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TITLE: FOOD PRODUCTION AND SERVICE IN UK HOSPITALS.

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ABSTRACT

Purpose – The purpose of this paper is to apply value stream mapping holistically to hospital food production/service systems focused on high-quality food.

Design/methodology/approach – Multiple embedded case study of three (two private-sector and one public-sector) hospitals in the UK.

Findings – The results indicated various issues affecting hospital food production including: the menu and nutritional considerations; food procurement; food production; foodservice; patient perceptions/expectations.

Research limitations/implications – Value stream mapping is a new approach for food production systems in UK hospitals whether private or public hospitals.

Practical implications – The paper identifies opportunities for enhancing hospital food production systems.

Originality/value – The paper provides a theoretical basis for process enhancement of hospital food production and the provision of high-quality hospital food.

INTRODUCTION

Despite being crucial to patient recovery and wellbeing (Wilson et al., 1997; Johns et al., 2010), hospital food is a complicated issue in the hospitality sector (Hartwell and Edwards, 2001), requiring cooperation between different hospital management levels (Hartwell et al., 2006). Hospital food and beverage provision is a popular research topic (Lee-Ross, 2002). Since the early 1980s, the National Health Service (NHS) has improved catering provision in hospitals and developed nutritionally appropriate menus for patients (Hwang et al., 1999; Paisley and Tudor-Smith, 2001). However, hospital food is often negatively perceived as: cold; tasteless; poorly presented and badly served (Hartwell et al., 2006). Kim et al. (2010) explained that improving hospital foodservice quality is challenging, requiring process flow to be understood from start to finish. Currently, there is increased competition in the healthcare industry – patients have better knowledge to help them understand foodservice quality (Kim et al., 2010). Consequently, we apply value stream mapping to food production/service in UK private and public-sector hospitals focusing on key inputs from food procurement, processes underpinning food production/service and outputs to patients. Hospital food production/service systems

Food procurement

Hospital foodservices have distinct steps: inputs; processes and outputs (Sullivan and Atlas, 1998; Puckett, 2004; Kim et al., 2010). Procurement, a vital first step in foodservice systems (Spears and Gregoire, 2004), organises and develops efforts between hospitals and external resources (Stefanelli, 1997). It is an important step in the value stream for hospital food production that selects ingredients meeting the required standard (Payne-Palacio and Theis, 2009). Procurement is a major focus for healthcare managers attempting to reduce food costs and provide high-quality food (Callender and Grasman, 2010). Procurement affects: food production/service; patient satisfaction and hospital profitability (Puckett, 2004; Spears and Gregoire, 2004). The menu and food production system (cook-

serve/cook-chill/cook-freeze) determine the food procurement process specifications (Knowles, 1998). Stefanelli (1997) and Davis et al. (2008) reported that numerous activities comprise procurement.

Raw material specification.

Chon and Sparrowe (2000) show that after menu design, specifications are developed to identify raw materials and select suppliers. Sullivan and Atlas (1998) pointed out that specifications are the heart of procurement process and should be simple and clear.

Supplier selection.

Good relationships with good suppliers provide hospitals with high-quality raw materials (Stefanelli, 1997; Puckett, 2004; Spears and Gregoire, 2004) and several points need consideration in supplier selection: quality; reputation; availability; price; discount; location and facilities (Cousins et al., 2011).

Purchasing.

Purchasing is critical to ensuring successful food and beverage operations and directly affects food quality and ultimately patient satisfaction, and hospital food costs (Payne-Palacio and Theis, 2009; Spears and Gregoire, 2004; Sonnino and McWilliam, 2011). However, if managed correctly, purchasing can become a hospital profit centre (Powers, 1995), but some studies report public hospital purchasing as problematic – it is complex and needs improvement (Humphreys et al., 1998; Payne-Palacio and Theis 2009; Hui et al., 2011).

Receiving.

Receiving is not generally considered in food procurement (Spears and Gregoire, 2004) although many food quality problems are caused by breakdowns in receiving food – influencing food costs and the

patient food quality (Puckett, 2004). Food materials are checked for quality, quantity, price and entered into daily records (Knowles, 1998).

Storage and issuing.

Once received, food is either transferred to the kitchen or into storage (Spears and Gregoire, 2004). Stefanelli (1997) emphasised that food should be stored appropriately in refrigerators, freezers or dry storage. Issuing releases food from storage into different areas – kitchen areas and foodservice outlets (Puckett, 2004) and may be: first-in-first-out (FIFO) referring to using oldest stock first, which ensures stock rotation; last-in-first-out using the food delivered last first (Puckett, 2004; Payne-Palacio and Theis, 2009).

Food production

Spears and Gregoire (2004) explained that food production involves preparing and cooking the right food quantity and quality. Hospital managers face formidable challenges in improving food operations, including: money; staff skills and training (Puckett, 2004; Johnston and Clark, 2005). However, Cousins et al. (2011) highlighted that in many healthcare organisations, recruiting skilled and experienced staff and training them has improved food production. Food production is complex (Hwang and Sneed, 2009), several factors influence cooking methods, including: menu; kitchen space; equipment; employee skills and meal delivery (Nettles et al., 1997; Rodgers, 2005). Assaf et al. (2008) confirmed that food production affects patient satisfaction and hospital costs. Various food production systems (Table I) are used in hospitals and other UK food operations (Payne-Palacio and Theis, 2009). Nettles et al. (1997) and Rodgers (2005) reported that selecting a cooking method is complex, issues include: hospital size; menu operation costs; facility construction; quality and staffing.

Standard recipes/portion size.

Standard recipes/portion size play key roles in controlling cooking processes and costs and provide information about the product, such as: ingredients; quantities/quality required; portion sizes (Shiring et al., 2001). To this list Sullivan and Atlas (1998), Hwang et al. (1999) and Assaf et al. (2008) added: standardised cooking methods; recipes; portion sizes. Davis et al. (2008) explained that portion size is important in menu pricing and controlling food waste; i.e., patients should order their food before it is served.

Time buffers.

Time buffers create time between food production and service, and can reduce labour costs (Creed, 2001; Rodgers, 2005). They offer advantages for foodservice operations (reducing: energy and equipment costs; staff skills and extra work) and customers (variety, food available and quality standards), but affect work flow (Creed, 2001).

Foodservice

Patient orders.

Patient orders are critical to improving hospital foodservice and patient satisfaction (Johns et al., 2010). Protected mealtimes ensure patients are not disturbed while eating and reduce malnutrition and food wastage (Dickinson et al., 2005; Naithani et al., 2008). Edwards et al. (2000) identified many obstacles, such as: language; eyesight problems and physical disability. According to Naithani et al. (2008), hostesses may help patients overcome such problems by helping them to select meals.

Service types.

Service types can be plated or trolley systems depending on where food is prepared (Hartwell et al., 2007). In plated service, food is served onto plates in kitchens and transferred to the ward on trays (Mavrommatis et al., 2011). In trolley service, food is prepared and sent to the ward hot or cold on a trolley and plated there (Hwang et al., 1999; Payne-Palacio and Theis, 2009).

Hospital menus.

Hospital menus are management and communication tools between food production/service staff and patients; they: affect patient satisfaction (Hwang et al., 1999; Hartwell et al., 2006; Johns et al., 2010); control food production and service processes and process flow from start to finish (Cousins et al., 2011); assist managers with procurement (specification, supplier selection, purchasing, receiving, storage), production (cooking methods, standard recipes, kitchen space, equipment, staffing) (Edwards et al., 2000) and service processes (portion size, patient order, service methods), which determine the relationship between catering staff and patients (Hartwell and Edwards, 2001; Cousins et al., 2011).

Nutritional considerations.

Allison (2003) pointed out that malnutrition is a big problem in hospitals and affects patient satisfaction, stay and hospital costs. Many issues affect patients including: food taste and temperature, meal presentation, medical treatment, staff attitudes to patients (Hartwell and Edwards, 2001; Mavrommatis et al., 2011; Goeminne et al., 2012).

Output to patient

Meal quality and patient satisfaction are important hospital food production outcomes (Sahin et al., 2006). Lau and Gregoire (1998) and Porter and Cant (2009) considered foodservice quality to be the best patient-satisfaction predictor. Additionally, quality evaluation depends on patient expectations and perceptions (Hartwell et al., 2007). Key food quality attributes are: taste; texture; colour; presentation;

menu variety and temperature (an important reason for patient dissatisfaction (O'Hara et al., 1997)) and staff attitude (Edwards et al., 2000; Hartwell et al., 2006; Wright et al., 2006). Stanga et al. (2003) reported that many patients complained that food was cold. Protected mealtimes prevent unnecessary and avoidable interruptions: so service times suit patients and staff; encourage/assist patients; improve the eating environment and patient nutrition; minimises food waste and reduces patient stay (Dickinson et al., 2005; Xia and McCutcheon, 2006; Naithani et al., 2008; Kim et al., 2010). Additionally, foodservice staff help deliver high food quality standards and promote patient satisfaction (Edwards et al., 2000).

Table I. UK hospital food production systems: advantages and disadvantages

	Cook-serve	Cook-chill	Cook-freeze	Sous-vide	Assembly-serve	Commissary
Definition	The oldest food production system in hospitals, food ingredients are prepared and cooked on-site, after cooking; food is served	Cooking methods based on food preparation/cooking followed by chilling and holding food in chill cabinets before being reheated for service	Food preparation and cooking followed by fast freezing before being ordered and reheated for serving	A modification of the cook-chill process involving vacuum sealing in plastic pouches, cooking in steam, then rapidly chilling and steaming when required	The convenience system, which depends on purchasing food which is ready to heat and serve	Centralised food production – a central kitchen is used for preparing, holding and packaging meals to serve, it uses different types of production
Advantages	Offers variety and flexibility for menus Fresh food items Better quality control Consistent with the patient needs Reduces storage space	Variety of food items Reduces wastage Minimises overproduction Reduces production costs Suitable for larger food production operations Improves quality and productivity	Food can be preserved a long time without affecting nutritional value Menu variety Matching the quality standards Quick service	Patient satisfaction Cutting food costs Improves food quality Reduces wastage Allows for portion control High standard of hygiene	Minimises skill and labour costs Reduces wastage Reduces equipment costs Eliminates procurement costs Allows for portion size control	Reduces material costs Reduces wastage Allows for quality control
Disadvantages	Delays between production and consumption Lack of staff skills Financial constraints Lower productivity	Problems in temperature control between cooking and serving Reduced patient satisfaction Higher equipment costs Requires large cooking spaces	Higher equipment costs Requires more working space Controlling quality of the food High energy costs	Food safety issues Higher equipment costs Adds extra costs to the patient. Food waste	Limited menu selection Portion size not meeting patient needs Increases equipment; and energy costs	Needs specialised equipment Length of time taken in food distribution process

Sources: Adapted from Barrie (1996), Knowles (1998), Sullivan and Atlas (1998), Hwang *et al.* (1999), Creed (2001), Mibey and Williams (2002), Puckett (2004), Engelund *et al.* (2007), Assaf *et al.* (2008), Davis *et al.* (2008), Assaf and Matawie (2009), Hwang and Sneed (2009), Porter and Cant (2009), Cousins *et al.* (2011)

METHODS

A multiple embedded case study was used to investigate food production and service systems in two small private-sector hospitals (PRSH1 and PRSH2) and one large public-sector hospital (PUSH1). Qualitative data collection methods included semistructured interviews (PRSH1¼2; PRSH2¼10; PUSH1¼10) with catering managers, head and other chefs at each hospital, focus groups – one with foodservice staff in PRSH2 (n¼4) and one with kitchen staff in PUSH1 (n¼5). Interviews/focus groups were digitally recorded, transcribed and analysed thematically using NVivo 9. Additional data were collected through patient feedback published on the hospitals' websites (Yin, 2009). The PRSH1 hospital was selected on its service standards – managers had appointed a Michelin-starred restaurant chef. The PRSH2 and PUSH1 hospitals were larger and run by the same management team, directly and through franchising, respectively. The public-sector hospital was the first NHS hospital to be managed by the private sector (Circle Hospital Group, 2012). Triangulation was used to combine data generated from the different qualitative research techniques (Yin, 2009). In our study, triangulation was used to check the content analysis validity. First, data triangulation was achieved by collecting information from different sources, including: semi-structured interviews; focus groups; document analysis. Second, investigator triangulation was achieved by involving several investigators. Various procedures were used to measure reliability, including: recording all interviews and focus groups thereby permanently recording what participants said and to prevent subjectivity. Interview and focus group questions were designed to support the study objectives and notes were taken during the interview to assure reliability. Once the interviews were transcribed, the researcher listened to the audio tapes repeatedly to ensure that accurate data transcription had been achieved. Table II profiles the case study hospitals.

Table II. Case study hospitals

	PRSH1	PRSH2	PUSH1
Type	Private-sector	Private-sector	Public-sector
Size	30 bedrooms	30 bedrooms	223 beds

RESULTS

Value stream mapping – food production/service system

Figure 1 shows the value stream from start to finish at the three hospitals and emphasises the menu's importance to managing food production/service systems and nutritional considerations. It shows system inputs including: procurement activities, food production and service processes; outputs to patient.

Food procurement

Raw material specification

Participants from all three hospitals were asked if they had specifications for all food items. Most participants (75 per cent) emphasised the specification's importance for achieving product quality. The specifications were developed by the catering manager/ head chef for all menu items, including all information related to products and suppliers at PRSH1/PRSH2 and PUSH1, respectively.

Supplier selection

Many criteria informed supplier selection: quality; price; discounts; location; facilities and relationships. Additionally, 87 per cent of the PRSH1/PRSH2 participants indicated that they dealt with particular suppliers to ensure consistent food quality:

“We work with national suppliers [...] on a national level and these suppliers are specified only for us, so each hospital in the chain works with the same suppliers everywhere to achieve consistency”
(PRSH2-head chef).

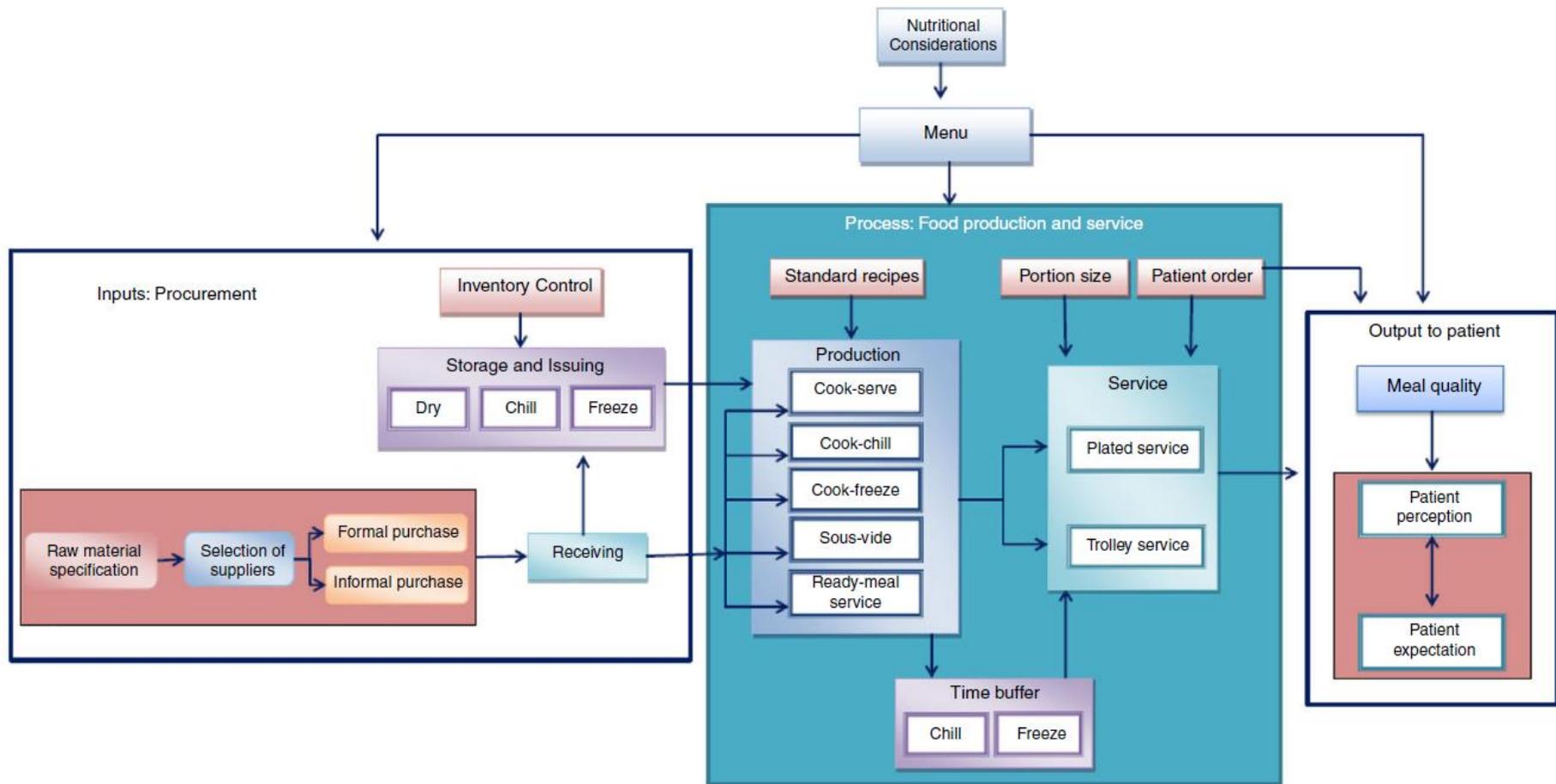
Many participants (60 per cent) reported that selecting suppliers took a long time in public-sector hospitals because hospitals have expensive menus and needed to contract with good suppliers:

“Before we make contract, I [PUSH1-Head chef] visit them and look at what are they doing to make sure that we get the right product, the company facilities, everything modern, facilities of delivering food, so we can calculate very well how we can save money for the customer.”

Purchasing

At the private-sector hospitals, 75 per cent reported that they depended on informal purchasing methods; they used local sources for material purchases and all fresh and organic food. This allowed them to improve outcomes such as: enhancing their presence in the local community and improving local service quality. All these issues were considered fundamental and helped the managers in the private-sector hospitals to deliver high-quality food:

Figure 1. Value stream mapping: food production/service system in UK hospitals



“All food is sourced locally. We concentrate on fresh food, organic food and seasonal food” (PRSH1-head chef).

Most (80 per cent) PUSHI participants explained that they used formal purchasing methods, which suited larger hospitals. Staff at the public-sector hospital depended on tendering methods to establish contracts with selected suppliers, using local sources to get raw materials. Additionally, they explained that there were several processes before food purchase, including: inventory checking; preparing purchasing orders and contacting suppliers.

Receiving

Most (77 per cent) hospital employees who participated in the study explained that receiving procedures in both the private- and public-sector hospitals were streamlined for simplicity and confirmed that receiving procedures (specification list; temperature; quantity; expiry dates; prices) were clearly defined. Additionally, they received daily food deliveries apart from dry foods. Problematic items were returned to suppliers:

“We all check the quality of food material and if we have any problems in quality or something we write a report and get the supplier to come and take it” (PUSH1-chef).

Storing and issuing

All three hospitals had different storage methods: dry for dry goods; refrigerators for chilled foods and freezers for frozen foods. Regarding issuing raw materials, staff at the case study hospitals operated a FIFO method, which helped inventory control and stock rotation.

Food production

All three hospitals operated an in-house catering service – a cook-serve system – so food was prepared and cooked inside teach hospital. Additionally, 72 per cent said that fresh food was cooked daily to ensure high-quality food for patients. They prepared all menu items before cooking using “mise-en-place” and standard recipes in all three hospitals. Regarding time buffers, 59 per cent explained that

they organised and eliminated work stress in both private and public hospitals, respectively. However, in PRSH1 and PRSH2, 37 per cent explained they did not need to use a time buffer because they prepared, cooked and served food on time. Most participants (80 per cent) at PUSH1 relied on this process, because PUSH1 had an expensive menu and served about 450 meals each day to patients. Also, they used water baths to control the temperature of food before serving.

Foodservice

Food ordering

Most participants (83 per cent) in PRSH1 and PRSH2 explained that ordering food was simple and that patients could select what they wanted to eat according to their needs. Breakfast was ordered the previous evening and other meals were ordered with hostesses on the day. Some PUSH1 participants (40 per cent) said that patients were not able to select their own meals because the menu did not provide information about ingredients and nurses were busy, so did not assist.

Meal service

Each case study hospital used a plated service system to deliver food (hostesses in private hospitals and by nursing staff public hospitals). Despite sound communication between patient and foodservice or nursing staff, results indicated that PUSH1 had poor communication between patient, nursing and foodservice staff:

When I was in the restaurant, a patient came storming at me, saying you do not care at all about me. I have got a list of allergies like this, I have got 20 allergies and every day I asked for proper meal to be cooked and nobody cooked for me. I said this is the first time I hear that. I went to the head nurse and asked him why don't your nurses tell the kitchens about patient's allergies (PUSH1-head chef)?

Menu and nutritional considerations

Most participants (81 per cent) stated that menus were designed to reflect patients' cultural, religious, nutritional needs and offered food variety to patients, visitors and staff in all three hospitals. Snack foods were available on demand.

Output to patient

To identify the critical issues affecting foodservice quality and reflect on patient satisfaction, we compared three hospitals and our results showed similarly high satisfaction levels at PRSH1 and PRSH2, and lower satisfaction levels at PUSH1 (Table III).

DISCUSSION

Food procurement

Raw material specification.

Specification lists play an important role in hospital food procurement process and must evolve according to menu changes (Chon and Sparrowe, 2000). All three hospitals specified menu items, but they were used more at PUSH1 than at PRSH1 and PRSH2 because its foodservice operation was larger. As Stefanelli (1997) reports, specifications assist hospital managers to control food quality and reduce misunderstandings with suppliers.

Supplier selection.

Staff at all three hospitals preferred dealing with local suppliers to get high-quality food. Selecting suppliers for PUSH1 was time-consuming because it had an extensive menu and used a tendering process to appoint suppliers. Catering staff in two private-sector hospitals used the same suppliers with whom they had good relationships. Staff at the two private-sector hospitals focused on quality not price, whereas staff at PUSH1 were more price driven.

Purchasing.

Purchasing systems depend on hospital size – formal purchasing for larger foodservice operations; informal purchasing for smaller ones (Cousins et al., 2011; Davis et al., 2008; Feinstein and Stefanelli, 2012). Informal purchasing was used in the smaller private hospitals and local suppliers were able to deliver food materials at any time and contribute to supplier quality, which positively affected the local community.

Receiving and storing.

Receiving and storing materials was a major control point in foodservice quality (Payne-Palacio and Theis, 2009). Private and public hospitals had similar receiving procedures, although private hospitals had simpler processes. Food storage involved: dry; chilled and frozen storage in all three hospitals. Payne-Palacio and Theis (2009) stated that the time/distance between food receipt and storage affected food quality and costs. The time between receiving and storing material was shorter in PRSH1 and PRSH2 than in PUSH1. Food was issued as appropriate (Spears and Gregoire, 2004); i.e., FIFO was used for issuing food from storage to production areas, which helped inventory control and stock rotation.

Table III. Patient feedback about hospital foodservice

	PRSH1(<i>n</i> = 300), %	PRSH2(<i>n</i> = 300), %	PUSH1(<i>n</i> = 300), %
Food was delicious	71	95	55
Presentation	62	81	66
Temperature	72	85	48
Service time	56	92	40
Food choice	68	86	61
Portion size	62	70	34
Eating environment	69	78	25
Staff attitude	61	71	28

Sources: Circle Hospital Group (2012)

Food production

Cook-serve systems were used in all three hospitals, reflecting Rodgers and Assaf (2006) report that cook-serve is the most popular UK hospital system. Assaf and Matawie (2009) suggested that cook-serve is suitable for public hospitals because it provides fresh food, flexibility and menu variety (Puckett, 2004). Standard recipes and portion size were used in PRSH1/PRSH2 and PUSH1, which helped staff to: identify process flow and eliminate mistakes; ensure patients received standard service and menu planning (Davis et al., 2008). However, most private hospital staff depended on experience and not standard recipes. Time buffers were used more in PUSH1 with its larger foodservice system. Time buffers helped reduce staff workloads and provided more consistent quality. Creed (2001) emphasised that time buffers can reduce work stress and overtime payments.

Foodservice

Patient orders

Ordering meals helps patients select what they wanted quantitatively and qualitatively (Edwards et al., 2000). Patients had opportunities and flexibility when ordering meals in the private hospitals. Xia and McCutcheon (2006) report that nurses appeared busy and did not help patients to eat their meal during mealtimes.

Meal service

Plated service systems were used in all three hospitals with several advantages, including: quality/portion control; less equipment and reduced cost (Hartwell and Edwards, 2001; Payne-Palacio and Theis, 2009). Hostesses delivered food to patients in the private hospitals. At PUSH1, food was delivered by nursing staff with little/no knowledge about foodservice systems that led to patient dissatisfaction. Miscommunication between nurses, patients and kitchen staff lowered satisfaction levels. Hwang et al. (1999) pointed out that many hospitals have communication gaps between patients, nurses and catering staff which affect foodservice quality.

Menu and nutritional consideration

Our results emphasise that menus are important in hospital food systems (Shiring et al., 2001) especially when they were aligned with cultural, ethnic, religious and social diversity. Additionally, Edwards et al. (2000) explained that diverse menus are important for patients, enabling them to select the meals they want. There was little difference between private and public hospital menus – at all three hospitals, food was provided for patients, visitors and staff. The PUSH1 menu was changed on a two-week cycle, whereas menus were changed just four times each year (spring, summer, autumn, winter) at PRSH1/PRSH2.

Output to patient

Many issues affected meal quality and patient satisfaction in private and public hospitals – taste; presentation; temperature; service time; food choice; portion size; eating environment and staff attitudes (Edwards et al., 2000; Hartwell et al., 2006; Wright et al., 2006). Patient feedback indicated that higher patient satisfaction was achieved at PRSH2 than at PRSH1 and PUSH1 (see Table III). Improvements were still being made to the foodservice system at PUSH1.

CONCLUSIONS AND RECOMMENDATIONS

This study is the first using value stream mapping to help understand and develop food production/service operations in UK private and public hospitals. Process flow is critical to foodservice quality patient satisfaction. Value stream mapping, which identifies the various activities involved in the process flow from start to finish, is recommended as the first step towards lean manufacturing principles to help identify potential system enhancements that would improve hospital food production/service efficiency and quality. Various issues affect process flow, including: menu and nutritional considerations; food procurement; food production; foodservice and patient perceptions/expectations. Managers at all three hospitals dealt with local suppliers and favoured fresh, seasonal, organic food to provide high service quality and support local communities. In-house catering was based on cook-serve and plated service involving hostess staff in PRSH1 and PRSH2 and nursing

staff in PUSH1. Different menu choices were offered at each hospital; however, the PUSH1 menu did not identify the food ingredients used in menu items. Assistance from nursing staff and communication with patients was insufficient at PUSH1. Higher quality foodservice was achieved at PRSH1 and PRSH2; the foodservice system had been changed at PUSH1 but still needed improvement – several problems persist and patient satisfaction was lower. We recommended, therefore, that menus detailing food ingredients supplemented by support from appropriately trained staff (hostesses or nursing staff) help patients select the right meals and promote patient satisfaction. We used a multiple embedded case study and value stream mapping to explore issues relating to high-quality, low-cost food production. A major limitation is that the sample size is small – three hospitals. Although hospitals size differed, the same management team effectively ran all three hospitals using cook-serve systems. It is recommended that future research focuses on a larger and more diverse hospital sample.

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