FINAL REPORT

REBUILD OF

THE FOOD STANDARDS AGENCY RECIPES

DATABASE

Final report

MRC Human Nutrition Research

Project reference number: 102004

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This final report contains details of the protocol developed by MRC Human Nutrition Research, in

fulfilment of the project entitled 'Rebuild of the Food Standards Agency recipe database'.

Contents

List of abbreviations

FSA: Food Standards Agency

HNR: Human Nutrition Research

MRC: Medical Research Council

MW: McCance and Widdowson's (eds.) The Composition of Foods

NDB: NDNS Nutrient Databank

NDNS: National Diet and Nutrition Survey

NDNS RP: National Diet and Nutrition Survey Rolling Programme

RCI: Raw commodity ingredients

RHM: Recipe home made

RPB: Recipe purchased brand

RPC: Recipe purchased composite

SIC: Simple ingredient commodity

SRD: Standard Recipes Database

1. Introduction

The final report for the project Rebuild of the Food Standards Agency (FSA) Recipes Database provides a background to the project, its aims, objectives, major project timelines and the resources used to deliver the project. It also includes an overview on the sources of information identified to complete the project, methods used and the pilot study. The detail of methods used and practical guidance on how the database was compiled are contained within the Guidance Notes for the Standardisation of Recipe Homemade Foods (RHM's) supporting the FSA Standard Recipes Database (SRD) (Appendix A) and the Guidance Notes for the Standardisation of Recipe Purchased Composite Foods (RPCs) and Recipe Purchase Branded Foods (RPBs) supporting the FSA SRD (Appendix B). These guidelines are referred to throughout the final report and should be read in conjunction to this report for a full understanding of the project.

2. Background

Within the remit of the FSA is delivery of Science and Evidence Strategy, which includes assessment of consumer exposure to additives, toxicants, preservatives and other food chemicals. Knowledge of consumer exposure enables the FSA to impact and inform on regulatory compliance, contaminant risk assessment, and ensures proportionate incident responses. This is achieved through the application of the food chemical content of foods to consumption patterns as determined by national nutritional surveys. A pre-existing recipe database, consisting of food (recipe ingredient) specifications, has been used by the FSA as a source for the application of the chemical content in dietary exposure assessments.

Previous versions of the FSA recipes database had increased in size through the addition of new food recipes as an increasing number of foods became available to consumers. In the past, the addition of recipes to the database was completed on a relatively ad-hoc basis, without the use of standardised procedures. The FSA found that this approach led to unclear and inconsistent methods used within the recipes database, with ingredient information compiled from a wide variety of sources. In 2012, the FSA invited proposals for the development of an electronic recipes database in a user-friendly format, using a standardised approach. The recipes database was to include around 10,000 food codes, which had been used in previous UK national nutrition surveys. The primary aim was to use the recipes database for conducting consumption and exposure assessments. MRC Human Nutrition Research Unit was subsequently awarded the contract for this work following a competitive grant application and review.

MRC HNR proposed to initiate the project by reviewing food codes required in the new recipes database. The basis of MRC HNRs' proposed methodology was to utilise the food consumption data from the National Diet and Nutrition Survey (NDNS), and Diet and Nutrition Survey of Infants and Young Children (DNSIYC).

3. Aim of the project

The lack of consistency in the existing recipes database formed the underlying technical requirement for the rebuild of the recipes database. The aim was to create a standardised recipes database, by reviewing all codes used in UK national nutrition surveys, producing standardised recipes using a consistent approach and to create a standard, well-documented, methodology so that future additions or improvements to the database could be made to the same standards by the FSA or others as required. Therefore, it was agreed, that HNR would create a first version of the SRD consisting of standardised recipes.

4. Methods

An outline of the main stages of the project are provided in this section of the final report, however, the detailed methodology and approach for the standardisation of recipes is provided in:

- The Guidance Notes for the Standardisation of Recipe Homemade Foods (RHM's) supporting the FSA Standard Recipes Database (SRD) (Appendix A)
- The Guidance Notes for the Standardisation of Recipe Purchased Composite Foods (RPCs) and Recipe Purchase Branded Foods (RPBs) supporting the FSA Standard Recipes Database (SRD) (Appendix B)
- Pilot Study Report (Appendix C)

5. Data compilation

All food codes as recorded during national nutrition surveys since 1992 were considered for inclusion in the SRD (Table 1), in order to reflect the UK food consumption depicted by these surveys over a period of 20 years. Food level datasets for these surveys were retrieved from the UK data archive (http://ukdataservice.ac.uk/) and aggregated to produce lists of food codes used during each survey, together with the summation of the weight of food consumed and the frequency each code was used. Following this, a master food code list was compiled to represent foods consumed in all

surveys, and merged with the current National Diet and Nutrition Survey rolling programme (NDNS RP) year 4 nutrient databank. This final stage was important as it enabled additional food codes (n=358) to be captured which may not be represented 'as consumed' in the survey datasets but are important as components of recipes, for example, raw meat.

Table 1 The number of foods compiled from the UK nutrition surveys for application into the SRD

National surveys reviewed	Fieldwork years	Food codes included* (n)
NDNS 1.5-4.5 years	1992-1993	2614
NDNS older people 65+ years	1994-1995	2860
NDNS young people 4-18 years	1997-1998	4238
NDNS adults 19-64 years	2000-2001	4612
Low Income Diet & Nutrition Survey	2003-2005	4142
Diet & Nutrition Survey of Infants and Young Children	2011	2564
NDNS rolling programme Year 1-4	2008-2009 2009-2010 2010-2011 2011-2012	3139 3044 3039 3267

* The numbers are including the same food codes used in multiple surveys, and supplements

A total of 9110 food codes were aggregated from the surveys for consideration to include in the SRD. The final number of food codes within SRD v1.0 is 8397. To achieve the final list of food codes HNR reviewed the following food types;

- Dietary supplements, prescribed dietetic products, medicines and nutritionally complete diet products (n=713) were excluded from the SRD.
- Food codes that were used as descriptors to assist with recipes, such as 'water as a diluent' (n=10), were included in the SRD.
- It was considered if factors for weight gain, or cooking loss etc. were required to apply for recipe update, in order to calculate the ingredient proportion 'as consumed'.

5.1 Categorisation of food codes into food type

To determine the process for creating standard ingredient lists, each food code was classified into a food type based on its description. Six food types were devised to describe the differences between

food codes. A 'supplements' category was devised which allowed exclusion of these food codes out of the final SRD list (Table 2).

Table 2 Number of food codes in each food code type which were compiled in the SRD

Food code type	Count (n/%)*
Raw commodity ingredients (RCI)	358 / 4.26
Simple ingredient commodity (SIC)	1069 / 12.73
Recipe: Homemade (RHM)	4662 / 55.5
Recipe: Purchased composite (RPC)	1670 / 19.88
Recipe: Purchased brand specific (RPB)	628 / 7.47
Miscellaneous (MISC)	10 / 0.11
Total	**8397**

Each food code has a food name which was used to assign the food type. In some cases these descriptions were not complete, or were not entirely clear, however every effort was taken to ensure a standardised classification to type. The SRD food types are defined as follows;

Single-ingredient food codes were identified by relevant keywords in the food code description which suggested an unprocessed nature such as; raw, uncooked, and fresh. These food codes were used to determine the ingredients in multi-ingredient food codes which comprise two or more ingredients.

- **Raw commodity ingredients (RCI)** are food codes in their raw agricultural and/or unprocessed state, plant or animal origin, for example raw meat and uncooked vegetables.
- **Simple ingredient commodity (SIC)** food codes are commodity items which have undergone some processing to derive an ingredient and may originate from an RCI, such as flour and sugar.

Multi-ingredient food codes were one of three distinct categories based on their food name description and/or respective NDNS food group.

- **Recipe Homemade (RHM)** food codes relate to homemade items comprising two or more ingredients; they are identified by the inclusion of 'homemade' within the description, or from their categorisation into homemade food groups in the nutrient databank.

- **Recipe Purchased Composites (RPC)** are food codes relating to purchased or retail items, where the food composition data was originally compiled using more than one brand (composites). RPC codes are identified by food name description (many include the words 'retail', 'purchased'), assignment to one of the purchased food groups, and may have accompanying notes within the nutrient databank detailing food code origin.

- **Recipe Purchased Brand Specific (RPB)** relates to food codes for products which have very distinct food composition and have a brand name included within their description. These food codes are often fortified products and this may act as an identifying characteristic for categorizing RPB codes.

Further guidance for food code categorisation:

Users should refer to the following reports and standard operating procedures for additional background information which may assist categorization:

- EFSA, Report on the development of a Food Classification and Description System for exposure assessment and guidance on its implementation and use*

- SRD food code assumptions compiled during creation of SRD v1.0 (Appendix D).

- An SRD food code categorization decision tree was also developed to guide classification of food codes (Appendix E)

EFSA Journal, 2011; 9 (12): 2489.

To assist in the compilation of standard ingredient lists HNR used default food codes for recipes which did not provide sufficient details (e.g. meat cuts and lettuce type). In-house documents including specific gravity measures and food weights were also used to compile standard ingredient lists for recipes.

5.2 Pilot study

Prior to commencement of the standardisation of all codes a pilot study was carried out (Appendix C). Briefly, the pilot used 40 food codes selected from the food codes, used in the UK national nutrition surveys (Table 1). The 40 food codes were covering each type of food category e.g. RCI (n=5), SIC (n=5), RHM (n=10), RPC (n=10), and RPB (n=10).

Overall the pilot study highlighted that several approaches were necessary to derive standard ingredient lists. The pilot study was effective in demonstrating the extent of variation in food codes and the mixed approaches required to ensure ingredient lists were as realistic and accurate as possible. The pilot study confirmed that the utilisation of the nutritional information for calculating ingredient proportions of manufactured foods (RPC and RPB) was efficient. It was also identified that the NDNS nutrient databank was an applicable tool to use for data compilation more efficiently (Section B. ii, of the pilot project – Appendix C).

During the project, all the stages of data compilation (pilot study results, methodology used for recipe update, and the data set of initially updated recipes-e.g. first 1000 recipes) were shared with the members of FSA periodically. The process was necessarily updated in accordance with the comments of FSA, and mutual discussions between FSA and MRC HNR. These project tasks were addressed through exchanging emails and joint teleconferences which were recorded in the monthly project update reports provided by MRC HNR.

5.3 Standardising multi-ingredient food codes (RHM, RPC and RPB)

RHM's were standardised according to guidance documented in Sections 3, 4 and 5 of the guidance notes in Appendix B. RPC and RPB recipes were standardised using the guidance notes documented in Sections 2, 3 and 4 in Appendix C.

5.4 Sources of information used to derive standardised recipes

As documented in the guidelines (see appendix A and B), permission was sought from publishers and supermarkets to use ingredient information to derive the standardised recipes. The sources used for RHM recipe compilation can be found in the RHM guidance notes (Appendix A). Table 3 below shows the proportion of RHM recipes derived from different sources.

Table 3. Proportion of RHM's derived from each information source

SOURCE OF INFORMATION	Total	%
Approved websites	180	3.83
Approved websites & MW	7	0.15
Approved websites & Manufacturers' instructions	1	0.02

Approved websites & NDB	18	0.38
Approved websites & Food rules	2	0.04
Approved websites & RPC	1	0.02
Duplicate code 100%	123	2.63
Food rules	36	0.77
FSA food portions sizes book	8	0.17
MW	3536	75.15
MW & Approved websites	46	0.98
MW & FSA food portions sizes book	17	0.36
MW & Food rules	11	0.23
MW & Manufacturers' instructions	32	0.68
MW & NDB	134	2.85
MW & RPC	7	0.15
MW & Team knowledge	45	0.96
MW, Team knowledge & approved websites	10	0.21
Manufacturers' instructions	158	3.36
Manufacturers' instructions & MW	9	0.19
Manufacturers' instructions & NDB	2	0.04
Manufacturers' instructions & Team knowledge	1	0.02
Manufacturers' instructions & RPC	2	0.04
Manufacturers' instructions & RPC & MW	2	0.04
NDB	67	1.42
NDB & Approved websites	3	0.06
NDB & MW	1	0.02
NDB & team knowledge	3	0.06
NDNS	1	0.02
No changes made to proportions or ingredients	72	1.53
No changes made to proportions-(ingredients updated)	108	2.30
Team knowledge	13	0.28
Team knowledge & Food rules	2	0.04
Non RHM-SIC,RPC, RPB	47	1.00
TOTAL RHM	**4705**	**100**

5.5 Data checks

Once complete, the recipes were subject to data checks. The procedure for both RHM's and RPB's/RPC's varied and are documented in Section 6 of the RHM guidelines (Appendix B) and Section 5 of the RPC/RPB guidelines (Appendix C).

5.6 Outputs/data transfer of the project

- Updated recipe dataset (extract shared via FileRun).

- Project report

- The Guidance Notes for the Standardisation of Recipe Homemade Foods (RHM's) supporting the FSA Standard Recipes Database (SRD)

- The Guidance Notes for the Standardisation of Recipe Purchased Composite Foods (RPCs) and Recipe Purchase Branded Foods (RPBs) supporting the FSA Standard Recipes Database (SRD).

- Pilot Study Report

6. Duration of project

The project commenced in May 2013 and was completed early in 2015. The following table (Table 5) summarises the main work packages (outputs) and their timeline:

Table 5. The main work packages (outputs) and the timeline

Task	Start date	Final date
Identification of relevant surveys and food codes and categorisation	23.05.2013	31.05.2013
The pilot study work and reporting	28.06.2013	31.07.2013
Production of study documents	14.06.2013	28.06.2013
Updating RHM food codes	15.08.2013	30.07.2014
Checking RHM food codes	15.05.2014	30.07.2014
Guidance notes on updating RHM food codes produced	01.07.2014	30.07.2014
Updating RPC-RPB food codes	19.03.2014	03.11.2014
Checking RPC-RPB food codes	03.11.2014	20.11.2014
Guidance notes on updating PRC-RPB food codes produced	10.11.2014	28.11.2014
Updating RPC-RPB Products no longer manufactured	18.12.2014	15.01.2015

The average time it took to standardise recipes e.g. use our generic coding rate 20-25 recipes/per person-day for RHM and 7-10 recipes /per person-day for RPC and RPB.

7. Project team

Several individuals were involved at various time points during the project, those involved and the dates are listed below in Table 6.

Table 6. Project staff and their work time

Staff name	Position	Role	Start date	End Date
Polly Page	Project director	Project management	01.04.2013	05.03.2015
Toni Steer	Project director	Project management	01.04.2013	05.03.2015
Birdem	Project manager	Project management	10.03.2014	05.03.2015

Amoutzopoulos				
Anna Harvey	Project coordinator	RHM coding	15.08.2013	30.07.2014
Lindi Holmes	DAA*	RPC-RPB Coding	19.03.2014	28.11.2014
Martha Hughes	DAA	RPC-RPB Coding, Assisting reporting	14.04.2014	25.02.2015
Holly Hulson	DAA	RPC-RPB Coding	01.09.2014	18.11.2014
Lindsay Inglis	DAA	RPC-RPB Coding	08.09.2014	28.11.2014
Catherine Galloway	Replacement student	RHM Coding RPC-RPB Coding	02.09.2013	02.09.2014
Kirsty Trigg	DAA	Pilot study	06.05.2013	20.12.2013
Emily Fitt	Project manager	Project management	01.04.2013	09.10.2013
Amy McCabe		Pilot study	01.04.2013	08.08.2013

*DAA: Dietary assessment assistant

8. Future updates of the SRD

The diversity and formulation of food products in the UK food market changes continuously. During the project it was noted that the changing nature of food products e.g. reformulation led to some earlier recipes in the project being revised, and updated. The submission of the final data extract contained standardised recipes based on the composition of foods available at the time the project was undertaken.

The SRD would benefit from regular review and maintenance in order to keep it up to date. Therefore, HNR recommends the regular review and revision of the SRD, ideally once in a year. The proposed management strategy for review and revision of out-of-date recipes could base each periodic update on a specific sub-food group (e.g. Breads, Biscuits, Pizza). This approach would allow a more proportionate approach to updates, as reviewing all codes would involve a considerable amount of time and resources.

9. Conclusion

This project, carried out by MRC HNR, provided a recipe dataset (SRD) including 8397 standardised and up-to-date recipes, two comprehensive guidance notes describing the methodology applied in the study, and the project and pilot study reports. The updated recipes represent the foods consumed in the UK as the recipes were selected from the UK National Nutrition Surveys, and therefore can serve as a key source for dietary exposure assessment studies in the UK. The supportive documents (guidance notes) provided with the data extract can contribute on the use of standard methodology in future studies focused on the revision of recipes. The pilot study report can be used as a reference on the background of technical methodology. The project report provides

information on the management process and background of the SRD project. Overall, the experience gained on the revision of such large number of recipes can be used as a model, and inform the development of similar projects in future. MRC HNR also recommends regular reviews of the SRD. Changes in foods available in the UK market will require the dataset to be regularly maintained in order to keep it up to date.

HNR staff would like to acknowledge the support of the publishers and supermarkets who gave permission to use ingredient information from recipes and food products. We would also like to acknowledge the support and guidance from staff at the FSA: Rufina Acheampong, Dr Joseph Shavila, and Robin Clifford who provided useful feedback and guidance on all aspects of the project, including detailed written feedback and input via several teleconference calls over the duration of the project.

10. Appendixes

Appendix A

The Guidance Notes for the Standardisation of Recipe Homemade Foods (RHM's) supporting the

Food Standards Agency Standard Recipes Database (SRD)

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Guidance Notes for
The Standardisation of
Recipe Homemade Foods (RHMs)
Supporting
The Food Standards Agency
Standard Recipes Database (SRD)

MRC Human Nutrition Research

Project reference number: 102004

Prepared by the HNR project team:

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This document contains guidelines to users and data compilers of the FSA SRD. This document has been developed by MRC Human Nutrition Research, in fulfilment of the project entitled 'Rebuild of the Food Standards Agency recipe database'. It relates specifically to the standardisation of recipe homemade foods (RHM) codes. All SRD users should familiarise themselves with this guidance document, and it is recommended it be treated as a working document, developing alongside the SRD RHM codes. All SRD users should be familiar with the final report for the SRD and the other accompanying documents that provide guidance on updating all components of the SRD.

Contents

List of Abbreviations

Data compiler: Those responsible for collecting and assessing the data to be used in the standard recipes database (SRD) and how the data are presented

Data user: The users of food composition tables and databases which vary greatly.

FC: Food code

FSA: Food Standards Agency

HNR: Human Nutrition Research

MRC: Medical Research Council

MW: McCance and Widdowson's (eds.) The Composition of Foods

MW6: McCance and Widdowson's (eds.) The Composition of Foods (6th edn.)

MW supplements: McCance and Widdowson supplements

NDB: NDNS Nutrient Databank

NDNS: National Diet and Nutrition Survey

NDNS RP: National Diet and Nutrition Survey Rolling Programme

RCI: Raw commodity ingredients, relates to food codes in their raw agricultural and/or unprocessed state, for example raw meat and uncooked vegetables.

RCI: Raw commodity ingredients – relates to food codes in their raw agricultural and/or unprocessed start, for example raw meat and uncooked vegetables.

RHM: Recipe homemade – re lates to food codes where the recipe is homemade, comprising of two or more ingredients. They are identified b y the inclusion of 'homemade' within the description, or from their categorisation into homemade food groups in the nutrient databank.

RPB: Recipe purchased brand – relates to food codes where the re cipe is a re tail item specific to one brand.

RPC: Recipe purchased composite – relates to f ood codes where the recipe is a retai l item and the existing food composition data on the year 4 NDNS Nutrient Databank was originally comprised of more than one brand (a composite).

SIC: Simple ingredient commodity – relat es to food co des that are commodit y items which have undergone some processing to derive an ingredient and may originate from a recipe commodity ingredient, such as flour and sugar.

SRD: Standard Recipes Database

TBSP: Table spoon

TSP: Tea spoon

1. Overview

This guideline has been prepar ed to enable users and data compilers of the Standard Recipe Database (SRD) to u nderstand the methods and assumpti ons used in standardising recipe h omemade (RHM) codes w ithin the SRD. The SRD was initially created by merging all food codes recorded during national nutrition surveys since 1992 and merged into a copy of the year 4 NDNS Nutrient Databank (NDB). This was converted to MS Excel format. The definition of fi elds and descriptors used within the SRD Excel extract are presented in Appendix 1. Recipe homemade (RHM) food codes relate to homemade items comprising two or more ingredients which were categorised as RHM and coded based on the instructions given in this guideline. This RHM guideline is intended to be used alongsi de the guidelines for recipes purchase composite (RPC) and recipes purchase brand (RPB) and the Fi nal Report relati ng to th e rebuild of the FSA SRD.

2. Sourcing Recipe Homemade (RHM) information

RHM codes were investigated to d etermine the appropriate components and proportions to generate a st andard ingredient list for the SRD. To achieve this, comparable recipes were explored and obtained from different sources, and used to guide decis ions. The primary source of ingredient information for the SRD were the recipes published within McCance and Widdowson's Composition of Foods 6th edition (MW6) and related published supplements. As a secondary information source, the NDB was used to assist with RHM food codes in two way s; firstly, to review related nutrient composition of food cod es and guide proportion of spe cific nutrient containing ingredients, and secondly as a so urce of recipe information.

Where comparable rec ipes were found in the MW this was the primary source of information used to create the standard ingredient lists, combined with additional recipe information which was available in the NDB. Data compilers also applied their own knowledge and experience of food consumption and current cooking methods to al l the standard ingredients lists prepare d for the SRD. For i nstance, due to the age of the recipes in the MW6 some contained lard and/or dripping, which are food ingredients used less often in current cooking practice. These were th erefore substituted for more commonly consumed f ats. Food i ntake data from the most recent NDNS was used to guide data compilers in understanding commonly consumed food i ngredients. Similarly, where MW recipes did not provide detail on le sser ingredients such as herbs and spices, data compilers expanded on these where necessary.

Additional recipe so urces used fo r compilation of the RHM SRD were online recipe collections and pop ular cookery books. These were reviewed for comparable recipes if sufficient information was not found in the MW and NDB. Publishers of both sources, online and cookery books, were formally asked to provide written permission to use their recipe information (see Appendix 2). The websites were chosen as the first five non-sponsored websites that appeared following a www.google.co.uk search for the term "recipes" (carried out on 13/05/13). The co okery books were chosen as the top 5 UK best-selling titles wi thin the food drink category in the 2012 Nielson best-se llers list (http://www.guardian.co.uk/news/datablog/2012/dec/28/top-100-bestselling-books-2012#food, accessed 13/05/2013). Permission was received from the following sources:

- http://uktv.co.uk/food/homepage/sid/423
- www.bbcgoodfood.com
- Lorraine Pascale's Fast, Fresh and Easy Food (2012). First edition. London: Harper Collins Publishers. ISBN 978-0-00-748966-4.

If these additional sources did not provide th e required information to match a recipe to the food code, data compilers adapted the ingredient list from a simi lar food code t hat had already been completed in the SRD. For example, "potato salad, with salad cream" may have similar proportions to "potato sala d, with mayonnaise". At thi s stage data compilers also collated ingredients and proportions based on personal recipe knowledge.

The various stages followed for reviewing and collecting recipe information from the different sources are given in Table 1. The lis t of approved sources used for the recipe compilation of RHM co des for the SRD in crea ting standardised food codes are given in Appendix 3.

Table 1. Stages involved in reviewing information sources for homemade recipe (RHM) codes

Method stage	Method instructions
RHM-1a	**Review Nutrient Databank (NDB):** Review the food code within the NDB to ascertain further food code details. The NDB may already hold recipe information compiled during food composition calculations.
RHM-1b	**Review MW6 and MW supplements:** Use the food code description to search the recipes section of MW6 and, if necessary, the supplement volumes to identify suitable recipe(s). The recipe should match the food code description, or be considered a reasonable match for composition. For example, 'cheese sauce made with whole milk' is a comparable recipe for the food code 'cheese sauce made with skimmed milk'.
RHM-1c	If a recipe is identified at stage 1b, only this recipe is used to form the SRD ingredient list, guided by the recipe contents and proportions.
	If a recipe is identified in stage 1a and 1b, a combination of ingredients and proportions is considered from both sources.
	If no recipe is found from stage 1a or 1b, or if the recipe in 1a appears out of date, move to stage 2.
RHM-2a	**Search published sources – recipe websites:** Using recipe websites (with appropriate permissions) search for a suitable recipe. Review each website and record all comparable recipes. A comparable recipe is one where the title matches or is considered a fair likeness to the food code description.
RHM-2b	All suitable recipes from websites should be documented and reviewed for comparable ingredients. When 5 recipes are found no further searching is required.
RHM-3a	**Search published sources - cookery books:** Search for a suitable recipe within recipe books (with appropriate permissions) and review and record suitable recipes. A comparable recipe is one where the title matches or is considered a fair likeness to the food code description.
RHM-3b	All suitable recipes from books should be documented and reviewed for comparable ingredients. Cookery book recipes should be combined with website recipes if appropriate, totalling a maximum of 5 recipes.
RHM-3c	Where 5 recipes can not be sourced from cookery books and/or websites, use available identified recipes and review suitability with reference to an expert panel (e.g. SRD working group).
RHM-4a	If the appropriate number of recipes is not found, search the NDB for a similar food code which might be suitable for adaptation to the food code description in question. If no recipe is identified the data compiler should utilise their own knowledge and experience of cookery to devise a suitable list of ingredients and proportions. This may mean making no changes to the proportion of ingredients to the original recipe, or updating ingredients to make them more current e.g. updating raw codes where possible to codes with cooking losses.

3. Procedure of standard recipe compilation using McCance and Widdowson (MW) and the NDNS Nutrient Databank (NDB)

Existing databank recipes

Some food codes in the NDNS N DB already co ntained ingredient lis ts. Each food code was reviewed in turn and the following questions were considered to guide and inform decisions as to which recipes should remain in their current state and which should be updated.

- Was the food code created during the NDNS Rolling Programme (e.g. from 2008)?

This can be determined using information in the comments box in the NDB (see Figure 1) which, since the start of NDNS RP, has been used to record the survey year and date for when the food code is created. Codes wh ere there are no comments, and tho se codes pre-dating 2008, have not been created spec ifically for use during NDNS RP. There ar e many recipes which re late to old surveys that have been used by very few participants, often created on the basis of one individual 's food dairy recipe entry. These recipes remain in the NDB due to their individual nature.

Where the decision was made not to upda te the recipe in the SRD/NDB, the food codes within the recipe were u pdated to appropriate defaul t codes where necessary. For example, many of the older recipes contained, for example, old fat spread and raw meat codes. A number of these recipes did not always match the food code description or were missing key ingredients, possi bly due to previ ous coding errors, and these food codes were updated where possible. If the food code description was for a wel l-known dish, these food codes were mostly updated to keep the recipes consistent within the NDB. For example food code 6750, chilli con carne with chicken mince, tomato juice a nd kidney beans, was an old code and has only been us ed once within the UK surveys. MW meat dishes and products recipes 206, Chilli con carne, was appropriate to use with adaptions. Food codes used frequently in the NDNS RP and held in the NDB as recipes were mostly considered to require standardisation.

- Does the recipe include comments/description relating to its origin?

When considering an update it is important to acknowledge the background relating to the food code orig in and purpose, related in part to poi nt 1 above. In the fi gure 1, the description field contains the food codes used during the creation of the original recipe and the co mments box shows when the food code was created, indicating in this case that there has been no update since 2007. These ingredients and proportions wer e

therefore cross checked against current low fat condensed soups. The ingredients were used when converting this code to a recipe if they were suitable.

Figure 1. Nutrient Databank (NDB) food description panel

1. Description: contains the food codes used during the creation of the original recipe
2. Comments: shows when the food code was created, since the start of NDNS RP. It, has been used to record the survey year and date for when t he food code was created, indicating in this case that there has been no update since 2007

- Do the ingredients and proportions appear feasible, and/or standard?

Answering this question requ ires the data compilers own kno wledge. Some old recipes contained errors such as missing key ingredients (e.g. c hicken missing from a chicken pie), dated ingredients (e.g. use of lard) or ingredient proportions which would not make the recipe feasible (e.g. 'custard made with skimmed milk' but containing semi-skimmed milk as an ingredient).

- Is the food code descript ion one which is li kely to be f ound in published recipe sources?

Some food codes have very distinctive de scriptions making their correspondence to published recipes difficult.

Example: Recipe (RHM): Chicken curry with high curry powder

"High curry powder" is not a wel l-known food product. Additionally it is not possible to estimate the amount of curry from the term "high" which is not clearly stated.

In this example, th e Working Group discus sed and devised a su itable food rule (see Appendix 4).

Changes to food code descriptions between survey years

Occasionally food code descriptions have been revised to ensure they represent products more accurately over the ti me scale of th e various UK n utrition surveys. There can sometimes be two descriptions in the UK su rveys for the same food code number. For example FC 5345 Cauliflower cheese with s/s milk and FC 5241 Cauliflower cheese made with semi skimmed milk. In this case FC 5241 was reviewed and updated a recipe (with ingredient list) was created for FC 5241. FC 5345 was referenced to FC 5241 and shown as a 100% duplicate of FC 5241.

Adding new food codes to support recipes

In specific situations new food codes have been added to the SRD:

- When there were no suitable RCI and SIC food codes to in the NDB to use for the compilation of the standard ingredient list.
- In order for the ingredient lists to be appropriate f or the use of exposure assessment there was a require ment for no n-nutrient based ingredients to b e added, under the new SRD miscellaneous food group (50X). Therefore marker codes were set up.

Marker codes: Six marker codes were se t up for the SR D, to account for ingredients of non-nutrient context in FSA recipes but which are important when considering exposure assessment/risk;

1. Marker code for vitamins and minerals
2. Marker code for flavourings
3. Marker code for food additives (stabilisers, thickeners, emulsifiers)
4. Marker code for colourings
5. Marker code for sweeteners (not sugar derivatives)
6. Marker code for preservatives (food additives other than covered by marker codes no 1,2,3,4,5)

Copying new SRD food codes in to the live NDB: The new SRD food codes that were created for the SRD may add val ue to the NDB and have therefore b een added into the NDB used for coding NDNS rolling programme. However, careful consideration was given to creating new foods codes and where possible this was minimised to avoi d creating food codes that might not be relevant for use in the NDB.

Food code recipe group changes from RHM to RPC

Certain FC's were deemed not suitable to be in the RHM food group as they were foods not commonly made at home, for example, sa usages which tend to be manu factured, therefore the recipe g rouping was changed to an RPC. A re cord is kept of these food group changes and can be found in Appendix 5.

Example: Recipe (RHM): Mixed Fruit Sponge Cake Mix

This RHM was produced and consumed as a commercial product. It was not possible to find information on the amount of its ingredients with household measures. Therefore, this RHM code was changed to RPC.

Food Weight

Data compilers used standard weights and measures for common foods obtained from sources such as: FSA Food Portion Sizes (3rd edition), MW6 and MRC HNR 'in house' food weights.

Weight loss

Total weight loss during food process such as cooking was calculated for certain recipes referring from the factors given in MW6 and assigned to the 'water loss' field in the NDB.

A preliminary weight loss was assigned on ingredients in recipes if an ingredient was expected to lose water significantly more than other ingredients (see example: rosehip syrup-page 15).

Ingredients and the proportions were included in the SRD in their 'as consumed' state (see example: whole fruit bun-page 12).

Weight gain

Weight gain was calculated for certain foods which require the addition of water/liquid for rehydration 'as consumed' state, such as pulses, rice and pasta, referring to the factors given in MW6. Weight gain is taken into account by increasing the proportion of the absorptive ingredient through the decrease of liquid components, specifically water and other water-based ingredients such as stock. If the relative weight gain factor was not found in MW, the compiler referred to the food rules (Appendix 4).

Food codes with losses

When there was no code for cooked/'as consumed' food, the raw code was used and nutrient loss was applied. When a raw food code was used for coding a recipe due to lack of cooked food code, data compilers marked the "vitamin loss" option in NDB for this food (Figure 2). This process was conducted to provide the accuracy of nutrition content of food in NDB.

Figure 2. Nutrient Databank-Application of vitamin loss

*Within the database no code for veal cutlets was available. Therefore "veal cutlet raw" was used, and a vitamin loss was applied.

Converting volume to weight

Many recipes provided liquid ingredients as a volume, whereas the NDB uses only weight measures. Volumes were converted into gram weights using specific gravity values provided in specific resources; FSA Food Portion Sizes (3rd), MW6 and MRC HNR 'in house' food weight sources.

Accounting for seasonal variation in food codes

Where food codes were presented as summer and winter varieties (e.g. milk) the proportion was equally divided between both winter and summer codes, so that each was recorded in the ingredient list.

Duplicate ingredients

Recipes must not contain duplicate ingredients when added to the SRD. For Recipes that have constituent parts that contain duplicate ingredients those ingredients were added together and shown as a single amount and the % of each was documented in the comments box on the NDB. For example food code 1322 beef steak pudding with suet pastry (Figure 3).

Figure 3. Example on the management of duplicate ingredients
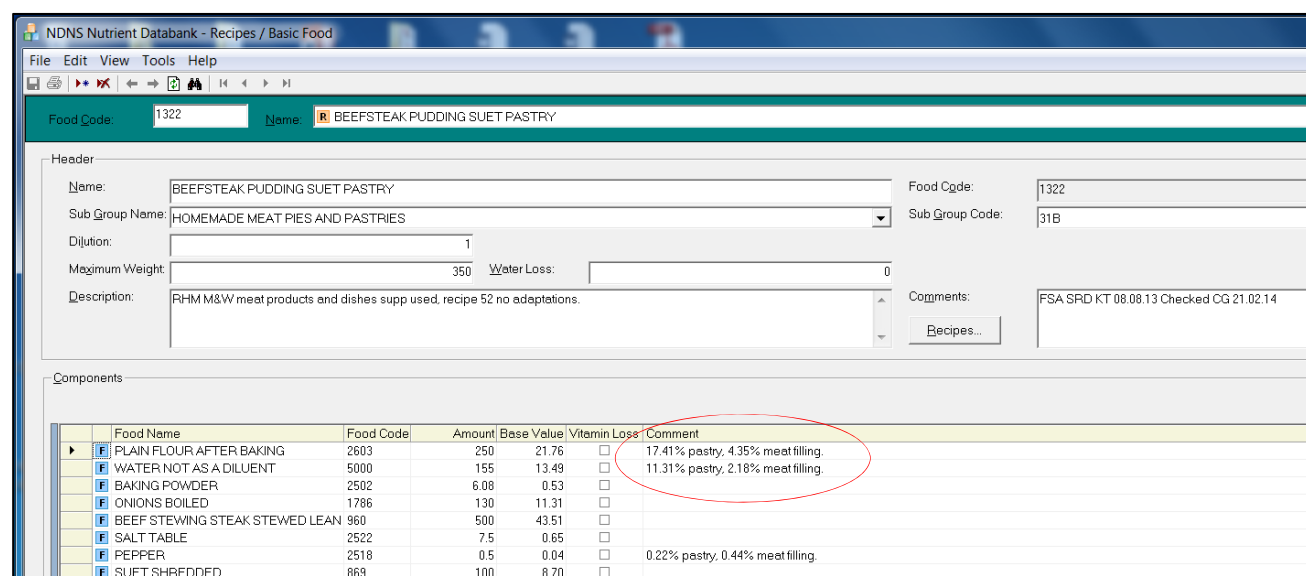
Excluding ingredients

If an ingredient is excluded from a recipe, it was made up with a similar/suitable ingredient based on what is stated in the FC description.

> Example: Hot cross buns, no peel
> The recipe was based on MW cereal dishes supplement book food recipe 253: "hot cross buns with adaptations". The peel was excluded and replaced with extra currants. If the peel was just excluded the proportion of fruit to dough would not have been correct.

Example of standard recipe compilation using MW and NDB

> Example: Recipe (RHM): Wholemeal Fruit Bun

> The appropriate rec ipe to use or adapt based on the food code description was selected:

> Hot cross buns, MW6

> A compilation of the list of original recipe components a nd any revisions required, including components which might need to be excluded or swapped was carried out.

In this example the revisions have been noted in "revised recipe components" column (Table 2) and the decision explained in detail:

Table 2. Compilation of the list of original recipe components

Original recipe components	Revised Recipe components	Notes
450g strong white flour	450g wholemeal flour	White flour swapped with wholemeal flour, with losses as stated in food name
28g fresh yeast	6.3g dried yeast	Fresh yeast is less common in current cooking methods, so that assigned a standard value of 7g dried yeast to 500g flour
1 egg	57g egg	Unless stated in the recipe a medium egg weight was used as a general rule
Pinch salt	1g salt	All ingredients depicted as 'pinch' was assigned as 1g measure.
56g margarine	56g 62-72% fat spread, not polyunsaturated	Margarine is not a commonly used term nowadays, but is similar in composition to 70% vegetable fat spreads.
112g currants	157g currants	See peel
2g mixed spice	2g mixed spice	Nutmeg and cinnamon were excluded as they are within mixed spice. Weight of mixed spice had increased to account for exclusions.
150ml milk	155.1g semi-skimmed milk	Unless stated 'milk' was assigned to semi-skimmed milk. Volume has been converted to grams using the specific gravity of semi-skimmed milk (1.03).*
60ml water	60g water	Volume was changed to weight.
56g caster sugar	56g white sugar	Caster sugar was included within the white sugar food code.
45g peel	Excluded ingredients	Peel is appropriate within a hot cross bun, however the recipe for this food code in NDB did not include this component so it was excluded and replaced with extra currants
1g cinnamon	1g cinnamon	See cinnamon
1g nutmeg	1g nutmeg	See nutmeg
Total weight:	**1002.3 g**	

* Specific gravity factors were applied to convert volumes to weight. In this example 1.03 was the specific gravity value used for semi-skimmed milk.

It was considered if the recipe required a weight loss factor to calculate ingredient proportions as consumed:

The weight loss factor was applied to calculate the total cooked recipe weight from the total uncooked recipe weight. In this example the uncooked recipe was 1002.3g and the cooked weight was 851.96g (15% weight loss factor was applied based on MW[6th], recipe 164).

The level 1 ingredients of the recipe was compiled and the ingredient proportion was calculated as % of the total;

$$Proportion\ (\%) = \left(\frac{Weight\ of\ component, g}{\begin{array}{l} Weight\ of\ total\ uncooked\ recipe, g < if\ weight\ loss\ applied\ to\ recipe > \\ Weight\ of\ total\ cooked\ recipe, g < if\ no\ weight\ loss\ applied\ to\ recipe > \end{array}} \right) \times 100$$

$$Ex.\ Proportion\ of\ wholemeal\ flour\ with\ losses\ (\%) = \left(\frac{450\ g}{1002.3\ g} \right) \times 100 = 44.9$$

Components used in SRD level 1			Components used in SRD level 2		
Food code no	**Food code description**	**%***	**Food code no**	**Food code description**	**%****
2643	Wholemeal flour with losses	44.90			
699	Milk, semi skimmed after boiling	15.46	608	Milk semi-skimmed pasteurised summer	7.73
			8543	Milk semi-skimmed pasteurised winter	7.73
5000	Water, not as a diluent	5.99			
2205	Sugar, white	5.59			
2611	Egg, after baking/boiling	5.69			
10040	Fat spread (62-72% fat), not polyunsaturated	5.59	867	Red palm oil	1.96
			871	Blended vegetable oil	1.96
			5000	Water not as a diluent	0.81
			601	Buttermilk	0.7
			2522	Salt table	0.08
			634	Cream double	0.08
			20004	Marker code for vitamins and minerals - supports FSA recipes	0
			20005	Marker code for flavourings - supports FSA recipes	0
			20006	Marker code for food additives (eg. Stabilisers, thickeners, emulsifiers) - supports FSA recipes	0
			20012	Marker code for colourings - supports FSA recipes only	0
			20014	Marker code for preservatives - supports FSA recipes only	0
2011	Currants dried weight	15.66			
New code¥	**Mixed spice**	0.2	2528	Cinnamon	0.08
			10154	Coriander seeds	0.076
			New code¥	**Caraway seeds**	0.024
			9217	Nutmeg ground	0.008
			New code¥	**Cloves, dried**	0.006
			2510	Ginger ground	0.006
2528	Cinnamon	0.1			
9217	Nutmeg, ground	0.1			
2530	Yeast, dried	0.63			
2522	Salt, table	0.10			

*%: Proportion
**%: Proportion of total
¥Within this example three new food codes were required in order to complete the standard recipe. The new food codes were added to NDB by MRC HNR, in line with current NDNS procedures and at the discretion of Public Health England.
Salt and water appear at level 1 and level 2 and both levels should be summed to give their overall value in the recipe.

Example of standard recipe compilation using recipes from published sources

Example: Recipe (RHM): Rosehip Syrup Undiluted

The appropriate rec ipe to use or adapt based on the food code description was selected: No exact recipes were found in the MW or NDB, there was one recipe for 'syrup' as part of a fruit salad recipe in the MW but this was not suitable. A recipe for rosehip syrup was found online as a compon ent of an ice cream recipe; additional recipes were available on other internet pages but not within the 2 reci pe sites approved and designated by the p rotocol. There was no addi tional recipe within the cookery books. The decision was made by th e SRD Work ing Group t o utilise the recipe from another internet source as a guide to compile this recipe.

- It was considered if the recipe required a weight loss factor to calculate ingredient proportions 'as consumed': Ther e was likely to be some water los s on stewing but the factor was unknown.

- The NDB was checked for recipe notes an d supporting information to the food code: No sufficient information was available in the NDB.

- Compiling the list of original recipe components and any revisions required, including components which may need to be excluded or swapped. In this example the revisions have been noted in bold and the decision explained in detail (Table 3):

Table 3. Compiling the list of original recipe components

Original recipe components	Revised recipe components	Notes
500g rosehips	**100g*** rosehips	Estimate edible portion/amount remaining after stewing at 20%
Peel from orange 1	**Excluded**	The orange peel was excluded as it was only added as a flavouring and so would not be consumed.
Juice from lemon 1	20g fresh lemon juice	Remains as required to prevent discolouration
125g sugar	125g white sugar	No change
375g water	375g water	No change

* A preliminary weight loss was assigned on ingredients in recipes if an ingredient was expected to lose water significantly more than other ingredients, hence the weight loss factor was applied to the rosehips.

- Applying the weight loss f actor: in this example the uncooked re cipe was 620g and no weight loss factor was available.

- Compiling the level 1 in gredients of the recipe an d calculating the ingredient proportion as a % of the total (Table 4).

Table 4. Assigning the recipe ingredients in SRD level 1, and ingredient proportions

Components used in SRD level 1		
Food code number	**Food code description**	%*
New code**	**Rosehip berries**	16.13
2205	Sugar, white	20.16
2064	Lemon, juice only no peel or flesh	3.23
5000	Water not as a diluent	60.48

*%: Proportion
**Within this example one new food code was requ ired to complete the standard recipe. The ingredients were set at level 1 only; no further recipes were required within this food code.

4. Ingredient calculations and methods

Nutrient information (e.g. fat content) of some f oods in the NDB were used for the assumption of ingredients (vegetable oil e.g.) added into the foods.

The methodologies used for different food types are listed below;

4.1. Fried foods

Fat values of the fried versions of basic f oods in the NDB were acc epted as a reliable source and were used for the assumption of fat added into the foods.

- For foods low in fat (e.g. vegetables);
It was assumed that all of the tota l fat value of the food composition i s absorbed f at and assigned as the proportion of added fat.

- For foods high in fat (e.g. meat, fish);
    To assess the amount of added fa t in thes e foods, the fat content of grilled or oven baked food was subtracted from the total fat content of t he fried food. Fat values for fri ed/grilled foods were used f rom MW6 edition and t he relevant supplements books.

If the food did not exist in NDB; absorbed fat content of recipes indicated in MW6 was used for the calculation of added fat. MW supplements contain information of absorbed fat quantities for many of their recipes. The recipe section of each supplement and where foods have been fried the amount of oil absorbed is included in the ingredient list with the quantity absorbed shown in brackets.

If the food recipe does not exist in MW then the recipe was based on a similar food code.

> Example: Recipe (RHM): Plaice floured no bones blended
> In MW there is no code available or fried, floured plaice. Thus a similar food code, Haddock coated in flour fried in blended vegetable oil, available in MW is used for the proportions.
> For more detail see "Appendix 4", section-fat absorption of battered foods (e.g. plaice, in batter)".

4.2. Coated foods

There are various meat and fish food codes in the SRD described as having a coating, meaning they have a batter, breadcrumb, flour, and/or egg layer applied prior to cooking. The specific type of coating should be described in the food code name but where the term "coating" is used singularly, the data compiler assumed only a flour coating was applied. To account for the proportion of coating in the ingredients generally the carbohydrate content of food was used. Meat and fish contain no naturally occurring carbohydrate so it was assumed that carbohydrate content was the result of the coating applied. The example below shows how the estimation of coating was applied:

Example: Recipe (RHM): Haddock, no bones, flour coated, fried

• Calculation of flour content:
Carbohydrate content of plain flour with losses: 80.9g/100g (A)
Carbohydrate content of Haddock in flour: 4.5g/100g (B)

Assume all the carbohydrate comes from the flour and follow the below equation to determine the % flour which contributes the 4.5g carbohydrate in the fried haddock.

(100 / A) x B= Amount of flour required to coat the fish.

(100 / 80.9) x 4.5 = 5.56 g

The amount of flour used to coat haddock is 5.56g in the total recipe.

- Calculation of added fat content:

When calculating the amount of fat to add to the recipe, the amount of fat in the coating was taken into account. Batter and breadcrumb coatings contribute significant amounts of fat to and overall recipe. It was assumed that flour contributes non-significant amounts of fat. To calculate this, the same principle above was used.

Example: Recipe (RHM): Plaice, in Batter

Amount of batter in the recipe (MW6): 31.4g batter (A)
Fat content of batter: 3.5g/100g (B)

(AxB)/100=Amount of fat provided from batter in recipe

(31.4x3.5)/100=1.1g of fat provided from batter

Fat content of "plaice in batter"= 16.8g/100g (A)
Fat content of "plaice, grilled"(*)= 1.7g/100g (B)
Fat content of "31.4g batter"= 1.1g/100g (C)
The amount of fish in the recipe= 100-amount of batter=100-31.4=68.6g (D)

*General rule: the grilled code is used to obtain total fat absorption of meat products

A – [(DxB)/100) – C]= Amount of vegetable oil to add to total recipe.

16.8 – [(68.6x1.7)/100] – 1.1 = 14.5g

Ingredient content of "Plaice, in Batter"
Plaice= 68.6 g
Batter= 31.4 g
Vegetable oil absorbed during frying= 14.5 g

4.3. Salt/sodium:

If necessary, salt/sodium content stated in nutrition panels of branded foods was used to estimate the proportion of added salt in recipes. This was done by subtracting the

naturally occurring salt content of the ingredients from the total salt value on label. Sodium was converted to salt multiplying by 2.5.

4.4. Drinks with added sugar:

Sugar content in nutrition panels of branded foods was used to estimate the proportion of added sugar in recipes. This was carried out by subtracting the naturally occurring sugar content of the ingredients from the total sugar value on label.

Accounting for bones and wastage/skin

Although used infrequently in recent years the NDB contained food codes with the bones and other non-edible portions included and therefore these are included in the SRD. Edible portions given in MW 6 and MW supplement books were used for each specific food. If no value was found in these sources, the average values for similar foods were determined from the tables in the MW meat supplement books.

The Food codes include the description of inedible portion through the description, such as *chicken drumsticks roast meat and skin (incl bone)*. Food codes stating `with bones and/or skin` in the description contain the MISC food code 9999 (food name: *Wastage: bone, skin etc. for use in recipes*) in the proportion determined by the edible portion factor for that food. The calculation of ingredient proportion where wastage is present is explained below.

Example: Chicken drumsticks roast, meat and skin (include bone)
Edible portion of "chicken drumsticks, roasted, weighed with bone": 0.63 (MW meat supplement)
Wastage: 1-0.63=0.37 (bone, skin etc.)

5. Guidance relating to specific food types

Food rules

The food rules used for recipe coding has been provided in the Appendix 4. Food rules list.

Default codes

A list of default food codes gathered in the creation of the SRD is provided at Appendix 6. This was referred to when deciding which RCI/SIC codes to select, to ensure consistency in the SRD. A few additional notes for common ingredients are provided below.

- Flour: the default flour used in the SRD is plain white, with self-raising flour used for food codes in which a raising agent may be required, such as cakes.

- Milk: the default milk is semi-skimmed (50:50 mix of summer and winter milk) and this has been used in the SRD where food codes do not state a specific milk type. The food codes for "milk after heating/boiling" were used in recipes which use milk in the cooking process.

- Vegetables and potatoes: Potatoes and carrots were assumed as old unless the food code states otherwise and cabbage was accounted for equally as white and savoy also unless stated otherwise.

- Fats: Separate defaults for oil and solid fats depending on the type of recipe and ingredient were used. For example, for coding of "fried foods with unspecified fat" "blended vegetable oil" but for coding of "sponge cakes with unspecified fat"; "fat spread (62%-72% fat) not polyunsaturated" was used.

- Herbs and spices: Dried mixed herbs and mixed spices were used for coding if multiple dried herbs and spices were used in recipes and if their quantities were indistinguishable.

Using canned codes

Baked beans were generally purchased canned and the use of canned tomatoes was often stated in recipes. Therefore based on the type of recipe the canned form of these products were used for coding recipes. However, in general, the use of canned codes was avoided unless it was stated in the recipe.

Exclusion of certain ingredients

Certain ingredients which were not commonly used in current cooking practices were excluded from recipes unless stated in the food code description. For example "Lard, used in recipes for frying" was coded as the default cooking fat of blended vegetable oil ingredient code: 871.

Use of codes containing added salt

Unless stated in the food code description, the use of codes with added salt was avoided. As an exception, frozen mixed vegetables boiled in salted water was used although added salt was not specified on food description. This decision was made due to no other

frozen mixed vegetable food code available on the NDB, the salt present in the code was minimal.

Marinade ingredients

Ingredients of marinades were not accounted if the food description did not contain sufficient information on the ingredients of the marinade.

Egg weights

The SRD was compiled using the size 3 (large) egg weight of 57g based on FSA Food Portion Size book, 3rd ed.

Foods, made up, ready to consume

Food codes that are described as "made up/ready for consumption" were coded using their dry, non-prepared state. The non-prepared food codes were used in conjunction with water/milk to determine the RHM food code recipe 'as consumed'. The non-prepared food codes were coded as RPC using the ingredients stated by manufacturers. This is due to the fact that the product (e.g. hot chocolate powder) would be purchased from retailers, and would be prepared (e.g. in the home) using other ingredients (e.g. hot milk) according to manufacturer's information on the product label.

Examples:

FC-10724 Hot chocolate made with semi skimmed milk is an RHM, ingredients consist of;

      FC 600-Semi skimmed milk after boiling, SIC

      FC 2309-Drinking chocolate dry weight, RPC

FC-3179-Angel delight made with semi skimmed milk is a RHM, ingredients consist of;

      FC 550-Instant dessert powder, RPC

      FC 608-Semi skimmed milk, RCI

Use of standard ingredients for common recipes

Standard ingredients were used fo r specific recipes which are commonly consumed for example stews and curries. For coding different varieties of these recipes , a base consisting of the standard ingredients were used. Any changes to the standard ingredient bases were informed by the general rules generated by the food composition team. A list of the common recipes are provided below. The detailed description of the gene ral rules for each common recipe can be found in food rules list given in Appendix 4.

List of common recipes:

- Vegetable Stews/Soups/Curries
- Meat dishes with additional vegetables/sauce
- Bolognese sauce
- Lasagne
- Chilli Con Carne
- Beef Stews
- Minced beef with vegetables
- Sausage casserole
- Meat curries
- Pasta with sauce / Pasta Bakes

6. Quality assurance

The quality assurance in the compilation of SRD was managed by quality assurance checking procedures given below and carried out by a team of trained coders.

6.1. Summation checks

The proportions calculated in standard ingredient lists must sum at 100%. An allowance of 99.80-100.20 was permitted. All ingredient lists underwent summation checks, which was built in function to the SRD, thereby ensuring an automated checking process. Where a figure other than 100 is shown the cell, it was flagged with background colour which remained until the proportions were corrected.

6.2. Error checks

The SRD was subject to a minimum of 10% checks where all aspects of the standardization and data collection procedures was double checked and corrected for any errors which were found. This level of quality checking is suitable for the detection and minimization of human data entry error. Cross error checks were performed by members of the project team not involved in the original ingredient list creation. In addition, any patterns or systematic errors identified during the 10% checking process triggered more specific, in-depth and/or extensive checks depending on the nature of the errors identified.

References

1. McCance and Widdowson's The Composition of Foods, Sixth summary edition. Food Standards Agency (2002). Cambridge: Royal Society of Chemistry. ISBN 0-85404-428-0.

2. Meat Products and Dishes. Chan, W. Brown, J. Church, S.M. and Buss, D.H. (1996). Sixth supplement to 5th edition of McCance and Widdowson's The Composition of Foods. Royal Society of Chemistry, Cambridge.

3. Fish and Fish products. Holland, B. Brown, J. and Buss, D.H. (1993). Third supplement to 5th edition of McCance and Widdowson's The Composition of Foods. Royal Society of Chemistry, Cambridge.

4. Food Portion Sizes. Food Standards Agency, (1988) Third edition, Her Majesty's Stationery Office, London.

5. http://www.food.gov.uk/multimedia/pdfs/cofuserdoc.pdf

6. Food Composition Data. Production, Management and Use. Greenfield, H. and Southgate D.A.T. (2003) Second edition, Food and Agriculture Organization of the United Nations, Rome.

Appendices

Appendix 1. The definition of the fields and descriptors used within SRD

FoodType	Classification of the standardised food/recipe: "RHM" (Recipe Homemade), "RPC" (Recipe Purchased Composites), "RPB" (Recipe Purchased Brand Specific), "RCI" (Raw commodity ingredient), "SIC" (Simple ingredient commodity).
L0FoodCode	The UK nutrition surveys food code of the food to be disaggregated.
L0FoodName	The UK nutrition surveys food name of the food to b e disaggregated.
L0FoodCategory	R: Food has a recipe, F: Food doesn't have a recipe.
L0BaseValue	Takes a value of 100, indicating that the amount o f food has quantity reported as value in per 100 matrix units.
L0Units	The measure (gram) used for indicating the amount of the food value.
L#FoodCode	The food code of the ingredie nt at the (#) level of the recipe. Blank if the recipe breakdown into ingredients does not reach this level of disaggregation.
L#FoodName	The food name of the ingredient at (#) level of the recipe. Blank if the breakdown into ingredients does n ot reach this level of disaggregation.
L#FoodCategory	R: Ingredient has a reci pe, F: Ing redient doesn't have a recipe.
L#BaseValue	Takes a val ue of 100, i ndicating that the amount of ingredient has quantity reported as v alue in per 1 00 matrix units.
L#Units	The measure (gram) used for indicating the val ue of the amount of the ingredient in recipe.
L#ComponentAmount	The value of the amount of L# ingredient used in recipe.
L#ComponentPercentage	The value of the proportion of standard ingredient in the recipe (100±0.2) %.

The symbol dash (#) is used for symbolising the number of levels e.g. 1,2,3.

Appendix 2. Letter to publishers

Dear

Re: Request for Permission to use published recipes for the development of a Standard Recipes Database.

I write representing the MRC Human Nutrition Research Unit (MRC HNR) in connection with the above project to request permission to utilise some information contained in recipes published [on your website/in your cookery book XXXX].

We are an independent research unit of the Medical Research Council (MRC) and have been commissioned by the Food Standards Agency (FSA, http://www.food.gov.uk/), an independent government department responsible for food safety and hygiene across the UK, to develop a database of standard ingredients in foods commonly consumed by people in the UK. The standard recipes database will solely contain a standardised ingredients breakdown for foods that people currently eat in the UK. This is an essential requirement for Government to enable them to undertake dietary exposure assessments within the UK population.

To develop the database we would like to compare existing ingredients lists in published recipes to derive an average ingredients list to represent a 'standard' homemade recipe that people are likely to eat. This will make the exposure assessments more applicable to the general UK population. The database we are developing will comprise approximately 4700 entries of which we estimate fewer than 10% will require us to consult published recipes. We are interested in recipes that we know are commonly made and eaten by people in the UK, so when creating our standard list of ingredients we expect to exclude any unusual or unique ingredients from a published list of ingredients, focusing instead where ingredients are comparable across a variety of sources. For example, if a particular Shepherd's pie recipe included dried apricots in the ingredients list we would exclude the apricots before combining with additional ingredient lists of similar recipes to create our own 'standardised' ingredient list for shepherd's pie with averaged ingredient proportions.

We are therefore writing to you to seek permission for MRC HNR to use some of the recipes (ingredients lists only) which are published [on your website/in your cookery book XXXXX] for the purpose above. Please be reassured that we are not seeking to use

ingredients lists from all your recipes nor to reproduce the recipe instructions or methods provided alongside the ingredients lists.

References to the sources used to create each of our average recipes will be cited and included in the standardised recipes database. Appropriate credit to the sources consulted to create each recipe will be given in the format below:

Pascale, L. (2011) Baking Made Easy. London, HarperCollins.
Oliver, J. Sausage rolls [online]. Available from:
http://www.jamieoliver.com/recipes/pork-recipes/sausage-rolls [accessed: 11/10/2012].

On completion of the project, all rights to/in the standardised recipes database will be transferred by MRC HNR to the Food Standards Agency without limitations. It is envisaged that the database along with a report describing how the recipes were derived will be made publicly available.

We therefore request your express permission to access and use for the purposes and in the manner outlined above, the lists of ingredients of a range of recipes published on your website/book for the creation of the standardised recipes database and for the subsequent assignment of this work to the FSA. We also request your express permission to cite the source of the published recipes used as shown above for inclusion of such citations in the standardised recipes database. Please note that by granting permission, you confirm that you are entitled to validly do so under applicable legislation.

Please do feel free to contact me should you have any questions or wish to clarify further any points in this letter. I would be grateful if you could get back to me at the address indicated above within two weeks from receipt of the present letter. I have enclosed a postage-paid envelope for your convenience.

Thank you for your consideration. I am looking forward to hearing from you.

Yours faithfully,

Appendix 3. References of approved sources used for the recipe compilation of RHMs for SRD

1. McCance and Widdowson's The Composition of Foods, Sixth summary edition. Food Standards Agency (2002). Cambridge: Royal Society of Chemistry. ISBN 0-85404-428-0.

2. Meat Products and Dishes. Chan, W. Brown, J. Church, S.M. and Buss, D.H. (1996). Sixth supplement to 5th edition of McCance and Widdowson's The Composition of Foods. Royal Society of Chemistry, Cambridge.

3. Miscellaneous Foods. Chan, W. Brown, J. and Buss, D.H. (1994). Fourth supplement to 5th edition of McCance and Widdowson's The Composition of Foods. Royal Society of Chemistry, Cambridge.

4. Fish and Fish products. Holland, B. Brown, J. and Buss, D.H. (1993). Third supplement to 5th edition of McCance and Widdowson's The Composition of Foods. Royal Society of Chemistry, Cambridge.

5. Vegetable Dishes. Holland, B. Welch, A.A. and Buss, D.H. (1992). Second supplement to 5th edition of McCance and Widdowson's The Composition of Foods. Royal Society of Chemistry, Cambridge.

6. Milk Products and Eggs. Holland, B. Unwin, I.D. and Buss, D.H. (1989). Fourth supplement to McCance and Widdowson's The Composition of Foods, Royal Society of Chemistry, Cambridge.

7. Cereals and Cereal Products. Holland, B. Unwin, I.D. and Buss, D.H. (1988). Third supplement to McCance and Widdowson's The Composition of Foods, Royal Society of Chemistry, Cambridge.

8. Immigrant Foods. Tan S.P, Wenlock, R.W, Buss, D.H. (1985). Second supplement to McCance and Widdowson's The Composition of Foods. Her Majesty's Stationery Office, London.

9. Vegetables, Herbs and Spices. Holland B., Unwin I.D. and Buss D.H. (1991). Fifth supplement to McCance and Widdowson's The Composition of Foods. Royal Society of Chemistry, Cambridge.

10. Meat, Poultry and Game. Chan W., Brown J., Lee S.M. and Buss D.H. (1995). Fifth supplement to the Fifth Edition of McCance and Widdowson's The Composition of Foods. Royal Society of Chemistry, Cambridge and Ministry of Agriculture, Fisheries and Food, London. ISBN 0-85186-380-9.

11. Fruit and Nuts. Holland B., Unwin I.D. and Buss D.H. (1992). First supplement to the Fifth Edition of McCance and Widdowson's The Composition of Foods. Royal Society of Chemistry, Cambridge. ISBN 0-85186-386-8.

12. Lorraine Pascale's Fast, Fresh and Easy Food (2012). First edition. London: Harper Collins Publishers. ISBN 978-0-00-748966-4.Food Portion Sizes. Food Standards Agency, (1988) Third edition, Her Majesty's Stationery Office, London.

13. http://uktv.co.uk/food/homepage/sid/423

14. http://www.bbcgoodfood.com/

Appendix 4. Food Rules

Food rules were created during the compilatio n process. The food r ules are the result of discussions at internal team meetings which were held regularly throughout the project to agree approaches to standard ising certain food codes, where the protocol d idn't specify an exact method.

No	Food Rules
	WEIGHT LOSS
1	When toasting a product e.g. bread, buns, rolls, apply weight loss in MW 6th edition to toasted code
	PORTION SIZE
2	Presume 1 tbsp = 3 tsp (tea spoon)
3	Presume 1 heaped tbsp is 1.5 x level tbsp.
	FOOD CODES
4	Use of old codes **-** Avoid using old codes where possible and use current default codes. Some food codes state a high percentage of fat for example FC 4147 "Rhubarb crumble with reduced fat spread" (70-80%). However, as most spreads have lower percentages of fat nowadays, a current food code should be used such as FC 10040 "Fat spread (62-72% fat) not polyunsaturated".
	COOKING METHOD
5	When a code states fried grilled assume dry fried
6	*Fat absorption/Adding fat to fried food*- Use MW as a first reference to compare the fat content of boiled codes to fried codes. For example to calculate the amount of fat to add to onions fried: using MW Vegetable supplement; onions fried contains 11.2g fat/100g and onions boiled contains 0.1g fat/100g. Therefore 11.1% fat is absorbed on frying. So add 11.1% fat + 88.9% onions fried with losses (fat content=0.2 g/100g). If there are no nutritional values for the food, use suitable substitute foods in MW e.g. sweet potatoes roasted with fat was based on roast potatoes.
7	*Fat Absorption of Battered Foods (e.g. Plaice, in Batter)* First calculate the amount of fat in the batter; Amount of batter in recipe = 31.4g (A) Fat content of batter = 3.5g/100g (B) (AxB)/100 = Amount of fat in batter (31.4x3.5)/100 = 1.1g Use MW for the fat values of 'Plaice grilled' and 'Plaice in batter fried' Fat content of "Plaice in batter fried"= 16.8g/100g (A) Fat content of "Plaice grilled"= 1.7g/100g (B) Fat content of batter (31.4g) in recipe = 1.1g/100g (C) Amount of fish = 100 – Batter amount 　　　　　= 100 – 31.4 　　　　　= 68.6g (D) Fat Absorption = A – ((D x B)/100) – C 　　　　　= 16.8 – ((68.6x1.7)/100) – 1.1

= 14.5g vegetable oil absorption

Amounts to use;
Plaice = 68.6g
Batter = 31.4g
Vegetable oil = 14.5g

	CEREALS AND CEREAL PRODUCTS
8	*Bulgar/Bulgur wheat*: The weight gain of bulgar wheat is based on the weight gain (% 216) of couscous.
	BREADS and BAKERY
9	*Chapati without fat:* use 55% flour and 45% water based on MW6[th] edition
10	*Chapati made with fat:* use 14.7g fat, 55g flour, 45g water making total fat content 12.8% based on MW 6th edition
11	*Chapati fried:* use 1 tsp of fat per 60g chapatti
12	For fruit pies and crumbles where the type of fruit is not specified, code equal portions of gooseberries, plums, blackberries, apples and Rhubarb based on MW6[th] edition and internet search
13	*Fruit cakes with added semolina:* use 50% semolina made up with water, and 50% flour of the total flour amount in recipe.
14	For instant desserts such as angel delight, use instant dessert powder code and make up according to manufacturer's instructions
	PASTA DISHES
15	The rule for pasta and sauce mixes is 50:50, this is based on MW recipe 272 (spaghetti bolognaise).
16	*Pasta sauces:* when coding pasta sauces on their own (not as part of a dish), if FC states pasta sauce with lentils for example use tomato sauce homemade as the sauce. If FC states Dolmio/jarred use pasta sauce tomato based.
17	*Default pasta sauce:* for red meat dishes use tomato based pasta sauce. For chicken, turkey and tuna pasta dishes use white based sauce.
18	*Pasta bakes:* <u>FC Description specifies meat only;</u> Use MW meat dishes supplement recipe number 283 (turkey and pasta bake). If it specifies only meat in the pasta bake use the amount allocated to turkey and bacon (500g) for the meat, and keep the vegetables as is. FC description specifies both meat and vegetables; If the FC states both meat and veg, then use the meat amount (500g) and vegetable amount (360g) according to the FC description, keep the onion amount as is (60g). FC description specifies vegetables only; If the FC description only states vegetables then add up all the meat and vegetable amounts (860g) and divide equally by the vegetables stated in the FC description and keep the onions amount as is (60g). Sauce defaults; If no type of sauce is stated and it is suitable, use a tomato base sauce using the amounts already provided. For fish pasta bakes, use a white sauce as default unless stated otherwise. Keep the cheese topping unless stated otherwise.
19	*Lasagne (standard recipe):* follow MW6 edition recipe 604 (Lasagne) and include all ingredients as stated in the recipe, excluding the bay leaf. Retain the bacon in the recipe. *Lasagne with additional vegetables:* not included in the standard MW recipe, use a base for all lasagnes to include all the ingredients in recipe 604, excluding the carrots and celery, and add only the vegetables as listed in the FC description. Calculate the amounts by adding up the carrot and celery amounts in recipe 604 (80g) and splitting the weight equally between the vegetables as listed in the FC description. The onions always remain at 50g as stated in recipe 604.

20	Pasta lasagne: multiply dry weight by 2.1. (19g dry = 40g cooked)
21	*Pastry-Savoury pies-red meat filling:* use flaky pastry (FC 393), 1 crust as default, unless states otherwise. Based on MW Meat Supplements.
22	*Pastry-Savoury pies-white meat filling:* use short crust pastry (FC 400), 1 crust as default, unless states otherwise. Based on MW Meat Supplements.
23	*Pastry-sweet pies:* use short crust pastry (FC 400), 1 crust as default, unless states otherwise.
24	*Tuna pasta bakes:* 50% pasta, 26.2% fish, and 23.8% sauce. The rule for pasta and sauce mixes is 50:50, this is based on MW recipe 272 (spaghetti bolognaise). The sauce to tuna ratio is based on MW Fish Supplement recipe 294 (fish pie). The default sauce is a white sauce.
25	*Rice/Sauce ratio:* if not specified use 50:50 - Based on rule for pasta/sauce.
26	*Pizzas -* Use MW Vegetable Supplement recipes 252 or 256 depending on FC description. When the recipe states tomatoes use FC 8476 Passata with cooking losses. This is based on a search carried out on the approved websites (BBC Good Food and UKTV Food) to assess what tomato base is used in the majority of the pizza recipes. To adapt pizza dough, use MW Cereals and Cereal Products Supplement recipe 349.
	SOUPS
27	For packet soups use proportions from MW but also check manufacturer's instructions to double check ratios
28	*Vegetable soups:* use a base for all vegetable soup recipes to include vegetable consommé, onions, butter, salt & pepper-based on M&W Miscellaneous Foods supplement recipe: 283 (vegetable soup). Add only the vegetables as listed in the FC description. Calculate the amounts by adding up all the vegetables in recipe 283 (excluding onions) and dividing by the number of vegetables listed in the FC description.
	FRUITS
29	*Rehydrating dried fruit:* use 1 cup of dried fruit (160g) to 1 cup of water = 350g in total
30	*Stewing dried fruits with sugar:* rehydrate as above (food rule #8) and add 63g sugar to the 350g total weight
31	*Mixed berries (from frozen):* use 10% redcurrants, 40% blackberries, 25% raspberries & 25% blackcurrants (used by 2/3 supermarkets)
	VEGETABLES
32	*Vegetable stews:* use a base for all vegetable stews recipes to include canned tomatoes, onions and marmite (based on MW 6th ed. recipe: 870 (veg casserole). Add only the vegetables as listed in the FC description. Calculate the amounts by adding up all the vegetables in recipe 870 (excluding the onions) and dividing by the number of vegetables as listed in the FC description. Recipe 870 includes fresh tomatoes (90g), this is only added if they are included in the FC description. If the FC description doesn't mention fresh tomatoes then add this 90g to the rest of the vegetables total.
33	*Vegetable curries:* use a base for all vegetable curries to include oil, spices, onions and water-based on MW vegetable dishes supplement recipe 151. Add only the vegetables as listed in the FC description. The amounts of each vegetable are calculated by adding the vegetables and potatoes as in recipe151 (excluding the onions) and dividing by the number of vegetables as listed in the FC description. If no vegetables are listed in the FC description then use MW vegetable dishes supplement recipe 152 as a guide and code carrots, potatoes, cauliflower and courgettes. Only use this rule if there is no suitable curry recipe in MW. For example, for potato, cauliflower and pea curry use recipe 98 (curry, cauliflower & potato) and adapt it by replacing half the cauliflower with peas. If FC description states just 'tomatoes and not 'canned tomatoes' use tomatoes grilled.

	BEANS AND PULSES
34	*Beans and pulses:* if it is not stated whether canned or dried are used in the recipe use dried boiled codes
	MEAT DISHES
35	*General rule for meat dishes with additional vegetables-* Follow appropriate MW recipe, keep the onion weight as stated in the recipe and replace the vegetables with equal amounts of vegetables as listed in the FC description. If the MW recipe does not contain vegetables use the onion weight for the additional vegetables as listed in the FC description. Refer to the guidance notes for more specific examples. If the FC description states a packet mix use FC 8654 (casserole mix dry) and manufacturer's making up instructions. However, if the packet mix used is a white based sauce FCFC 8654 will not be appropriate as the ingredients for this packet mix will be different. For example, FC 8934 "Beef stroganoff made with stroganoff mix" was treated as an RPC/RHM as there was no dry packet mix food code suitable to match this product.
36	*General rule for meat dishes made with canned/jar sauce:* MW6 and the Meat Products and Dishes supplement contain recipes for meat dishes made with jar/canned sauces e.g. sweet and sour pork made with canned sweet and sour sauce. However, if no suitable recipe is available in MW6 follow the jar/canned sauce manufacturer's recipe instructions.
37	*For a standard sausage casserole recipe* follow MW6 recipe 610 (sausage casserole) and include all ingredients as stated in the recipe, excluding the bay leaf. Include pork, bacon and sausages in the standard recipe. *Sausage casserole with additional vegetables:* use a base for all sausage casseroles to include pork sausages as the only meat (unless the FC description indicates otherwise) therefore replace the bacon and pork with extra sausages to make a total weight of 800g of sausages. Add only the vegetables as listed in the FC description. The amounts are calculated by replacing the baked bean weight (227g) and splitting the weight equally between the vegetables as listed in the FC description. The onions always remain at 150g as stated in recipe 610.
38	*Meat curries:* use a base for all meat curries to include oil, spices, seasonings, onions and water-based on MW Meat Products and Dishes supplement recipe 166. Add only the vegetables as listed in the FC description. The amounts of each vegetable are calculated by using the onion weight in recipe 166 (60g) and dividing by the number of vegetables as listed in the FC description and onions. Onions are always included even if they are not mentioned in the FC description. Adjust the type of meat accordingly. Only use this rule if there is no other suitable curry recipe that can be identified in MW. For example a chicken korma or other yogurt based curry use recipe 197 (chicken korma). If the food name states just 'tomatoes' and not 'canned tomatoes' use tomatoes grilled.
39	*Beef stews:* base on MW6 recipe 574 (beef stew). Use a base for all beef stew recipes to include onions, oil, flour, stock, salt & pepper, add only the vegetables as listed in the FC description. The amounts are calculated by replacing the weight of the carrots in recipe 574 (150g) and dividing by the number of vegetables as listed in the FC description.
40	*Minced beef stew with vegetables (standard recipe):* follow MW Meat Products and Dishes supplement recipe 245 (mince beef with vegetables, stewed) and include all ingredients as stated in the recipe. *Minced beef stew with additional vegetables:* not included in the standard MW recipe, use a base for all minced beef stews to include all the ingredients in recipe 245, excluding the carrots. Add only the vegetables as listed in the FC

	description. The amounts are calculated by replacing the carrot weight (200g) and splitting the weight equally between the vegetables as listed in the FC description. Keep the onion weight at 200g as stated in recipe 245.
41	*Chilli con carne (standard recipe)*: follow MW6 recipe 588 (Chilli con carne) and include all ingredients as stated in the recipe. (Note this recipe does not contain chilli powder, therefore, add 2 tsp chilli powder as listed in MW Meat Products and Dishes supplement recipe 206 (Chilli con carne).
	Chilli con carne with additional vegetables: not included in the standard MW recipe, use a base for all Chillis to include all the ingredients in recipe 588, excluding the green peppers and add only the vegetables as listed in the FC description. Calculate the amounts by replacing the green pepper weight (100g) and splitting the weight equally between the vegetables as listed in the FC description. Keep the onion weight at 150g as stated in recipe 588.
42	*Sweet and sour meat dishes with canned/jar sauce with the addition of vegetables:* Base this on MW Meat Dishes Supplement recipe 278 (Sweet & Sour pork made with canned sauce). Add onions and only the vegetables listed in the food code description. The amount of vegetables to add is based on the percentage of vegetables in MW Meat Dishes Supplement, recipe 276 (Sweet & Sour pork) -28.7%.
43	*Sweet and sour meat dishes:* Base on MW Meat dishes supplement recipe 276 (Sweet & Sour pork). Add onions and only the vegetables listed in the food code description.
44	*Stir fries with meat & vegetables:* use a base for all stir fries to include onions, even if onions are not mentioned in FC description.
45	*Pasta/Sauce ratio* if not specified use 50:50 - Based on M&W Meat Dish Supplement recipe 272 spaghetti bolognaise
	POULTRY DISHES
46	*Chicken/turkey stews:* Base on MW6 recipe 574 (beef stew). Replace beef with chicken/turkey. Use a base for all chicken/turkey stew recipes to include onions, oil, flour, stock, salt & pepper- and add only the vegetables as listed in the FC description. Calculate the amounts by replacing the carrot weight (150g) in recipe 574 and dividing by the number of vegetables as listed in the FC description. Adjust weight loss accordingly.
47	*Chilli made with jar sauce only:* follow manufacturer's guidelines. *Chilli made with jar sauce and additional vegetables:* Base on MW6 recipe 588. Use beef mince, vegetables (guided by the FC description) and oil. Exclude all other ingredients and replace with jar sauce. The stock in the recipe is in ml (volume) so a conversion factor needs to be applied: x 1.05.
48	*Bolognese sauce (standard recipe):* follow MW6 recipe 576 (Bolognese sauce with meat) and include all ingredients as stated in the recipe.
	Bolognese sauce with additional vegetables: not included in the standard MW recipe, use a base for all bolognaises to include all the ingredients in recipe 576, excluding the carrots and celery, and add only the vegetables as listed in the FC description. Calculate the amounts by adding up the carrot and celery amounts in recipe 576 (70g) and splitting the weight equally between the vegetables as listed in the FC description. The onions always remain at 60g as stated in recipe 576.
49	When updating food codes that contain "chilli con carne" using a packet mix, use FC 8654 "Casserole mix dry weight" at 2.43% and chilli powder at 0.17% as chillis are tomato based with added spice.
50	Drained weight of a can of chopped tomatoes = 60% tomatoes.
51	*Fruit crumbles:* MW6, recipe 176- the sugar in the recipe is for the crumble

	topping, use fruit cooked with sugar.
52	*Fruit pies:* MW6 recipe 178, 182, 179, and 183- the sugar in the recipe is for the fruit filling, so use fruit cooked without sugar and add the sugar as stated in the recipe.
53	For FC descriptions that state 'high in', add 50% extra of the ingredient. However, if it is a dry ingredient, add extra liquid to compensate.
	FISH DISHES
54	*Battered Fish:* Use the carbohydrate value (CHO) of batter (i.e. 38.3g) to calculate the amount of batter required to coat the fish. Find the CHO value for the battered fish code being completed, either in MW or the NDB (for example 14.3g in cod battered). Then use the following calculation: 100/38.3 = 2.61 x 14.3 = 37.33g. In summary: [100/amount of CHO in batter] x amount of CHO in selected battered fish code = the amount of batter to add in grams.
55	*Cod/white fish poached:* Base on MW fish supplement food number 47 (haddock, poached) using proportions given (100g fish, 25g milk, 4g butter) as cod is a similar fish to haddock. If FC states without fat, exclude fat. *Cod smoked poached:* Base on MW fish supplement food number 66 (haddock smoked, poached) using proportions given (100g fish, 25g milk, 6g butter) as Cod is a similar fish to Haddock. If FC states without fat, exclude fat.
56	When coating fish with flour; For large fish, or whole fish fillets, coated with flour use 5.56g flour per 100g of fish For small fish, fillet pieces, or shellfish coated with flour use 6.55g flour per 100g of fish
57	*Tuna dishes:* for hotpots, curries, casseroles- use fresh tuna steaks, for pasta bakes use tuna canned in brine.
	BEVERAGES
58	*Cappuccino:* use 88% milk and 12% strong coffee
59	*Latte:* use 91% milk and 9% strong coffee
60	For fried crinkle, cut chips, add 16.6% specified fat based on MW6[th] edition and MW vegetable supplement
61	For fried steak, cut chips add 13.4% specified fat based on MW6[th] edition and MW vegetable supplement
	FATS and OILS
62	No conversion factor for vegetable oil to lard, 1 tsp (tea spoon) oil = 3g, 1 tsp lard = 5g, therefore multiply lard by 0.6 to convert to vegetable oil
63	No conversion factor for vegetable oil to dripping, 1 tsp oil = 3g, 1 tsp dripping = 5g, therefore multiply dripping by 0.6 to convert to vegetable oil
	SWEETENERS
64	*Sweeteners:* use household measure. for example: for 1 tbsp sugar (20g) use 1 tbsp granulated sweetener (3g). Weight of sweetener taken from the NDNS Year 5 NDB: FC 9612.

Appendix 5. Food code recipe group changes

Food Code	Food Code Description	Original Food Group*	New Food Group
8741	Bacon crunchies coated breadcrumbs purchased	RHM	RPC
3804	Beef in red wine sauce with mashed potato eg ASDA GFY	RHM	RPC
10144	Beef/ox kidney stewed	RHM	SIC
1227	Birds eye liver & onion gravy	RHM	RPB
1667	Broad beans canned drained weight	-	SIC
1715	Carrots, canned, drained weight	-	SIC
6366	Cheese ravoli in tomato sauce canned	RHM	RPC
8787	Cheesecake packet mix no fruit topping	RHM	RPC
6656	Chicago ribs pork & TVP in marinade retail dalepak	RHM	RPB
5075	Chicken breast with rice, broccoli & carrot in tomato & wine sauce ready meal	RHM	RPC
1077	Chicken no skin weighed with bone fried in P/S oil	SIC/RCI	RHM
9401	Chocolate cake covering	RHM	RPC
9823	Chunky nut chex	RHM	RPB
1596	Clams canned seasoned	RHM	RPC
9574	Cod in breadcrumbs grilled / oven baked	RHM	RPC
3412	Cod/haddock coated in breadcrumbs, reduced fat, grilled	RHM	RPC
4289	Cornflakes-high fibre eg Ryvita	RHM	RPC
7697	Cream desserts with fruit eg MB potshots	RHM	RPC
8176	Croissant with sweet filling	RHM	RPC
166	Croissants plain not filled	RHM	RPC
2665	Dried mixed fruit	RHM	RPC
8956	Fish cakes in batter grilled no added fat	RHM	RPC
2679	French beans-canned, drained	-	SIC
7886	Fruit spread with edible seeds	RHM	RPC
7887	Fruit spreads, stone fruit	RHM	RPC
857	Ghee, made from veg oil	RHM	SIC
9563	Haddock in batter purchased oven baked	RHM	RPC
9524	Haddock in breadcrumbs frozen grilled/baked	RHM	RPC
1674	Haricot beans/canned boiled drained weight	-	SIC
5419	Hot crunch birds lemon/banana/chocolate	RHM	RPB
1017	Lamb scrag & neck stewed lean pots veg bones	SIC/RCI	RHM
10051	Low fat spread (26-39% fat) polyunsaturated, fortified with B6, B12, folic acid, omega 3 from fish	-	RPC
699	Milk semi skimmed after boiling	RCI	SIC
700	Milk skimmed after boiling	RCI	SIC
9248	Milk whole heated	RCI	SIC
4122	Mushroom and broccoli potato wedge bake with mozzarella cheese, frozen ready meal eg weightwatchers	RHM	RPC
1781	Mushrooms canned	-	SIC
8179	OLD CODE Softgrain bread fortified with folate	RHM	RPC
226	Wheatflakes with sultanas or raisins	SIC/RCI	RPC
1637	Oven crispy battered fish oven baked (Cod in batter frozen baked – name on Nutrient data bank)	RHM	RPC

2728	Pancakes served with duck, crispy, Chinese only	RHM	RPC
1809	Peas garden, canned	-	SIC
1816	Peas-chick canned	-	SIC
10770	Popcorn plain no added fat, sugar or salt	RHM	RCI
8269	Pork sausage smoked grilled	RHM	RPC
4008	Pork sausagemeat, coated in breadcrumbs, grilled or oven baked, e.g. 'walls balls'	RHM	RPC
3784	Pork sausages, very low fat, grilled	RHM	RPC
1896	Potatoes new canned drained	-	SIC
8499	Punjab puri	RHM	RPC
1676	Red kidney beans, canned, boiled, drained weight	-	SIC
9990	Reduced fat spread 60% PUFA low in trans	SIC/RCI	RPC
4103	Sainsbury W/M shortbread	RHM	RPB
5164	Sainsburys pasta tubes in cheese & broccoli sauce	RHM	RPB
6249	Sara lee summerfruits meringue pie	RHM	RPB
6243	Sausages in batter grilled eg walls wall banger	RHM	RPC
1277	Sausages, beef, grilled	RHM	RPC
1283	Sausages, low fat, pork, grilled	RHM	RPC
1282	Sausages, pork and beef, grilled, fried	RHM	RPC
7785	Sausages, pork, economy, grilled	RHM	RPC
1280	Sausages, pork, grilled	RHM	RPC
7793	Sausages, premium, pork, grilled	RHM	RPC
69	Savoury rice dry	RHM	RPC
2407	Snowball bottled	SIC/RCI	RPC
20	Soya flour low fat	-	SIC
7713	Spotted dick purchased	RHM	RPC
8894	St Ivel Prize whipped yogurt with cream not UHT	RHM	RPB
965	Stewing steak and kidney raw	RHM	RCI
1925	Sweetcorn immature cob canned drained	-	SIC
1924	Sweetcorn, canned, drained	-	SIC
6159	Tesco apricot crunchies	RHM	RPB
6524	Tesco quorn mushroom pie two crust	RHM	RPB
1220	Trotters and tails salted boiled meat only	RHM	SIC
9102	Tuna ravioli in spicy tomato sauce – canned	RHM	RPC
8261	Turkey roast roll, turkey breast roast	SIC/RCI	RPC
1157	Turkey sausages grilled fried	RHM	RPC
10186	Venison sausages, baked or grilled	RHM	RPC
9986	Very low fat spread (20-25%) not PUFA low in trans	SIC/RCI	RPC
698	Whole milk after boiling	RCI	SIC
3988	Cappuchino/Latte purchased	RHM	RPC
7962	Cream egg/Mintolai	RPB	RPC

Old deleted codes reinstated and categorised by the project team.

Appendix 6. Default codes

Food Item	Food Code	Default Food Description	Notes
Milk	8543	Milk Semi Skimmed Pasteurised	Should be a mix of summer/winter milk if not boiled
Fresh Yeast	2530	Yeast Dried	Use 7g of Dried Yeast to 500g Flour
Spices Unknown	20000	Mixed Spice	
Flour No Raising Agent	2603	Plain Flour After Baking	Default to white flour when not specified
Flour with Raising Agent	2604	SR Flour After Baking	Default to white flour when not specified
Vegetable Powders (All Types)	20001	Vegetable Powders - Incomplete	
Sugar	2205	Sugar White	Default to white sugar when not specified
Oil (Type Unspecified)	871	Blended Vegetable Oil	
Salt	2522	Salt Table	Use table salt unless sea salt stated
Dried Beef	931	Beef Lean Average Raw	
Herbs (Unspecified)	9764	Dried Mixed Herbs	
Rusk	140	Breadcrumbs Shop-Bought Dried	
Pork Fat	858	Lard Pork Fat	
Potato Granules/Dried Potato	2642	Instant Potato Powder	
Potato Starch	9202	Potato Flour	If also potato granules then combine both ingredients
Lamb Fat	854	Compound Cooking Fat Not PUFA	Use as default for unknown/unspecified animal fat
Beef Fat	855	Beef Dripping	
Dried Long Grain Rice	57	Rice White Long Grain Polished Dried	
Dried Peas	1818	Peas Freeze Dried Boiled	
Garlic Granules	1743	Garlic Raw	Assume same weight
Sunflower Oil	873	Vegetable Oil Polyunsaturated E.G. Sunflower	
Glucose Fructose Syrup	2613	Glucose Syrup	
Chocolate Chips	2254	Milk Chocolate Bar	
Raising Agent	2606	Sodium Bicarbonate, Unless Cake, Scone Etc.	
Barley Malt Extract	9805	Malt Extract	
Stock, beef	2462	Consomme (Other Clear Soups; Bouillon Cubes)	
Stock, vegetable	20051	Consomme, vegetable	
Stock, fish	20052	Consomme, fish	
Black Beans (Turtle)	8281	Beans Black Eye Boiled	
Margarine Polyunsaturated	10043	Reduced Fat Spread (41-62% Fat) Polyunsaturated	On internet search most poly spreads had

			these fat ranges
Margarine Not Polyunsaturated (Type Unspecified)	10040	Spread (62-72% Fat) Not Polyunsaturated	
Reduced Fat Spread Not Polyunsaturated	7775	Reduced Fat Spread 41-62% Fat Not Polyunsaturated.	
Low Fat Spread Not Polyunsaturated	10047	Low Fat Spread 26/29% Fat Not Polyunsaturated	
Utterly Butterly	7775	Reduced Fat Spread (41-62% Fat) Not Polyunsaturated	
Flora	10043	Reduced Fat Spread (41-62% Fat) Polyunsaturated	
Butter	851 852	Butter Salted/Butter Unsalted	Use butter salted for savoury products, and butter unsalted for sweet products
Hard Margarine	862	Hard Margarine Unspecified/Recipe	
Cream of Tartar (Included with Baking Soda)	2502	Baking Powder	
Carrots Boiled	1711	Carrots Old Fresh Boiled	
Potatoes Boiled	1829	Potatoes Old Boiled	
Garam Masala	2508	Curry Powder	
Nestle Carnation Caramel	619	Milk Condensed Whole Sweetened	
Gravy Thick	2425	Gravy Thickened No Fat	
White Sauce (Type of Milk Unspecified)	3026	White Sauce, Semi Skimmed Milk As Default	
Spring Onions	7722	Onions-Spring-Bulb Raw And Top	Apply vitamin loss
Short Crust Pastry	400	Pastry Short crust Cooked	
Sweetcorn (Type Unspecified)	1923	Corn On The Cob Kernals Only	
Emmental Cheese	671	Cheese Gruyere	
Cardamom Seed	-	No Code On NDB Do not Code As Used In Small Quantities	
Yogurt	702	Yogurt Whole Milk Natural Unsweetened	Use if type unspecified, but if the products states reduced/low fat use low fat option
Tuna, canned	1534	Tuna Canned In Brine, Fish Only	
Custard	548	Custard Made with SS Milk And Sugar	
Cook In Sauce (Type Unspecified)	3984	Cook In Sauce Tomato Based	
Ham (Code As 50/50 Smoked/Unsmoked)	9508 9509	Ham Unspecified Not Smoked Not Canned/ Ham Unspecified Smoked	
Ground Coriander	10154	Coriander Seeds	
Onions Fried	8898	Onions with Frying Losses	Use for onions in

			recipes where they are flash fried such as stir fries
Onions in recipes	1786	Onions Boiled	If the recipe is boiled or simmered use this code, for example onions used in recipes such as stews, sauces and casseroles which have been steamed for a considerable time
Egg and Crumb	2610	Egg and Crumb After Frying Loss	Keep 50/50
Artificial Cream	7720	Dream Topping with Semi Skimmed Milk	
Imitation Cream	2681 6828 7718 10448	Elmlea (Double, Light Single, Whipping, Light Double)	Use appropriate code to fit FC description
Cabbage	1704 2617	Cabbage Savoy Fresh Boiled / Cabbage White Boiled	Use only when type of cabbage not specified
Pastry-Savoury Pies-Red Meat Filling	393	Flaky Pastry Cooked	Use 1 crust as default, unless states otherwise
Pastry-Savoury Pies-White Meat Filling	400	Short crust Pastry Cooked	Use 1 crust as default, unless states otherwise
Pastry-Sweet Pies	400	Short crust Pastry Cooked	Use 1 crust as default, unless states otherwise
Kidney, Lambs	1223	Kidney Lamb Raw	Apply vitamin loss
Chicken Liver	1225	Chicken Liver Raw	Apply vitamin loss
Pig Liver	1205	Liver Pig Raw	Apply vitamin loss
Ice Cream (Type Unspecified)	721	Ice Cream, Standard, Dairy, (Made with Milk/Cream) Vanilla, Soft Scoop	
Extra Lean Pork	9460	Diced Pork Stewed Lean Only	
Duck Fat/ Goose Fat	876	Chicken Fat	
Dogfish	2737	Rock Salmon/Dogfish Raw	Apply vitamin loss
Pigeon Peas	1813	Peas Split Dried Boiled	
Minced Chicken	1067	Chick Cass Light And Dark Meat Only	
Cider Cooked	8350	Cider Dry Not Canned	
Puff Pastry	393	Flaky Pastry Cooked	
Skate Cooked	9269	Skate Grilled (No Code For Skate with Losses)	
Jam	2215	Jam with Edible Seeds Purchased	
Pepperoni	1274	Salami	
Icing Sugar	2205	Sugar White	
Ox Liver	8798	Liver Ox Baked in Oven No Fat	
Gluten Free Flour	8869	Gluten Free Flour Mix	
Jam Sugar (Preserving)	2205	Sugar White	
Extra Lean Mince	942	Beef Minced Stewed Fat	

		Skimmed	
Lean Mince	942	Beef Minced Stewed Fat Skimmed	
Red Snapper	7798	Cod baked or grilled no butter	
Juice	2337	Orange Juice Unsweetened Pasteurised	
White Flora	9330	Solid Sunflower Oil	
Kidney Beans (Canned)	10787	Red Kidney Beans, No Added Salt Or Sugar, Canned And Drained, Cooked	Only use if recipe states canned
Kidney Beans -When Doesn't State Canned	1677	Red Kidney Beans-Dried Boiled	Only use if recipe doesn't state canned
Pulses	1758 16771813	Lentils Split Boiled, Red Kidney Beans-Dried Boiled, Peas Split Dried Boiled	
Stout	8334	Stout Not Canned Eg.Courage	There are 3 stout codes and courage has the average alcohol content
Turkey	5296 5301	Enter As 50:50 Turkey Breast Meat Only Grill No + Fat & Turkey Leg Thigh Meat Only No Skin Cass	
Quorn Mince	7189	Quorn Mycroprotein and Pieces	
Flageolet Beans	1676	Red Kidney Beans Canned boiled Drained Weight	
Marrowfat Peas	1810	Peas, Marrowfat, Canned with Added Sugar and/or Salt	
Smoked Fish	1424 9255	50:50 Cod Smoked Steamed/Haddock Smoked Baked or Grilled	
Packet Soup	8575	Vegetable Soup Packet Made Up	
Bacon Unspecified	908	Rashers Cut Unspecified Not Smoked Grilled Lean and Fat	
Whole wheat Pasta	36	Pasta Spaghetti Wholemeal Boiled	
Borlotti Beans	1673	Haricot Beans Dried Boiled	
Liver	2656	Lambs Liver with Losses	
Martini	2682	Wine or Sherry After Cooking in Stews	
Gold Top Milk	607 606	50:50 Milk Whole Channel Island Pasteurised Winter Milk Whole Channel Island Pasteurised Summer	
Artichoke	1653	Artichoke Globe Boiled Weight As Served	
TVP	1376	Soya Mince As Made Up	
Lamb in Breadcrumbs	9431	Lamb Leg Chops / Steaks Grilled / Fried Lean & Fat	
Veal	1044	Veal Cutlet Raw	Apply Vitamin Loss

White Sauce	3026	White Sauce, Semi Skimmed Milk	
Tinned Fruit	Depend ing on food type	Use 50:50 Mix of Canned in Juice And Syrup, Fruit Only	
Sausage	1280	Sausages, Pork Grilled	
Red Fat Spread (PUFA) e.g. Flora Light	10049	Low Fat Spread (26-39% Fat) Polyunsaturated	
Gungo Peas	1820	Pigeon Peas-Only Have Dried Code, Add Extra Water To Allow For Cooking. Base On Split Peas Wg & Water Absorption.	
Mixed Beans	8826 1685 8281 1677 1815	Aduki, Soya, Blackeyed, Kidney Beans Chick Peas.	
Treacle	2206	Golden Syrup	If treacle is used in recipes then enter as golden syrup as thought more common practice.
Marmalade	8559	Marmalade with Peel Purchased	
Lager in Recipes	9250	Low Alcohol Lager Not Canned	
Chicken Thighs, Casseroled	1069	Chicken, Boiled, Dark Meat Only	Use meat without skin
Low Fat (40%) PUFA	10043	Reduced Fat Spread (41-62% Fat) Polyunsaturated	
Beer in Recipes	8339	Beer Others Unspecified Not Canned	
Pinto Beans	8280	Black Eye Beans	

Appendix B

The Guidance Notes for the Standardisation of Recipe Purchased Composite Foods (RPCs) and Recipe Purchase Branded Foods (RPBs) supporting the Food Standards Agency Standard Recipes Database (SRD).

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Guidance Notes for The Standardisation of Recipe Purchased Composite Foods (RPCs) and Recipe Purchased Branded Foods (RPBs) Supporting The Food Standards Agency Standard Recipes Database (SRD)

MRC Human Nutrition Research

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This document contains guidelines to users and data compilers of the FSA SRD. This document has been developed by MRC Human Nutrition Research, in fulfilment of the project entitled 'Rebuild of the Food Standards Agency recipe database'. It relates specifically to the standardisation of recipe: purchased composite (RPC) and recipe: purchased brand specific (RPB) codes. All SRD users should familiarise themselves with this guidance document, and it is recommended it be treated as a working document, developing alongside the SRD RPB and RPC codes. All SRD users should be familiar with the other accompanying documents that provide guidance on updating all components of the SRD, most notably the guidance notes for the standardisation of recipe homemade (RHM) codes.

Contents

List of Abbreviations

Data compiler: Those responsible for collecting and assessing the data to be used in the standard recipes database (SRD) and how the data are presented

Data user: The users of food composition tables and databases which vary greatly.

FC: Food code

FSA: Food Standards Agency

HNR: Human Nutrition Research

MRC: Medical Research Council

MW: McCance and Widdowson's (eds.) The Composition of Foods

MW6: McCance and Widdowson's (eds.) The Composition of Foods (6th edn.)

MW supplements: McCance and Widdowson supplements

NDB: NDNS Nutrient Databank

NDNS: National Diet and Nutrition Survey

NDNS RP: National Diet and Nutrition Survey Rolling Programme

RCI: Raw commodity ingredients – relates to food codes in their raw agricultural and/or unprocessed start, for example raw meat and uncooked vegetables.

RHM: Recipe homemade – relates to food codes where the recipe is homemade, comprising of two or more ingredients. They are identified by the inclusion of 'homemade' within the description, or from their categorisation into homemade food groups in the nutrient databank.

RPB: Recipe purchased brand – relates to food codes where the recipe is a retail item specific to one brand.

RPC: Recipe purchased composite – relates to food codes where the recipe is a retail item and the existing food composition data on the year 4 NDNS Nutrient Databank was originally comprised of more than one brand (a composite).

SIC: Simple ingredient commodity – relates to food codes that are commodity items which have undergone some processing to derive an ingredient and may originate from a recipe commodity ingredient, such as flour and sugar.

SRD: Standard Recipes Database

1. Overview

This guideline has been prepared to enable users and data compilers of the Standard Recipe Database (SRD) to u nderstand the methods and assu mptions used in standardising recipe purchased co mposite (RPC) and recipe purcha sed branded (RPB) codes within the SRD. The SRD was initially created by merging all food codes recorded during national nutrition surveys since 1992 and merged into a copy of the year 4 NDNS Nutrient Databank (NDB). This was converted to MS Excel format. The definition of fields and descriptors used within the SRD Excel extract are presented in Appendix 1 of the RHM guidance notes.

Recipe purchased composite (RPC) relates to food codes where the recipe is a retail item and the existing food composition data on the year 4 NDNS Nutrient Databank was originally comprised of more than one brand (a composite). The Majority of food codes that are used in the c urrent NDNS rolling programme are created as composites of a variety of brands in order to generate an average food composition profile suitable for population intake s urveillance. Recipe brand s pecific (RPB) relates to foods codes that are specific for branded foods which ha ve a distinct food composition or are consumed by many s urvey respondents. This guideline is intended to be used alongside th e guideline for recipe homemade (RHM) and ot her accompanying documents relating to the rebuild of the FSA SRD. Users are referred to appendices found in the RHM guidelines for further information on standardising and updating RPC and RPB codes.

2. Sourcing recipe purchase composite (RPC) and recipe purchase branded (RPB) information

RPC and RPB codes were investigated to determine the appropri ate components and proportions to generate a standard ingredient list for the SRD.

Many of the RPC food codes, particularly those created since 2008 and used in the NDNS rolling programme, had detailed descriptions regarding their origin and brands included in the composition held on the NDB. Therefore, in itially the NDB was reviewed to help guide the compilation of a st andard ingredient list for RPC codes. To ensure the information was current, products currently in the food supply across the top three UK supermarket retailers were investigated to ascertain current ingredients and pro portions being used during manufa cture. The supermarkets, Tesco, Sainsbury's and As da were chosen based on the average 12 week grocery till roll expenditure collected by Kantar Worldpanel (www.kamcity.com) (as at commencement of the project). E ach

supermarket was informed of the project an d permission sought to use ingredient information from food labels to inform the recipe standardisation process.

For RPC codes, the aim was t o collect at l east 5 products from the s upermarket ingredient information available; one from each supermarket brand, one from a value range, one from a luxury range, and an addi tional 2 branded products. When it was not possible to identify 3 s upermarket products and 2 bra nded products for an R PC code, any combination of appropriate products were included. Where it was still not feasible to identify 5 products, these specific RPC codes were discussed with the SRD working group and agreed as to whe ther the amount o f products identified was suitable to inform a standardised ingredient list for the RPC food code.

Brand specific food cod es (RPB) descriptions were reviewed to identify the pro duct and manufacturer, referring to the NDB for furthe r details if required. The company website was also reviewed for product details. If the suitable ingredient information was not available online, a v isit was scheduled to the supermarkets for gat hering label information and/or contact was made with the manufacturer through email or telephone. Some manufacturers may not wish to disclose the full details of their formulations as this can be company sensitive material. Therefore, in some instances it was not possible to make any assumptions on ingredient proportions. In these si tuations, unknown proportions were estimated by experienced users only in consideration of similar foods in the market or food codes in NDB.

The food codes on the NDB have been kept in their original form even if they are not consistent with the FSA food l ist to reduce the ri sk of the code being considered a different food.

3. Procedure of standard recipe compilation for RPC and RPB

Recipe Purchased Composite (RPC)

In Figure 1 a screen shot exam ple of an Excel worksheet and NDB code is showed which also summarises the steps involved in the standardisation process. Relevant subheadings in this section have been numbered to relate to steps set out in Figure 1.

Product selection (Steps 1 to 2)

For each RPC code, information from products identified were used to form the standard ingredient list. Product identification was via pictorial representation of the food and the accompanying food description provided. If insufficient information was provided on the website, a local supermarket outlet was visited to gather information on the product. As described earlier, the aim was to collect 5 products to inform the standardisation process.

Compiling information (Steps 3 to 6)

Microsoft Excel was used to compile all the relevant information required. This included the food code number and description, product names, links to their sources and date they were accessed, ingredients (as they appeared on the label, all available percentages were recorded in the adjacent column), and the nutritional information for energy, carbohydrate, sugar, fat, protein and salt content per 100g.

Once all the appropriate information was collated the standardized ingredient list was created. Where appropriate, similar ingredients were grouped together for example:

- Rusk and breadcrumbs
- Wheat flour and wheat starch
- Dried skimmed milk powder and whey proteins
- Sugar and dextrose
- Dehydrated potatoes, potato flakes, dried potato and instant potato powder
- Modified maize starch and corn flour

Any ingredients' which occurred in less than a third of the products were considered unusual and were excluded from the final ingredient list. This was to ensure a representative ingredient list of that product. However, it was essential that suitable combinations of ingredients were grouped together to minimise the risk of an important recipe components being excluded. For example, fat is an essential component of scones. However fat could potentially be excluded from a scone recipe if several different types were used, such as butter, margarine or vegetable oil, meaning they all appeared in less than one third of the products. In this particular example all fats were included in the final recipe and the amount of fat was split equally between the three ingredients to best represent the products available at the time of recipe collation.

Figure 1. An example of an RPC recipe compilation worksheet*:
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(1) Databank description

(10) Total of the ingredient percentages

(9) Calculation example

(2) Product name and website link

(3) Individual product ingredient list.

(4) Nutrition per 100g

(5) Grey out ingredients which <33% of samples

(6) Ideal ingredient list

(7) Average from label

(8) Total protein, fat, carbohydrate and Sugar contribution from each ingredient

(11) Nutrient Databank

*The description of each compilation step is given on the next page.

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*The steps involved in the recipe standardisation process (*Figure 1 note*)

1) Check the product description from the RP C Total List spreadsheet matches wi th the NDB description.

2) Find 5 appropriate products , 3 supermarke t and 2 branded if poss ible. Copy and paste the product name and website link onto the spreadsheet.

3) List all the individual product ingredients in label order and any perc entages given for each product.

4) Fill in the appropriate nutritional values per 100g or 100ml for each product.

5) Grey out the ingredients which appear in fewer than 33% of the samples.

6) Create the standardized ingredient list with the remai ning ingredients, grouping together ingredients which are the same or similar (e.g. sugar and dextrose). In this example these are colour coded.

7) Calculate the average percentage of in gredients if a percentage is given (highlighted in red).

8) Fill in the table which shows how much each ingredient is contri buting to the total carbohydrate, sugar, fat and pr otein by multiplying the percentage of the ingredient by the relevant nutrition per 100g from the NDB. The total of this ta ble is used for calculations and as a guide to whether the nutrition matches.

9) Complete any calculations which can be carried out for ca rbohydrate, sugar, fat or protein, taking into account the contribution of macronutri ents from oth er ingredients (see point 8) and adjusting as necessary. Estimate any other ingredient proportions with a logical justification, e.g. Label order.

10) Check the total of ingredient percentages add up to 100% by choosing an appropriate remainder (see Figure 2 and 3).

11) The final ingredient list and proportions are then entered   into the NDB. The nutrition information shown on the databank is then compared to the average nutrition per 100g. Percentages are then   adjusted if necessary to ensure the percentages for key macronutrients are within 10% of the original average nutrient values.

Calculating Proportions (Percentages) (Steps 7 to 9)

The overall aim of calculating the proportions (percentages) is to determine a reasonable mean value of each ingredient included in the final recipe. This was achieved by using nutritional information from the pr oduct label and appl ying general nutrition and food composition knowledge to create an accurate breakdown of ingredient proportions for a specific product.

In products where proportions were provide d for the same ingredient in all of the products, the mean proportion was used in the final standardised ingredient list. If some of the products had missing proportions for an ingredient a weighed reasonable average of the proportions was assign ed. The missing proportions of ingredients were estimated by experienced compilers through investigating the known proportions of ingredients for the same and/or similar food products. This was implemented by comparing the order of the ingredients presented on the food labe l which are prov ided in weight descending order. The justification for any assumptions made for estimating the proportions of some missing ingredients were noted beside the ingredient proporti on. For example, if in the recipe the ingredients were given as carrots (8%), peppe rs, peas (6%), it was assumed that the missing proportion of peppers could be estimated between 6% and 8%.

The nutritional information from all of the products collated were averaged. These values were used as a guide to calculate the proporti on of ingredients in the final standardised recipe.

An example is the use of carbohydrate cont ent for the amount of breadcrumb in food code 9524 HA DDOCK IN BREA DCRUMB FROZEN GI RLLED/OVEN BAKED, as this ingredient accounted for the majority of carb ohydrate in the prod uct. This calculation was carried out b y using food composition tables to determine the a mount of carbohydrate contained in breadcrumbs (71.6%) and using this information to work out the weight of breadcrumbs in the recipe. The total average amount of carbohydrate for this product is 18% and breadcrumbs contain 71.6g per 100g, therefore in this example:

Total amount of carbo hydrate in product X 100 / total amount of carbohydr ate in breadcrumbs = total amount of breadcrumbs contained in the recipe:

18 % x 100 / 71.6% = 25.14 %

This same method can be used regarding other nutritional values, for example sugar, fat and protein.

Choosing Appropriate Remainders (Step 10)

The sum of all ingredients for the standardised recipe must total 100%. Therefore, for most food codes, an appropriate remainder ingredient was chosen by the compiler. This remainder was an ingredient that would not significantly affect the total nutrition or appear in a large amount within the product.

If a product contained water as an ingredient, water was used to make up the remaining percentage as it did not affect any calculations from carbohydrate, sugar, fat or protein made using other ingredients (Figure 2). Alternatively, in the example given in Figure 3, wheat flour was used to make up the remaining percentage because it is the main ingredient in this product and it would not significantly alter the nutrition.

However, in the case of an RPB the data compiler may have been restricted to keep the label order of ingredients and therefore an alternative ingredient to water may have been chosen as the remainder ingredient.

Figure 2. Example of a standard ingredient list in an Excel RPC calculation sheet, where the final ingredient list totals 100% using water as the remainder.

Figure 3. Example of a standard ingredient list in an Excel RPB calculation sheet, where the final ingredient list totals 100% using barley malt extract as the remainder*

10320 ..... HONEY CORNFLAKES									
Product name	**...... HONEY CORNFLAKES**								
Link accessed 25/11/2014	**Picture 25/11/14**			**Protein**	**Fat**	**CHO**	**Sugar**	**cho-sugar**	
Ingredients	**Maize**	63.00%	FROM LABEL	5.92%	2.08%	50.65%		50.65%	
	Sugar	21.51%	CALC FROM SUG: 28-5.41*100/105					0.00%	
	Chopped peanuts	7.00%	FROM LABEL	1.79%	3.22%	0.88%	0.43%	0.44%	
	Molasses	5.00%	EST FROM LABEL ORDER	0.06%		3.36%	3.36%	0.00%	
	Honey	2.00%	FROM LABEL			1.61%	1.61%	0.00%	
	Barley malt extract	0.95%	REMAINDER					0.00%	
	Salt	0.47%	TO MATCH SALT					0.00%	
	Niacin	0.01%						0.00%	
	Vit B6	0.01%						0.00%	
	Riboflavin	0.01%						0.00%	
	Thiamin	0.01%						0.00%	
	Folic acid	0.01%						0.00%	
	Vit B12	0.01%						0.00%	
	Iron	0.01%						0.00%	
		100.00%		7.77%	5.30%	56.50%	5.41%	51.09%	
Nutritional content		**Per 100g**							
Energy kcal		396							
Protein		7.1							
CHO		79							
Sugars		28							
Fat		5							
Saturates		0.9							
Fibre		2.9							
Salt		0.47							

Remainder: barley malt extract

*In this example three of the ingredients had percentages provided on the label with sugar calculated. Due to the label order the only ingredient left that could form the remainder is barley malt extract.

Entering into the NDB (Step 11)

Food Code Matching

Once all standard ingredients were selected for a product the correct RCI a nd SIC food codes were selected to match the ingredients. These were entered into the ingredient list in the appropriate proportions. In some cases default food codes needed to be used if an ingredient description was not completely clear (see default codes, page 15). If there was no default or suitable food code in the SIC/RCI it was queried and a default or new code was created, if appropriate, for futu re recipes. An example of this was garam masala, which is not available on the NDB. As a team it was agreed to use curry powder for garam masala.

Checking

Once all of the ingredients and proportions were entered into the NDB the recipe was checked for accuracy. This was done by comp aring the nutrient profile on the NDB with the average nutritional information of the pr oduct from the calculations set out i n the Excel spreadsheet. Ing redients were adjusted accordingly at thi s stage to ensure the nutrient profile matched. The main macronutrients were ideally kept within 10% of average label nutrition information if applicable. On some occasion s this was not applicable due to:
  - The data compiler trying to keep the ingredients in label order,
  - The data compiler being able to derive the percentages of all the main ingredients in the products used in the standardisation process,
  - Limitations of the NDB, fo r example diffe rences in nutritional composition of ingredients on the NDB compared to that provided by the manufacturer.

Duplicate ingredients

Recipes must not contain duplicate ingredients when added to the SRD. For Recipes that have constituent parts that con tain duplicate ingredients, those ingredients were added together and shown as a single amount.

Weight Loss and Gain Factors

Weight loss and gain factors were not co nsidered in many R PC food codes a s the nutritional information given was usual ly 'as consumed' and the ingredients were calculated based on the nutrition. Unlike RHM's, the proportions of the ingredie nts were

used rather than given amounts. Any weight loss on reheating prepared foods would have impacted the whole product and therefore individual ingredient proportions are likely not to change significantly. Cooked ingredient food codes such as 'tomato puree with cooking losses' were used for any foods that had already undergone processing i.e. ready meals.

Food codes with losses

When there was not a code for a cooked or 'as consumed' food, the raw code was used and a nutrient loss was applied. When a raw food code was used for coding a recipe due to the lack of a cooked food code, data compilers marked the "vitamin loss" option in NDB for this food. Weight loss was not applied for foods like garlic, ginger and chilli if their proportion was less than 5% in the food. This process was conducted to ensure the accuracy of nutrition content of food codes in the NDB.

Converting volume to weight

Many recipes provided liquid ingredients as a volume, whereas the NDB uses only weight measures. Volumes were converted into gram weights using specific gravity values provided in specific resources; FSA Food Portion Sizes (3rd), MW6 and MRC HNR 'in house' food weight sources.

**Accounting for seasonal variation in food codes**

Where food codes were presented as summer and winter varieties (e.g. milk) the proportion was equally divided between winter and summer codes and both codes were recorded in the ingredient list in the NDB.

Recipe purchased branded (RPB)

Brand specific food codes exist for products which have a very distinct food composition, or are consumed by many survey respondents. This method follows a similar procedure as for RPC codes, but relates to just one food item or items specific to one brand which fit the NDB description. Initially the food code description was reviewed to identify the product and manufacturer, referring to the NDB for further details if required. The company website was reviewed for product details, or products were investigated at supermarkets.

Ingredient information was set out on an Excel spreadsheet similar to the RPC method, and proportions were calculated (Figure 4).

Figure 4. An example of an RPB with explanation:
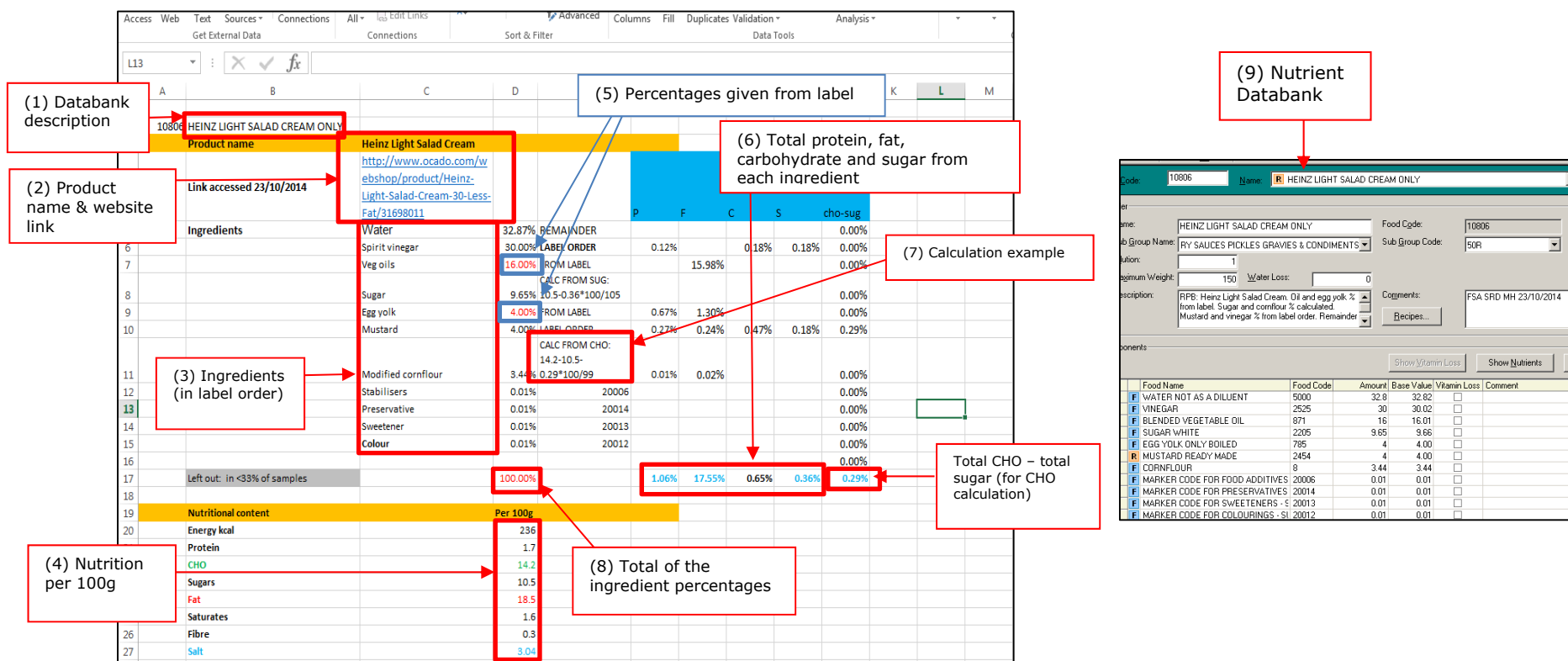
1) Check the product description from the RPB Total List spreadsheet matches the NDB description.
2) Find the appropriate product, preferably on the brand website. If more than one product matches the description then include all. If more than 5 products are available choose the most appropriate. Copy and paste the product name and the website link onto the spreadsheet.
3) List all the ingredients in label order and any percentages given.
4) Fill in the appropriate nutritional values per 100g or 100ml.
5) Use the percentages from the label (highlighted in red) as a guide for working out the proportions of each ingredient. For an RPB all ingredients must be included in label order. If more than one product is used an ingredient list is produced in a logical label order.
6) Fill in the table which shows how much each ingredient contributes to carbohydrate, sugar, fat and protein. The total of this table is used for calculations and as a guide to whether the nutrition matches.
7) Complete any calculations which can be carried out for carbohydrate, sugar, fat or protein, taking into account the contribution of macronutrients from other ingredients (see point 6) and adjusting as necessary. Estimate any other ingredient proportions guided by label order.
8) Check that the total of ingredient percentages add up to 100% by choosing an appropriate remainder (see Figure 2 and 3).
9) The final ingredient list and proportions are entered into the NDB. Duplicate ingredients are grouped together. The nutrition information shown on the databank is then compared to the average nutrition per 100g. Percentages are then adjusted if necessary to ensure the percentages for key macronutrients are within 10% of the original average nutrient values.

RPC and RPB codes not updated

Some RPC and RPB food codes had no sui table match from th e existing products available in the selected supermarkets, or the source of the RPC or RPB code was obscure (e.g. from a non UK food retailer) and no longer available. According to suggestions of FSA, this food codes were updated based on using similar f oods or assumptions, and food names were amended with adding a statem ent "unreliable". RPC and RPB codes that have been updated with this approach can be found in Appendix 2 of this guideline.

For some R PC and R PB food codes, the food codes within the reci pe were updated to appropriate default codes wh ere necessary. For example, many of the older recipes contained old fat spread and raw meat codes. A number of these recipes did not always match the food code description or had missing key ingredients, possibly due to previous coding errors. These food codes were updated where possible.

Adding new food codes to support recipes

In specific situations new food codes have been added to the SRD:

- When there were no suitable RC I and SIC food codes in the NDB to use for the compilation of the standard ingredient list, see Appendix 3.
- In order f or the ingredient lists to be appropriate for the use of exposure assessment there was a require ment for no n-nutrient based ingredients to b e added, under the new SRD miscellaneous food group (50X). Therefore marker codes were set up. Refer to Section 3 (page 9) of the RHM guidelines.

4. Guidance relating to specific food types

Food rules
The food rules used for recipe coding have been provided in Appendix 1 of this guideline.

Default codes
A list of default food codes gathered in the creation of the SRD is provided at Appendix 6 of the RHM guideline. This was referred to wh en deciding which RCI/SIC codes to select, to ensure c onsistency in the SR D. However, in most cas es codes used with R PC and RPB's were primarily informed by t he label information. A f ew additional notes for common ingredients are provided below.

- Flour: The default flour used in the SRD is "plain flour after baking". Plain flour after baking was used unless stated otherwise on the label. Raising agent would be added as a separate ingredient stated on the label.

- Milk: The food codes for "milk after heating/boiling" were used in recipes which use milk in the cooking process. The type of milk was usually clear from the label. If not, a milk code providing the most appropriate nutrition (notably protein and fat) to match the average nutrition information was selected.

- Vegetables and potatoes: Potatoes and carrots are assumed as old unless the food code states otherwise and cabbage is accounted for equally as white and savoy also unless stated otherwise.

- Herbs and spices: Dried mixed herbs and mixed spices were used for coding if multiple dried herbs and spices were used in recipes and if their quantities were indistinguishable. Codes for specific herbs and spice were used in RPC's and RPB's if available.

5. Quality assurance

The quality assurance in the compilation of SRD was managed by quality assurance checking procedures given below and carried out by the SRD working group.

5.1. Summation checks

The proportions calculated in standard ingredient lists must total 100%. All ingredient lists underwent summation checks, which was a built in function of the SRD, thereby ensuring an automated checking process.

5.2. Error checks

The SRD was subject to a minimum of 10% checks where all aspects of the standardization and data collection procedures was double checked and corrected for any errors which were found according to a list of checking criteria (Appendix 4 and 5). This level of quality checking is suitable for the detection and minimization of human data entry error. Cross error checks were performed by members of the project team not involved in the original ingredient list creation. In addition, any patterns or systematic errors identified during the 10% checking process triggered more specific, in-depth and/or extensive checks depending on the nature of the errors identified.

References

1. McCance and Widdowson's The Composition of Foods, Sixth summary edition. Food Standards Agency (2002). Cambridge: Royal Society of Chemistry. ISBN 0-85 404-428-0.

2. Food Portion Sizes. Food Standards Agency, (2002) Third edit ion, Her Majesty's Stationery Office, London.

Appendices

Appendix 1. Food Rules

Food rules were created during the compilation process. The food rules were created as a result of discussions SRD wo   rking group meetings which were held regularly throughout the project to agree approaches to standardising certain food codes, where the protocol didn't specify an exact method. In addition to the specific food rules relating to the RPC/RPB component of   the project there are   also RHM food rules (refer to Appendix 4 in the RHM guidelines) which may also be applicable to the RPC/RPB codes. Users are advised to search both when considering updating RPC/RPB codes.

No	Food Rules
1	If a product has a recipe, and no similar product can be found, use the original recipe and update the ingredients in it e.g. changing raw food codes to cooked food codes for a take-away product.
2	Add 'Product not found. Not updated' to the RPC Total List and update the description box on the NDB.
3	Find a similar product if no recipe exists on NDB. Try and match main ingredients and type of dish e.g. quiche or casserole. Beef pies could be used for Bridies (Scotch pies) substituting lamb for beef.
4	White meat and red meat are not usually considered inter-changeable. However, if the code was requested very few times e.g. 10497 Lamb bhuna (requested ONCE) or a similar product was found made by the same manufacturer e.g. 2664 Vesta chicken curry with rice red meat could be substituted with white meat. In other words use the ingredients of Vesta beef curry and rice available online and substitute chicken for beef (only applicable for RPC's).
5	Check MW for similar products and proportions of ingredients e.g. Shortbread wholemeal. Use recipe for shortbread white and the proportion of wholemeal to white flour of wholemeal biscuits in MW.
6	Use nutrition information from original code on NDB with ingredients of a similar product. Write down nutritional info before changing to recipes in tools or it will be lost.
7	Always note the justification for decisions on calculation sheets and on the NDB.
8	If only two or three samples of a product are found, but ingredients and nutritional information is very similar e.g. Bolognese sauce canned from ASDA and Sainsbury's, use all the samples found and include all overlapping ingredients.
9	The proportion of salt for the product, if present in the ingredient list, is adjusted to match the nutritional information on the food labels and where necessary sodium was converted to salt by multiplying the weight in grams by 2.54.
10	If ingredients of a product is found on a supermarket website, but the nutritional information is on a website not considered a reliable source e.g. an internet site, calculating dietary intake- Include the ingredients but not the nutritional info. If it is one of very few products found suitability would have been discussed and agreed within the SRD group.
11	If the nutritional information of five products is given as both cooked and raw, then use the nutritional information which is stated in the code description on the NDB, e.g. for food code 9285: Breaded chicken breast raw, use the raw nutritional information and code the chicken breast as raw, such as food code composition changing over the duration of the project and percentages of ingredients given on the label which cannot be adjusted.
12	If a nutrient (e.g. sugar) is low but the main source of that nutrient is excluded as it only appears in one out of the five products, do not include it and note that it is the reason for the low nutrient content of the final recipe.

14	Sugar in commercial juice drinks cannot be matched by using generic juice codes on NDB, but sugar cannot be added since it is not on the ingredients list e.g. 7892 Baby pure fruit juice concentrate fortified with vitamin C and 10722 Acai berry juice drink with added vitamin B6. Use homemade fruit puree codes e.g. grape puree homemade since the sugar content is much higher. Do not exceed total fruit juice percentage obtained from labels. Note justification on NDB.
15	Occasionally it is impossible to match nutrients like sugar, energy or protein with existing codes on NDB e.g. 7623 Bran flakes, own brand, Not Kellogg's, because of NDB limitations, such as food code composition changing over the duration of the project and percentages of ingredients given on the label which cannot be adjusted.
16	For a take away product that no longer exists, e.g. 1315 Bacon & egg in muffin, bagel or bun, use NDNS year 5 to get information of components and nutrition, for example use egg & sausage recipe and substitute bacon for sausage for food code 1315.
17	When the nutrition information of take away food is available online, but the product description has changed e.g. McDonalds Big Tasty with bacon is now called Deluxe with bacon, use Food Portion Size book for list of ingredients to make up a recipe using nutritional information obtained online.
18	Juice drink is grouped under RTD Still drinks, but the only grape juice code on the NDB is sparkling. Do not include sparkling juice in a still drink. Make up juice with grape puree homemade and water.
19	Use marker code 20014 for preservatives for acidity regulators e.g. malic acid, citric acid and flour treatment agent or antioxidant e.g. ascorbic acid.
20	For recipes where the nutrients nearly match but the total ingredients list does not add up to 100% and no water is present in the recipe (e.g. 8044 cereal bar made with oats only UF) -do not add water to make up remainder. Add an ingredient that is present in the samples but was excluded because it is in <33%. In this case peanut butter was most appropriate to make up the remainder and also to add to the protein. The relevant ingredient should be decided in a query meeting.
21	If an ingredient % is obtained from all label averages, do not alter the % of this ingredient even if a nutrient like protein or fibre is too low or too high. Write a justification on the calculation sheet and in the description box on the NDB.

Appendix 2. RPC/RPB food codes no longer manufactured, but updated

Food number	Food Code Description
5115	Sparkling Ribena Spring Blackcurrant Canned
6208	Sainsburys Honey Nut Loops
7918	C-Vit Rtd Any Not Blackcurrant
7919	C-Vit Conc Blackcurrant
8184	Golden Crackles Kelloggs
9966	Ribena Juice & Fibre Bcurrant Rtd
10167	Lazytown Flavoured Spring Waters Nas Fortified
10257	New Day Honey Hoops Cereal Fortified
10446	Optifit Yogurt Drinks, Any Flavour, Fortified With Vits C, E, B6
118	Bread Vit-Be
231	Oat Krunchies, Quaker
1102	Chicken Chow Mein Vesta As Served
1106	Chicken Curry Vesta No Rice
3216	Benecol Snack Bar, Chocolate Chip And Hazelnut
3257	Sunny Delight, Light Fruit Juice Drink
3357	All Bran Apricot Bites, Kelloggs Only
3450	Aldi Honey Balls Cereal
3745	Oat & Rice Cereal Bar, Fortified, Kelloggs Mueslix Bar
3855	Old Code Nestle Monsters, Inc. Breakfast Cereal Only
5213	Ribena Strawberry Yoghurt Drink Fortifed With Vits
5506	Ribena Twist Low Cal Sparkling Spr
10305	Lidl Bixies Shreddies Type Cereal Fortified
9112	Birds Eye Super Whip Low Fat Cream
7719	Smatana
8623	Opal Fruits Ice Lolly
5208	Chocco Crunchies Tesco
7972	Bitz Bar (Plain & Milk) Matchmaker
8296	Old Code Oasters Ie Low Fat Savoury Oat Snacks Eg Jordans
8612	Cadburys Nut Crisp Bar
9616	Halo Reduced Calorie And Fat Chocolate Bar
9796	Perfect Balance (Heinz Weight Watc
9818	Oat Bran Flakes With Raisins And Apple (Js Brand)
10322	Morrisons Trim Flakes Breakfast Cereal
10672	Heinz First Steps Choc Chip Cookies Fortified
10922	Heinz Little Pasta Animals With Carrot And Tomato Dry Weight Fortified
10936	Weetabix Oatibix Bites With Cranberry Fortified
10985	Annabel Karmel Multigrain Puffs, With Added Thiamin, 12 Months+
7866	Old Code Crisps Jacket Potato Assorted Flavours
5594	Mcvities Go Ahead Fruit Ins
7647	Kelloggs Common Sense Oat Bran Fla
7648	Kelloggs Common Sense Oat Bran Fla

2652	Ice Magic, Ice Cream Topping Sauce
8601	Bards Toffee Popcorn With Added Vi
8958	Kelloggs Nut Feast
9137	Boots Lemon & Lime Drink Rtd Fortified With Calcium & Vitamins
9138	Cow & Gate Olivarit Banana & Pinea
9278	Horlicks Chocolate Not Instant Not Low Fat Dry Wei
649	Buildup Slender Slimming Drink Powder
5174	Vegetable Hot Pot Heinz Weight Watchers
8311	Bournvita Low Fat Dry Weight
8625	Tesco Fruity Hoops Breakfast Cerea
10369	Little Man Choco Moon Breakfast Cereal Fortified
10406	New Day Honey Wheat Puff Cereal Fortified
10680	Aldi Fruit Shots Juice Drinks Rtd Fortified
3738	Lucozade Solstis With B Vitamins
3556	Vitofit Vitamin Drink E.G. Lidls
3159	New Yorker Breakfast Bar Fortifie
8806	Spar Wedges Cereal & Potato Snack
8181	Chockles Choc Cornflakes & Puffed
8675	Co-Op Honey Bears Breakfast Cereal
8699	Farleys Bedtimers Chocolate Drink
3226	Get Up & Go, Oatwheat & Cornflake Cereal With Raisins & Apple E.G. Safeway
3800	Flakes And Grains Cereal With Tropical Fruit, Sainsburys Bgty
6133	Del Monte Fruitini in Creamy Sauce
6987	Simply Double Dessert Topping
8707	Sainsburys Turkey and Bacon Loaf
3185	Southern Style Chicken Pancakes E.G. Findus
3362	Wolfra Multivitamin Fruit Juice Dr
5140	Kelloggs Hot and Krumbly
8217	Cadbury's Chocolate Milk Drink-Low Fat
6402	Sanatogen Start-Up Fruit Juice Dri
9183	Wells Fruit Drinks,Conc.,Low Calor
8622	Bart Simpson Dairy Dessert
7882	Pizza Snacks Eg Walkers Bitza Pizz
5170	Chivers Bread Busters Funky Cola Spread
8031	Milupa Infant Drink Dry
8249	Pork Roast Roll Cooked Bernard Matthews
2738	Multigrain (Corn, Rice,Wholewheat) Crisp E.G. Jordans
2986	Slimfast Soup, Dry Weight
10418	Aldi Multivitamin Fruit Juice Drink Nas
6524	Tesco Quorn Mushroom Pie Two Crust
6159	Tesco Apricot Crunchies
5120	Crisps Square Flavours With Artificial Sweeteners
3164	French Fries, Low Fat E.G. M&S
8894	St Ivel Prize Whipped Yogurt with Cream not UHT

Appendix 3. New food codes added to the NDB to support the RPC/RPB standardisation

Food Code	Food name
20008	Yeast extract
20018	Onion, dried.
20019	Garlic, dried
20020	Leek, dried
20021	Celery, dried
20022	Onion, powder
20023	Garlic, powder
20024	Leek, powder
20025	Celery, powder
20026	Tomato, dried
20027	Red pepper, dried
20028	Red pepper, powder
20029	Tomato, powder
20030	Carrot, dried
20031	Carrot, powder
20032	Dextrins (Maltodextrin)
20033	Coconut oil
20034	Sweet corn, dried
20035	Chicken meat, dried
20036	Green beans, dried
20037	Cheese powder
20038	Vine leaf in brine
20039	Cocoa mass
20040	Cocoa butter
20041	Molluscs, Clams, fresh
20042	Gluten from wheat
20043	Macadamia nuts raw
20044	Psyllium husk
20045	Gum base
20046	Sweeteners containing polyols (Except erythritol)
20047	Sweeteners, inulin, oligofructose
20048	Blood, pork
20049	Calcium caseinate
20050	Glucose, dried
20051	Consomme, vegetable
20052	Consomme, fish
20053	Fish powder

Appendix 4. Criteria for checking RPC coding

1- Check that the FSA RPC food code description is compatible with the description of the compiled food products chosen by the compiler.

2- Sense check the number of food products co mpiled. Five products should ideally be chosen, but for u ncommon products this may not b e possible. For example, mayonnaise is a common product and if only 3 produ cts were found this may b e flagged up.

3- Check that the products comply with the project aim, which aims to collect at least 5 products; one from each supermarket brand, one from a value range and one from a luxury range, if possible.

4- Visually check the web links used to see if they are from approved and relative UK sites.

5- Check that the list of ingredients match the FSA RPC food description. For example, if the product description is 'jam doughnut purchased', jam should be present in the ingredient list. If jam was missing from the list, this product should be flagged.

6- Check if the f inal ingredient list covers the common ingredient components. New codes were created for the ingredients that were substantial for some products. For example gum base w as created as it is a subst antial ingredient in chewing gum. However to avoid creating unnecessary food codes, food codes were not creat ed if the percentage of the ingredient within a product was very low.

7- Sense check that the proportion of ingredients in the final ingredient list is logical. For example, for a beef product with bolognese sauce, beef would be expected to have the highest proportion, and the seasonings to have the lowest.

8- Sense check that the average calculation/we ight estimation of prop ortions on the final ingredient list is l ogical compared to the proportions on the label of the food products collected.

9- Check to make sure that there are no co mmon ingredients among the food products missing in the final ingredient list.

10- Check that the correct code was used/rep laced in the NDB for each ingredient, considering the use of correct default codes (see default code list) and cooked codes.

11- Check the nutrients: Check that the nutrient content of the compiled food products are similar. For example if four products are approximately 100 kcal but one is 1000 kcal it needs to be flagged and c hecked. In these situations the first step should be to compare t he nutrient values on the link provided, considering the matrix unit used on label (the amount that the value is reported for, e.g. per serving-27 g or per

100 g, or a typo on the order the nutritional information). The second step should be to check the differences of the ingredients within the compiled products.

12- Check that all nutrients have been recorded where possible.

13- Visually check the average of the nutri ents from the label by doubl e clicking to highlight all the cells included in the calculation.

14- Check that the total proportion of final ingredients equals 100.

15- Check the calculations, if available, of specific nutrients like carbohydrate, sugar, fat, protein and salt. Considering if the correct values, correct food cod e, and nutrients (e.g. carbohydrate, fat) were used for the calculation and coding.

16- Check that the final ingredient list and nutrients on the calculation sheet match with the coding in NDB, considering the main macronutrients should be w ithin 10% of each other.

17- Check that none of the ingredients are duplicated on the NDB.

18- Check that the description fields on the NDB are completed appropriately. Take into consideration that t he product des cription may be differe nt between the NDB and FSA list. We used the NDB food description as the original.

19- Make sure no codes say 'incomplete' in the food code description.

Appendix 5. Criteria for checking RPB coding

1- Check if the FSA RPB food code description is compatible with the description of the compiled food products chosen by the coder.

2- Visually check the web links used to see if they are from approved and relative UK websites.

3- Check that the list of ingredients match the FSA RPB food description. For example, if the product description is 'Kellogg's crunchy nut clusters', nuts should be present in the ingredient list. If nuts was missing from the list, this product should be flagged.

4- For one product; c heck that the ingredients are listed in label order and the proportions of ingredients follow this order, from largest to the smallest. This is a critical checking criteria for RPB coding . For more than one products; sense chec   k that the proportion of ingredients in the final ingredient list is logical.

5- Check that the correct code was used/rep   laced in the NDB for each ingredient, considering the use of correct default codes (see default code list) and cooked codes.

6- Check the nutrients: Check that each nutrient value looks correct. Check the nutrient information using the online link for comparison taking into account the matrix unit used on the label, the amount that the value is reported for (e.g. per serving-27 g, or per 100 g).

7- Check that all nutrients have been recorded where possible.

8- Check that the total proportion of final ingredients equals 100.

9- Check the calculations, if available, of specific nutrients like carbohydrate, sugar, fat, protein and salt. Considering if the correct values, correct food code an d nutrient (e.g. carbohydrate, fat) sources were used for the calculation and coding.

10- Check that the final ingredient list and nutrients on the calculation sheet match with the coding in NDB, considering the main macronutrients should be w ithin 10% of each other.

11- Check that none of the ingredients are duplicated on the NDB.

12- Check that the description fields on the ND B are completed appropriately. Take int o consideration that the product description may be differe nt between the NDB and FSA list. We used the NDB food description as the original.

13- Make sure no codes say 'incomplete' in the food code description.

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Appendix C

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Appendix D

Assumptions to classification of food types in the SRD

All food and beverages coded in the dietary assessment component of UK nutrition surveys from 1992 onwards were included in the SRD, with the exception of supplements, dietetic products, and medicines.

Each food code was assigned to a food type, designed specifically for use in the SRD;

RCI   Raw Commodity Ingredient (1)

SIC   Simple Ingredient Commodity (2)

RHM   Recipe for homemade items (3)

RPC   Recipe for composite purchased items (4)

RPB   Recipe for brand specific items (5)

MISC   Miscellaneous food codes of non-nutrient value to assist recipe compilation (6)

The classification table below should be consulted when classifying additional food codes to future versions of the SRD, to ensure consistency in recipe production.

Food category		Classified food type	
Dairy	Milk, all types, enriched with added vitamins/minerals/fatty acids	4*	RPC
	Milk, dried/powder, dry weight	2	SIC
	Milk, dried/powder, made up with water	3	RHM
	Infant formula, powder, dry weight	2	SIC
	Infant formula, ready to drink	2	SIC
	Infant formula, made up with water	3	RHM
	Non-dairy alternatives (soya, oat, rice etc), not fortified	2	SIC
	Non-dairy alternatives (soya, oat, rice etc), enriched with vitamins/minerals/fatty acids	4*	RPC
	Spreadable butters and blended margarines	4	RPC
	Cheese spreads and processed cheese	4	RPC
Fruit (and vegetables)	Canned fruit (vegetables), fruit (vegetables) only	2	SIC
	Canned fruit (vegetables), fruit (vegetables) and juice/syrup	4	RPC
	Stewed fruit (vegetables), with no added sugar/salt	2	SIC
	Stewed fruit (vegetables), with sugar/salt added	3	RHM
Cereals	Pasta, wheat based, dry and cooked	2	SIC
	Pasta, fresh, egg based, filled or plain	4	RPC
	Bread, loaf/rolls, all types	4	RPC
	Bread, all types, toasted	3	RHM
	Other bread products eg ciabatta, muffins, not stated as purchased	3	RHM
Meat and fish	Meat or fish, fried	3	RHM

	Meat or fish, grilled or baked, no added fat^	2	SIC
Sauces	Any food codes for sauces within food group 50R of the nutrient databank are assumed as purchased if not stated	4*	RPC
Beverages	Beverage powders, all types, powder, dry weight	4*	RPC
	Beverage powders, all types, made up with water	3	RHM
	Fruit juice drinks, not pure juice, with added water/sugar/sweetener	4*	RPC
	Fruit juice, fresh or from concentrate, pure juice only	2	SIC
	Fruit squash/concentrate/diluting juice, not diluted	4*	RPC
	Fruit squash/concentrate/diluting juice, diluted as consumed	3	RHM
	Alcoholic beverages; beer, lager, wine, spirits, liqueurs	2	SIC
	Mixed alcoholic beverages e.g. shandy	4	RPC
General	Purchased food powders/mixes, dry weight	4*	RPC
	Purchased food powders/mixes, made up with water/milk	3	RHM
	Food codes described as 'grilled or fried'; assume as no fat added	2	SIC
	Food codes described as 'takeaway' only	3	RHM
	Food codes described as 'retail/purchased or takeaway'	4	RPC
	Water used as a diluent	6	MISC
	Marker for added vitamins/minerals/fatty acids	6	MISC
	Marker for food additives, preservatives, colourings	6	MISC

* These products may also represent branded food codes (RPB).

Appendix E - SRD food code categorization decision tree