DEVELOPING A DATA-DRIVEN BASELINE OF WASTE DIVERSION IN HEALTH CARE

EXECUTIVE SUMMARY

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August 2019

This report was produced as part of the UBC Sustainability Scholars Program, a partnership between the University of British Columbia and various local governments and organisations in support of providing graduate students with opportunities to do applied research on projects that advance sustainability across the region.

This project was conducted under the mentorship of Fraser Health staff. The opinions and recommendations in this report and any errors are those of the author and do not necessarily reflect the views of Fraser Health or the University of British Columbia.

Acknowledgements

The author would like to thank the following individuals for their contribution, feedback, and support throughout this project:

Marianne Dawson

Glen Garrick

Karen Taylor

The author would also like to thank all staff members from Lower Mainland Facilities Management, Vancouver General Hospital, Richmond Hospital, St. Paul's Hospital, and Business Initiatives and Support Services who provided valuable data and administration support. Without these amazing people, this project would not be successful.

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Introduction

Increase waste diversion has been one of the top priorities in health care organizations. By 2020, health care organizations in British Columbia's Lower Mainland aims to increase non-hazardous waste diversion rates at existing acute and residential care sites to 50%, decrease waste intensity rates at existing acute and residential care sites to 12kg/sqm in Providence Health Care and 10kg/sqm in Vancouver Coastal Health, and increase waste diversion rates in all new health care construction projects to 90% (GreenCare, 2018). To achieve these objectives, the Energy and Environmental Sustainability Team (EES), a business line of the Lower Mainland Facilities Management, which serves the four health care organizations in British Columbia's Lower Mainland: Fraser Health, Providence Health Care, Provincial Health Services Authority, and Vancouver Coastal Health was created in 2010 to conduct research, implement programs, and develop policies in the health care organizations. The EES team developed a Blue Bin program to reduce waste in landfills from three waste streams: mixed containers, mixed papers, and refundable beverage containers, and an Organics program has been launched in the cafeterias at selected sites.

Although the Blue Bin and Organics programs capture data from the major non-hazardous waste streams in health care organizations, other waste streams that have been recycled independently at each site have not been tracked. To acquire a full picture of the waste diversion, a comprehensive and accurate analysis of all waste streams at each site is fundamental. To address this issue, this project aimed to understand the recycling process and collect data on 13 waste streams at four acute health care sites: Vancouver General Hospital, Richmond Hospital, UBC Hospital, and St. Paul's Hospital. The 13 waste streams include batteries, reprocessed medical devices, Styrofoam, shrink wrap, construction waste, electronics, furniture, lighting, mattresses, paint cans, pallets, printer cartridge, and scrap metal. The data collection of each waste stream focused on the quantity being recycled each year, the frequency of pick-ups, and the contact information of the vendor. Moreover, this report will explain the feasibility of continuing to conduct a comprehensive analysis of all waste streams for other sites in the Lower Mainland, describe the challenges and barriers of quantifying the yearly mass of each waste stream, and provide suggestions for new recycling programs targeting these waste streams.

Background

Among the multitude of environmental problems in the world, the volume of solid waste has reached an alarming level. According to Statistics Canada, 24.9 million tons of solid waste was disposed in landfills or being incinerated in 2016. Non-residential sources of waste for disposal was 14.7 million tons. This enormous amount of waste ending up in landfills or being incinerated

every year can lead to air emissions, land disturbance, or water pollution. One solution to reduce solid waste in landfills is to divert waste by recycling and composting.

Among the different sources of solid waste in landfills, the health care industry is one of the major sources that generate significant amounts of solid waste. In 2001, hospitals and other health facilities in Canada generated approximately 1% of the total solid waste (Kagoma, Stall, Rubinstein, & Naudie, 2012). To raise awareness of the waste issue, the World Health Organization emphasized that health facilities need to adopt waste reduction, composting, and recycling practices, and to reduce or eliminate the incineration of medical waste (WHO, 2008). Aligning with the global standards of sustainable development, the EES Team aims to reduce the environmental impact of the health facilities across the four Lower Mainland health care organizations. Since 2016, the Blue Bin program has been implemented across all health organization owned and operated acute and residential care sites.

The Blue Bin Program increased waste diversion rates at acute and residential care sites by an average of 17% from 2011 to 2018 (EPAR, 2017). Apart from the waste streams covered by the Blue Bin and Organics Programs, other waste streams can also be recycled at health facilities. At selected sites, there are recycling programs for batteries, electronics waste, Styrofoam, and shrink wrap. However, these recycling programs have not been tracked. Therefore, the purpose of this project is to collect data on the 13 waste streams that have not been tracked at four acute care sites.

Research Approach

To collect data on the 13 waste streams for each site, the initial stage was to review and scrutinize the existing data files that contain the major waste streams to gather useful data for this project. At the second stage, a series of in-person interviews were conducted with the facilities' manager at each site to gather new data. The interview focused on the waste streams that have not been tracked. The targeted waste streams were batteries, reprocessed medical devices, Styrofoam, shrink wrap, construction waste, electronics, furniture, lighting, mattresses, paint cans, pallets, printer cartridge, and scrap metal.

For each waste stream, the facilities' manager was asked whether there is a recycling program. If there is a recycling program, which vendor is in charge of collecting the waste, how often does the vendor pick up the waste, and what amount of waste is collected each time. In case of lacking information on a specific waste stream, the facilities' manager was asked to refer a contact person who manages the waste stream at the site. Follow-up interviews were conducted with the contact person, either through email or by phone. The same interview format was followed. In certain cases, a request for data was sent to the vendor to collect the necessary data.

Summary

Across the four visited sites, the waste diversion rate increased significantly with additional waste streams. Specifically, the waste diversion rate increased by 2% on average at each site. These results reflect the importance of collecting data on waste streams besides the Blue Bin and Organics programs. Among the 13 waste streams, batteries, electronics, furniture, lighting, and scrap metal are the five waste streams that could be easily tracked in the health care organizations by standardizing the vendors.

Apart from collecting data from the facilities' managers and vendors, other methods could be tested in future studies. The first method is to request a list of newly purchased items in a month from the inventory department. Normally, newly purchased items replace old items. Thus, the quantity of waste being generated in a month can be derived from the number of items being purchased in a month. The second method is to build a regression model that use the square footage, patient day, or staffed beds at each site to predict the quantity of waste generated at a site. There are two limitations to this method. First, it relies on a large dataset. In the current projects, only four sites were investigated. With data from more sites, the prediction will be more reliable. Second, it is based on the assumption that the larger the site is, the more waste is generated. The waste generated at one site also depends on the services that it provides, such as the number of operation rooms. Thus, using this method to predict the quantity of each waste stream at a new site needs to be cautious. The third method is to perform a one-month waste audit to examine how much waste is generated in a month, and how frequent each waste stream is picked up by the vendor. A downside of this method is that it requires a considerable amount of effort and time.

In conclusion, collecting data of other waste streams besides the Blue Bin and Organics program clarifies the waste diversion and provides a broader view of the recycling process at each site. Despite several challenges during the data collection period, there are strategies to overcome these obstacles.

Recommendations

- Implement a recycling program for the waste streams besides the Blue Bin and Organics
- Require a yearly report from the vendors in the contract agreement
- Collaborate with the vendors and the site staffs to develop a method to track the quantity of waste before being removed
- If possible, standardize the vendors across the sites

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