

Community-Based Programs for Safe Disposal of Used Needles and Syringes

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Objectives: To review issues related to discarded syringes in the community and to describe community-based programs for the safe disposal of used needles and syringes.

Methods: We used the medical literature and chain referral to identify community-based syringe disposal programs other than syringe exchange programs (SEPs). We held a workshop in June 1996 involving staff from disposal programs; manufacturers of syringes, sharps containers, and other disposal devices; solid waste companies; public health staff; and researchers.

Results: Fifteen programs for the safe disposal of syringes were identified in the United States, Canada, and Australia. Of these, 12 primarily served persons with diabetes who use insulin, and 3 primarily served injection drug users (IDUs). The programs used three major strategies: puncture-resistant containers discarded in trash, community drop boxes, and sharps containers turned in for biohazard disposal at community sites, hospitals, or pharmacies. Participants in the workshop described key points in developing syringe disposal programs. Programs should involve pharmacists, physicians, waste disposal companies, public health departments, hospitals, diabetes educators, persons with diabetes who use insulin, and IDUs. For IDUs, criminal penalties for possession of syringes are a substantial deterrent to participation in community efforts to safely dispose of used syringes. The multiple and sometimes conflicting local, state, and federal laws and regulations concerning medical waste hinder development of multistate or national approaches to the safe disposal of syringes. More information is needed on community-based syringe disposal programs.

Conclusion: Communities in the United States, Canada, and Australia have developed different approaches to achieve safe disposal of used syringes.

Key Words: Substance abuse—Intravenous drug use—Diabetes mellitus—Needle/syringe disposal—Needlestick injuries.

Used syringes* discarded in community settings (e.g., parks, beaches, trash) provoke strong negative responses. In 1987–1988, repeated incidents in which medical waste, including syringes, washed up on beaches near

New York City caused widespread public disgust and led to intense efforts to require the safe disposal of medical waste, including syringes. The fouling of the beaches led to a wide range of new laws and regulations regarding the handling of medical waste. These laws and regulations primarily affected health care facilities and were intended to prevent recurrences of events like the ones in the New York City area, to protect the public from exposure to potential injuries and possible acquisition of disease from sharps in medical waste (1).

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*In this report the term "syringes" is used to refer both to syringes and needles.

In community settings outside health care facilities, discoveries of discarded used syringes and incidences of needlestick injuries continue. Although the frequency of these events is not well documented, newspaper accounts of needlestick injuries are published regularly (2–6). Persons at risk for needlestick injuries include children who pick up syringes discarded in public places (7) and sanitation workers who handle trash. Used syringes in the community raise fears about needlestick injuries and risks of transmission of potentially fatal infectious diseases. Since the 1980s, concerns about the possibility of HIV transmission from needlestick injury have increased public concern about unsafely discarded syringes. Recent proposals to increase the over-the-counter sale of sterile syringes to injection drug users (IDUs) to reduce HIV transmission among this group have provoked concerns about greater numbers of discarded syringes in the community (8).

METHODS

To increase the amount of information available regarding community-generated used syringes and community programs for the safe disposal of syringes, we reviewed the published scientific literature on these topics; searched for community-based programs for safe disposal of syringes, with a special emphasis on programs in the United States; and held a workshop at The Johns Hopkins School of Hygiene and Public Health (June 20–21, 1996) to address the issue of safe disposal of syringes. The co-sponsors of the workshop are listed at the end of this report (see Acknowledgments). The purposes of the workshop were to review both public concerns and data regarding the risks of the unsafe disposal of syringes and to assess community-based programs designed to promote the safe disposal of syringes.

From August 1995 through August 1996, we identified programs through review of published scientific articles and chain referral of contacts (i.e., when a program was identified, we asked program staff whether they knew of other programs). We collected data on the programs through telephone interviews and at the June 1996 workshop. Three types of variables were collected for each program. Descriptive variables for each program included the program name, date started, current status (operational, closed), location, size, and population of the community served by the program. We tried to obtain objective measures of program activities (e.g., number of syringes collected, number of pamphlets distributed). Logistic variables included funding sources, requirements for participation, and a description of how the program operates. Operational variables included the types of organizations administering the program, other organizations or agencies involved in the program, the estimated cost of the program, the effect of the program (if measured), and a contact person for additional information. We searched for objective measures of the effect of the disposal programs (e.g., the reduction in reported needlestick injuries or the results of systematic surveys of discarded syringes). We excluded syringe exchange programs (SEPs) from the survey.

Background

Hypodermic syringes are used in two major settings: by health care workers in health care facilities (e.g., hospitals, outpatient facilities, physicians offices) and by the public outside of health care facilities

(i.e., community use) (1). We focus on the problems of the disposal of used syringes generated by community use, primarily by IDUs and persons with diabetes who use insulin. Syringe disposal in health care settings in the United States is extensively regulated by the Occupational Safety and Health Administration (OSHA) and a variety of state and local laws and regulations related to the collection, designation, transportation, and disposal of medical waste (1). The disposal of syringes generated by community use is generally exempt from these regulations (1).

The number of used syringes generated by community use is difficult to estimate. Becton-Dickinson (Franklin Lakes, NJ, U.S.A.) manufactures most of the insulin syringes used in the United States. Becton-Dickinson estimates that at least 90% of home users are persons with diabetes and that they use approximately 1 billion syringes a year (B. Ginsberg, personal communication, June 1996). Combining an estimate of 2.4 million persons with diabetes who use insulin and an estimate of 1.1 injections of insulin per person per day yields estimates of 2.5 to 3.7 million insulin injections per day and 0.9 to 1.4 billion insulin injections per year in the United States (9). Reliable estimates of the number of syringes used outside health care settings for other medical conditions (such as parenteral treatments for migraine headaches and allergies) are not available but are probably substantially less than the number of syringes used by people with diabetes.

The other major component of community use is syringes used to inject illicit drugs. From an estimate of 1.1 to 1.3 million IDUs in the United States (10), and an estimated average of 2.8 injections per IDU per day (~1000/IDU/year), Lurie et al. (11) estimated an annual total of 1 billion illicit drug injections per year in the United States.

Many IDUs (12) and persons with diabetes who use insulin use a syringe for more than one injection. Consequently, the estimates of the numbers of insulin injections and of illegal drug injections are considerably larger than the actual number of syringes used by IDUs and by persons injecting insulin.

Disposal of Used Syringes by IDUs and Persons With Diabetes

Some information has been published on how IDUs and persons with diabetes dispose of their used syringes. The U.S. Environmental Protection Agency recommends that persons who inject insulin for diabetes place used syringes in opaque plastic containers or cans with tops and then discard the syringe-filled container in the trash (13). Of 100 persons in Atlanta with diabetes who used insulin and participated in a survey, 93% reported throwing their used syringes in the trash; 3% placed the syringes in the toilet. Only 4% placed syringes in a puncture-resistant container. More than half (54%) made the syringe unusable by others by bending or breaking off the needle (14). Another study compared syringe disposal practices of patients with diabetes in two Atlanta hospitals—one a private university hospital and the other a public municipal hospital. Only 56% of patients recalled receiving training in the safe disposal of their used syringes, and only 47% reported placing their used syringes in a puncture-resistant container before placing them in the trash. Disposal practices in the two hospitals did not differ by the patients' educational level, economic status, or gender (15). A 1991 study of patients using insulin at a Veterans Administration hospital found that most did not know proper disposal techniques and put themselves and others at risk for needlestick injuries and blood-borne infections (16).

The disposal practices of IDUs were studied by Gleghorn and colleagues (A. Gleghorn, personal communication, December 1997) in seven U.S. cities. They found that 76% of IDUs reported their most common means of disposal of used syringes were throwing them into

the trash and onto the street. In Atlanta, a qualitative study found that although IDUs make efforts to dispose of used syringes in ways intended to protect others from possible injury, IDUs' efforts to save and safely dispose of their syringes are particularly constrained by fear of arrest for possession of syringes and fear that possession of used syringes will identify them as IDUs. Atlanta IDUs with medical reasons for possession of syringes were more willing to save and safely dispose of used syringes because they were not at risk of arrest (17). The substantial effect of the fear of arrest for possession of syringes is similar to reports of IDU behavior from Denver (18) and eastern Connecticut (19). Such arrests are usually made for violations of drug paraphernalia laws, which in almost all states establish criminal penalties for the possession of syringes for illicit drug use (20).

Risk of Needlestick Injuries Outside Health Care Settings

Despite the large numbers of syringes used outside health care settings by IDUs and persons with diabetes, only limited data are available on the numbers of needlestick injuries outside health care settings. A study in England and Wales used requests for hepatitis B immunoglobulin for postexposure prophylaxis to identify needlestick injuries in the community (21). Over a 4-year period (1988–1991), 958 of the requests for immunoglobulin were to treat persons who had suffered needlestick injuries in the community. The needlestick injuries were reported to have occurred in the street (154 injuries, 16% of all needlestick injuries), from contact with rubbish (119 injuries, 12%), in the park (56 injuries, 6%), and on the beach (40 injuries, 4%).

Outside health care settings, waste handlers are the workers who experience the largest number of occupational needlestick injuries. Waste handlers include collectors of residential trash; workers at landfills, trash transfer stations, and recycling centers; incinerator operators; and wastewater workers (because of syringes thrown into storm drains and toilets). In a 1990 report, rates of needlestick injuries were estimated to be 18.2 per 1000 workers per year among New York City refuse collectors and 2.7 per 100 workers per year among Browning-Ferris Industries Corporation (BFI) municipal waste workers (1). According to the same study, 200,000 refuse workers experienced a range of 500 to 7300 medical-waste injuries per year. In a 1989 questionnaire study of waste workers in Washington State, 21% of the 438 waste workers reported having been stuck or scratched at some time by hypodermic syringes in waste. About 6% of waste workers reported a needlestick injury in the past year; of these, streetside trash collectors reported the highest rate of needlestick injuries (10%) in the year before the survey (22). In addition to waste handlers, other workers, including housekeeping staffs (e.g., in hotels and airlines) and public service personnel such as police and firefighters, are at risk of improper disposal of syringes.

Risk of Transmission of Blood-Borne Infections From a Needlestick Injury in the Community

The risk of becoming infected through a needlestick injury in the community depends on a number of factors, including the probability that the syringe contains an infectious blood-borne agent (e.g., HIV, hepatitis B virus [HBV], hepatitis C virus [HCV]) and the risk of transmission from the contaminated syringe. There is extensive literature on occupational needlestick injuries among health care workers, with an estimated average risk of transmission of HIV through percutaneous exposures of 0.3 per 100 incidents (23). Among health care workers, the risk factors for HIV transmission were depth of the wound, volume of blood, and size of the needle (24). The potential risk of acquiring HIV infection from a needlestick injury in the community

is considerably lower than that for occupational exposure of health care workers (1). The lower potential risk in community settings is explained in part by the following factors: health care exposures often involve syringes containing blood that was quite recently taken from a patient, the volume of blood transferred can be substantial, and the source patient is known to be HIV-infected. The recent report of HIV survival in a syringe for up to 28 days, however, suggests a possibly higher risk of infectious HIV in discarded syringes (25). The risk of transmission of other blood-borne pathogens, especially HBV and HCV, is probably higher than that for HIV because of the higher prevalence of infection, higher virus titers in blood, and longer survival of the virus in the environment.

Studies of blood-borne pathogen transmission related to needlestick injuries in the community are few. A review of emergency room records in Rome, Italy, identified 408 persons who suffered needlestick injuries because of discarded syringes. All the wounds were superficial; in 163 (39%) of the injuries, the needle had passed through a shoe or a dress. This study found no HIV seroconversions among 408 initially seronegative persons (26).

In a 1990 study, needlestick injuries among nonhospital refuse workers were estimated to result in 1 to 15 HBV infections and <1 HIV infection per year. BFI is the second largest company providing recycling and the disposal of waste and medical waste and is one of the largest employers of waste handlers in the United States (~26,000 workers, of whom about 19,000 are operational staff). Since 1985, BFI has collected data on its employees who suffer work-related needlestick injuries. None of the occupational injuries has resulted in HIV or HBV infections (P. Harris, personal communication, February 1998). In addition, we did not find any report of HIV transmission from an occupational or nonoccupational needlestick injury occurring in the community (i.e., not in a health care setting).

Although the risk of becoming infected with blood-borne pathogens such as HIV is quite low, for each worker who sustains a needlestick injury, the emotional stress and the financial costs of medical care can be substantial. Many persons who sustain needlestick injuries have understandable concerns about possible health consequences and suffer considerable emotional stress, as illustrated by the experience of health care workers sustaining needlestick injuries (27). In 1996, BFI estimated a total cost of \$4400 for the direct and indirect costs of medical care and follow-up for each employee with a needlestick injury (P. Harris, personal communication, June 1996). These cost estimates did not include the more recent widely used practice of providing postexposure prophylaxis or therapy for persons with sexual or percutaneous exposures to HIV (28). Use of HIV postexposure treatment for needlestick injuries in the community will lead to a substantial increase in costs and, for some persons treated, will be associated with complications.

RESULTS

Published reports were available on only three programs, in Marietta, Georgia, Washington State, and DeSoto County, Florida (29–31). In Florida, we identified at least 18 community-based syringe disposal programs in various counties, all developed mainly for insulin users. Each program is run differently, and staff from some programs were unaware of the other programs in Florida. We obtained detailed information on 3 of these Florida programs. We identified 13 other syringe disposal programs operating outside of Florida, 10 in the

United States, 2 in Canada, and 1 in Australia. One program was available in both the United States and Canada. These 15 different disposal programs are listed in Tables 1 and 2.

Three disposal programs were primarily designed to serve IDUs (Table 1). The 12 programs designed primarily for persons with diabetes who use insulin are listed in Table 2. All programs for IDUs involve either drop boxes (some of which are converted mailboxes) into which used syringes can be dropped or pocket-sized personal sharps containers.

The Fitpack is unique because it is a commercial product designed to be used by IDUs. These personal sharps containers are widely used in Australia and other countries by SEPs and pharmacies. In Australia in 1996, 1 million Fitpacks were used, and half of the 14 million syringes provided to IDUs through SEPs and pharmacy distribution were dispensed in Fitpacks (P. Goldsworthy, personal communication, March 2, 1998). Fitpacks are designed to hold new syringes and, in a separate section, used syringes. Fitpacks are made in three sizes, to hold 3, 5, or 10 syringes. The Fitpack is designed to be a sharps container for returning used syringes to SEPs and a puncture-resistant container for disposing of syringes in the trash. The Toronto program "Get the Needles Off the Street" uses a combination of approaches to promote the safe disposal of syringes by both IDUs and insulin users (e.g., drop boxes in parks and at health facilities including hospitals, and retrieval of syringes reported by the public or found by city employees).

The 15 syringe disposal programs use three different strategies. In the first strategy, 3 programs promote placing used syringes in puncture-resistant containers available in the household (e.g., plastic bleach or soda bottles). The containers are then thrown in the trash. In the second strategy, 3 programs use drop boxes in the community. Syringes from the drop boxes are sent for biohazard disposal. In the third strategy, 10 programs promote saving used syringes in sharps containers to be turned in for biohazard disposal (i.e., not thrown in the trash). The drop-off sites for sharps containers containing used syringes included pharmacies (3 programs), hospitals (7 programs), and health departments (4 programs). Six programs exchanged new sharps containers for filled sharps containers. One program uses the mail to send used syringes for biohazard disposal.

More than half of the programs were developed by local or state public health departments. Pharmacists, diabetes educators, and disposal companies also played important roles in the development of the programs. BFI has assisted the development of many of these programs for the safe disposal of syringes.

Data on the size of these programs were incomplete. The education efforts in Marietta, Georgia, and the state of South Carolina distributed 13,000 and 30,000 adhesive labels, respectively, for use on puncture-resistant containers. Of the 6 programs that had information about the volume of syringes collected (measured in pounds), most collected approximately 1500 lbs of syringes per year. The Safe Needle Disposal Program in San Francis-

TABLE 1. Syringe disposal programs primarily for injection drug users

Program	Location	Years in operation	How the program operates	Source for more information about the program
Get the Needles Off the Street	Toronto, Ontario, Canada	1989-present	City government program that includes 16 syringe drop boxes in health departments, parks, a clinic, a hospital, and a syringe exchange program designed for IDUs. Pharmacy-based collection of syringes designed for insulin users. Park, beach, and street cleaners collect discarded syringes.	Pamela Scharfe CPHI Environmental Health Services Community Services-Public Health Division 416-392-0995
Fitpack	Australia	1990-present	Individual pocket-sized plastic containers with separate sections for new and used syringes. The used syringe section has internal flaps that inhibit retrieval of used syringes. Fitpacks containing used syringes can be exchanged for Fitpacks with new syringes at pharmacies, syringe exchange programs, and health departments or placed in the trash.	Peter Goldsworthy ASP Plastics 011-61-2-9623-7677
Operation Red Box	Baltimore, Maryland	1996-present	Four mail boxes painted red are located in areas with high levels of illegal drug use. Syringes can be placed in these boxes but cannot be retrieved. People going to dispose used syringes in these drop boxes are exempt from criminal charges for syringe possession.	Peter Beilenson, MD, MPH Commissioner of Health Baltimore City Health Department 410-396-4387

TABLE 2. Syringe disposal programs primarily for insulin users

Program	Location	Years in operation	How the program operates	Source for more information about the program
"The Right Way"	United States and Canada	1989-present	Browning-Ferris Industries (BFI) has developed a variety of pharmacy-based approaches; typically, customers return used syringes to the pharmacy in a sharps container and the sharps containers are periodically collected by BFI staff and disposed of as biohazard waste. In the western United States and western Canada, some pharmacies use a kiosk-like return cabinet into which pharmacy customers place sharps containers. The return cabinet is emptied by BFI staff. Use of the return cabinet minimizes pharmacy staff contact with used syringes. In addition, BFI collaborates with programs in the United States and Canada that maintain syringe disposal boxes in fire stations, ambulance locations, police stations, city halls, public schools, hospitals, health departments, and other locations. The used syringes in the boxes are disposed of as biohazard waste.	Connie Neal, RN Browning-Ferris Industries 281-870-7619
Needle/Syringe Disposal Program	DeSoto County, Florida	1990-present	Fourteen red biohazard containers are located at fire stations, police departments, sheriff's offices, and mobile home parks. A red-painted mailbox drop box is located at the central fire station. Individual sharps containers filled with used syringes can be exchanged for new empty containers at the public health department and local hospital.	Donald Toews, PhD DeSoto County Public Health Unit 941-993-4602
Disposal of Needles Labels & Information Project	Marietta, Georgia	1990-present	Public education campaign promoting saving used syringes in a puncture-resistant household container and placing the container in the trash. The program distributes stickers (primarily to pharmacies) to attach to the container identifying the contents as hazardous.	Kathy Berkowitz Greater Atlanta Association of Diabetes Educators 404-616-3722
Home Syringe Public Education Project	Washington State	1990-1994	Distributed brochures explaining six disposal options to key groups (diabetes association, health departments, home health care agencies, waste collection companies, and pharmacies). One option, advocating saving used syringes in 2-liter soda bottles, attaching a pre-printed label, and placing the syringe-filled bottle in the trash, became illegal in 1994 when a new Washington law prohibited disposal of sharps in residential trash.	Wayne Turnberg, MSPH Washington State Department of Health 206-522-0132
San Francisco Safe Needle Disposal Program (SFSNDP)	San Francisco, California	1991-present	New sharps containers are exchanged for sharps containers filled with used syringes at 49 locations (Walgreens pharmacies, hazardous waste collection facility, select clinics, hospitals, and other pharmacies).	Jacob Michaels San Francisco Sanitary Fill Company 415-657-4007
Lee County Used Sharps Depository Program	Lee County, Florida	1991-present	A cooperative effort of the Lee County Departments of Health and Solid Waste. New sharps containers are distributed free at 100 pharmacies, health departments, and fire stations. Filled sharps containers are accepted at 21 health departments and fire stations.	Susan Godley Lee County Health Department 941-332-9556

(continued)

TABLE 2. (Continued)

Program	Location	Years in operation	How the program operates	Source for more information about the program
Project SAND (Safe Accessible Needle Disposal)	Chautauqua County, New York	1991-present	Between 1991 and 1996, new sharps containers were exchanged for filled sharps containers twice a year at collection locations in the community. When the New York State law (see NYS, below) went into effect in 1996, Chautauqua County discontinued the disposal program and now promotes disposing of used syringes at nursing homes and hospitals. Pharmacies in Chautauqua County distribute stickers to attach to soda bottles for disposal of used syringes at these nursing homes and hospitals.	Ann Morse Abdella Chautauqua County Health Department 716-753-4795
Bay Area Sharps Disposal Program	Hillsborough County, Florida	1993-present	The health department coordinates this program in which new sharps containers are exchanged for filled sharps containers at all 12 county hospitals. This service is free to clients.	Steven Barry Hillsborough County Health Department 813-272-6320 Extension 3106
Sharps Disposal Program	New York State	1993-present	In 1993, the New York State Senate passed a law requiring that by July 1, 1996, all nursing homes and hospitals accept home-generated medical waste that is in a puncture-resistant container.	Delton Courtney New York State Department of Health 518-402-1009
South Carolina Home Syringe Disposal Guidance Program	South Carolina	1993-present	The State Health Department distribute brochures and printed stickers advocating saving used syringes in a 2-liter PET soda bottle, attaching the sticker, and placing the syringe-filled bottle in the trash. Stickers advise that used syringes should not be placed in recycling programs.	Phil Morris SC Department of Health & Environmental Control 803-896-4173
Stuck on Safety (SOS)	San Diego, California	1995-present	Participating hospitals accept used syringes contained in a puncture-resistant plastic or metal container.	Jeri Simon Browning-Ferris Industries 619-695-0775
Mail Away Sharps Program	United States	1992-present	BFI sells kits (including a sharps container) to package and send used syringes through the mail to biohazard disposal facilities.	Jeff Norton Browning-Ferris Industries Kirkland, Washington 425-814-2244 x104

co reported collecting 1.2 million used syringes in 1995 and 1.5 million in 1997.

Despite limited information on the costs of the community-based programs for the safe disposal of used syringes, most were inexpensive to operate. The cost tended to increase with the amount of equipment and personnel time involved. The programs involving only brochures and label distribution cost the least (\$1,000–\$5,000 U.S.). The most expensive program for which cost data were available was the Safe Needle Disposal Program in San Francisco, with an estimated cost of \$63,000 U.S. per year, including \$10,000 U.S. per year for advertising. However, cost data were not available for what were likely to be more expensive programs in Australia, Toronto, and the BFI program in Canada and the United States. The New York State disposal program involves a one-time \$500 to \$1,000 U.S. start-up cost to participating hospitals or nursing homes. Project SAND

in Chautauqua County, New York, cost approximately \$7,500 U.S. per year to provide drive-up locations where new sharps containers were provided in exchange for sharps containers filled with used syringes.

Project Red Box in Baltimore was the most extensively evaluated disposal program. Qualitative interviews and focus groups were used to assess the perspectives of IDUs and the concerns of community members in the neighborhoods where the red boxes were placed. In addition, discarded syringes in the streets around the red boxes and in comparison areas were counted. Community and IDU acceptance increased after the red boxes had been in place for several months. However, the numbers of syringes deposited in the red boxes were relatively low (32).

Two programs had data on the number of needlestick injuries reported by sanitation workers before and after the start of a program. In San Francisco, 21 needlestick

injuries were reported in the year before the start of the Safe Needle Disposal Program, compared with 1 needlestick injury in 1994 and 3 injuries in 1995. In Chautauqua County, New York, the number of reported needlestick injuries decreased from 15 during 1989 to 1990 to none in 1993 to 1995.

Two programs have changed their operations after passage of new laws. The SAND program in Chautauqua, New York discontinued the drive-up collection of filled sharps containers when a New York law went into effect requiring hospitals and nursing homes to accept used syringes. The Washington State program promoting the use of shatter- and puncture-resistant containers was halted in 1994 due to new legislation forbidding the disposal of residentially generated sharps in the trash. The recommendations of the state program (to collect used syringes in labeled polyethylene terephthalate [PET] 2-L soda bottles and to dispose of the syringe-filled bottles in the trash) were prohibited and reporting of violations of the new laws was required (i.e., local health departments were required to enforce the law) (30).

DISCUSSION

Although persons outside health care settings, including sanitation and public safety workers and the general public, face a low risk of transmission of HIV or other blood-borne pathogens resulting from a needlestick injury from a syringe discarded in the community, the public's tolerance of discarded syringes is quite limited. We found several communities that have attempted to address these concerns by developing programs for the safe disposal of syringes. The need for community-based syringe disposal programs is likely to increase because of the projected increases in the number of persons with diabetes who use insulin as well as increases in the over-the-counter sale of syringes to prevent transmission of HIV and other blood-borne viruses among IDUs. If IDUs follow the U.S. Public Health Service recommendation of one-time use of sterile syringes (33), the number of syringes used by IDUs will increase.

The sources of discarded syringes in the community are usually not known. Some are discarded by IDUs and some by persons using insulin. Others may come from medical waste generated at hospitals and other health care facilities.

Various strategies have been used to provide safe disposal of needles and syringes in community settings. First, some communities have encouraged placing used syringes in household items (e.g., plastic soda bottles, cans) used as puncture-resistant containers, with or without biohazard labels, which are then discarded in the trash. Second is the use of community drop boxes. Third,

some communities provide systematic collection of containers (usually but not always sharps containers) of used syringes, which are then treated as biohazard waste (i.e., not placed in the trash). These programs often provide new sharps containers in exchange for the ones containing used syringes. Although not included in this survey, SEPs are another type of program for the safe disposal of used syringes. Some overlap exists among these strategies; for example, some pharmacies also accept used syringes in puncture-resistant household containers such as plastic bottles, and residential pickup of syringes in puncture-resistant containers for biohazard disposal is available in some parts of Washington State.

There is continuing debate about whether sharps (including syringes) should be excluded from trash. The argument for exclusion is as follows. No household or commercially produced containers can withstand the compaction forces of many tons per square inch created in garbage trucks and by landfill heavy equipment. Eventually, the sharps placed inside soda, bleach, or milk bottles; coffee cans; or sharps containers will be released. When released, the sharps, including syringes, place the public and a wide variety of workers in waste disposal, recycling, and landfills at risk of injury and possible transmission of infectious disease. Several states, including Washington, have passed laws prohibiting disposal of sharps in residential trash. To make such exclusion practicable, programs that allow IDUs and persons using insulin to dispose of their used syringes and other sharps must be widely and easily accessible, convenient, and low cost. Although exclusion from the trash is a desirable goal, it is probably impractical in most areas.

The OSHA blood-borne pathogen rule (34) can be an important factor in designing programs for syringe disposal in the United States. Workers who handle used syringes are generally thought to be exposed to blood-borne pathogens and covered by this rule. The OSHA rule requires that exposed workers receive safety training and hepatitis B vaccination if they are not already immune and that employers keep records documenting completion of these requirements. It is administratively easier if the workers who receive and handle used syringes, such as many health care workers, firefighters, and medical waste disposal workers, are already covered by the OSHA rule. This is one reason why many programs arrange for drop-off of used syringes at hospitals, nursing homes, health departments, and fire stations. Finally, the routine work of pharmacists does not involve exposure to blood-borne pathogens. Some pharmacists are concerned that accepting used syringes may lead to required compliance with the OSHA rule. Disposal programs that minimize pharmacy staff contact with used

syringes (e.g., the return cabinet) may avoid the application of the OSHA rule.

Our findings are subject to several limitations. First, this study provides only a partial description of the community-based efforts to promote the safe disposal of syringes. Examples of programs not included in this listing are syringe disposal containers placed in bathrooms in airports and airplanes (K.W. Springer, personal communication, January 1998). Second, the exclusion of SEPs leaves out an important community-based effort to offer IDUs safe disposal of their used syringes. Most SEPs in the United States require that one used syringe be turned in for each syringe given to an IDU (known as a one-for-one exchange). Used syringes collected by SEPs are sent for biohazard disposal. In 1996, 85 SEPs in the United States reported exchanging 14 million syringes (35) and receiving a comparable number of used, potentially infectious syringes. Because SEPs provide sterile syringes, they are very effective in motivating IDUs to dispose of their used syringes safely. For example, in San Francisco, a combined total of 2 to 3 million used syringes a year are received by the Safe Needle Disposal Program and the San Francisco SEP.

Considerations for Establishing Community-Based Programs for Safe Disposal of Syringes

Given the continuing unsafe disposal of syringes and the likely increase in the use of syringes outside health care settings, we recommend that communities consider organizing programs for safe disposal of syringes that are tailored to their local situations. We recommend consideration of the following observations from this study.

First, because IDUs and persons with diabetes who use insulin are the principal generators of used syringes in the community, we recommend that community programs address the needs of both groups.

Second, the programs need to have community involvement and support that is as broad-based as possible. Both for planning and implementation, constituencies that should be involved include physicians who prescribe and pharmacists who dispense syringes, harm reduction practitioners involved in SEPs, educators working with patients who inject medications at home (particularly diabetes educators), syringe producers, trash workers, medical waste and refuse companies, organizations representing persons with diabetes, persons who inject illicit drugs, and public health department personnel. Each constituency represents an important perspective and a source of support for the planning and implementation of a program. For example, community pharmacists are particularly important because they dispense most of the

syringes used in the community, can offer customers counseling about safe disposal (including providing or selling sharps containers), and can receive used syringes for biohazard disposal.

Third, for IDUs, laws making it a crime to possess syringes used for the injection of illicit drugs are a substantial barrier to the safe disposal of used syringes. IDUs are unlikely to save or transport used syringes if they risk arrest and criminal penalties for doing so. We recommend reviewing drug paraphernalia laws and other syringe laws that impose legal penalties for the possession of syringes to determine their effect on the ability of IDUs to participate in programs for the safe disposal of syringes. A major step in promoting the safe disposal of used syringes by IDUs is to make it legal for them to carry used syringes to locations for safe disposal (36).

Fourth, the current local, state, and federal regulations and statutes governing the handling and disposal of infectious waste are key factors in determining what types of programs are workable. These laws and regulations differ substantially among communities. Local or state health departments should be consulted about existing laws and regulations. It would be very useful if local, state, and federal governments could agree on consistent national standards for the regulation of community generated used syringes and other types of sharps medical waste.

Fifth, it is important to realize the stigma attached to being identified as an IDU or as a person with diabetes who uses insulin. Program options that provide anonymity are more likely to be attractive to users of syringes.

Sixth, data on the cost, effectiveness, and possible combinations of different program options are insufficient to allow data-based decisions about the types of programs to implement. We recommend additional studies of community-based programs for the safe disposal of syringes.

Seventh, it is not possible to identify an optimum strategy or combination of strategies. Until more systematic evaluations of strategies are available, a mix of approaches like the program in Toronto appears to be desirable.

Finally, we were impressed by the many programs that have been created because of local interest in eliminating used syringes from the community. We hope that making these programs more widely known will inspire other communities to start new programs. Our findings suggest that relatively limited resources are needed to implement programs for the safe disposal of potentially dangerous used syringes and that there is considerable community interest in cooperating to create and maintain such programs.

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