

Reducing Food Waste in the Yale New Haven Hospital System

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Background

In 2021, the United Nations estimated that global food waste was 931 million tonnes of food waste (about 120 kg per capita), and about a third of the world's food was thrown away¹. This number is quite significant, as food waste accounted for more greenhouse gas emissions than any single country's emission per year, except for China and the United States. In the U.S., there are over 100 billion pounds of food wasted per year². Reducing food waste is crucial, especially in large institutions such as hospitals, because it may bring substantial environmental (climate change) and economic benefits.

In healthcare, reducing food waste is essential, as it is estimated that 0.23 kg is wasted per meal served in a hospital³. Most food waste in a hospital is thrown away to landfills (85%), while food that is recycled or composted is a fraction of the waste. Reducing the amount and redirecting waste to composting are both valuable steps because they not only reduce a hospital's cost of food production and waste management but also facilitate reaching environmental and sustainability goals.

Objectives

1. **Conduct interviews** with Food and Nutrition staff to understand their perspectives on food waste
2. **Analyze food waste** data from the Waste Not system to identify potential opportunities in reducing food waste
3. **Propose targets and goals** for food waste reduction and management

Methods

Key Informant Interviews

- Five structured interviews (20 - 30 minutes/interview) with employees and staff from patient food services at YNHH: interviewees include three staff working as the executive chef (n=1) and patient food service ambassadors (n=2) from York Street Campus (YSC) and two staff working as the storeroom clerk (n=1) and the senior storeroom clerk (n=1) from Saint Raphael Campus (SRC).
- Questions covered possible sources of food waste at YNHH, potential solutions for food waste reduction at YNHH, and potential future challenges that may be encountered after changes and regulation implementation.

Analysis of Waste Not data on food waste

- Composed of Waste Not 1.0 and Waste Not 2.0. General sources (site and station) of the waste were recorded in both versions such as in YSC and SRC.
- Data Cleaning: A time variable was added to keep track of stations from different months. For each month, quarts of waste were divided per patient day.
- Visualization: Bar charts and line charts were used to visualize trends in time.
- Testing: Paired t-test and Wilcoxon Rank-Sum Test were used to test for statistical differences in food waste between SRC and YSC.

Results: Qualitative

"There was a time, a patient ordered six popsicles when really only one was eaten and the other five melted, and this is because they know that they are not paying for it"

- **Major sources of food waste:** Patients' leftovers and the retail at the cafeteria.
- **Patient Food services:** Long patient waiting time leads to cold food, decreased appetite, and malnutrition issues.
- **Single patient portion size:** Large portion sizes are more likely to cause leftovers and small portion sizes may lead to patient malnutrition issues.
- **Food preservation:** Improper food preservation causes health risks.
- **Food prediction:** Lack of flexibility in predicting amounts of food needed may cause overproduction and waste.

¹ Environment, U. N. (n.d.). *UNEP Food Waste Index Report 2021*. UNEP. Retrieved April 30, 2022, from <https://www.unep.org/resources/report/unep-food-waste-index-report-2021>

² Venkat, K. (2011). The climate change and economic impacts of food waste in the United States. *International Journal on Food System Dynamics*, 2(4), 431-446.

³ Thiel, C. L., Park, S., Musicus, A. A., Agins, J., Gan, J., Held, J., Horrocks, A., & Bragg, M. A. (2021). Waste generation and carbon emissions of a hospital kitchen in the US: Potential for waste diversion and carbon reductions. *PLoS one*, 16(3), e0247616. <https://doi.org/10.1371/journal.pone.0247616>

Results: Quantitative

- **Overproduction:** Figure 1 shows that most of the food waste of YSC came from overproduction.
- **Salad Waste:** Figure 2 shows that the salad room has more waste than other locations at YSC.
- **SRC wastes more than YSC:** SRC has a statistically significant higher difference than YSC, as the p-value is less than our Type I error of 0.05.

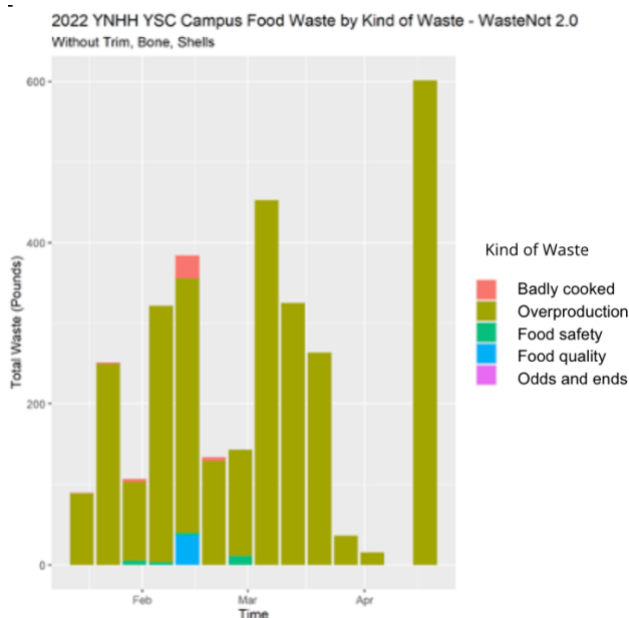


Figure 1 Food waste by type in YNH YSC (Waste Not 2.0)

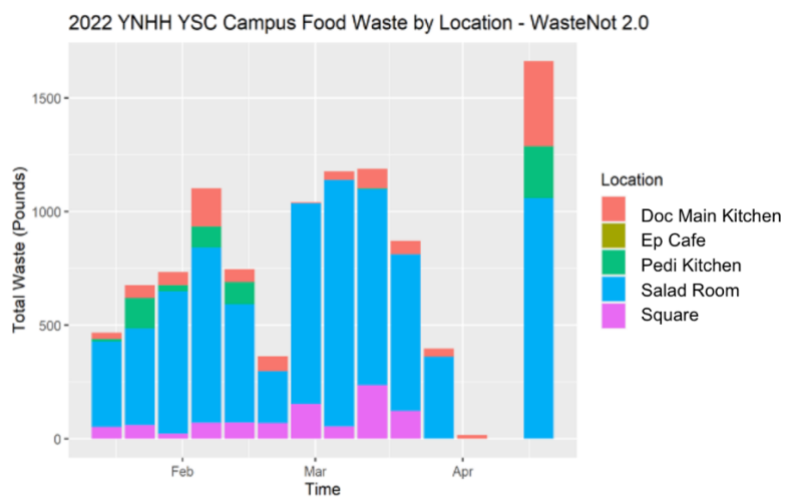


Figure 2: Food waste by location in YNH YSC (Waste Not 2.0)

Recommendations

- **Provide multiple portion sizes:** Patients can choose from different portion sizes based on their personal preferences.
- **Improve Waste Not system:** Improve the accuracy of data records, and add a more detailed division of food waste categories. This would allow more accurate review of timing and sources of food waste, and thus a more tailored approach to food waste reduction.
- **Use alternative easy-to-store food:** Consider reducing use of more highly perishable salad items, and focusing on fresh items that are more stable.
- **Routinize setting food waste goals and reviewing food waste data:** Refine food prediction by regularly recording waste data and scheduling regular (monthly) analysis/reflection discussions that include the full team and identify strengths and accomplishments in achieving food waste reduction goals.

Limitations

- Difficult to compare YSC and SRC directly. Due to time constraints we were not able to interview the staff working the same functions for both hospitals, and we interviewed staff working on different positions in food services in different hospitals.
- Interviews should be conducted with staff from different levels or working in different functions, which means to include food service staff from the basic steps to the provision ready steps in the whole food service process.
- This study was not able to collect waste data from other hospitals, which means that the research scale was limited to YNH itself. Knowing at least other hospitals' infrastructure of food services and approximate consumer size, which means patients and staff, would help YNH realize the gaps between other hospitals.

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