**Step-by-step procedure to code food groups:**

1. Break down mixed dishes into ingredients
   1. Create subset dataset with mixed dishes only (that are present in PEAS recalls):

|  |  |  |
| --- | --- | --- |
| **FNDDS group number** | **FNDDS group name** | **FNDDS codes** |
| 27 | Meat, poultry, fish with nonmeat items | 27000000 to < 27500000 |
| 28 | Frozen and shelf-stable plate meals, soups, and gravies with meat, poultry, fish base; gelatin and gelatin-based drinks (excluding for soups and gravies) | 28000000 to < 28300000 |
| 32 | Egg mixtures | 32000000 to < 33000000 |
| 58 | Grain mixtures, frozen plate meals, soups (excluding for soups) | 58000000 to < 58400000 |
| 745 | Tomato mixtures | 74500000 to < 74600000 |

* 1. Import ingredient weights for all mixed dishes (**from FNDDS 4.0 database**)

FNDDS version compatibility (food codes) with our data – **FOOD CODES FROM PEAS NOT IN FNDDS**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **FNDDS version** | **Number of observations** | | **Number of different food codes** | |
| **N total** | **N mixed dishes** | **N total** | **N mixed dishes** |
| FNDDS 2015-2016 | 5232 | 678 | 436 | 85 |
| FNDDS 2013-2014 | 2744 | 400 | 219 | 59 |
| FNDDS 2011-2012 | 2181 | 386 | 175 | 57 |
| FNDDS 5.0 | 612 | 92 | 138 | 47 |
| FNDDS 4.0 | 496 | 85 | 138 | 44 |
| FNDDS 3.0 | 877 | 308 | 206 | 83 |
| FNDDS 2.0 | 1380 | 324 | 251 | 89 |
| FNDDS 1.0 | 7749 | 381 | 274 | 97 |

**Solving emerging issues:**

* 1. 44 unlinked mixed dishes: **linking to FNDDS 2015-2016 matched all missing dishes.**
  2. Mixed dishes with repeating food code but different description: combine if the difference is not content-related. If content-related, alter dish to match description and assign new food code (e.g. pasta salad vs. pasta salad W/O FAT = removed the fat ingredient from the list of ingredients). See **N:\DIPHRHBB\Staff Subdirectories\Carolina Schwedhelm\Food grouping documentation\mixed\_dishes\_for recoding.xlsx** for details on changes.
  3. Food codes with only 1 ingredient or ingredients that are themselves mixed dishes: find equivalent dish and recode or add ingredients from similar recipes. Watch that proportions stay roughly the same.
  4. Some mixed dishes had large amounts of water that seemed to be for cooking (example, same amount of water and rice). We deleted water for cooking from the following codes:
     1. 27120060
     2. 27146100
     3. 27345410
     4. 27345510
     5. 27345520
     6. 27363100
     7. 58137220
     8. 58137230
     9. 58137240
     10. 58151130
     11. 58160000
     12. 58161510
     13. 58162310
     14. 58163380
     15. 58175110
     16. 581623101
     17. 581633801
     18. 581633802
  5. Identifying mixed dishes that should stay as mixed dishes (completely aggregated) and removing from mixed dishes dataset (will be added later with the non-mixed dish data)
     1. List of food codes that will stay aggregated (and are not needed in coding of new codes/modifications:

|  |  |
| --- | --- |
| Food codes (first half) | Food codes (second half)\* |
| 27160100 | 58100013 to 58103310 |
| 27214100 | 58104280 to 58127350 |
| 27214110 | 58130011 to 58131310 |
| 27246300 | 58145110 to 58145117 |
| 27246500 | 58147310 to 58148112 |
| 27260010 to 27260090 | 58161110 |
| 27311510 | 58161510 |
| 27350410 | 58200250 |
| 27450070 |  |
| 27450130 |  |
| 32102000 | 58302000 |
| 32104950 | 58306100 |
| 32105180 |  |
| 32130070 |  |
| 32202010 |  |
| 32202085 | \*I included all these in the code anyway, just to be sure |
| 32202200 |
| 32400080 |

Steps 1 to 3: SAS programs: macros\_for\_foodgroup\_coding\_1\_1.sas

foodgroup\_coding\_1\_1.sas

(directory: 'N:\DIPHRHBB\Staff Subdirectories\

Carolina Schwedhelm\SAS programs')

* 1. Re-aggregate ingredients belonging to sauces, savory pies and pastries, putting salt together with what is being seasoned…

SAS programs: foodgroup\_coding\_1\_2.sas

foodgroup\_coding\_1\_3.sas

(directory: 'N:\DIPHRHBB\Staff Subdirectories\

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* 1. Create variable for proportion of total dish weight for each new ingredient

Steps 5 & 6: SAS programs: foodgroup\_coding\_1\_4.sas

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* 1. Replace food amount (g) with weight corresponding to ingredient (g):

FoodAmt\_new = FoodAmt\* prop\_weight

* 1. Assign food group number to all different ingredients (see step 9)

Steps 7 & 8: SAS programs: foodgroup\_coding\_1\_5.sas

(directory: 'N:\DIPHRHBB\Staff Subdirectories\

Carolina Schwedhelm\SAS programs')

* 1. Replace food description with ingredient description

|  |  |
| --- | --- |
| **Summary of mixed dishes in PEAS recalls** | |
| Number of total mixed dishes in INFITEMS\_UNC | 1972 |
| Number of different recipes for disaggregation (leaving mixed dishes from our food categories as a whole) | 401 |
| New total observations in mixed dishes for disaggregation subset data (PEAS ASA24 data) (disaggregated & reaggregated mixed dishes) | 5136 |
| Number of disaggregated & reaggregated foods (repeating by dish) | 1199 |
| Number of different ingredients (not repeating) | 379 |

* 1. Merge main dataset with mixed dish dataset

Steps 9-11: SAS programs: foodgroup\_coding\_2\_1.sas

(directory: 'N:\DIPHRHBB\Staff Subdirectories\

Carolina Schwedhelm\SAS programs')

* 1. Code remaining food codes (from main dataset) based on a more detailed version of HEI food groups, using FNDDS for codes:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Food group number** | **Food group name** | **Grouping based on:** | **FNDDS codes** | **Number of observations per category (foods\*meal\*day\*patid)** |
| 1 | Milk and milk drinks | HEI + FNDDS | 11000000 to < 12000000 |  |
| 2 | Milk desserts | FNDDS | 13000000 to < 13300000 |  |
| 3 | Cheeses | HEI | 14000000 to < 15000000 |  |
| 4 | Poultry | HEI | 24000000 to < 25000000 |  |
| 5 | Fish and shellfish | HEI | 26000000 to < 27000000 |  |
| 6 | Meat | HEI | 20000000 to < 24000000 |  |
| 7 | Cured meat | HEI | 25200000 to < 26000000 |  |
| 8 | Organ meat | HEI | 25100000 to < 25200000 |  |
| 9 | Eggs | HEI | 31000000 to < 34000000 |  |
| 10 | Legumes, nuts and seeds (including meat substitutes) | HEI | 41000000 to < 50000000 |  |
| 11 | Breads from refined grains | FNDDS but separated refined and whole | 51000000 to < 51200000  AND  52100000 to < 5300000  AND  Separate codes 51800000 to < 52000000 into refined and whole grain |  |
| 12 | Whole grain breads | FNDDS but separated refined and whole | 51200000 to < 51700000  AND  Separate codes 51800000 to < 52000000 into refined and whole grain |  |
| 13 | Cakes, cookies, pies, pastries, bars | FNDDS | 53100000 to < 54000000 |  |
| 14 | Pancakes, waffles, French toast, other grain products | FNDDS | 55100000 to < 56000000 |  |
| 15 | Savory pies and pastries | FNDDS | Find among food codes for Grain mixtures, frozen plate meals, soups (58000000 to < 59000000):  Egg rolls  Spanakopitta, grape leaves stuffed with rice  Quiche  Turnovers  Empanadas  Puffs  Tamales  Pizzas and pizza rolls  Calzone  Won tons  Dumplings  Dim sum  Pot pies) |  |
| 16 | Sandwiches  (Meat sandwiches & Non-meat sandwiches together because there was only 1 non-meat sandwich (veggie wrap) |  | 27500000 to < 27600000  Including burgers and wrap sandwiches |  |
|  | 32200000 to < 32300000  AND  41900000 to < 42000000  AND  42300000 to < 42400000  Including egg, meat substitute, nut butter sandwiches |  |
| 18 | Protein-based patties and loaves |  | Find among food codes for Meat, poultry, fish with nonmeat items (27200000 to < 27400000):  Including meat loaf, meatballs, croquettes, crab cake, salmon cake/patty |  |
| 19 | Pasta-based mixed dishes |  | Find among food codes 58000000 to < 59000000  Including lasagna, cannelloni, ravioli, tortellini, mac and cheese, manicotti, stuffed shells… (+ rice casserole w/cheese, similar to mac and cheese…) |  |
| 20 | Tortilla-based mixed dishes |  | Find among food codes 58000000 to < 59000000  Including burritos, chimichanga, tacos & taquitos, quesadillas, huevos rancheros |  |
| 21 | Mayonnaise-based salads |  | Egg salad and deviled eggs, chicken salad, tuna salad, shrimp salad, pasta salad with mayonnaise-type salad dressing |  |
| 22 | Pastas, cooked cereals, rice | FNDDS | 56100000 to < 57000000 |  |
| 23 | Crackers and salty snacks from grain products | FNDDS | 54000000 to < 55000000 |  |
| 24 | Breakfast cereals, higher sugar (>21.2g/100g) – as defined by WWEIA | WWEIA | 57000000 to < 58000000  Separate high sugar and low sugar based on sugar content specified |  |
| 25 | Breakfast cereals, lower sugar (=<21.2g/100g) – as defined by WWEIA | WWEIA | 57000000 to < 58000000  Separate high sugar and low sugar based on sugar content specified |  |
| 26 | Fruit juices | HEI | 61000000 to < 62000000  AND  64000000 to < 68000000 |  |
| 27 | Whole fruits (incl. dried fruit) | HEI | 62100000 to < 64000000 |  |
| 28 | White potatoes and starchy vegetables | HEI | 71000000 to < 71200000  AND  71300000 to < 71400000  AND  71500000 to < 72000000 |  |
| 29 | White potatoes, fried, chips and sticks (including hash browns) |  | 71200000 to < 71300000  AND  71400000 to < 71500000 |  |
| 30 | Dark green vegetables | HEI | 72100000 to < 73000000 |  |
| 31 | Red and orange vegetables | HEI | 73100000 to < 74500000  AND  74600000 to < 7500000 |  |
| 32 | Other vegetables | FNDDS | 75100000 to < 7600000  Includes avocado (as in HEI) |  |
| 33 | Solid fats | HEI | 81000000 to < 81300000 |  |
| 34 | Oils | HEI | 82000000 to < 83000000 |  |
| 35 | Salad dressings | FNDDS | 83100000 to < 90000000 |  |
| 36 | Sauces and condiments (creams, cream substitutes, white sauces and gravies, | FNDDS | 12000000 to < 13000000  AND  13400000 to < 1400000  AND  28500000 to < 30000000  AND  74400000 to < 74500000  AND  81300000 to < 82000000 |  |
| 37 | Soups |  | 14700000 to < 15000000  AND  28300000 to < 28400000  AND  58400000 to < 58500000  AND  71800000 to < 71900000  AND  72300000 to < 73000000  AND  73500000 to < 74000000  AND  74600000 to < 75000000  AND  75600000 to < 76000000 |  |
| 38 | Sugars and sweets | HEI + FNDDS | 91000000 to < 92000000 |  |
| 39 | Coffee and tea | FNDDS | 92100000 to < 92400000 |  |
| 40 | Soft drinks and sugar-sweetened drinks (including energy drinks) | FNDDS | 92400000 to < 93000000  AND  95100000 to < 95300000 |  |
| 41 | Alcoholic drinks | HEI | 93000000 to < 94000000 |  |
| 42 | Water, noncarbonated | FNDDS | 94000000 to < 95000000 |  |
| 43 | Nutritional drinks (meal replacement, protein powder) | FNDDS | 95300000 to < 96000000 |  |

**Solving emerging issues while grouping foods:**

1. Avocado (63105010) has a fruit code. For HEI is coded as “other vegetables”. Assign to food category of “other vegetables” (group #26).
2. A bit different to HEI coding, red and yellow vegetables include only:
   1. Carrots
   2. Pumpkin
   3. Squash, winter
   4. Sweet potatoes
   5. Tomatoes

Other yellow/red vegetables such as peppers (hot chili and bell peppers) are under “other vegetables”

1. Coded kampyo as “other vegetables”
2. Coded corn as “other vegetables”
   1. Format data long per meal:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| PATID | RECALLNO | OCCASION | FOOD1 | FOOD2 | FOOD3 | FOOD… |
| 1 | 1 | 1 | 5g | 0g | 0g | … |
| 1 | 1 | 2 | 0g | 10g | 10g | … |
| 1 | 1 | 3 | 0g | 0g | 10g | … |
| 1 | 2 | 2 | 20g | 5g | 20g | … |
| 1 | 2 | 3 | 10g | 30g | 0g | … |
| 1 | 3 | 1 | 0g | 0g | 10g | … |
| 1 | 3 | 2 | 10g | 0g | 10g | … |
| 1 | 3 | 3 | 40g | 0g | 0g | … |
| 2 | 1 | 1 | 5g | 0g | 20g | … |