Food Waste Recycling, Gloucestershire Managed Services Team

TEAM MEMBERS:

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Background:

The UK produced around 9.5 million tonnes of food waste in 2018[1]**.** Food waste has a cascading environmental impact by increasing the amount of food grown or raised, increase in transport emissions to deliver food to hospitals, and increase in methane and carbon dioxide from disposing of uneaten food on landfill.

Unserved food and plate waste (the remaining uneaten food served to patients), is considered food waste in our hospitals, Gloucestershire Royal Hospital and Cheltenham General Hospital. Our team consists of Gloucestershire Managed Services (GMS) employees from three different departments: Catering, Waste Management and CGH Portering Services.

We are all passionate about the idea of food waste recycling having witnessed the vast amount of food reaching our waste compound daily. Our hospital sites previously wasted 20% of patient meals, equating to approximately 600 meals and £1900 a week across 18 wards. The catering department has worked hard to reduce this. In the past 12 months, we have introduced a range of initiatives such as bespoke portion sizes for patients on wards. By addressing knowledge gaps across the organisation and engaging both clinical and non-clinical staff, and making some system changes, our food waste from wards was successfully reduced to 8%, saving thousands of pounds and carbon emissions each year.

However, it is impossible to eliminate food waste entirely. Therefore, our current project has investigated how to minimise the impact of the remaining 8% of food waste. Our combined knowledge and experience in managing food waste across departments, from the kitchen, to serving on the wards, to disposal at the waste compound, make us a suitable team to target this problem. Food waste recycling, if done so responsibly, can convert waste into fertilisers for agriculture, promoting healthy soil. The gasses from decaying food that would release methane can also be collected and converted into natural energy forms. Sadly, food accounts for around 25% of the greenhouse emissions released into the atmosphere.

Specific Aims:

1) To study the current food waste disposal system, and identify what changes are needed in preparation for food waste recycling
2) To measure prospective savings from implementation of food waste recycling

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Methods:

As a team we focused on our Cheltenham site. We have held and will continue to hold regular meetings to continue to progress the project.

We decided to focus on patient meals that were left untouched and therefore wasted, as we believed that this stream alone contributes a large proportion of our ongoing food waste. Meals may be untouched following delivery to patients with reduced/no appetite, patients fasting, delays in patients arriving on the ward, or patients discharging before their pre ordered meal arrived.

We reviewed our current processes. Currently, all food waste from food delivered to wards is disposed of from individual wards. This waste is incinerated at a local municipal energy from waste plant (Javelin Park).

We organised a waste food weighing process to gain accurate measurement of the volume of food wasted, broken down by food type. We procured a food weighing scale and provided training to Catering Supervisors and Catering Assistants on how the scale operated and when to weigh the food waste, and how to record the data accurately for each service. We selected Tivoli Ward as a trial site for this process as the ward has recently been renovated and is well organised.

We discussed as a team how our current food waste disposal system would need to change to accommodate recycling. This including several logistical considerations to move food waste from ward level to the waste compound, and space for storage. Our recycling process is as followed

- Food waste would go into biodegradable bags to be weighed
- A food caddy will be placed in each wards designated waste sluice.
- Ward staff will place food waste into the caddys after each mealtime (3 times daily).
- Food caddys will be collected by portering services after each mealtime (3 times daily) and placed in a designated food waste bin in the hospital waste compound. This bin will be supplied by the food waste recycling company. The food waste recycling company will collect food waste 3 times per week, on a Monday, Wednesday, and Friday, bin quantity can be increased at any time, this will accommodate all the food waste that arrives in the compound. The bins should be clean and fresh after collection (most companies replace old for new), and therefore we should never have rodent/wasp issues.
- We have storage space in the compound for all the bins we would use.

Trial implementation

The Trust will be running a pilot scheme for recycling with The Green Block and this will include a trial of food waste recycling. This is scheduled to commence in the new year (2023). Food waste will be taken for anaerobic digestion.

Measurement:

Patient outcomes: Our project will not impact on patient care and clinical outcomes.

Environmental sustainability:

We recorded the weight and type of patient meals that were left untouched for two weeks on Tivoli ward. This measurement includes servings of main meals, sides (vegetables, rice) and dessert.

We used existing data from September-October 2022 to calculate the weight of food wasted from uneaten meals across the remaining 11 wards. We used this data on units/portions and weight of patient meals wasted to extrapolate potential annual savings across Cheltenham hospital. The data available captures weight and number of main meals wasted but does not include sides and desserts.

A combination of weight and financial cost were used to generate potential carbon (CO2e) savings.

We used emissions factors in waste to energy incineration (0.172/kg) from Rizan et al 2021[2] and Anaerobic Digestion (0.0089/kg) form the UK Government Database[3] to calculate the CO2e saving that would be made from redirecting food waste to recycling.

Economic sustainability:

The cost of foods wasted were obtained from our catering department.
The cost of our current waste disposal was obtained from the Trust waste team.

There is currently no quote available from Green Block. We obtained a range of supplier quotes and took an average of these to look at potential savings from implementing a recycling service.

Social sustainability:

The impact of food waste recycling was qualitatively assessed through conversations with staff and patients.

Results:

Patient outcomes:

There will be no negative impacts on patient care.

Environmental sustainability:

Our Tivoli ward audit found 36.78kg (172 units) were wasted from uneaten meals in two weeks. Using the lower recorded weekly weight (17.03kg) as an estimate, this gives us a prospective annual total of 817.6kg of food (4,128 units) wasted in Tivoli ward alone.

According to our existing data across 8 weeks (September-October 2022), 244.24kg of uneaten meals were wasted on all the remaining hospital wards, this gives us a prospective annual total of 1587.56kg of food wasted.

From redirecting 2,405.16kg of uneaten meals from energy from waste to anaerobic digestion, we anticipate an annual carbon reduction of 393.23 kgCO2e per year. **This is equivalent to driving 1,132.6 miles in an average car.**

Economic sustainability:

Cost of waste to energy disposal:

- Current cost = £14.91 per 0.15 tonnes

- Current waste = 2.4763 tonnes

Cost of disposal = £246.14 / year

Cost of recycling via anaerobic digestion

- £10.50 per 240 litre bin (0.15 tonne per bin)
- Current cost = £10.50 per 0.15 tonnes
- Current waste = 2.4763 tonnes

Cost of disposal = £173.34 /year

This cost example shows that per tonne, Anaerobic Digestion recycling is cheaper, with an estimated annual saving of **£72.80.**

Social sustainability:

We asked patients and staff members their thoughts on the Trust establishing food waste recycling, with quotes below showing overall feedback is positive;

> *"I think the recycling of the hospital food waste is an excellent idea, it will reduce the hospitals carbon footprint and make everyone involved more aware of what they are throwing away"*
>
> Maria Paterson, Nurse
>
> *"I am surprised that it is not been done already, normal households have been recycling their food waste for years now, it is beneficial for the environment and it would show the NHS cares".* - Patient
>
> "*Good idea, it is what is needed and will make a difference, considering the amount of food waste that the hospital produces, it is great that the staff are so committed in making this change*". - Derek Gess, Medical Engineering
>
> *"Everyone should recycle, be it food, cardboard, plastic, or anything recyclable, it is all about sustainability, about our environment, the food waste recycling project is a must, I will make sure I finish eating all my hospital meals from today, I promise".* - Patient

Discussion:

Our project has identified approximately 2.4 tonnes of food waste annually from uneaten meals delivered to wards alone. This has not included a large percentage of sides and deserts, plate waste, cold food available on the wards (e.g., sandwiches) or retail waste from the hospital cafeterias. These waste streams were not measured due to the limited time scale for the project. Therefore, our current projected savings of food waste recycling are significantly underestimated.

Removing food waste from other waste streams will enable better recycling as food waste will not contaminate other materials – instead these will be clean and dry to be easier segregated, baled and sent for recycling. This will then help increase our more general recycling rates and reduce the volume of black bag waste which is currently sent to a waste-to-energy plant. NHS Estates[4] project that waste volume needs to halve by 2025 if trusts are to reach net zero by 2040 and therefore recycling of food waste is an essential step to take.

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In additional to food waste recycling, we have future plans to continue to reduce food waste int he first place, targeting the cafeterias, by offering cooked meals at a reduced price towards the end of serving times. This will reduce waste while benefitting staff at the same time.

Conclusions:

We are a dedicated and passionate team who are always in the process of thinking of new ideas to reduce food waste under the guidance of our Waste and Catering Management. One larger project currently underway is targeting our patient ordering system. Currently, patients order meals the night before the next day's meals. We have plans for an electronic meal ordering system, with the aim of reducing patient food waste down further to under 5% by allowing patients to order meals on the day (lunch in the morning and dinner in the afternoon). This will further reduce waste as patients are more likely to receive a meal they prefer at the time as well as reduce meals sent in patient's absence for reasons such as discharges, operations and ward moves.

The Trust's Green Plan[5] includes an aim to recycle 100% of our food waste by 2025. So, collecting food waste from ward kitchens in Cheltenham General is just the beginning of a larger project. It will extend to cover patient meal services at Gloucestershire Royal, all the retail outlets on both main sites and include food waste from kitchens and beverage bays used by staff across the whole trust.

References:

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3. Government emission conversion factors for greenhouse gas company reporting 2022 Government conversion factors for company reporting of greenhouse gas emissions - GOV.UK (www.gov.uk)
4. NHS Estates. Estates 'Net Zero' Carbon Delivery Plan 2022 https://www.england.nhs.uk/greenernhs/publication/delivering-a-net-zero-national-health-service/
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