Food Matching: Experiences in the UK
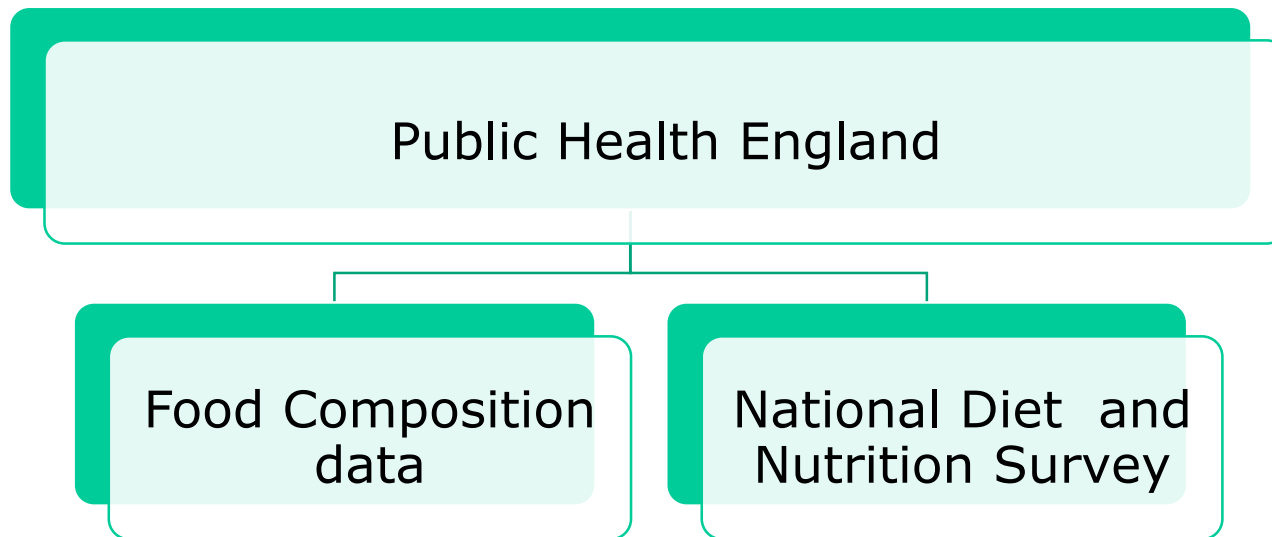
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MRC Human Nutrition Research[1]
Institute of Food Research[2]
08 April 2016

EuroFIR Food Forum, Brussels

UK food composition data and the national diet and nutrition survey

Public Health England
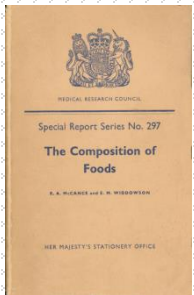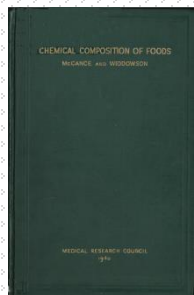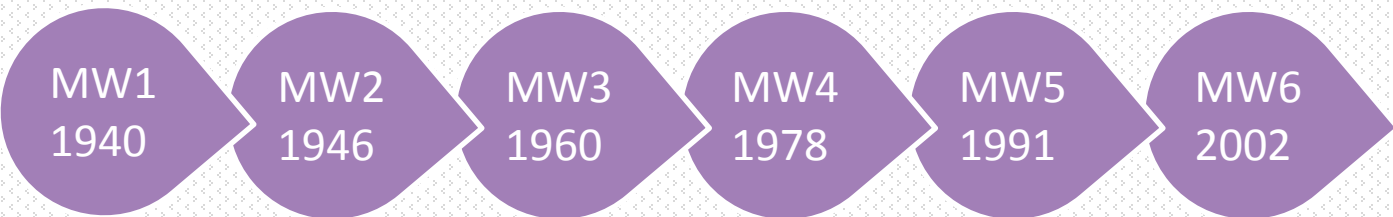
Food Composition data

National Diet and Nutrition Survey

UK food composition data

A knowledge of the chemical composition of foods is the first essential in dietary treatment of disease or in any quantitative study of human nutrition
(McCance and Widdowson, 1940)

MW1 1940 — MW2 1946 — MW3 1960 — MW4 1978 — MW5 1991 — MW6 2002
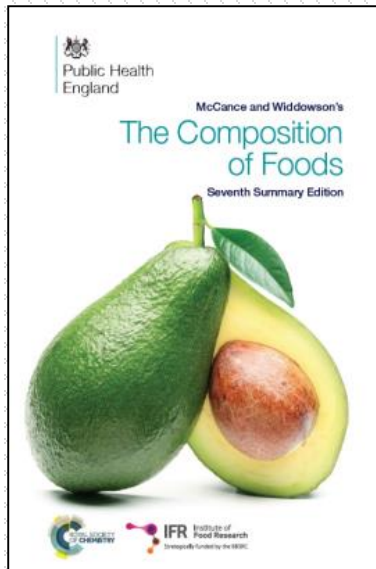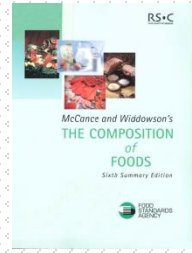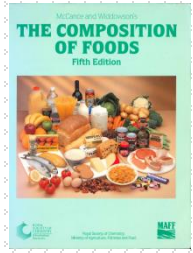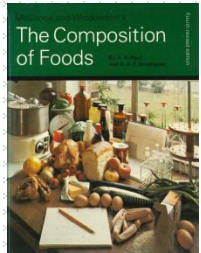
Updating composition data

Need for new/updated data reviewed by PHE, IFR with input from users

- **Analytical surveys**
  - commissioned by Food Standards Agency, Department of Health and Public Health England

- **Collaboration with industry**
  - e.g. vitamin K_1 and K_2 content of eggs commissioned by the British Egg Industry Council

- **Manufacturer's and Trade Association data and label data**
  - e.g. All processed foods reviewed to update sodium, fat, sugar, fatty acids following recent reformulations

- **Literature data**
  - e.g. Updated data for herbs and spices from USDA

Composition of Foods Integrated Dataset (2015)

Update included:

- All data from MW7

- Recalculated values for foods associated with new MW7 data, e.g.

  - apple, flesh and skin, weighed with core
  - grapes, average (of white and red)

- Recipes recalculated using new composition data and amending ingredients (e.g. fats, added salt), where necessary

- Updated composition of processed foods based on manufacturers' data, e.g. reductions in

  - salt
  - trans fatty acids
  - saturated fat

- Review and validation of 'old' data for foods from supplements, e.g.

  - fish species
  - fruit
  - vegetables

Production of NDNS Nutrient Databank

Published composition database

CoFID 2015, IFR

NDNS Nutrient Databank

Gap filled to produce user database, PHE

HNR Database
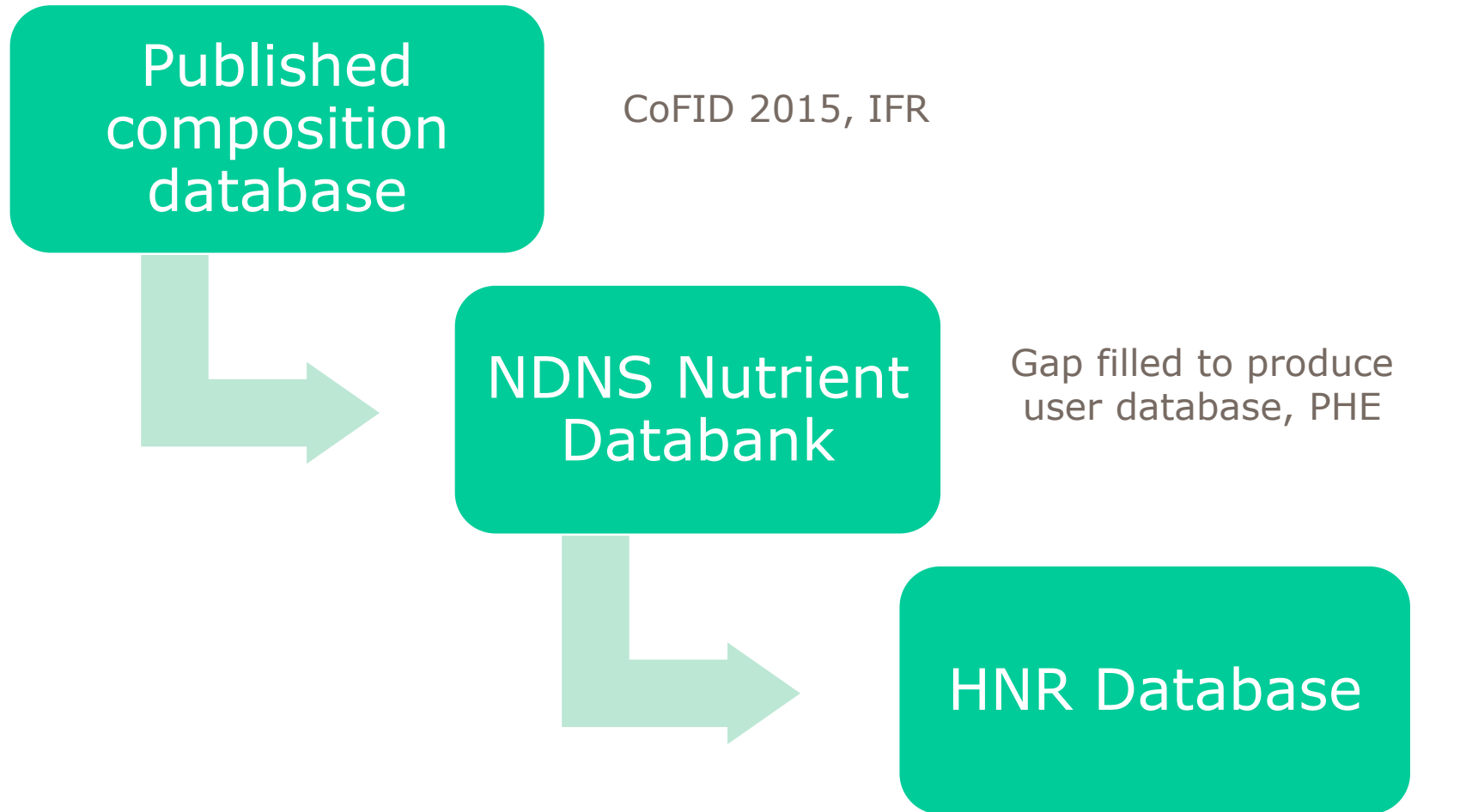
Additional data added, HNR

Dietary Assessment in NDNS

- Dietary data is coded by a team of data enterers

- Food intakes are entered into a dietary assessment system (DINO)

- The food composition data used is the NDNS Nutrient Databank; this was incorporated into the DINO system.

- the Nutrient Databank; contains over 5000 foods and drinks, including manufactured products, homemade recipe dishes and dietary supplements.

Dietary Assessment in NDNS

- Coders attempt to match each food item in the diary with a food code from DINO.

- For composite items (e.g. sandwiches) each individual component is assigned.

- Where the coder could not resolve the food/portion consumed, the entry was flagged as a query for action

- Food composition coordinator suggests most appropriate codes for all flagged food and portions adhered to a systematic **food matching** practice.

Queries

- Classification;

    1) Missing/ no suitable food code in database

    – E.g. new products, or existing foods that haven't been reported before.

    2) Insufficient information to code food

- Resolution;

Collecting as much information about the product

- Food labels/wrappers
- Online food info
- Shopping
- Contact manufacturers and school caterings
- Identification of ingredients and cooking methods: Reported recipe> standard recipes> websites

Missing/ no suitable food code

1) Matching the food item with a similar food code

General aspects to consider;

- Food description. e.g. Meat dishes: protein, fat etc. Cereal dishes: CHO, e. fibre etc.
- Foods with specific fats and artificial sweeteners content

Foods	Food code	Energy (kcal)	T. Fat (g)	Sat. Fat (g)	Protein (g)	CHO (g)	Sugars (g)	Na (mg)	E. fibre (g)
STRAWBERRY YOGURT DRINK		75	0.8	0.7	3.2	14.5	14.2	0	0
Match 1 – YOGURT DRINK WITH FRUIT JUICE	711	62	0	0	3.1	13.1	13.1	47	0
Match 2 – YOGURT DRINK CONTAINING FRUIT PUREE	7755	74	0.9	0.6	4.4	14	13.7	10	0.1

Missing/ no suitable food code

MRC | Human Nutrition Research

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Missing/ no suitable food code

2) Matching to multiple food codes

Special consideration to;

- Available food codes
- Ingredients
- Coding facility

Via a 'nutrient profile calculator' integrated to DINO

Foods	Food Code	%	Energy (kcal)	T. Fat (g)	Sat. F.A. (g)	Protein (g)	CHO (g)	Total Sugars (g)	Na (mg)	E. fibre (g)
ALL BUTTER BISCUITS	8191	82%	501	24.3	15.36	6.2	68.7	22	403	1.8
PECAN NUT KERNEL ONLY	2174	8%	689	70.1	5.7	9.2	5.8	4.3	1	4.7
SUGAR WHITE	2205	3%	394	0	0	0	105	105	5	0
MAPLE SYRUP	8068	4%	254	0.2	0.04	0	67.2	67.2	10	0
GOLDEN SYRUP	2206	3%	298	0	0	0.3	79	79	265	0
Total		100.0%	497	25.5	13.1	5.8	65.0	26.6	339	1.9
ALICE BRAND PECAN COOKIES-LABEL VALUE			495	25.2	13.2	5.9	63.7	26.3	345	2.1
Difference (%)			-0.4	-1.2	0.8	1.7	-2.0	-1.1	1.7	9.5

Missing food code in database

3) New food code creation

a. Decision criteria;

- compositional match of existing food codes
- frequency of consumption
- amount of consumption
- approach; to have a minimum/efficient number of food items, thereby maintaining manageability of the system and consistency of use
- fortified foods/supplements require a new code due to their specific fortification levels
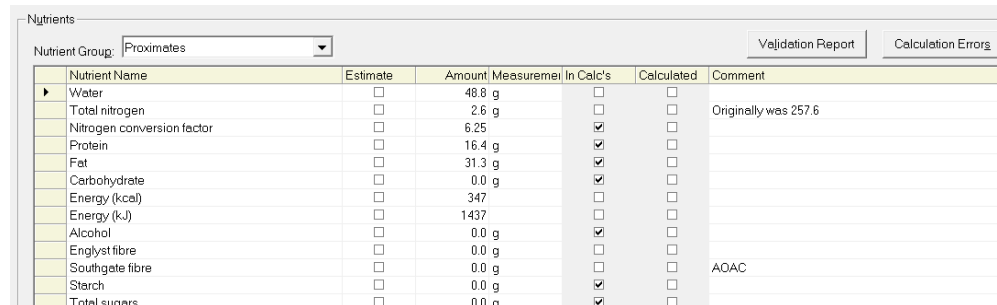
Missing food code in database

3) New food code creation

b. Method for filling nutrients;

For manufactured foods
- Nutrient labels: Checking the food component identification and units
  - E.g. CHO> monosaccharide equivalents
  - AOAC fibre> Englyst fibre
  - Per portion (20g)> per 100g edible foods
- Matched/estimated from similar existing food codes
- Borrowed from other FCTs (preference for UK analytical values)
- Composite foods disaggregated into food components (e.g. fruit)
  - Estimation using nutrient information (e.g. vitamin A -tomato purée)

Nutrients

Nutrient Group: Proximates

Validation Report   Calculation Errors

Nutrient Name	Estimate	Amount	Measuremel	In Calc's	Calculated	Comment
Water	☐	48.8 g		☐	☐	
Total nitrogen	☐	2.6 g		☐	☐	Originally was 257.6
Nitrogen conversion factor	☐	6.25		☑	☐	
Protein	☐	16.4 g		☑	☐	
Fat	☐	31.3 g		☑	☐	
Carbohydrate	☐	0.0 g		☑	☐	
Energy (kcal)	☐	347		☐	☐	
Energy (kJ)	☐	1437		☐	☐	
Alcohol	☐	0.0 g		☑	☐	
Englyst fibre	☐	0.0 g		☐	☐	
Southgate fibre	☐	0.0 g		☐	☐	AOAC
Starch	☐	0.0 g		☑	☐	
Total sugars	☐	0.0 g		☑	☐	

Missing food code in database

5) Recipe calculation

- Recipes for homemade dishes and manufactured products*
- Using a recipe calculator function of DINO applying;
    - yield and retention factors
    - water losses (e.g. cooking)
    - weight gain (e.g. pasta)
    - edible portions (e.g. meat)

- Recipe is linked with the food group of the recipe to report on these foods both at the recipe & food level.

Insufficient information on food record

- Individual dietary pattern/responses to other questions in diary
- Default codes; based on the food item with the greatest consumption frequency within the food group (e.g. The default cheese is cheddar).

Documentation

- Resolution of queries spreadsheets
  - ✓ In order all data enterers to access the manner in which a particular query was resolved, thereby maintaining consistency.
- Food rules list
  - ✓ e.g. fat absorbed with frying and squash dilutions
- Food lists based on market surveys (e.g. sandwich lists)
- Conversion factors (e.g. specific gravity)
- DINO functions: Nutrient profile calculator, recipe calculator

Thank you

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