



## The British Frozen Food Federation

2010 Report



*Frozen Food -*

*Nutritional Acceptability for Hospital Food Provision:*

*A pilot study*

## **FOREWORD**

This report has been commissioned by the British Frozen Food Federation (BFFF).

The British Frozen Food Federation (BFFF) is the trade association of the frozen food industry. Its' mission statement is '*to promote and protect the interests of the Frozen Food Industry*'.

The report was managed and written by Charlotte Harden and Holly Wilson on behalf of the Centre for Food Innovation at Sheffield Hallam University.

## **PROJECT AIMS**

### ***The aims of this project are to establish:***

- Current use of food for the provision of hospital meals
- The nutritional variation between fresh and frozen versions of these foods
- The nutritional impact of using frozen produce for hospital meal provision

### ***The objectives of this project are to:***

- Obtain a rotational menu from a pilot hospital to review current meal provision
- Conduct NetWISP V3.0 analysis to establish the nutritional content of various food items served in the hospital
- Conduct independent-sample t-tests to determine if there is a significant difference between the average values of fresh and frozen foods
- Evaluate the results of the statistical analysis to establish the nutritional impact of using frozen food for hospital meal provision

## **EXECUTIVE SUMMARY**

An investigation was conducted in order to analyse a hospital menu and examine the effect, on nutrients, of providing the meals from fresh or frozen sources. Subsequent nutritional and statistical analysis showed no significant difference between fresh and frozen food classification for the 37 nutrients tested.

These results correlate well with findings by other investigators. Frozen food can be an effective way of providing adequately nutritious meals for those under hospital care.

There are numerous other advantages of using frozen food on a catering scale. Produce intended for freezing is typically frozen within hours of harvest or slaughter. The implementation of new technology means modern freezing processes cause virtually imperceptible changes to sensory characteristics. Other advantages of using frozen food on a catering scale are also evident. These include contributions towards reduction in food waste, availability, convenience and improved price stability.

The use of frozen food for the provision of hospital meals may help alleviate cost and time restraints and free up resources which could be spent on the provision of palatable and enticing meals.

## CONTENTS

	<b>Page</b>
<b>CHAPTER 1</b>	
<i>1.0 Background</i>	6-7
<b>CHAPTER 2</b>	8-9
<i>2.0 Examination of the pilot hospital menu</i>	
<b>CHAPTER 3</b>	10-11
<i>3.0 Nutritional analysis</i>	
<b>CHAPTER 4</b>	12-13
<i>4.0 Statistical analysis</i>	
<b>CHAPTER 5</b>	
<i>5.0 Results Evaluation</i>	14
<b>REFERENCES</b>	15

### **1.0 BACKGROUND**

When the NHS was first introduced in 1948, Regional Boards controlled all hospital services including catering (Davis and Stone, 1991). With links between health and nutrition becoming increasingly apparent, Government recommendations soon led to the employment of catering professionals and the implementation of hygiene and nutritional standards (Nursing Practice, 2005).

Since the introduction of hospital meals, numerous legislative changes have taken place; these have shaped present catering systems. Despite these changes, perceptions of hospital meals are negative; many people believe hospital food is low quality, unappetising and nutritionally inadequate (Cardello, 1995; Cardello, 1996; Hartwell, 2006; Independent, 2009; BBC, 2009). This public opinion has been fuelled by reports of patients suffering under nutrition and weight loss whilst in hospital care (Barton et al., 2000; McWhirter and Pennington, 1994).

Optimisation of hospital meals is still a major public health concern. Numerous recent commitments have been pledged in order to; achieve revised nutritional standards, protect patient meal times, provide feeding assistance to those who need it and serve a choice of palatable meals. In addition to legislative changes, high profile 'Celebrity Chefs' including Lloyd Grossman, Heston Blumenthal and Jamie Oliver have been drafted to provide innovative ways of improving consumer acceptance of hospital meals.

A number of recent reports have concluded that, despite consumer misconceptions, there is no significant evidence that the nutritional quality of food is compromised by freezing (Young et al., 2010; Harden et al., 2009).

The use of frozen food for the provision of hospital meals may alleviate cost and time restraints and free up resources. These could be spent on the provision of a range of palatable and enticing meals to those who rely on them.

The purpose of the following investigation is to analyse a hospital menu and to examine the effect, on nutrients, of providing the meals from fresh or frozen sources.

### 2.0 EXAMINATION OF THE PILOT HOSPITAL MENU

In order to make an investigation into the current provision of hospital meals a rotational menu was obtained from a pilot hospital situated in the North of the UK. The menu included all meals (breakfast, lunch and dinner) served on a two week rotation basis in 2010. Information about each meal, including ingredients and cooking instructions, was provided.

An initial point of analysis was to split the food into categories as follows:

1. **Individual Single Items.** These items are those which are served as a single menu item, for example peas or chips.
2. **Individual Composite Items.** These items are those which are served as part of a composite dish, for example the mince in a pasta bake.
3. **Composite Dishes.** These items represent dishes that are made up from single items by kitchen staff on the hospital premises.

The potential provision type of each item (i.e. the possibility of obtaining the item from a frozen source) was examined. This is not a possibility for all produce, for example flour. However, the **Composite Dishes** table highlights where menu items, which are currently made on site from single items, could be made elsewhere and bought into the kitchen as frozen produce.



## **2.1 Results Summary - Current Provision**

### Single Items

- In the hospital menu there were 43 single item foods
- The number of single items which could be provided in a frozen form are 40
- Potential provision of frozen food for the hospital menu could be up to 93%

### Individual Composite items

- In the hospital menu there were 43 individual composite item foods
- The number of individual composite items which could be provided in a frozen form are 36
- Potential provision of frozen food for the hospital menu could be up to 84%

### Composite dishes

- In the hospital menu there were 91 composite dishes
- The number of individual composite items which could be provided in a frozen form are 88
- Potential provision of frozen food for the hospital menu could be up to 97%

### **3.0 NUTRITIONAL ANALYSIS**

NetWISP V3.0 (Tinuveil Software) dietary analysis software was used to analyse and convert the hospital menus into energy, macronutrient and micronutrients. The food composition databank supplied is from HMSO/OPSI, McCance and Widdowson's *The Composition of Foods* - 6th Edition (2002), 5th Edition plus supplements.

In addition, NetWISP V3.0 contains data from the following manufacturers:

- Tillery Valley Foods, 2008
- Calypso Soft Drinks Ltd, 2008
- Brakes, foodservice (catering) products, 2008
- Nutricia, tube and sip feeds, 2008
- Abbott, tube and sip feeds, 2006
- Glycaemic index of foods, 2005
- Better Hospital Food, 2005
- Pasta & Pasta Sauces, Food Standards Agency (FSA), 2004
- Catch-Up Project, FSA, 2004
- AOAC fibre content of foods, USDA, 2004
- Non-milk extrinsic sugars content of foods, calculated by Registered Nutritionist, 2003

The food composition database contains a total of about 6,000 food records and up to 125 nutrients.

The Composition of Foods is widely acknowledged as the key reference tool for examining the nutritional value of foods consumed in the UK. There can however, be no guarantee that a particular item will have precisely the same composition as that described due to the natural variability of foods.

### **3.1 Nutritional Analysis**

**single food items**

a comparable nutritional analysis was available for 15 out of the 43 items

**individual composite items**

a comparable nutritional analysis was available for 6 out of the 43 items

**composite food dishes**

a comparable nutritional analysis was available for 9 out of the 91 dishes

**4.0 STATISTICAL ANALYSIS**

Using the nutritional analysis data obtained from NetWISP V3.0, independent sample t-tests were performed in order to identify the effect of fresh versus frozen food classification (SPSS; version 15.0 for Windows, SPSS Inc., Chicago, IL, USA). This is a commonly used statistical procedure used to determine if there is a significant difference between the average values of the same measurement made under different conditions. Values of  $P < .05$  were classed as significant.

Nutrients tested:

Protein g; Total fat g; Carbohydrate g; Energy in kcals; Energy in kJ;  
Saturated fat; Monounsaturated fat g; Polyunsaturated fat g; Cholesterol mg;  
Sugars g; Non milk extrinsic sugars g; Starch g; AOAC fibre g; Englist fibre g;  
Sodium in mg; Potassium in mg; Calcium in mg; Magnesium in mg;  
Phosphorous in mg; Iron in mg; Copper in mg; Zinc in mg; Chloride in mg;  
Manganese in mg; Selenium in  $\mu\text{g}$ ; Iodine intake in  $\mu\text{g}$ ; Vitamin A (r.e.) in  $\mu\text{g}$ ;  
Carotene in  $\mu\text{g}$ ; Vitamin D in  $\mu\text{g}$ ; Vitamin E in mg; Thiamin in mg; Riboflavin in  
mg; Niacin in mg; Vitamin B6 in mg; Vitamin B12 in  $\mu\text{g}$ ; Folate in  $\mu\text{g}$ ;  
Pantothenic acid in mg; Biotin in mg; Vitamin C in mg

#### ***4.1 Results - Statistical Analysis***

An independent samples t-test was conducted to compare the macronutrient and micronutrient content of fresh and frozen versions of the same food products. There was no significant difference in scores for fresh and frozen foods.

**5.0 RESULTS EVALUATION**

The results of this investigation demonstrate that there would be no significant nutritional difference between providing the pilot hospital menu using fresh or frozen produce. It can therefore be concluded that frozen food could be an effective way of providing adequately nutritious meals for those under hospital care. The results of this investigation correlate well with findings by other researchers (Young et al., 2010; Harden et al., 2009).

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