AUSNUT 2023 – About the food measures

September 2025

Overview

AUSNUT 2023 provides the food composition data used in the 2023 National Nutrition and Physical Activity Study ([ABS, 2025](#)) to translate reported food and dietary supplement consumption into intakes. It also includes supporting information to help interpret the data and compare results with previous surveys.

Developing the food measures dataset

The measures dataset was developed following a staged approach. This involved identifying the list of measures available in Intake24 for each AUSNUT 2023 food. The densities of each food were determined first, followed by the food specific measures. FSANZ drew on measures data from our existing datasets where possible. Additional measures were developed as needed using a range of methods.

The AUSNUT 2023 measures dataset contains 9,816 measures, for the 3,741 foods.

Portion options in Intake24

Intake24 allows respondents to report the amount of food consumed in multiple ways, depending on the food. This includes the use of:

- standard portions and measures – to report an amount of a defined portion such as a slice of bread, a cup of rice or a tablespoon of sauce

- drink scale, guide and as-served images – to report the amount of food using images of common household cups and glasses, a series of portions shown on a plate or a series of items varying in size.

Each Intake24 portion option is assigned an AUSNUT 2023 measure to determine the gram amount of each food consumed.

Assigning foods measures

AUSNUT 2023 contains two types of measures:

- densities – to allow the volume of a reported food to be converted into a gram amount. These were mostly needed for foods reported using images such as drink-scales, as-served and guide-images with an associated mL amount in Intake24 such as bottles. Note: AUSNUT 2023 does not include any gram amounts for drink-scales or as-served images, just the density used to convert the volume reported into a gram amount.

- food specific measures – representing the typical size of foods consumed in set portions such as a slice of bread etc. These were generally needed for foods using standard portions, standard measures and guide images in Intake24.

FSANZ used a range of approaches for assigning foods densities and food specific measures in AUSNUT 2023 as outlined below.

1. Densities

Almost all foods in AUSNUT 2023 have at least one density, with units of grams per millilitre (g/mL). Multiple densities are provided where information on how the food was cut or prepared was available (such as grated or diced). In this situation, an additional description is provided to enable users to select the most appropriate density for their purposes. In the example below, the dataset contains a density for a solid piece of meat, to use for estimating the mass of a single piece of steak, and a density for chopped or sliced meat, to use for estimating the mass when pieces are placed in a bowl or on a plate.

Food name	Measure ID	Description 1	Description 2	Gram amount
Beef, steak, lean, raw	44727	density	Piece	1.06
Beef, steak, lean, raw	44728	density	sliced or chopped	0.57

FSANZ drew on data from AUSNUT 2011-13 and the Australian Food Composition Database (AFCD) to assign AUSNUT 2023 foods a density. This dataset was updated to include densities generated from our most recent analytical programs including updated data for legumes, pasta, beverage powders, milk, juices and soft drinks.

Where an existing density was not available from our published datasets, FSANZ relied on:

- Imputing densities from similar foods within the dataset. For example, the density for lactose free milk was imputed from regular milk.

- Borrowing densities from published data sources such as the United States Department of Agriculture's (USDA) FoodData Central and Post Interview Processing System (NHANES, 2009-10; USDA, 2023), and recipe books. For example, the density for a cup of sliced apples was borrowed from FoodData Central.

- Estimating densities based on the proportion and densities of ingoing ingredients such as for mixed dishes.

- Label information to determine the density of some breakfast cereals where a product label identified a serve size in grams as a proportion of a cup (e.g. 'Average serve size = 45 g (¾ of a cup)').

Notes on densities

There is considerable uncertainty associated with densities for mixed dishes and these values should be used as indicative only. This is because the density of a mixed dish can be highly variable based on a range of factors including the proportion of ingredients (e.g. the ratio of sauce to the rest of the dish), the way it is cut (e.g. chopped, grated or pureed), and the way it is packed into a container (e.g. small pieces or large chunks). Respondents interpretation of images and descriptions included in dietary recall programs can also be quite variable.

2. Food specific measures

The majority of foods in AUSNUT 2023 have multiple food specific measures, with units of grams (g). Measures are also provided in millilitres (mL) for liquids and semi-solids. Information on how the measures differ is provided in the description fields. In the example below, the dataset contains multiple food specific measures for mango including a small, medium and large mango, as well as a bite-size piece.

Food name	Measure ID	Description 1	Description 2	Gram amount
Mango, peeled, raw	44338	mango	large	367
Mango, peeled, raw	44339	mango	medium	294
Mango, peeled, raw	44340	mango	small	221
Mango, peeled, raw	44341	piece	bite-size	10

FSANZ drew on data from AUSNUT 2011-13, AFCD and Intake24 guide images to assign AUSNUT 2023 foods food specific measures. The AUSNUT 2011-13 and AFCD measures were reviewed and updated as required to reflect product sizes available during the 2023 study.

Where an existing food specific measure was not available, a range of techniques were used for filling gaps. A summary of the different derivation methods is provided below.

Manually weighed

Products which are often variable in size such as fruit and vegetables, or subjective such as a handful of nuts, or small, medium and large fish fillets were manually weighed. In these cases, an average weight was determined by FSANZ based on a range of products.

Label Data

Label information was most frequently used to develop measures for commercial products such as sweet and savoury biscuits, sachets of porridge, wraps, meat alternatives, protein powders, meal replacement drinks, frozen pizzas, and other commonly consumed commercial individual serve items.

Imputation

Many food specific measures in AUSNUT 2023 were derived by assuming that a measure for a food that has been manually weighed can be applied to a similar food. For example, a scoop of vanilla ice cream can be assumed to be the same weight as a scoop of flavoured ice cream.

Estimation

Estimation was used to calculate the gram amount of:

- Single cooked foods using the raw weight of the food, usually derived by analysis, and a known weight change factor. This approach was most commonly used to determine measure data for toast, and cooked eggs, meat, seafood and vegetables.

- Multiple ingredient foods consumed using the mass of the ingoing ingredients, any relevant weight change factors and the average number of suggested serves identified by the recipe (if relevant). This approach was most commonly used to determine measure data for cakes, slices and other desserts, takeaway foods such as hamburgers, hot dogs, sandwiches etc.

- A food consumed using a known volume and the relevant density. This approach was most commonly used to determine the measure data for sauces, milkshakes, thickshakes, and margarine spreads.

- A food using the edible and inedible portion. This approach was mainly used to determine the weight of cuts of meat with different levels of trimming and for fruits and vegetables to account for the presence or removal of peel.

Estimation was also used to determine the best approximation where a range of analytical and/or label values were available or where limited measures were available for infrequently consumed foods and the choice of measure size was unlikely to have any significant effect on study outcomes.

Borrowed data

A small number of measures were based on values provided by the Australian food industry. For example, a range of fruit and vegetable measures were based on the average weight of items analysed by Hort Innovation (HIA, 2022). Industry data was only used where FSANZ had confidence in the data provided and its relevance to the way measures were reported in the study.

Where Australian derived data was not available, data was borrowed from the USDA (NHANES, 2009-10; USDA, 2023). Values have only been borrowed where FSANZ was confident that the products are similar between countries. For example, a leaf of lettuce or a stalk of celery.

Dataset validation

The AUSNUT 2011-13 measures dataset underwent an extensive data validation process, including manual weighing of foods within key categories. Other routine validation activities undertaken by FSANZ included ensuring:

- density values were consistent with literature values, such as the FAO Food Density Database (FAO/INFOODS, 2012), for the type of food and its physical form (e.g. diced, grated, etc.)

- the portion specific measures were consistent with those for related foods (e.g. the amount of different coffee types was similar when presented in the same type of cup)

- the densities were consistent within groups of similar foods (e.g. all sugar sweetened cordial bases had a density of around 1.22)

- portion data increased in proportion to the increase in added foods, for example a burger with salad and cheese weighed more than a burger with salad.

A note on measure estimation in nutrition surveys

When considering the use of any survey dataset, it is important to understand the limitations of the data. Research published by Rumpler et al (2008) indicated that errors in estimating the mass of a food consumed represented one-third of the error in a 24-hour dietary recall and, together with the omission of foods, was the largest source of error in estimating food consumption and nutrient intake.

References

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