

# Household Medical Waste

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## **Abstract**

My research examines flows of biomedical waste from domestic spaces (or on the go) to waste water treatment facilities, storm drain outlets, and landfills, in particular, biomedical waste generated by an ever increasing number of people with diabetes. According to the IDF (2012), diabetes is on the increase in every country. This increase necessarily means a growth in the production, consumption and thus the disposal of personal biomedical waste. Diabetes is a chronic illness that requires persistent management at home and on the go, which generates copious amounts of waste. These circumstances create a unique problem with tensions between product design (including the intended mode of disposal), personal practice and agency, government policy, dynamic technologies, social attitudes and waste management practices. This research seeks to understand the retention, disposal and ridding of medical waste in everyday life. The burden of waste currently falls on individuals that generate personal biomedical waste as well as waste facilities. This, as well as social stigma, leads many individuals to simply throw away or flush much of the waste. In order to better comprehend a waste flow of diabetic debris, I use thematic coding to analyze interviews and user generated content in online public forums. I aim to explore creative solutions for individuals with diabetes and others who manage waste by examining potential gaps between policy and practice in everyday life.

# 1 Synopsis for Ashgate Book

## 2 Introduction

What do individuals who generate medical waste do with their waste? Although there are many policies in place at national, state, provincial, and municipal levels, what does the actual practice of personal medical waste management look like on an everyday basis? Diabetes, which is already quite prevalent and growing worldwide, will serve as a case study for understanding attitudes about personal biomedical waste management and personal practices of disposal. These practices and attitudes are very much a problem for geography because where one lives or travels affects not only what type of waste one generates, but also how and where one divests it. This research is primarily situated in North America, making comparisons between the US and Canada. Examining waste practices on this scale will aid in understanding what happens to this type of waste once it leaves the consumer/user. Medical waste management on a much larger scale, such as hospitals and retirement homes is more often researched and better understood from a urban planning perspective. I will conduct a qualitative analysis of personal medical waste management through interviews, and online communities dedicated to people with diabetes. For this study, I draw on Barr (2002) to draw attention to the importance of social attitudes surrounding household waste.

Diabetes requires constant management and produces copious amounts of biomedical waste. This waste not only requires management in clinics and

hospitals where people with diabetes are treated, but also in various private and public spaces, such as homes, public spaces and touristic destinations. The line of treatment an individual diabetic follows determines the quantity and quality of their waste. One fairly universal tool or technology in diabetes management requires the use of sharp lancets and blood test strips, often numerous times a day, to monitor blood glucose levels. Additionally, people with diabetes can produce large amounts of waste including, glass insulin vials, syringes, infusion needles, infusion sets, insulin pens, pods, patches, reservoirs, continuous glucose monitors, wireless transmitters etc. . .

This research seeks to understand the retention, disposal and ridding of medical waste on an individual level for those who regularly generate waste that contains blood, fluids and sharps. Safe sharps disposal is a concern for not only health and waste management workers, but also important at home, at work, at school, traveling, or in other public places such as hotels, parks, and restaurants.

While the US Food and Drug Administration discourages people who manage health problems at home from placing loose needles and other sharps (ones not placed in a designated sharps container) in the household or public trash cans or recycling bins, and flushing sharps down the toilet because it puts trash and sewage workers, janitors, housekeepers, and household members at risk of being harmed, the FDA doesn't discourage sharps from being landfilled. Quite the opposite, the FDA encourages a flow of formal and informal sharps containers into the landfill.

Bouhanick et al. (2000) conducted an international study using a questionnaire on what people with diabetes do with their sharps and monitoring waste. They found that

At home: needles, syringes, lancets and reagent strips were thrown directly into the bin in 46.9%, 49.9%, 52.2% and 67.6% of cases, respectively; and in a closed plastic bottle in 29.6%, 28.5%, 28.9% and 19.9% of cases, respectively. Specific containers were used in 8.6% and 6.3% of cases for needles and syringes, respectively. 62% of the bottles and containers were thrown directly into the bin, whereas 15.5% were returned to a pharmacy (4.5% taken to hospitals, 2.9% were burned). At work: 63% of the patients brought their needles and syringes home for disposal, 6.9% kept suitable containers at work and 30% threw their materials directly into local bins (p.851)

. Their study shows a clear need for a better way to dispose of these types of household biomedical waste and even more so as the number of people using self injectibles continues to rise. Additionally, Crawshaw et al. (2002) and Dallel et al. (2005) conducted studies on the disposal of diabetic debris and both concluded that a lack of user knowledge is largely to blame and there is a serious need for the standardization of sharps disposal and the dissemination of best practices to individuals. Govender and Ross (2012) studied sharps disposal practices in South Africa and likewise highlighted the need for better education of how to dispose of sharps. The underlying

theme calls for better education, but even those educated on how to dispose of their daily biomedical waste show low compliance. This in essence comes down to convenience, something not to be taken for granted when living with chronic illness.

Making everyday life more convenient for people who manage chronic illnesses is difficult to weigh against the effect of waste produced from more accurate and more convenient devices (Gilg et al., 2005). According to Krišunas (2011)

The development of the single-use disposable syringe, initially by Murdoch and subsequently by Becton Dickinson and Monoject, was a major milestone for diabetes care as well as health care and injection safety. What we have now learned in the ensuing years is that all these single-use devices and the various next generation products, including diabetes care products, have spawned an interesting contribution to the global waste stream ( p. 851).

In addition to looking at already published work on household waste (Chappells and Shove, 1999) and medical waste and sharps disposal by people with diabetes (Bouhanick et al., 2000; McConville and Hamilton, 2002), I look to public internet forums to answer the question of what people with diabetes actually do with their diabetes related waste. I've found that the most common methods of disposal to be 1) Toss in in the waste bin/garbage (landfill stream) 2) Participation in sharps collection or drop off program 3) Flushing down toilets and 4) Retaining them for long periods of time.

Next, I follow up on the flow of waste based on methods of disposal suggested in forums. I move the study from the internet to Kingston, Ontario for a grounded perspective. This is research in progress, so I will focus on waste that flows from a consumer to the Ravensview waste water treatment facility or storm drains in Kingston, ON. I will briefly mention the other flows, which I am still researching.

While Canada has national standards for sharps disposal and many sharps collection and return services for consumers, it varies by province (Walkinshaw, 2011). Canada and Ontario actively divert sharps and medical waste from landfills. Ontario has recently It aims to be self-sufficient in its management of healthcare waste by relying on regional incineration facilities (Anyinam, 1994). In the United States there is no national standard for individuals to dispose of sharps and policy is determined by the state and municipality. The US also has sharps collection services but the cost is typically incurred by the individual. The following is not policy but suggestions from the FDA for disposing of sharps and US:

Place needles, syringes, lancets, and other sharp objects into hard plastic or metal containers with a screw-on top or other tightly securable lid (e.g., an empty paint can or liquid-detergent container). Before discarding, reinforce the top with heavy-duty tape. Do not put sharp objects in any container you plan to recycle. Do not use clear plastic or glass containers. Containers should be no more than full. Check with your local waste



collection service to make sure these disposal procedures are acceptable in your county. All sharps should be disposed of in rigid puncture-resistant containers such as liquid detergent bottles, bleach bottles or metal containers (FDA, 2014).

In the US one can either dispose of sharps and personal medical waste by placing it in a container with duct tape and label for transport to a landfill or one can pay a private service to dispose of the sharps and medical waste. These options are not ideal for the individual nor the wellbeing of a community. Because there is little incentive to dispose of these types of waste in compliance with the local or national standards, a shocking number simply do not.

There is healthy debate in public health and medicine as to sharps disposal. Where healthcare workers were once required to recap needle devices, they are now discouraged from doing so. This is no longer considered a best practice because the majority of healthcare workers needle sticks occurred during the recapping of the needle (Ancona et al., 1994). There are concerns for environmental impacts for landfilling and incineration. Other creative ways to deal with sharps and biomedical waste comes from product inventors such as that of Anyinam (1994), which is a method and apparatus for sterilization and separation of plastic and non-plastic medical wastes.

## **2.1 Ravensview Waste Water Treatment Facility**

What happens in Kingston Ontario to a needle once it is flushed? At Ravensview syringes and other diabetic supplies that are flushed undergoes a process that separates plastics from organic materials similar to that of Anthony (1994).

Incineration may be required for certain hazardous materials, like pathological waste, but a large portion of personal medical waste can be treated through non-incineration technologies utilizing steam or heat to sterilize the material.

## **3 Conclusion**

Who takes on the responsibility for disposal? Is it the end-user, is it the device manufacturer, is it the product designer, is it the Federal Government, is it state or local government, the waste industry, is it the healthcare provider, or is it the pharmacists or point-of-sale? The answers to these questions rely wholly on geographical location, social attitudes and creativity. Krisiunas (2011) makes interesting comparisons between disposable coffee cups and Effects of sharps and biomedical waste management has consequences for people and places. Flows of waste from hospitals and health care providers as well as individuals require serious attention from policy makers, product designers, and waste management facilities. It seems that education and social attitudes change slowly all the while the waste adds up. Perhaps hydrodegradable cas-

ings for the needles and lancets, so the are ready to flush. Is education the answer?

## References

- Ancona, K. G., Wolf, T. A., Phillips, C., Goren, G., Germak, J., and Wilson, T. A. (1994). Insulin syringe disposal practices of pediatric patients with insulin-dependent diabetes mellitus. *Clinical Pediatrics*, 33(4):232–234. PMID: 8013171.
- Anthony, F. H. (1994). Method and apparatus for sterilization and separation of plastic and non-plastic medical wastes. U.S. Classification 422/1, 241/DIG.38, 264/911, 422/307, 209/11, 241/65, 423/DIG.18, 241/99; International Classification A61B19/02, B09B3/00, A61M5/32, A61L11/00; Cooperative Classification Y10S241/38, Y10S264/911, Y10S423/18, A61L11/00, A61B19/0288, B09B3/0025, B09B3/0075, A61M5/3278; European Classification B09B3/00D, A61M5/32C4, A61L11/00, B09B3/00M.
- Anyinam, C. (1994). Managing biomedical waste in ontario. *Hospital Topics*, 72(1):22–27. PMID: 10136312.
- Barr, S. (2002). *Household Waste in Social Perspective: Values, Attitudes, Situation and Behaviour*. Ashgate Publishing Company.
- Bouhanick, B., Hadjadj, S., and Weekers, L. (2000). What do the needles, syringes, lancets and reagent strips of diabetic patients become in the absence of a common attitude? about 1070 questionnaires in diabetic clinics. *Diabetes & metabolism*, 26(4):288–293. PMID: 11011221.
- Chappells, H. and Shove, E. (1999). The dustbin: Study of domestic waste. *International Planning Studies*, 4(2):267–280.
- Crawshaw, G., Irwin, D. J., and Button, J. (2002). Disposal of syringes, needles, and lancets used by diabetic patients in north east essex. *Communicable disease and public health / PHLIS*, 5(2):134–137. PMID: 12166300.
- Dallel, N., Kacem, M., Nabouli, R. M., and El May, M. (2005). [disposal of insulin syringes by diabetic patients. report of 100 patients]. *La Tunisie médicale*, 83(7):390–392. PMID: 16220694.
- FDA, U. S. (2014). Needles and other sharps (safe disposal outside of health care settings). This webpage gives tips for safely disposing (getting rid

of) needles and other sharp devices that are used outside of health care settings.

- Gilg, A., Barr, S., and Ford, N. (2005). Green consumption or sustainable lifestyles? identifying the sustainable consumer. *Futures*, 37(6):481–504.
- Govender, D. and Ross, A. (2012). Sharps disposal practices among diabetic patients using insulin. *South African medical journal = Suid-Afrikaanse tydskrif vir geneeskunde*, 102(3 Pt 1):163–164. PMID: 22380912.
- Krisiunas, E. (2011). Waste disposal in the 21st century and diabetes technology: A little coffee (cup) or beer (can) with that insulin infusion (set). *Journal of Diabetes Science and Technology*, 5(4):851–852. PMID: 21880225 PMCID: PMC3192589.
- McConville, D. E. and Hamilton, E. M. (2002). Syringe disposal practices and gender differences. *The Diabetes educator*, 28(1):91–98. PMID: 11852747.
- Walkinshaw, E. (2011). Medical waste-management practices vary across canada. *CMAJ : Canadian Medical Association Journal*, 183(18):E1307–E1308. PMID: 22105749 PMCID: PMC3255123.