**Supplementary material**

Supplemental Table 1 describes the categories used to classify food expenditure data from the HES. Due to the level of aggregation of the original data it was not possible to conform completely to (41) classification system. Frozen fruit was included in the same category as other processed fruit and so was included in the ultra-processed food category. There was no way to distinguish between raw and salted nuts, so these were included in the snack category rather than as unprocessed food. Fruit and vegetable juices with and without added sugar and salt were not identified separately, so all fruit and vegetable juices were classified as processed beverages. The category for frozen seafood does not distinguish between minimally processed seafood and that which has been subject to further processing before freezing (e.g. crumbed or battered fish), so frozen seafood was included in the processed seafood category. The expenditure shares of these items is small and it is expected that the majority of expenditure in each category is actually on processed rather than unprocessed variants of each food product, so their classification as processed food should not bias the results.

**Supplemental Table 1** Classification of food and beverage expenditure

|  |  |  |
| --- | --- | --- |
| Category | | Description |
| Unprocessed foods | |  |
|  | Fresh fruit and vegetables | Fresh fruit and vegetables, frozen vegetables, dried fruit |
|  | Fresh and frozen meat | Fresh and frozen beef, lamb, chicken, pork and other meats |
|  | Fresh fish | Fresh fish and seafood |
|  | Fresh eggs | Fresh eggs |
|  | Fresh milk and cream | Fresh milk and cream |
|  | Tea and coffee | Packaged tea and coffee |
| Processed culinary ingredients | |  |
|  | Flour, rice, pasta, etc. | Flour, rice, pasta and other unprocessed or minimally processed cereal products |
|  | Oils and butter | Vegetable and animal oils and fats, butter, margarine |
|  | Spices | Spices and herbs |
|  | Sugar | Sugar |
| Processed foods | |  |
|  | Processed fruit and vegetables | Canned, bottled, pickled and preserved fruit and vegetables, frozen fruit |
|  | Processed meat | Sausages, ham, bacon and other canned and processed meat |
|  | Processed and frozen fish | Canned, bottled, frozen and processed fish and seafood |
|  | Processed dairy and eggs | Cheese, yoghurt, powdered milk and other processed dairy and egg products |
|  | Bread | Bread and rolls |
|  | Breakfast cereals | Prepared breakfast cereals |
|  | Cake and biscuits | Cakes, tarts, puddings and biscuits |
|  | Condiments and spreads | Food additives, spreads, syrups, honey, jams, sauces, salad dressings |
|  | Snack foods | Potato crisps and other savoury confectionary, chocolate, sweet confectionary, ice-cream, nuts |
|  | Pre-prepared meals and other processed foods | Canned and packeted soup, baked beans, canned spaghetti, baby foods and prepared meals |
|  | Non-alcoholic beverages | Soft drink, cordials, fruit juice and bottled water |
| Food away from home | |  |
|  | Takeaway foods | Takeaway food and school lunch money |
|  | Meals out | Meals out at restaurants, hotels, clubs, etc. |
| Other food | | Food and beverages that cannot be classified or that are not described in enough detail to classify |