

Evaluation of Plate Wastage at Epworth Richmond

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Research

Introduction

Plate waste refers to uneaten, edible food left on meal trays served to patients and higher levels have been associated with reduced patient satisfaction, increased malnutrition risk and related complications as well as significant financial and environmental burden.^(1, 2) Waste is highly prevalent throughout the healthcare system⁽²⁾ and one New Zealand study reported that food services represent one of the highest sources of all hospital waste with 50% contributed by plate waste alone.⁽²⁾

A 2017 audit estimated the malnutrition prevalence rate at Epworth Healthcare at 16%. Malnutrition among hospital inpatients is commonly associated with increased risk of adverse health outcomes including reduced quality of life, increased morbidity and mortality, prolonged length of stay, higher re-admission rates and increased health care costs.⁽³⁻⁵⁾ A hospital's food service department therefore provides a valuable opportunity to improve patient satisfaction, nutritional intake, malnutrition risk and clinical outcomes.^(1, 6)

Although quality care within hospitals increasingly focuses on enhancing patient satisfaction while supporting positive clinical outcomes, this must be achieved while adhering to budgetary limitations.⁽⁶⁾

Accordingly, reduced hospital plate waste serves as an important and useful indicator of improved patient satisfaction and nutritional intake, more sustainable practice and reduced financial burden.⁽⁶⁾

In 2018, Mater Private Hospital in Brisbane reported an average estimated plate waste of 12%. This was a significant reduction from their previous 29% estimated plate wastage, following the implementation of a room service style plated meal delivery system. The reduced wastage was also associated with improved patient satisfaction and nutritional intake. Epworth Richmond implemented a similar room service style meal delivery system in 2017. Plate wastage has not been evaluated since this system change.

Aims

- Assess the current level of plate waste at Epworth Hospital Richmond, using visual estimation and interviews of key stakeholders.
- Explore factors that may contribute to plate wastage, such as individual menu categories or items, patient satisfaction, age, gender, diet code or ward.
- Provide recommended strategies to minimise waste, enhance patient satisfaction and nutritional intake while reducing costs.

Methodology

Data collection was conducted over 10 days, including analysis of tray waste and patient, dietitian, menu monitor and ward host interviews.

Plate waste data was collected using a visual measurement technique as this was deemed via literature review to be the most cost-effective and time-efficient methodology which posed minimal interruptions to ward hosts delivering meals and patients.⁽⁷⁻¹¹⁾ Photographs of patient's meals trays were analysed manually to discern percentage of food waste per item and a comprehensive 7-point (validated) scale was selected to analyse the plate waste on 402 meal trays.⁽¹⁾ The 7-point scale required classifying each item as either: 100%, 95%, 75%, 50%, 25%, 5% or 0% wasted.

Informal, semi-structured interviews were conducted with patients, dietitians, and menu monitors to collect qualitative data on factors contributing to plate waste. One menu monitor and six dietitians were interviewed to obtain the views of hospital staff. Questions related to meal quality, likely causes of plate waste, and suggested improvements to reduce waste.

To ascertain patient satisfaction and reasons for food waste, 49 patients were interviewed using a simple 13-question survey.

References

1. Schiavone S, Pelullo C, Attena F. Patient Evaluation of Food Waste in Three Hospitals in Southern Italy. *International Journal of Environmental Research and Public Health*. 2019;16(22):4330.
2. Williams P, Walton K. Plate waste in hospitals and strategies for change. *e-SPEN, the European e-Journal of Clinical Nutrition and Metabolism*. 2011;6(8):e235-e241.
3. Goonan S, Mirza M & Spence H 2014. Getting a Taste for Food Waste: A Mixed Methods Ethnographic Study into Hospital Food Waste before Patient Consumption Conducted at Three New Zealand Foodservice Facilities. *Journal of The Academy of Nutrition and Dietetics*, Vol. 14, No. 1 pp. 63-70.
4. Kagei-Braun N, Mueller M, Schuetz P, Mueller B, Kutz A. Evaluation of Nutritional Support and In-Hospital Mortality in Patients With Malnutrition. *JAMA Network Open*. 2021;4(1):e2033433-e.
5. Alton L, Green M, Versace V, A. Bolton K, Widdicombe K, Bucher A et al. Profiling Malnutrition Prevalence among Australian Rural In-Patients Using a Retrospective Census of Electronic Medical Files over a 12-Month Period. *International Journal of Environmental Research and Public Health*. 2020;17(16):5909.
6. Gsemirne P, De Wilt E, Burtin C, Valcke Y. Higher food intake and appreciation with a new food delivery system in a Belgian hospital. Meals on Wheels: a bedside meal approach. *Appetite*. 2012;59(1):108-116.
7. Mackenzie-Shaidens K, Maundier K, So D, Norris R, McCray S. Impact of electronic bedside meal ordering systems on dietary intake, patient satisfaction, plate waste and costs: A systematic literature review. *Nutrition & Dietetics*. 2020;77(1):103-111.
8. Hunka A, Wenzel B, Just D. Reliability and Accuracy of Real-Time Visualization Techniques for Measuring School Cafeteria Tray Waste: Validating the Quarter-Waste Method. *SSRN Electronic Journal*. 2015;114(3):470-474.
9. Giboreau A, Schwartz C, Morzel D, Meiselman H. Measuring Food Waste and Consumption by Children Using Photography. *Nutrients*. 2019;11(10):2410.
10. Winger, E., Luger, M. & Schindler, K. Using digital photography in a clinical setting: a valid, accurate, and applicable method to assess food intake. *Eur J Clin Nutr* 72, 879–887 (2018). <https://doi.org/10.1038/s41430-018-0120-x>
11. Buzby J, Guthrie J. Plate Waste in School Nutrition Programs: Final Report to Congress. *Food Assistance & Nutrition Research Program*. 2002;2(009):20.

Results

Plate Wastage

- 402 patient trays were analysed on 11 wards (55% of in-patients captured, n=736).
- Mean overall Plate wastage was 23% per tray and 20% of all trays had $\geq 50\%$ food wastage.
- Wastage varied by menu category from 14% of desserts, 16% of soups and sandwiches, 31% of main meals and 46% of light alternatives (which includes main salads and items such as party pies and chips).

Portion Sizes

Table 1 shows menu items that were associated with significant plate wastage but also stood out as items that could have portion sizes reduced to limit future waste. Roasts were served with two large slice of meat with at least half of this serve wasted on more than 50% of plates. Chips and rice were observed to be similar in size to the main meal they were accompanying and were often left uneaten.

Table 1. Menu items suggested for portion reduction

Menu Item	Orders Analysed, n (%)	Item $\geq 50\%$ Wasted, n (%)	Average Waste, %
Roasts	14 (3)	8 (57)	46
Club Sandwich	7 (2)	4 (57)	36
Chips	27 (7)	11 (41)	33
Rice	13 (3)	7 (54)	49



Images A: Steak sandwich with large serve of chips, B: Chicken Korma with a large portion of rice, potatoes and egg, C: Beef stirfry with 50% wastage.

Influence of patient demographics on plate wastage

- Age: Patients aged 70+ left more waste than patients aged 18-69: 7% more overall (P=0.015) and 11% more at breakfast (P=0.021)
- Gender: Females left 6% more waste than males on average, per tray (P=0.028). Females: mean waste =26%, SD =33%; n=184. Males: mean waste =20%, SD =28%; n=218.
- Diet Code: Texture Modified diets were associated with higher waste than Regular (P=<0.001) and Therapeutic diets (P=<0.001). Texture Modified diets: mean waste =42%. Therapeutic diets (i.e., GI light, Free Fluids): mean waste =18%. Regular Diets (i.e., Cardiac, Diabetic, Regular): mean waste =22%
- Wards: Wards with the highest plate waste were oncology (32%), Gastroenterology (31%) and General medicine (30%), while the lowest plate wastage was observed on the Urology and Gynaecology (11%), Neurology and Orthopaedic (12%) wards.

Patient interviews regarding reasons for wastage and overall meal ratings

The key themes of resulting feedback from 49 patient interviews is summarized in Table 2.

Table 2. Patient identified reasons for plate wastage and overall food rating

Reasons for Plate Waste from Patients	Reasons for Overall Food Rating from Patients
49% had food and/or menu issues	62% of patients linked lower rating to food and menu issues, such as disliked items and large portions.
40% stated clinical conditions or dietary limitations	37% of patients had positive feedback regarding their food and meal experiences.
27% stated portions were too large	27% of patients linked lower rating to clinical condition, such as loss of appetite.
-22% reported loss of appetite	9% of patients reported service issues
16% felt unwell	3% of patients reported environmental issues

Recommendations for meal management system and menu alteration

Suggestions provided to Epworth Richmond foodservice management:

1. Ward host nutritional training and implementation of standardised meal delivery practices.
2. Provide pictures and clear descriptions of meal items on ordering screens for patients.
3. Offer small portions for main meals and starchy sides (mashed potato, chips, rice) and standardised portions for all menu items.
4. Remove starchy sides from main meals and allow patients to order additionally, if desired.
5. Review the "Light Alternatives" section of the menu based on patient feedback and guidance from dietitians.
6. Ongoing menu improvement based on patient feedback to be collected every three to six months.

Conclusions

Food waste is a multi-faceted issue, where reaching zero is an unrealistic achievement. While plate waste is an issue in the hospital setting, the emphasis should be placed on patients receiving adequate nutrition. From this study, it was evident that a variety of factors contribute to plate waste such as clinical condition, age, gender, and diet code.

The transition to a cooked to order, room service food system has been shown to improve patient satisfaction and nutritional intake along with reducing overall plate waste. The room service system has only been implemented for five years at Epworth Richmond and this plate waste audit was the first of its kind. Disappointingly the findings illustrate that plate wastage continues to greatly exceed that achieved at Mater Private Hospital (23% vs 12% at Epworth). Additionally, this study highlights further areas of improvement. Options for smaller and standardised portion sizes; clearer menu descriptions; improved food service staff training; and menu alterations, all have a role to play in reducing financial and food waste.

Implementing a system for regular feedback from patients focused solely on food service will provide an on-going source of information to drive further improvements in the system. This, combined with previously mentioned recommendations will place Epworth Richmond at the forefront of patient centered care in Australia.