An overview of technical support for nutrition analysis within the Caloriewise pilot

Final version

Contents

Appendices

List of Tables

List of Figures

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1.   Summary

1.1.   In 2009 the Food Standards Agency (UK) launched a calorie labelling initiative[1] as a first step towards providing more consistent nutrition information to consumers in a way which would help them to make healthier choices when eating outside of the home.

1.2.   This work was taken forward by the FSA in NI and was uniquely targeted at SME (small and medium enterprises) businesses and NI consumers. A six-month pilot scheme was launched[2] (1 May to 31 October 2012) where eight local food businesses (including contract caterers, restaurants, cafes and sandwich bars) and three local health trusts displayed calorie information on menus for the first time. The pilot included standardised branding and information for consumers under the banner of "Caloriewise".

1.3.   In order to encourage participation of SMEs in the Caloriewise scheme, the FSA provided funding for two higher education institutions (University of Ulster (UU) and the College of Agriculture, Food and Rural Enterprise (CAFRE)) to provide technical support for calculating the calories for menu choices.

1.4.   This report outlines the technical support provided by UU. A general overview has been provided of the procedures for analysing a menu for a new company from data collection through to analysis and feedback. Some of the issues raised during the Caloriewise pilot have been demonstrated using anonymous examples. The report also includes a step-by-step guide launched at a joint workshop (13 May 2013) for food businesses with CAFRE, Food Safety Authority Ireland (FSAI), UU, FSA and businesses which participated in the pilot scheme, as well as results from an evaluation questionnaire. The report and associated workshop detailed the following areas:

- Nutrition analysis – outline of overall steps required

- Example of trial of work required in a typical site

- Present position of SMEs and technical experience available in house to SMEs

- Barriers to getting work completed

- Lessons learnt from the exercise

- Benefits for SMEs of Caloriewise

- Recommendations for future roll-out

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[1] http://www.food.gov.uk/news/newsarchive/2009/jan/eatoutinfo
[2] http://www.food.gov.uk/northern-ireland/nutritionni/caloriewise/#.UtWrTPQW18E

2. Introduction

2.1.   In recent years, out-of-home (OH) eating has been the focus of increasing attention because of its association with higher energy and fat intakes and lower micronutrient intakes (Kant & Graubard 2004, O'Dwyer *et al.* 2005, Orfanos *et al.* 2009, Lachat *et al.* 2011) and weight gain (Rosenheck 2008).

2.2.   Although the trends in OH eating are particularly well documented in America (Kant & Graubard 2004), in the UK and Ireland the trends are less clear cut because of the lack of a clear definition of OH eating. For example, OH eating has been shown to contribute 11% of energy intakes in the United Kingdom (UK) (DEFRA 2010), but this did not include takeaway foods. On the other hand, in the Republic of Ireland (RoI), OH eating contributed 24% to energy intakes when restaurants, takeaways, shops and delicatessens were included (IUNA 2011).

2.3.   A key challenge to limiting energy intake is the public's significant underestimation of the amount of calories they consume (Burton *et al.* 2006). Calorie labelling (CL) on menus is one specific policy lever that has been proposed to help consumers make more informed choices at point-of-purchase.

2.4.   To date, point-of-purchase CL legislation has become mandatory for all chain restaurants (≥20 outlets) in the US[3]. In the UK, 50 businesses, with 9 rolled out in NI, have pledged to the Department of Health Responsibility Deal to "…provide calorie information for food and non-alcoholic drink for our customers in out-of-home settings from 1 September 2011, in accordance with the principles for calorie labelling agreed by the Responsibility Deal[4]. In Northern Ireland (NI), the recently-launched obesity prevention framework, "A Fitter Future For All" has also specifically identified CL of menus in food businesses such as restaurants as one of its outcomes (DHSSPSNI 2012).

2.5.   However, to date there has been little empirical research on the potential impacts of point-of-purchase CL. A review of the available literature (Harnack & French 2008) suggests that despite the methodological limitations of the available studies, results uniformly suggest that such an initiative may have a beneficial, albeit limited, effect on food choices made away from the home. This limited effect may reflect poor consumer understanding of overall daily energy requirements and/or a low level of importance many consumers place on nutrition when eating out. It may also reflect the complexity of food choice behaviour. Thus, multiple levels of influence may need to be targeted in parallel, including consumer understanding of calories and attitudes

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[3] https://www.federalregister.gov/regulations/0910-AG57/food-labeling-nutrition-labeling-of-standard-menu-items-in-restaurants-and-similar-retail-food-estab
[4] https://responsibilitydeal.dh.gov.uk/pledges/pledge/?pl=8

about calories when eating out, in order for CL to have substantial influence on OH food choices.

2.6. At the same time, the implications for point-of-purchase CL for food businesses, particularly SMEs, need to be fully explored to understand the opportunities associated with and constraints against CL. For example these may include the perceptions of increased costs, lack of technical knowledge, problems associated with keeping calorie counts consistent, "turning off" customers and a deterrent to menu innovation.

2.7. In 2009, the Food Standards Agency (UK) launched a calorie labelling initiative[5] as a first step towards providing more consistent nutrition information to consumers in a way which would help them to make healthier choices when eating outside of the home.

2.8. This work was taken forward by the FSA in NI and was uniquely targeted at SME businesses and NI consumers. A six-month pilot scheme was launched[6] (1 May to 31 October 2012) where eight local food businesses (including contract caterers, restaurants, cafes and sandwich bars) and three local health trusts displayed calorie information on menus for the first time. The pilot included standardised branding and information for consumers under the banner of, "Caloriewise".

2.9. A set of criteria for the display of calorie labelling was provided to food businesses[7] for the 2009 scheme and following consultation, these were refined by the FSA[8] for the Caloriewise pilot:

- calorie information will be displayed clearly and prominently at point of choice
- calorie information will be provided for standardised food and drink items sold
- calorie information will be provided per portion/item/meal
- reference information on calorie requirements will be displayed clearly and prominently

2.10. However, during 2009 it was noted that one of the main barriers was the calculation and display of accurate calories value[9]. In order to encourage participation of SMEs in the Caloriewise scheme, the FSA provided funding for two higher education institutions (University of Ulster (UU) and the College of Agriculture, Food and Rural Enterprise (CAFRE)) to provide technical support for calculating the calories for menu choices.

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[5] http://www.food.gov.uk/news/newsarchive/2009/jan/eatoutinfo
[6] http://www.food.gov.uk/northern-ireland/nutritionni/caloriewise/#.UtWrTPQW18E
[7] http://food.gov.uk/consultations/ukwideconsults/2009/calorielabellingcateringoutlets
[8] http://www.food.gov.uk/multimedia/pdfs/publication/fsanicaterercalorieinfopilot.pdf
[9] http://food.gov.uk/multimedia/pdfs/publication/evalcalinfocateringoutlets.pdf

2.11. This report outlines the technical support provided by UU. A general overview has been provided of the procedures for analysing a menu for a new company from data collection through to analysis and feedback. Some of the issues raised during the Caloriewise pilot have been demonstrated using anonymous examples. The report also includes a step-by-step guide launched at a joint workshop (13 May 2013) for food businesses with CAFRE, Food Safety Authority Ireland, UU, FSA and businesses which participated in the pilot scheme, as well as results from an evaluation questionnaire of the workshop.

3. Nutrition Analysis: Collation of Recipes

3.1. During the pilot, the trained nutritionists/dietitians at UU followed 16 steps (**Appendix 1**) in order to display calorie information at the point of choice in catering establishments.

3.2. **Step 1:** As outlined in principle two of the Caloriewise scheme (FSA 2011), calorie information was provided for, *"standardised food items that are sold for at least 30 days in a year".*

3.3. **Step 2:** At the start of the project it was beneficial for the trained nutritionists to meet with the catering staff from the participating food business as it helped to build rapport, gave greater insight in the food business, cooking methods and product ranges used. Recipes were provided by food businesses in hard copy or electronically and were cross-checked with the onsite head chef to ensure that they were the actual recipes used on the premises. The trained nutritionists checked the recipes for completeness (e.g. in a recipe for soup, water was not listed in the ingredients, but only in the recipe instructions. By not including water in the nutrition analysis, the calories in the soup were higher). When recipe information was available prior to meeting with the catering staff, a list of questions was compiled and obvious queries addressed. In food businesses where no recipes were routinely recorded, the head chef dictated the recipes to the trained nutritionist. The nutritionist also explained the output format from the nutrition analysis software that the food businesses would receive (**Appendix 2**).

3.4. **Step 3:** The recipes provided by the food businesses were often descriptive (e.g. 1 clove of garlic, 1 red pepper, 2 slices of ham); however for the purposes of nutrition analysis, weights of ingredients in grams/ounces/millilitres/fluid ounces/kilograms were required. The trained nutritionists clarified the weights of ingredients during the visits to the food businesses or where appropriate, used information from the MAFF Food Portion Sizes book (Crawley).

3.5. During the pilot, a standard checklist was used by the nutritionists to ensure that the recipes were complete and ready for entry onto the nutrition analysis software:

> **Step 4:** Was seasoning specified: herbs / spices / salt / pepper / stock cubes
>
> **Step 5:** Cooking methods used: grilling / frying / oil or butter added / boiling or steaming / salt added to water
>
> **Step 6:** Addition of garnishes / salads for presentation
>
> **Step7:** How many portions does the recipe make?

3.6.   **Step 8:** The visit to the food business premises provided the nutritionists with an opportunity to photograph the food products used - in order to capture the information from labels to add to the nutrition analysis software. The information required included: brand name, company contact information, product code, weight of contents, nutrition information per 100g, weight per portion (if applicable) and preparation instructions. All food items in store cupboards, fridges and freezers were photographed.

3.7.   Steps 1 to 8 generated queries which depended on the accuracy and level of detail in the recipes provided (See examples **Box 1**, page 10). For some food businesses there was a large number of queries and the most efficient way for catering staff to answer them varied, but typically a telephone call was arranged - as responding to a long document was found to be very time-consuming for the food businesses.

Box 1: Example of queries for food businesses

- Are your king size vol au vents 55g each? Recipe is for 20 portions but only 55g of vol au vent included in recipe.
- Is the BBQ sauce used with the skewers XX brand? Is it correct that 6kg of raw chicken is used for 20 portions? (In chicken satay skewers only 2.27kg of chicken is used for 20 portions)
- Is the sweet chilli sauce used XX brand? If not, what brand is it?
- What brand and weight is one breaded chicken fillet? Is each 150g? Is it bought cooked?
- Is water added to all recipes with the gravy as per side of pack i.e. 75g with 1 litre of water?
- And the bouillon (25g per 1 litre of water)?
- Is water added into the peppered sauce recipe with the gravy and bouillon?
- How is the breaded chicken cooked?
- For the instant mash potato: 1 kg of powder makes 53 portions - is the 1 kg after water has been added in the chicken and broccoli crisp recipe?
- How many goujons are served in the chicken goujon wraps? Is there one wrap per serving weighing 55g? Does one goujon weigh 15g and are these deep fat fried or oven baked?
- A 12 inch tortilla wraps weight approx 100g - are the wraps used with the goujons and fajitas smaller, at 55g each?
- In the salsa sauce recipe it states 0.17gm of curry powder - is this 17g for 20 portions? In the Tandoori chicken there is 0.57g given of black pepper and garlic granules - should this be 57g?
- Do the puff pastry sheets weigh 350g before cooking? What brand are these?
- What brand is the short cut pastry mix used in the chicken, ham and leek pie? What are the instructions for making this up with water? Is the weight given in the recipe before or after water has been added?
- Is it correct that 6kg of raw chicken is used in the Szechuan chicken recipe?
- What weight is one cooked chicken kiev?
- In the honey and wholegrain chicken recipe, there is honey and preserve honey in the ingredients. What is preserve honey and do you have the nutritional information per 100g?
- Is it correct in the Tandoori chicken that 4kg of raw chicken is used for 20 potions and in the Szechuan chicken there are 6kg used for 20 portions?
- Is it correct that 225g of raw pasta is used in the chicken and pasta bake recipe for 20 portions? That only equates to 25g of cooked pasta per portion.

4. Nutrition Analysis: Data Entry

4.1.   The selection of a nutrition analysis software depends on the budget available, level of nutrition training, whether the most up-to-date database is available (**Appendix 1**, Step 9) (NB: the 7th edition of The UK Composition of Foods will be available in 2014). It is also important to note missing nutrition information e.g. salt/sodium content if the food business wishes to obtain more than calorie information. The Food Safety Authority of Ireland (FSAI) has tested an online calorie calculator. This will be free for food businesses to use and will be rolled out in 2014.

4.2.   **Step 9:** Once all the recipe information was collated by the nutritionists, the information from the food labels was entered into the nutrition analysis software (WISP v3.0, Tinuviel Software Ltd, UK, from which screenshots have been included).

4.3.   **Step 10:** Nutrition analysis software have been designed to capture food intake data of consumers at home; as such, branded food products used by food businesses are not included. The nutritionists at UU entered nutrition information for over 400 foods to the WISP database for the Caloriewise pilot (**Figure 1**).

Figure 1: Adding food items from nutrition labelling information in WISP

4.4.   Nutrition information for gravies and bouillons were added "as sold" per 100g. For food items with no nutrition labelling, efforts were made to source the product online or contact with the supplier. However, when this was unsuccessful an appropriate substitute was used. For each food business, a list of items where substitutes were used was provided once all analysis was completed.

4.5.   **Step 11:** Recipes were created in WISP (**Figure 2**), with a three-letter code used to identify recipes from different e.g. XYZ Sweet and sour chicken.

Figure 2: Adding ingredients, with weights specified in grams

4.6.   **Step 12:** The raw ingredient coded was selected in WISP, unless the recipe stated otherwise (e.g. chicken in a sandwich was cooked chicken, whereas raw chicken was selected for sweet and sour chicken) and weights were entered in grams.

4.7.   **Step 13:** Recipes were checked for completeness and seasoning added where specified.

4.8.   **Step 14:** For recipes that were cooked prior to serving, vitamin losses (function in WISP) and weight losses/gains were applied (**Figure 3**). For foods where there were weight losses (e.g. meat dishes) or gains (e.g. rice or pasta), percentages were applied from two main sources (see **Appendix 3 and 4**).

Figure 3: Applying vitamin and weight losses to recipes

4.9.   **Step 15:** The ingredient list was checked for completeness in terms of weights and appropriateness of food codes prior to final analysis.

4.10.   **Step 16:** A printout was generated for individual recipes detailing the food codes selected and weight in kilograms (**Appendix 2**). All businesses were provided with copies of the recipes for future reference. **Appendix 5** highlights some of the common errors identified during the Caloriewise pilot.

5. Nutrition Analysis: Data Feedback

5.1.   In order to facilitate ease of use for the food businesses, spreadsheets detailing the grams per portion and calories per portion were produced (**Table 1**). For dishes served with a side order, the calories were displayed both separately and combined.

Table 1: Example of summary data

Recipe	Portion (g)	Energy (kcal)
Beef curry (no rice)	365	487
Rice	160	211
Beef curry with rice	525	698
Beef lasagne	424	737
Mince steak Pie	283	463
Steak & mushroom pie	288	360
Cottage pie	349	555
Steak and onion pie	263	347
Steak and ale pie	277	362

5.2.   For companies with a large number of dishes, recipes were categorised into separate sheets to facilitate ease of identification (**Figure 6 & 7**). This was particularly useful for caterers with weekly rotational menus, as the calorie content of meals was easily identified.

Fish / Lamb / Pizza / Potatoes, rice and pasta / Beef / Chicken / Pork / Vegetarian / Sauces / Salads /

Figure 4: Example of summary sheet with separate tabs for different types of recipes

Menu 2　　□ Traditional　　□ World choice　　□ Vegetarian　　□ Snack

	Portion size (g)	Calories
Roast chicken with stuffing	243	627
Chicken curry without side	166	240
Rice	197	272
Chicken curry with rice	363	512
Vegetarian spring rolls with rice and curry sauce	442	618
Mince and onion pie	188	675

Figure 5: Example of colour coding of the excel outputs

5.3.　Prior to the food businesses receiving the final version of the calorie content of recipes, the nutritionists checked the portion sizes and calorie content for erroneous values. Where unrealistic values were identified, the use of visual aids (e.g. Carbs and Cals book) provided assistance for the catering staff to identify the correct portion size. It was found that these errors were due to estimations for weight of ingredients when food businesses initially provided recipes.

6. Healthy Choice Menus

6.1.   During the Caloriewise pilot some restaurants preferred to only provide calorie information for dishes on a separate 'Healthy Choice' menu. Therefore, the role of the nutritionist was vitally important to ensure that healthy options, lower in calories were provided.

6.2.   Food businesses provided 'Healthy Choice' menus that were analysed by the nutritionists and where appropriate, changes were suggested in order to reduce calories by one of several methods (detailed below). Moreover, it was important that the changes that did not impact on customer satisfaction or taste. However, it was recognised that by implementing small changes, the % gross profit on dishes could be improved (**Box 2**):

- Reduce ingredient weights

- Substitute with a lower calorie alternative

- Reducing the amount of oil or butter added

- Choosing a reduced fat option

- Reducing the portion of meat or carbohydrate

Box 2: **Reduction of portion size = reduction in cost without impacting customer satisfaction**

Example 1:

Dried pasta usual portion   = 100g = 8p/portion = 370kcal

        Reduced portion   = 75g = 6p/portion = 270kcal

1000 portion = £20 saving   ↓**25%**

Example 2:

Chicken breast usual portion = 120g = 80p/portion = 192kcal

        Reduced portion   = 100g = 67p/portion = 160kcal

1000 portions = £130 saving   ↓**16%**

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7. Lessons learned during Caloriewise: benefits and barriers

7.1. The Caloriewise pilot provided an insight into the complexities that would be faced should calorie labelling at the point-of-choice be rolled out to other food businesses in Northern Ireland. In terms of the data collection and analysis by the nutritionists, several key benefits and barriers were identified:

7.1.1. The nutrition analysis software currently available require trained nutritionists/dietitians to operate in order to reduce error when applying weight loss/gain, the absorption of oil when frying and substituting appropriate foods when nutrition information could not be obtained. Nutrition training was important when advising on 'Healthy Choices' menus and checking portion sizes and calorie values of analysed recipes.

7.1.2. Within the pilot, a number of common errors were identified that would lead to the wrong calorie information being calculated (**Appendix 5**). It is important to note that unless the person responsible for the nutrition analysis has been trained and has experience, many of these errors may not have been identified. Furthermore, food composition is impacted by a number of factors including natural variability, seasonality, age of animal, storage conditions etc. As such, the EU Food Information Regulation (2011) should be used as guidance on tolerance levels for calculating calorie content.

7.1.3. The databases in the majority of nutrition analysis software are for consumers in the home and do not contain foods often used by food businesses. Staff time is required to add new foods to the database.

7.1.4. Photographing of nutrition labels in the food businesses reduced time spent contacting manufacturers for information.

7.1.5. Visits to food businesses were key to building rapport with the staff and gave the nutritionists an appreciation of the complexities of the changing food environment and cooking practices.

7.1.6. Whilst recipe databases were available for some food businesses, extra details were required by the nutritionists in order to be able to complete the nutrition analysis (e.g. weight of 1 breast of chicken). This involved weighing ingredients of non-standardised recipes. It was also noted that some kitchens do not have weighing scales for food, as catering staff do not routinely use them when cooking.

7.2. Benefits and barriers for the participating food businesses were also identified:

7.2.1. During the Caloriewise pilot it was noted that whilst some of the managers of the food businesses were enthusiastic about participating, often it was left up to the chefs to provide the information. The majority of chefs did not have hard copies of their recipes but rather relied on memory. Throughout this document, steps have been identified to facilitate ease of collection (e.g. photographing food labels, dictation of recipes). Highlighting the opportunities to maximise %GP helped to engage chefs who were initially reluctant (**Box 2,** page 16).

7.2.2. Consolidation of stock as similar items but different brands may have different calorie content and buying more of the same product increases buying power with catering suppliers.

7.2.3. Standardised recipes provide an opportunity for the food businesses to examine portion control mechanisms and kitchen wastage, as they are required to provide recipe details for the purposes of data entry. However, many food businesses have more than one chef and differences in the quality and taste of the dishes may be noticed by customers. The production of standardised recipes will ensure consistency in the preparation and cooking methods between chef thus increasing customer satisfaction.

7.2.4. Calorie labelling provides increased appeal to customers who are following weight loss diets or by highlighting "lighter choices" on the menu and widens the customer base.

7.3. Feedback from the Caloriewise workshop (May 2013) highlighted the fact that there tends to be high staff turnover within the catering industry and as such it can be difficult to continue with a recipe when a chef (especially Head chef or Sous chef) moves to another business. However, the initial investment in time spent collating the recipes will not be lost, as recipes can be updated within nutrition analysis software and modified to suit different requirements.

7.4. An additional barrier identified during the pilot and workshop session included the large number of options provided on menus (e.g. 4 daily choices x 4 week menu cycle). The Caloriewise pilot did require a large investment in staff time (collating 300 recipes and analysing took 2 nutritionists 3 months). However experience within NICHE on the FSAI MenuCal pilot project has shown that this time can be reduced when only calories are the focus of the data entry system. A lot of time during the pilot was spent gathering recipes and checking database errors with catering staff

7.5. Participants at the workshop indicated that they would be very interested in participating in a short training course on calorie labelling aimed specifically at caterers. This is also supported by findings from survey of catering establishments on

the Island of Ireland (*n* 180, *Safefood* commissioned project within NICHE). Results demonstrated that:

- Only 8% of eating establishments reported displaying point-of-choice nutrition information
- Fast food franchise outlets were the most likely eating establishments to display point-of-choice nutrition information
- Half (49%) of catering managers / owners reported they would like support in obtaining this information

7.6.   To our knowledge, no such short course is offered, but rather is taught within longer nutrition courses/diplomas that caterers cannot afford to attend or take the time away from their business to attend. As such, there may be demand for a free or low-cost short course on calorie labelling, aimed at caterers. There should also be a mechanism to provide support and clarification of queries by trained nutritionists/dietitians for those caterers who wish to calculate calories themselves.

8. Recommendations for future roll-out

8.1.   Future roll-out of the Caloriewise scheme across catering establishments will require further investment in staff training, in order to calculate calories accurately. It may be possible to utilise Invest NI Innovation Vouchers, particularly given the benefits to business highlighted within this pilot (**Section 7.1**). However, given the current complexities with the nutrition analysis software, involvement of experienced nutritionists is warranted.

8.2.   The Caloriewise pilot highlighted the importance of involving all parts of the food service industry from manufacturers (small and large), catering suppliers and distributors to caterers.

8.3.   The application the of EU Food Information Regulation (2011) on food labelling for processed foods will assist with the addition of food items to nutrition analysis databases, except in some circumstances where distribution of food items is local. Furthermore, tolerance limits provided by the EU for nutrient declaration provide a basis for determining limits when providing calorie labelling at point-of-choice for consumers.

8.4.   The Caloriewise pilot demonstrated that sandwich and salad bars, where portion sizes are not regulated by standardised serving spoons, are a difficult area on which to provide calorie information. From the experiences of the pilot, it is recommended that calorie labelling is rolled out on a voluntary basis, with provision for training and ongoing support for food businesses.

8.5.   The reduction of portion sizes in terms of benefits to the consumer by way of calorie reduction; and for the food business by increasing % gross profit were highlighted by the pilot and are useful ways to engage food businesses.

8.6.   Photographing recipes, once cooked, would provide a useful reference for both the nutritionist and catering staff. It is important standardised photography protocols are devised to be able to compare between recipes.

9. Summary

9.1.   In summary, the Caloriewise pilot highlighted that:

9.1.1. The level of detail required to calculate accurately the calorie content of recipes and a 16-step process to guide future work.

9.1.2. The need for an easy-to-use, free database for calorie labelling by food businesses, including a database of nutrition information for foods from catering suppliers.

9.1.3. The requirement for training of catering staff with limited or no nutrition knowledge.

9.1.4. The importance of engaging food businesses by highlighting the benefits identified within this pilot, particularly the potential for maximising % gross profit.

9.1.5. The importance of readily-available access for food businesses to trained nutritionists/dietitians to increase confidence in nutrition analysis when undertaken independently.

9.1.6. The benefits of lists of suggested appropriate portion sizes and ranges of calorie content for foods commonly found in catering businesses.

9.1.7. The need for further investigation into tolerance limits for calorie labelling on menus.

9.2.   The FSA in NI and FSAI are uniquely positioned - and continued collaboration on a standardised scheme is encouraged, given the number of businesses that have franchises in NI and RoI. This was echoed by participants at the workshop (May 2013). A standardised scheme (including marketing materials) will also be easy for consumers to recognise and understand, following educational campaigns.

9.3.   Taken together, the evidence from research studies and the Caloriewise pilot demonstrates willingness and a need for calorie labelling from both caterers and consumers. Further engagement with the relevant stakeholders is warranted and encouraged for the successful roll-out of Caloriewise. This includes workshops for caterers on calorie labelling, mechanisms to provide support from nutritionists/dietitians and consumer education campaigns.

Appendix 1: Stepwise Approach to Calorie Labelling

How to calculate calories — where do I start?

calorie wise
Making sense of Calories

1. • Menu – standard foods only i.e. those served more than 30 days/year

2. • Recipes – standard format & written down

3. • Weight of ingredients in grams or ml – peeled or whole, cooked or raw weight, branded items, with skin/fat/bone

4. • Don't forget seasoning – herbs / spices / salt / pepper / stock cubes

5. • Cooking method – frying, grilling, oil/butter added, boiling/steaming, salt added

6. • Are garnishes/ dressings included

7. • Number of portions

8. • Photograph nutrition information of ingredients in store/freezer/fridge or obtain from catering supplier

9. • Nutrition analysis software – cost/ease of use/training, up-to-date database, awareness of limitations i.e. Missing information for certain nutrients if going beyond calories

10. • Add foods not on database – nutrition information from label as similar items do not always have same calories

11. • In the nutrition analysis software, allocate the recipe name and number provided in system or allocate own code to reduce confusion with other similar recipes

12. • Search for food items within database to create the recipe – frying, grilling, oil/butter added, boiling/steaming, salt added

13. • Don't forget seasoning – herbs / spices / salt / pepper / stock cubes

14. • Weight loss / weight gain on cooking

16. • Check weights of foods, appropriate ingredients selected

17. • Create printout with ingredients, preparation method and calories

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Appendix 2: Recipe printout 4 from WISP

ST DHH Apple and celery salad   No : 659

Ingredients

		wt(kg)
9987	Spelga natural low fat bio yogurt	0.250
14012	Apples, eating, average, raw	0.600
13451	Celery, raw	0.750

Method

Nutritional analysis per serving

Protein (g)	0.9	Carbohydrate (g)	4.5	Energy (kcal)	23
Fat (g)	0.2	Sugars (g)	4.6	Energy (kJ)	96
Saturates (g)		Sodium (mg)	34	Fibre (g)	0.9

This recipe serves 21 people   Average serving size 75 g   Cost per serving £   0.016

Appendix 3: Does cooking food change the calorie content?

Foods that have been fried in fat

It is difficult to estimate the amount of added calories that deep fat frying will provide to a food. The level of oil absorbed will depend on several factors including the temperature of the fryer and the type of food being fried (e.g. is it mainly carbohydrate or protein based).

For this pilot it is best to use the relevant WISP code, if available e.g. roe, cod, hard, fried in blended oil. When inputting a cooked code ensure to adjust the weight for water lost on cooking, in this case 14%. Therefore if 100g of raw cod was used, 86g of cod would be entered using the fried code. If there is no fried option available use the raw food e.g. roe, cod, hard, raw (100g) and add 10 ml of oil per portion to adjust for deep fat frying.

Weight Loss on Cooking

In order to calculate the nutrient composition of cooked dishes correctly, it is essential to take weight (water) loss on cooking into account (**Table 2** and **Appendix 4**).

A few recipes will gain weight on cooking. Steamed sponge pudding, for example, will gain about 4% water. Dumplings will gain about 53% water. For these types of dishes, add this percentage to the ingredients list and then set the water loss on cooking to zero.

Table 2: Typical values for percentage weight loss on cooking (taken from Tinuviel Software Ltd)

Type of Dish	Percent Weight Loss
Beef Stew or Beef Casserole	30
Bolognese Sauce, with meat	32
Cauliflower Cheese	15
Cheese Sauce	15
Chilli, meat or vegetable	30
Curry, meat or vegetable	30
Custard	21
Fruit Cake	5
Fruit Crumble	7
Fruit Pie	4
Irish Stew	24
Lancashire Hotpot	20
Lasagne	26
Milk Pudding	19
Moussaka	22
Nut Roast	13
Omelette	6
Pancakes, sweet, savoury or stuffed	20
Pork Casserole	20
Quiche, cheese	10
Quiche, Lorraine	26
Risotto	34
Samosas	14
Scones	19
Scrambled Egg	11
Sponge Cake	13
Sweet and Sour Pork	28
Vegetable Casserole	15
White Sauce, sweet or savoury	18
Yorkshire Pudding	16

Weight Gain on Cooking

When using WISP to analyse a recipe containing pasta or rice, where the ingredient weight is for the raw food, this should be handled as follows:

Consider wholemeal pasta which has a gain figure of +130%. If you had 50g of raw pasta which was placed into the dish, you would need to add 65g of water to the recipe, which represents the weight gain of the 50g of raw pasta on cooking.

The formula for the amount of water is: (Original weight of ingredient) x (Gain figure/100)

i.e. in this case 50 x 130/100 = 65g.

This additional water ensures that the nutrient concentration is correct and also that the yield comes out right (i.e., the number of servings the full dish provides). There may already be water in the dish, but this is unaffected. Also, the whole dish may have a further weight loss on cooking, but this too is not affected by the above.

In this pilot we have kept these foods standard by always entering the weight of the foods using the cooked code. The FSA 2004 codes are the most up to date so should be used. For the above example, the cooked amount of pasta would be 115g.

When cooking single ingredients such as rice or pasta, these will gain weight, as water is absorbed. The mean percent change is shown below:

Food	Percent Weight Change
Spaghetti, white, dried, boiled	+113
Spaghetti, egg, white, fresh boiled	+ 82
Spaghetti, wholewheat, dried, boiled	+130
Macaroni, dried, boiled	+146
Fusilli, dried, boiled	+123
Fusilli, fresh, boiled	+ 82
Tagliatelle, dried, boiled	+127
Tagliatelle, fresh, boiled	+ 83
Brown rice, boiled	+153
White rice, easy cook, boiled	+177

Appendix 4 : Food waste and loss of weight on cooking (Chappell (1954) 8:325-340 Br J Nutr)

Table 1. *Percentage change of weight of foods during cooking,*
expressed as a percentage of the raw, edible weight

Food	No. of samples	Change in weight Range	Mean value with its standard error	Remarks
		Cereals		
Baked puddings	21	− 2·9 to −18·0	− 9·4 ± 0·91	Cake mixtures and charlottes, no pastry or milk puddings
Biscuits: plain	17	− 6·0 to −17·4	−12·8 ± 0·60	Less than half fat to flour in recipe
rich	15	− 4·0 to −14·3	− 9·2 ± 0·87	More than half fat to flour
Custard powder sauce	88	0 to −12·0	− 4·5 ± 0·31	
Cakes: rich	115	− 2·0 to −20·3	− 9·1 ± 0·28	More than half fat to flour in recipe
plain and ginger-bread	57	− 5·3 to −21·0	−10·1 ± 0·31	
sponge and genoese	22	− 5·1 to −26·0	−14·2 ± 1·05	
American recipes	14	− 5·7 to −16·5	−10·5 ± 0·81	Soft batter, well beaten before cooking
Coconut pyramids	14	− 2·4 to −15·3	− 7·1 ± 1·0	
All cakes	234	− 2·0 to −54·0	−11·0 ± 0·4	
All cakes except meringues and pyramids (see eggs)	208	− 2·0 to −26·0	−10·0 ± 0·24	
Forcemeat, baked	15	− 2·0 to −39·2	−19·6 ± 277	Breadcrumb base. Smallest loss when covered tin was used
Macaroons	18	− 4·0 to −19·4	−10·6 ± 1·18	
Milk puddings:				
baked whole grain	24	− 3·4 to −48·9	−19·4 ± 2·03	Chiefly rice puddings
moulds fine grain	17	− 1·8 to −15·0	− 5·0 ± 1·1	Chiefly cornflour
Macaroni, boiled	12	+168 to +230	+198 ± 5·49	
Pancakes	12	− 8·6 to −18·6	−13·0 ± 0·95	
Pastry: choux	14	−35·0 to −47·8	−40·3 ± 1·3	Baked blind
puff and flaky	20	−12·8 to −36·8	−20·7 ± 1·44	
Rice, boiled	12	+180 to +247	+222 ± 7·21	
Shortbread	12	− 2·1 to −14·8	− 7·5 ± 1·02	
Scones	13	− 9·6 to −22·7	−14·2 ± 1·14	
Sage and onion stuffing	16	− 2·0 to −40·0	−21·7 ± 2·85	−2·0 % when cooked in covered tin
Steamed puddings	12	− 8·3 to +6·5	+ 0·4 ± 1·04	
Tarts, open and covered	57	0 to −16·6	− 6·6 ± 0·6	
Yeast baking	21	− 3·8 to −28·7	−11·8 ± 1·29	
Yeast girdle cookery	12	− 2·7 to −21·8	− 7·6 ± 1·77	
Yorkshire pudding	12	−12·0 to −37·1	−24·3 ± 1·99	
Bread: fried	12	+14·2 to +51·6	+31·7 ± 2·5	
toasted	25	− 5·6 to −20·4	−13·3 ± 0·77	Stale bread lost less weight than new bread
Buns and crumpets, toasted	12	0 to −13·6	− 5·4 ± 1·03	
		Eggs		
Baked soufflés	14	− 7·3 to −13·1	−10·1 ± 0·49	
Meringues and jap cakes	12	−26·5 to −54·0	−34·9 ± 2·2	−27 to −36 % fresh egg, −48 to −54 % dried egg
Custard, baked, shell egg	12	− 3·3 to − 9·7	− 5·1 ± 0·46	
Omelets	12	− 1·7 to − 9·5	− 5·6 ± 0·83	Plain omelets −1·7 to 5·7 %, soufflé omelets −2·3 to −9·5 %
Sebayon and egg sauces	12	− 3·1 to −10·6	− 8·3 ± 1·27	Larger losses occurred with slow cooking

Table 1 (*cont.*)

Food	No. of samples	Change in weight		Remarks
		Range	Mean value with its standard error	
Fish				
Baked	15	− 4·4 to −38·0	−18·5 ± 1·96	Includes plaice, turbot, sole, halibut, whitebait, mackerel, herring, salmon, cod and bream. Fried with egg and breadcrumb or milk and flour coating. No batter used
Fried	60	− 2·2 to −38·0	−14·0 ± 1·06	
Grilled	15	− 6·6 to −33·3	−17·9 ± 1·93	
Poached	14	0 to −20·0	− 9·2 ± 1·22	
Steamed	12	− 5·4 to −16·0	− 9·5 ± 1·08	
Fish cakes and puddings	14	0 to −18·0	− 6·2 ± 1·47	Higher values for puddings (containing milk)
Fruit				
Apple, baked	12	− 1·3 to −36·3	−17·1 ± 2·92	−1·3 % when cooked in covered dish
Stewed fruit and syrup	30	0 to −30·7	− 9·4 ± 1·09	
Fruit (dried)				
Banana stewed or	13	+35·6 to +128·1	+90·7 ± 8·58	Greatest increase given with prolonged stewing
Figs soaked until	13	+23·3 to +49·8	+35·9 ± 2·53	
Pineapple soft, no sugar	12	+123·8 to +259·0	+190·7 ± 10·18	
Prunes added	14	+21·6 to +100·0	+64·1 ± 5·84	
Meat				
Bacon, fried or baked	39	−22·0 to −72·8	−53·0 ± 1·39	Values similar for either method of cooking
Steak, fried	20	−18·4 to −44·3	−29·4 ± 1·62	
Chop, grilled	20	−12·9 to −49·4	−32·3 ± 2·04	
Roast	46	−12·6 to −39·3	−26·4 ± 1·05	Beef, pork, mutton and veal
Stewed	18	−21·4 to −46·4	−31·8 ± 1·84	Cooked in casserole. Beef (nine samples) −21·4 to −36·7. Mutton (nine samples) −21·4 to −46·4
Ham, boiled	12	−10·0 to −24·1	−15·4 ± 1·26	
Poultry, roast	13	− 7·1 to −33·1	−22·8 ± 2·34	Includes game, whole birds cooked
Sauces				
Cheese	12	0 to −13·5	− 5·4 ± 1·39	
Onion	21	0 to −19·3	− 5·1 ± 1·2	
White	22	0 to −13·9	− 7·2 ± 0·97	
Soups				
Various	12	−14·4 to −28·6	−19·8 ± 1·57	Includes loss due to evaporation
Vegetables				
Asparagus, boiled	16	−12·0 to +4·5	− 0·5 ± 1·03	
Broad beans, boiled	13	−12·3 to +3·6	− 2·7 ± 1·06	1950: larger losses and no gain. 1952: small loss or gain
Brussels sprouts, boiled	26	− 8·2 to +25·2	+11·6 ± 1·07	
Cauliflower, sprigged, boiled	12	−12·5 to +14·0	+0·04 ± 2·18	Gains only (no losses) February to May. Losses only (no gains) September to January
Chicory, boiled	31	−15·6 to + 8·2	− 2·5 ± 0·7	Loss or gain in same batch cooked on same day

Table 1 (*cont.*)

Food	No. of samples	Change in weight		Remarks
		Range	Mean value with its standard error	
		Vegetables (*cont.*)		
Corn-on-the-cob, boiled	12	+ 6·9 to +25·9	+14·0 ± 1·63	Largest gains when cob barely ripe or at end of season
Cabbage, boiled	28	−25·0 to + 4·2	− 7·5 ± 1·37	Five gains, all in August or November
Carrot, old, boiled	27	−25·6 to +10·2	−10·7 ± 1·17	Three gains in 3 years, all in August or September
Jerusalem artichoke, boiled	13	− 9·1 to −26·3	−13·5 ± 1·18	
Leek, boiled	18	−28·3 to +12·7	−13·9 ± 1·87	
Marrow, boiled	13	−10·7 to −40·3	−27·7 ± 1·95	
Mushroom: fried	14	−48·7 to +15·3	−18·1 ± 3·71	
stewed	12	−13·6 to −32·4	−24·3 ± 1·60	
Peas: garden, boiled	21	−15·8 to + 6·9	− 5·3 ± 0·8	One gain in August 1949 and one in August 1952, losses in same month. Losses over 10 % in June and August
frozen, boiled	12	− 1·8 to −18·8	−10·8 ± 1·65	Loss depends partly on amount of ice adhering to peas
Parsnip: boiled	12	−11·8 to +11·1	− 0·3 ± 1·98	Gain at beginning of season only
roast	12	−19·4 to −50·0	−31·6 ± 2·60	
Potato: new, boiled	22	− 7·4 to + 8·0	− 1·2 ± 0·59	One gain in May, one in June, several in August
old, boiled	35	− 9·1 to +10·4	+0·04 ± 0·78	Often 5 % or more loss or gain if broken to flour
old and new	57	− 9·1 to +10·4	−0·45 ± 0·53	
baked in stock	12	−17·1 to +0·5	− 9·5 ± 1·77	Largest loss in potatoes partly in air, smallest loss in those submerged in stock
chips	16	−15·5 to −60·2	−42·4 ± 2·51	
roast	12	−12·6 to −22·9	−19·2 ± 0·97	
boiled and then fried	12	−11·4 to −46·6	−27·1 ± 2·97	
Onion: baked in stock	16	0 to −30·8	−21·6 ± 1·94	See potato baked in stock
boiled	14	− 5·9 to −30·0	−19·0 ± 1·48	
fried	12	−50·0 to −68·1	−55·4 ± 1·42	Absorbed approximately 12 % of its own raw weight of frying fat
Runner beans, boiled	16	−13·6 to + 8·5	− 3·3 ± 1·30	No change of weight, or less than 1 % in three cookings
Seakale, boiled	19	−24·4 to +13·6	− 9·7 ± 1·47	Loss or gain at any time and often on same day
Spinach: boiled	19	−56·6 to +24·4	−18·8 ± 3·97	
boiled and sieved	12	−29·5 to −64·5	−44·8 ± 3·18	
Spring greens, boiled	41	−13·9 to +31·0	+12·5 ± 1·03	
Swede: boiled	14	− 8·5 to −25·7	−18·7 ± 1·48	Cooked in thin slices in boiled salted water
pressure cooked	18	−32·0 to + 1·4	−13·9 ± 2·16	Cooked in thin slices at 15 lb. pressure for 7 min
Tomato: baked	12	− 5·0 to −17·2	− 8·2 ± 1·04	
fried	15	− 6·0 to −43·4	−24·7 ± 2·95	
grilled	12	0 to −20·7	−11·9 ± 1·75	Whole tomatoes with skin on did not lose weight
Turnip, boiled	13	−19·4 to +21·3	−10·4 ± 1·82	Loss was greater if vegetable was diced before cooking

Appendix 5: Examples of common errors when calculating calorie content

This section provides a variety of examples of sources of error that commonly arise when analysing recipes.

Example 1: Missing information from recipes

In this example we were asked to check the calories that had already been calculated in-house. When the recipes were checked, a number of different mistakes had been made. A portion of curried parsnip soup was labelled as 450 kcal/portion, whereas reanalysis found it to be 164 kcal/portion, due to the absence of water in the original recipe.

A large vol au vent was labelled as having 168 kcal, when in fact it should have been marked with 427 kcal. This had happened due to the weight of one large pastry case (55g) being used in a recipe for 20 portions, instead of 20 cases at 1100g.

Example 2: Portion size errors due to weight loss on cooking

In one establishment, standardised recipes were provided and used across several different locations. A meeting with staff from all locations was arranged to discuss portion sizes of dishes served, as many recipes appeared to make very large portions. The 'Carbs and Cals and Protein and Fat' book proved to be a useful tool in determining the portion sizes of cooked foods served. For most dishes there are six visual portion size options that can be used as a guide, as seen here. This exercise stressed the importance of applying the correct weight-loss factors to dishes to ensure the calculated cooked weight is similar to the actual portion being provided.
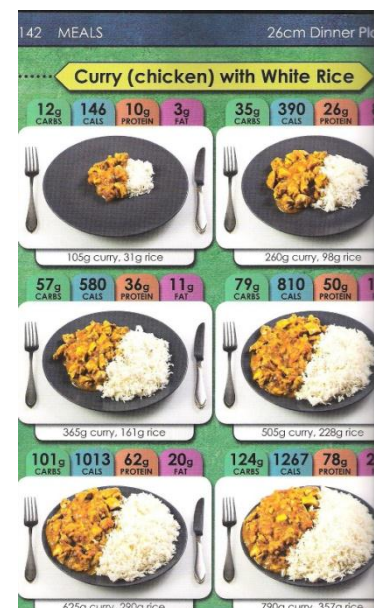
Example 3: Portion size errors when foods are not weighed

One establishment emailed its recipes and during analysis it was noted that some of the portions of carbohydrate foods appeared to be very large, therefore increasing the calorie content significantly. A portion of cooked couscous was reported to weigh 250g. On visiting the restaurant, the 'Carbs and Cals and Protein and Fat' book was used to show the chef the portion of couscous that was being served for one meal. From the picture he immediately knew that the portion had been overestimated and the cooked serving was 110g.

Example 4: Nutrition information not provided by manufacturer

In one establishment the majority of the buns and pastries were bought from a local company. There was no nutrition information on the packaging of the goods or available online. The company was contacted by telephone several times and also via emails in an attempt to obtain the calorie information - but there was no response. In this case, the weights of the pastries and buns were obtained and substituted with nutrition information from a similar food, either from the database in the nutrition analysis software or from food labels. Unfortunately, this is a source of error that can be avoided but requires suppliers to be forthcoming with the nutrition information of their goods.

Example 5: Applying weight loss factor to recipes within main recipe

Care also needs to be taken when applying weight loss factors to recipes with both cooked and uncooked foods. A beef burger in a bap is an example of this, see below:

> *Beef burger in bap with onions*
>
> 80% beef burger raw 100 grams, onions XX grams, white floured bap XX grams

The weight loss factor normally used for a beef burger is 30%. However, the onions and bap will not have 30% weight loss and so if this was applied to the whole recipe, the portion size would be inaccurate. A way to solve this issue is to calculate manually the weight loss of the burger and use a cooked code with the cooked weight, in this case 67 grams of 80% beef burger, grilled. The bap and onions can then be added without any weight loss factor being used. Alternatively, the raw weight of the burger could be entered with a weight loss factor of 30% as a sub recipe and then added to a recipe with the onions and bap and no weight loss applied.

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