, while for those aware of their HIV positive status it is under two per cent. Further, for HIV positive injection drug users aware of their status who receive effective HIV counselling and testing, transmission is close to zero. Among those HIV positive users aware of their status who do not receive counselling, or who do not change their behaviour as a result, the HIV transmission rate remains at two to four per cent.

Holtgrave and Anderson make several recommendations for HIV prevention from this analysis:

- Test high-risk populations (such as injection drug users) to ensure all know their HIV status;
- Provide appropriate counselling services for those who test positive;
- Monitor HIV-positive injection drug users for ongoing high-risk behaviours; and
- Intensify counselling, support and other prevention services where necessary.

Hudoba, Grenyer and O'Toole (2004) described an Australian program for assertive treatment of injection drug users. The program aimed to increase the training of needle exchange staff and to support staff to use these skills to engage injection drug users in medical, psychological and social services. Staff training significantly improved staff knowledge and skills. Referrals to drug treatment services increased after staff training from 44 to 49 per cent of users. Referrals to health and medical services also increased.

Wylie, Shahb and Jolly (2007), in a study of social networks of injection drug users in Winnipeg, found that some individuals acted as bridges between clusters of users, and that these individuals often practice high-risk behaviours, making them ideal agents for transmission of blood-borne infections. Because of this analysis, the authors suggest aggressive contact tracing and education is vital to epidemic control.

Links with mental health and addictions treatment

Needle exchange participation is associated with reduced drug use and increased drug treatment enrollment (Hagan, 2000a). Bélanger et al. (2000) reported that injection drug users who had been in contact with a needle exchange program for more than two years were almost four times a likely to have quit drug use than those in contact with the program for fewer than two years.

It is possible to obtain high rates entry to drug treatment among injection drug users attending needle exchange programs. Ceasing drug use completely, however, is a difficult goal. In a Baltimore, MD study, half of referrals from needle exchange initiated treatment; of those initiating treatment, three-quarters completed treatment; however, of those in treatment, about half still had positive drug tests (Brooner et al., 1998).

Entry can be increased using case management. Another Baltimore, study achieved an overall rate of entry to drug treatment of 34 per cent. Forty per cent of injection drug users entered treatment within seven days with case management, versus 26 per cent with referral only. The key component of case management that contributed to higher rates of drug treatment entry was providing transportation (Strathdee et al., 2006). Other research showed that a single motivational interview is not sufficient to increase entry into treatment (Kidorf et al., 2005).

Needle sharing is associated with depression (Braine et al., 2004; Gossop et al., 2002). In a Canadian survey, Tjepkema (2004) concluded that illicit drug dependence is strongly associated with depression: 24 per cent of men and 32 per cent of women with drug dependence are depressed.

Methadone substitution program and residential drug dependence treatments can substantially reduce injection drug use, sharing needles and unprotected sex among injection drug users (Gossop et al., 2002).

Best practice guidelines for needle exchange programs

We identified recent documents recommending evidence-based best practices for needle syringe programs. Best practice guidelines summarize research evidence in a form that can be used as program guidelines. These are summarized below.

Ashton (2004, p. 27) noted “Getting sterile equipment to injectors is essential but not necessarily enough. Proactive intervention aimed at behaviour change may be needed if the exchange’s output is not simply to feed unchanged sharing patterns.” While needle distribution is the core service, around this should be built:

- Formalized risk assessment of clients;
- Client education;
- Encouraging and facilitating treatment entry;
- Addressing poverty and distress;
- IDU peer collaboration; and
- Maintaining and enhancing staff skills.

A survey of staff and users of Canadian harm reduction programs (Canadian Harm Reduction Network / Canadian AIDS Society, 2008) identified the following needs and best practices:

- Ready access to appropriate drug treatment programs;
- Methadone maintenance programs (for opiate addiction);
- A drug substitution option for cocaine similar to methadone for opiates;
- Peer involvement;
- Accessible needle distribution, including in prison;
- Safer crack-use kits;
- Safe injection sites;
- Drop-in centres and shelters;

- Preventive education of youth and education of other service providers about drug use, including police;
- Health services provided by caring, non-judgemental health providers; and
- Outreach;

The US Centers for Disease Control and Prevention (2001) recommended:

- Client-centered education and counseling on risk factors;
- Referral to treatment for substance abuse;
- Needle syringe exchange; and
- Hepatitis A and B vaccination.

A group of United Kingdom groups together recommended a set of "essential service elements" for controlling blood-borne disease spread (National Needle Exchange Forum (NNEF), UK Harm Reduction Alliance, Exchange Supplies, 2006). These included:

- Access to a full range of injecting and other equipment from a range of fixed-site needle exchange programs, pharmacies, and outreach (including peer-delivered and secondary needle exchange);
- Local, easy access that is user-friendly and confidential;
- Access to specialist needle exchange programs, with trained staff, that provide education, health assessment, testing, vaccination, and wound care; and
- No limits on the amounts of injecting equipment people can take away.

The Ontario Needle Exchange Programs best practice recommendations (Strike et al., 2006) include the following:

- Provide sterile needles in the quantities requested by clients, without requiring clients to return used needles, with no limit on the number of needles provided, and with encouragement to return used needles;
- Educate clients about the risks of using non-sterile needles;
- Educate staff and clients to safely handle and dispose of used injection equipment;
- Provide multiple options and locations for safe disposal of used injection equipment;
- Distribute other IDU supplies, including cookers, filters, citric or ascorbic acid, sterile water, alcohol swabs, and tourniquets. It also recommends the distribution of glass stems and brass screens for smoking cocaine;
- Use models of delivery that maximize accessibility; and
- Collaborate with local agencies that serve injection drug users to provide additional locations for injection drug users to receive needle exchange program services.

The Ontario best practices document includes further best practice recommendations in:

- Safer injection education;
- Safer sex promotion and provision of safer sex materials;
- Overdose prevention education;
- Referrals and counselling;
- Improving access to primary care for injection drug users;
- First aid for abscesses and skin problems;
- Vaccination and testing;
- Relationships with law enforcement; and
- Program evaluation.

The United Nations Office on Drugs and Crime (no date) outlines a three-part strategy to reduce the adverse consequences of drug abuse and stop the spread of blood-borne disease:

- Prevent drug abuse;
- Facilitate entry into drug treatment; and
- Reduce adverse health and social effects of drug abuse.

The World Health Organization (WHO) (2007b), in a *Guide to starting and managing needle and syringe programmes*, provides an extensive description of and checklist for such programs. The WHO program-level checklist includes:

- Tailor programs to local needs;
- Build public support;
- Do not allow police to block programs;
- Seek flexible, sustained funding;
- Replicate good programs;
- On-going training for managers and staff;
- Learn from experience to develop specific program features to achieve high coverage; and
- Target the most vulnerable drug users.

Potential harms caused by needle exchange programs

Crime

Marx et al. (2000) compared trends in arrests in needle exchange program and non-needle exchange program areas before and after introduction of a needle exchange program. Introduction of a needle exchange program had no effect on arrest trends.

Needle disposal

A major public concern about needle exchange programs is the potential for disposal of needles in an unsafe manner. We reviewed the evidence on this issue.

A research review (Ksobiech, 2004) estimated the overall worldwide return rate for needles to needle exchange programs at 90 per cent. It ranged from 15 per cent to 112 per cent.

The review also noted that "it is generally unclear where the needles were originally acquired, and if IDUs return their own needles, or are returning needles for a social network" (Ksobiech, 2004, p. 1).

Coffin et al. (2007) concluded that HIV-positive injection drug users who obtain syringes from a safe source are more likely to safely dispose of their needles. Coffin also noted that diabetics produce the vast majority of community-generated syringes, although those disposed of by injection drug users present particular concern because of the high prevalence of blood-borne infections among injection drug users.

Birkhead et al. (2007) described a New York City policy that all health facilities must provide community sharp disposal facilities.

Increased syringe coverage does not result in increased unsafe disposal (Bluthenthal et al., 2007.)

Broadhead, van Hulst and Heckathorn (1999) examined the effects of closing a controversial needle exchange program in New England. Following the closure of the needle exchange program, injection drug users reported increased reuse and sharing of needles. The closing of the needle exchange did not reduce the volume of discarded syringes and other drug-injection debris found in surveys of outdoor drug-use areas. Broadhead and colleagues concluded that after closing of the program the problems that led to the closure remained while injection drug users engaged in higher levels of HIV risk behavior.

In Baltimore, the start up of a needle exchange program led to a decline in the number of discarded needles relative to counts of other background trash over the following two years (Doherty et al., 2000.)

Needle stick injuries and resulting infection

Thompson, Boughton & Dore (2003) studied HBV, HCV, and HIV infections from community-acquired needle-stick injuries in Australia. Thompson and colleagues found no infections reported in Australia, despite the distribution of 30 million needles per year in needle exchange programs. The authors concluded that the risk of infection from community-acquired needle-stick injuries is extremely low.

Canadian evidence on the risk of infection from needles discarded in the community comes from a study by Papenburg and colleagues (2008) of 274 children with needle sticks from discarded needles, treated at two Montreal hospitals since 1988. Not one became infected with HIV, Hepatitis B, or Hepatitis C.

Do needle exchange programs increase drug use?

In a study that compared frequency of injection drug use between injection drug users randomized to a needle exchange program and those with usual (pharmacy) access to needles, researchers found no differences in frequency of injection drug use. They concluded that needle exchange programs do not increase drug use (Fisher et al., 2003).

Public acceptability of needle exchange programs

A review of public opinion surveys in Australia found that public support for needle exchange programs ranged from 50 to 90 per cent. Opposition to needle exchange programs lessened when those surveyed were given information about needle exchange programs. Support for needle exchange programs in surveys did not necessarily mean those surveyed accept drug use (Treloar & Fraser, 2007).

Coffin (2000) reported similar evidence of positive public opinion. In the US, a 1996 Kaiser Family Foundation poll reported 66 per cent popular support. Hart Research polls reported 54 to 55 per cent support for needle exchange from 1995 through 1997.

Biohazard waste disposal

In 2008 the Saskatchewan Ministries of Health, Environment, and Advanced Education, Employment and Labour released the Saskatchewan Biomedical Waste Management Guidelines. The Guidelines provide considerable detail on the technical aspects of biohazard waste disposal, but do not specifically address either injection drug use needle ("sharps") disposal or system issues around the organization and funding of sharps disposal. The document contains a specific section, Appendix F-2, on guidelines for the disposal of sharps wastes by the general public. The document recommends two methods for disposal:

- At an approved collection facility such as a health facility or pharmacy or, where this option is not available, in a disposal ground where care is taken to ensure that the wastes are not compacted by heavy equipment;
- Where this is not practical in a "non-puncture resistant container made of thick opaque plastic (e.g. bleach bottle)" with the lid screwed tightly, placed into garbage bag for disposal with household garbage.

Unique aspects of cocaine use

Cocaine injection is a strong risk factor for HIV infection and was a major factor in the Vancouver HIV epidemic among injection drug users in the late 1990s (Tyndall, 2004; Wood et al., 2002).

Social impact of HIV infection among injection drug users

HIV infection is a matter of general concern to society because HIV infection among the injection drug using population serves as a nexus of infection for the general population (Wang, 2007). Blood-borne infections are spread from injection drug users into the wider population mainly through sexual contact, facilitated by the fact that many injection drug users are involved in the sex trade.

Document and data review

LTSC reviewed documents and data shared by the Ministry of Health and obtained from Saskatchewan needle exchange programs, and summarized statistics on current patterns of needle exchange and historical trends.

Key findings included:

- Saskatchewan has an estimated 5,000 current injection drug users.
- Needle distribution coverage is approximately three-quarters of estimated injection drug use, probably one of the highest rates in the world. Coverage is close to 100 per cent in Regina and Prince Albert.
- Saskatchewan's HIV prevalence among injection drug users has been below other major Canadian cities, Saskatoon is now approaching the prevalence of other major cities. Saskatchewan HCV prevalence among users is similar to other Canadian cities.
- The proportion of injection drug users reporting needle sharing declined from 29 to nine per cent in Regina from 2000 to 2005, as needle distribution more than tripled from half a million to 1.9 million needles per year.
- Saskatchewan has an unusually high rate of use of injection cocaine, a drug with a very high rate of needle use and therefore of risk for infection.
- Neighbouring provinces have already experienced a shift to crack cocaine, which is mostly smoked. Harm reduction programs in Winnipeg and Calgary are distributing smoking equipment to facilitate and encourage this trend.

Injection drug use (IDU) in Saskatchewan

Three recent reports paint a picture of injection drug use in Saskatchewan's two big cities (Plamondon et al., 2007; Public Health Agency of Canada, 2006; Saskatoon Health Region, 2006). The summary description that follows is based on these studies, unless otherwise noted.

- Injection drug users fall mainly in the 20-39 year old age group. They are evenly distributed between males and females. Almost all have high school or less education. Most are Aboriginal. Most live in stable housing, although they tend to be mobile and move often. However, up to one-fifth have been homeless in the past year.
- Most began injecting drugs in their late teens or early twenties.
- Injection drug users in Saskatchewan currently mostly inject cocaine and morphine. Cocaine is imported and distributed illegally. It is widely and cheaply available. Morphine is mainly obtained by the illegal diversion of medical prescriptions. According to Fischer (2006), Canada has the world's highest per capita consumption of prescription opiates such as morphine, while according to Rehm and Weeks (2005), in 2002 Canada reported the fourth highest per capita use of prescription narcotics in the world. Prescription control

measures have been described as “lax . . . and inconsistent” (Fischer, 2006, p. 1387).

- Injection drug users also use other non-injection drugs, mostly alcohol and marijuana, aggravating their high-risk behaviour.
- Injecting is often a social activity. Most inject with their regular sex partners, close friends, or family. They inject mostly in their own homes, or at friends’ or relatives’ places. Injection drug users know not to share needles but may interpret this to mean only not with people close to them. Because injecting is often social, sharing of needles and other injection equipment can easily occur.
- More than half inject drugs three or more times per week; thirty per cent inject daily. Of those who inject every day, most inject between two and ten times per day.
- Client needle use varies according to what drugs they use and how much they can afford. On a several-day cocaine binge with a group of people, a client could use several hundred needles. Other users inject only a few times a week. Most clients take the needles to where they live, or to a friend or relative’s house, to inject. Clients who inject in public places are more likely to be transient and away from their home community, or homeless. Public injecting in parks or alleys is most likely to occur among transients or homeless users where there is no access to public washrooms in businesses or public buildings. Some communities and business, particularly in Prince Albert, have actively tried to discourage use of public washrooms for injecting by controlling access or installing black lights, which make it difficult to see a vein into which to inject. This has forced transient or homeless drug use out into more public areas such as streets and parks. Street users, who inject in parks, school grounds, or alleys, are the most likely to discard their needles where they use them (key informant interviews).
- In Regina nearly all injection drug users use needle exchange services, but 14 per cent do not. In Saskatoon, 19 per cent did not use needle exchange services. In Saskatoon, almost half reported they could not get as many needles as they required from the needle exchange. Sixty per cent reported buying needles. In Saskatoon half of users reported the hours of access as a barrier to needle exchange use, and one quarter reported the location was a barrier to use.
- In Regina, 90 per cent did not borrow a needle for injection in the past six months, the highest proportion among the Canadian sites surveyed. Of those who did borrow, almost all borrowed from sexual partners, close friends, or family. However, among those who did borrow, one quarter reported that they used borrowed needles for all their injections, and another quarter that they used borrowed needles for half or more of their injections. These proportions were the highest among the sites surveyed.
- In Regina, the proportion of injection drug users aware of their HIV status was the lowest among the sites surveyed. Of those who

tested HIV positive in the survey, 43 per cent were not aware of their positive status, the highest proportion in Canada. There was a similar pattern for HCV status. One-fifth of Regina injection drug users believed they were HCV negative when they were in fact HCV positive. Almost two-fifths were unaware of their HCV status. Both these proportions were the highest among the Canadian sites surveyed.

- Although the service is provided, HIV and HCV testing rates among injection drug users are low. Of 194 registered clients in Regina, 25 reported an HIV blood test in the past 12 months (memo May 20, 2008 from A/Supervisor, Communicable Disease and Sexual Health Program, to HIV/BBP/IDU Consultant, Saskatchewan Ministry of Health). Saskatoon's Street Health program conducted 135 HIV and 58 HCV tests in 2007-08, among 890 clients, a decrease from the previous year (de Bruin, Lindberg & Grauer, 2008).
- Saskatchewan injection drug users and program staff report a high-risk pattern of injection drug use, relatively rare worldwide, of deliberate blood sharing through "blood shots" (interviews with key informants). Injection drugs are mixed with users blood and shared.
- In Saskatoon, two-thirds of those surveyed had sought addictions treatment. However, one-third did not finish treatment, one-third relapsed within a year, and one-fifth could not access treatment. The main barrier to access was wait times for service.

Saskatchewan has a pattern of high use of injected cocaine and very little use of crack cocaine, unlike Edmonton and Winnipeg. This pattern of drug use affects needle sharing. Because the high from cocaine is short-lived, cocaine use leads to high numbers of injections per day, which requires large numbers of needles. Where clean needles are not available, this contributes to sharing or reusing needles, especially in a social situation. As well, limits on needle exchange may affect cocaine users disproportionately because of their high frequency of injection (Hankins, 1998).

Estimates of the number of injection drug users in Saskatchewan

There is no exact count of current injection drug users in Saskatchewan. We used data from the 2004 Canadian Addiction Survey to estimate that there are 5,000 current injection drug users in Saskatchewan. (See Appendix F for details of the calculation.) This is consistent with estimates with program staff and Medical Health Officers in interviews. We estimate that there are approximately 2,000 injection drug users in each of Regina and Saskatoon, 600 in Prince Albert, and 400 in the rest of the province. The estimates for the three major cities include a transient population that seeks needles and drugs in larger cities, but spends at least part of the time in smaller rural communities.

Needle exchange as part of broad harm reduction programs

For the seven Saskatchewan health regions that operate needle exchange programs needle exchange is but one component of a broader harm reduction program targeted to injection drug users. Some or all programs include health teaching, education on safer injection practices, needle distribution and exchange, testing, immunization, primary health care or referrals, mental health and addictions counselling or referrals, case management of users who are HIV or HCV positive, among other services.

A key component of all the programs is relationship building between staff and injection drug users to build trust. Many of the staff of the various programs have worked in their program for many years; as a result they know many of their clients and have built trust relationships over many contacts. In the three cities that operate vans as part of their street worker programs, the vans have come to symbolize a point of contact with health care that can be trusted.

How do needle exchange programs actually work?

The following description is based on the four needle exchange site visits by LTSC and on interviews with program staff and injection drug users (reported in detail later in this document).

All but two of Saskatchewan's needle exchange sites operate out of public health offices or community organizations that serve clients needle exchange programs wish to reach. In public health sites, clients attend needle exchange as some of many clients using a range of public health services. Most sites have a small room, among other offices and clinical rooms, dedicated to needle exchange. One client at a time meets face-to-face in the room with a public health nurse or, in some cases a community organization or public health street program worker. Policies describe safety protocols; staff use their experience and judgement as to whether to leave the door open to the room, have a second staff member present, or refuse to meet with a client. Security incidents are rare to non-existent.

For those programs that use a registry (most programs) the client identifies him or her self by initials and birth date, or a code name they have previously registered. In many cases the staff member already knows the client. In Saskatoon, which has an electronic registry, the staff are immediately able to access the client's history, including immunizations, previous tests (but not results), and referrals.

The client returns his or her needles in sharps container (container for safe disposal of needles and syringes) provided by the needle exchange on a previous visit, or, if the needles are in another type of container, deposits the needles into a large sharps bin. For safety reasons, program staff members do not handle used needles or directly count needles. The number of returned needles is estimated based on the size of the sharps container and how full it is. Program staff members verify their estimates of the capacity of the different containers by filling them with clean needles and doing a count.

During the exchange other interactions and assessments are occurring. The nurse will do a rapid health assessment visually and by asking the client questions. On occasion they will recommend the client seek health care at a doctor's office or emergency room. Depending on the program, they may provide treatment for skin infections or other minor conditions. If the client is open to it, the nurse or other worker will do counselling on health issues, safer injection practices, or addictions treatment. Staff members are able to make referrals to other health services, including addictions treatment. Street workers will sometimes accompany clients to first appointments.

A similar process occurs in the street vans. Vans have regularly scheduled stops; schedules are listed in handouts that go out with needles. One client at a time is admitted, the registry is checked, and the needles returned. Counselling and health assessment is carried out and clean needles and other supplies are given to the client.

While the basic rule is one-for-one exchange, policies allow for and staff will use their discretion. Each program has slightly different programs and policies. New clients will get a starter pack of ten or 20 needles. Clients without returns will typically get ten needles. Programs with registries will track the client's overall return history, rather than their returns on each visit. If a client has previously returned more needles than they had taken

in the past, or has a good record of returning their needles, they may get leeway on a particular visit. Staff may also distribute more needles than usual without returns if the client reports having lost needles (such as in a move) or is taking them to a rural community for secondary distribution to a group of people (which often occurs in the three large urban sites). This discretion is based on the registry record where used and the staff knowing their clients and having long experience in assessing whether or not they are getting a "story".

There is no specific policy on distributing needles to dealers, for several reasons. First, program staff have no way of determining who is a dealer. Second, the definition of a dealer is not clear-cut. There is a continuum of behaviour from large distributors who sell drugs but do not use them through to the user who will occasionally deal to get money for a fix, to the user who buys drugs for others. The overall policy of one-for-one exchange protects against large-scale use of needle exchanges for dealers to obtain needles, because they cannot provide returns. Further, it is not necessary for dealers to access needles at needle exchanges, because they are readily available in bulk at large grocery and chain drug stores.

At the end of the visit, the staff member will distribute clean needles and other supplies to the client. Many programs include a short newsletter or educational flyer with the needle pack they give out. Other supplies vary by program, but can include alcohol swabs, sterile water, "cookers" (spoons) for heating drugs, and filters for drawing up drugs. The rationale for distributing these supplies is that spoons, filters, and water are often shared and so are a source of contamination and spread of disease, especially the more contagious Hepatitis C.

Clients take the needles and a sharps disposal container, if needed. Clients are taught not to recap needles, but to dispose of them directly into the sharps containers. Some clients do not like using sharps containers, as they fear it makes them visible to police, so they will use their own containers.

HIV case management: a recent innovation

Beginning in 2006 the three largest urban health regions were provided some Saskatchewan Ministry of Health special funding for case management of HIV positive persons having difficulty keeping their appointments for treatment. The concept was to follow and support clients to adhere to their treatment to control HIV through addressing barriers such as transportation, childcare, housing, reluctance to follow treatment recommendations, and other issues.

Needle recovery

Needle exchange programs, along with other programs and services such as fire departments, are involved in several ways in used needle recovery.

Used needles are collected in three ways:

- Through exchange of clean needles for used needles – "returned" needles;
- From needle drop boxes in the community – "recovered' needles"; and
- Through community pickups of loose needles by needle exchange programs, fire departments, and others -- "recovered' needles".

Needle exchange programs and fire departments for the most part keep statistics on returned or recovered needles.

Ninety per cent of needles distributed by needle exchanges in Saskatchewan are returned for exchange. A further two per cent of needles distributed are recovered in drop boxes, and another one per cent of the number of needles distributed are collected from community pickups. A private company, Biomed, is contracted to empty the drop boxes and dispose of the needles.

Recovered needles are not necessarily needles distributed by needle exchanges. They can come from other sources, such as purchased needles for injection drug use, purchased needles for insulin injections, and disposal of medical waste. There is no way to identify whether a particular needle was distributed by a needle exchange or obtained elsewhere.

Table 3 provides recent breakdowns on the sources of recovered needles

Table 3. Breakdown of needles recovered from the community, Saskatoon and Regina Qu'Appelle Health Regions, by agencies involved in recovery, 2007-08

Health Region / agency	Sub-total	Total
Saskatoon		21,329
Fire and Protection Services	17,588	
Public Health Services	2,623	
City of Saskatoon	500	
Spring clean up by needle exchanges, partners	321	
Riversdale Business Improvement District	297	
Regina Qu'Appelle		11,814
Public Health Street Project	6,968	
Landlords with Street Project staff	4,000	
Landlords	2,230	
Citizens with Street Project staff	1,006	
Spring clean up by needle exchanges, partners	654	
AIDS Programs South Sask	598	
Citizens	160	
City of Regina	135	
Wascana Centre Authority	100	
Fire Department	Not reported (467 callouts in 2007)	

Source: Saskatchewan Ministry of Health

Needle exchange program activities, outputs and outcomes

Table 4 summarizes available indicators of activities, outputs and outcomes of Saskatchewan needle exchange programs. The indicators are structured using a logic model. See Appendix A for an explanation.

Highlights of these data include:

- Provincial spending on needle injection programs total $1.4 million.
- Spending per injection drug user averages $288 per year; it is highest in Regina Qu'Appelle, at $430 per user.

- A total of 3.9 million needles were distributed in 2007-08, more than half of these (2.0 million) in Regina Qu'Appelle Health Region.
- Cost per thousand needles distributed (an efficiency measure) was highest in rural health regions, followed by Regina Qu'Appelle Health Region. It was lowest in Prince Albert Parkland Health Region.
- Estimated coverage (the proportion of needles used provided by the needle exchange program) was close to 100 per cent in Regina Qu'Appelle and Prince Albert Parkland Health Region, and 57 per cent in Saskatoon.

Table 4. Indicators of Saskatchewan needle exchange program activities, outputs, and outcomes, 2007-08 fiscal year

Indicator	Sask	Health region			
		RQHR	SHR	PAPHR	Other*
Need / target population					
Injection drug users (count; estimate)	5,000	2,000	2,000	600	400
Yearly needle use per user (count; estimate)**	1,000	1,000	1,000	1,000	1,000
Total injection drug needle use (count, 000s; estimate)	5,000	2,000	2,000	600	400
Inputs					
Dedicated provincial funding ($000s)	407	124	124	82	77
Health region actual spending ($000)	1,441	860	369	153	58
Provincial funding per injection drug user ($)	81	62	62	137	193
Health region spending per injection drug user ($)	288	430	185	255	146
Activities					
Services					
Active clients (discrete count of those active in past year)	1,542†	194†	890	200	176
New clients (discrete count)	?	NR	264	NR	NR
Needles distributed (000s)	3,873	2,039	1,136	627	71
Needles returned for exchange (000s)	3,483	1,917	962	551	52
Needles deposited in drop boxes (000s)	?	NR††	NR	66	0
Needles recovered in the community (000s)	?	NR††	21	NR	0
Efficiency					
Per 1000 needles distributed (actual cost, $)	372	422	325	244	825
Outputs					
Estimated coverage (total distributed / total estimated used, %)	77	102	57	104	18
Exchange rate (returned for exchange only, %)	90	94	85	88	74

Indicator	Sask	Health region			
		RQHR	SHR	PAPHR	Other*
Outcomes					
Blood-borne communicable disease infection due to injection drug use (IDU)					
Counts					
HIV incident cases attributed to IDU (#)	76	27	41	8	0
HCV incident cases attributed to IDU (#)	NR	NR	NR	NR	NR
HCB incident cases attributed to IDU (#)	NR	NR	NR	NR	NR
Rates					
HIV incidence rate attributed to IDU (/ 1,000 pop)	1.5	1.4	2.1	1.3	0
HCV incidence attributed to IDU (/ 1,000 pop)	NR	NR	NR	NR	NR
HCB incidence attributed to IDU (/ 1,000 pop)	NR	NR	NR	NR	NR
Safety - needle sticks					
Counts					
NX program staff	NR	NR	NR	NR	NR
Community service personnel (fire, police, municipal)	NR	NR	NR	NR	NR
Public, from community-acquired needles	NR	NR	NR	NR	NR
Drug treatment referral					
Count	NR	NR	NR	NR	NR
Rates (per 1,000 injection drug users)	NR	NR	NR	NR	NR

Notes: Sask: All Saskatchewan programs; RQHR: Regina Qu'Appelle Health Region; SHR: Saskatoon Health Region; PAPHR: Prince Albert Parkland Health Region; Other: Five Hills Health Region, Keewatin Yatthé Health Region, Mamawetan Churchill River Health Region, Prairie North Health Region, and Sunrise Health Region.

NR: not reported

* Other programs include those in Five Hills, Keewatin Yatthé, Mamawetan Churchill, and Prairie North Health Regions.

** Lurie , Gorsky , Jones & Shomphe (1998)

† Regina Qu'Appelle Health Region has limited registration; therefore the count for RQHR and the total count are underestimates.

†† RQHR reports needles recovered in the community for the first six months of calendar 2008 as follows: by the needle exchange programs: 5488; by landlords, citizens, city and parks workers: 5062; in spring clean-up: 645; needle deposited in drop boxes, first five months of calendar 2008: 10,875.

Other related drug addiction treatment modes

While not part of this review, methadone substitution for injection drug users addicted to opiates is an important harm reduction service. Methadone treatment is operated separately from needle exchange. Treatment clinics are not operated by public health departments, but by addictions services under medical supervision or by private practice physicians. Methadone treatment is administered at pharmacies participating in the program.

Detox services are also offered by immediate care of drug users coming down from the use of drugs or alcohol.

There is heavy demand for both these services. Program staff and medical health officers report that access to methadone treatment and to detox centres is a bottleneck for addictions treatment in several cities.

How is Saskatchewan doing with HIV control?

Table 5 presents an estimate of what is happening in Saskatchewan with HIV control among injection drug users. The numbers of injection drug users (IDUs) are estimated numbers. Incidence is case detection rather than actual incidence of infection, which cannot be accurately measured without frequent testing. Case detection rates can increase in the short term because of more aggressive testing and contact tracing. This occurred in Saskatoon starting in 2005 and may be occurring in Regina now. Despite these limitations, the data suggest both room to improve and an upward trend in incidence. Data summarized earlier in Table 2 indicate that incidence rates for HIV as low as 1.0 per 100 person / years at risk are achievable in North America.

Prevalence rates (15 per cent in Saskatoon (from the Saskatoon Health Region's needle exchange user registry) and nine per cent in Regina in 2007 (a preliminary report from the Public Health Agency of Canada 2007 I-Tracks Regina survey, obtained from the Regina Qu'Appelle Deputy Medical Health Officer) also indicate the two cities are closing in on rates reported in other major Canadian cities.

Table 5. Incidence (newly detected cases) of HIV attributed to injection drug use, among injection drug users (IDUS), by Health Region and year

Year	2005	2006	2007
Prince Albert Parkland			
# cases	9	8	8
# IDUs (est.)	600	600	600
Rate*	1.5	1.3	1.3
Regina Qu'Appelle			
# cases	9	15	27
# IDUs (est.)	2,000	2,000	2,000
Rate*	0.5	0.8	1.4
Saskatoon			
# cases	33	37	41
# IDUs (est.)	2,000	2,000	2,000
Rate*	1.7	1.9	2.1
Saskatchewan total			
# cases	51	60	76
# IDUs (est.)	5,000	5,000	5,000
Rate*	1.0	1.2	1.5

* Incident cases / 100 person years at risk
Source: Saskatchewan Health (no date)

Key informant interviews and analysis

LTSC completed 114 in-person or telephone interviews with key informants or their designated alternates, including 29 injection drug users. We approached key informants in all organizations in each category of informant in each health region. The exception was community organizations, where we approached a maximum of two in each health region. The numbers at the end of each category heading indicates how many interviews were completed in that category. The list of informants interviewed is attached as Appendix D.

Program staff (28)

Highlights of information learned through the interviews with program staff were:

- *Exchange model (one used needle for one new needle) is essentially followed.*
- *In public health nurse delivered exchanges, the exchange is used as an opportunity for health assessment and health teaching.*
- *Needle exchange is a way to contact IDUs, build relationships and establish trust.*
- *Needles used for IDU cannot be distinguished from needles used for insulin.*
- *Considerable secondary needle exchange is occurring, which extends the reach of needle distribution to harder to reach people and to rural communities.*

We interviewed 28 program staff in seven health regions where needles exchange programs are currently offered, and one region that proposes to offer it. We included most community organization staff in this category, because most community organizations we interviewed were involved as partners in needle exchange.

Table 6 summarizes selected program data, by program, obtained from interviews and statistical reports.

Table 6. Saskatchewan needle exchange program selected characteristics, and statistics, by health region

Health Region	Regina Qu'Appelle	Saskatoon	Prince Albert Parkland	Prairie North	Five Hills	Keewatin Yatthé, Mamawetan Churchill River	Sunrise
Sites	Regina	Saskatoon	Prince Albert	Battleford / Meadow Lake	Moose Jaw	4 sites in North*	Yorkton**
No. of fixed sites	3	1***	1	4	1	4	1
Mobile van?	yes	yes	yes	no	no	no	no
Fixed sites in main drug use area(s) (larger centres)	yes	no*	yes	--	--	--	--
Community partner involvement in exchange	extensive	limited	no	pharmacy	no	no	no
Fixed site hours	week days	week days, Sat morning	week days	week days	week days	week days	1-2 week days
Outreach workers	yes	yes	yes	yes	no	no	no
Mobile hours	M-F evenings	Tu-F evenings	M/W/Th evenings				
Program run by	Public Health	Public Health	Public Health	Public Health (NB) / Addictions (ML)	Public Health	Public Health	Public Health
Drop boxes?	3	12	7	no	no	no	no
Established	1991	1992	1994	2002	2002	2002	--
Involved in community needle pick-up?	yes	yes	no	no	no	no	no
Registration of clients?	limited, in 2 of 3 sites	yes	yes	?	?	yes	yes
Primary care available on site?	no	no	1 day / week	yes (one site)	no	no	no
Immunization?	yes	yes	yes	?	?	yes	
On-site testing?	yes	yes	yes	one site	?	?	?
Needle type used	BD	Monoject	Monoject	?	BD	?	?

Health Region	Regina Qu'Appelle	Saskatoon	Prince Albert Parkland	Prairie North	Five Hills	Keewatin Yatthé, Mamawetan Churchill River	Sunrise
Total budget ($000s, annual)	860	367	152				
No. of currently active needle exchange users (past year)	194†	890	200	98	?	50	160
Formal involvement of addictions services (more than referrals)	no	no	no	yes	yes	no	no
Annual referrals to mental health and addictions services, including methadone program	NR	40	NR	NR	NR	NR	NR
Current estimate of HIV+ IDUs	9%	15%	?	NR	NR	NR	NR

* Northern sites are La Ronge, Buffalo Narrows, La Loche, and Ile-a-la-Crosse

** proposed program, not yet active; count of IDUs is from Regina program (also included in Regina count)

*** Saskatoon has a low-volume satellite site in one high-use area

† Regina Qu'Appelle has limited registration; this number substantially understates the count of active users

NR: not recorded

Asked about patterns of injection drug use in their communities, program staff members reported the following:

- "'We're not sharing' means we are not sharing with people we don't know, but we are sharing with family members and partners."
- There is extensive injection drug use in the Sunrise Health Region (Yorkton an area) where there is as yet no needle exchange.
- Main injection drugs used for the last several years in Saskatchewan are, in descending order of use:
  - powdered cocaine;
  - hydromorphone (Dialudid™) (a synthetic opiate used as a prescription pain killer);
  - morphine; and
  - Methylphenidate (Ritalin™) and pentazocine (Talwin™).
- This pattern of drug use is significant, because of the predominance of the use off powdered cocaine in Saskatchewan. In Alberta and Manitoba crack cocaine has become common. Crack cocaine is usually smoked, although it can be injected. Cocaine injection is more frequent than for any other injected drug. A user probably averages ten needles a day, but on binges use can be much higher.
- An enforcement crackdown on Ritalin™ several years ago reduced the use of Talwin and Ritalin ("Ts and Rs"). Ts and Rs injection typically required four needles a day. Usage switched to cocaine, as it became cheap and readily available.
- Snorting and smoking cocaine is now prevalent in northwest Saskatchewan (Keewatin Yatthé Health Region).
- Injection drug use starts later than other illicit drug use, usually in the twenties. Few teenagers use injection drugs. Injection drug use often continues well into middle age.
- There is a well travelled route between the downtown east side of Vancouver, other major prairie cities, and communities in Saskatchewan, even small rural communities, particularly for Aboriginal people. This means that Saskatchewan communities, including small rural communities, are quickly exposed to both drug use patterns and diseases from other major western Canadian cities.
- While the three major cities have had very circumscribed injection drug use populations in specific core neighbourhoods, this is starting to change. The injection drug using population is starting to spread out across the major cities as housing becomes more difficult to find.
- Drug users pay for their drugs by working as a street sex workers, pimping, hustling, petty theft and by working in waged employment. Many people manage fine with injection drug use while also working.

Asked "What works well in your program?" 12 program staff responded that it builds trusting relationships to provide a high-risk, hard-to-reach population with health services and harm reduction. Some of their comments on what works well were:

- "Trust building; I get to know them."
- "Barrier-free access to health care; it is part of a whole social process of self care leading to other care."
- "The staff attitude to clients is exceptional. Trust has been built. We are often the connection."
- "Needle exchange is the hook to connect clients to a full range of services and counselling."
- "We connect to very high-risk individuals who do not access healthcare anywhere else."
- "Relationship building, providing care in a non-judgemental way."
- "Respect, non-judgemental attitude, support for self-esteem."
- "Exchange is the excuse for many other services."

Program staff next most frequently (5) identified that effective program partnerships had been established.

- "Collaboration with health services in [our community]. . . . There is access to a host of services. Collaboration works well."
- "Our accompaniment role to connect and refer clients to other health services; partnerships: we connect with other agencies."

Three staff members noted that accessibility to the program was good because of the multiple sites in different parts of the city, the hours, and the extended outreach.

Two program staff identified that support has led to positive life changes for injection drug users:

- "We see progress. We see people get off the streets, get their kids back."
- "Sometimes people go straight!"

One staff member each also noted that needle exchange reduces blood-borne infections, reduces discarded needle in public areas, and provides anonymity and confidentiality to users.

Asked what could be improved, program staff members had many suggestions for improvement:

- Increase accessibility through extended hours and more suitable locations in municipalities with existing programs, and more municipalities with programs (12). Some sample comments were:
  - "Increase accessibility by opening in the evenings more;"
  - "Improve access according to what clients need. More offsite locations and mobile testing";

- "I am not sure if all people are using it, they may still shy away because of locations. I wish that we could have a partnership with the Friendship Centre;"
- "Move into the core area [in Saskatoon] so people would come to us;" [Several respondents noted that the new Saskatoon HIV Aboriginal Reduction of Harm Program (SHARP) centre on Saskatoon's west side will improve access in the core area. SHARP will be co-managed by the Saskatoon Tribal Council and the Saskatoon Health Region. The new centre will improve the delivery of health care services to Aboriginal people affected by or at risk for HIV/AIDS and sexually transmitted infections. It will include needle exchange.]
- "It would be important to have the van out every night;"
- "We would like to be open seven days a week;" and
- "More centres for needle exchange around the province."

- More staff to expand services (including longer hours), to add social work services, and increase needle pickup (9);
- A wider range of supplies (spoons, filters, water) (6). [These are supplied by some, but not all, programs, because of the expense. All are a potential source of contamination and infection.]
- Improved needle recovery and disposal (6)
  - The needles we collect are incinerated. It is a huge cost. We used to take them to the landfill."
  - "Improved needle recovery with more drop boxes or home pick up."
  - "A drop box would increase our return rate. Depending on where they live, they may not want to be walking downtown with a big yellow sharps container. Because of the stigma attached."
  - "A sustainable plan for needle disposal in general."
  - "We talk about but have not acted on a drop box in the community."
- Staff training and interchange of ideas (4):
  - "Universal [precautions] best practices training for staff [in a community-based organization]."
  - "Provincial meetings of staff two times a year, as were held until 2005, for communication and professional development."
  - "Program support for smaller health regions."
- Easier access to other programs for drug addiction (methadone, where there are wait lists in many centres; detox in Regina) (4);
- Improved connection of needle exchange with addictions services (3):

- "The role of public health in moving people to recovery is not clear. Harm reduction is no longer an end in itself. We don't do recovery services. We are still learning about how to refer to addictions services."
- "Referrals are made, but 'card referrals' [the worker gives the client a card with the phone number for the service]. There are no immediate services. We should use a readiness for change model."
- [We need] addictions and mental health outreach in this environment [among injection drug users].

- More acceptance of harm reduction from the public and the medical community (2):
  - "I would like to see harm reduction be seen as a way to deal with a chronic condition and not as a negative thing. We need an awareness campaign of harm reduction and its benefits to society, that it is not a negative. The campaign should be aimed at medical staff, the public, the political. Immunization for international travels is harm reduction and it needs to be advertised as that to the wider voting public."
  - "Better acceptance from the medical community of injection drug users -- in the ER [emergency room] and doctors' offices. There is no street clinic. Some NPs [nurse practitioners] are based out of Four Directions. One doctor's office has a good reputation. The ER is overcrowded. They have to wait -- they won't. We do prevention of infections, help with mental health problems."
- Community education about needles (2):
  - "People think that if they touch a needle they're going to die."
- Peer education using people with a connection to First Nation culture and communities.

Staff members identified the following best practices in needle exchange not yet used in their or all programs:

- Use of the injection drug user registration database developed in Saskatoon, which can track needle exchange history and immunization status, and testing history of the client.
- A wider range of supplies, especially spoons and sterile water, ascorbic acid (used to break down crack cocaine, rather than the more harmful vinegar) and crack pipes (sharing of crack pipes can transmit infections).
- A drop-in safe space, including overnight, used for support discussions.
- More partnerships with community-based organizations.
- Unlimited distribution of needles.
- Needle exchange in correctional institutions.
- Needle dispensing boxes, where you put one in, and take one out.

Police chiefs and heads of police associations (7)

Police chiefs confirmed that cocaine is the drug of choice for injection. Police chiefs reported little contact with their local needle exchange programs, but would like closer contact. Contact that did exist was around issues such as needle pickup. Police had a wide range of views on needle exchange, from support to opposition. No police chiefs thought needle distribution increased drug use; however, some thought that needle distribution without one-to-one exchange would increase discarded needles. Police frequently encounter needles in the three major cities, but not elsewhere. Province-wide, police officers experience one or two needle sticks per year, during searches. Police chiefs were unaware of a case that had ever resulted in infection.

LTSC interviewed seven police chiefs, heads of RCMP detachments, or their designates, in five communities and with one provincial organization.

- Cocaine is the most prevalent drug and the drug of choice for injection drug users.
- Police chiefs knew little or nothing about their local needle exchange programs. Some did not know there was a program. None knew the location of their local needle exchange, other than being aware of the mobile vans in the three major cities.
- Police reported little contact with needle exchange organizations. Where contact did exist, it was around problems, especially discarded needles and needle pickup.
- Asked what they thought about needle exchange, two informants supported the concept, one did not know enough to comment, four wanted more information or answers to their questions, one was skeptical of the benefit, and one was opposed to such programs. The range of views is shown in the following two comments:
  - "Needle distribution does not lead to use, they will want the fix if they have a clean needle or not."
  - "The money used would be better spent on the prevention and education side, rather than needles. We are opposed to needle exchange despite the fact that there may be health benefits."
- Three informants did not know enough about it to identify a positive aspect of needle exchange, one thought it might keep needles off the street, and three thought it might reduce harm to injection drug users.
- Asked what could be done to improve needle exchange, two informants said better communication between needle exchange programs and police, one said more rigid exchange rules (one for one), and one said to validate the program with evidence.
- Police informants either did not think providing needles affected drugs use, or didn't know. No one thought it increased drug use. Some police informants were, however, concerned that increased needle distribution without one-to-one exchange would increase the number of discarded needles in the community.
- Police outside of the three major cities rarely encounter needles. In the three major cities, police frequently encounter needles. The

main risk of needle sticks is during searches. Police carry sharps containers and will pick up the occasional needle. For larger quantities, they call the fire department or, if on private property, leave it to the landlord to clean up.

- Needle sticks to police officers are rare. Outside the three major cities, they almost never occur. In the three major cities, the average is one or two per year in each city. No police chief reported a needle ever being used as a weapon or being aware of an infection ever resulting from a needle stick.
- Police report that dealers do sometimes distribute drugs in preloaded syringes. While police suspect drug dealers may be getting needles from needle exchanges, they have no direct evidence this occurs. Police think needle exchanges should be accountable for this if it is occurring and that needle exchange syringes should be identifiable.

Fire chiefs (6)

All fire departments interviewed are involved in community needle pickup. Most needle pickup is in the three largest cities. Fire chiefs want more effective community strategies to deal with discarded needles and more resources to support their pickup role. Needle sticks to fire fighters are extremely rare. None has resulted in infection.

Fire chiefs or their designates reported the following in interviews:

- All fire departments interviewed carry out needle pick-up in the community.
- Fire departments in the three major cities are all involved in needle pickup, along with needle exchange programs and other agencies. Fire chiefs noted a spike in needle pickups in the spring when the snow melts.
- Fire chiefs outside the two major cities know little or nothing about their communities' needle exchange programs.
- In the three major cities, fire departments are or have been involved in multi-agency or civic committees to plan an overall approach to needle pickup in the community.
- In the three largest cities, fire chiefs are concerned about the quantity of discarded needles, and want a more effective community strategy to deal with them.
- Fire chiefs in the three largest cities want more resources allocated for their role in needle pickup and/or a better system for needle pickup. Two placed it in the context of the need for an overall strategy for dealing with biohazard waste in the community.
- While firefighters frequently encounter needles either in community pickups or firefighting operations, needle stick injuries to firefighters are extremely rare. Fire chiefs were able to identify only three such injuries province-wide in the last decade. They were not aware of any infections resulting from these needle sticks.

Mayors (4)

Mayors are concerned with injection drug use because of discarded needles and related crime. All agreed needle exchange and pickup was not a major issue on which they heard from the public.

We interviewed four mayors or other civic officials from three municipalities. In the other four municipalities, either civic officials declined to be interviewed or deferred to their police and fire chiefs.

- Mayors or other civic officials described increasing concern with drug abuse in their three communities, with the related crime, and with discarded needles. One mayor noted that an initiative to control washroom access and put in black lighting in washrooms in the downtown area (black lights make finding veins to inject impossible) has actually forced injection drug use onto the streets and made it more visible.
- Mayors or civic officials interviewed were aware of their communities' needle exchange programs. Civic officials had been involved in setting up needle drop boxes.
- Opinions on needle exchange varied. One mayor said, "Without needle exchange, we would be knee-deep in needles. If not needle exchange, what?" Another said, "The program needs to be tightened up; I have talked to people who say 'you save $255,000 per person not infected' -- I don't care about that; I care about children."
- Views on what could be improved with needle exchange programs also varied: suggestions coming from mayors or civic officials included ensuring it was one-for-one exchange (2); increasing the number of and accessibility of drop boxes (2); and having needles that were identifiable as coming from the needle exchange (1).
- Two mayors expressed considerable concern about disposal of needles and the dangers of needles discarded in the community or in the municipal waste system.
- No mayor identified any instances of needle stick injuries to municipal workers other than those to police officers and fire fighters separately identified.
- All mayors agreed that needle exchange and pickup was not a major issue for the public. As one mayor put it, "I don't get calls about it." One identified concern in the business community around drug use in general and police presence in the downtown area; discarded needles were part of this broader issue.

Medical Health Officers (7)

Medical Health Officers (MHOs) -- physicians trained in public health -- supervise Saskatchewan's needle exchange programs. MHOs identified as strengths of their programs the rapport that staff develop with injection drug users and good access to needle exchange. Their priorities for improvement are to further improve access and the quality of the services the programs provide through staff training. They attribute Saskatchewan's high needle distribution rates to the predominance of cocaine in Saskatchewan. They believe return rates of needles are appropriate. MHOs see no

relation between needle distribution and encouraging drug use, noting that "Addiction is a function of social and family factors. . . . These are the real roots of drug use - not needle availability." MHOs believe that if needle exchange were stopped, "you would be creating a public health disaster. Injection drug users will still use drugs and reuse needles."

We interviewed seven Medical Health Officers (MHOs) or their deputies. Those interviewed covered six of the seven Health Regions that operate needle exchange programs, one Health Region planning to initiate a program, and one First Nations health system. The Medical Health Officer for the seventh Health Region deferred to the needle exchange program manager for an interview.

MHOs reported that their roles were clinical oversight and involvement in policy development. They reported more or less day-to-day involvement in program operations depending on the experience and length of service of the nursing staff running the program.

Medical Health Officers identified that the following worked well in the needle exchange programs (numbers in parentheses identify how many MHOs identified this theme):

- Establishment of trust with clients, interpersonal contact, accepting, non-judgemental attitude of staff (4);
- Flexible times and locations for access (3);
- That needle exchange is one part of a broader range of harm reduction and health services (2);

Other aspects that worked well included anonymity; the high exchange rate for needles that keeps needles off the street; committed staff; outreach, such as the van; and partnership with community organizations for distribution.

MHOs had the following recommendations to improve needle exchange programs:

- Improve needle access through more locations, weekend access, expanded outreach, longer hours, and including prisons.
- Improve the quality of health services by:
  - Providing ongoing training and support so that new staff provide consistent service (3);
  - Formalizing agreements with community partners to improve quality control, training and health care; and
  - Holding provincial meetings of program staff 2-3 times per year;
- Use a stages-of-change model to move clients towards more control over their lives and reduce risky behaviours at every interaction (2). "Our operating approach should be to move clients through a stages of change continuum. Every contact with clients should assist them to move along, . . . to help clients get more control over their lives. . . . Every contact should be purposeful."
- Expand the number of needle drop locations;
- Reduce the bottleneck of the Saskatoon infectious diseases clinic (where clients are referred if infected with blood-borne disease).

Most MHOs identified better accessibility of needle exchange as the best practice that should be implemented in their communities.

Asked whether the current needle exchange model is appropriate for Saskatchewan or whether there are any gaps that should be addressed, MHOs identified the following:

- Increase outreach to users of secondary needle distribution: two MHOs noted that clients of the needle exchange also collect and return needles for others, but that needle exchange staff do not have direct contact for education purposes with these secondary clients. They would like to improve outreach to this population.
- Fill in geographic gaps in access to the service;
- A stronger link to addictions treatment;
- Shift emphasis towards prevention and dealing with the underlying causes of drug addiction; and
- Reach new users earlier.

Asked if they thought needle return rates were appropriate, MHOs responded that in general, they thought returns were appropriate. They noted that:

- There is a time lag between dispending and collecting (there is always an inventory in the community, and when distribution is growing, this means returns will not match distribution)
- Returns are estimated by the size of container, to avoid the risk of staff counting needles; (These estimates are verified by staff by counting the number of clean needles each size container holds.)
- There are other sources of disposal available, such as the drop boxes, which are increasingly used; and
- There has been promotion of the safe disposal of diabetic needles by sealing them in plastic containers and putting them in the garbage--drug users may follow this practice with their drug needles as well.

Asked why they thought Saskatchewan's needle distribution rates are higher than other jurisdictions, MHOs responded that this was due to several reasons:

- The predominant type of drug used (powdered, injectable cocaine) requires more frequent injections than other drugs to maintain a high (5);
- Needle programs have achieved a high level of accessibility (2); and
- There is secondary distribution throughout the province from the urban centres.

Asked if they thought a change in the number of needles distributed through needle exchange program would change the incidence of injection drug use, MHOs were unanimous in saying that it would not. Some of their comments were:

- "I don't think that us altering the availability of needles would in any way dent the use of injection drugs. Addiction is a function of social and family factors. . . . These are the real roots of drug use - not needle availability."
- "Injection drug use is about addiction – self-treatment by substance abuse; injection drug use preceded needle exchange programs; if

there were no needle exchange, there would still be injection drug use. People will find ways to get their needles."

When asked if they thought a change in the numbers of needles distributed through needle exchange programs would change the incidence of HIV, MHOs generally agreed that HIV spread was inversely related to availability of clean needles, but cautioned that injection drug use was one of several routes of infection and that needle distribution had to be combined with education on reducing all risky behaviours.

Several MHOs noted that their programs already distribute items such as spoons, filters, and sterile water, as well as needles, to reduce infection risk. No programs with distribution distribute equipment for smoking crack cocaine.

Asked how needle exchange fit into a broader public health framework, many MHOs were passionate in their responses. Here is a sample of their comments:

- "Needle exchange is not just a clinical process of exchange. [It is also] education. We don't do one without the other. This is an outreach program. It is very important to look at it as a package."
- "This is a group of people who we wouldn't see if we did not offer this service. They are marginal and this allows them to be in touch with public health for both care and public knowledge."
- "It is really dangerous to cut addicts loose. . . . Needle exchange keeps injection drug users in contact with the health system. Most people eventually go through some form of recovery. . . . Addiction treatment is all about trust and building relationships.
- "[If you stopped needle exchange] you would be creating a public health disaster. Injection drug users will still use drugs and reuse needles. Reuse leads to acute bacterial infections, septicemia, heart valve problems, MRSA skin infections. Removing needles does not affect addiction. Harm reduction and the social determinants of health need to be constantly addressed. Prevention occurs at the community leadership level. . . . Harm reduction is a long-term process based on relationships. Relationships include regional intersectoral committees that include people like fire and police."

Regional Directors of Mental Health and Addictions (12)

Mental health and addictions directors in the health regions where needle exchange programs operate reported very little contact at front-line or senior levels between addictions and needle exchange programs. They would like to strengthen the links. This group does not believe needle distribution encourages injection drug use.

Mental health directors noted that injection drug use was one small part of the overall picture of drug addiction: by far the most common drug addiction problem is with alcohol. One noted the large increase in injection drug use over the past five years due to the availability of cheaper cocaine and morphine and the increase in cash available to spend on drugs by some users.

Mental health and addictions directors reported minimal contact with the needle exchange programs in most sites. Where there was contact, it was through needle exchange outreach workers engaging addictions clients in programs or residential treatment centres to inform them about the program. Three sites reported addictions workers having a role in the needle exchange program. In one site, this was a recent development, but success in

engaging injection drug users to start treatment has been low – about three per month. In a second site, addictions workers were integrated into a harm reduction program that included needle exchange. However, the director here commented that "to engage the [injection drug] users [in addictions treatment] is extremely difficult; we haven't found an effective way to do that yet." In the third, community organization site, an addictions worker is present and available and sometimes conducts needle exchange.

Most connections between needle exchange and addictions programs occur through a conventional referral process. Needle exchange programs are rarely aware of whether the referral is followed through and addictions programs are usually unaware of where the referral came from. Typically even if the referral came from a needle exchange staff member, mental health and addictions class the visit as a self-referral.

Mental health directors are supportive of harm reduction; several described it as the first stage, and addictions treatment as the second stage.

Asked about what was working well with needle exchange, mental health directors said:

- Access was working well (4);
- The exchange requirement was working well, because it cleared used needles from users and the community (2);
- Clients were well educated by the program about not reusing or discarding used needles (2); and
- They did not know enough about needle exchange to comment on what was working well (2).

Asked what could be changed or improved with needle exchange programs, mental health and addictions directors suggested:

- Stronger links between needle exchange and addictions services (4);
- Adding a wider range of supplies to reduce risk of infection (2);
- An overall provincial strategy on harm reduction, including methadone treatment, needle exchange, and access to biohazard disposal / needle drop boxes (2);
- Needle for needle exchange to reduce discarded needles in the community; and
- They were not involved enough to comment.

Mental health and addictions directors did not have opinions on whether the current needle exchange model was appropriate for Saskatchewan or whether needle distribution rates were appropriate. Most did not have opinions on needle return rates or accountability of needle exchange programs. Those that did have opinions thought programs were accountable and doing a good job. One thought needle return rates could be increased. Another made the following comment on whether needle exchange programs are sufficiently accountable for what they do: "The social challenge is that what we do in harm reduction looks to some like condoning drug use. It leads to a backlash. We also need public education, because the public sees injection drug use as an individual health issue, not a public health issue."

Asked, "Do you think a change in the number of needles distributed would change injection drug use?" most mental health and addictions directors responded that it would not. One was not sure. Here are some of their comments:

- "If needle distribution decreases, then there will be more sharing. People's access to drugs is based on the availability of drugs and money."
- "It wouldn't change it one little bit. People don't inject or not because they have a clean needle. They inject because they are addicted. The number of needles has no relationship with drug injection rates."
- "I worry [attitudes towards] addiction are very value laden: 'You did it to yourself;' 'If you are too dumb and injected with a dirty needle and die it's your own fault.'"
- "Needle exchange does not increase drug use. People are misinformed about needle exchange. There are myths about it, like that giving someone a needle encourages drug use. We don't understand addiction. When we started a treatment program at the jail, corrections officers did not want to acknowledge that there was [already] drug use in jail."

Directors of Education (8)

Directors of Education in school divisions have varying links to their communities' needle exchange programs. They generally support harm reduction approaches, including needle exchange, but are concerned about student and staff safety from discarded needles. Discarded needles are a problem mostly in specific sites near high injection drug use areas. They would like more information for themselves and their communities about needle pickup and disposal. Most school divisions have protocols for how to handle needles; staff members are informed of these protocols. Needle sticks to staff and students are extremely rare: directors identified three over the past six years, none of which resulted in infection.

LTSC interviewed Directors of Education or their designates from seven school divisions in five of the health regions where needle exchange programs operate. Other Directors of Education did not respond or declined to be interviewed.

Directors of Education were aware of drug use among youth in their schools, but not of injection drug use. They described drug use in their communities as shaped by social, economic, and mental health factors – drug use was more prevalent in poorer neighbourhoods. Their main contact with injection drug use was through finding needles in or near schools, mostly in poorer neighbourhoods.

Directors of Education were aware of needle exchange programs, usually through public health nurses, community information, or news coverage. Links to their community's needle exchange program varied from none to being closely involved in a community drug strategy.

Asked what they thought about their community's needle exchange program, Directors of Education were generally supportive of needle exchange and the broader framework of harm reduction. Their main concern was with discarded needles in or near school grounds. Some of their comments included:

- "I know that it is controversial but if it is closely monitored, I think that it serves the purpose well. It supports folks with addiction."
- "I come from a Harm Reduction model. Anytime that we can actively engage people to take responsibility for their problem, such as this, it is a good thing."
- "I think that it is a good program because it does keep the needles off the street and school grounds. It gives users access to medical help and connection to help to go off of the drugs should they want to and also helps to prevent the transmission of disease transmitted through needle use."
- "I think that it is working. I deal mostly with the youth. They say that it is okay, but they would like different hours and they don't like the office. One location is better than another. To me it works because we are not seeing a lot of needles on the playground. It is busy, so it has to be working."
- "Our concern is needles in playgrounds. Does needle exchange affect that? It is hard to make that link, but it is a big risk. Our caretakers sift through sand pits every day. Our schools ask students to wear shoes."
- "Injection drug use is an addiction. Addictions are illnesses. We need to treat it. As a school board we don't judge people, we help them."
- "Our concern is for student / teacher safety. It troubles me that students have to beware needles."
- "We have minor concerns around finding needles in school yards in specific schools."

Asked what works well with their community's needle exchange program, most were not familiar enough with it to comment. One informant was very familiar with the community's program: "The [name] health center is in a good location, it is in a location where people are hanging out. They do send out a . . . hand out, what to do when you find a needle. They will send somebody to pick it up. According to youth and families who use the centre, the one [location] is good because there is education but they also say that they do not 'get lectured', so they choose that location. There are drops and sharp boxes on reserves, so they can get a whole bunch of needles at once to take back out."

Asked what could be changed or improved, Directors of Education had several suggestions. These included more information to the community about the needle exchange and how to handle used needles (3), nothing (2), full recovery or exchange of needles (2); a broader drug strategy, a safe way to dispose of needles, keeping the mobile vans away from school grounds, and starting a safe injection site. Here are some of their comments:

- "The program should be more culturally responsive and more appropriate. It is overrepresented by Aboriginal people. There is a reason for it. We need to address the demographics and socio-economic problems; until we address some of the contributing factors, we need to go the needle exchange route because there is going to be drug use. . . . We need to reject knee-jerk reactions like more incarceration. . . . I would like to see more treatment services

without such long delays and line-ups. I would like to see outreach workers more visible and more accessible within the community."

- "It works well when people, both users and community members, are well informed. The community needs accurate information about the program."
- "Not sure what could be improved. I would like 100 per cent recovery [of needles] – that would be ideal. School principals have asked can the van stay away from schools. A suggestion: an injection site centrally located and away from schools. The bigger issue is how can we make playgrounds safer. Needle sticks are very frightening."
- "If a true needle exchange program then it is needle for needle. Pushers should not have 1,000 needles in the closet. If a needle exchange program, make sure it is one-for-one exchange."
- "My staff say have exchange more frequently than two nights per week because of the demand."
- "Without scaring the population could there be more media coverage on what to do with loose needles? What do you do?"

Asked about finding and handling used needles on school property, Directors of Education reported that it did occur and that they had protocols on how to handle it. These were not always followed, however. The problems with needles tended to be concentrated in a few schools in each city near high concentrations of drug users. Typically in a high-risk area two or three needles might be found occasionally after a weekend, sometimes more in the spring when the snow melts.

Asked about needle-stick injuries to staff or students, Directors of Education identified a total of two needle sticks to students on school grounds over the past six years in five of the six school divisions in the three largest cities and two school divisions in regional cities. They identified one needle stick to a staff member. This occurred when another staff member did not follow the school's protocol for handling needles. They identified no cases of infection from needle sticks.

Asked if they thought a change in the number of needles distributed would change the use of injection drug, five Directors of Education thought it would not, and two said they did not have an opinion. A few of their comments follow:

- "Not really. The folks that come are people who are addicted, so the incidence remains the same. To get someone off of drugs is a very long and slow process. If any of them enter counselling it is a small number in the scheme of things."
- "I don't think so. If you limit the number of needles, then people are just going to reuse them. If you increase the needles no one will say, 'now that I have three needles, I should do more drugs'. There should never be a limit to the amount of needles that people can pick up, so that people would have to reuse needles."
- "Since we have our drug strategy in place that focuses on many strategies including education, I think that it is a very worthwhile and safe program and that is what it is intended to be. And I think that it should be continued."

Directors of community organizations (6)

Community organizations participate to varying degrees in needle exchange programs. Regina relies heavily on two community organizations located in the areas of highest drug use to distribute needles. Saskatoon has relied little on such partnerships, although this is now changing. Community organizations have developed effective outreach and trust with their communities.

Most community organizations interviewed participate in needle exchange programs. Their input therefore, has been incorporated in the program staff interview input section. A few key points emerged from the interviews with community organizations:

- Regina relies heavily on community organizations for needle distribution. About two-thirds of needles are distributed through two community organizations located in the two highest injection drug use neighbourhoods. In one community organization, public health nurses conduct the needle exchange. In the other, community organization staff do it.
- Prince Albert relies on a community organization to run a mobile van, with community health nurses distributing needles.
- Community organizations have developed effective outreach and trust with their communities and facilitate needle exchange.

One community organization representative objected to the premise of the review of needle exchange programs:

- "Your questions are morality based rather than health-based or finance-based. Some of your questions seem to be framed as if this is a moral issue. The challenge is to find a new way to engage the community about drug use. Is there a better way we can respond? Higher income people can buy needles without stigma or judgement. Needle exchange is about looking after people's health."

Injection drug users or former users (29)

Injection drug users interviewed frequently had long histories of drug addiction. Most live life on the margins -- on the street, or with frequent changes in where they live. Most are Aboriginal. They often use drugs with others.

Users report high rates of needle use – from 20 up to 100 per day for short periods. Users of needle exchange programs are very aware they should not share needles, but have observed needle sharing, especially at night or in prison. Users report needles are readily accessible from needle exchanges on weekdays. They can also easily purchase needles from retail drug and grocery stores.

Users appreciate the supportive atmosphere and range of services of needle exchange programs. They describe strong rapport with the staff.

To improve the needle exchange programs, they would like more access to counselling, including peer educators, more and better drop boxes for needles, more access to needles, especially at night, and a broader range of supplies. Some suggested a safe injection site.

Users are familiar with needle drop boxes and report using them. They say they see others discarding needles unsafely when they inject on the street or because they do not want to be caught by police for "carrying" used needles.

Those who had stopped using drugs most often had done it to keep or get back their children. Many had tried unsuccessfully to stop, often several times. Users said quicker access to methadone treatment, treatment based on Aboriginal culture, and stronger support in the community would help them stop.

Users said access to needles and drug use were not related. One put it, "There's nothing going to stop you if you need a fix." They also said reducing needle exchange access would increase HIV and the number of needles on the street.

LTSC interviewed, individually or in groups, 29 current or former injection drug users in the three largest cities. These interviews were facilitated through the needle exchange programs. Almost all were Aboriginal. They ranged in apparent age from early twenties through their fifties. Typically they had been introduced to injection drug use by family members, sexual partners, in the sex trade, or in prison.

Current and former injection drug users told us that high rates of needle use were common, from 20 to more than 100 needles per day with cocaine, at least for short periods. The only limit was how much cocaine you could afford.

Users interviewed were very aware that they should not share needles. That message has gotten through. Despite that, users described seeing people using used needles (especially late at night) or sharing needles (especially in prison).

Users reported that clean needles are very accessible from needle exchanges during weekdays. They can also be purchased relatively easily if necessary from drugstores and other retail stores.

Users who had been in prison reported that drugs are readily available in prisons. Some users reported being introduced to injection drug use in prison.

For those who have stopped injection drug use, the main incentive was keeping or regaining their children.

Injection drug users described a variety of histories and frequencies of use:

- A few were recent new addicts, but most had a long history of drug addiction, for 20 years or more. Some had used needle exchange programs since their inception in the early 1990s. Some used injection drugs whenever they could get enough money, some used once a day or occasionally.
- Several needle exchange users described being secondary distributors of needles, such as on their home reserve, to a partner, or to a social network.
- Most injection drug users described using drugs in a social situation, including with a partner. A few reported they were "closet users".
- Most needle exchange users lived life on the margins – on the street, or with periods of homelessness, or with frequent changes in residence.

When asked how many needles they or a user might use, injection drug users described high rates of use, from 20 up to 100 or 125 needles per day for short periods. The highest needle use is for cocaine, because of the brief high.

Needle exchange users were very aware that they should not share or reuse needles. Asked if they ever see needle sharing, about half replied that they had, while a few said that they never had. Here are some of their comments:

- "People know they shouldn't share needles, but they still do, when they are high, or because they don't care. It is sad to see."
- "Yes, when there are no clean needles. When you are hooked on it, you don't care about it [sharing]; [Earlier this informant stated that he had done time in jail.] There is lots of injection drug use in jail -- six guys to one needle, sharing -- out of those six guys, one will have HIV. They're not going to tell."
- "Yes, when there are no clean needles. [In jail] pretty much all the people in there do drugs."
- "I have seen sharing blood purposely; I saw it last week. To save time [in getting a fix]. They call it 'blood shots'."
- "I have seen someone pull out a needle from the drop boxes."
- "It is not acceptable, but sharing happens late at night when someone runs out of needles." [Interviewer: "What is the problem with sharing?"] "HIV -- everybody knows that."
- "Yes, I have seen [needle sharing] in jail. It was the only needle there. I haven't seen it elsewhere."
- "I never seen it. I wouldn't share myself. I don't like playing Russian roulette. I don't want to take a chance."
- "At one point in time I did witness people sharing, but I don't witness that much sharing any more. It is easy to get a hold of needles."

Asked where they get clean needles and what would make it easier, needle exchange users generally reported that needles were readily accessible during weekdays. They acquire them at needle exchanges, or if it was more convenient or the needle exchange was closed, at drugstores. At night, if they were out, they reused their own needles, bought them on the street, or bought them at one 24-hour drugstore in Saskatoon. Injection drug users were familiar with which stores hassled them about why they wanted the needles, and avoided those stores. They reported that they readily could purchase needles and syringes at larger chain drugstores or other large retail outlets, where they are sold in bulk for diabetic use.

Injection drug users said that having the needle exchange open seven days a week (2), and open later would make it easier to get clean needles.

Asked if they ever saw people throwing away used needles and what would make it easier to get rid of needles safely, injection drug users replied that most people do return needles, but that fear of being caught with used needles by the police and few drop boxes sometimes lead people to discard them inappropriately. While many users feared being caught by police with used needles, few had actually been caught, and none reported ever being arrested solely for carrying used needles. Users of needles exchanges (the source of the interviews with injection drug users) were often proud of the fact they cleaned up and returned their needles and looked down on those who did not.

- "People throw them away because they don't want to get caught with them [by the police]."
- "We need more disposal boxes; there is only one at St. Paul's on the Westside [in Saskatoon]."

- "Some people are pretty irresponsible about needles. But most people here are responsible. People throw them away because there is no place to put them. They don't want to get caught [with needles]. I have never been charged, but the police have stopped me. There is a law about drug paraphernalia. People worry about carrying [needles]."
- "Yes, I see that. When they don't have a place to shoot up, they do it in back alleys. They discard it [the needle] without any courtesy. Sometimes the cops pull you over. The cops don't arrest you [for carrying used needles] but they make you feel like s**t."
- "I get rid of my points [needles] in the disposal boxes -- the yellow street containers. I see needles on the streets. They're pigs."
- "There are drop boxes all over the city, but most users discard on the street, which I don't agree with. They don't want to be seen going to the drop boxes. I use the yellow boxes. You have to bring in used needles to get clean ones. There is no hassle from the cops about carrying needles. I don't want to discard needles on the street where children might pick them up."
- "Yes, I see it happen in houses. They toss it on the floor or outside." [Interviewer: "Why?"] "Disrespect, not caring, not thinking. Carry boxes [for used needles] are no problem. You keep them hidden. I have never been stopped by the cops."
- "You see them on the ground. There is nowhere to put them. People don't want to carry needles. The police don't hassle me [for carrying used needles]."

Asked what works well about this needle exchange program, users said that the respectful, welcoming atmosphere and support, the contact with a range of services, and that it keeps needles off the streets. The staff of these programs has clearly established strong rapport with these users.

- [Describing a community organization site that distributes needles:] "It is really good that it is unconditional services. Women will come here. There are multiple services. People are welcomed. There are Aboriginal faces; it is welcoming."
- "Keep the needle exchange. I don't want to spread HIV. The needle exchange keeps them safe from getting diseases that are incurable."
- "We did life skills here. We lost our kids, got into program here. We relapse -- we always come back here and can get help. The counsellors are friends. Where else could we turn? You're treated like a person when you come here."
- "The needle exchange is good. They are people who want to help you. They talk with you. I like talking. The meals are good. You can use the phone. There are AA meetings here.
- "The van works really good for me. I go to the same stop [every week]. The needle exchange keeps the disease rate down, probably

the medical expenses for the province -- the cost of hospitals, medication."

- "It is a good program. They gave us buckets for needles."
- "They always have clean needles. People are courteous and kind, not ignorant or arrogant. They are more than willing to assist you to keep yourself healthy."
- "Keep the program going. This program is beneficial for both the user and the non-user. This keeps a lot of needles off the street."
- "The van means fewer needles on the street."
- "Everything works good. They test you in the van. You can talk to them; they are good people. They understand me. I am proud of what they do they try to help out everyone as much as they can, personally and medical-wise."

Asked what could be changed or made better, users had the following suggestions:

- Use counsellors and peer educators (6)
  - "There should be a counsellor there when you give out needles -- take them to a room, see if they want help." (4)
- More or better drop boxes for needles (6)
  - "More bins for the kids' sake, for the babies."
- More access (at night, 24 hours) (5)
- More supplies (filters, water, spoons) (5)
- No complaints, no changes needed (4)
- A safe injection site (4)
  - "We need a safe injection site. We used to look for places [to inject] . . . [continuing another user's story about going into store washrooms to inject:] That's not safe."
- More community pickups (2)

Asked, "Do you want to stop using drugs? Why or why not?" users had the following responses:

- Have already stopped (6) Most frequently the reason for stopping or wanting to stop was to keep or get back children.
  - "I stopped because of my granddaughter."
  - I have seen many people stop - usually after a death of someone close, or they lose their kids. Sometimes the lucky ones just stop, or have help from a higher power."
  - "I have stopped, I am on methadone. I didn't like how I had to raise money for [my partner] by doing tricks and stealing. I lost everything I ever had two [children]. I can't keep them. I chose to give them up. I just snapped back into reality. Doing tricks was disgusting. I wanted to go back to school. I lost my job [because

of addiction]. I'm going to school now; I don't do needles anymore."

- Have tried to stop, unsuccessfully (6)
  - "Yes, I was in rehab; I have tried two times. It worked a little. I would like to practice traditionally, with elders, a sweat lodge, smudging. In rehab I had 90 meetings in 90 days. Listening to the stories triggered my relapse."
  - "I tried numerous times; I was on methadone."
- Do not want to stop (3)
  - "No, I am not hurting anyone; I will quit someday."

Asked what would help them to stop, users who wanted to stop said that quicker access (no wait) to methadone treatment (2), treatment based on Aboriginal culture and spirituality, and having a support system of family, friends, and counsellors in place once out of rehab.

Asked if a change in the number of needles distributed would affect drug use, users responded unanimously that the number of needles distributed and drug use were not related. Some of their comments were:

- "There's nothing going to stop you if you need a fix."
- "No. People will buy old used needles."
- "If needles were harder to get, people would clean out their used needles. People use drugs at their own pace -- needles don't matter."
- "No exchange means you would see more needles on the street. Exchange is the best way to go. If needles were harder to get, you would see more people sharing and more HIV. If they're going to cut funding on it [needle exchange] they would be making a hell of a mistake. You would find a lot more syringes on the street."
- "More needles mean less infections. Fewer needles means people would share."

Other selected key informants (5)

Regina Drug Treatment Court

LTSC interviewed the Acting Manager of the Regina Drug Treatment Court. The following is a description of the Court, provided by the Acting Manager:

The Regina Drug Treatment Court is a partnership between the Saskatchewan Ministries of Justice and Health, with 50 per cent funding by Justice Canada. Federal funding is part of a six-site Canadian pilot project. A national evaluation is underway; the Regina site evaluation is to be completed at the end of 2008.

Treatment delivered in a stand-alone treatment centre of Regina Qu'Appelle Health Region Mental Health and Addiction Services. The program began operating in 2006.

Drug Treatment Court is a court of the Regina Provincial Court, convened one afternoon a week. Most clients are high risk to re-offend; they have cycled through court repeatedly and they have not responded well to previous court orders.

Applicants complete an initial 30-day assessment as a bail condition. If assessment is successful, the applicants must plead guilty to their drug charges. Completion of treatment is part of a conditional sentence. If they complete the eight to 18 month program they receive a one-day suspended sentence. Conditions include that participants must cease criminal activity and remain free of all illegal substances. Participants are subject to random urine screens at least once a week.

Participants in the program progress through four phases of addiction programming: transition, stabilization, relapse prevention and maintenance. Some program activities are offered from a First Nation perspective.

The Acting Manager provided preliminary data, which should be confirmed once the formal evaluation is completed. Of about 130 people referred from the crown since October 2006, about 30 people were ineligible for the program. Of the 100 that were accepted, approximately 60 per cent are no longer in the program. They did not complete the 30-day assessment or have simply dropped out. Approximately 40 per cent of those accepted are still in the program.

Of all participants to date, four have fully graduated. Four more have completed the program, but have not yet met the criteria for graduation, because they do not have clean urine screens, or have not got employment.

Saskatchewan Pharmaceutical Association

In other jurisdictions, such as England and New Zealand, pharmacies are the major distribution centre for needles for harm reduction in injection drug use. LTSC interviewed the Registrar and Field Officer for the Saskatchewan Pharmaceutical Association (SPA), the professional regulatory body for Saskatchewan pharmacists, to determine what their views were on this issue and if they had ever considered a larger role in needle exchange.

The representatives of the SPA reported that opinion on the appropriate role of pharmacists was divided in the profession about pharmacists playing a larger role in harm reduction, such as needle exchange and methadone maintenance treatment. There are strong opinions within the profession on both sides of the issue. As a result of this, as well as the absence of clear policy guidance on the role of pharmacists from either the federal or provincial governments, the profession has played little role in needle exchange in Saskatchewan. Some pharmacies refuse to even sell needles at all, while many do sell them. If pharmacies were to play a role in needle exchange, the SPA would expect that it be part of a broad harm reduction strategy in which pharmacists were provided with and part of a range of supports to address the range of issues around misuse of drugs. It should be an integrated program, rather than a stand-alone pharmacy service.

Pharmacies also do not play a role in biohazard disposal, except for their own regular clients. The SPA reports that it has not had direction from health regions about any role for pharmacies in biohazard disposal; if they were to play a role, funding the cost of biohazard disposal would be an issue.

Health Canada, First Nations and Inuit Health (FNIH)

LTSC interviewed the HIV/Blood-borne Pathogen/Sexually Transmitted Infections Coordinator for the Health Protection and Public Health Division, First Nations and Inuit Health Programs, Health Canada.

FNIH coordinates HIV and harm reduction programs for on-reserve health programs in Saskatchewan. Fifteen to 20 First Nation communities have formal needle exchange programs, while other communities want nothing to do with needle exchange. In those communities, injection drug users would rely on needle exchange programs in their

geographic health region. Sunrise Health Region in particular is in need of a needle exchange program to serve First Nation communities in the Region.

FNIH estimates that about two-thirds of all HIV cases in Saskatchewan are among First Nations people. First Nations HIV cases identified on reserve are reported through the Medical Health Officers responsible for First Nations' health services in southern and northern Saskatchewan, but are included in the total provincial numbers reported by the Saskatchewan Ministry of Health.

Survey of Canadian needle exchange programs

In a survey of the state of needle exchange in Canada, Klein (2007) noted that because needle exchange programs fall within provincial authority as a health service, their roles vary by province. The first needle exchange program in Canada was established in Vancouver in 1989, followed soon after by programs in Toronto and Montréal. By 2001 there were more than 200 needle exchange programs in Canada. By 2007, every province was supporting needle exchange in some form.

Ontario requires health regions to provide needle distribution by law, under the their public health act. Klein commented that needle exchange programs tend to operate in larger cities with larger populations of injection drug users, but are scarcer in rural areas or smaller towns.

Ontario Harm Reduction Distribution Program (no date [a]; no date [b]) lists 32 Ontario needle exchange programs. In 2004 Ontario distributed 3.2 million needles from 34 active programs, all affiliated with public health departments. The Program hosts an annual conference of the provincial needle exchange programs.

There is no accurate national count of sites where needle distribution or exchange occurs in Canada, but it is at least in the several hundreds. Syringes distributed are counted in some provinces, but not others. Counts of injection drug users are also estimates. Klein reported an estimate for Ontario that programs there distributed 53 needles per injection drug user per year (five per cent of estimated use), and that a Montreal study estimated seven per cent coverage of required clean needles.

Based on the survey of the Canadian needle distribution and exchange situation, Klein made a number of recommendations. These included that:

- Governments ensure needle distribution is available in every health region, based on needs assessments;
- Possession of items with trace amounts of drugs on them and of drug paraphernalia should not be illegal;
- Police activities should not interfere with needle exchange program programs;
- Needle exchange programs should have ways to develop and share best practices;
- There should be no limits, on the quantity or type of equipment distributed; and
- Sterile injection equipment should be easily accessible through pharmacies.

The Public Health Agency of Canada tracks injection drug use, characteristics of users, risk behaviours, and HIV and HCV infection rates in the I-track studies (Public Health Agency of Canada, 2004b, 2006). Regina is the one Saskatchewan site that participates in these studies. In addition, some city programs have sponsored one-time studies of IDUs, including risk behaviour, access to needles, and infection rates. Such studies were conducted in Winnipeg, Regina, and Prince Albert in the late 1990s (Elliott et al., 1999; Prince Albert Health District, no date; Regina Health District, no date.)

We located only one program evaluation of a needle exchange in Canada; this evaluation focussed on operational issues (Campbell & Fair, 2007).

In a web search, LTSC identified 40 websites of Canadian organizations involved in or providing information on needle exchange. These sites are summarized in Appendix E.

Informants from programs outside of Saskatchewan (3)

LTSC interviewed informants from needle exchange / harm reduction programs in Calgary, Edmonton, and Winnipeg. We used the interviews to compare programs and get their input as to what was working well and what could be improved in their programs. Table 7 summarizes program and injection drug use characteristics in these three cities and Regina and Saskatoon.

Similarities and differences

All three programs operate with very similar overall frameworks and policies to those in Saskatchewan. Public health departments, as in Saskatchewan, operate two of the three programs. The Edmonton program is operated by a community-based street clinic. Despite the overall similarities, however, there are differences. Differences include:

- Winnipeg, Calgary and Edmonton experience less per capita injection cocaine, more use of crack cocaine, and distribute far fewer needles per capita than Saskatchewan
- Because of the shift to smoking crack cocaine, needle distribution is dropping in the three other prairie cities
- The three other cities have begun to distribute crack cocaine smoking equipment.
- Winnipeg, Calgary and Edmonton provide needles on demand and do not impose exchange requirements.

What works well?

Asked what works well in their harm reduction programs, other prairie cities reported the following (letters after the item indicated which cities identified the item):

- Distribution of safer crack use kits (W).
- Keeping control of needle exchange in public health; it is important not to give up needle exchange to a non-profit organization -- you lose contact with clients for communicable disease control (W).
- Nurses in the van five of six days to provide testing (W).
- A weekly newsletter, which is extremely popular (W);
- Motivational-based counselling to focus the client on their next preferred option (W);
- Developing rapport and trust with clients, a time-consuming investment (W);
- Referrals for addictions treatment on a regular basis. The outreach van schedules visits to the detox centre three times per week to meet with staff there and to test clients. Program staff visit treatment centres weekly. This creates good relationships that can expedite the process of accessing detox and addictions treatment (C).
- A skill mix of RNs, social workers, and outreach workers. We do have a nurse on every shift to do testing and health assessment (C).

- Firm partnerships with other agencies that service high-risk populations. For example, we do outreach to prisons for education prior to release (C).
- We are experts in outreach. We know how to get to people. We can bring services these people would normally not access. For example, we do walking patrols on the riverbank and under the bridges two days a week (C).
- We have a good working relationship with local police force (C).
- Not being constrained by a large bureaucracy. It is helpful we are not part of the health region (E).
- We are connected well across the province, with government, the Alberta Medical Association, the pharmacists' association (E).
- We have done lots around prison work (E).
- We have a mixture of nurses and outreach workers. We hire casual staff from the community (E).

What could be improved?

- Increased number of hours and sites for operation (W, E, C).
- More people to walk clients to addictions appointments (W).
- An improved data system -- ours is antiquated (C).
- 50 per cent more staff (C).
- More safety drop boxes. Calgary has a better system -- they flooded the city with them (E).
- More community members as staff. They bring expertise and a perspective that we can use (E).

Table 7. Comparison of major prairie cities harm reduction programs for injection drug use, selected characteristics and data

	Winnipeg	Regina	Saskatoon	Calgary	Edmonton
Approximate metropolitan population (000s, 2006 census)	695	195	234	1,079	1,035
Number of IDUs (estimate)	unknown	2,000	2,000	?	4,000-10,000
HIV+ prevalence among IDUs (%)	13 (2005)	9	15	?	24 (2005)
Injection cocaine among major drugs used	no	yes	yes	yes	yes
Crack cocaine widely used	yes	no	no	yes	yes
No. of needles distributed in most recent year (000s)	320	2,039	1,136	355	625
Needles per thousand population	460	10,256	4,855	329	604
Trend in needle distribution from previous year	down 12%	up 6%	up 25%	up 25%	down 25%
Percentage of needles returned	79	94	85	110*	80
Drop boxes for needle return	no	3	12	20	yes
Distribution of crack smoking kits	yes	no	no	yes (no pipes)	yes (no pipes)
mobile distribution	6 evenings / week to 12:30 am	5 evenings / week	4 evenings / week	7 evenings / week to 12:00 am	6 evenings / week
community partners involved	yes	yes	limited	limited	yes
client registration	no	limited	yes	yes	no
number of discrete clients	1,000	not known	890	1,500	~3,500
policy on needle distribution	no limit	exchange	exchange	no limit	no limit

* includes drop boxes

Source: interviews

4. Conclusions and recommendations

Needle exchange in Saskatchewan is, overall, an effective, science-based program

Injection drug use in Saskatchewan is marked by exceptionally high-risk behaviours for the spread of blood-borne diseases. Given these high-risk patterns, what is remarkable about HIV prevalence in Saskatchewan is how low it has remained over the past two decades.

Saskatchewan's needle exchange programs fundamentally are successful. They have achieved some of the highest rates of needle coverage in the world (estimated at close to 80 per cent). They provide a comprehensive harm reduction service to clients who have little other contact with health care. While direct cause and effect cannot be demonstrated, it is very likely largely due to these programs that overall HIV rates among injection drug user in Saskatchewan have remained below the rest of Canada.

Our review of the scientific evidence confirmed a scientific consensus that supports the use of needle exchange programs to control HIV infection. Saskatchewan overall has implemented many of the best practices of what is known about how to most effectively implement needle exchange.

Despite these successes, however, there is room for improvement.

A more aggressive and comprehensive approach to HIV control

The first challenge that must be addressed is the recent increase in HIV incidence in the province. While the number of existing HIV cases in Saskatchewan is still low compared to Canada as a whole, the increase in new HIV cases associated with injection drug use in the past three years is worrisome. Saskatchewan needs to step up its HIV control among injection drug users to the next level.

Within Saskatchewan, Regina and Prince Albert have had the highest coverage of needles used by injection drug users. In those two cities, coverage of injections with clean needles is close to complete. In Regina, needle exchange in two community-based organizations located within the districts where injection drug use is most prevalent contribute to this high coverage.

Needle distribution coverage is lowest in Saskatoon (an estimated 57 per cent). This is also the location of a recent HIV outbreak among injection drug users. While some of Saskatoon's increased HIV case numbers likely reflect that Health Region's aggressive HIV case finding approach, that does not explain away the higher rate of HIV in that city. At best it simply spreads it over a longer time period. Saskatoon should be, and already is, increasing its community-based needle distribution through appropriate agreements with community-based organizations located in the areas where drug use is highest.

Needle exchange is not sufficient to control HIV transmission among injection drug users. Needle exchange, as well as helping to control HIV, also provides a point of contact for broader services. It is a point of contact that may be the only one for some of the injection drug users most at risk of infection. In addition to needle exchange and the other range of current harm reduction services offered, a broader range of services should be added.

Most important of these is an aggressive testing, case identification, contact tracing, education, and case management system for new HIV cases. Saskatoon is well down the

road to implementing this more active approach; other health regions need to develop it fully as well.

There should be a program goal of regularly testing every injection drug user for HIV and Hepatitis C. A key indicator used in needle exchange programs should be the test status of every client. All clients should have been tested within the past twelve months and be aware of their HIV and Hepatitis C status. Backing up these initiatives should be the use of the tool of a point-of-care electronic registry to indicate the status and progress of every consenting client.

Needle exchange provides an opportunity to establish contact with injection drug users for health assessment, teaching, and treatment. This role should be strengthened and expanded to become essentially a primary health care service targeted to injection drug users, able to provide a broad range of health care and social services to injection drug users on the street and in the communities where they live. This means integrating primary health care, infection control, addictions, social supports, and public health services around the needs of injection drug users. The goal of this integrated service approach will be to extend and deepen the approach to harm reduction to better limit harm and to provide a door to hope that is easier to open for users.

Specifically, links between mental health and addictions treatment services and needle exchange should be strengthened. Although addictions treatment for injection drug users has low success rates, eventual cessation of use where possible is the most effective harm reduction result. These services should be provided in close relationship with needle exchange programs, rather than simply as indirect referrals.

As well, specialist infection control should be more closely linked to the street program; for example, it would make sense to bring infectious disease consultations to a street-site clinic, rather than to refer clients across the city to an unfamiliar site.

Public concerns about needles and biohazard disposal

A second issue is public concern over needle exchange. There is both public lack of awareness and public concern about the exchange programs, the scientific research on which they are based, how they operate, and what the results are. For most people, the only public evidence of the programs is the discarded needles they find and which they attribute to the programs.

Medical officers of health and needle exchange program directors should be taking a more active role in explaining the needle exchange programs and harm reduction and in expanding and deepening their relationships with senior municipal, fire and police, school and other community leaders.

There is no way to identify where community discarded needles are coming from; since injection drug users can and do purchase needles, these cannot be attributed to needle exchange programs. In fact the needle exchange programs place a great deal of emphasis on return of needles. Regina has demonstrated that high return rates are possible.

The issue of discarded needles focuses policy attention on the system for disposal of sharps in general, both for insulin and injection drug use. Sharps disposal is both a political and a public health issue. Responsibility for sharps collection as a biohazard should be clarified and funded. The opportunities for and education about disposal of sharps could be improved.

A community-based, province-wide approach to biohazard waste collection and disposal to address all biohazard wastes will require:

- Waste collection systems that provide readily available access wherever needles and other biohazards are used;
- Public and user education on safe disposal and handling of biohazards;
- Waste pickup and disposal systems.

This will require provincial leadership and a funding plan.

Provincial support and direction

Provincial support for ongoing communication and learning among needle exchange programs should be re-established. This should include at least annual meetings of staff, annual review of comparative statistics among program directors and MHOs, and oversight and technical support from the Chief Medical Health Officer and other Ministry of Health staff.

Data collection from needle exchanges should be standardized and routinized in a provincial database, using an activities, outputs and outcomes format such as that used in this report. Saskatoon has a well developed registry system and epidemiological analysis capacity, which could and should be extended to other health regions.

Other significant issues

- Saskatchewan prisons remain the most important uncontrolled nexus of infection from injection drug use and of initiation of injection drug use in the province. Saskatchewan should have a prison harm reduction program, including education and needle exchange.
- The evidence from Saskatoon demonstrates that an electronic registry is not a barrier to injection drug users accessing needle exchange and that it is a valuable clinical tool for managing contacts with clients and a valuable epidemiological tool for monitoring the overall program and the state of HIV control. All health regions should be registering using a registration database similar to what Saskatoon uses. The goal of tracking users would be to “case manage” progress with clients so that every contact has a purpose in reducing the harm of injection drug use.
- Regina should develop closer links to the AIDS Program South Saskatchewan, one of its community partners, including conducting needle exchange in that agency as it does at Carmichael.
- Sunrise Health Region needs a needle exchange program.

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Appendix A. Evaluation logic model

A logic model for the evaluation

The program logic model is a standard evaluation tool that makes planning and evaluation easier. Program logic models are the state of the art in evaluation frameworks. A program logic model maps the intended and/or actual logical steps of a program. These steps are:

- Set goals and objectives (including target populations);
- Allocate or receive inputs or resources;
- Carry out activities (often services);
- Create outputs that affect clients or populations external to the program; and
- Create desired changes in the clients or population served (outcomes).
- Outcomes also can also be affected by external factors beyond the control of the program. These external factors (or risks) should be assessed and planned for, where possible.

In planning mode, program logic models prompt planners to ask, "What is planned or expected to happen at each step in the program logic model?" In evaluation mode, logic models prompt evaluators to ask, "What actually happened at each step? Were planned results actually achieved at each step in the program logic model?"

Ideally, program logic models are developed used first for program planning. A clearly developed program logic model then facilitates evaluation. Table A1.1 illustrates use of a of a program logic model for evaluation.

Table A.1 A program logic model evaluation framework

Program logic model component	**Evaluation question**
Program description (Goals, objectives, target groups)	What are the goals, objective, and target groups?
Inputs (resources used)	What are the actual resources received?
Activities (activities carried out / services to be provided by SK Region FNIHB)	What activities have actually happened?
Outputs (actual products of program in the target groups)	What are the actual program outputs in the target group?
External factors (other relevant factors in environment)	What external factors have affect outcomes, in addition to program outputs? What adjustments were made for this?
Outcomes (actual changes in target groups)	What are the actual outcomes in the target groups?

Logic models also define accountability for project results. Accountability is based on the sphere of management control or decision-making. Project managers are accountable for efficient management of inputs to achieve activities and outputs. Program designers and

funders are responsible for setting program goals, deciding on the amount and allocation of inputs, the selection of organizations or managers to manage activity and outputs. Ultimately, therefore, program designers (policy makers) and funders are accountable for outcomes.

Table A1.2 outlines a proposed evaluation framework for the needle exchange program evaluation. In the absence of a provincial or program-specific logic model for needle exchange, I have created a tentative logic model. This logic model is defined down the first column of the table. This may be revised in the course of the evaluation as we determine how programs are actually organized.

The other columns define proposed evaluation questions, indicators to answer those evaluation questions, and data sources.

Table A.2. Evaluation framework for Saskatchewan's needle exchanges

Program plan	Evaluation questions	Indicators	Data source
Program description			
Goal: "prevention of harm associated with injection drug use, especially the prevention and identification of cases of blood-borne infections such as HIV and Hepatitis C" (from the Saskatchewan Ministry of Health funding mandate letter) **Target**: Injection drug users (IDUs)	**Efficacy** • What are the goals of public health agencies within which the needle exchange program fits? • Are the goals of the funding agency and of the public health agencies implementing the needle exchanges consistent? • Is there research evidence from elsewhere that the proposed logic model can achieve the identified goals of the funders or public health agencies?	• Consistency of funder and program operator goals • Strength of research evidence (strong / moderate / weak / none)	Program staff interviews Funder interviews Research evidence review
Inputs			
Budget (dollars) **Staffing** (number of people) **Skills** (program staff training) **Infrastructure** (capital investments)	**Cost effectiveness** • Is the resource allocation appropriate to achieve the outputs specified? (Too much? Too little? Right amount?) • Have the inputs been allocated in the most cost-effective way? (Are there alternative ways to allocate or manage resources that could achieve the same or greater outputs for lesser cost?)	Allocation of inputs reflects existing best knowledge (from research evidence review on program effectiveness) (yes/no)	Research evidence review Budget and program funding documents for actual funding /staffing over past five years
Activities			
Program plan (policies and protocols) **Management and accountability** for implementation of program plan **Needle distribution** **Needle recovery**	**Relevance** • Does the program plan detail implementation of an effective program based on the research evidence? • For each activity detailed in the plan: can	Program plan details program policies and protocols Program policies and protocols are consistent with research evidence (yes / partially / no).	Program staff interviews Program policies and protocols

Program plan	Evaluation questions	Indicators	Data source
Safety practices	this activity reasonably be expected to achieve the planned outputs? **Implementation** For each activity: • Are the activities carried out as planned? • What are the barriers and facilitators?	Program activities can reasonably be expected to achieve the planned outputs, given the resources allocated and research evidence (yes / no). Activities implemented according to plan (yes / partially / no).	
Outputs			
Coverage **Needle recovery** **Safety**	**Implementation** • What is the coverage rate (% of total estimated needle use by IDUs that are provided by needle exchange program) • What is the estimated reduction in needle sharing? • What is the recovery rate of used needles (% of needles distributed returned) • What number of needles improperly disposed of? • What are the sources of needles improperly disposed of? • What is the incidence of needle sticks from used needles found in the community? What is the rate of infection from those needle sticks? • What are the barriers and facilitators to coverage, recovery, and safety?	Coverage rate Recovery rate Community pickup count Annual needle stick incidents and infections from needle sticks (number) among: • needle exchange program staff • Protective services workers (police, firefighters) • The public	Program statistics Estimates of drug users and frequency of use from MHOs, program staff, and police services
External factors			
Other factors • affecting HIV and Hepatitis C incidence • affecting effectiveness of needle distribution and recovery and safety	**Implementation** • Did the program plan appropriately identify and plan the management of external factors that may threaten achievement of planned outcomes?	Of major external factors that threatened achievement of planned outcomes, the proportion identified, planned for, and managed successfully.	Program interviews

Program plan	Evaluation questions	Indicators	Data source
	• Were these external factors managed as planned? • What were the barriers and facilitators?		
Outcomes			
Lower incidence of HIV/Hepatitis C due to IDU **Ancillary effects**	**Success** Did the program reduce the incidence rate of HIV and Hepatitis C compared to what might have been reasonably expected in the absence of the program? How many cases of HCV or HIV infection are needle exchange users, compared to non-users? Were there any other consequences of the needle exchange program, beneficial or harmful? • Needle sticks • Increases or decreases in illegal drug use • Increases or decreases in particular drug of choice, and related effects on injection frequency, mode or patterns of consumption • Referrals to mental health and addictions services • Other	Health region and provincial incidence rates of HIV and Hepatitis C among injection drug users • time trend in rates in relation to needle exchange program coverage • comparison to rates in other provinces in relation to needle exchange program coverage • I-Track surveys, • provincial drug services utilization data Identification and quantification, as best possible, of ancillary benefits and harms of the program	Public health infectious disease reports All interviews I-Tracks surveys

Appendix B. Interview guides

Protocol for interviews

- LTSC interviewed key informants or their designate in each of the three major urban needle exchange program sites (Regina, Saskatoon, and Prince Albert). In addition, LTSC interviewed by telephone (or, at the option of LTSC, in person, these representatives in four other programs (Moose Jaw, North Battleford, Keewatin Yatthé, and La Ronge).
- Categories of key informants and the interview guides for each follow below.
- LTSC visited and interviewed key informants at each of the three major urban needle exchange programs. Other interviews in the major urban sites were conducted in-person if they could be scheduled during site visits.
- Other Saskatchewan interviews, or interviews that could not be scheduled during needle exchange program site visits, were conducted by telephone.
- Interviews were booked for 30-60 minutes (more if multiple informants).
- The interviewer took notes of the interviews. These notes were to be used solely for the purpose of the evaluation consultant's analysis of the discussion.
- The topics/questions were covered during the interview, but not necessarily in the order given.
- All informants were asked for information on program plans, activities, outputs, etc. They were also asked to provide the documents, statistical reports, or other reports that back up their information. In some cases, answers to questions in the interview guides may already have been available in program reports.

Interview guide – program staff

1. Briefly describe your program.
2. What is your role in this program?
3. What is the goal of your program?
4. What activities does your program carry out to accomplish this goal?
5. How do you know if you are accomplishing your goal?
6. What works well in your program?
7. What could be changed or improved?
8. Are there any best practices in needle exchange that you don't yet use that you think you should? If so, why don't you use them?

9. What do you know about the patterns of injection drug use in your community? (types of drugs, characteristics of users)
10. What is your annual distribution of needles (count)? What is your estimate of the number of needles distributed through your community that are 'moved' to smaller outlying communities for distribution? What is your estimate of the number of needles distributed through your needle exchange program that are informally distributed through your community (peer distribution)?
11. What is your estimate of your coverage rate (proportion of all needles used for injection drug use in your community that your program provides)? (If informant cannot estimate, ask for estimates of number of IDUs in the community, type of drug use, and daily frequency of injection.)
12. How many of your registered clients are HIV positive?
13. Do you think those injection drug users most vulnerable to needle sharing behaviours are accessing your needle exchange program? Why or why not?
14. How many registered clients participate in needle exchange program in your community? How many are "regular" users? (i.e., daily injections) What is the average number of injections per day among your registered clients?
15. Do you track the number of referrals to ancillary services made for your registered needle exchange program clients? How many referrals did you make to mental health or addictions services last year?
16. What is your needle exchange rate (proportion of needles distributed by your program that are returned to you)? Do you think this is high enough or too low? Why?
17. Saskatchewan's needle distribution rates are higher than elsewhere in Canada. Why do you think that is?
18. What can you tell me about IDUs' awareness of the risk of HIV and hepatitis through needle sharing? What about needle exchange program clients? How do you know?
19. Could awareness be increased? How?
20. What affects needle-sharing behaviour among needle exchange program clients?
21. Can you tell if drug dealers are using your needles for distribution? How?
22. Do you know if drug dealers use your needles for distribution? What do you know about this?
23. Is there anything else you would like to say that we haven't covered?

Police chief

1. What is your role in this police force?
2. Briefly describe to me what you know about the patterns of illegal drug use in your community.
3. What do you know about your community's needle exchange program?
4. How do you link to your community's needle exchange program?

5. What do you think about it? Why? Probes: Do we distribute too many needles? Too few? Does needle distribution contribute to IDU?
6. What works well with your community's needle exchange program?
7. What could be changed or improved?
8. Do you think a change in the number of needles distributed through needle exchange program would change the incidence of injection drug use? Why or why not?
9. What can you tell me about police finding and handling used needles? Does it occur? When? Where? How?
10. Has there ever been a needle-stick injury to a member of your police force. If so, when and where?
11. What can you tell me about drug dealers in your community and their connection, if any, with the needle exchange program? Probe: Do drug dealers use needle exchange program needles for distribution? How do you know? What do you know about this?
12. If yes to Q11: Who should be responsible for dealing with this? What would you like to do about it?
13. Is there anything else you would like to say that we haven't covered?

Fire chief

1. What is your role in this fire department?
2. Is your department involved in collecting used needles in the community? (If not, end interview).
3. Briefly describe to me what you know about the patterns of illegal drug use in your community.
4. What do you know about your community's needle exchange program?
5. How do you link to your community's needle exchange program?
6. What do you think about it? Why?
7. What works well with your community's needle exchange program?
8. What could be changed or improved?
9. What can you tell me about fire fighters finding and handling used needles? Does it occur? When? Where? How? Is there an organized program?
10. Has there ever been a needle-stick injury to a member of your department? If so, when and where?
11. Is there anything else you would like to say that we haven't covered?

Mayor

1. What is your role in your city administration?
2. Briefly describe to me what you know about the patterns of illegal drug use in your community.

3. What do you know about your community's needle exchange program?
4. How do you link to your community's needle exchange program?
5. What do you think about it? Why?
6. What works well with your community's needle exchange program?
7. What could be changed or improved?
8. What can you tell me about how your municipality finds and handles used needles? Does it occur? When? Where? How?
9. Has there ever been a needle-stick injury to a member of your staff collecting needles? To a member of the community? If so, when and where?
10. What do you know about what the public in your community thinks about needle exchange and pick up? How do you know this?
11. If you are aware of public concerns, what are they?
12. Is there anything else you would like to say that we haven't covered?

Medical Health Officer

1. What is the program design for needle exchange in your health region?
2. What is your role in relation to your community's needle exchange program? If accountable to you, how?
3. Are community-based organizations also involved in needle exchange in your health region? If so, who and how? Who are they accountable to? How? For what?
4. Briefly describe to me what you know about the patterns of drug abuse in your community.
5. What works well with your community's needle exchange program?
6. What could be changed or improved?
7. Are there any best practices not yet used that should be implemented in needle exchanges in your community?
8. Is the current needle exchange model appropriate for Saskatchewan? Are there any gaps that need to be addressed?
9. Are needle exchange rates appropriate? Why or why not?
10. Why do you think Saskatchewan's distribution rates higher than in other jurisdictions? Is this problematic? Why or why not?
11. What are the trends in HIV and Hepatitis C incidence in you community? (Ask for annual data for past ten years.) How do these numbers relate to your needle exchange program? Can you identify incident cases by injection drug use? (If so, obtain data.)
12. Is there anything else you would like to say that we haven't covered?
13. Do you think a change in the number of needles distributed through needle exchange program would change the incidence of injection drug use? Why or why not?

14. Do you think a change the numbers of needles distributed through needle exchange programs would change the incidence of HIV? Why or why not?
15. Do you think needle exchange programs could reduce the incidence of HIV by doing other things or by distributing other harm reduction items such as crack pipes? Why or why not?
16. How does needle exchange fit into a broader public health and drug treatment strategy within your region?

Regional Executive Director of Mental Health and Addictions

1. Briefly describe to me what you know about the patterns of drug abuse in your community.
2. What do you know about your community's needle exchange program?
3. How do you link to your community's needle exchange program?
4. What do you think about it? Why?
5. What works well with your community's needle exchange program?
6. What could be changed or improved?
7. Are there any best practices not currently being used that should be implemented in needle exchanges in the province?
8. Is the current service model appropriate for Saskatchewan? Are there any gaps that need to be addressed?
9. Are your health region's needle distribution rates appropriate? Why or why not?
10. Are your health region's needle recovery rates appropriate? Why or why not?
11. Are organizations involved in needle exchange sufficiently accountable for what they do? Why or why not?
12. Is there anything else you would like to say that we haven't covered?
13. Do you think a change in the number of needles distributed through needle exchange program would change the incidence of injection drug use? Why or why not?

Directors of Education (2)

1. What is your role in your school system administration?
2. Briefly describe to me what you know about the patterns of drug abuse in your community.
3. What do you know about your community's needle exchange program?
4. How do you link to your community's needle exchange program?
5. What do you think about it? Why?
6. What works well with your community's needle exchange program?
7. What could be changed or improved?
8. What can you tell me about finding and handling used needles on school property? Does it occur? When? Where? How?

9. Has there ever been a needle-stick injury to a member of your staff or a student? If so, when and where?
10. Is there anything else you would like to say that we haven't covered?
11. Do you think a change in the number of needles distributed through needle exchange program would change the incidence of injection drug use? Why or why not?

Community organizations (2)

1. Briefly describe your organization (goals, what you do).
2. What is your role in this organization?
3. How are you involved in needle exchange?
4. If directly involved in needle exchange, carry out the Program staff interview. If not directly involved in needle exchange, carry out the following interview:
5. What do you know about the patterns of injections drug use in your community? (Types of drugs, characteristics of users.)
6. What do you know about your community's needle exchange program?
7. How do you link to your community's needle exchange program?
8. What do you think about it? Why?
9. What works well with your community's needle exchange program?
10. What could be changed or improved?
11. Saskatchewan's needle distribution rates are higher than elsewhere in Canada. Why do you think that is?
12. What can you tell me about drug users' awareness of the risk of HIV and hepatitis through needle sharing?
13. Could it be increased? How?
14. Do you know if drug dealers use needle exchange program needles for distribution? What do you know about this?
15. Is there anything else you would like to say that we haven't covered?
16. Do you think a change in the number of needles distributed through needle exchange program would change the incidence of injection drug use? Why or why not?

Needle Exchange Program users

With the cooperation of needle exchange programs to invite participants, LTSC conducted group and individual interviews with needle exchange program users in the three major urban sites. The guide for these interviews was as follows:

1. Establish rapport
2. Obtain consent [describe protocol]
3. Tell me your story about using drugs. (Probe for history, type of use, social setting.)

4. Do you ever see needle sharing? Tell be about that. (Probe for when it occurs, setting, reasons, with whom?)
5. Have you ever refused to share a needle with someone? Tell me about that.
6. Where and how do you get needles?
7. What about people you know? How do they get needles?
8. How easy is it to get clean needles? What would make it easier?
9. Do you ever see people throwing away used needles? What would make it easier for them to get rid of them safely?
10. What works well about this needle exchange program?
11. What could be changed or made better?
12. Do you want to stop using drugs? Why or why not?
13. What would help you stop?
14. What else do you want to tell me that I should know?
15. Do you think a change in the number of needles distributed through needle exchange program would change the incidence of injection drug use? Why or why not?

Needle Exchange Program funders (Ministry of Health)

1. Briefly describe your organization (goals, what you do).
2. What is your role in this organization?
3. How are you involved in needle exchange?
4. What do you know about the patterns of injections drug use in Saskatchewan? (Types of drugs, characteristics of users.)
5. What do you know about health regions' needle exchange program?
6. How do you interface with the health region needle exchange programs?
7. What works well with Saskatchewan's needle exchange programs?
8. What could be changed or improved?
9. Saskatchewan's needle distribution rates are higher than elsewhere in Canada. Why do you think that is?
10. What controls are in place to ensure that the needle exchange programs meet their mandate?
11. Are these controls sufficient?
12. What barriers or issues affect program monitoring?
13. Is there anything else you would like to say that we haven't covered?

Directors of needle exchange / harm reduction program in Calgary, Edmonton, and Winnipeg

1. What is your position/role in your program?

2. What are the characteristics of injection drug use in your community (type of drug use, number of IDUs, HIV, Hepatitis C rates, trends)
    - Program description
    - Program model/philosophy
    - Program goal
    - Program activities
    - Client registration?
    - Number of needles distributed
    - Needle exchange? How?
    - Number of needles returned
    - Referrals for addictions treatment
3. What works well?
4. What could be improved?
5. What is your assessment of program impact?
6. Can you share any documentation (evaluations, annual reports, program statistics, program descriptions)?
7. Anything else?

Other interviews

LTSC also interviewed representatives of the following:

- First Nations and Inuit Health (FNIH), Regina;
- The Drug Treatment Court in Regina;
- The Saskatchewan Federation of Police Officers;
- The Saskatchewan Pharmaceutical Association;

Appendix C. Protocol for the research review

LTSC conducted a research review using the protocols and search strategies described below.

Search A: needle exchange effectiveness

The following search string was used on U.S. National Library of Medicine / National Institutes of Health PubMed database:

("needle exchange" [All Fields] OR "syringe exchange" [All Fields]) AND (hasabstract[text] AND "1998/07/19"[PDat] : "2008/07/15"[PDat] AND "humans"[MeSH Terms] AND (Clinical Trial[ptyp] OR Meta-Analysis[ptyp] OR Practice Guideline[ptyp] OR Randomized Controlled Trial[ptyp] OR Review[ptyp] OR Case Reports[ptyp] OR Comparative Study[ptyp] OR Controlled Clinical Trial[ptyp] OR Evaluation Studies[ptyp] OR Government Publications[ptyp] OR Guideline[ptyp] OR Scientific Integrity Review[ptyp] OR Technical Report[ptyp]))Search B

Abstracts were retrieved and reviewed. Abstracts were excluded if:

- It was not about needle or syringe exchange programs;
- The article was strictly opinion, a news report, or a letter; or
- The article was a program description of a program located outside North America, with only local or regional implications.

Finally, the full articles were retrieved and reviewed using the same criteria as for abstracts.

As well, we conducted a search for Cochrane Reviews on “needle exchange” or “syringe exchange”. We found no such reviews.

This search yielded 48 articles.

Search B: Harm

The following search string was used on U.S. National Library of Medicine / National Institutes of Health PubMed database:

("needle exchange"[All Fields] OR "syringe exchange"[All Fields]) AND harm [All Fields] NOT "harm reduction" AND (hasabstract[text] AND "1998/07/19"[PDAT] : "2008/07/15"[PDAT] AND "humans"[MeSH Terms] AND (Clinical Trial[ptyp] OR Meta-Analysis[ptyp] OR Practice Guideline[ptyp] OR Randomized Controlled Trial[ptyp] OR Review[ptyp] OR Case Reports[ptyp] OR Comparative Study[ptyp] OR Controlled Clinical Trial[ptyp] OR Evaluation Studies[ptyp] OR Government Publications[ptyp] OR Guideline[ptyp] OR Scientific Integrity Review[ptyp] OR Technical Report[ptyp]))

This search yielded no additional articles.

Search C: Journal search

We searched using the search functions on the websites of selected journals for any articles within the past ten years substantively dealing with “needle exchange” or “syringe exchange”. We excluded articles where needle exchange was not the central topic

addressed by the article, news reports, and letters. We included. Include editorials. We searched the following journals:

- British Medical Journal (BMJ)
- Canadian Medical Association Journal (CMAJ)
- Harm Reduction Journal
- Journal of the American Medical Association (JAMA)
- NEJM (New England Journal of Medicine)
- The Journal of Infectious Diseases
- The Lancet

This search yielded 14 additional articles.

Search D: Website search

We searched the following websites for any documents substantively dealing with "needle exchange" or "syringe exchange," including statistical data or reports.

- Canadian AIDS Society Canadian HIV/AIDS Legal Network
- Canadian Harm Reduction Network
  The Harm Reduction Coalition
- Center for Disease Control (CDC)
- Centre for Infectious Diseases
- International Harm Reduction Association
- Public Health Agency of Canada
- World Health Organization

This search yielded 7 additional articles.

Search R: Reference list search

Members of the Reference Group and their program staff were invited to identify articles of which they were aware, not identified in the previous searches.

Search S: Secondary references

Key articles identified in the previous searches were reviewed for further significant articles identified in their reference lists. The focus was to identify recent review and best practices articles.

Search for Canadian needle exchange programs

We conducted a web search to:

1. Identify and list:

- Websites of any Canadian associations of needle exchange programs at the federal or provincial levels
- Websites of any needle exchange programs

- Any provincial or federal government websites or pages on needle exchange

2. Identify and obtain from these websites:

- Lists of needle exchange programs;
- Evaluation documents of needle exchange programs;
- Best practice guidelines;
- Surveys of needle exchange programs;
- Statistics or statistical reports of needle exchange programs;

In conducting these searches, we started with the search string ("needle exchange" OR "syringe exchange" programs) AND Canada in the Google search engine. We then used a snowball strategy to identify further linked sites from the sites first identified in this search.

Appendix D. Canadian organizations involved in or making recommendations on needle exchange and their websites

Organization	Location/ coverage	Website
AIDS Vancouver Island's Street Outreach Services	Vancouver Island, BC	www.avi.org/sos
ANKORS Needle Exchange	Kootenay region, BC	www.ankors.bc.ca/needle.php
BC Ministry of Health HIV/AIDS	British Columbia	www.health.gov.bc.ca/hiv/needle.html
Blood Ties Four Directions Centre	Whitehorse, YT	www.bloodties.ca/HIV.htm
British Columbia Persons with AIDS Society	British Columbia	www.bcpwa.org/
Canadian AIDS Society	Canada	http://www.cdnaids.ca
Canadian Harm Reduction Network	Canada	www.canadianharmreduction.com/index.php
Canadian HIV/AIDS Legal Network	Canada	www.aidslaw.ca/EN/index.htm
Clean Works Brockville	Brockville, ON	www.healthunit.org/professionals/needle_exchange/clean_works.html
Downtown Eastside Youth Activities Society Needle Exchange Program	Vancouver, BC	http://www.deyas.org/nex.htm
Exchange Works	Halton Region, ON	www.halton.ca/health/services/sexualhealth/needle_exchange/default.htm
Government of Saskatchewan	Saskatchewan	www.gov.sk.ca/
HIV North Society Needle Exchange Program	Peace Country Health Region, AB	www.hivnorth.org/default.aspx?page=8
Kingston Street Health Center	Kingston, ON	www.kchc.ca/streethealth/index.html
Nine Circles Community Health Centre	Winnipeg, MB	www.ninecircles.ca/services/harm-reduction-services.html
Northwest Points	Kenora & Rainy River Districts, ON	www.nwhu.on.ca/programs/health-protection-nep.php
Ontario Harm Reduction Distribution Program	Ontario	www.ohrdp.ca/about.html
Ontario Needle Exchange Network	Ontario	www.ohtn.on.ca/nep_onen.htm
Ottawa Clean Needle Syringe Program	Ottawa, ON	http://ottawa.ca/residents/health/living/alcohol_drugs_tobacco/drugs/site/index_en.html
Peel Works Needle Exchange Program	Peel Region, ON	www.region.peel.on.ca/health/needle-exchange/

Organization	**Location/ coverage**	**Website**
Point de Repères	Quebec City, QU	www.pointdereperes.com/site/index.html
Porcupine Health Needle Exchange Program	Cochrane District, ON	www.porcupinehu.on.ca/Infectious_Diseases/PorcupineHealthUnitNeedleExchangeProgram.html
Project X-Change	Durham Region, ON	www.jhsdurham.on.ca/harmreduction/
Public Health Agency of Canada	Canada	www.phac-aspc.gc.ca/aids-sida/publication/index.html#surveillance
Quesnel Tillicum Society & Native Friendship Centre	Quesnel, BC	www.quesnel-friendship.org/html/programs.htm#needle
Regina Qu'Appelle Health Region	Regina Qu'Appelle Region, SK	www.rqhealth.ca/programs/comm_hlth_services/pubhealth/pubhealth_dis.shtml#street
Safe Works Access Program	Newfoundland & Labrador	www.acnl.net/swap.shtml
Safeworks	Calgary Region, BC	www.calgaryhealthregion.ca/programs/harmreduction/safeworks.htm
Saskatoon Sexual Health Clinic	Saskatoon Region, SK	www.saskatoonhealthregion.ca/your_health/ps_public_health_sexual_health.htm
Sharp Advice Needle Exchange	Cape Breton, NS	www.accb.ns.ca/sharpadvice.htm
Stay Sharp Needle Exchange	Guelph Area, ON	www.wdghu.org/page.cfm?id=804
Street Works	Edmonton, AB	www.streetworks.ca/
StreetWorks	Niagara Region, ON	www.aidsniagara.com/content/streetworks.html
Superior Points Harm Reduction Program	Thunder Bay District, ON	www.tbdhu.com/SexualHealth/NeedleExchange/
The Point Needle Exchange	Sudbury, ON	www.sacy.ca/programs/harmreduction/main.php
The Van Needle Exchange Program	Hamilton, ON	www.myhamilton.ca/myhamilton/CityandGovernment/HealthandSocialServices/PublicHealth/SexualHealth/TheVan.htm
The Works	Toronto, ON	www.toronto.ca/health/sexualhealth/sh_the_works.htm
Vancouver Island Health Authority	Vancouver Island, BC	www.viha.ca/
Waterloo Region Needle Exchange Services	Waterloo Region, ON	http://chd.region.waterloo.on.ca/web/health.nsf/0/FED78EC268C678688525712C0063FADA?OpenDocument
Windsor Needle Exchange Program	Windsor, ON	www.aidswindsor.org/harm_needleex.php

Appendix E. Estimate of the number of injection drug users in Saskatchewan

Source data

We used the following data to estimate the number of injection drug users in Saskatchewan:

- A. Saskatchewan population aged 15+ years, 2008: 840,467 (Saskatchewan Ministry of Health, 2008)
- B. Proportion of population reporting lifetime injection drug use, Canada, population aged 15+ years, 2004: 1.1% (Adlaf & Ialomiteanu, 2005, p. 61)
- Percentage reporting lifetime use of any of five illicit drugs (cocaine, speed, ecstasy, hallucinogens, heroin), population aged 15+, 2004 (Adlaf & Ialomiteanu, 2005, p. 63):
    - C. Canada: 16.5%;
    - D. Saskatchewan: 14.2%
- E. Proportion of the Saskatchewan population aged 15+ reporting cocaine use in the past year by any route of administration: 1.7% (Sawka & Munro, 2005, p. 78)
- F. Proportion of the Saskatchewan population aged 15+ reporting lifetime cocaine use by any route of administration: 8.0% (Sawka & Munro, 2005, p. 79)
- G. Saskatchewan Ministry of Health estimate from treatment data that about half (53.6%) of lifetime injection drug users currently use (personal communication, HIV/BBP/IDU Consultant, Saskatchewan Ministry of Health, September 9, 2008).
- The only data we could find on the natural history of injection drug use showed that rates of stopping injection drug use are low - about 6 per cent per year. Huo, Bailey & Ouellet (2006) reported that in Chicago from 1997 to 2002, 16 per cent of injection drug users stopped use at least temporarily during 2.5 years of follow up. This is consistent with the Saskatchewan Ministry of Health estimate that about half of lifetime users are current users.
- The only significant characteristic predicting stopping use was the length of time spent injecting; newer, younger users were more likely to stop. (Huo, 2006).

Highest estimate

Assume that all current cocaine users in 2004 were injecting, as injection is the predominant pattern of cocaine use reported by program staff and police in recent years. This estimate would be the extreme upper bound of the estimated number of current injection drug users. Note that the proportion of the Saskatchewan population aged 15+ reporting current cocaine use (1.7%) is higher than the proportion of Canadians reporting lifetime injection drug use (1.1%). This method gives an estimate of 14,300 current injection drug users in Saskatchewan (1.7% of the adult population).

We calculated the estimate of current injection drug users using the following formula: A X E = 840,467 X 0.017 = 14,300 current users.

Lowest estimate

For the lowest estimate, assume that the ratio of current to lifetime injection drug use is equivalent to the ratio of current to lifetime cocaine use, as cocaine is the predominant injection drug used in Saskatchewan. This is a lower bound estimate, as the ratio of current to lifetime cocaine use likely underestimates the ratio of current to lifetime injection drug use because of the historic pattern of snorting cocaine made cocaine use more prevalent in the 1980s, compared to today when most cocaine use in Saskatchewan is by injection.

This method gives an estimate of A X B X E/F = 840,467 X 0.011 X (0.017/0.08) = 1,965 current users.

We know this estimate is too low because it roughly matches the registered users in the province's needle exchange programs, assuming Regina has the same number of users as Saskatoon. (Regina does not have complete registration.)

Middle estimate

Assume that the Saskatchewan rate of injection drug use is slightly less than the Canadian rate of 1.1%, based on the ratio of Saskatchewan residents who reported lifetime use of five illicit drugs (14.2%) to all Canadian residents (16.5%). Assume also the Ministry of Health's estimate that 53.6% of lifetime injection drug users are current users.

We then calculate the estimate of current injection drug users using the following formula: A X B X (D/C) X G = 840,467 X 0.011 X (14.2/16.5) X 0.536 = 4,265 current users.

This estimate may be a little low, due to the tendency to underreport drug use, and the difficulty of reaching the current drug-using population, leading to underestimates.

Ministry of Health estimate

The Saskatchewan Ministry of Health estimates 5,300 injection drug users in Saskatchewan (personal communication, HIV/BBP/IDU Consultant). This estimate uses a similar approach to the middle estimate above, but uses a different adjustment factor to convert the Canadian to the Saskatchewan rate of injection drug use.