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A SWOT ANALYSIS OF CONDUCTING MEDICATION DISPOSAL PROGRAMS IN WISCONSIN COMMUNITIES

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A SWOT ANALYSIS OF 1-DAY MEDICATION EVENTS AND CONTINUOUS MEDICATION PROGRAMS IN WISCONSIN COMMUNITIES

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ABSTRACT

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The purpose of this research was to conduct a SWOT (strengths, weaknesses, opportunities, threats) analysis of 35 Wisconsin communities which offered 1-day medication take-back events and continuous medication programs and had contracted with the La Crosse Household Hazardous Waste Department for transportation or disposal of collected medications. A 96% response rate was achieved. This SWOT analysis was subsequently used to develop recommendations for the strategic planning of community-based medication take-back programs, to include 1-day events and continuous programs. Based on the research findings, medication programs need to ensure the safe collection of medications and include plans to provide convenient access to continuous medication disposal programs in addition to 1-day events. Research findings indicated that medication disposal program threats included the need to secure and sustain financial support and facilitate the implementation of Drug Enforcement Agency (DEA) and Environmental Protection Agency (EPA) rules and regulations.

ACKNOWLEDGEMENTS

As a pharmacist, the disposal of unused, unnecessary or expired medications has been an ongoing problem. My goal when I started this research, was to blend my pharmacist skills with my public health education to address this problem. I am hopeful that this research will make a difference in the lives of Wisconsin communities who offer medication disposal programs and to the environment.

I would like to express my thanks to my thesis committee: Dr. Dan Duquette, Dr. James Wiener, Dr. Barbara Bennie, Mr. Jeff Gloyd and Dr. Gary Gilmore. Thanks to Dr. Duquette for reminding me of the importance of the research *process*. Thanks to Dr. Wiener for adding an environmental focus and providing me with new research articles related to my research. Thanks to Dr. Bennie for your patience, educational support and statistical analysis of the data. A special thanks to Jeff Gloyd for an incredible preceptorship which lead to this research project and his innovative ideas and insights.

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INTRODUCTION

Background

Over time, medical treatments have become less invasive and the use of drugs to treat and prevent disease has become standard therapy. New drugs to treat disease are being introduced into US markets every year with as many as 62 new drug applications slotted for FDA approval in 2009 (Brower, 2009).

The United States population continues to consume and spend more on drugs than ever before, as evidenced by the fact that in 1960 the United State residents spent approximately $70 per person on prescription drugs; that figure had climbed to $189 by 1980 and reached $335 by 1998 (Lichtenberg, 2009). In 1998, 2.7 billion prescriptions were dispensed in retail pharmacies, compared to 3.6 billion prescriptions dispensed in 2003. Wysowski and Governale note that this six-year change in utilization represents a 33% increase (2006). We can expect these trends to continue as a result of increased per capita consumption, expanding populations, new target age and disease groups and new uses for exiting drugs (Daughton, 2003). However, the increased utilization of pharmaceuticals demands an assessment of the impact of pharmaceutical disposal on the environment and public health.

The spectrum of pharmaceuticals found in water systems represents an unknown proportion of total medications that actually may exist in the water supplies. As of 1999, nearly all ecological monitoring for pharmaceuticals had been performed in Europe. In

2002, the United States Geological Survey conducted a study which examined 139 water streams in the United States. This study found 82 contaminants in 80% of the samples tested, many of which were pharmaceuticals (Kolpin et al., 2002). However, the threat of pharmaceuticals in the water systems to human health and the environment remains unknown (Daughton, CG, Ternes, T., 1999).

Currently, unused, unnecessary, and expired medications are being legally discarded in the trash or flushed into sanitary systems. As a result, pharmaceuticals are surfacing streams and drinking water (Donn, Mendoza, Pritchard, Associated Press, March, 2008). Disposal of medications by these methods is highly discouraged because wastewater treatment facilities are unable to remove pharmaceuticals from drinking water.

There is scant information in journals and popular press which provides a consensus for pharmaceutical disposal. Regulations regarding pharmaceutical disposal are applicable to businesses only. In February of 2007, the White House Office of National Drug Control Policy issued guidelines to the general public for the safe disposal of unnecessary, unused or expired medications. These guidelines include the following:

Federal Guidelines:

- Take unused, unneeded, or expired prescription pharmaceuticals out of the original containers and discard in the trash.
- Mixing of prescription drugs with an undesirable substance, such as used coffee grounds or kitty litter, and putting them in impermeable, non-descript containers, such as empty cans or sealable bags, will further ensure that pharmaceuticals are not diverted.

- Flush prescription drugs down the toilet *only* if the label or accompanying patient information specifically recommends doing so.
- Take advantage of community pharmaceutical take-back programs that allow the public to bring unused drugs to a central location for proper disposal. Some communities have pharmaceutical take-back programs or community solid-waste programs that allow the public to bring unused drugs to a central location for proper disposal. Where these exist, they are a good way to dispose of unused pharmaceuticals. (February 20, 2007. www.whitehousedrugpolicy.gov)

However, these guidelines do not align with medication disposal practices endorsed by the American Pharmaceutical Association (APhA) and the US Fish and Wildlife Service which suggests the following three guidelines:

1. DO NOT FLUSH unused medications. Consumers were once advised to flush their expired or unused medications; however, recent environmental impact studies report that this could be having an adverse impact on the environment. While the rule of thumb is not to flush, the Food and Drug Administration (FDA) has determined that certain medications should be flushed due to their abuse potential. Read the instructions on your medication and talk to your pharmacist.

2. When tossing unused medications, protect children and pets from the potentially negative effects:

- Crush solid medications or dissolve them in water (this applies for liquid medications as well) and mix with kitty litter or sawdust (or any material that absorbs the dissolved medication and makes it less appealing for pets or children to eat), then place in a sealed

plastic bag BEFORE tossing in the trash, remove and destroy ALL identifying personal information (prescription label) from the medication container.

- Check for approved state and local collection programs or with area hazardous waste facilities. In certain states, you may be able to take your unused medications to your community pharmacy.

3. Talk To Your Pharmacist. Research shows that pharmacists are among the most accessible healthcare professionals. As the medication experts on the healthcare team, pharmacists are available to guide you on how to properly dispose of your unused medications (American Pharmacists Association March, 2007).

Drug disposal practice remains variable, informal advice is inconsistent and US policy is non-existent (Daughton, 2003). Increased pharmaceutical utilization, a lack of clear guidance on how to best dispose of unused, unnecessary and expired pharmaceuticals and a recent increase in public awareness of pharmaceuticals in the water systems has prompted some Wisconsin communities to provide access to medication disposal programs. These programs include community sponsored 1-day medication disposal events and continuous disposal programs offered through local law enforcement agencies. Currently, 35 Wisconsin communities offer either 1-day medication disposal events or continuous programs and contract with the La Crosse County Household Hazardous Waste Department for disposal of collected medications. These programs vary in terms of methods of operation, capacity, reported outcomes and sustainability.

Purpose of the Study

The purpose of this research was to conduct a SWOT (strengths, weaknesses, opportunities, threats) analysis of the 35 Wisconsin communities who offered 1-day medication take-back events or continuous medication programs. This analysis briefly describes the details of current medication programs and subsequently provides an analysis of key internal and external factors within these medication disposal programs which can be used in the future strategic planning in these and other Wisconsin communities.

Statement of the Problem

With increased utilization, pharmaceuticals will continue to flow into the water systems and may impact the environment and public health. The importance of freshwater resources underscores the need for clear pharmaceutical disposal alternatives. Until Federal and State governments reach a consensus regarding the best management practices for pharmaceutical waste, activities associated with disposal by the general public are needed to reduce the release of pharmaceuticals into the environment (Daughton, 2003). In the meantime, local medication disposal programs, which include 1-day events and continuous medication take-back programs, may offer an opportunity to remove unused, unnecessary, and expired medications from water supplies.

Medication disposal programs have been implemented in 35 Wisconsin communities in response to a heightened awareness of medications in the water supplies and the potential for adverse impacts on the environment and human health. Internal operations of these programs vary and their external capacity to sustain future medication disposal programs remains unknown. No data have been collected that evaluates the strengths and

weaknesses and opportunities and threats of these programs. This is an inherent problem that can be addressed through a SWOT analysis applied to these 35 Wisconsin communities who contract with the La Crosse County Household Hazardous Waste department for medication disposal. Medication collection program variability, addressed through a SWOT analysis of individual efforts, can collectively identify areas of improved efficiencies within current programs and direct future quality improvement efforts by these programs in an environment where resources are scarce and possible impact is unknown.

Need for the Study

Australia, Canada and the European Union have had existing continuous medication take-back programs for over 10 years. The goals of these programs are to lesson disposal of pharmaceuticals into the environment, to reduce child poisonings, and to minimize inappropriate sharing of medications (Return Unwanted Medicines, 2002). In Australia, greater than 5000 pharmacies collect unnecessary, unused or expired pharmaceuticals and more than 200 tons of medications have been collected annually since the program began. Funding for these programs is provided by the government and the pharmaceutical industry (NHMRC, 1999).

In Canada, a medication return program was implemented in 2002 through a consumer-orientated stewardship program. Existing programs and resources in Canada include province-wide disposal services, provincial and regional "Medication Cabinet Cleanup" campaigns, patient education materials and medication review tools. The keys to successful programs in Canada include the following:

- Convenience for customers

- Public awareness through advertising and promotion of the service
- Funding for waste disposal
- Organized collection center
- Standard methods and facilities
- Individual initiative
- Continuing support from professional associations and their partners/sponsors

More than 75% of Canadian pharmacies participate in these voluntary programs, which include free return of all pharmaceuticals and over-the-counter medications (Daughton 2003).

In the European Union (EU), 27 member states and Norway have implemented collection programs since 2004 and their definition of what types of medications that can be collected varies between states. Eleven of the EU States offer pharmacy-based collection programs. Nine countries have broadened the definition of "medicinal products" to include not only prescription and over-the-counter (OTC) pharmaceuticals, but also illicit "recreational" drugs; seven EU states have also included the collection of syringes (Glassmeyer, 2009). The financial support for these programs is varied. Some countries rely solely on government funding, while others are supported through the pharmaceutical industry or local pharmacies (Daughton, 2003).

Pharmaceutical take back programs in the United States have only recently been implemented, and there are considerable differences between programs. Currently, nine states offer either continuous or community sponsored 1-day pharmaceutical events. These include California, Florida, Illinois, Washington, Maine, Indiana, Michigan, Pennsylvania and Wisconsin. These programs represent attempts to minimize the

introduction of pharmaceuticals into the environment and potential health risks. There are no published data to evaluate or compare the qualitative or quantitative outcomes of these programs.

The northeast region of the United States currently sponsors a “mail-back” pilot program that is designed to get people to put unused prescription or over-the-counter drugs in pre-addressed, postage-paid pouches and mail them to the Maine Drug Enforcement Agency for disposal. Mail-back pouches are made available through many pharmacies. This program is unique due to the cooperation of the state legislature, Maine Drug Enforcement Agency and United States Postal Service. Outcomes from this pilot program are not expected until 2009 (Glassmeyer, 2009).

Illinois, Indiana, and Michigan have recently conducted a limited number of 1-day community medication disposal events and continuous medication collection programs. These events have been sponsored by law enforcement and regional Environmental Protection Agencies (EPA). One day medication events, although limited, have been successful in Chicago, IL and surrounding suburbs, collecting over 1600 pounds of medications during a recent event. In addition to 1-day events, several Illinois counties currently offer continuous medication disposal programs Monday through Friday from 8:00AM until 4:00PM through local law enforcement agencies (Illinois Sea Grant, 2007). Monroe County, Indiana has held annual week long collection events and has offered continuous collection programs since 2006. In 2007, a coalition of nine faith communities, located in 19 Michigan cities, was established to collect medications during a 1-day event. Two thousand people participated collecting over one ton of medicines. (Glassmeyer, 2009).

Wisconsin pharmaceutical take-back events have been implemented in 35 Wisconsin counties during the past two years, and participation in these events has exceeded expectations. Milwaukee, Wisconsin has held two annual 1-day collection events since 2007. These two annual events have resulted in over 640 people disposing of 3200 pounds of non-controlled medications. During a community sponsored 1-day medication take-back events, Chippewa County, Wisconsin collected over 275 pounds of medications in April of 2008 and 585 pounds of medications in 2009. Medication weight collected did not include any packaging or plastic prescription vials. Most recently, Dane County conducted its third medication take back 1-day event in October of 2008 and collected over 800 pounds of medications and this total does not include packaging or plastic prescription vials.

The La Crosse county Household Hazardous Waste Department offers a continuous medication disposal program at no charge to La Crosse residents. Local businesses may also dispose of unwanted, unnecessary or expired medications at the La Crosse county Household Hazardous Waste Department and are required to pay a nominal fee for participation.

Currently, there is only one continuous medication take back program in Wisconsin, sponsored by the La Crosse Household Hazardous Waste (HHW) Department, which accepts medications for disposal from other counties who have collected medications during community sponsored 1-day events and continuous collection programs. Jeff Gloyd, Special Waste Manager, stated that the La Crosse County HHW department has collected more than 17,000 pounds of pharmaceuticals for disposal during the 2 years the program has been operating (J. Gloyd, personal communication, June 22, 2009).

Because medication collection programs have been successful in collecting large amounts of pharmaceuticals and represent prevention efforts within communities to provide access to medication disposal, the need exists to conduct a SWOT (strength, weaknesses, opportunities, threats) analysis of Wisconsin pharmaceutical take-back programs. This SWOT analysis, through the identification of program strengths, weaknesses, opportunities and threats, has the capacity to be used in the strategic planning of future pharmaceutical take back-programs offered within these communities. In addition, it was thought that this SWOT analysis might provide value to other Wisconsin communities that were considering implementation of a medication disposal program.

Until Federal and State governments reach a consensus regarding the best practice management of pharmaceutical waste, activities associated with disposal by the general public could prove useful in minimizing the release of pharmaceuticals into the environment (Daughton, 2003). In the meantime, local medication disposal programs that include 1-day events and continuous medication take-back programs provide an opportunity to reduce the entry of unused, unnecessary, and expired medications into the surface and ground waters.

In the United States, continued research is urgently needed to examine potential environmental concerns or human health problems as a result of current pharmaceutical disposal practices. Overall, research studies of this nature were deemed critical in minimizing human exposure and conserving economic and environmental resources.

Research Questions

Given the descriptive nature of this study, the following research questions were posited by the investigator:

- What are the strengths of current medication take-back programs offered in Wisconsin communities?
- What are the weaknesses of the current medication take-back programs in Wisconsin communities?
- What are the perceived opportunities in the current pharmaceutical take-back programs offered in Wisconsin communities (offering a continuous medication
- What are the perceived threats in the current medication take-back programs offered in Wisconsin communities?
- What are the recommended steps necessary in the future strategic planning of medication programs in Wisconsin communities?

Assumptions

For the purpose of the study, it was assumed that program directors that were identified and contacted to complete the survey were familiar with pharmaceutical take-back programs in their counties to accurately answer the survey questions.

Delimitations

The SWOT analysis will be delimited to the 35 counties in Wisconsin that had contracted with the La Crosse County Household Hazardous Waste (LCHHW) department for transport and disposal of pharmaceutical waste collected during 1-day events or continuous programs during the past 24 months. These 35 counties were chosen as a means to identify program directors most familiar with pharmaceutical take-back

programs and to confirm the accuracy of reported pharmaceutical waste collected and reported to the La Crosse County HHW department.

Limitations

Information collected by the survey relies upon self response, and was therefore limited by the accuracy of the program directors information collected.

Definition of Terms

Some of the terms that were used in this study are defined below:

a. **Pharmaceutical**: any synthetic, semisynthetic, or natural chemical substance used in the treatment, prevention, or diagnosis of disease, or for other medical reasons. (Merriam Webster Dictionary)
b. **Pharmaceutical and Personal Care Products:** include prescription and over-the-counter human drugs, veterinary drugs, diagnostic agents, nutritional supplements, and other consumer products such as fragrances, cosmetics, and sun-screen agents used for personal health or cosmetic reasons (www.epa.gov).
c. **Controlled Substances**: a pharmaceutical or chemical substance whose possession and use is regulated under the Controlled Substances Act and that is listed in one of five schedules of controlled substances in Title 21 of the US Code. (http://www.usdoj.gov/dea/pubs/csa.html).
d. **Expired Pharmaceutical Drugs**: Over-the-counter (OTC) or prescription drugs that have reached the manufacturers established date to be discarded. This would include study medications, study drugs, investigational drugs, and pharmaceutical samples (http://research.uthscsa.edu/safety/pharmdisposal).
e. **SWOT (Strengths , Weaknesses, Opportunities, Threats) Analysis**: An approach often used in strategic planning in the marking and business sectors,

particularly in the preliminary stages of decision making in preparation for more comprehensive strategic planning (www.answers.com/topic/swot-analysis).

f. **1-day events**: Medication collection events that are limited to one day, which includes less than six hours of collection and participation is limited because of the limited hours of operation. 1-day collection events exclude continuous programs. (www.pswi.org/government)

g. **Continuous Medication Disposal Programs**: Medication disposal programs that are ongoing or continuous. Participants have the option to participate on a continuous basis (Jeff Gloyd, April, 2009)

h. **Municipality:** political unit such as a city, township, village or town, incorporated for local self government (www.answers.com/topic/municipality)

CHAPTER II

REVIEW OF RELATED LITERATURE

Introduction

For decades, federal environmental officials and nonprofit watchdog environmental groups have focused their efforts on regulating contaminants in water supplies which clearly pose a health risk. Their efforts include the filtration of algae, viruses and bacteria. The standards for drinking water quality are typically set by governments or by international standards (World Health Organization, 2006). These regulations define the minimum and maximum concentrations of contaminants acceptable in the drinking water (www.epa.gov).

Pharmaceuticals have been entering the environment since people first started taking medications to treat disease. However, recent evidence of pharmaceuticals found in the water systems has federal government officials asking questions and seeking answers to decide if pharmaceuticals pose a health risk (APress, 2008) and has raised public awareness in the United States. Some experts say pharmaceuticals may pose a unique danger because, unlike most contaminants, pharmaceuticals are designed to have a therapeutic effect on the human body. More studies are needed however to determine the effects on pharmaceuticals on human health (Kolpin, 2002).

Over time, medical treatments have become less invasive and the use of prescriptions to treat and prevent disease has become standard therapy. Prescriptions are produced and used more every year and increased utilization may imply more medications in the water

supplies. In 1998, 2.7 billion prescriptions were dispensed in retail pharmacies in the United States. In 2003, the number of prescriptions dispensed rose to 3.6 billion. This six-year change in utilization represents a 33% increase. Of the top 20 most dispensed medications by volume, 40% were launched in the 1990s or 2000s. Retail costs for the total market of dispensed outpatient prescription medications were $96.1 billion in 1998 and $196 billion in 2003, a 104% increase (Wysowski & Governale, 2006). The Kaiser Family Foundation reports that 66,308,205 prescriptions were dispensed in WI outpatient pharmacies in 2006 (Kaiser Family Foundation 2006). This trend is expected to continue.

In the United States, federal and state governments are recognizing the need to offer guidance (www.whitehousedrugpolicy.gov) and regulations. However, these agencies have failed to reach a consensus regarding the best practice management of pharmaceutical waste and further investigations and research are in progress. The Environmental Protection Agency (EPA) has focused their efforts are looking at detection of pharmaceuticals in the water systems and results are yet to be published. Benjamin H. Grumbles, assistant administrator for water at the U.S. Environmental Protection Agency, acknowledged that in 2007, the EPA had developed new methods to: detect and quantify pharmaceuticals in wastewater. Gumbles stated, "We realize that we have a limited amount of data on the concentrations. We're going to need to learn a lot more" (Berg, 2008, p.68).

Currently, unused, unnecessary, and expired medications accumulate in patients homes (NCPIE, 1995) and are being legally destroyed by placing them in the trash or flushing them into sanitary systems. Disposal of medications by these methods is highly discouraged because wastewater treatment facilities are unable to remove the

pharmaceuticals from drinking water using conventional drinking-water treatment processes (coagulation, flocculation and sedimentation) and patients are not provided a means for convenient access for disposal of unused, unnecessary, and expired medications.

Ternes and colleagues recently demonstrated that ozone oxidation or activated-carbon adsorption techniques are not widely used and can efficiently remove pharmaceuticals from drinking water (Ternes, 2002). These ultra-filtration technologies are expensive and remain in pilot testing in Minnesota and New Jersey (U.S. Senate subcommittee hearing 4/15/08).

A study conducted in 2003 at Tulane University found that chlorination, ozonation and dual media filtration processes reduced the concentration of pharmaceuticals below detection in Mississippi and Detroit Rivers. Results of this study demonstrated that existing water treatment technologies can effectively remove certain pharmaceuticals from drinking water (Boyd, 2003), but these filtration processes are not currently utilized in the United States.

Increased utilization of medications, no government mandates to test, limit or advise people on how to dispose of their unused, unnecessary and expired medications and the non utilization of filtration processes to remove medications from the water supplies will allow medications to continue to surface in the streams and ground water.

In the meantime, medication disposal alternatives are being offered and the U.S. has seen the implementation of community medication take-back 1-day events and continuous collection programs. These take-back programs have gained popularity in various states as a local means to collect and dispose of unused, unnecessary, and expired

medications. Numerous programs in Wisconsin exist, however, these programs vary and there is no published data to reflect current operations and future strategic planning efforts.

Disposal Program Overview

Assessing pharmaceutical disposal programs requires an understanding how medications end up in the water systems and current disposal behaviors of patients. Pharmaceuticals result in the water systems through one of three mechanisms (Ruhoy and Daughton, 2008):

1. Run off of antibiotics and steroids from animal feed operations into ground water systems.
2. Excretion of pharmaceutical and their metabolites through urine and feces into toilets.
3. Unnecessary, unused or expired medications legally destroyed by placing them into sink or toilet or sent to landfills.

It is the excretion and legally destroying of medications in landfills and waste streams that impact the influx of medications into waste streams and water supplies.

Assessing medication disposal alternatives require an understanding of current disposal behavior of patients. A recent study was conducted by Seehusen and Edwards at a Tacoma, Washington Army Medical Center and found that non-Hispanic whites over 60 years of age, had five or fewer unused or expired medications in their homes and less than 20% reported ever having been given advice about proper medication disposal by a health care provider. More than half of all respondents reported storing unused or expired medications in their homes, and more than half reported flushing medications down a

toilet. These findings suggest that providing patient access to medication disposal environmental alternatives may have an impact (Seehusen, 2006).

Emerging Evidence and Public Awareness

In March of 2008, Donn, Mendoza and Pritchard, Associated Press writers, released their report regarding pharmaceuticals found in US water supplies. This three-part report was based on a five month investigation. The authors described their review of scientific reports, analysis of federal drinking water data bases, visits to environmental study sites and water treatment plants and interviews with more than 230 officials and scientists. They discovered medications in the drinking water supplies of 24 major metropolitan areas from Southern California to Northern New Jersey, from Detroit to Louisville, Kentucky. A vast array of pharmaceuticals, including antibiotics, anti-convulsants, mood stabilizers and sex hormones were found in the drinking water supplies of at least 41 million Americans (Associated Press, 2008)

Key findings from their report include:

- Philadelphia water results: 56 pharmaceuticals or byproducts in treated drinking water, including medicines for pain, infection, high cholesterol, asthma, epilepsy, mental illness and heart problems. Sixty-three pharmaceuticals or byproducts were found in the city's watersheds.
- Anti-epileptic and anti-anxiety medications were detected in a portion of the treated drinking water for 18.5 million people in Southern California.
- Northern New Jersey found a metabolized angina medicine and the mood-stabilizing carbamazepine in drinking water provided to 850,000 people in the area.

- A sex hormone was detected in San Francisco's drinking water.
- The drinking water for Washington, D.C., and surrounding areas tested positive for six pharmaceuticals.
- Three medications, including an antibiotic, were found in drinking water supplied to Tucson, Arizona,
- Of the 62 major water providers contacted, the drinking water for only 28 water providers were tested. Among the 34 that haven't been tested: Houston, Chicago, Miami, Baltimore, Phoenix, Boston and New York City's Department of Environmental Protection, deliver water to 9 million people.

Some providers screened for only for one or two pharmaceuticals, leaving open the possibility that others are present. The AP's investigation also indicated that watersheds, the natural sources of most of the nation's water supply, are also contaminated. Pharmaceuticals were detected in the watersheds of 28 metropolitan providers. Officials in six of those 28 metropolitan areas which included Fairfax, Virginia; Montgomery County, Maryland; Omaha, Nebraska; Oklahoma City, Oklahoma; Santa Clara, California and New York City stated they did not test their drinking water for pharmaceuticals.

The New York State Health Department and the United States Geological Survey (USGS) tested the source of the city's water, in upstate New York. They found trace concentrations of heart medicine, antibiotics, estrogen, anti-convulsants, a mood stabilizer and a tranquilizer. In a statement, city officials insisted that "New York City's drinking water continues to meet all federal and state regulations regarding drinking water quality in the watershed and the distribution system" (Associated Press, 2008).

In several cases, officials at municipal or regional water providers told the AP reporters that pharmaceuticals had not been detected, but the AP obtained the results of tests conducted by independent researchers that showed otherwise.

The most comprehensive study to date to test pharmaceuticals in the water systems was completed in 2002 by the US Geological Survey (Kolpin, et al., 2002). These studies examined the occurrence of pharmaceuticals in 139 streams in thirty states. This study found trace amounts of caffeine, acetaminophen, erythromycin, fluoxetine and albuterol in 80% of the water samples collected.

In another study conducted by the USGS, twenty-four water supplies were analyzed and screened for 106 contaminants in a United States water treatment facility (Stackleberg et al., 2004). Study findings found thirty-four contaminants in greater than 10% of the samples. The spectrum of contaminants identified in water samples represents an unknown portion of the total amount of pharmaceuticals actually present. The occurrence of pharmaceuticals in water systems, may or may not have an impact on the environment or human health because the known concentrations are so low measured as parts per trillion (Daughton 2003).

The Government Response

Drug disposal practice remains variable, informal advice is inconsistent and United States policy is non-existent (Daughton, 2003). The Associated Press articles prompted subcommittee hearing on April 15, 2008 of the U.S. Senate Committee on Environment and Public Works Subcommitee on Transportation Safety, Infrastructure Security and Water Quality titled “Pharmaceuticals in the Nation’s Water: Assessing Potential Risks and Actions to Address the Issue: Disposal of pharmaceuticals is this a health risk to U.S.

populations?" Summary of these hearings included two major points of discussion. First, in 1996, the United States Congress instructed the United States Environmental Protection Agency (USEPA) to identify and address endocrine-disrupting chemicals in water. Twelve years later, we are still waiting for data or summary reports with EPA findings (Berg, 2008). Second, USEPA findings to date stated that there is an absence of reliable data showing a relationship between health risk and low concentrations of pharmaceuticals in water supplies. Water treatment filtration could carry considerable cost and therefore, government mandates to monitor and filter for pharmaceuticals in water systems is inappropriate at this time (Senate Subcommittee April 2008). To date, the federal government doesn't require any testing and hasn't set safety limits for pharmaceuticals in drinking water.

In February, 2007, the White House Office of National Drug Control Policy (www.whitehousedrugpolicy.gov.) issued guidelines for the safe disposal of unnecessary, unused or expired pharmaceuticals. These current guidelines include:

- Take unused, unneeded or expired prescription medications out of their original containers;
- Mix the prescription medications with an undesirable substance, like used coffee grounds or kitty litter, and put them in impermeable, non-descript containers, such as empty cans or sealable bags, further ensuring that the medications are not diverted or accidentally ingested by children or pets.
- Throw these containers in the trash.
- Flush prescription medications down the toilet only if the accompanying patient package insert specifically instructs it is safe to do so.

- Return unused, unnecessary or expired medications to pharmaceutical "take-back" locations that allow the public to bring unused medications to a central location for safe disposal.

These guidelines however, are contradictory to practices endorsed by the Wisconsin Department of Natural Resources (DNR) which provided the following guidelines for managing pharmaceutical waste in 2008. These guidelines include the following: (http://dnr.wi.gov./org/aw/wm/pharm/pharm.htm)

- The DNR strongly discourages the disposal of pharmaceutical waste in a solid waste landfill or sanitary sewer. Disposing of pharmaceuticals by flushing them down the sewer or throwing them into a landfill may result in the medications showing up in measurable amounts in surface water or groundwater that some communities use for drinking water. The practice of squirting or pouring pharmaceuticals into a sanitary sewer or absorbent material, commonly referred to as "wasting," is a form of disposal and is not recommended.

All guidelines provided to date do not provide clear guidance regarding the disposal of unused, unnecessary, and expiried medications to patients seeking an alternative to throwing medications in the toilet or in the trash.

Medication Disposal Programs in Other Countries and in the U.S.

Australia, Canada and the European Union have existing continuous medication take-back programs which allow retail pharmacies to accept unused, unnecessary or unwanted medications for disposal. These programs, which have been in existence for greater than ten years, are sponsored by government agencies and state pharmaceutical organizations

and the goal of these programs is to lesson disposal of pharmaceuticals into the environment, reduce child poisonings and minimize inappropriate sharing of medications.

In Australia, the Return Unwanted Medicines (RUM) Project has provided for the collection and disposal of unwanted and out-of-date medicines from consumers across Australia since 1998. Greater than five thousand pharmacies collect unnecessary, unused or expired pharmaceuticals and more than four hundred tons of medications have been collected annually since the program began. Funding for these programs is provided by the government and the pharmaceutical industry (NHMRC, 1999).

In Canada, a medication return program was implemented in 2002 through a consumer-orientated stewardship program. Currently, 75% of all pharmacies in British Columbia participate in this voluntary program, accepting free return of all pharmaceuticals and over-the-counter medications (Daughton, 2003).

In the European Union, eleven countries have continuous medication take-back programs which accept all pharmaceuticals. The cost of these programs is shared by the pharmaceutical industries, pharmacies and the municipalities (Daughton, 2003). To date, this preventive approach to pharmaceutical disposal has met program goals based on the data collected (Driver, 1998).

In Ireland, patients may bring back only tablets to the dispensing pharmacies which are then collected annually by the government for disposal at no cost to the participating pharmacy or patient. (Kilkenny Ireland Pharmacist, personal communication June 10, 2009)

In the United States, ten states currently have implemented either continuous or 1-day community one day events. Several states, such as Washington (HB 2600), Maine (HB

411), Minnesota (HB 1959) and Iowa (IAS 579) have passed legislation that authorizes and provides guidance regarding pharmaceutical collection and disposal. The northeast region of the U.S. sponsors a "mail-back" pilot program which is designed to get people to put unused prescription or over-the-counter medications in pre-addressed, postage-paid pouches and mail them to the Maine Drug Enforcement Agency for disposal. Mail back pouches are available at many pharmacies (Associated Press, 2007).

Illinois, Indiana, Michigan have recently conducted a limited number of medication 1-day events. These events have been sponsored by law enforcement and regional Environmental Protection Agencies (EPA). The successes of these 1-day medication events, although limited, have been successful as evidenced by a recent collection in a Chicago Illinois suburb, collecting over 1600 pounds of medications during a recent event. Several Illinois counties currently offer continuous medication disposal programs Monday through Friday from 8:00AM until 4:00PM through local law enforcement agencies (Illinois Sea Grant, 2007).

Medication Disposal Initiatives in Wisconsin

Wisconsin medication 1-day take-back events or continuous programs have been implemented in thirty-five Wisconsin communities over the past two years. Participation in these events has exceeded expectations. In June 2007, Milwaukee, Wisconsin collected 2387 pounds, including packaging, of returned medications during a 1-day event (Daughton, Ruhoy 2007). Chippewa County collected over 275 pounds of medication in April of 2008 and 558 pounds in April 2009 during community sponsored 1-day medication take-back events (W Nehring, personal communication, April 30, 2009).

Thirty-five Wisconsin communities have implemented take-back programs and have contracted with the La Crosse County Household Hazardous Waste Department for disposal of collected medications. Currently, there is only one continuous medication take back program in Wisconsin, deputized by the La Crosse County Sheriffs Department, which collects and accepts medications for disposal from 1-day events and continuous collection programs. Year to date, the LaCrosse County HHW department has collected over 17,000 pounds of pharmaceuticals for disposal (J Gloyd, personal communication, June 12, 2009).

These medication disposal programs vary considerably. Program organizers will often attempt to collect some measure of the quantities of medications collected during 1-day events or continuous programs (K. Jacobson personal communication, Nov 15, 2008). This investigator did not find any published data, either qualitative or quantitative, which enables a comparison of program collection results. Regardless of their limitations, medication take-back programs highlight the need for prudent disposal of accumulated medications stored within patient's homes (Daughton & Ruhoy, 2008).

Summary

The impact of medications in water systems may impact public health and the environment. Federal and State governments have failed to reach a consensus regarding the best practice management of pharmaceutical waste. In the interim, local medication take-back disposal programs offer an opportunity to remove unused, unnecessary, and expired medications from water supplies. These medication disposal programs, both 1-day events and continuous programs, offer people living in Wisconsin community's access to dispose of medications which may serve to decrease the burden of

pharmaceuticals on the environment. Conducting a SWOT (strengths, weaknesses, opportunities, threats) analysis of the 35 Wisconsin counties that currently offer 1-day medication take-back events or continuous medication programs may provide program insights and will be useful in the future strategic planning of medication programs in these and other Wisconsin communities.

CHAPTER III

METHODS AND PROCEDURES

Introduction

This was a descriptive study based on strengths, weaknesses, opportunities and threats (SWOT) analysis of current 1-day medication disposal events or continuous medication take-back programs in 35 Wisconsin communities. A descriptive study was chosen to maximize insights into these existing medication disposal programs and to provide the necessary latitude to capture strengths, weaknesses, opportunities and threats for future strategic planning of medication take back programs.

Subject Selection

The participants were recruited from the clientele who had contracted with the La Crosse County Household Hazardous Waste Department for pharmaceutical waste disposal during the past 24 months. Initial efforts included identifying the medication program directors or household hazardous waste managers in the targeted 35 Wisconsin counties who were most familiar with medication programs in their municipality or county. Phone calls were made by the primary researcher to confirm contact information, to assess their willingness to complete the survey instrument and to determine a preference for using an electronic or paper survey. Once the contact information was collected and confirmed, an informed consent form and a survey (electronic or paper copy) were distributed to the participants.

Survey Development

There are no surveys commercially available that capture the data, based on the research questions, that measure the strengths, weaknesses, opportunities and threats of medication disposal programs. Thus, a twenty-nine question survey was created by the primary researcher. A review of published SWOT analysis was conducted. In addition, discussions with Jeff Gloyd, Special Waste Manager of the La Crosse County Household Hazardous Waste Department, were conducted to identify medication program criteria to be used in the survey instrument. Based on the results, a strength/weakness survey pairing and an opportunity/threat survey pairing was utilized to avoid redundancy and to reduce the effort required by survey participants. This concept of pairing was also used because it was straightforward and allowed respondents to keep the strength/weakness program criteria together and the opportunities/threats program criteria together.

The survey was reviewed by the author's thesis committee, which included Dr. G. Gilmore (Chair), Dr. D. Duquette, Dr. J. Wiener and Mr. Jeff Gloyd, for content validation. The survey was also reviewed by the Dr. B. Bennie from the University of Wisconsin La Crosse Mathematics Department to ensure alignment of the survey questions with statistical analysis based on the study research questions. Dr. B. Bennie provided statistical analysis consultation during all phases of the research which included draft, implementation, statistical analysis and review of survey results.

Prior to conducting the main study, a pilot study was conducted with two Wisconsin contacts included in the sample and survey feedback requested. These two pilot contacts were selected based on their established medication collection programs and the recommendation of Jeff Gloyd, Special Waste Manager, La Crosse County Household

Hazardous Waste Department. After completing the pilot survey, minor adjustments were made to the survey based on comments received by the two pilot contacts. Surveys, both paper copy and electronic depending on participant preference, were used to ensure the best response rate and control cost.

Survey Implementation

The survey was distributed by email or faxed to participants, depending on the preference, as selected in the initial contact interview between the primary researcher and participants. The survey was distributed to the program directors in all 35 counties in May 2009. Participation was voluntary. Timeline to complete the survey was limited to 15 days and follow up electronic email reminders or phone calls were sent to participants on day ten to enhance participation.

Statistical Treatment

The survey was divided into three sections and included 29 questions. The three sections included demographics, strengths and weaknesses, opportunities and threats. Both the pairing of strength with weakness and opportunity with threat used a Likert scale.

The first ten questions of the survey gathered demographic information including the participants job title, county or counties or municipalities served by the disposal program, type of medication take back program conducted in the municipality or county, number of collections during the past 24 months, who can participate, hours of continuous program operation and identified financial and non-financial supports of disposal programs.

The second section included nine questions and each question required an assessment by the participant of her or his program and required a strength or weakness response. Based on their current program(s), participants were asked to choose one of the following options to complete each statement: Extreme Weakness, Moderate Weakness, Not Applicable, Moderate Strength, and Extreme Strength. Survey statements in section two gathered strength and weakness program information specific to public participation, community partnerships, public awareness of the need to keep pharmaceuticals from entering the environment, public awareness of the need to prevent accidental poisoning, public awareness of the need to prevent drug diversion, convenient access to disposal programs, local business participation, recruitment of staff and volunteers and participation by law enforcement.

The third section of the survey included nine questions and each question required an assessment by the participant of her or his program and required an opportunity or threat response. Based on their current disposal program(s), participants were asked to choose one of the following options to complete each statement: Extreme Opportunity, Moderate Opportunity, Not Applicable, Moderate Threat, and Extreme Threat. Survey statements in section three gathered opportunity and threat program information specific to offering a continuous medication collection program, obtaining funding for a medication disposal program, sustaining funding of a medication disposal program, providing local incineration of collected medications, ensuring the safe collection of medications, transporting collected medications to disposal sites, assessing the operational plan of conducting a disposal program, advertising of a medication disposal program, providing the public with information on environmental, health and legal issues, and implementing

rules and regulations of the Drug Enforcement Agency (DEA) and U.S. Environmental Protection Agency within a medication disposal program.

Collection of data began in May 2009, and data were summarized and statistically analyzed prior to June 1st 2009. SPSS software was used to analyze the survey data.

Limitations

Three limitations are recognized by this research. Participant identification was optional; this information, if provided, was known only by the primary investigator. Therefore, the ability to compare responses between respondents is a limitation of this study.

Respondents were not given the option to add comments to their responses which may have clarified the justification given for a specific response. The addition of comments to all responses or allowing for general comments at the completion of the survey was recognized as a limitation of this research.

The demographic section of the survey asked respondent to identify financial supports and the percent contribution from each financial provider of their disposal program. The question did not attempt to assess total financial program costs, therefore total program expenditures remains unknown and was a limitation of this research.

CHAPTER IV

RESULTS AND DISCUSSION

Results

The purpose of this thesis was to conduct a SWOT (strengths, weaknesses, opportunities, threats) analysis of 26 Wisconsin medication disposal programs, representing 35 Wisconsin counties. This chapter briefly describes the details of current medication programs and examines key internal and external factors within medication disposal programs that will be useful in the future strategic planning in Wisconsin communities**.** Findings will be presented in alignment with the four research questions, which focus on current program strengths/weaknesses and opportunities/threats. This SWOT analysis will subsequently be used to guide the fifth research question, which addresses recommendations for the strategic planning of community-based pharmaceutical take-back programs, both 1-day events and continuous programs.

The population included in this analysis was identified because they had contracted with the La Crosse County Household Hazardous Waste Program for disposal or transportation of medications collected through a 1-day event or continuous program during the past 24 months. Other counties in Wisconsin may offer 1-day events or continuous pharmaceutical take-back programs, but were not included in this research.

Survey Response

The survey was divided into three sections and asked respondents to provide (1) a description of their current disposal program, (2) program perceptions of their internal

strengths vs. weaknesses, and (3) program perceptions of their external opportunities vs. threats. The survey was distributed to 26 participants most familiar with the medication disposal programs in their communities and who had contracted with the La Crosse Household Hazardous Waste Department during the past 24 months for final disposal of collected medications. Twenty-five respondents completed the survey (96% response rate) and used the electronic software program, SurveyMonkey®, to collect responses over a 14-day period during May 2009. This high survey response rate (one participant did not complete the survey) was sufficient to offer the detail to answer the five research questions. Research findings, aligned with the research questions, allowed for conclusions to be made directly from the observed data.

The not applicable (NA) responses to questions included in sections 2 and 3 of the survey were excluded from the data analysis. Exclusion of the not applicable (NA) responses enabled the analysis of data to be more clearly focused and provided an alignment with the response categories of strength or weakness, opportunity or threat.

Ten questions were included in the first section of the survey and attempted to capture and quantify program details specific to respondent's title, county or counties or municipalities served by the medication disposal program(s), type of medication disposal program offered, number of disposals conducted during the past 24 months, types of facilities that accept medications for continuous disposal, continuous program hours of operation, who can participate, and financial and non-financial program supports.

Survey findings showed that the positions or titles most frequently provided by respondents included Solid Waste Directors (40%), Health Department Directors (16%) and County Collaboration/Task Force Committees (16%). Based on survey findings, the

respondents' results represented 35 counties in Wisconsin and include Adams, Ashland, Bayfield, Brown, Burnett, Chippewa, Crawford, Dane, Douglas, Dunn, Eau Claire, Fond Du Lac, Forest, Grant, Iowa, Jefferson, Iron, Juneau, La Crosse, Lincoln, Marathon, Monroe, Pierce, Portage, Price, Richland, Rock, Rusk, Sawyer, Shawano, Taylor, Trempealeau, Vernon, Washburn, and Wood (Figure 1).

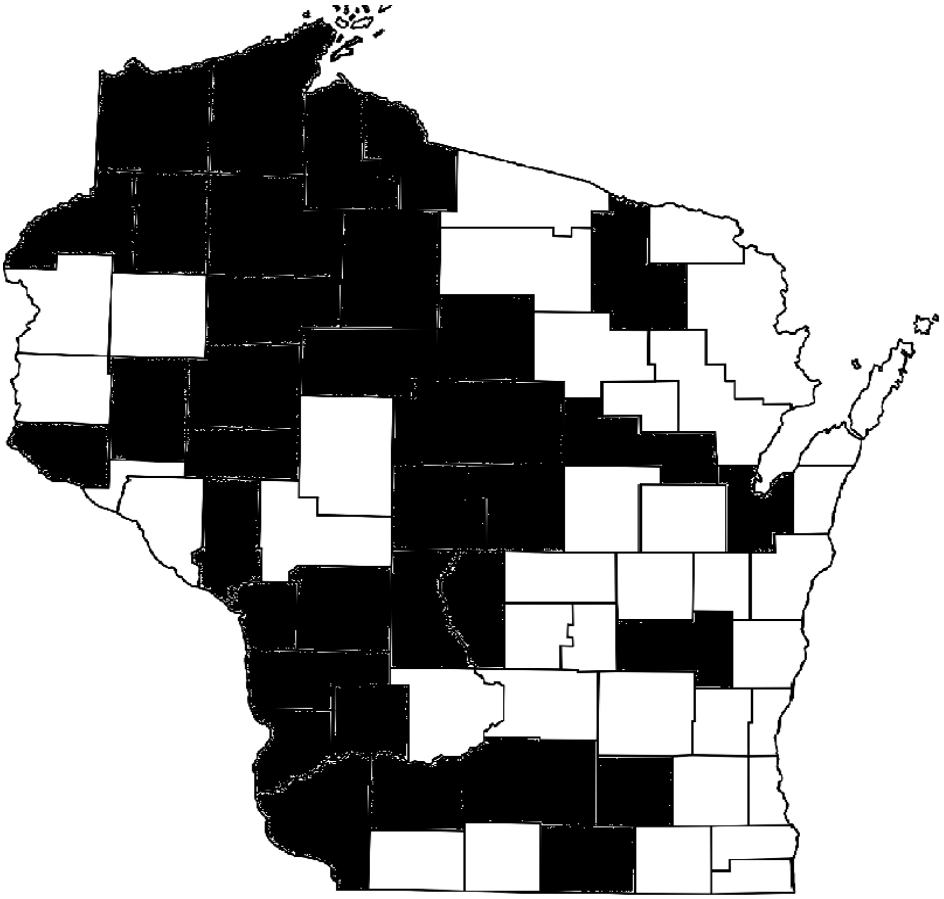

Figure 1. Map of Wisconsin County Survey Participants, 2009

These counties have an estimated population of 2,233,500 based on population estimates of Wisconsin from census data gathered from April 1, 2000 to July 1, 2007. (http://www.census.gov/popest/counties/tables/CO-EST2007-01-55.xls).

One survey question had respondents identify the specific type of program offered in communities. The response included either a 1-day event or continuous program or both a 1-day and continuous program choice. The research findings showed that two-thirds (66.7%) of respondents offer only a 1-day medication disposal program (Figure 2).

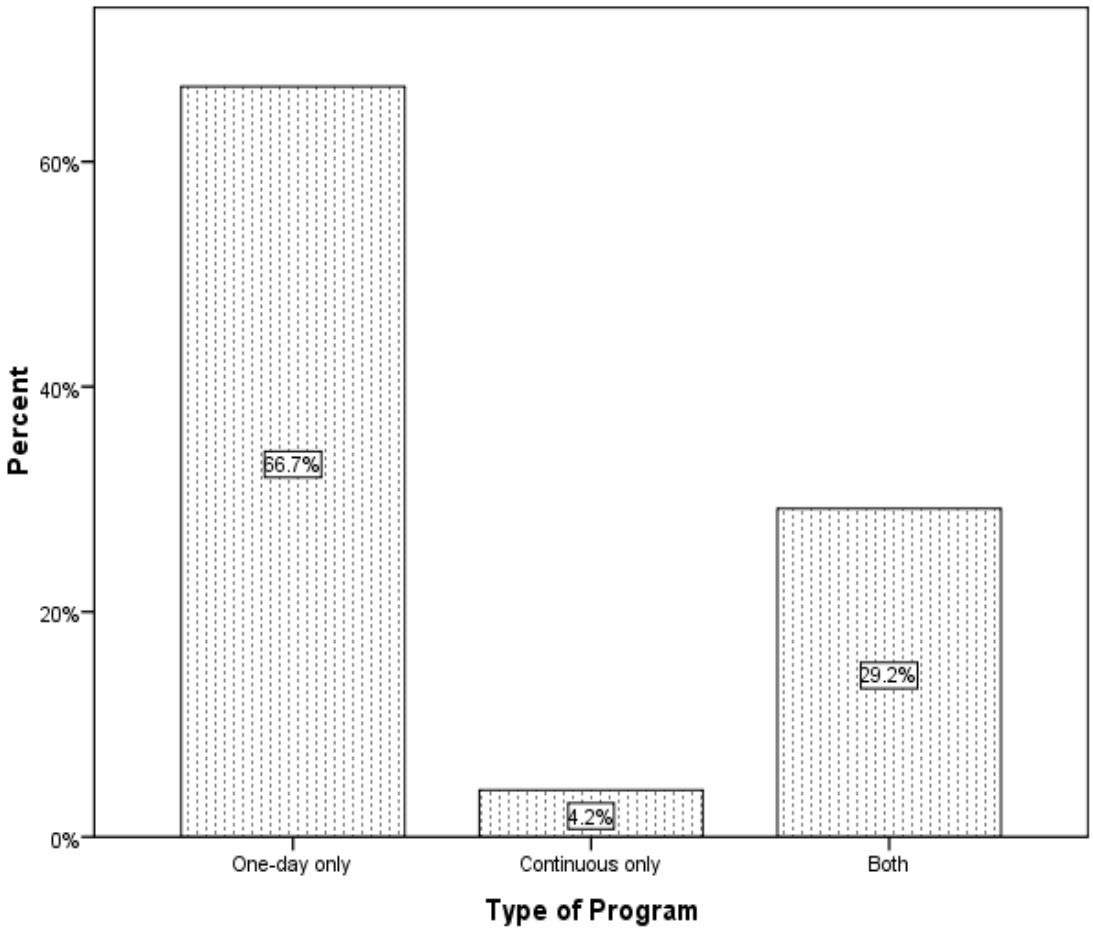

Figure 2. Type of Disposal Programs Represented by 35 Wisconsin Counties, 2009

Respondents were asked to quantify the number of 1-day events that were conducted during the past 24 months. The results showed that 60% of respondents had conducted either one or two 1-day medication disposal programs in the past 24 months (Figure 3). The results also showed that 30% of respondents had conducted three or four 1-day

medication disposal programs in the past 24 months, and 10% of respondents had conducted eight 1-day events during the past 24 months.

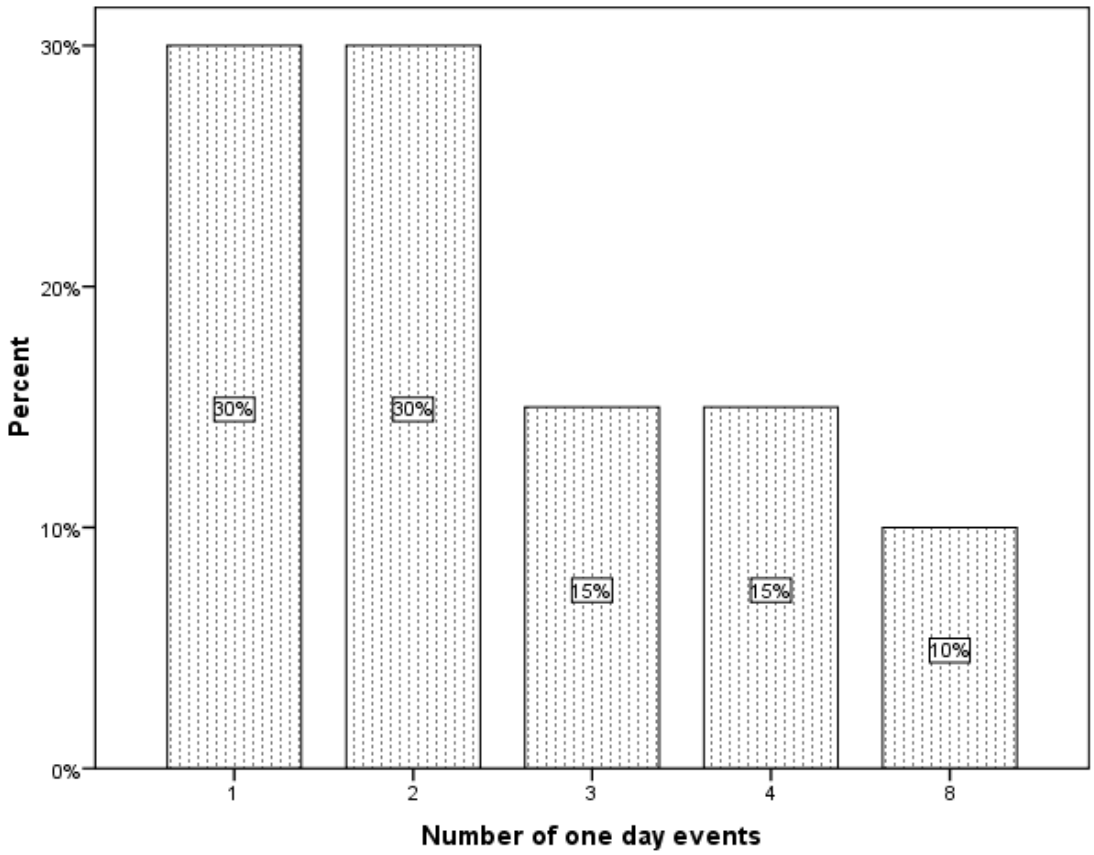

Figure 3. Number of 1-day Events in past 24 months, 2009

Respondents were asked to quantify the number of hours of per week their continuous program was available for public participation. The results showed that 75% of respondents offer 40 hours per week for public participation in their continuous program (Figure 4). One continuous program offered 168 hours of operation per week. This response was clarified by the respondent who indicated that a secure metal drop box within a law enforcement facility was available for auto deposit of any medications for disposal 24 hours 7 days a week.

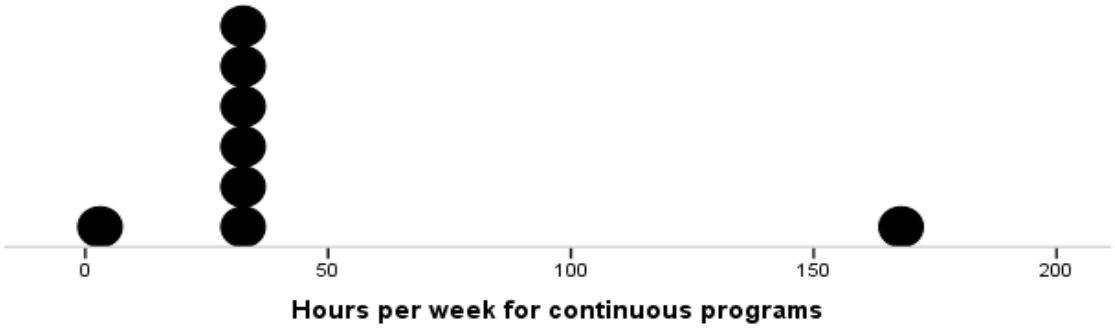

Figure 4. Hours of Operations per Week Offered for Participation in Continuous Disposal Programs, 2009

Respondents were asked to identify which facility in their county accepts medications for disposal. Police stations are the major facility (75%) accepting medications for continuous disposal. Household hazardous waste departments and other facilities each represent 12.5% of the continuous program facilities that accept medications for disposal (Figure 5). It is important to note that law enforcement agencies are the only institutions that can legally accept controlled substance medications for disposal under current Drug Enforcement Agency (DEA) regulations.

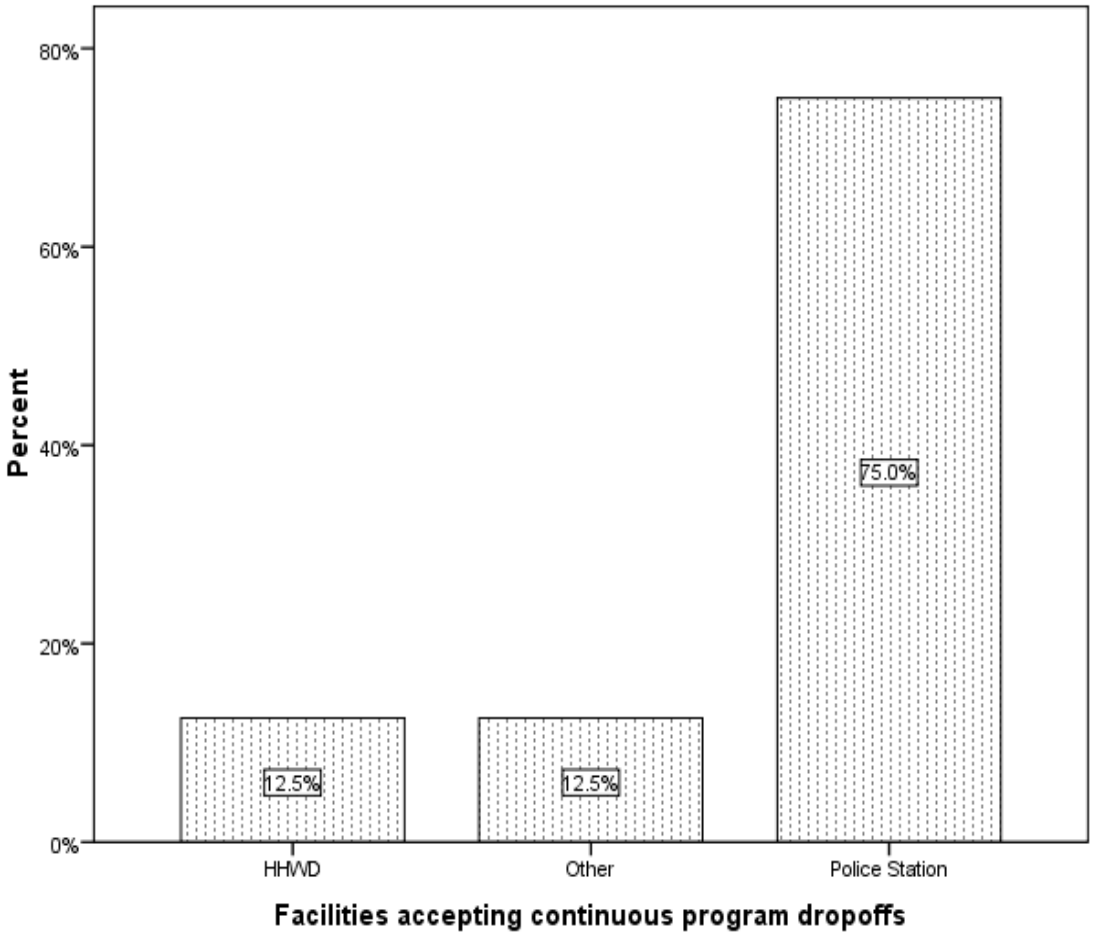

Figure 5. Facilities Accepting Medications for Disposal: Continuous Programs Only, 2009

Respondents were asked to identify who can participate in their medication disposal program. Respondents indicated that community resident participation in both 1-day events and continuous programs was (100%) and business participation was reported as 16.67% (Figure 6). Only those businesses that are registered as very small quantity generators (VSQG) with the U.S. Environmental Protection Agency (USEPA) may participate in community medication collection programs, a factor that may limit business participation in disposal programs (16.67%).

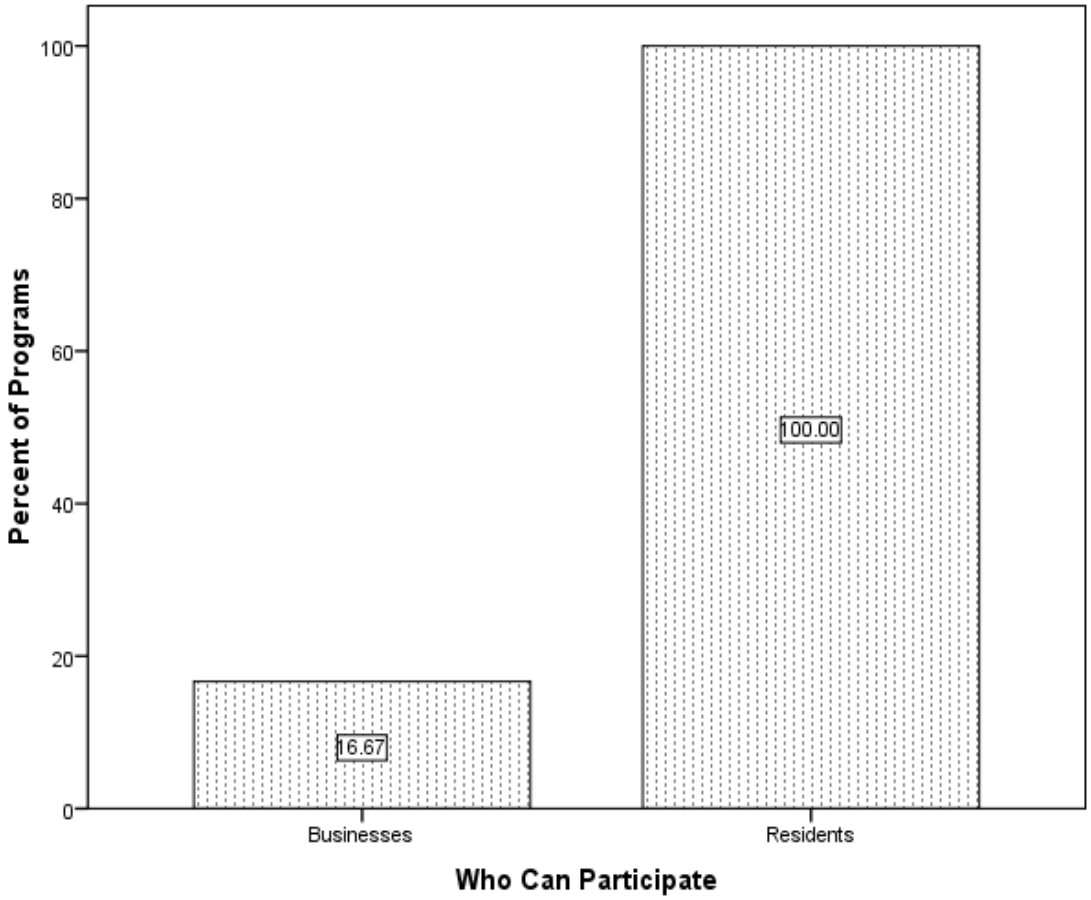

Figure 6. Who Is Allowed to Participate In Medication Disposal Programs, 2009

Respondents were asked to identify sources of financial support for their medication disposal program. The question was separated by program type and allowed for 1-day events and continuous program responses. The questions also allowed for any combination of financial support to include the categories of federal, state, county, municipality (e.g., City of Chippewa Falls), local business donors or private individuals. The question required that the total financial support of the medication disposal program equal 100%. The question did not attempt to assess total financial program costs, therefore total program expenditures remains unknown.

Responses based on *1-day events* showed that county government (e.g., Dane County) represents the largest source of financial support for 1-day events, the sole source of

financial support for six of the 22 1-day programs and contributed at least half of the total financial support in five other programs. State Government (e.g., Department of Natural Resources) was the primary source of financial support for four of the 22 programs and a secondary source of support for three other programs. Federal government was the sole or primary source of financial support for two programs, and a secondary source of support for one other program.

Municipal government was the primary source of financial support for only one program and a secondary source of support for three others. Local government was the primary source of financial support for two of the 22 programs and a secondary source of support for four others. Private individuals represented the smallest group of financial contributors and were the secondary source of support for three other programs (Figure 7).

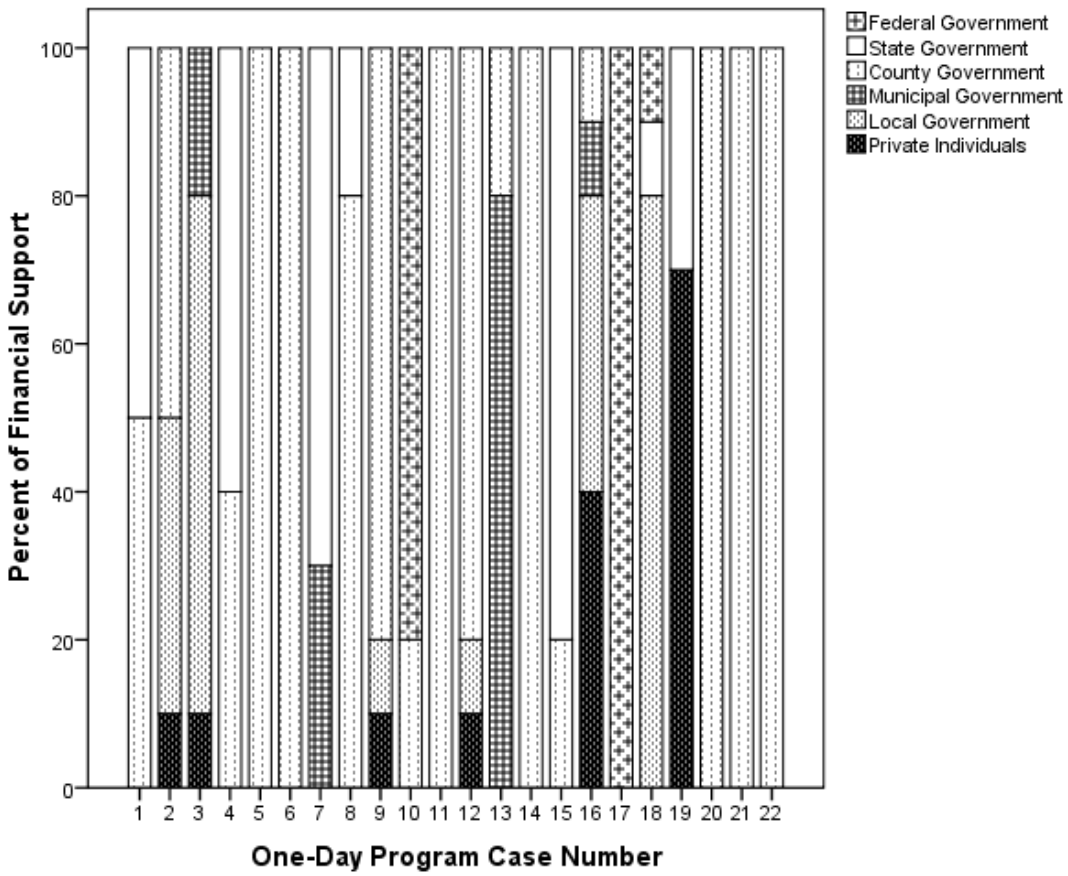

Figure 7. Financial Support for 1-day Take-Back Programs in Western Wisconsin, 2009

Respondents indicated that financial support of *continuous* programs by County Government (e.g., Dane County) represented the largest financial support group: were the sole financial support for three of the eight continuous programs and contributed more than half of the financial support for one of the eight programs. Municipal Government (e.g., City of Chippewa Falls) and local government were the sole financial support for two of the eight continuous programs. None of the continuous medication disposal programs were financially supported by Federal or State governments (Figure 8). Again, it is noted that the survey did not attempt to assess total financial program costs; therefore, total expenditures remain unknown.

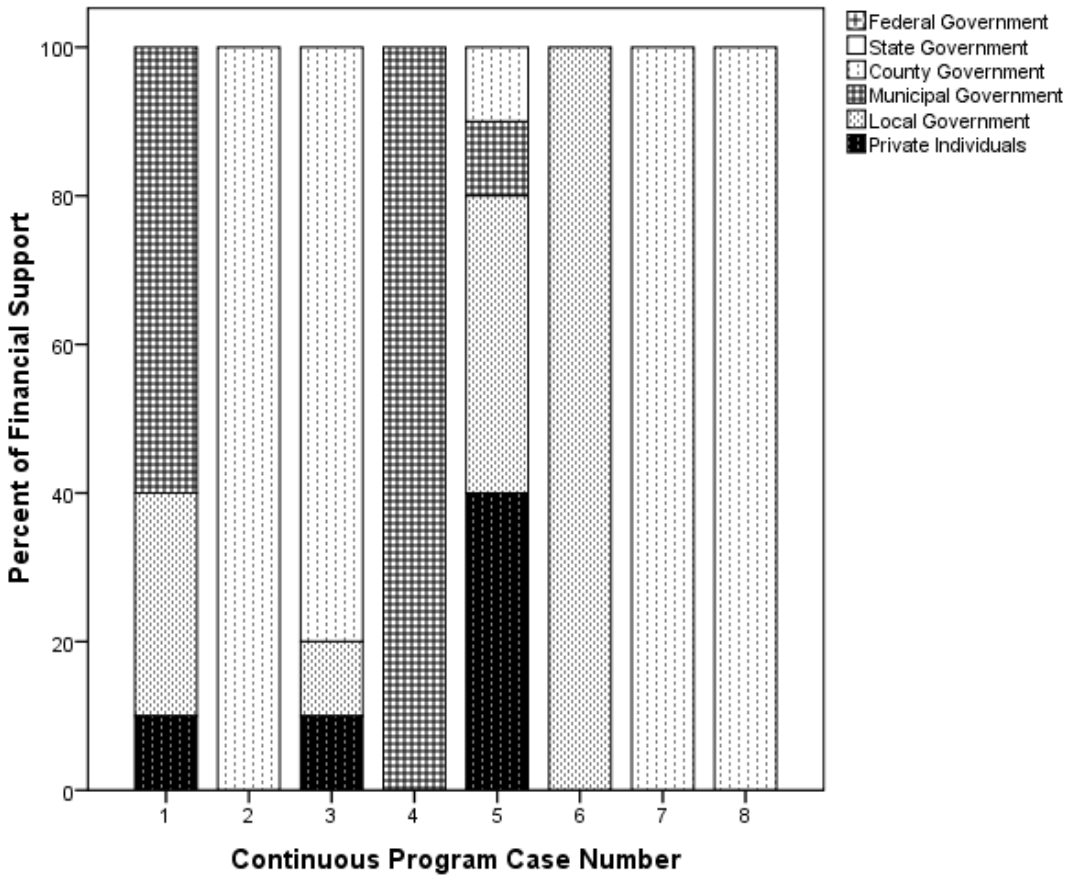

Figure 8. Financial Supports of Continuous Medication Disposal Programs, 2009

Respondents were asked to identify sources of non-financial support to their medication disposal programs. This question was further subdivided to either 1-day events or continuous programs. The survey question allowed the respondents to select any category that applied and included Law Enforcement, Public Health, County Collaboration/Task Force Committee, Hospitals/Clinics, Consortium or others. The details of non-financial support were not included in the survey question

Respondent results of *1-day medication events* identified Law Enforcement, Public Health and Others as the primary sources of non-financial support. Drug Task Force, Consortiums and local hospitals/clinics represented secondary sources of support (Figure 9).

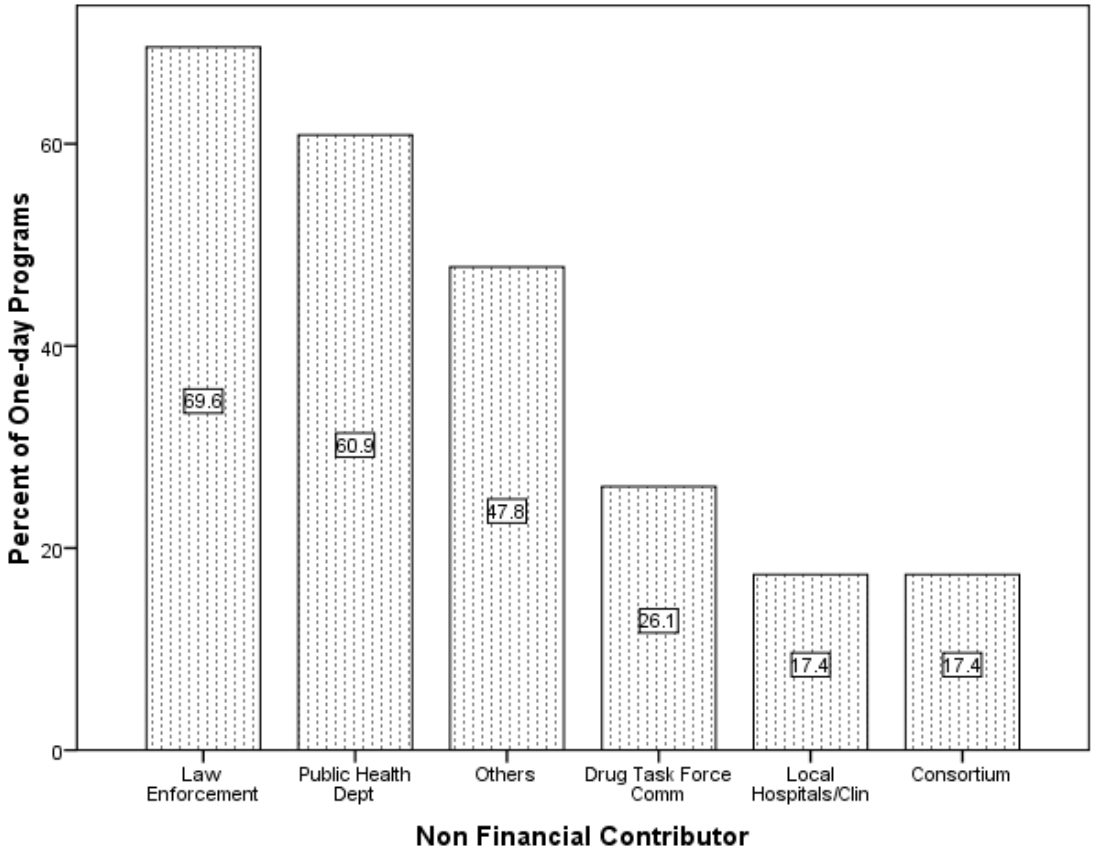

Figure 9. Non-Financial Supports of 1-day Medication Disposal Events, 2009

Respondent results for *continuous* medication programs identified Law Enforcement (87.5 %), and Drug Task Force Committees (62.5%) as the major non-financial contributors. Public Health and Others shared an equal response rate (37.5%). Local hospitals (25%) and Consortiums (12.5%) were reported as sources of non-financial support (Figure 10).

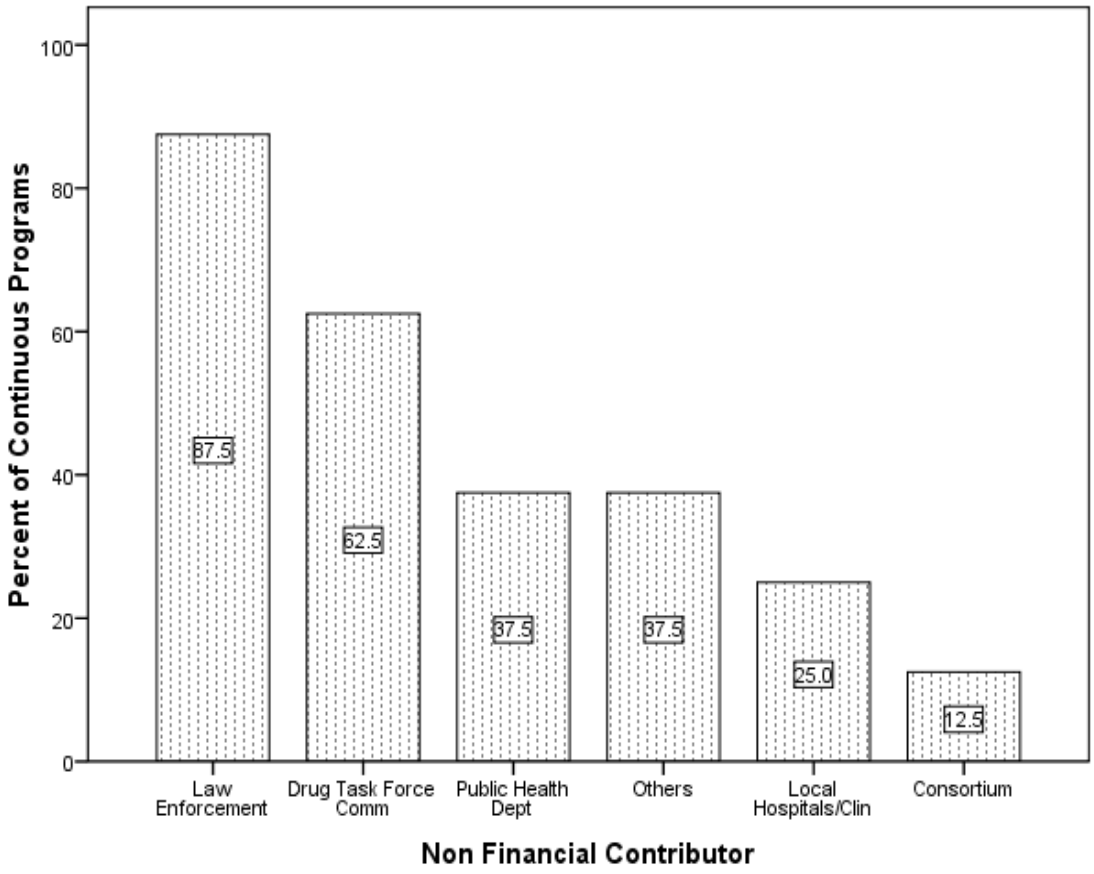

Figure 10. Non- Financial Supports of Continuous Medication Disposal Programs, 2009

The first and second research questions attempted to assess the perceived strengths and weaknesses of current medication take-back programs both 1-day events and continuous programs. Research questions concerning program strength and weaknesses addressed internal aspects of current medication collection programs, including public participation, community partnerships, public awareness of the need to keep pharmaceuticals from entering the environment, public awareness of the need to prevent accidental poisoning, public awareness of the need to prevent drug diversion, access to disposal programs, local business participation, recruiting of staff and volunteers and participation by law enforcement.

Responses indicated that people who participate in medication disposal programs is a moderate strength in 48% of the programs and an extreme strength in 28% (Figure 11).

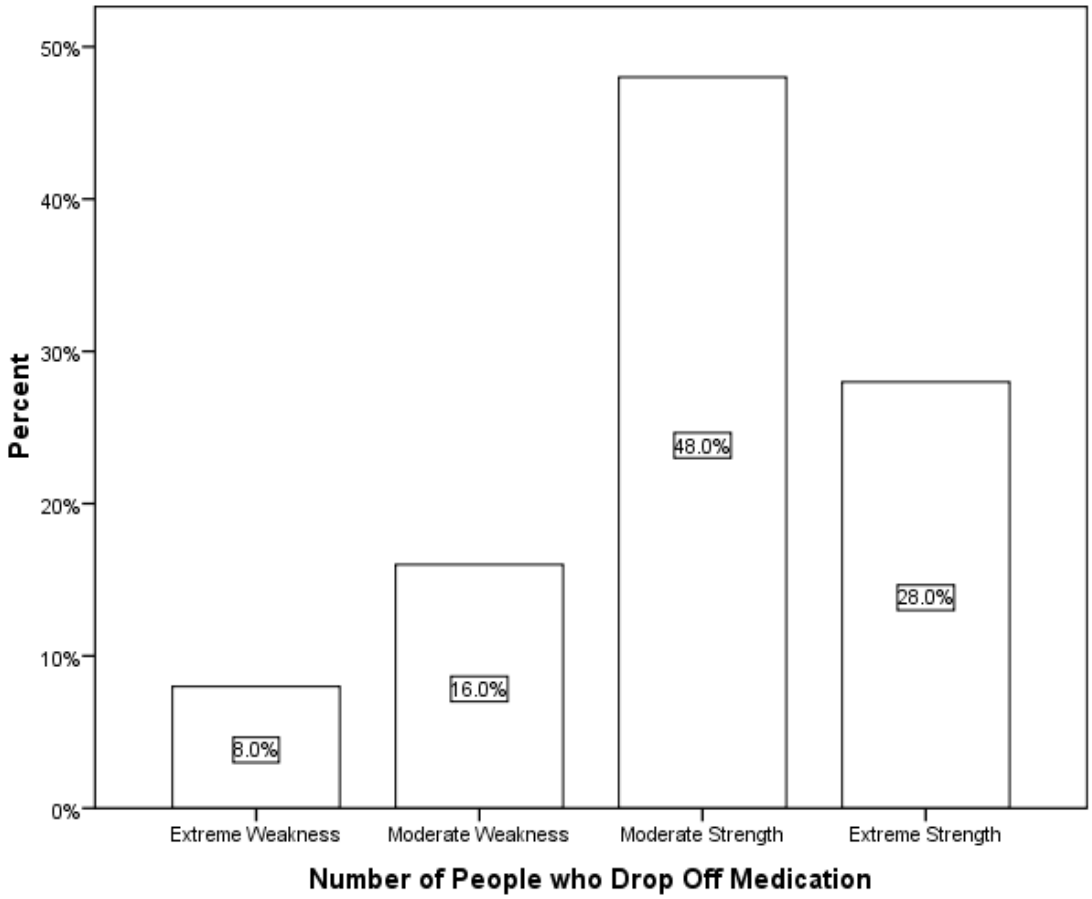

Figure 11. Number of People who Participate in the Medication Disposal Program, 2009

Responses indicated that community partnerships among hospitals, pharmacies, law enforcement and other civic entities that help plan, implement and sustain a medication disposal program are an extreme strength (57.1%) or moderate strength (14.3%) of medication disposal programs (Figure 12).

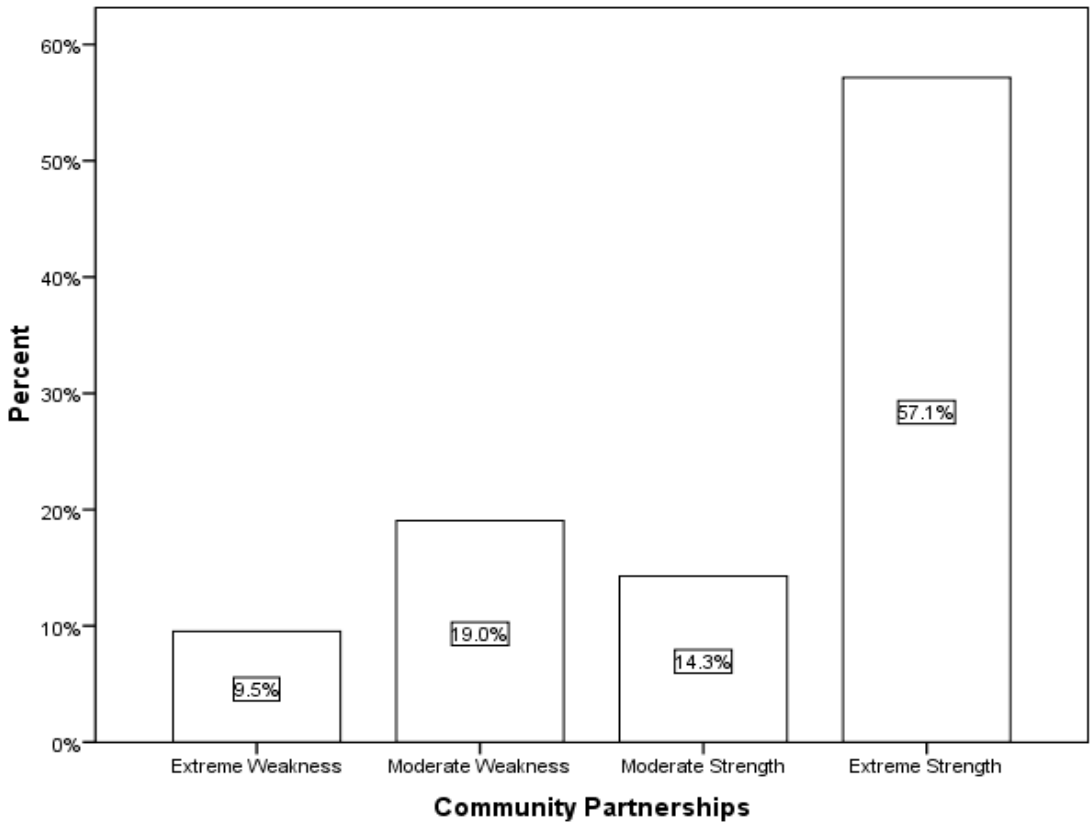

Figure 12. Weakness or Strength of Disposal Program and Community Partnerships, 2009

Responses indicated that public awareness of the need to keep medications from entering the environment as a motive for participation in disposal programs was a moderate (40%) or extreme (32%) strength of medication disposal programs (Figure 13).

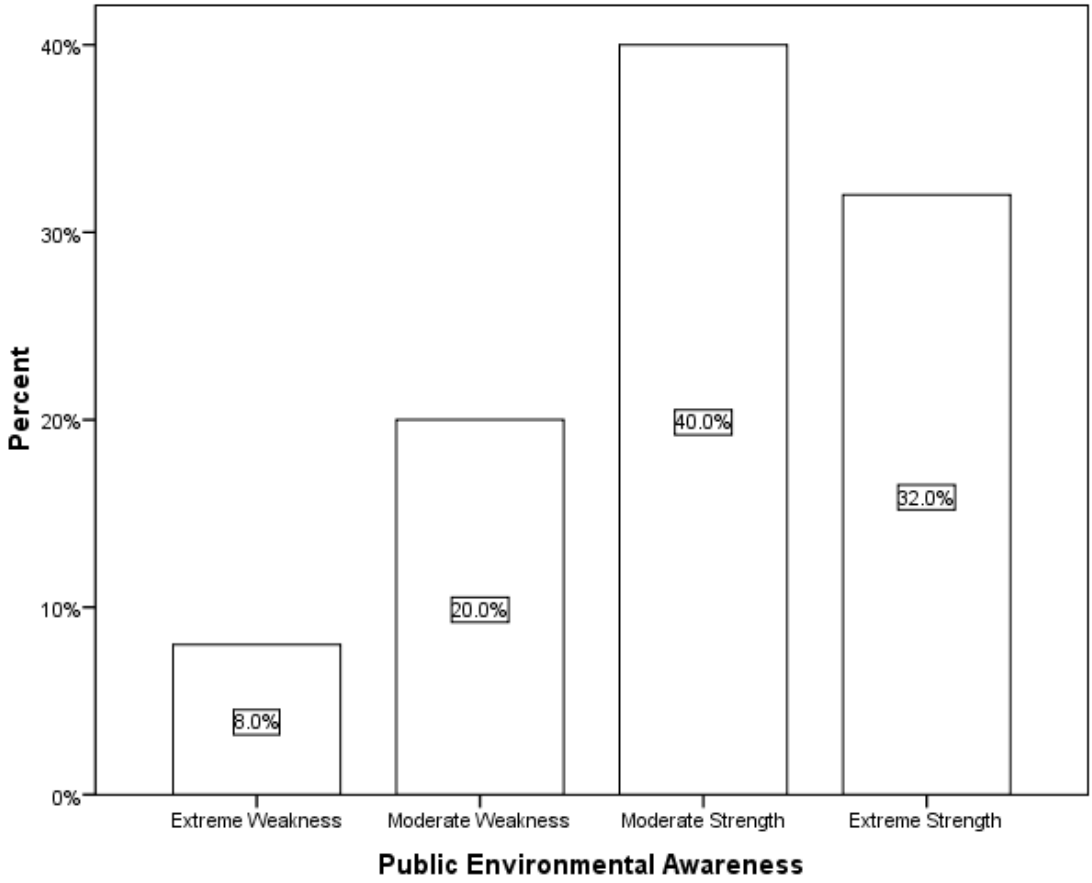

Figure 13. Weakness or Strength of Disposal Program and Public Environmental Awareness, 2009

Responses indicated that public awareness of the need to prevent accidental poisoning was considered a moderate weakness (41.7%) and to a greater degree a moderate strength (45.8%) of medication disposal programs (Figure 14).

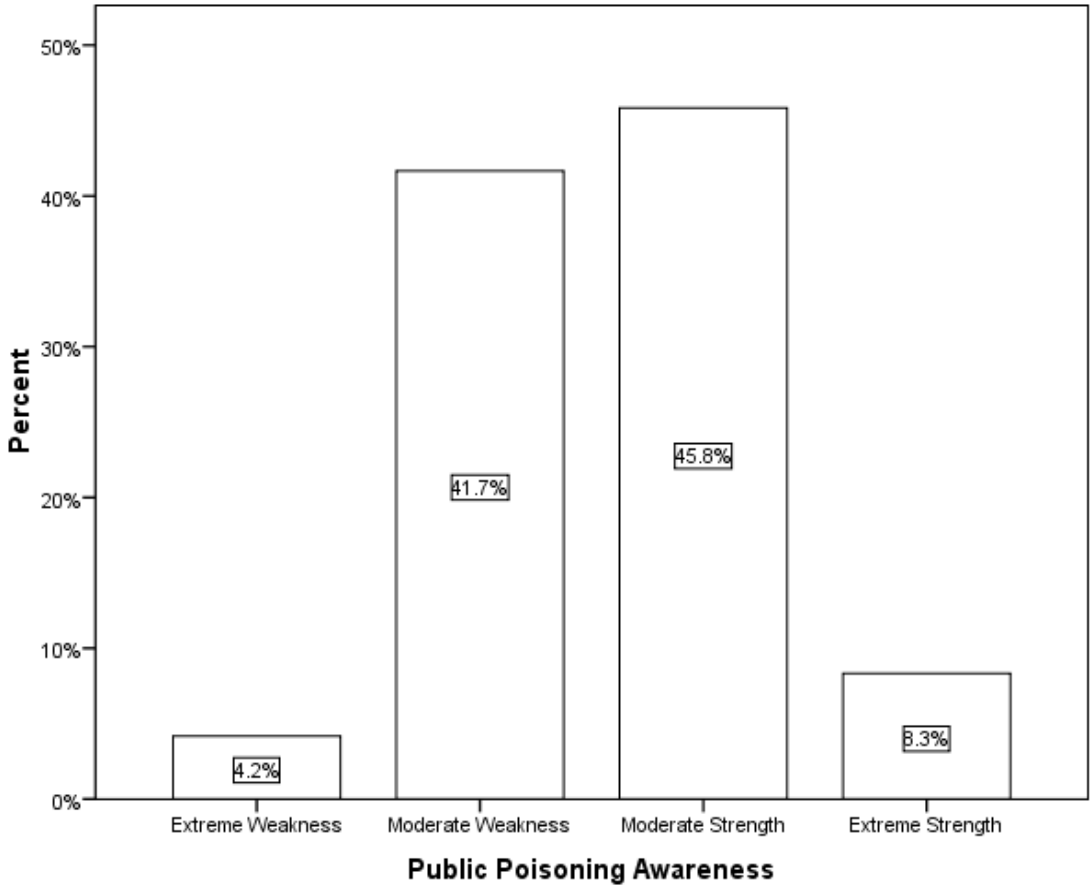

Figure 14. Weakness or Strength of Disposal Program and Awareness of Poisonings, 2009

Responses indicated that public awareness of drug diversion, as a motive for participation in a medication disposal program, was a moderate strength (43.5%) or extreme strength (30.4%) of medication disposal programs (Figure 15).

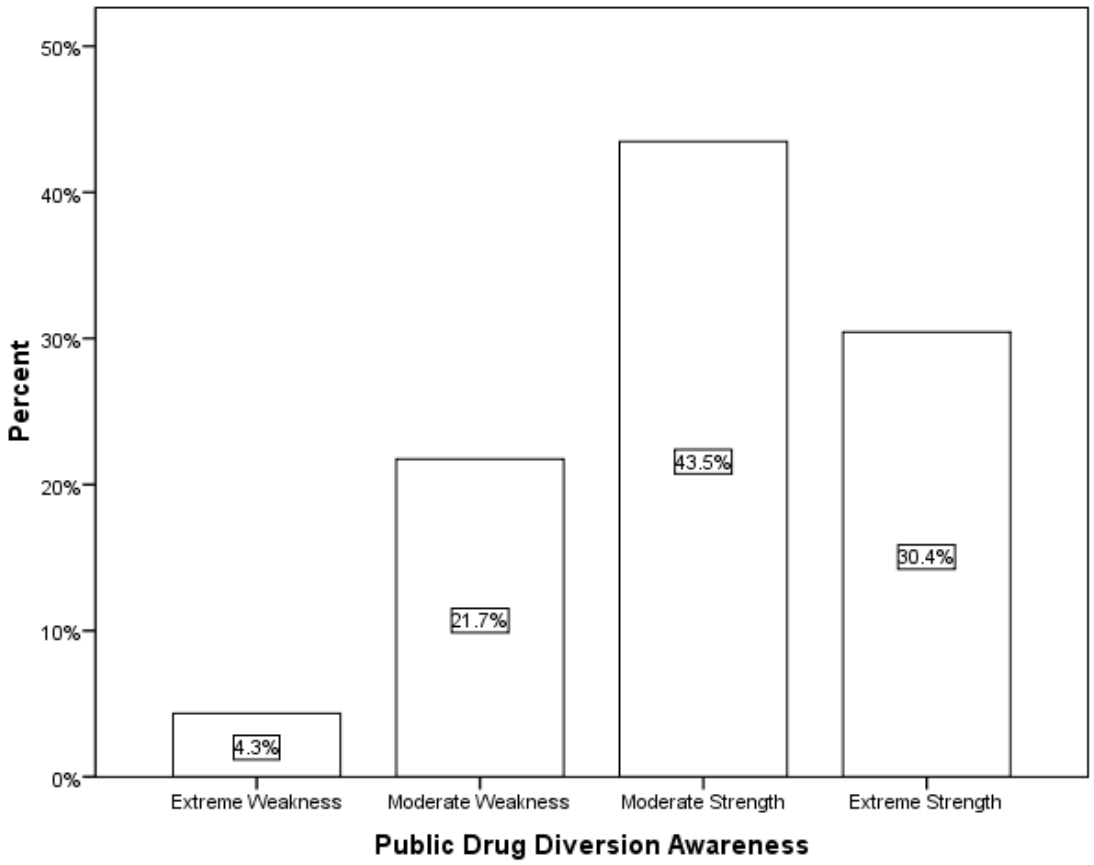

Figure 15. Weakness or Strength of Disposal Program and Awareness of Drug Diversion, 2009

Responses indicated that convenient access is an extreme strength (56%) or moderate strength (24%) of a medication disposal programs (Figure 16).

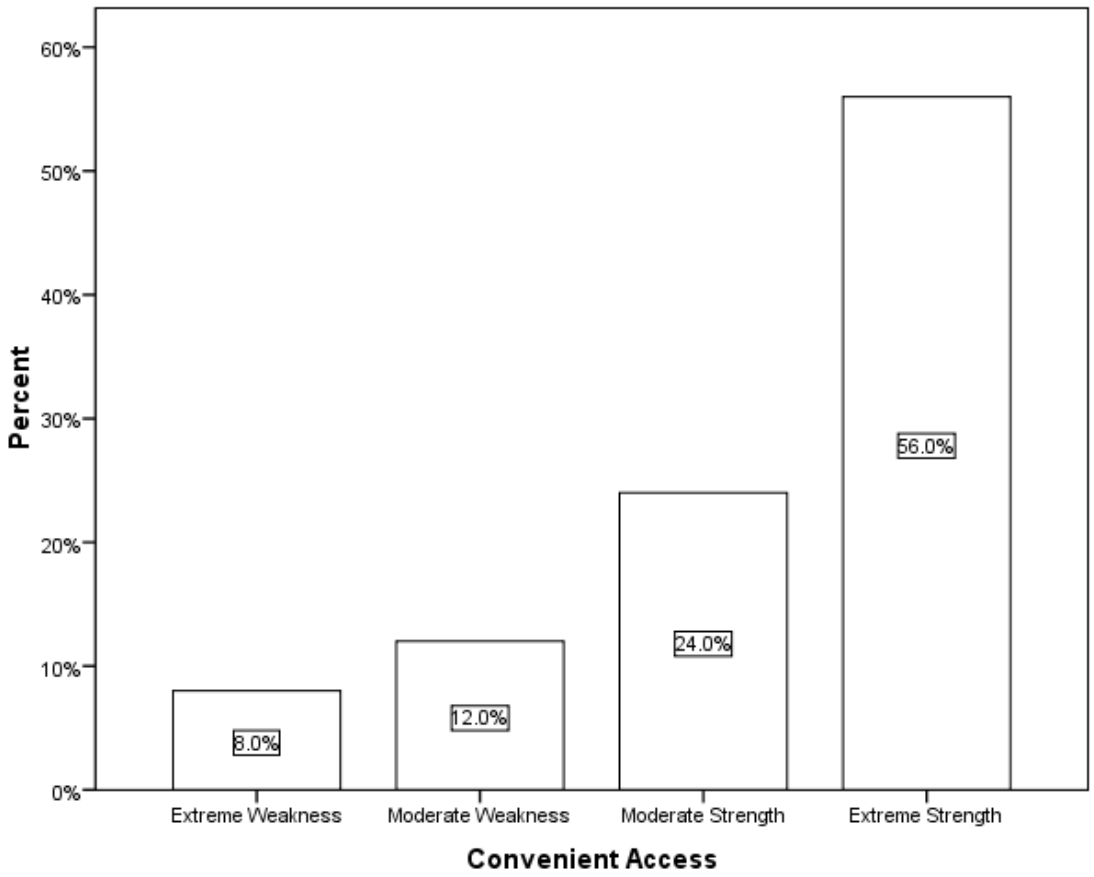

Figure 16. Weakness or Strength of Disposal Program and Convenient Access, 2009

Responses indicated that United States Environmental Protection Agency (USEPA) regulations prevent businesses from participating in disposal programs. This was perceived as a moderate weakness (60%) of medication disposal programs (Figure17).

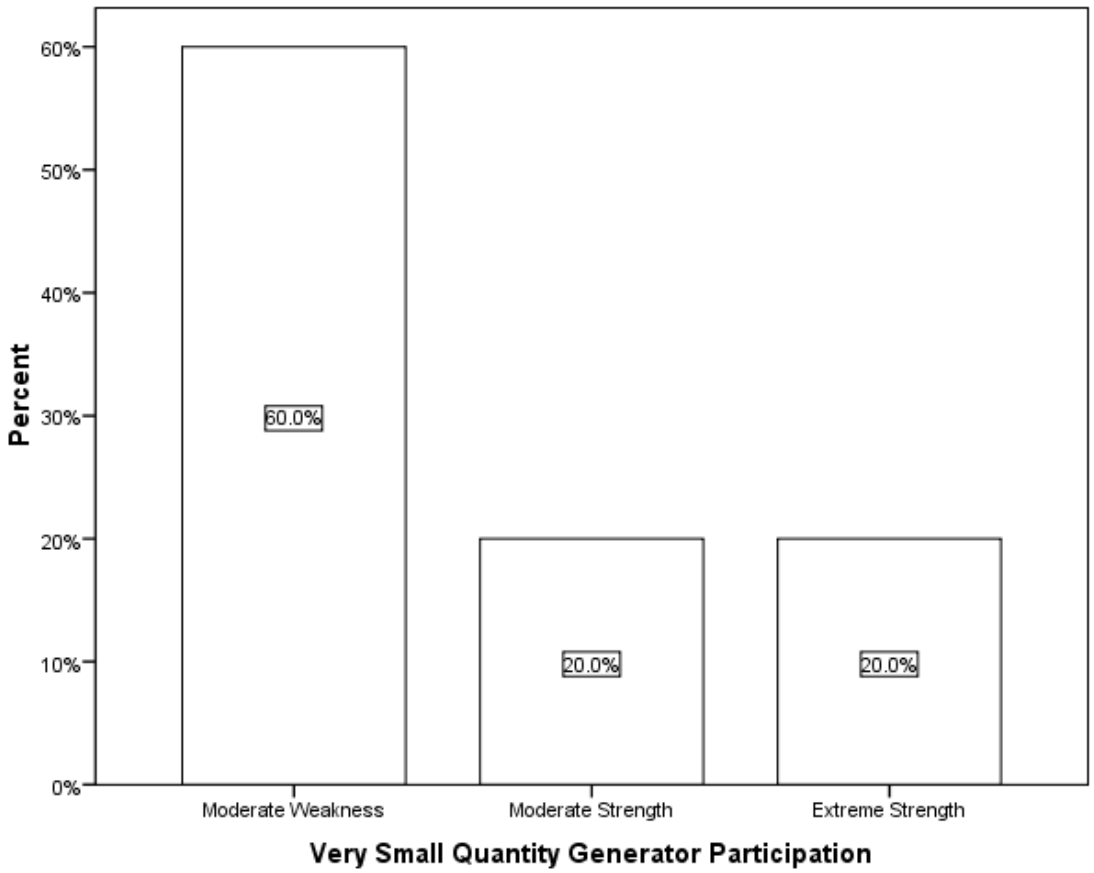

Figure 17. Weakness or Strength of Disposal Program and Business Participation, 2009

Responses indicated that recruiting staff and volunteers are a moderate strength (64%) and extreme strength (24%) of medication disposal programs (Figure 18).

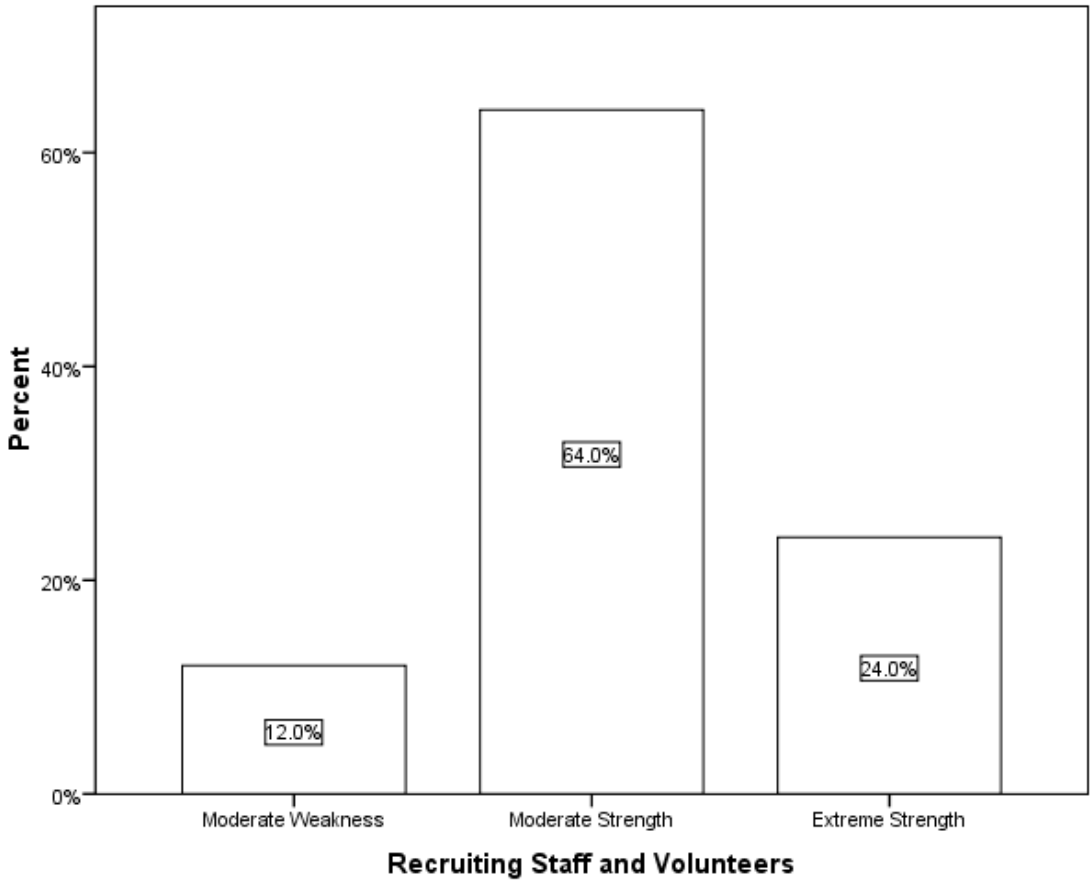

Figure 18. Weakness or Strength of Disposal Program and Recruiting Staff and Volunteers, 2009

Responses indicated that law enforcement involvement is an extreme strength (43.48.%) or moderate strength (30.43%) of medication disposal programs (Figure 19).

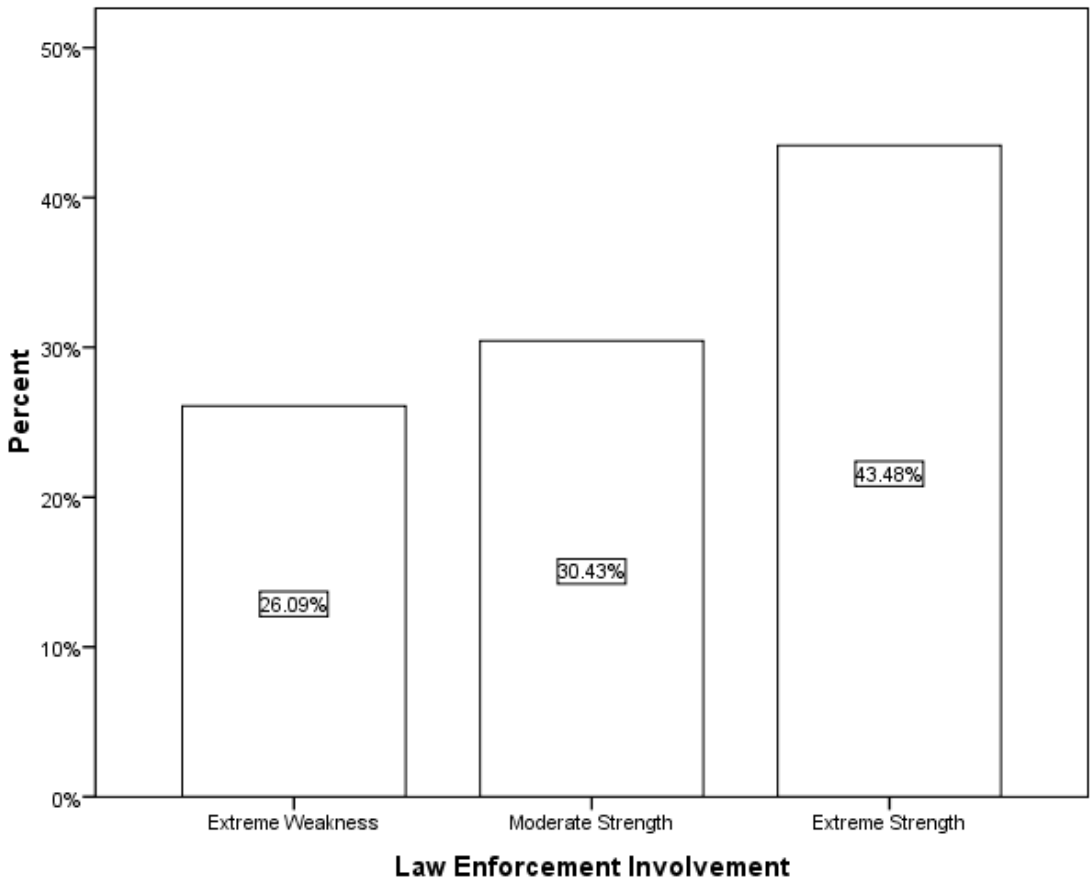

Figure 19. Weakness or Strength of Disposal Program and Law Enforcement Involvement, 2009

The third and fourth research questions attempted to assess the perceived opportunities and threats of current medication take-back programs both 1-day and continuous programs. Research questions aligned with program opportunities and threats included offering a continuous medication collection program, obtaining funding for a medication disposal program, sustained funding of a medication disposal program, providing local incineration of collected medications, ensuring the safe collection of medications, transporting collected medications to disposal sites, assessing the operational plan of conducting a disposal program, advertising of a medication disposal program, providing the public with information on environmental, health and legal issues, and implementing

rules and regulations of the Drug Enforcement Agency (DEA) and U.S. Environmental Protection Agency (USEPA) within a medication disposal program.

Responses indicated that offering a continuous medication collection program was considered an extreme opportunity (66.7%) or moderate opportunity (20%) for medication disposal programs (Figure 20).

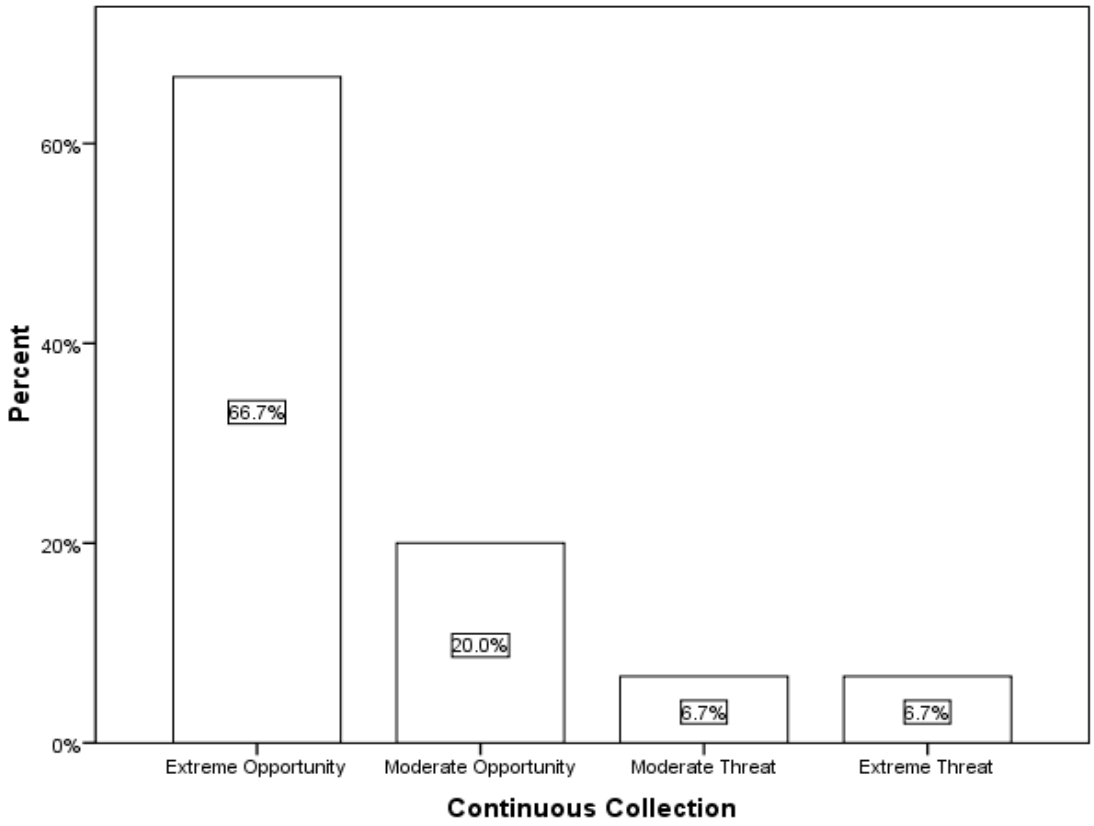

Figure 20. Opportunity or Threat of Offering a Continuous Disposal Program, 2009

Responses indicated that obtaining funding was considered an extreme threat (44%) or moderate threat (39.1%) to medication disposal programs. Survey findings also showed that obtaining funding to operate a medication disposal program is an extreme (8.7%) or moderate (8.7%) opportunity (Figure 21).

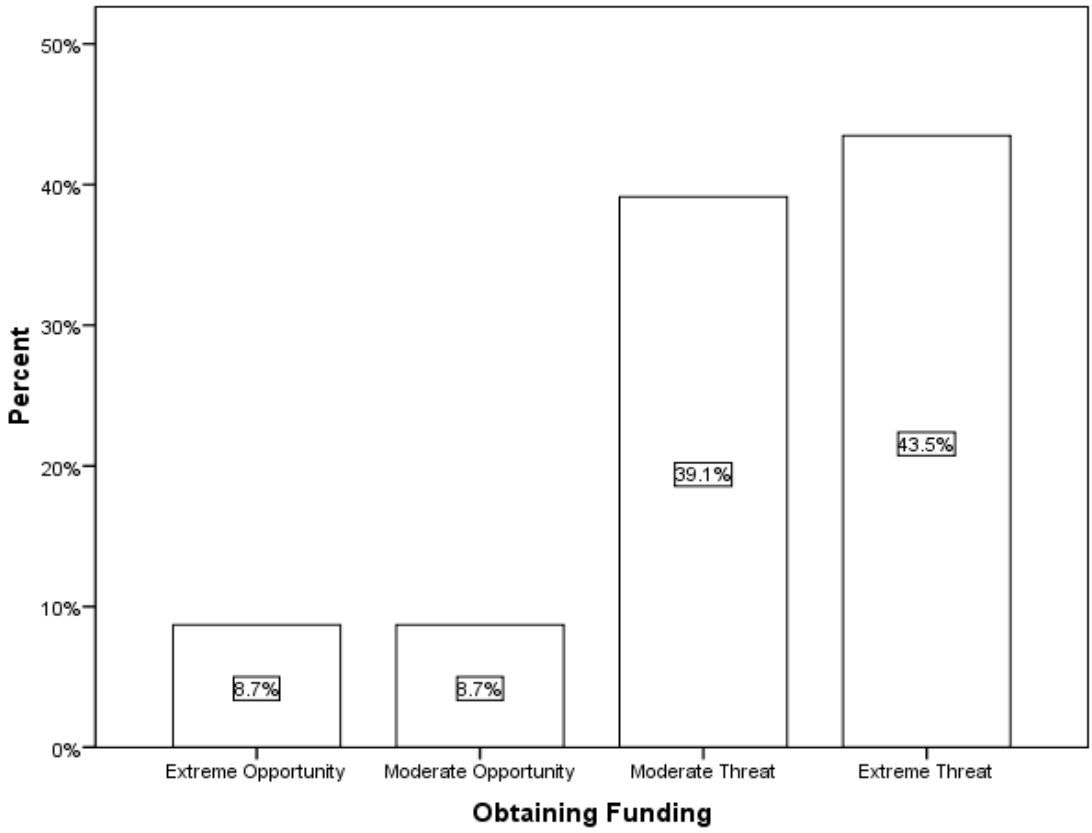

Figure 21. Opportunity or Threat of Obtaining Funding and Medication Disposal Programs, 2009

Responses indicated that sustaining funding was an extreme threat (58.3%) or moderate threat (16.7%) to medication disposal programs. Survey findings also showed that sustaining funding to operate a medication disposal program was an extreme (12.5%) to moderate (12.5%) opportunity (Figure 22).

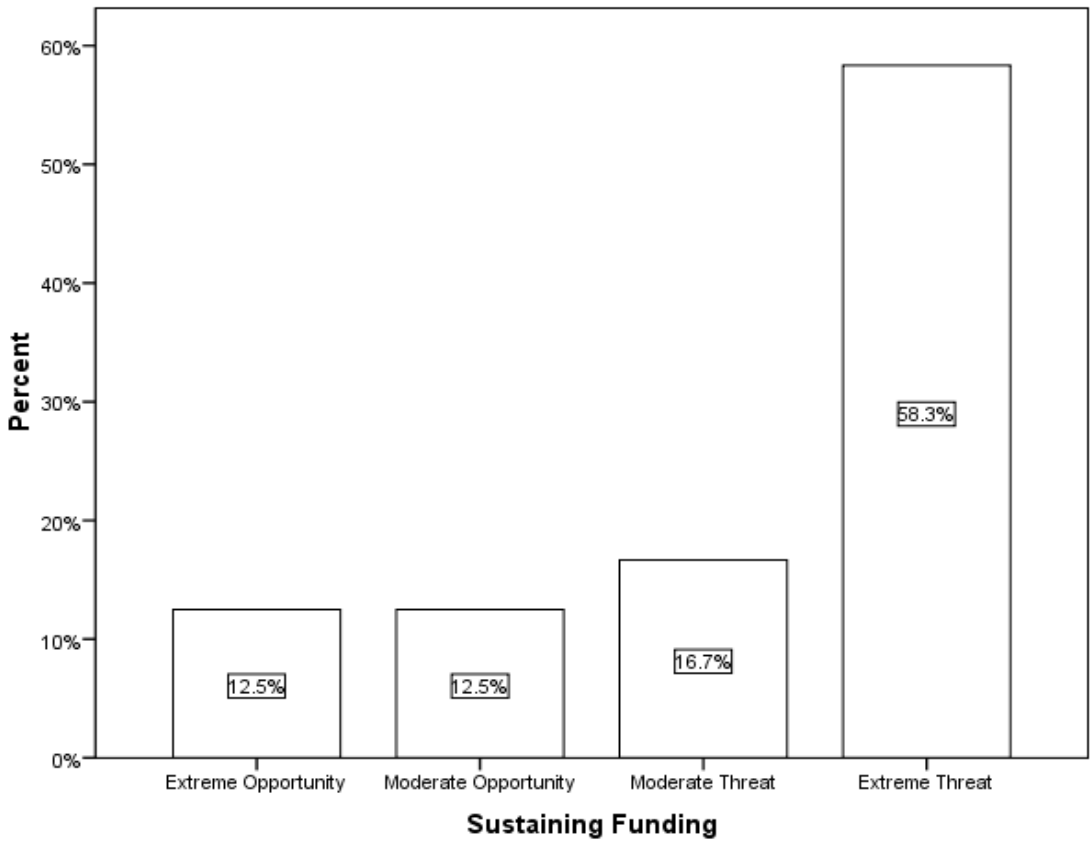

Figure 22. Opportunity or Threat of Sustaining Funding and Medication Disposal Programs, 2009

Responses indicated that the offering of local incineration of collected medications was an extreme threat (33%), whereas 22% of the participants considered local incineration to be a moderate threat, moderate opportunity or extreme opportunity (Figure 23).

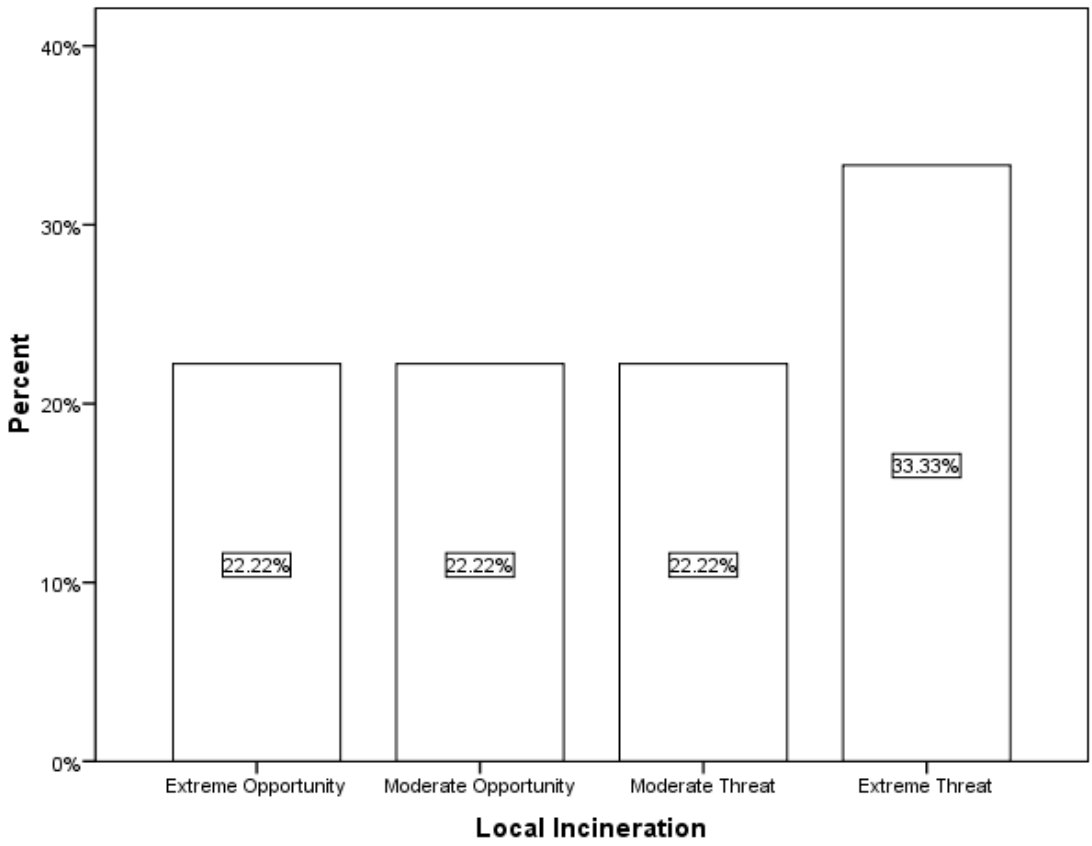

Figure 23. Opportunity or Threat of Local Incineration and Medication Disposal Programs, 2009

Research findings indicated that ensuring safe collection is an extreme opportunity (50%) or moderate opportunity (37.5%) for disposal programs. Few of the respondents considered ensuring the safe collection of medications to be a moderate threat (8%) or extreme threat (4%) (Figure 24).

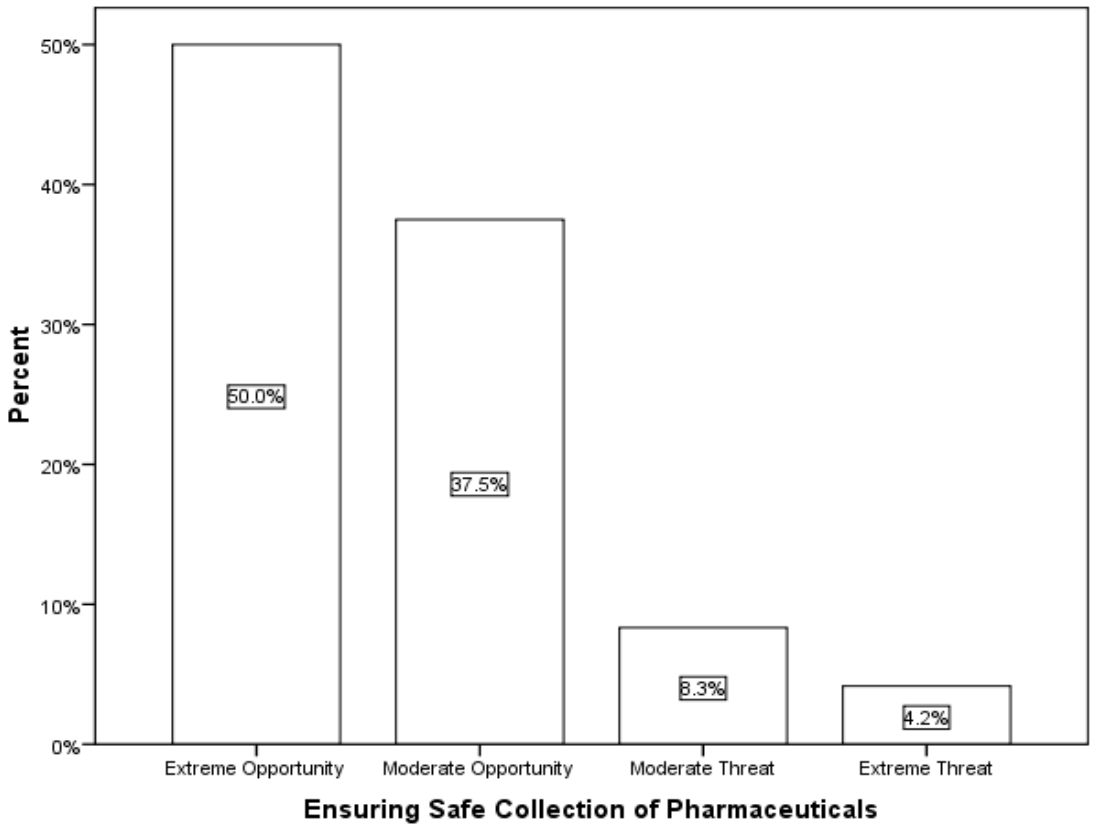

Figure 24. Opportunity or Threat of Ensuring Safe Collection of Pharmaceuticals and Medication Disposal Programs, 2009

Transporting collected pharmaceuticals was considered to be a moderate opportunity (33.3%) and moderate threat (33.3%) by respondents. Survey findings also showed that transporting collected pharmaceuticals was an extreme opportunity (23.8%). A total of 57 % of respondents identified transportation of collected medications as a program opportunity (Figure 25). The survey did not ask respondents to provide details of their response. The capacity for collection programs to transport collected medications for disposal may have had an impact on participant response. It is noted that all respondents had contracted with the La Crosse County Household Hazardous Department (HWD) for transportation and disposal of medication collected during the past 24 months.

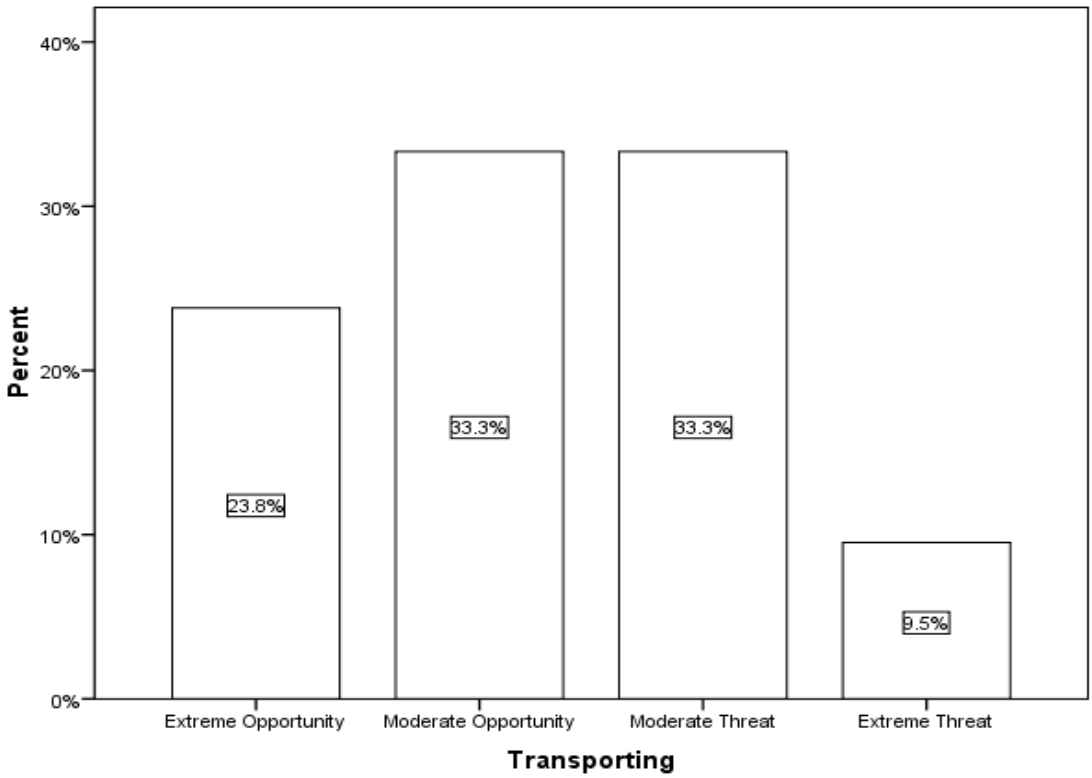

Figure 25. Opportunity or Threat of Transporting Collected Pharmaceuticals and Medication Disposal Programs, 2009

Most of the survey respondents considered their operational plan for medication disposal programs to be a moderate opportunity (56.5%) or extreme opportunity (26.1%). The operational plan was considered a moderate threat by 17% (Figure 26).

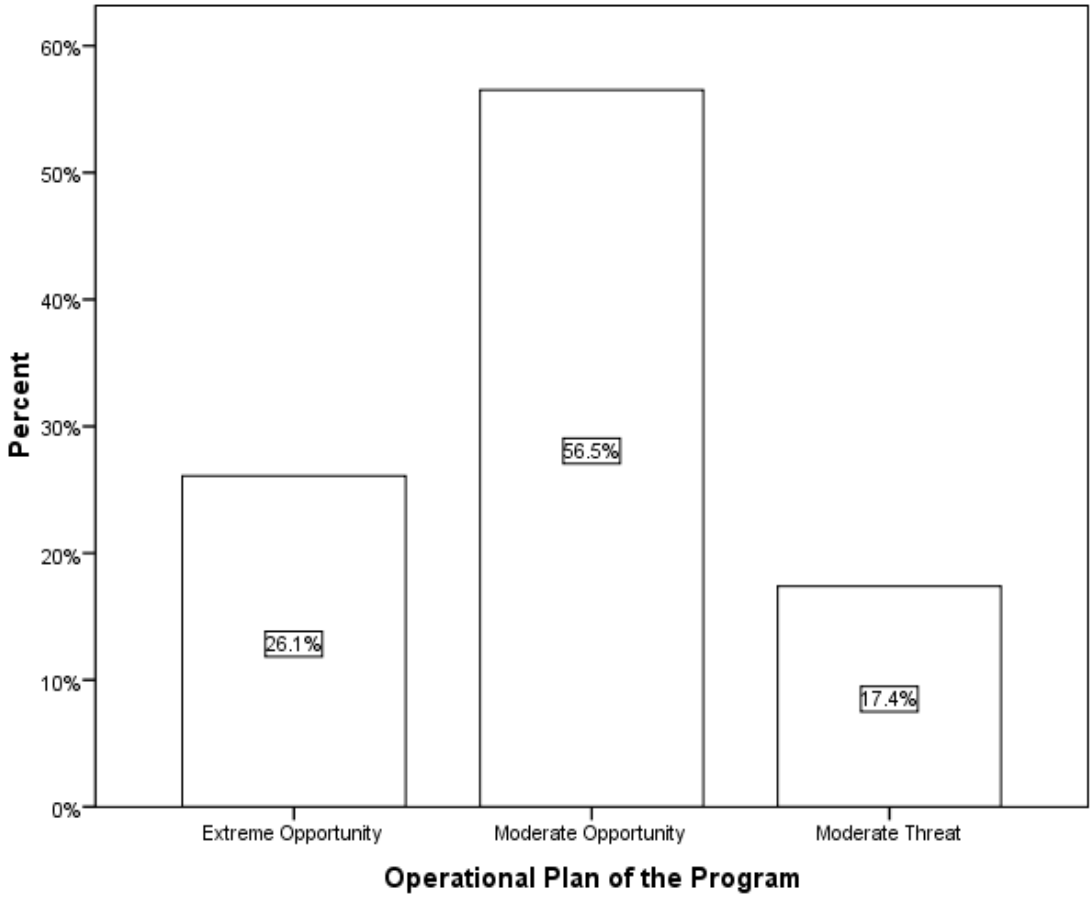

Figure 26. Opportunity or Threat of the Operational Plan of Disposal Programs, 2009

Research findings indicated that advertising was considered a moderate opportunity (60.9%) and extreme opportunity (26%) by the respondents. Comparatively few respondents (13%) considered advertising as a threat to their disposal programs (Figure 27).

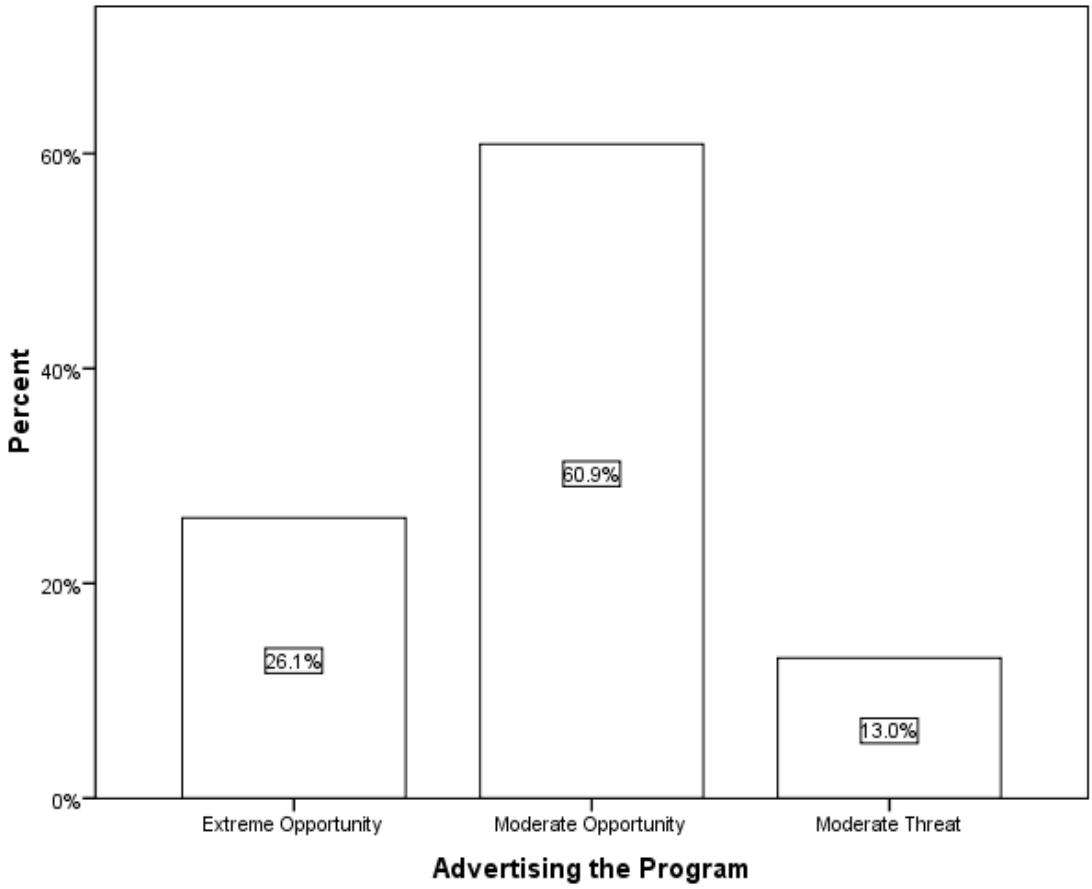

Figure 27. Opportunity or Threat of Advertising and Medication Disposal Programs, 2009

Nearly all respondents considered public education to be a moderate opportunity (67%) or extreme opportunity (29%) of their disposal program. Public education was considered a moderate threat by 4% (Figure 28).

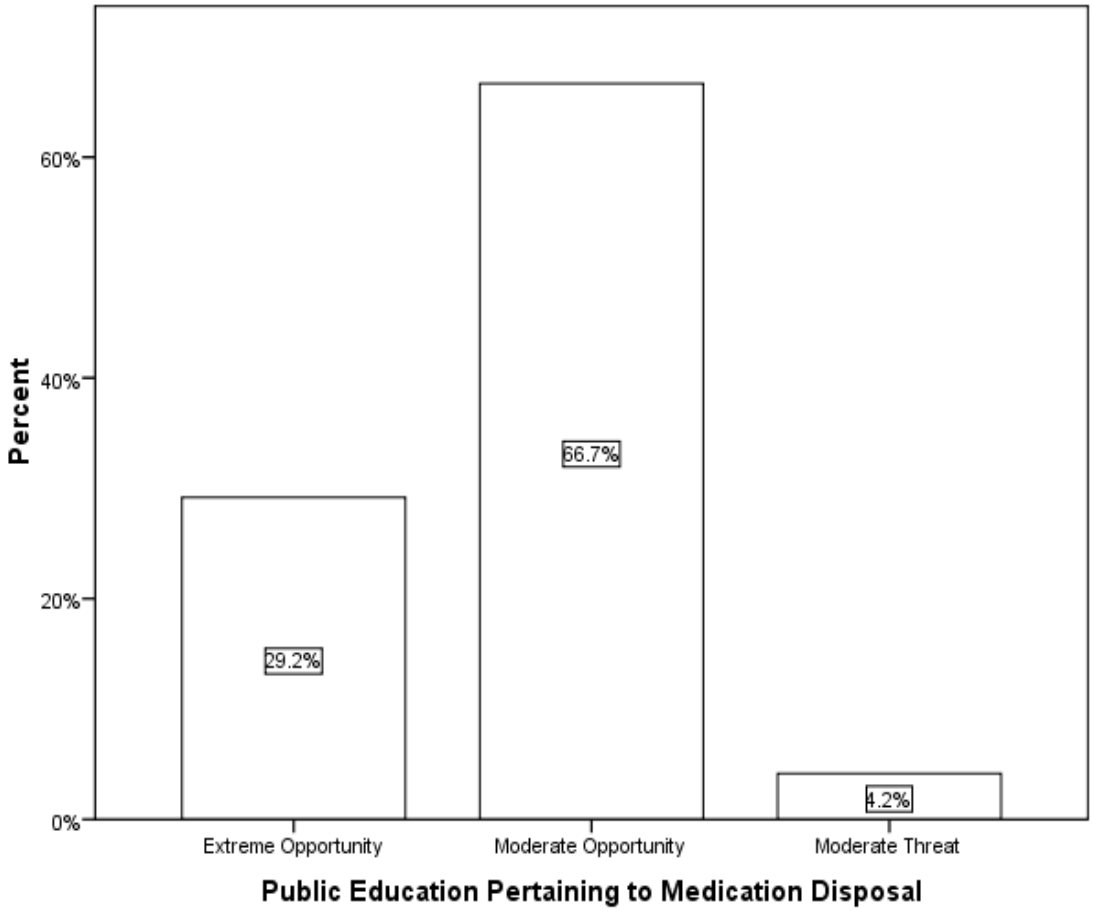

Figure 28. Opportunity or Threat of Public Education and Medication Disposal Programs, 2009

Implementation of United States Environmental Protection Agency (USEPA) and Drug Enforcement Agency (DEA) rules and regulations was considered a moderate threat (52%) and a moderate opportunity (26%) by respondents. Survey response also showed that EPA and DEA rules and regulations were an extreme threat (13%) and extreme opportunity (8.7%) (Figure 29).

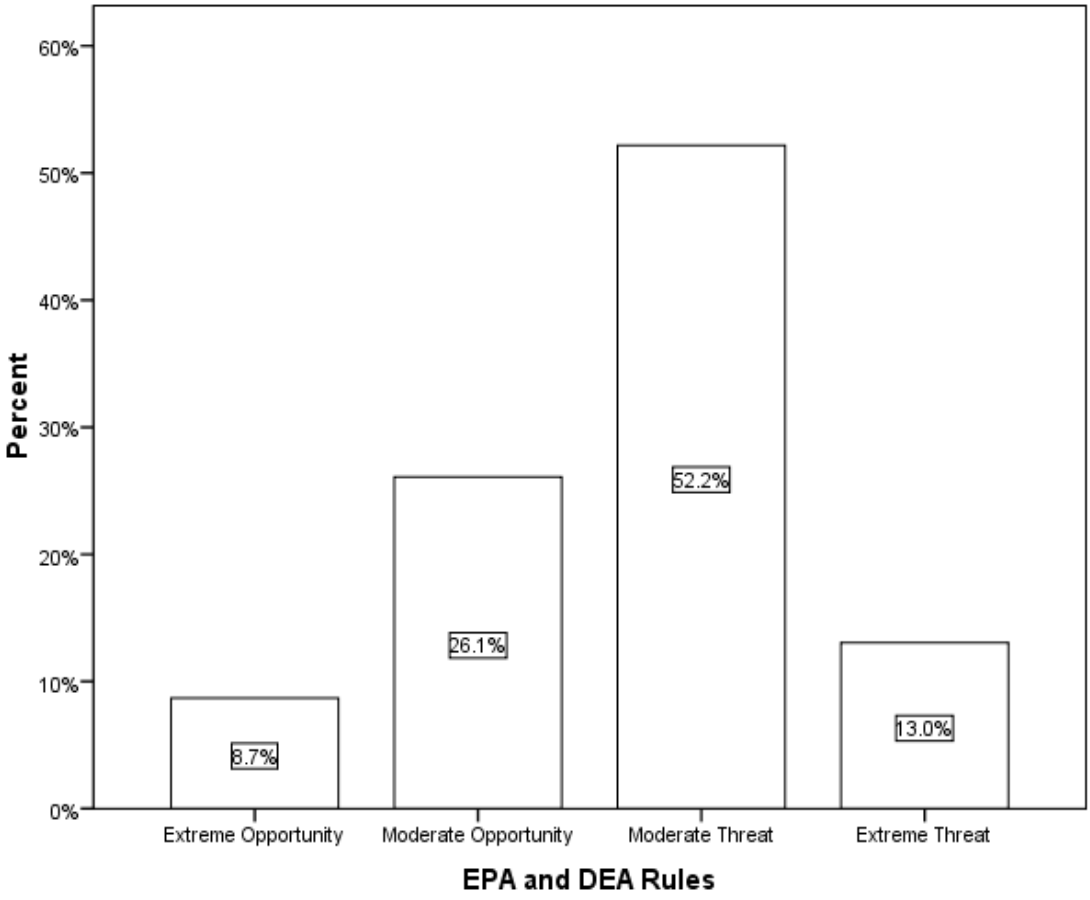

Figure 29. Opportunity or Threat of Implementing EPA and DEA Rules and Regulations and Medication Disposal Programs, 2009

Discussion

The survey was completed by 26 medication program directors representing 36 Wisconsin counties. Due to close county proximity and small county size, two participants who completed the survey represented multiple Wisconsin counties. Overall, the research findings indicated the following trends: the majority of the medication disposal programs are 1-day events and most frequently, one or two 1-day events have been conducted during the past 24 months. These programs have been offered to an estimated 2,233,500 people in 35 counties in Wisconsin.

Continuous medication disposal programs are most frequently offered by law enforcement at police stations (75%) and medications were available to collection 40 hours per week. Participants in medication disposal programs were primarily residents of the county or municipality, and businesses represented only a small participation percentage.

County Government (e.g., Dane County) was the most common funding source of both *1-day events* and *continuous* programs. Municipal government (e.g., City of Chippewa Falls) was the second highest financial supporter of *continuous* events. State government (e.g., Department of Natural Resources) was the second highest financial supporter of *1-day events*. The results did not assess total financial program costs.

The top non-financial supporter of both 1-day events and continuous events was law enforcement. Public Health, Drug Task Force Committees and others were noted as second, third and fourth non-financial supporters respectively of both 1-day events and continuous programs. Non-financial support details were not included in the survey question.

Responses to the first and second research questions identified perceived program strengths and weaknesses, with programs strengths exceeding weaknesses. Perceived program strengths, as indicated by the percent response, included people who participated in disposal programs (48% moderate strength), community partnerships (57% extreme strength), public awareness of the environment (40% moderate strength) and drug diversion (44% moderate strength), convenient access (56% extreme strength), recruiting staff and volunteers (64% moderate strength) and law enforcement involvement (43%).

Responses to the first and second research questions identified one perceived program weakness, as indicated by the percent response. The results showed that not allowing businesses to participate in medication disposal programs was a moderate weakness (60%). Additional results showed business participation in medication disposal programs as a moderate strength (20%) and extreme strength (20%).

Public awareness of the need to prevent accidental poisoning which motivates people to participate in medication disposal programs, although weighted as a moderate strength (46%), was also represented as a moderate weakness (42%). Respondents were not offered the option to comment on survey questions which may have offered insights regarding this question.

Responses to the third and fourth research questions, which concerned perceived program opportunities and threats, revealed five program opportunities, four program threats and one response with a moderate opportunity and moderate threat with an equal percent response. Perceived program opportunities, as indicated by the percent response, included offering of continuous disposal program (67% extreme opportunity), ensuring the safe collection of medications (50% extreme opportunity), operational plan which

included program logistics (57% moderate opportunity), program advertising (61% moderate opportunity) and public education providing information on environmental, public health and legal issues specific to medication disposal (67% moderate opportunity).

Responses to the third and fourth research questions also identified four perceived threats which included obtaining funding (44% extreme threat), sustaining funding (58% extreme funding), offering local incineration (33 % extreme threat) and implementing EPA or DEA rules and regulations into a medication disposal program (52% moderate threat).

Based on survey response, local incineration was an extreme threat (33%). However, an equal response of 22% for extreme opportunity, moderate opportunity and moderate threat was identified in the research results. Respondents were not offered the option to comment on this survey questions and these comments may have offered insights regarding perceived opportunities and threats regarding local incineration. The transportation of collected medications was considered a moderate opportunity (33%) and moderate threat (33%) by an equal numbers of respondents.

The fifth research question concerned strategic planning of future medication disposal programs. Based on the research findings, medication programs need to ensure the safe collection of medications and should include plans to provide access to continuous medication disposal programs. In addition, optimizing medication disposal operational plans, advertising medication disposal programs, offering additional public education information regarding the environment, public health and legal issues concerning medication disposal are required in program strategic planning efforts. Finally, research

findings indicated that strategic program planning needs to obtain and sustain financial support and facilitate the implementation of DEA and EPA rules and regulation.

In summary, the results showed that perceived program strengths far outweigh program weaknesses and represent the internal factors which have an impact on current medication programs. Research results also showed that perceived program opportunities exceed perceived program threats and these opportunities and threats represent external factors which may impact these programs and should be used in the strategic planning of these and future medication disposal programs.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The purpose of this research was to conduct a SWOT (strengths, weaknesses, opportunities, threats) analysis of 35 Wisconsin communities who currently offer 1-day medication take-back events or continuous medication programs. This SWOT analysis briefly defined an assessment method useful in the future strategic planning of medication programs in these and other Wisconsin communities**.**

In March of 2008, a three-part report released by the Associated Press authored by Donn, Pritchard and Mendoza, estimated that 41 million people in the US are currently exposed to pharmaceuticals in their drinking water. These findings have created a public awareness of the problem and have raised public awareness regarding the impact of medications in our water systems, the environment and their health. To this end, several local communities in Wisconsin have established medication collection programs. These collection programs attempt to reduce the entry of unused, unnecessary or expired medications into the environment; diversion of medications to unintended users; and accidental poisoning which may result from taking medications.

The first and second research questions addressed the perceived strengths and weaknesses of current medication take-back programs both 1-day events and continuous programs. Perceived program strengths, as indicated by the percent response, include people who participate in disposal programs (48% moderate strength), community

partnerships (57% extreme strength), public awareness of the environment (40% moderate strength), drug diversion (43% moderate strength), convenient access (56% extreme strength), recruiting staff and volunteers (64% moderate strength), and law enforcement involvement (43%).

Only one perceived weakness was identified by the respondents: allowing businesses to participate in medication disposal programs registered as very small quantity generators, a U.S. Environmental Protection Agency (USEPA) regulation and was indicated as a moderate program weakness (60%). Public awareness of the need to prevent accidental poisoning which motivates people to participate in medication disposal programs was considered a moderate strength (45%) or moderate weakness (41%) by nearly equal numbers of respondents.

The third and fourth research questions addressed the perceived opportunities and threats of current medication take-back programs, both 1-day events and continuous programs. The results indicated that program threats include obtaining funding (43% extreme threat), sustaining funding (58% extreme funding), and offering local incineration (33% extreme threat) and implementing Environmental Protection Agency (EPA) or Drug Enforcement Agency (DEA) rules and regulations into a medication disposal program (52% moderate threat). Perceived program opportunities, as indicated by the percent response, include offering a continuous disposal program (67% extreme opportunity), ensuring the safe collection of medications (50% extreme opportunity), operational plan which includes program logistics (56% moderate opportunity), program advertising (61% moderate opportunity) and public education which provides

information regarding the environment, public health and legal issues specific to medication disposal (67% moderate opportunity).

The fifth research question addressed the development of recommendations to be included in the strategic planning of medication disposal programs. Based on the research findings, medication programs need to ensure the safe collection of medications and include plans to provide continuous access to medication disposal programs. In addition, optimizing medication disposal operational plans, advertising medication disposal programs, offering additional public education information regarding the environment, public health and legal issues concerning medication disposal are required. Based on the research findings, program threats which need to be addressed in strategic program planning, include securing and sustaining financial support and providing the means by which the Drug Enforcement Agency and Environmental Protection Agency rules and regulations can be more easily implemented within medication disposal programs.

Conclusions

Federal and state governments have not yet reached a consensus regarding the best management practices for pharmaceutical waste based on federal and United States Environmental Protection Agency (USEPA) guidelines. In the meantime, activities to prevent improper disposal by the general public are needed to reduce the release of pharmaceuticals into the environment. The research questions addressed the identification of strengths and weaknesses and opportunities and threats of medication disposal programs in 35 Wisconsin communities. Research findings indicated that the internal program criteria necessary to conduct a community medication take-back program

should include convenient access, community partnerships, law enforcement and public awareness of the environment and drug diversion. Internal medication disposal program weaknesses include allowing businesses to participate in community medication disposal programs because of regulatory restrictions which prevent business participation and public awareness of accidental poisoning.

External medication disposal program opportunities and threats were identified in the third and fourth research questions. Opportunities and threats include program operational plans, offering a continuous and safe disposal program, securing and sustaining funding, local incineration of collected medications, public education efforts providing information regarding the environment, transportation, program advertising and implementing EPA and DEA rules and regulations. The third and fourth research question findings direct the fifth research question and indicated that future strategic plans of medication disposal programs need to include four criteria. These criteria included the following:

1. Sustained sources of financial support.
2. Availability of safe and continuous disposal program options in addition to 1-day events.
3. Approaches for implementing DEA and USEPA rules and regulations.
4. Development of operational plans for conducting disposal programs, transportation, advertising and public education efforts which included information regarding the environment, public health and legal issues.

Recommendations

The fifth research question addressed the development of strategic planning recommendations for community-based medication take-back program based on the survey results. These recommendations, based on research finding include the following four recommendations found under Current Medication Disposal Programs in Wisconsin.

Current Medication Disposal Programs in Wisconsin

The first recommendation, based on program threats, seeks to obtain and sustain funding of medication disposal programs, as well as controlling program costs. Program costs can be controlled by increasing efficiency through enhanced collaboration among Wisconsin counties that currently offer medication disposal programs. Such efforts could include the consolidation of operational costs necessary to transport collected medications, advertize medication collection programs and public education efforts regarding medication disposal. In addition, these same medication disposal programs need to recruit and allow businesses, identified as a program weakness, to participate and request business sponsorship of medication disposal programs. Business participation should be considered a source of revenue to support and sustain current and future medication disposal programs, which were identified as program threats and weaknesses.

The second recommendation is to conduct an assessment of current continuous medication disposal programs in Wisconsin to ascertain levels of convenient access for medication disposal. This information could be used to determine which medication collection facility, law enforcement offices or pharmacies or other, offers the most convenient access for continuous medication disposal, ensures the safe collection of

medications and guarantees the greatest rate of participation by people seeking access to medication disposal.

The third recommendation is to conduct a SWOT analysis of USEPA and DEA rules and regulations used in medication disposal collection programs. This analysis would be completed by the medication disposal programs managers who use the La Crosse County Household Hazardous Waste Department for disposal of collected medications. Findings from this analysis may prove useful in directing a critical appraisal of pertinent regulations promulgated by USEPA and DEA.

The fourth recommendation, based on a collaborative effort of the 35 counties who use the La Crosse County Hazardous Waste Department for medication disposal, is to secure federal or state grant funding, which seeks to summarize the financial costs, total weight of drug collected, total weight of controlled substance drug collected and number of people who bring in medications for disposal based on individual community disposal programs. This assessment, based on current operational plans, will provide necessary projections for participation, collected drug weight, program costs and could be used to guide the future development of a collective statewide Wisconsin medication collection program.

For Future Research

Future studies are suggested which compare participant responses to the survey questions which include aligned with the population in the Wisconsin county where the disposal program(s) is provided. These results may provide additional insights regarding financial and non-financial supports, perceived weaknesses and strengths and perceived opportunities and threats.

The role of the health educator can not be overlooked as an opportunity to provide necessary information to communities regarding the disposal of unused, unnecessary or expired medications. Additional research is suggested which identifies the most effective means to provide medication disposal information and this information should seek to effectively reach large numbers of people who have a need to dispose of their medications at medication disposal locations which are safe and convenient.

Societal usage of medications will continue in the United States. Preventative measures are needed at a national level to address a possible environmental and public health problem. A national effort should seek to facilitate collaboration between prescribers, drug manufactures and pharmacy providers--engaging as partners in the prescribing, dispensing, and disposal of medications. Such an effort would be supported by those who advocate for clean drinking water and who accept a role as environmental stewards.

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APPENDIX A
STRENGTH, WEAKNESS, OPPORTUNITY AND THREAT (SWOT) ANALYSIS OF MEDICATION TAKE-BACK PROGRAMS IN WISCONSIN COMMUNITIES

Medication Take Back Programs in WI:SWOT Analysis

1. Default Section

* 1. What is your position or title within your municipality or county?

Name:

Company:

Address:

Address 2:

City/Town:

State:

ZIP:

Country:

Email Address:

Phone Number:

* 2. Please list the municipality or county where your program takes place (Municipality includes, city, village or township).

County

City (Cities)

Village (s)

Township(s)

3. In your municipality or county, do you offer?

- ◯ One-day event ONLY.
- ◯ Continuous program ONLY (Continuous programs offer daily hours of operation or medication disposal).
- ◯ BOTH a one-day event AND continuous program.

Medication Take Back Programs in WI:SWOT Analysis

4. If you offer a ONE-DAY medication disposal event, how many events have been held in your municipality or county during the past 24 months? (List the nunber of events)

- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5
- ◯ 6
- ◯ 7
- ◯ 8
- ◯ 9
- ◯ 10
- ◯ More than 10

5. If you offer a CONTINUOUS PROGRAM for medication disposal program, how many hours per week is your program available for public participation (Please estimate to the nearest whole number).

6. If you offer a continuous program, what facility accepts medications for disposal? (Check all that apply)

- ☐ Police Station
- ☐ Household Hazardous Waste Department
- ☐ Hospital
- ☐ Hospice
- ☐ Pharmacy
- ☐ Other

Other (please specify)

7. Who can participate in your program (Select all that apply)?

- ☐ Residents living in your municipality or community
- ☐ Businesses registered as VSQG's (Nursing Homes, Schools, Veterinary Clinics, Pharmacies)

Medication Take Back Programs in WI:SWOT Analysis

8. Please select those programs that financially support your ONE-DAY event and include the percent (%) contribution from each (Total should equal 100%).

- [ ] Federal government (e.g., Environmental Protection Agency)
- [ ] State government (e.g., Department of Natural Resources)
- [ ] County government (e.g., Dane County)
- [ ] Municipality government (e.g., City of Chippewa Falls)
- [ ] Local business donors (e.g., Kiwanis,Optimist Club or Hospitals)
- [ ] Private individuals (e.g., contributions from individuals)

9. Please select those programs that financially support your CONTINUOUS PROGRAM and include the percent contribution form each (Total must equal 100%).

- [ ] Federal government (e.g., Environmental Protection Agency)
- [ ] State government (e.g., Department of Natural Resources)
- [ ] County government (e.g., Dane County)
- [ ] Municipality government (e.g., City of Chippewa Falls)
- [ ] Local business donors (e.g., Kiwanis,Optimist Club or Hospitals)
- [ ] Private individuals (e.g.,contributions from individuals)

10. Who are the NON-financial contributors to your program(s) (e.g.,staff time, mileage, food costs?

	Public Health Department	Law Enforcement	Drug Task Force Committee	Local Hospitals and Clinics	Consortium (Veterans Administration, Hospitals, Clinics)	Others (describe in comment box)
ONE-DAY event	☐	☐	☐	☐	☐	☐
CONTINUOUS Program	☐	☐	☐	☐	☐	☐

Other (please specify)

Medication Take Back Programs in WI:SWOT Analysis

2. Stength and Weakness Assessment

The next #9 questions require an assessment of program(s) strengths and weaknesses based on internal conditions. Please select Not Applicable if the question does not apply. If the question does apply, select one of the following options based on your current program(s) to complete each statement: Extreme Weakness, Moderate Weakness, Moderate Strength, Extreme Strength.

* 1. Participation, as indicated by the number of people who have delivered medications for disposal, is a _____ of our program.

- ◯ Not Applicable OR
- ◯ Extreme Weakness
- ◯ Moderate Weakness
- ◯ Moderate Strength
- ◯ Extreme Strength

* 2. Partnerships among hospitals, pharmacies, law enforcements, and other civic entities within our community to plan, implement and sustain our program(s) is a (an) _____of our program.

- ◯ Not Applicable OR
- ◯ Extreme Weakness
- ◯ Moderate Weakness
- ◯ Moderate Strength
- ◯ Extreme Strength

* 3. Public awareness of the need to keep pharmaceuticals from entering the environment, motivates people to participate, is a (an) _____of our program.

- ◯ Not Applicable OR
- ◯ Extreme Weakness
- ◯ Moderate Weakness
- ◯ Moderate Strength
- ◯ Extreme Strength

Medication Take Back Programs in WI:SWOT Analysis

* 4. Public awareness of the need to prevent accidental poisoning motivates people to participate in our program is a (an) _____of our program.

- ◯ Not Applicable OR
- ◯ Extreme Weakness
- ◯ Moderate Weakness
- ◯ Moderate Strength
- ◯ Extreme Strength (ES)

* 5. Public awareness of the need to prevent drug diversion or the use of medications by those for whom the drug was NOT intended motivates people to participate in our program. This is a (an) _____of our program.

- ◯ Not Applicable OR
- ◯ Extreme Weakness
- ◯ Moderate Weakness
- ◯ Moderate Strength
- ◯ Extreme Strength

* 6. Convenient access to our one-day and/or continuous programs is a (an) _____of our program.

- ◯ Not Applicable OR
- ◯ Extreme Weakness
- ◯ Moderate Weakness
- ◯ Moderate Strength
- ◯ Extreme Strength

* 7. Allowing community businesses, registered as VSQG's, to participate in our medication collection programs is a (an) _____of our program.

- ◯ Not Applicable OR
- ◯ Extreme Weakness
- ◯ Moderate Weakness
- ◯ Moderate Strength
- ◯ Extreme Strength

Medication Take Back Programs in WI:SWOT Analysis

* 8. Recruiting staff and volunteers to participate in our program is a (an) _____of our program.

- ◯ Not Applicable OR
- ◯ Extreme Weakness
- ◯ Moderate Weakness
- ◯ Moderate Strength
- ◯ Extreme Strength

* 9. The requirement of law enforcement involvement in pharmaceutical collection is a (an) _____of our program.

- ◯ Not Applicable OR
- ◯ Extreme Weakness
- ◯ Moderate Weakness
- ◯ Moderate Strength
- ◯ Extreme Strength

Medication Take Back Programs in WI:SWOT Analysis

3. Opportunities and Threat Assessment

The next #10 questions require an assessment of program(s) opportunities and threats based on external conditions. Please select Not Applicable, if the question does not apply. If the question does apply, select one of the following options based on your current program(s) to complete each statement: Extreme Opportunity, Moderate Opportunity, Moderate Threat, Extreme Threat.

* 1. Offering a continuous pharmaceutical collection program in our municipality or county is a (an) _____of our program.

- ◯ Not Applicable OR
- ◯ Extreme Opportunity
- ◯ Moderate Opportunity
- ◯ Moderate Threat
- ◯ Extreme Threat

* 2. Obtaining funding to operate our program(s) is a (an) _____of our program.

- ◯ Not Applicable OR
- ◯ Extreme Opportunity
- ◯ Moderate Opportunity
- ◯ Moderate Threat
- ◯ Extreme Threat

* 3. Sustained funding to continue program operation(s) is a (an)_____of our program.

- ◯ Not Applicable OR
- ◯ Extreme Opportunity
- ◯ Moderate Opportunity
- ◯ Moderate Threat
- ◯ Extreme Threat

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* 4. Local incineration within our municipality or county for pharmaceutical disposal is a (an) _____of our program

- ◯ Not Applicable OR
- ◯ Extreme Opportunity
- ◯ Moderate Opportunity
- ◯ Moderate Threat
- ◯ Extreme Threat

* 5. Ensuring the safe collection of pharmaceuticals during one-day events or continuous program is a (an) _____of our program.

- ◯ Not Applicable OR
- ◯ Extreme Opportunity
- ◯ Moderate Opportunity
- ◯ Moderate Threat
- ◯ Extreme Threat

* 6. Transporting collected pharmaceuticals for permanent disposal is a (an) _____of our program.

- ◯ Not Applicable OR
- ◯ Extreme Opportunity
- ◯ Moderate Opportunity
- ◯ Moderate Threat
- ◯ Extreme Threat

* 7. Our operational plan, which includes the logistics of conducting a medication program disposal program, is a (an) _____of our program.

- ◯ Not Applicable OR
- ◯ Extreme Opportunity
- ◯ Moderate Opportunity
- ◯ Moderate Threat
- ◯ Extreme Threat

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* 8. Advertising our program, within our municipality or county, is a (an) _____of our program

- ◯ Not Applicable OR
- ◯ Extreme Opportunity
- ◯ Moderate Opportunity
- ◯ Moderate Threat
- ◯ Extreme Threat

* 9. Public Education which provides information regarding the environmental, public health and legal issues pertaining to medication disposal, is a (an) _____of our program.

- ◯ Not Applicable OR
- ◯ Extreme Opportunity
- ◯ Moderate Opportunity
- ◯ Moderate Threat
- ◯ Extreme Threat

* 10. In our county or municipality, implementing U.S. Environmental Protection Agency (EPA) or Drug Enforcement Agency (DEA) rules and regulations for medication collection is a (an) _____of our program.

- ◯ Not Applicable OR
- ◯ Extreme Opportunity
- ◯ Moderate Opportunity
- ◯ Moderate Threat
- ◯ Extreme Threat

11. If you would like to receive a report summarizing the results of the survey which will be available in the Fall 2009, please check "Yes" and include your email address in the comment field.

- ◯ No
- ◯ Yes

Other (please specify)