



Contents lists available at ScienceDirect

## Waste Management

journal homepage: [www.elsevier.com/locate/wasman](http://www.elsevier.com/locate/wasman)

## Backcasting to identify food waste prevention and mitigation opportunities for infant feeding in maternity services

Yvonne Ryan-Fogarty<sup>a,\*</sup>, Genevieve Becker<sup>b</sup>, Richard Moles<sup>a</sup>, Bernadette O'Regan<sup>a</sup>

<sup>a</sup> Department of Chemical Sciences, University of Limerick, V94 T9PX, Ireland

<sup>b</sup> BEST Services, Galway H91T22T, Ireland

### ARTICLE INFO

#### Article history:

Received 5 May 2016

Revised 25 November 2016

Accepted 17 December 2016

Available online xxxxx

#### Keywords:

Backcasting

Food waste

Waste prevention

Green healthcare

Waste hierarchy

### ABSTRACT

Food waste in hospitals is of major concern for two reasons: one, healthcare needs to move toward preventative and demand led models for sustainability and two, food system sustainability needs to seek preventative measures such as diet adaptation and waste prevention. The impact of breast-milk substitute use on health services are well established in literature in terms of healthcare implications, cost and resourcing, however as a food demand and waste management issue little has been published to date. This paper presents the use of a desk based backcasting method to analyse food waste prevention, mitigation and management options within the Irish Maternity Service. Best practice in healthcare provision and waste management regulations are used to frame solutions. Strategic problem orientation revealed that 61% of the volume of ready to use breast-milk substitutes purchased by maternity services remains unconsumed and ends up as waste. Thirteen viable strategies to prevent and manage this waste were identified. Significant opportunities exist to prevent waste and also decrease food demand leading to both positive health and environmental outcomes. Backcasting methods display great promise in delivering food waste management strategies in healthcare settings, especially where evidenced best practice policies exist to inform solution forming processes. In terms of food waste prevention and management, difficulties arise in distinguishing between demand reduction, waste prevention and waste reduction measures under the current Waste Management Hierarchy definitions. Ultimately demand reduction at source requires prioritisation, a strategy which is complimentary to health policy on infant feeding.

© 2016 Elsevier Ltd. All rights reserved.

### 1. Introduction

Food waste is of major concern especially in healthcare systems and has been the subject of many investigative research studies (Abd El-Salam, 2010; Barton et al., 2000; Halloran et al., 2014; Sonnino and McWilliam, 2011; Williams and Walton, 2011). Williams and Walton (2011) summarised results from 32 hospital studies which suggest a median food wastage rate of 30% by mass with ranges varying between 6% and 65%. Various authors have argued that healthcare needs to shift to preventative and more demand led measures both in terms of demand for healthcare but also in demand of materials and energy required to deliver universal healthcare systems, in order to move toward sustainability (McGain and Naylor, 2014; NHS England, 2014; Ryan-Fogarty et al., 2016; Watts et al., 2015).

To date research regarding the environmental impact of food has tended to focus on production and supply chain waste alleviation rather than addressing consumption and demand factors, which are more challenging in their identification and mitigation (Bajzelj et al., 2014). As humanity begins to focus on the effects of climate change and adaptation to decreased availability of agricultural land attention has shifted to seeking optimal sources of nutrition, particularly protein sources for human consumption. Consensus is growing that in order to effectively curtail environmental impact and provide food security, society needs to address the significant impacts exerted through the cultivation, production, processing and transportation of food, but crucially overall food demand needs to decrease through diet adaptation and food waste reduction (Bajzelj et al., 2014; Garnett, 2011; González et al., 2011; Wirsenius et al., 2010).

In hospital settings infant feeding actions have direct environmental impacts in terms of transport, materials used, unconsumed breast-milk substitute, bottles, teats, packaging, leaflets and product information plus the costs of storage and obsolescence (American Academy of Pediatrics, 2012). Published works have

\* Corresponding author.

E-mail addresses: [yvonne.ryan@ul.ie](mailto:yvonne.ryan@ul.ie) (Y. Ryan-Fogarty), [gbecker@bestservices.ie](mailto:gbecker@bestservices.ie) (G. Becker), [Richard.moles@ul.ie](mailto:Richard.moles@ul.ie) (R. Moles), [Bernadette.oregan@ul.ie](mailto:Bernadette.oregan@ul.ie) (B. O'Regan).

attempted some quantification of the costs to health services of purchasing breast-milk substitutes, and costs of exclusive artificial feeding in terms of health impacts (Pokhrel et al., 2014; Renfrew et al., 2012; UNICEF UK, 2012). Some recent publications have questioned trends in infant feeding practices and their impact on food security, women's health, consumption patterns and ethical considerations (Becker and Ryan-Fogarty, 2016; Cassidy, 2012; Ryan et al., 2013; Salmon, 2015; UNICEF UK, 2015). However available data suggest that the impact of breast-milk substitute food and associated wastes have not been formally quantified nor have measures been taken to mitigate impacts.

### 1.1. The Irish context

Ireland's Food Waste Regulations (Waste Management (Food Waste) Regulations 2009, 2010) list 11 classes of commercial or other activities that require source segregation and treatment at authorised food waste treatment plants. A number of provisions in the legislation ensure that food waste is consigned for recycling and not disposal via sewage systems, for example, the use of in-sink macerators is prohibited by the Food Waste Regulations where a food waste collection service is available, even if a discharge licence allowing food effluent to sewer has been issued. This provision strives to ensure that all food waste is recycled (Department of Environment, Heritage and Local Government, 2010). Yet it was estimated that on a daily basis up to 36 tonnes of waste food from catering operations enter the Irish drainage system through the use of macerators leading to blockages and reduced effectiveness of grease traps and leading to flooding and increased pressure on wastewater treatment plants (Creedon et al., 2010). Studies of acute hospitals conducted by the Irish Environmental Protection Agency found that approximately 0.73 kg of food waste is generated per in-patient bed day (Environmental Protection Agency, 2013). However, akin to other studies (Costello et al., 2015), accounting for liquid foodstuffs such as fresh milk, breast-milk substitutes and fruit juices that can be poured down drains or soaked into other foods presents a significant challenge. Waste milk and breast-milk substitutes have high biological oxygen demand, are sources of nitrogen and phosphorus pollution and may cause operational issues especially to on-site waste water treatment plants where dilution factors may be lower.

Maternity services (both public and private) are offered through the Irish public hospital system managed by the Health Service Executive (HSE). Ireland has 5 maternity hospitals and a further 14 general hospitals have maternity units or wards, plus infants in paediatric hospitals and wards. Of these 19 maternity service providers, 9 hold Baby Friendly Hospital Designation, and all others are registered as participating in the initiative. The *Baby Friendly Health Initiative* (BFHI) was established in 1991 by UNICEF and WHO. Among the requirements for designation, BFHI designated hospitals are required to abide by the *International Code on Marketing of Breast Milk Substitutes* and subsequent World Health Assembly resolutions (World Health Organization, 2015). Practices of the BFHI and of the International Code are reflected in the *HSE National Infant Feeding Policy for Maternity and Neonatal Units* (Health Service Executive, 2015). This policy reflects expected national practice: however, these practices may not be reflected in their entirety in every maternity unit.

### 1.2. The role of backcasting

Systemic changes and transitions are required in order to achieve sustainability. Backcasting has been proposed as a means to achieve integrated approaches to combine:

- involvement of a range of stakeholders,

- incorporation of economic and social components in tandem with environmental components of sustainability,
- consideration of demand and supply chains as interconnected production and consumption systems (Quist et al. 2002 cited in Quist and Vergragt, 2006).

Backcasting is an approach in which desirable, sustainable, future visions or “normative scenarios” are created, followed by an analysis of how to achieve these, as a foundation for describing strategies and follow up activities to attain desirable futures (Alcamo and Henrichs, 2008; Holmberg and Robert, 2000; Jansen, 2003; Quist and Vergragt, 2006). Scenarios may provide interdisciplinary frameworks in which solutions can be envisioned for complex environmental problems, raise awareness, communicate complex information, facilitate policymakers in engagement with stakeholders and provide assistance in thinking big about an environmental issue (Alcamo, 2008). The complexity of future uncertainties and “inherent ambiguity” of the different values and mental frameworks of stakeholders makes grasping the knowledge of what transitions are required difficult, and there exists a wide variety and diversity in approaches, topics, systems and scales (Quist and Vergragt, 2006; Vergragt and Quist, 2011).

As an iterative and reflexive method, it has been argued that backcasting does not propose a finalised version of the future, instead it assumes that vision and pathway developments employ higher learning processes and that participants learn about desired futures, barriers, contradictions, change agents, incentives and improvements to the future vision (Vergragt and Quist, 2011). The European Commission has developed dedicated resources to assist foresight practitioners, *FOR-LEARN* aims to consolidate and improve access to foresight knowledge including backcasting methods (European Commission Joint Research Centre, 2007).

### 1.3. Objectives of paper

The overall goal of this paper is to evaluate the use of backcasting as a tool for mitigation of Ready to Use (RTU) breast-milk substitute food waste in the Irish Maternity Service through:

- Identification of sources of waste RTU breast-milk substitutes within the Irish Maternity Service.
- Theoretical quantification of RTU breast-milk substitutes procured and volumes of liquid waste arising.
- Evaluation of solutions to prevent and mitigate this waste in accordance with international best practice in waste management, World Health Organization and Baby Friendly Hospital Initiative policies.

## 2. Methods

The Irish healthcare system, HSE, offers an informative case study as in recent years it has developed sustainability aims and has undertaken extensive waste prevention measures especially with respect to food waste under the Irish Environmental Protection Agency (EPA) Green Healthcare Programme (Environmental Protection Agency, 2014; Ryan-Fogarty et al., 2016). The Maternity Service, through established environmental and health initiative programmes, can provide a test bed for innovative solutions and can therefore be used to identify methods and strategies that have potential for application in other jurisdictions.

This paper utilises backcasting methods as outlined in *FOR-LEARN Backcasting Online Foresight Guide* (European Commission Joint Research Centre, 2007) to develop normative scenarios for breast-milk substitute food waste management. The backcasting method employed is depicted in Fig. 1.

Download English Version:

<https://daneshyari.com/en/article/5756977>

Download Persian Version:

<https://daneshyari.com/article/5756977>

[Daneshyari.com](https://daneshyari.com)