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Thesis:

Development of a Community Sharps Collection Pilot Program for the Town of
Northampton, Massachusetts: A Review of the Barriers

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November 1, 2007

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Thesis submitted in partial fulfillment of the requirements of the degree of
Master of Science in Environmental, Health and Safety Management

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Acronyms

AADE	American Association of Diabetes Educators
ADA	American Diabetes Association
AMA	American Medical Association
APA	American Pharmacists Association
APIC	Association of Professional in Infection Control
CAC	Citizen's Advisory Committee
CDC	Centers of Disease Control
CSCNP	Coalition for Safe Community Needle Disposal
CON	City of Northampton
BCHD	Boone County Health Department
BCSWMD	Boone County Solid Waste Management Department
DFRI	Diabetes Foundation of Rhode Island
DPW	Department of Public Works
MADEP	Massachusetts Department of Environmental Protection
EPA	Environmental Protection Agency
EIA	Environmental Industry Associations
EOA	Environmental Industry Association
FCSWMD	Franklin County Solid Waste District
GOAF	Government Organization of Accounting and Finance
HCV	Hepatitis C Virus
HCB	Hepatitis B Virus
HIV	Human Immunodeficiency Virus
IDU	Intravenous Drug User
MA	Massachusetts
MRF	Materials Recovery Facility
NASTAD	National Alliance of State and Territorial AIDS Directors
NACCHO	National Association of County and City Health Officials
NACDS	National Association of Chain Drug Stores
NAHC	National Association of Home Care
NRC	National Recycling Coalition, Inc.
NSWMA	National Solid Wastes Management Association
SCCPP	Sharps Community Collection Pilot Program
SEP	Syringe Exchange Program
US	United States
USCM	United States Conference of Mayors
WASTEC	Waste Equipment Technology Association
USPS	United States Postal Service
RIRRC	Rhode Island Resource and Recovery Corporation

CHAPTER 1: INTRODUCTION

1.1 Overview

Spent sharps generated from in-home medical use such as in the treatment of diabetes and discarded sharps collected by public health and public safety personnel during their normal work activities can pose significant problems when disposed in municipal solid waste. The in-home user generally disposes of sharps by placing them in a rigid plastic container and then discards the container into the solid waste stream where, as a result of compaction and other transportation related activities, the containers often rupture causing the needles to become loosely dispersed throughout the solid waste stream. Uncontained sharps can pose a health and safety problem to personnel employed in solid waste facilities, where personnel inspecting bags for banned wastes or removing recyclables from the waste stream can be inadvertently punctured. Public health and safety personnel often find spent sharps that have been illegally discarded into the environment and collect these discards in an effort to protect the public from accidental exposure through puncture. These personnel often have difficulty lawfully disposing of sharps because of the limited number of collection locations.

1.2 Project Focus

The focus of this thesis project is compare case study models regarding sharps collection and disposal and reviews the major issues such as the need for syringe disposal programs, options for research, costs for sharps collection programs, community outreach, training and education, and collection models from four states,. This thesis also addresses the needs for building community partnerships, for establishing regulations within the Northampton Board of Health, for designing a program that requires local pharmacies, who sell needles, to act as a designated collection site, or to offer self-injector customers a free syringe mail in program. Preliminary discussions with local pharmacies indicate that they will do whatever is required of them.

1.3 Project Goals

The goal of the thesis project is design and documents a Sharps Community Collection Pilot Program (SCCPP) for the City of Northampton (CON), MA that could be replicated on a regional basis. The CON will pilot and refine the Sharps Collection Program, and will then expand the program to include all forty-four communities served by the Northampton Landfill.

CHAPTER 2: BACKGROUND

2.1 Description

Every year, nearly nine million syringe users administer between 2 - 3 billion injections outside traditional health care facilities. Two-thirds of these “at-home” injectors are people with diabetes and patients receiving home health treatment for allergies, infertility, multiple sclerosis, even for veterinary care. Many of these self-users are unaware of the safe disposal methods available to them. Many just simply throw their used needles in the trash or flush them down the toilet posing a risk of injury to anyone who encounters them and potential exposure to diseases such as Human Immunodeficiency Virus (HIV) and Hepatitis B (HBV) or C (HCV). With the continued growth of home health care and a predicted increase in Americans diagnosed with diabetes over the next fifty years, the problem will only continue to escalate and worsen if it is not addressed. Recommendations for proper disposal of sharps have been changing rapidly. Until a year ago, even the Environmental Protection Agency (EPA) website advised putting used sharps in rigid plastic containers and placing them in the trash. Since then, measures have been taken to enact legislation to restrict the disposal of sharps in the solid waste stream. New recent legislation of the Acts of 2006, "An Act Relative to HIV and Hepatitis C Prevention," requires the Massachusetts Department of Public Health (DPH) and the Department of Environmental Protection (DEP) to design, establish and implement programs for the collection and disposal of sharps effective July 1, 2008. However, with only months remaining before the ban takes effect there is currently no

funding or plan or infrastructure in place for alternative means of proper and safe disposal.

2.2 Research Questions

Primary - What criteria must be satisfied to design, develop and implement a community based sharps collection program?

Secondary - Although many models exist for collecting sharps, none of these programs have been adopted on a wide scale. Why haven't these models been successful?

2.3 Definitions

International Bio Hazard or Biohazard waste symbol – used on containers to indicate the the contents may be highly infectious.

Approved sharps container - a single or multi-use container, which meets certain requirements of the law, designed primarily for the containment of sharps.

Sharps - devices which are capable of puncturing, lacerating, or otherwise penetrating the skin. Examples include (but are not limited to) needles, needles attached to disposable syringes, and lancets.

Lancets - medical devices used to test blood sugar level.

Blood - human blood, human blood components, and products made from human blood.

Needle removers - devices that physically remove a needle from a syringe.

Hypodermic needle – a hollow needle commonly used with a syringe to inject substances into the body.

Needle-less Systems - a device that does not use needles for (1) the collection of bodily fluids or withdrawal of body fluids after initial venous or arterial access is established; (2) the administration of medication or fluids; or (3) any other procedure involving the potential for occupational exposure to blood-borne pathogens due to percutaneous injuries from contaminated sharps.

Occupational Exposure - reasonably anticipated skin, eye, mucus membrane, or parental contact with blood or other potentially infectious materials that may result from the performance of an employee's duties.

Destruction Device - a hypodermic syringe destruction device wherein a cutting member and hammer member are positioned on a movable carrier within a housing. A fixed anvil is mounted within the housing, and an opening in the housing is arranged to permit the needle end of a hypodermic syringe to be inserted in an open region between the anvil and blade-hammer, with the movable carrier in a normal position. A solenoid is mechanically coupled to the carrier to move the blade through the syringe and hammer across the needle and anvil, whereby the needle region of the hypodermic syringe is separate from the syringe portion, and the needle is bent essentially 90 degrees.

Sharps Mail-back Program - a service you can purchase which comes with a needle container and mail-back packaging. Needle containers are filled with used needles and mailed back in the package provided by the company. The price for the service varies according to the size of the container.

Syringe exchange program - used syringes are traded for new ones. The group running the service will dispose of used needles safely according to prescribed programs.

Resource and Recovery Act - provides for comprehensive cradle-to-grave regulation of hazardous waste and authorizes environmental agencies to order the cleanup of contaminated sites. Since 1984, it has also called for the extensive regulation of underground storage tanks and the cleanup of contamination caused by leaking tanks. In addition, the Act addresses the environmental problems associated with non-hazardous solid waste and encourages states to develop solid waste management programs, regulate solid waste landfills and eliminate open dumps. Federal facilities are required to comply with federal, state, and local regulations and requirements on solid and hazardous waste and underground storage tanks to the same extent as private parties. The Act contains provisions on a number of other topics, such as resource recovery, used oil management and recycling, and small town environmental planning. While most of the Act's provisions focus on the protection of human health, its wide-ranging attempts to prevent, reduce, and eliminate pollution have an obvious, if largely unstated, effect on wildlife protection as well.

Blood-borne Pathogens - infectious materials in blood cells that can cause diseases in humans including Hepatitis B and C and Human Immunodeficiency Virus.

Contaminated Sharps - Any contaminated object that can penetrate the skin including, but not limited to, needles, scalpels, broken glass, broken capillary tubes, and exposed ends of dental wires.

Decontamination - The use of physical or chemical means to remove, inactivate, or destroy blood-borne pathogens on a surface or item to the point where they are no longer capable of transmitting infectious particles and the surface or item is rendered safe for handling, use or disposal.

Biologics or “designer” drugs – are made up of molecules that are too large and can be destroyed in the digestive system, therefore they are administered through injection or infusion.

Hepatitis B - a serious disease caused by a virus that attacks the liver. The virus, which is called hepatitis B virus (HBV), can cause lifelong infection, cirrhosis (scarring of the liver), liver cancer, liver failure, and death.

Hepatitis C - liver disease caused by the hepatitis C virus (HCV), which is found in the blood of persons who have the disease. HCV is spread by contact with the blood of an infected person.

Regulated Waste - liquid or semi-liquid blood or other potentially infectious materials; items contaminated with blood or other potentially infectious materials; items that are

caked with dried blood or other potentially infectious materials and are capable of releasing these materials during handling; contaminated sharps; and pathological and microbiological wastes containing blood or other potentially infectious materials.

Municipal Solid Waste - predominantly household waste (domestic waste) often added with commercial wastes collected by a municipality within a given area. They are either solid or semisolid and generally exclude industrial hazardous wastes.

Source: Wickipeda, Web MD and CDC website.

CHAPTER 3: LITERATURE REVIEW

3.1 Brief History of Sharps Disposal

Sharps have become a major issue for landfills and waste haulers in recent years due to the hazard associated with handling them. The meaning of “sharps” in terms of regulated medical waste includes discarded needles, needles attached to disposable syringes, and lancets which are capable of puncturing, lacerating or otherwise penetrating the skin.

The issue has become increasingly important due to growth of home treatment and individual drug users outside the healthcare setting, changes in medical treatment by healthcare providers away from traditional oral medications to biologics, and potential infection to anyone who comes in contact with disposed needles. Biologic or biological products include globulin, serum, vaccine, antitoxin, or antigen used in the prevention or treatment of disease. The use of “biologics or designer drugs” is gaining in popularity and is the preferable treatment over oral medications because administration goes directly into the blood stream, is fast acting, and helps patient compliance as they are taken less often.

As with most pharmaceutical products, “biologics” are expensive due to necessary research and development, manufacturing, and delivery. Yet, spending for biologics is expected to grow steadily from estimates at \$40 billion or 20% of total drug spending in 2005 to \$90 billion or 28% of total drug spending 2009 (“*2007 Strategic Briefing,*” *Coalition for Safe Community Needle Disposal*). The number of people using needles is growing at a steady rate and continued growth is projected. In fact, the Centers

for Disease Control (CDC) predict a 165% increase in Americans diagnosed with diabetes over the next fifty years. This does not include the expected increase in the number of patients being treated at home with self-injections for allergies, multiple sclerosis, HIV, HBV & HCV, infertility, and arthritis, nor does it include individual drug users. The main cause of needle-stick exposure within municipal solid waste occurs when bags break, when waste is compacted, or when needles are flushed down toilets or disposed in drains.

Overall, there are at least three billion injections yearly outside of healthcare settings. About two billion of these injections are administered by people with diabetes and patients receiving home healthcare for a variety of conditions (allergies, arthritis, migraines, HIV, Hepatitis, and other illnesses). In addition, there are approximately, one billion intravenous drug users (IDU) using illicit drugs, like heroin and cocaine (*Lurie P, Jones TS, Foley J*). Most of the needles used for these injections end up discarded in household trash and community solid waste, putting garbage collectors, custodial workers, and all workers involved in waste disposal operations and the public at risk of needle stick injuries and potentially fatal injections. Unlike hospitals and medical facilities that are mandated to collect and dispose of their hazardous wastes separately either through incineration or autoclaving, the estimated eight million home needles and IDU across the United States (US) are on their own. Most of these have not been given proper instruction on the public health risks from improperly discarded needles or provided with appropriate and safe disposal options. A point worth noting regarding the IDU is that in addition to dealing with their drug habits and the current lack of safe needle disposal options, many laws and statutes make safe needle disposal more difficult

and highly unlikely for these users. Sadly, many IDU's still share needles and are at high risk for contracting HIV, HBV or HCV. IDU's have elevated prevalence of blood-borne infection (*Centers for Disease Control and Prevention. "AIDS Associated With Drug Use"*). This thesis investigates both benefits and potential barriers to increasing the number and types of community safe needle disposal programs.

In response to the growing number of sharps disposal issues, increases in reported incidents by workers, and public concern, many state and local groups have already taken action to better control, regulate, and reduce the number of reported incidents. These states and local governments include Oregon, Wisconsin, California, Hawaii, Florida, New York, New Jersey, Rhode Island, Massachusetts, and Washington. Another powerful effort and agent for change is the "Coalition for Safe Community Needle Disposal (CSCND)." This national organization formed in August of 2002, by key representatives from public health, professional associations, government, and industry assembled in Washington, D.C. in January 2001, to discuss "Safe Community Syringe Disposal: Understanding the Barriers and Creating Solutions." After all the data was presented and discussions held, the following statement was developed:

"In the community, improperly disposed used sharps pose a public health hazard to both workers and the public. While this complex problem requires national leadership, successful solutions must be focused at the state, local and community levels. Collaborative efforts involving national, state and local governments, the solid waste industry, labor organizations, syringe and pharmaceutical manufacturers, pharmacies and pharmaceutical distributors and health associations are needed to identify,

develop, and implement strategies to ensure safe disposal of used sharps in the community. Ideally, these strategies should reduce or eliminate sharps in solid waste, should be low-cost and convenient for the public, and should be easily implemented in the community” (*Safe Community Syringe Disposal 2001*).

In a short time, this unique collaboration of business and industry, medical, and community groups grew to include non-profit and government organizations as well. The Coalition’s goal is to promote public awareness and develop solutions for safe disposal of needles, syringes, and other sharps in the community. What makes this coalition powerful is the expertise and heavy hitters from the American Medical Association (AMA), American Pharmacists Association (APA), National Association for Home Care and Hospice (NAHCH), National Alliance of State and Territorial AIDS Directors (NASTAD), National Association of County and City Health Officials (NACCHO), National Solid Wastes Management Association (NSWMA), National Recycling Coalition (NRC), and United States Conference of Mayors (USCM) who give of themselves freely by sharing their extensive experience and knowledge in health, disease management, education and infectious disease prevention. Initial funding sources include the Waste Management Charitable Foundation, Inc. and Beckton Dickerson Company. Both companies have tremendous incentives for the Coalition to be successful and have encouraged others in the business community to join.

Historically, sharps disposal outside of the healthcare setting was not regulated until 2002, when the Massachusetts Department of Environmental Protection (MADEP) issued a sharps management guidance document entitled “Interim Guidance for a Pilot

Program for the Management of Sharps Generated from Certain Non-Commercial Sources.” This set the stage for piloting non-commercial sharps collection programs and two pilot programs have been initiated since then. In May 2002, the Franklin County Solid Waste Management District (FCSWMD) set up the first sharps program in MA using a mail-back program because MA regulations only allowed collection at a permitted solid waste facility. Using a USDA Rural Utilities Grant, 500 mail-back containers were purchased and distributed. Average cost was \$25 dollars per unit. MADEP policy (October 2002 and March 2005) allows collection of residential sharps at a municipal facility, medical facility or pharmacy. Containers for sharps must be leak proof, rigid, puncture resistant and shatterproof. In 2003, the FCSWMD used the new DEP policy to set up a collection system using disposable sharps boxes and a series of drop off-sites throughout the county. This system was less expensive and more functional than requiring residents to use a mail-back system. The FCSWMD provides at no charge, one quart and one gallon sharps containers. Ten collection sites were established: two town halls, three town nurses offices, two Board of Health offices, two physician practice sites and one district office. Franklin County residents can pick up specifically designated sharps containers and return full containers for disposal. All collection sites tracked the number of containers issued and returned, which was coordinated by FCSWMD who underwrote the collection and disposal costs. Stericycle collected and disposed of containers on a routine basis, two to three times a year. The FCSWMD works with diabetes educators at local hospitals to disseminate information and boxes. Sharps boxes and information also are provided to home health care visiting nurses, school nurses and shut-in programs through the county sheriff department. Letters were also sent

to physician offices, veterinarians and pharmacies. Listed below is the program cost information.

Table 1. Franklin County Solid Waste Management District Sharps Collection Cost

Summary:

YEAR	2004	2005	2006	2007 Projected
Sharps Boxes	\$600	\$1,400	\$1,500	\$2,600
Disposal	\$800	\$1,700	\$1,800	\$2,100
Totals	\$1,400	\$3,100	\$3,300	\$4,700

Source: Jan Ameen, Executive Director FCSWMD

This has been a successful program which the FCSWMD continues to operate and there have been no reports of pathogen exposures to any participants.

According to Marilyn B. Lopes, in 2004, the second pilot program was started in the County of Barnstable, MA (population 250,000; however the county population swells to between 650,000 to 750,000 people during summer months) and includes fifteen towns. The Cape Cod Cooperative Extension organized initial meetings and invited Department of Public Works (DPW), Department of Health (DOH) and Fire Departments. From this effort, the “Think Twice About Sharps Disposal” program was initiated because sharps disposal was not part of the hazardous waste program. A guide to safe disposal of household syringes and lancets was developed and offered free to consumers. Seventeen collection sites were set up and included: twelve fire stations, three transfer stations, one public works and one health department site. Local media was used in any way possible

to kick off event. The Cape Cod Cooperative Extension oversees the program, keeps containers on hand for the collection sites, coordinates disposal and funds the program through the County Household Hazardous Waste program.

3.2 Regulatory Background and Review

Federal, state, and local laws pertaining to safe needle disposal include the EPA, the Occupational Safety and Health Administration (OSHA), United States Postal Service (USPS), and the Commonwealth of MA. Management of municipal solid waste permits state and local governments to direct or otherwise regulate the movement of municipal solid waste generated within their jurisdiction to a designated disposal site, transfer station, recycling facility, or other waste processing facility. In 1976, Congress passed the Resource and Recovery Act (RCRA), which mandated that state governments develop and implement environmentally sound waste management plans (*Government Finance Officers Association (GOAF) Issue Brief*, May 2003.).

To address safe needle disposal, federal, state, and local regulations were passed in response to beach wash-up incidents along the eastern coastal areas in 1987 and 1988. The new laws and regulations were designed primarily for healthcare facilities and medical waste operations and required formation of a comprehensive regulated medical waste management plan. The regulated medical waste plan specifically targeted the generator, requiring tracking of waste composition, quantity information, and waste disposal practices. This approach made sense at the time and addressed public pressure to respond. Passing laws and regulations targeted the biggest potential offenders and

generators by controlling syringe and other hazardous waste. This response was what the public wanted and the EPA delivered.

During this time, syringes generated by home injectors and individual drug users were exempted from rigorous restrictions, which required proper storage and handling, labeling, manifesting, treatment, and syringe destruction before disposal. This made sense because they were outside the scope of these mandates and in line with both community and public concern. In 2001, several states (for example New York which passed laws by both the Department of Environmental Conservation and the Department of Public Health) addressing needle and sharps disposal. Section 27-1507 of the New York State Environmental Conservation Law required “all sharps must be rendered unrecognizable prior to disposal.” Sharps are required to be destroyed because of health and safety concerns of regulated medical waste handlers throughout the storage, collection, treatment, and disposal processes. The New York State Public Health Law, Section 3381-a, requires hypodermic syringes, needles, and disposable hypodermic units also be destroyed based on concern for their use in administering narcotic drugs. Methods of treatment or destruction include incineration, autoclaving, or any other Department of Health approved method. New York State, as others before them, failed to include sharps and needles generated by household and intravenous drug users.

Until recently, the US EPA’s recommendation on safe household disposal of used needles was to place them in rigid, leak-tight containers, seal, and label the containers as “needles,” and dispose of as household trash. In 2004, the EPA issued new guidelines for the disposal of sharps used in the community settings. Many believe the CSCND played a key role in convincing the agency to advise the public to use more safe and appropriate

disposal (*Price, S*). The new EPA guideline lists several safe disposal options available to both the household and individual drug users and also suggests contacting the local health department with any questions regarding safe sharps disposal. The new EPA guideline does not include any reference to their previous recommendation “using sealed containers and placing in household trash” and instead offers options such as mail-back services, needle exchange programs, drop-box or supervised collection sites in hospitals, nursing homes, doctors offices, fire and police stations, pharmacies or health departments, and the use of home destruction services which burn, melt or the sever sharps making them safe for home disposal.

In June of 2006, the EPA created a second brochure entitled “Protect Yourself, Protect Others.” Topics include “Safe Options for Home Needle Disposal,” “Why are Used Needles Dangerous,” “Do’s and Don’ts,” along with “Recommended Needle Disposal Options for Self Injectors by Community and National Services.” The brochure is available online (at www.EPA.gov) and in pharmacies and demonstrates how the EPA is expanding its public education and awareness campaign. This additional brochure identifies both national and community safe disposal options and suggests calling your local public health department to see what is available in your area . Although this is just a guideline, the message is clear, “change is possible and safe needle disposal is moving forward.”

Due to the increase in needle stick injuries and health risks associated with exposure to viruses and other blood-borne diseases, OSHA published the *Occupational Exposure to Blood-borne Pathogens Standard* in 1991 (*OSHA Standard 29 CFR Part 1910.1030*). This standard was also driven by public fear and concerns by OSHA

regarding HIV, HBV and HCV viruses. The standard requires employers with workers exposed to blood or other potentially infectious materials to reduce or eliminate the hazards of occupational exposure. Employers must implement an exposure control plan and provide details on employee protection measures. The plan also mandates use of a combination of safety controls such as engineering and work practices ensuring the use and availability of personal protective clothing and equipment, provides training, medical surveillance, HBV vaccinations, and signs and labels. Engineering controls are the primary means of eliminating or minimizing employee exposure and include the use of safer medical devices, such as needle-less devices, shielded needle devices, and plastic capillary tubes.

Many gains and improvements in medical devices have been developed. Education and training programs have also been implemented and improvements in medical surveillance are in use to lessen the number and severity of needle sticks and sharps injuries. Despite these efforts, needle stick and sharps injuries continue to be a high concern due to the high frequency of occurrence and severity of health effects not only in healthcare settings but to workers in other fields as well (trash collection, custodial staff, waste and recycling center employees and the general public). In fact, the CDC estimates that healthcare workers sustain nearly 600,000 percutaneous injuries annually involving contaminated sharps (www.cdc.gov/needlestick).

The Needle Stick Safety and Prevention Act was also passed by Congress directing OSHA to revise the blood-borne pathogens standard to establish in greater detail requirements that employers identify and make use of effective and safer medical devices. OSHA did add new requirements which became effective in April 1991,

including additions to the exposure control plan and keeping a sharps injury log. It also specifies in greater detail the engineering controls which must be used to reduce or eliminate worker exposure. This standard has been a success in mandating employers to implement safer controls to address worker safety, as it became a greater issue to workers outside the healthcare setting. Waste Management Inc., the largest waste disposal operation in the US, estimates that 3% of their workforce suffers from needle sticks annually. Except for the limited information available by Waste Management, OSHA and CDC, no one really knows or tracks how many needle sticks occur outside the healthcare setting from improperly disposed needles and sharps. There is currently no law that requires such reporting.

The USPS regulates medical waste in the postal system under 39 CFR Part 111.1. Needles and sharps are included under Hazardous and Restricted mail. The definition includes any item of medical waste having a projecting and cutting edge or fine point that was used in animal or human patient care or treatment or in medical research or industrial laboratories. The term includes, but is not limited to, hypodermic needles, syringes (with or without the attached needles), Pasteur pipettes, scalpel blades, blood vials, needles with attached tubing, and culture dishes (regardless of the presence of infectious agents). Also included are other types of broken or unbroken glassware that were in contact with infectious agents, such as used slides or cover slips. The term does not include new unused medical devices such as hypodermic needles, syringes, and scalpel blades (<https://www.USPS.gov>).

Unfortunately, there are no federal mandates from the EPA or OSHA for the estimated three billion needles generated annually by home and individual drug users.

Moreover, the number of users is projected to continue to increase as highlighted in the previous section. This creates a huge burden on state and local municipalities, who have the responsibility to regulate, control, and manage municipal solid and hazardous wastes. State and local governments will have to engage and work with community partners to come up with solutions and options to best serve the people in their communities. Currently, state and local laws do exist for the proper disposal of medical and infectious waste. However, these waste types are treated differently depending on how and/or where the waste is generated (*“2007 Strategic Briefing”, Coalition for Safe Community Needle Disposal*).

Tables 2, 3, and 4 illustrate how state and local laws differ from state to state, identification of syringe collection programs, and mail-back options from the *Journal of the American Pharmaceutical Association, November/December 2002, Vol. 42, No 6 Suppl. 2*.

State Guidelines:

“In thirteen states, the state agencies responsible for infectious waste management have published guidelines for legal community syringe disposal options table 2” (*Turnberg and Jones*).

Table 2. State Agencies with Community Syringe Disposal Guidelines:

DISPOSAL	In house trash	Community syringe	Community syringe mail
STRATEGY		collection site/location	back program
RECOMMENDED		assistance	

STATE:			
Alabama	✓		
Florida	✓	✓	✓
Hawaii	✓		
Massachusetts	✓		
Michigan	✓		
Minnesota	✓		
New Jersey	✓	✓	
New York	✓	✓	
Ohio	✓		
Oregon		✓	
Rhode Island	✓	✓	
South Carolina	✓		
Wisconsin		✓	✓
Total	11	6	2

* No state agency guideline in California, Georgia and Washington

Federal Guidelines:

Since the expiration of the 1988 Medical Waste Tracking Act, the EPA has had no direct authority over infectious waste disposal. However, the EPA has recommended guidelines on containers for trash disposal of syringes. EPA container recommendations before trash disposal are presented in table 3.

Table 3. State Agency and EPA Syringe Container Guidelines:

Recommended Syringe Container For Trash Disposal	Clear plastic soda bottle	Glass bottle	Detergent bottle	Plastic bleach bottle	Metal coffee can	Commercial sharps container
State						
Alabama			Yes	Yes	Yes	
Florida	No	No	Yes	Yes		Yes
Hawaii			Yes	Yes		Yes
Massachusetts	No	No	Yes		Yes	
Michigan			Yes	Yes	Yes	
Minnesota	Yes					
New Jersey	Yes		Yes			
New York	Yes	No		Yes	No	
Ohio	Yes		Yes	Yes	Yes	
Rhode Island	No	No	Yes	Yes	Yes	
South Carolina	Yes					
EPA		No	Yes	Yes	Yes	

State Laws and Regulations:

As Table 3 demonstrates, eleven states legally allowed syringes to be disposed of in household trash. In New York, regulations did not address the legal concept of syringe disposal in trash but, the state agency policy allowed home users to use trash disposal as a viable option. Florida infectious waste regulations encouraged home users to separate and properly package their syringes, but did not address disposal. Oregon and Washington specifically prohibited sharps disposal in with household trash and extended this requirement to anyone who sent solid waste to these states for disposal.

Syringe Collection Programs:

Ten states did not address syringe collection in either infectious waste or state regulations. A conservative interpretation in these states could require syringe collection sites (i.e., pharmacies or doctors offices), to be regulated as infectious waste generators

and meet healthcare facility requirements. Two states, South Carolina and Rhode Island, were less restrictive and declared syringes generated from home users not a regulated waste and permitted collection sites freedom from infectious waste generator requirements. Six states specifically addressed collection sites in solid waste or infectious regulations. California and Wisconsin eased infectious waste disposal requirements for collection sites. Washington and Florida provided exemption from solid or infectious waste facility permitting requirements for collection sites. New Jersey allowed syringe collection by permitted regulated infectious waste generators, like hospitals. New York required community sharps collection at hospital and other healthcare facilities and required providers or collectors of syringes, like pharmacies to register with the state health department and meet state infectious waste disposal methods (see table 4).

Table 4. Community Syringe Collection and Disposal Addressed in Solid or Infectious Waste-Related Statute and/or Regulation *1,2,3 P:

Disposal Options:	Trash disposal allowed by statute and/or regulation	Collection programs addressed in statute and/or rule	Mail back programs addressed in statute
State:			
Alabama	✓		
California	✓	✓	✓
Florida	✓	✓	
Georgia	✓		
Alabama	✓		
Massachusetts	✓		
Maine	✓		
Minnesota	✓		
New Jersey	✓	✓ 3	
New York	✓ 1	✓ 3	
Ohio	✓		
Oregon	P		
Rhode Island	✓		
South Carolina	✓		
Washington	✓ 2	✓	
Wisconsin	P	✓	

- ✓ 1 = Trash disposal not specifically addressed in rule or statute; allowed under state agency guideline.
 - ✓ 2 = Trash disposal conditionally allowed by statute in regions not serviced by a “sharps collection service”.
 - ✓ 3 = Only collection by licensed medical facilities addressed by statute or rule.
- P = Trash disposal prohibited by statute or law.

Mail-back Programs:

California was the only state who addressed the mail-back option in law. The mail-back system requirements included submission of a list of all infectious waste generators serviced by a company and periodic updating of the list.

From a MA perspective, legislation is a key strategy and incentive to development of community safe needle disposal programs. The following MADEP and DPH laws address this issue.

Table 5. DEP and DPH Laws For Community Sharps:

Document	Purpose	Target Areas
Policy for the Management of Sharps Generated From Non-Commercial Sources 03.22.05	Provide management approach and flexibility requirements of 310CMR 16.06 (Site Assignment Regulations) and 19.015 (Solid Waste Facility Regulations) for safe collection and disposal of sharps	<ul style="list-style-type: none"> • Sharps users and designated points of collection for sharps; pharmacies, medical facilities and municipal facilities
Infectious Waste Disposal & Transport - Mass. DEP & DPH 09.06	Describe the management and disposal of infectious waste	<ul style="list-style-type: none"> • How infectious waste is managed at medical facilities and home health care. • List requirements medical facilities must meet before infectious waste is accepted for disposal. • Identifies transportation requirements • Lists regulations governing infectious waste

Home Medical Waste - covers waste from homes

Identifies hazards, handling and management options.

• Prescription drugs, cancer and radioactive treatment drugs & waste, syringe and sharps disposal options

Chapter 172 of Acts 2006 - 07.21.06 Sharps ban at all landfills.

An act Relative to HIV and HCV Prevention

•Requires development of infrastructure for safe management and disposal of sharps. Effective date 07.01.08

Source: www.mass.gov/legis/laws

The process of developing an infrastructure to comply with the sharps disposal waste ban in landfills by July 1, 2008, is underway. On February 9, 2007, MADEP and DPH released a draft for public comment on State Sanitary Code, Chapter VIII, 105 CMF 480.00, “Minimum Requirements For Medical or Biological Waste” was initiated and a final rule will be promulgated before the end of 2007 (*www.mass.gov MADEP and DEP website*).

Other federal agencies that regulate different aspects of medical waste management include:

- Department of Transportation Office of Hazardous Materials Safety (DOT)
Regulates medical waste transportation in 49 CFR, Sections 172 and 173.
- Regulates medical devices such as sharps containers which are designed to safely contain used needles.
- Nuclear Regulatory Commission (NRC)
Regulates some types of radioactive medical waste.

3.3 Community Sharp Disposal Models

A review of the necessary criteria needed to satisfy the design, development, and implementation of a community based approach.

Background:

Many different models exist within the US. Depending upon what state and local municipality you live in determines whether laws or statues exist, whether there is prevalence or lack of needle stick incidents, and whether local community leaders are sensitive to environmental health and safety issues.

Safe Disposal Solutions:

A myriad of disposal options are suggested and cited in the literature by Turnberg and Jones including;

- Syringe exchange programs,
- Permitting household users to place used sharps in plastic bottles or tin cans sealing them and disposing with household trash,
- Bringing plastic containers filled with used sharps to hospitals, nursing homes, doctors' offices or clinics,
- Providing users with sharps containers and designating special drop-off collection sites (i.e., pharmacy, fire or police station),
- Using drop-off boxes (i.e., mailboxes painted red) placed in high risk or key areas of a city,
- Mail-back programs,

- New products developed to destroy needle heads by melting or grinding down,
- Using safer needles which encapsulate needles after use

Most models use a multidiscipline approach within state and local government to design, develop, and implement programs.

Funding:

Several funding methods are identified including passing the cost onto the user, municipality, or pharmacy, seeking grants, partnering with manufacturers or distributors of sharps containers or destruction devices or are affiliated with hazardous waste operations.

Statues and Laws:

Flexible and clear legislation is essential to provide a basic framework to work from. Some existing laws regulating medical waste and drug paraphernalia actually hinder the process of establishing a successful sharps collection program. Only three states (California, Oregon, and Wisconsin) have laws making it illegal to dispose of sharps in household trash. Stated another way, it is perfectly legal in forty-seven states to dispose of sharps by simply tossing them in with household garbage. CSCND claims, “that 93% of all self injectors dispose of their needles in this manner.” In fact, that is one disposal option that is consistent and agreed almost upon across the board. The good news is that many states are becoming more aware of the potential health and safety risks of improper sharps disposal and they are revising and/or revisiting local laws to prohibit this practice.

Anne Burns, Director of APA states, “Our goal is to create a separate waste stream for used sharps just like automobile users who improperly dispose of their car’s waste oil and who are aware of the environmental impacts. The automobile owner now has options; to take used oil to local gas station or have oil changed by a vendor who is prepared to handle proper oil disposal. This change did not happen overnight, but with increased public awareness regarding the environment, along with realistic, accessible, and cost effective options, this unsafe practice has changed tremendously over the last couple of decades.” Responsibility for managing state and/or local programs must be agreed upon. The most common approach is a shared responsibility between DEP and Public Health. A single governmental agency with sole responsibility for program management was rare. One model sited that the DEP was solely designated and another model assigned three-way partnerships between DEP, DPH, and DOT.

3.4 State and Community Perspective

The literature suggests there is a “growing interest in safe needle disposal which can be traced back to several states and these are all listed below who have been extremely active” (*Jones and Foley*). These states include Wisconsin, Rhode Island, Florida, California, MA, Minnesota, and Washington The reasons prompting this activity are consistent from state to state and include:

- Disposal of needles outside the medical system fell outside the scope of existing laws,
- An increase in number of reported needles sticks by garbage collectors or other workers,
- Needles spotted within trash, at the landfill or municipal recycling centers,

- Concerned citizens banding together to reduce risks of possible injury and disease.

This call to action supports the CSCND’s mission to collaborate with community, business, and government to promote public education and create solutions for safe needle disposal. Many communities are becoming more involved in this emerging public health issue. CON is eager to meet and exceed the challenge put forth by the CSCND, “which urges each community to establish collection and disposal programs to reduce the risk of injury and infectious disease to people who come in contact with discarded needles” (*Redfearn, S*).

The primary issues in MA issues are:

The legislation established around this issue by the MADEP and DPH includes: 2002 Community Safe Needle Collection Guidelines, Infectious Waste Disposal & Transport, Household Hazardous Products - Home Medical Waste and in 2006, An Act Relative To HIV and HCV Prevention. This legislation was initially vetoed by the Governor, but it was later passed by two thirds of the Senate.

In the COH additional issues are:

- Landfill compliance
- Increase in weekly calls to the Board of Health DPW inquiring about needle disposal
- Continue proactive record and history in waste management field
- Provide a public health community service
- Successful community involvement

- Health and safety of eighteen employees within the DPW solid waste division operations
- Workers Compensation - cost of needle sticks incidents in short term only is approximately \$3,000 per case.
- Recyclables transported to Springfield Materials Recycling Facility (MRF) expose their employees and when needles are found MRF stops its process, removes source; waste can be identified and will be shipped back to Northampton landfill. Town would be responsible for these additional costs and material would go into landfill.

3.5 Summary and Conclusion

Key challenges that must be addressed in order to remove existing barriers and develop solutions for community safe needle disposal are:

3.5.1 Regulatory:

As of this writing, there is no overarching regulation or law to deal with community sharps. Management and control of municipal solid and hazardous wastes lies predominantly with the state and local agency. Perspectives, methods and regulations differ. Certain laws regarding possession of needles are a detractor to safe disposal. Existing state and local laws are not consistent and sometimes difficult to understand. Some laws do not create enough flexibility for communities to set up collection points. There is a strong need to establish program management by defining roles and responsibilities and have key leaders at state and local level champion the cause.

3.5.2 Funding:

With many state and local governments having limited resources this program funding is major issue. Funds may already be stretched to the limit or non existent. Alternative funding is primarily government or private grants, foundations or charities. In MA, this is an important issue as the state has mandated or banned needle disposal in landfills by July 1, 2008. To date, the state has not provided any additional resources to help local communities develop the necessary infrastructure to comply with this new legal requirement.

3.5.3 Medical Management and Treatment:

There are many emerging trends increasing the complexity of issues associated with sharps collection programs including; biologics, patient education, anticipated disease growth, new reimbursement options and escalating healthcare costs. A major development is growth in biologics and new designer drugs. Using medication injections vs. traditional oral approaches is preferred by many physicians because medications go directly into the blood stream and improve patient compliance with treating illness.

Significant gaps in patient education exist in the hospital settings, physician's offices and clinics regarding potential risks, proper and safe needle treatment and disposal options. Some patients are given one of the potential risks or the other but rarely both. Many healthcare providers and pharmacists are just unaware of the vital role they could play. Predicted disease growth (especially, diabetes and infectious diseases) must be a strong consideration at all levels (nationally, state and local). More research and development of product stewardship programs for sharps disposal or reimbursement

could be created as a partnership between Medicaid, pharmaceutical companies, sharp manufacturers and others.

3.5.4 Public Education and Awareness:

The need to educate, train and reach the general public, healthcare professional, pharmacists and groups at risk must be addressed. Currently, the approaches and methods for patient and community education are inconsistent. New ways of looking at this issue can emerge locally with the right mix of people reflecting community needs and priorities. The literature reinforces the importance of public education and outreach on a continuing basis.

3.5.5 Disposal Options:

There were at least six disposal methods (household trash disposal, collections sites, mail-back, syringe exchange programs, destruction device and household hazardous waste special collection) identified in the literature, representing the range of implementation strategies among the states reviewed. Programs using a combination of contractor and vendor partnerships appear to be more successful and cost effective by reducing equipment costs and disposal costs.

3.5.6 Better Use of Existing Resources:

Many communities could tap into both state and national organizations to help start the effort. The CSCND and its membership the AMA, the ADA and the APA is the leading driver of safer disposal practices, P2 strategy (reduce or eliminate volume),

disease prevention and lobbying for new national reform. This Coalition is an excellent resource that can assist with state and local efforts to develop policies, programs and guidelines.

3.5.7 Conclusion:

This is why it is important to move ahead with this project. Further case study analysis and comparison optimizes information and models that already exist to help to address this new emerging problem. Specific focus to design, develop and implement the best solution for the CON by optimizing the lessons learned to date regarding design solution ideas, review of the test or pilot data and taking advantage of design knowledge. Collection and summary of this information assists efforts in the CON and provides the Northampton team with greater advantages in building a model best suited for the needs of the town and surrounding communities.

Chapter 4: Methodology

4.1 Problem Restatement

The purpose of this project was investigate and review existing community sharps disposal programs in the US in an effort to compare and contrast the most successful practices and identify how and why these programs are successful. The criteria were analyzed in order to design, develop, and implement a safe and successful community based sharps collection program for the CON, MA. This information will enable the development and implementation of a pilot program in the CON. Upon completion of the pilot, the program's strengths and weaknesses will be reviewed. In the long term, the goal is to replicate the program in the 40+ surrounding communities, currently served by the Northampton landfill. In the short term, Northampton will be able to meet the new legal requirements banning the disposal of sharps in landfills by July 1, 2008.

4.2 Goals

The primary goal of this thesis project was to assist the CON to develop and implement a safe community sharps collection and disposal program, which minimizes employee and public exposure to used sharps and needles reducing the potential for injury or infection from accidental needle sticks. The secondary goal is share the "lessons learned" from the pilot program and assist with program implementation in all of the forty-four communities served by the Northampton landfill. As an outcome of these goals, the city will also comply with a new MA law that will ban the disposal of sharps in trash as of July 2008.

4.3 Methodology Overview

The data collection process provided appropriate information and performance results, which answered the primary and secondary research questions driving the thesis project. The focus of data collection included:

1. New and emerging regulatory and legal requirements
2. Differing types of disposal options
3. Program funding
4. Program management
5. Education and training

4.4 Case Study Selection Criteria

“Case Studies are empirical investigations. They are useful in revealing why decisions were made and how they were implemented” (*Case Study Analysis*, Morelli). To assist with this effort, several interviews and discussions on thesis project and case study selection were conducted in April and May of 2007 with Jen Schumann, Executive Director CSCND, Huston Texas. For review are three case studies from Wisconsin, Rhode Island, and Illinois which enabled a detailed review of their programs that captured the background, process, outcomes, successes, failures and lessons learned.

The states below were selected for two reasons; first, these states lead the way with the most proactive achievement to date, and second, these states are similar in size, geographical location, and program scope to MA.

Figure 1. Case Study States and Population:

STATE	POPULATION
Massachusetts	6,437,193 (for comparison purposes)
Indiana	6,313,520
Wisconsin	5,556,506
Rhode Island	1,067,610

Source: www.factmonster.com

These case studies provided an opportunity to explore a single program in depth and allowed comparisons. The interviews were investigative; evaluation research and action research on program history, design and development evaluated whether programs and policies are working. The interview questions included;

- ✓ Start up Process - How and why did you get started?
- ✓ Design and Operations - What were the steps you took?
- ✓ Implementation and Ownership - Who is responsible for program?
- ✓ Regulation - What laws, statute and/or ordinances do you follow?
- ✓ Program Funding - How is program funded, initially and currently?
- ✓ Documentation - What are written programs and policies?
- ✓ Training and Education - Who conducts and methods used?
- ✓ Benchmarking - What lessons have you learned?
- ✓ Can we use and share the information you provided us in this project?

All state contacts provided information through interviews, email and/or hard copy, and agreed this information could be included in this thesis project. In fact, many were proud and very willing to be part of the case study.

After carefully reviewing and analyzing all the data collection and program documentation, each individual case study section was created emphasizing the key points gathered from the state contacts.

4.5 Expected Results

The case study method described each state's individual experience with sharps collection incidents, processes followed, challenges faced, interventions employed, and successful program implementation outcomes. Applicable lessons learned have been utilized in the development and design of the CON pilot program. This program will be completed in phases over two years.

4.6 Research Limitations

The findings of this study are subject to several limitations. The information was collected and analyzed during the spring and summer of 2007 through telephone interviews, examination of program documents, and review of procedures, regulations and training materials. Interpretation of this data was limited by time and the small number of case studies selected. This process did not include site visits, participation in program training and education or observation of how each sharps collection program operates in each community. Therefore, the results have been limited to generalizations.

Chapter 5: Case Studies

5.1 Wisconsin Case Study Background: (Population 5,600,000)

Several interviews were conducted by phone and follow up emails during June 4, through June 20, 2007 with the following state contacts; Barbara Bickford, Medical Waste Coordinator - Department of Natural Resources, Wess Damro, Recycling Manager Port and Solid Waste Department and Judy Friederichs, Director/Health Officer. The information offered by these professionals, review of Wisconsin's state and local laws and regulations and the regulatory review from my literature review chapter provided the foundation of this case study.

According to Barbara Bickford, the state of Wisconsin is a pioneer in the promotion of household sharps collection. This effort started back in the early 1990's through legislation that required and enabled all generators to safely dispose of sharps. Three goals were targeted:

1. To reduce risk of injury and disease.
2. To include everyone who generates or who comes into contact with small amounts of sharps (public, waste haulers, individual drug users, pet owners, farmers and small businesses).
3. To foster sharps collection programs which are safe, convenient, inexpensive, flexible and anonymous.

Disposal Options:

Wisconsin considered several sharps collections options: disposal in trash containers, mandatory sharps collection by healthcare facilities, pharmacies and others

and voluntary sharps collection by anyone who wanted to participate. Wisconsin chose voluntary collection because this program did not conflict with state environmental statutes, which did not support mandatory collection. Voluntary collectors felt like they owned their collection programs and reaped the direct benefits of fewer injuries and lower worker compensation costs. The key drivers for Wisconsin's sharps collection program are safety, efficacy and anonymity.

Program participants must use safe containers and safe transportation. Collectors also must use safe containers and follow minimum requirements for handling, storage, transportation and comply with OSHA blood-borne pathogen standards. Users can conveniently access collection sites from well publicized "sharps collection sites" (over 500 locations), and drop off their sharps with no paperwork.

Collection sites can be easily registered by phone or letter, and no fees, licenses, permits or reports are required. The state mandates that collection sites must be not-for-profit to reduce costs to users (the only costs allowed are disposal, minimal administration and collection containers.) The collectors pay no fees to state. Wisconsin's flexible law permits a wide local needs to be established that list including needs, collection programs for special users i.e. persons with disabilities, homebound or fixed income persons etc...

An important aspect of the Wisconsin program is anonymity. It includes everyone who generates small amounts of sharps: diabetes patients, illicit drug users, pet owners, and businesses.

Wisconsin rules for community sharps program, which have five key components:

1. Prohibition on landfilling - all sharps must either be disinfected or broken or be incinerated before landfilling. Essentially, no sharps were permitted in solid waste stream. Household generators are not excluded and must keep sharps segregated from other waste, use proper containers and dispose of sharps safely (e.g. take sharps to a “collection station”).
2. Safety requirements apply to all generators and collectors with no exceptions. This includes source separation, use of proper containers, handling, storage, transportation, treatment and disposal.
3. Users and collectors are exemptions from paperwork and licensing, as long as safety procedures are in place and followed.
4. Sharps collection sites must follow clear instructions on training policies, safety procedures and notification (e.g. if site moves).
5. Supporting provisions include definitions, treatment standards, and enforcement.

Three key components of Wisconsin’s sharps collection program includes:

1. Minimal but effective regulation for easy to implement programs. This includes operating sharps collection stations at or below cost, following safety procedures, registering with the state, developing rules and regulations that encourage sharps collection stations and enforcing no legal penalties for syringe and needle possession.
2. Local initiatives work best for local needs. A multidiscipline team was formed with pharmacies, healthcare practitioners, local government, waste haulers and diabetes practitioners and patients. This team approach was used to initiate; 500

stations were in use as of 2002. Currently 90% of counties 66 out of 72 have a program in place.

3. Sharps disposal education was instrumental in the success of the program. Wisconsin published guidelines, trained healthcare workers, and maintains a list of collection stations. Local training programs were designed to meet county/municipal needs. The State Health Department trained public health nurses and 250 infection control workers who acted as trainers at local facilities. The Health Department provided updates in infection control and AIDS/HIV newsletters and worked closely with the professional organization American Practitioners Infection Control (APIC). Local municipalities continue to develop their own training, newsletters, public service announcements and web site information.

The highlights of Wisconsin's program include:

1. Fewer sharps are observed in the waste stream.
2. Recycling waste is free of sharps.
3. Waste collection handlers have fewer health risks.
4. The state does not have statistics because they are not required to keep records. However, some local programs do track amounts collected, costs and/or number of sharp injuries.
5. Compliance with the program is highest when fines for improper disposal are established, when education is frequent and ongoing, and when community leaders champion the idea.

Lessons learned and areas for improvement:

1. Progress is impeded when collection stations are inconvenient and where no one volunteers to collect sharps.
2. The use of safe, non-commercial sharp containers keeps program costs down.
3. The hospitality sector and persons who are housebound must be encouraged to take part in the program.
4. Those who inject livestock and/or pet owners must also be included.

Summary and conclusion:

Wisconsin has reduced the risk of injury and disease from improper sharps disposal by responding to real public health risks posed by household sharps. They developed successful sharps collection programs by initiating community involvement, encouraging volunteers to collect sharps, drafting safe and effective local and state regulations, supporting local grass root initiatives and public education.

Brown County, Wisconsin (Population 240,000):

In 1995, Brown county, the Green Bay Health Department, the County's solid waste department, the Wisconsin environmental agency, area hospitals, pharmacists, physicians, public works departments, infectious control providers, the regional diabetes association, the hemophilia association, sharps users and waste haulers teamed up to develop a sharps collection program for individuals. The program began a year later with a collection network of thirty stations (pharmacies, clinics and hospitals). Each facility distributed empty containers and collected full ones for free. Brown County outshines other sharps collection programs in many ways. For example, the program has a broad base of funding, including sixteen municipalities, two county departments, three local hospitals, one national waste hauler, one national medical waste contractor and their local landfill. In addition to brochures, the county produced videos for both the generators and operators and prepared sharps collection "startup kits" for those developing their own program. The county has documented statistics about its program, after six weeks, it surveyed users and collectors and continues this practice annually. Based on these surveys, they now offer one-quart containers to persons who only use lancets and five-gallon containers for hemophiliacs. In 1998, the county began a collection program for businesses to install sharps containers their customers and employees. As of January 2001, there are sixteen pharmacies, seven clinics, and three hospitals participating in the Brown County collection program.

Table 6. Summary of Current Brown County Program Results:

Date	Pounds Collected	Number of containers distributed	Cost
June – Dec. 1996	1567 lb	3192	\$9,035
1997	8654 lb	3353	\$10,555
1998	8519 lb	4757	\$13,128
1999	7121 lb	5923	\$16,937
2000	4729 lb	4892	\$19,288
2001	No Data	Reorganization	
2002	6315 lb	No data	\$30,582
2003	8863 lb	No data	\$36,250
2004	8714 lb	Stopped Supplying	\$11,192
2005	7120 lb	Stopped Supplying	\$6,590
2006	7167 lb	Stopped Supplying	\$6,619
Totals 10 years	68,769 lbs.	22,117 5 yrs. Only	\$160,176

Source: Wess Damro, Recycling Manager Port and Solid Waste Department, Wisconsin

The table shows that amounts collected increased and declined. Costs however, have steadily increased, mainly due to rising costs of containers. The county estimates that the cost in 2000 was approximately five dollars per container, which included the cost of container and disposal. This cost compares favorably with return by mail sharps containers, which would cost approximately twenty to twenty-five dollars per container.

In 1997, the county estimated based on weight that 500,000 to 600,000 sharps were collected (assuming all sharps were 1cc syringes, all containers were full, and twenty to twenty-five containers were disposed in each storage tub). In January 2004, the county switched to non-standard containers and stopped supplying containers to program participants.

In 2006, the county sharps disposal contract was not renewed primarily due to service issues. August 2006 was the last month Stericycle (the county medical waste disposal contractor) served the county. September 2006 was the first month with a new contractor and the numbers were down because the new contractor.

Currently the program funding is 50% municipal, 25% Brown County and 25% Private Partners. The program has run smoothly except for one needle stick. Despite being trained to handle the containers as little as possible, a sharps collection station operator was stuck when she tried to pack sharps containers in the shipping box more efficiently.

5.2 Rhode Island Case Study Background: (Population 1,067,610)

Several interviews were conducted by phone and follow up emails during June 6, through June 20, 2007 with Cherie Fischer the state contact from the Diabetes Foundation of Rhode Island (DRFI). The information gathered from the DFRI and a review of state laws and regulations provided the bases for this case study.

In 1999, Rhode Island worker needle stick injuries and plant operation interruptions at the state landfill and material recovery facility led to the development of Rhode Island's statewide residential needle disposal program.

The Rhode Island Resource Recovery Corporation (RIRRC) the agency that manages the entire state's waste stream) observed an increase in the number of loose needles in residential trash and recyclable material. Whenever sharps were detected at the Materials

recycling facility (MRF) operations were stopped at a cost of \$1,800.00 dollars per hour. In 1999, more than 400 pounds of loose sharps were removed from the MRF. In the first eight months of 2000, forty incidents involving loose syringes resulted in sixty-five hours of MRF interruptions at an estimated cost of \$117,000.00 dollars.

History

According to Cherie Fischer, the RIRRC contacted the DFRI to discuss how to reduce the number of discarded needles in residential trash and recyclables. The DFRI identified fourteen pharmacies that had already had sharp collection systems in place. However, OSHA requirements for workers required special training for blood-borne pathogen standards. To simplify needle disposal, the DFRI worked on needle kiosk designs that could reduce exposure to used needles.

Patients could place used needles through a one-way door into a locked kiosk reducing the potential exposure to blood-borne pathogen exposure for collection personnel. The initial design was similar to a five foot high mail box, for the deposit of coffee can or other sealed containers. Glass containers were not permitted. The Champlain Foundation provided funding for this initial kiosk design.

By the fall of 2000, the “Eureka” program kiosks were in place at fourteen sites around Rhode Island. By August 2002, the number of kiosk locations grew to 42 sites; the sites included 35 pharmacies, 4 fire stations, 2 police stations and 1 at the diabetes foundation office. All kiosks were placed inside the facilities, usually in the waiting areas. By the end of December 2002, the number kiosks grew to fifty.

Education and training

The DFRI educated the public about the Eureka kiosk system using a wide variety of media tools. Some of the media tools included: public relations campaigns, print ads, television and radio spots, website postings, posters and brochures for displays at physician offices.

Program Targets and Goals

The campaign was targeted to reach sharps users, state agencies, municipalities, physicians, pharmacists, nurses and health educators. These contacts spread the word to that sharps containers should be brought to the Eureka kiosks. The staff at each kiosk location provided a new sharps container free of charge and accept the old one when full. The sharps collection containers were provided and donated by Rhode Island DOH, RIRRC and Stericycle. Stericycle is a medical waste company that provides pick up and delivery of sharps from Eureka kiosks to a medical waste treatment plant. Stericycle ships the destroyed needles to American Refuel Incorporated where it is burned for energy.

Outcome and results

From October 2000 through February 2002 more than 7,500 pounds of sharps and sharps containers have been collected through Eureka. Since March of 2002, the monthly collection has averaged 750 pounds (more than 1,000,000 million syringes collected

annually). The DFRI and Eureka have partnered and are using multiple measures to evaluate the program's operations and impact. The measurements include:

1. Weight and estimated number of sharps collected for individual sites and overall programs.
2. Number of needles found in material recovery facility line.
3. Number of RIFRRC worker injuries.

In 2002, initial findings at the RIRRC were promising. No needle worker stick injuries since the start of the Eureka program and a 50% decrease in the weight of loose needles and sharps found on the MRF line from 400 pounds of sharps in 2000 to 200 pounds in 2001.

Lessons learned

Eureka has been most successful at those sites where staff and/or local fire departments strongly promote the program. Program costs have varied, depending on the available community resources and sponsorship. The total start up cost for initial design and materials was \$130,000.00 dollars and was funded mostly through in-kind donations, cash sponsorship and grants. For Eureka collection sites, the average cost is \$1,500.00 dollars per year and includes sharps containers, literature for the local community, maintenance and disposal.

In 2001, the Rhode Island General Assembly passed legislation to establish a commission to evaluate needle disposal law and methods examine the outcome of the Eureka sharps disposal program and obtain long term funding for the program.

In 2002, the DFRI and Walgreen formed a partnership to begin a nationwide expansion of the Eureka program to include all Walgreen pharmacies, wherever feasible. A second partnership was also formed with Medical Waste Solutions to develop Eureka into a comprehensive and replicable sharps disposal program.

Summary and Conclusion:

Because sharps generated at home are not regulated, community sharps collections sites, such as pharmacies or fire stations, are not addressed by Rhode Island's medical waste law and rule. This would actually encourage facilities to become approved sharps collection sites. Rhode Island's blood-borne pathogen standard discourages programs in which employees accept sharps containers from customers, and encourages programs in which employees do not have to handle containers because customers place them directly into a collection container.

The success of this program demonstrated the possibility of a statewide residential needle disposal program, by using a team approach among consumer groups, the solid waste industry, state agencies health care providers and corporations. Since this time, the DFRI is marketing the Eureka Disposal system (with a variety of other services) to assist other states initiate and/or improve existing programs. Their marketing strategy is aimed at state agencies, not-for-profits, and corporations that are concerned with unsafe needle disposal issues.

5.3 Indiana Case Study Background: (Population 53,526)

Several interviews were conducted by phone and follow up emails during April 24, through June 3, 2007 with the following state contacts; David D. Lamm, Administrator Boone County Solid Waste District, Sharon Adams, Boone County Health Department and Rachel Weinrich, Indiana State Department of Health. The knowledge these contacts supplied and a review of Indiana state laws and regulations contributed to the development of this case study.

According to David Lamm, in 2001, the Boone County Health Department (BCHD) approached the Boone County Solid Waste Management District (BCSWMD) with a request that a portion of an existing Solid Waste District/Health Department grant be utilized to purchase sharps containers for distribution free of charge to diabetes patients in Boone County. Since the health department gave immunizations, they were already a “regulated entity.” In other words, they already had a private sector service provider that picked up the sharps containers they generated. Adding a few from the public was not considered to be problematic.

Process

Once a container is full, participants can deliver sharps container to the BCHD at no charge, where it is properly disposed. The sharps program allows needle users a safe way to dispose of their equipment. Currently, Stericycle picks up the full sharps containers from the health department. No committee oversees this program. The Citizens Advisory Committee (CAC) of the BCSWM simply agreed from a solid waste perspective that this was a “good idea.” Solid waste collection companies that are

represented on the BCSWMD CAC have enthusiastically supported this program. One company in Boone County has provided photographs of needles encountered when needles are placed in plastic bleach or detergent containers that get thrown into the recycling bins.

Regulation and Education

No local or county guidelines exist and there is no formal training program for personnel handling the sharps containers. However, additional printed materials were developed and key elements for safe sharps collection were stressed, (eg. sharps are never removed from the containers; they go directly into locked disposal cabinets). There was no media kick off event. The program went ahead quietly and efficiently. Boone County approached this program as a medical service not a hazardous waste trash collection event.

The county “advertising” has been primarily word of mouth, through healthcare providers (doctors, diabetes awareness groups, pharmacists, public health nursing staff) or an occasional newspaper article. There was no advertising budget, and all funding went directly to the collection program. The BCSWMD also contacted physicians, pharmacists, and farm co-op services. Farmers tend to use the same needles repeatedly so they do not generate as many unless they vaccinate very large herds.

Program Management

The environmental and nursing staff at the health department accepts sharp containers, distribute new ones and keep records. It is handled as a “no questions asked” service. Bring in a container, get another one for free. Some of the veterinarians have also

donated monies to this effort although they are not regulated like medical facilities. There are no monthly meetings. The health department staff provides statistics on a quarterly basis (Table 6).

Table 7. Sharps Container Distribution and Collection Costs in Boone County:

Year	Containers Distributed	Purchase Cost	Containers Collected	Estimated Needles collected	Disposal Cost	Total Costs
2001	16		6	2,400		\$121.60
2002	57		52	20,800		\$604.70
2003	62	\$599.47	68	27,200	\$1,166.34	\$1,765.81
2004	113	\$568.62	106	42,400	\$1,333.20	\$1,901.82
2005	157	\$742.61	131	52,400	\$1,179.00	\$1,921.61
2006	189	\$996.03	242	96,800	\$1,611.72	\$2,607.75
2007	62	\$326.74	76	30,400	\$506.16	\$832.90
Total	656		681	272,400		\$9,756.19

Source: David D. Lamm, Administrator Boone County Solid Waste District, Indiana.

Results and Expectations

The county program had no previous model, recommendations or studies to base their program on and no concerns other than a need to provide the service. Staff at both the BCSWMD and the BCHD saw a need in their community and simply wanted to fill it. They wanted to approach safe sharps disposal programs in an open and uncomplicated manner. Their motto is start the program and just watch what happens. Escalating costs were expected. The county started and has not looked back.

The key component of Boone County’s program is that it is a cooperative effort, and the professional handling is performed as a medical service and not as a hazardous waste collection event.

5.4 Case Study Summary

5.4.1 Participation

All programs utilized a team approach and cooperative effort. The composition of the planning and implementation team membership was dictated by state, county or municipal location, interest, past experience with sharps disposal, community needs and available resources. Representatives included consumer groups, the solid waste industry, state agencies, healthcare providers and corporations.

5.4.2 Education and training

All programs have (either initially or through program expansion) contacted hospitals, physician practices, veterinarians and/or farmers through word of mouth or newspaper articles to continue to build awareness of sharps disposal programs. In addition, all programs developed printed material. Initial and continuing education was a central element in Wisconsin and Rhode Island.

5.4.3 Funding

Funding programs vary; Brown County, Wisconsin divided the cost (50% municipal, 25% Brown County and 25% private). Wisconsin, Indiana, Rhode Island and MA programs started as part of ongoing grant. Currently, the BCSWMD carries program costs. In Rhode Island, the Diabetes Foundation is marketing the Eureka program to help communities with the development and implementation of community based sharps disposal programs. All the case study programs increased following program start up in terms of number of containers and disposal costs. This is an important issue to highlight with decision makers in the CON to expect program funding to increase initially.

5.4.4 Expectation and results

All programs have some form of evaluation and/or measurement of success. However, this information varies according to types of data collected, frequency of reporting and community surveys. Indiana, handles sharps collection as a medical service not as a hazardous waste collection event. In all other case studies, household trash disposal of needle avoidance was the primary target.

5.4.5 Laws and regulations

In 2002, the Centers for Disease Control sent out a “Call to Action” across the United States to alert the public to this crisis and make safe disposal of used syringes a priority. There have been ongoing debates as to whether states should allow the disposal of sharps containers in the solid waste stream, even if they are placed in puncture resistant containers.

California was the first state to sign a law prohibiting syringes from being disposed of in the garbage. Rhode Island, Florida, Massachusetts, New Mexico, Oregon, and Wisconsin have all passed legislation dealing with sharps disposal and/or provide collection points for needles.

In Wisconsin, there is a huge emphasis on state regulation, local initiatives and public education. The state adopted rules for managing and reducing medical waste in 1994. Local initiatives for voluntary collection sites include pharmacies, healthcare providers, and waste haulers as a public service. Wisconsin choose to focus more on public education than enforcement, specifically addresses home sharp generation and the impact of sharps in the waste and environment.

In Indiana, there are no local or county guidelines requiring community based sharps collection programs outside the medical facility. Emphasis is on providing a medical service to assist residents in implementing safe and effective needle disposal.

In Rhode Island, the law discourages syringes from being disposed of in the garbage and currently prohibits syringe disposal in the garbage.

Chapter 6: Conclusion

6.1. Project Importance:

In recent years, sharps have become a major issue for landfills and waste haulers due to the hazard associated with handling them. Overall, there are at least three billion injections yearly outside of healthcare settings. About two billion of these injections are administered by people with diabetes and patients receiving home healthcare for a variety of conditions (allergies, arthritis, migraines, HIV, HBV, HCV, and other illnesses). In addition, there are approximately one billion intravenous drug users using illicit drugs, such as; heroin and cocaine. Most of the needles used for these injections end up in municipal solid waste, all workers involved in waste disposal operations as well as the public at risk of needle stick injuries and potentially fatal injections.

The estimated eight million home needles and intravenous drug users across the US are not regulated, unlike hospitals and medical facilities which are mandated to collect and dispose of their medical wastes separately either through incineration or autoclaving. Many home injectors have not been given proper instruction on the public health risks from improperly discarded needles or provided with appropriate and safe disposal options. According to the CSCND, intravenous drug users face another barrier, in addition to dealing with their drug habits and the current lack of safe needle disposal options, many laws and statutes make safe needle disposal more difficult and highly unlikely for these users. Sadly, many intravenous drug users still share needles and are at high risk for contracting HIV, HBV or HCV. I agree with the CSCND and believe this is a central issue.

6.2 Analysis and Findings:

Several states and communities have developed different approaches to achieve safe disposal of used syringes. The programs used several major strategies: providing sharps containers free or at minimal cost, establishing collection sites for biohazard waste disposal at community sites, hospitals, or pharmacies, and setting up community drop boxes.

Key points in syringe disposal programs were identified and include:

1. Programs should involve waste haulers, pharmacies, physicians, public health departments, diabetes educators, persons with diabetes who use insulin and intravenous drug users. The team approach works best.
2. Sharps disposal education and awareness is critical to the success of any program.
3. Keep program simple by developing cost effective, easy to use systems.
4. Local initiatives work best, especially when local leaders champion and support program.
5. Participation by local pharmacies is an important element in program success.
6. Expect increase in program expansion once started.
7. Multiple (and sometimes conflicting) local, state and federal laws concerning medical waste and syringe possession can hinder common sense approaches at state and national level.
8. Program measurements and evaluation such as surveys, tracking sharps related incidents, cost of containers, workers compensation and waste disposal help keep program in line with community needs, budget and expectations.

6.3 A timeline for development and implementation:

Below find the project management timeline for development, design and implementation of the SCCPP. The project scope will run several years into the future. Several implementation options follow this timeline and include advantages and disadvantages of each. All options will be presented to the CON for their review, approval and support.

Table 8. Timeline For Implementation:

PHASE IN PROCESS	DELIVERABLE
Phase 1	Summary and Conclusion of Case Studies.
Phase 2	Establish Local Team - utilize key representatives from DOH, DEP, DPH, Local Pharmacy, Diabetes Foundation and/or Hospital, Fire and Police Departments, and community users.
Phase 3	Clearly define mission goals and priorities; program management, existing laws and regulations, results from case studies and existing programs, size of community and affected population, sharps user population demographics, current methods of collection and other considerations that are unique to the CON (i.e., landfill, increased calls, past problems).
Phase 4	Assess options - review the programs currently in use in the US and develop possible solutions for CON.
Phase 5	Present solutions to the municipality for review and approval.
Phase 6	Seek necessary state approval (if applicable).
Phase 7	Develop Implementation - timeline to include: <ol style="list-style-type: none"> 1. Written guidelines, policy and program 2. Equipment and supplies 3. Training and education 4. Kick off program, key dates, flyers, press releases and community outreach.
Phase 8	Launch SCCPP in CON.
Phase 9	Monitoring and Evaluation - track progress and identify issues three to six months. Replicate process for the forty-four surrounding communities.

6.4 Research Disposal Options

Research indicates several options are currently used for sharps/syringe throughout communities within the US and include the following:

1. Container Collection Sites - How This Option Works

An individual brings full sharps containers to a collection site such as a pharmacy, medical facility (for example, a hospital or public health clinic), or non-medical facility (for example, a fire station) for safe disposal. Other sites have sharps collection drop boxes (a kiosk, mailbox-type receptacle, or other secured collection bin). This is a viable option that can capture many of the syringes generated in the community. Successful syringe container collection programs feature: minimal regulatory constraints placed on collection sites, easy access provided through numerous and well-publicized collection locations and minimal costs to users through subsidized costs of containers and disposal. Even if a community does not have collection site programs, an individual may be able to develop an informal relationship with a local pharmacy or other facility that will accept and safely dispose of filled syringe containers.

Advantages and Disadvantages

Sharps container collection programs have two key advantages:

1. Used syringes are kept out of the regular solid waste stream, which reduces the risk of needle stick injuries to waste and recycling workers.

2. Syringes collected through these programs are disposed of safely as medical waste. This involves special disinfection to destroy germs and destruction or burial to ensure that the needle points cannot injure anyone.

Facilities and individuals may perceive some disadvantages:

1. Individuals may feel that bringing sharps containers to a collection site is inconvenient and reduces their privacy because it identifies them as a syringe user.
2. Collection sites may have to comply with state blood-borne pathogen standards and medical waste disposal requirements, and they must carefully maintain the collection bins or kiosks.

2. Container Mail back Programs - How This Option Works

Sharps containers are distributed to customers, and when full are mailed back to a syringe disposal company for safe disposal. This is a viable option that can capture some of the used syringes generated in the community.

Advantages and Disadvantages

Syringe mail back programs have the same advantages as syringe container collection sites: used syringes are kept out of the regular solid waste stream, which reduces the risk of needle stick injuries to waste and recycling workers, syringes collected through these programs are disposed of safely as medical waste. This involves special disinfection to destroy germs and destruction or burial to ensure that the needle points cannot injure anyone.

The cost of mailing the container to the disposal company varies. The cost may be too high for some individuals, and may be considered a disadvantage.

3. Disposal in the Trash - How This Option Works

Individuals place their used syringes in the household trash, needle is removed first or syringe is placed in a puncture-resistant container. Some individuals remove the needle from the syringe and put it in a container using a special device. The syringe and contained needle are then disposed of in the household trash.

Advantages and Disadvantages

The main advantages of this option are convenience and low cost.

This option has several important disadvantages:

1. It places people at risk of being stuck by a needle and increases their chances of contracting a blood-borne infection. Placing unprotected syringes into the household trash puts waste collectors at risk.
2. Placing used needles in a puncture-resistant container may help protect trash collectors from being stuck. Even so, most containers disposed of in the trash shatter in the garbage truck and release their contents. This places waste workers at risk.
3. Bottles or cans used as puncture resistant containers may be recycled by mistake. This puts waste recyclers at risk.
4. Not in line with EPA current recommendation for household syringe disposal.
5. Disposal in the trash will become illegal in MA under a new state law which will prohibit syringe disposal in landfill as of July 1, 2008.

6.5 Program Design for Northampton Sharps Collection Pilot Program

Based on the calculations of the supervisor of the DPW in Northampton there is an estimated diabetic population of 869 or 3% of the population ($28,978 \times 3\% = 869$ individuals). Others using sharps on a regular basis (treatment of allergies and other diseases, illegal drug users, pet use etc.) is 290 or 1% of the population ($28,978 \times 1\% = 290$ individuals). Therefore, our target population is approximately 1,000 individuals.

Proposed project scope per Supervisor of the DPW:

1. Research options and costs for sharps collection programs in MA.
2. Design a model collection program for our target population that could be replicated on a regional basis. The CON is interested in piloting and refining a program within the city, and then expanding the collection system to include all forty-four communities served by the Northampton landfill.
3. Work with the Northampton Board of Health
Establish a regulation requiring pharmacies, located in Northampton to take back used sharps in standardized containers (if they sell needles or lancets) at no cost to participants. Pharmacies would not have to participate in the take-back program if they do not sell needles or lancets, or if they provide an alternative program at no cost to participants (e.g. provide postage-paid containers for mailing).

Note: This represents a new approach and it is within the Board of Health's power to impose this program on local pharmacies. Preliminary discussions with local pharmacies indicate that they will do whatever they are required to do.

4. Perform outreach to pharmacies; assist them in establishing protocols and procedures to:

- ✓ Accept sharps in standardized containers from customers at no charge (the city is willing to purchase and provide the 1.5 quart collection containers to Northampton residents at no cost, but how the containers could be distributed has not been determined).
- ✓ Maintain a record of each participant's name, address and phone number. (recorded on a card each time a sharps container is distributed or received).
- ✓ Store sharps containers in specialized thirty gallon boxes.
- ✓ Call for pickup when two boxes are full.
- ✓ Report any concerns or issues to the City on a timely basis.
- ✓ Cooperate with the City in promoting the sharps collection program.

5. Plan and implement a "kick off event"

- ✓ Prepare press releases and perform other media outreach.
- ✓ Distribute free sharps collection containers at an event.
- ✓ Collect properly containerized sharps at no cost.
- ✓ Provide information about sharps drop-off locations and program details.
- ✓ Facilitate diabetes education and information about proper disposal of expired/unwanted medications.

6. Write a how to implementation guide for municipalities.

Work with County Emergency Medical Coordinator and others as necessary to schedule and conduct needs assessment, identify sharps disposal options and develop programs based on local need, town location and available community resources.

6.6 Marketing Strategy

The case study research indicates successful community sharps disposal programs have been developed and introduced into the community as either an expansion of existing environmental and recycling programs or expansion of community medical service. Either method could be used for the CON pilot program. Consolidation of both environmental/recycling programs and medical services expansion might be the best approach for Northampton, as it is an environmentally conscious community. Other factors to consider for the collection program development is mandatory vs. volunteer options. Mandatory collection would require city ordinance i.e. all pharmacies that sell syringes and/or hospitals must accept sharps from the community. Voluntary collection means just that-no additional laws or local regulations. The city would build upon existing collection sites and invite others to participate including pharmacies, hospitals, fire stations, police stations, health department and recycling centers.

Another option not explored in thesis project (as none of the case studies employed this approach) was the use of home needle destruction devices. There are a variety of products available that clip, melt, or burn the needle and allow the sharps

user to throw the syringe or plunger in the garbage. These devices can reduce or eliminate the danger of sharps entering the waste stream. Historically, this option was limited and cost prohibitive. Today, new technology exists, (see safemedical.com “Voyager”) approved by the Food and Drug Administration, which are cost effective, small, compact (approximately 6 inches by 3) and can hold as many as 6 one-quart containers. (“Voyager” unit, www.safemedical.com).

6.7 Areas of Further Research

This thesis did complete investigation and identification of potential detractors to increasing the number and types of community safe needle disposal programs and establishing a project timeline to implement a SCCPP for the CON. This investigation and information analysis identified future research targets:

- ✓ Clarify existing laws and policies governing syringe sales and possession
- ✓ Learning more about syringe disposal options
- ✓ Addressing the perceived conflict between blood-borne disease prevention and drug abuse through continuing education
- ✓ Having local, state and national organizations improve their partnership when addressing this issue. Helping each other problem solve and take advantage of potential synergy.
- ✓ Continue development and research of home destruction devices as a viable disposal option to reduce material and disposal costs and shrink or eliminate waste stream and foster upstream prevention strategy.

- ✓ Continue research and development of improved medicine delivery (i.e. pen style syringe), medical management and increase education opportunities both at the patient and community level.

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