Using third-party food sales and composition databases to monitor nutrition policies

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ABSTRACT

Nutrition-related policies are essential in the fight against noncommunicable diseases (NCDs) in the WHO European Region. To be effective in improving population health and reducing NCD risk, these policies need to be based on good-quality, robust, up-to-date evidence. However, such evidence is not always readily available across the Region. Third-party food sales and composition data can be used to monitor the effectiveness of nutrition-related policies. These data are often more detailed and can be used to supplement or replace more traditional data sources such as national dietary surveys. This fact sheet assesses the different types of third-party food sales and composition data that are available across the WHO European Region. It describes their characteristics, availability, and strengths and limitations. It details how these data can be used to monitor policy effectiveness and provides best-practice case study examples. Policy-makers can use this information to decide which data resources are most appropriate for their national and local needs. These data can be used to improve nutrition-related policies and population health in the Region.

Contents

Foreword

To achieve the Sustainable Development Goals (SDGs), particularly SDG 2 (End hunger, achieve food security and improved nutrition, and promote sustainable agriculture) and SDG 3 (Ensure healthy lives and promote well-being for all at all ages), nutrition-related policies are needed. These should be based on robust, up-to-date and accurate evidence. However, access to such evidence is not necessarily straightforward or achievable for all Member States. Reasons for this include lack of good-quality data, lack of resource to generate or procure data, and lack of knowledge of where to find such data. This is concerning, as policies to tackle noncommunicable diseases (NCDs) and improve population health may be developed without being underpinned by good-quality evidence.

NCDs are responsible for 71% of all deaths globally, which equates to 41 million people. The four most common NCDs (cardiovascular diseases, cancers, respiratory diseases and diabetes) account for 80% of all premature NCD deaths. The WHO European Region is the region worst affected by NCD-related morbidity and mortality, where it accounts for almost 90% of all deaths. Overweight and obesity are a major NCD risk factor and affect over 59% of adults and an increasing proportion of children in the Region.

Monitoring and evaluation are key elements of a successful response to tackle NCDs. However, provision of good-quality, readily available data across the Region is lacking. While WHO continues to advocate for the improved availability of heath and dietary data for monitoring and surveillance, third-party food sales and composition data can provide useful resources to fill that gap. The WHO European Office for the Prevention and Control of NCDs – an innovative powerhouse for generating solutions to tackle NCDs – works to strengthen country capacity in this area by highlighting potential third-party food sales and composition data sources, describing their characteristics, strengths and limitations so that countries can choose the most appropriate data sources to fit their needs.

This fact sheet will enable policy-makers in Member States to consider how third-party food sales and composition data can be used to monitor, evaluate and therefore strengthen the implementation of nutrition-related policies. It highlights case study examples to give policy-makers real working examples of how such data can be utilized to improve policies and ultimately benefit population health.

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Abbreviations

FoP   front-of-pack

OOH   out-of-the-home

PHE   Public Health England

PHO   partially hydrogenated vegetable oil

TFA   trans-fatty acid

Executive summary

Third-party food sales and composition data can be used to monitor nutrition-related policies.
These data often give more granular and useful information on price, brand and nutrition composition than can be found in the results of national dietary surveys and food composition tables. This fact sheet sets out the different types of food sales data that are available and explains their strengths and weaknesses. It gives informative case study examples where these data formats have been used to monitor nutrition-related policies.

This fact sheet is aimed at national policy-makers and researchers in the WHO European Region.
It aims to provide a starting point for countries that are considering how food sales data can be used to monitor and evaluate nutrition-related policies. It identifies potential sources of commercially supplied food sales and purchase data and highlights issues that should be considered when deciding which data source is most appropriate. It explains how such data can be used to build monitoring and evaluation into nutrition policy implementation. This will allow policy-makers to assess the efficacy of policies and target where improvements may be necessary.

1. Background

There are various sources of data that food researchers and policy-makers can use to measure trends and patterns in food consumption and thereby monitor nutrition policies. These include measures of production, imports, exports, food stocks and utilization at the national or regional level and measures of purchase and consumption at household or individual level.

One of the main ways of measuring the household consumption at an individual level is through national dietary surveys. However, these are not carried out in all countries, and they may be conducted infrequently and have small sample sizes; they are also resource-intensive and subject to misreporting. [1,2] Furthermore, when it comes to monitoring and evaluating public health nutrition policy, dietary surveys rarely provide sufficiently detailed information on the types and brands of products consumed.

Food sales and purchase data can be used to measure the value and volume of food and drinks sold or purchased. Such data can be presented as annual, quarterly, monthly or weekly totals at the national or regional level; they can be split by retailer, store location, product category, company and brand; and they can include sociodemographic breakdowns. Food sales data measure how much of a product, in terms of value or volume, has been sold from the supplier's side, whereas food purchase data measure how much of a product has been purchased by the consumer. Third-party sources of food sales and purchase data can be used as a source of information for researchers and policy-makers looking to better understand trends and patterns in food consumption.

Although much happens between the time a food item is purchased and the time it is consumed – including preparation, distribution among household members and waste – food purchase data can be a good indicator of dietary intake when linked with composition data, albeit at the household level. Other factors of interest that can be analysed using food sales data include pack and serving sizes, information about ingredients, and presence of front-of-pack (FoP) labels.

2. Types of data

There are three main types of data.

Value of sales and purchases

The total value of sales/purchases expressed in monetary terms; this may be aggregated at national level and/or split by week, month, quarter or year. These data may be available at the level of individual household or store and presented in per capita or per household terms.

Volume of sales and purchases

The total volume of sales/purchases measured in kilograms, litres or number of units; this may be aggregated at national level and/or split by week, month, quarter or year. These data may be available at the level of individual household or store and presented in per capita or per household terms.

Market share

The proportion of sales/purchases given as a percentage or in absolute terms, by product name, brand or company.

Box 1 What's the difference between a product, a brand and a manufacturer?

When assessing data sources, it is important to consider what level of granularity is available in different datasets. Some companies provide information only at the brand or company level, while others provide information on individual products.

The **manufacturer** is the name of the company that makes the product. The **brand** is the name given by the manufacturer to a group or range of products. The **product name** is the name given to the individual product that is consumed. Products with the same name come in different sizes, and each size will carry a different barcode or Universal Product Code (UPC) (also known as EAN or GTIN-13). For example, Milka Chocolate Hazelnut Bar 200 g and Milka Bubbly Milk and White 50 g are two individual **products** under the Milka **brand**, which is produced by the **manufacturer** Mondelez.

3. Data collection methods

3.1 Total market estimates of food sales and purchases

Total market data are estimates of food sales or purchases from suppliers. Data collection can be made from the suppliers themselves through interviews, from publicly available sources such as the trade press, and from company reports. These data are generally expressed as total value and/or volume of food sold through different retail channels, such as supermarkets, independent stores, small local grocery stores and traditional markets, and can be broken down by category. Market share data also give the share of value and/or volume sales by company and brand. These data are often available in multiple countries and can be used for comparison.

3.2 Household panels

Household panel data are based on the purchases of a sample of households. Selected households are provided with a handheld scanner or mobile app and are asked to scan the barcodes of all the grocery products they purchase in store or online. Copies of receipts are often collected and used to validate the data. Product type, price, pack size, brand and company may all be recorded. Food purchase data from household panels are collected continuously and can be presented weekly, monthly, quarterly and annually, with results from the household panel scaled up to the national level. Household panel data in different countries are less likely to be available for cross-comparison.

Households are often given incentives to participate in these research panels, usually in the form of shopping vouchers. Households are recruited to be demographically representative in terms of income, ethnicity, geography and education. However, the degree to which this is achieved is variable. Household panels vary in size, from a few hundred to hundreds of thousands of households.

3.3 Point of sale data

Electronic point-of-sale data (EPOS or POS) is collected directly from in-store checkouts. This can be accessed by researchers in two ways:

1. Directly from a retailer by:

   - accessing data from an individual store or group of stores;[3]

   - accessing loyalty card data from a specific retailer;[4] or

   - accessing online grocery purchases from a specific retailer.[5]

2. Through a commercial third-party company. These data are generally collected systematically across multiple stores, retailers and regions. Examples of third-party data providers and their characteristics are shown in **Table 1**. It should be noted, however, that not all companies in all countries are willing to provide data.

Table 1 – Third party commercial data providers and their characteristics

Data provider	Data collection method	Volume data	Value data	Price data	Market share data	Nutrient composition data available	Access	Weblink
Euromonitor	Total market estimates	Yes	Yes	Limited	Yes	Limited	*	http://www.euromonitor.com/soft-drinks
GfK	Household panel	Yes	Yes	Yes	Yes	No	Payment	https://www.gfk.com/products/retail
Global Data	Total market estimates	Yes	Yes	Yes	Yes	No	*	https://www.globaldata.com/consumer/research-areas/industry/food/
Innova	Total market estimates	Yes	Yes	Limited	Yes	Unknown	*	https://www.innovamarketinsights.com/services/market-sizing/
IRI	Point-of-sale	Yes	Yes	Yes	Yes	Unknown	Payment	https://www.iriworldwide.com/en-GB/solutions/market-performance-and-strategy/market-measurement
Kantar Worldpanel	Household panel	Yes	Yes	Yes	Yes	Yes	Payment	http://www.kantarworldpanel.com/en/grocery-market-share/great-britain
Mintel	Total market estimates	Yes	Yes	Limited	Yes	No	*	http://www.mintel.com/drink-market-research
Nielsen	Point-of-sale and house-hold panel	Yes	Yes	Yes	Yes	Separately through sister company Brand Bank	Payment	http://www.nielsen.com/uk/en.html

* Subscription or one-off payment

4. Strengths and limitations of third-party food sales/purchase datasets

There are two main advantages to using purchase/sales data as opposed to data from dietary surveys.

Food purchase/sales data can be more objective and avoids reliance on individual recall. Food purchase/sales data also contain more information on the type and brand of product and can be used to validate and complement dietary surveys and out-of-home purchases. They may also provide a more regular time series than the results of national dietary surveys.

While food purchases may be a good indicator of diet, there is much that happens between the time food is bought and the time it is consumed.

Also, household panel data generally do not provide any detail on consumption by individuals. As data come from a private third party, users have little or no control over the data collection process, including recruitment incentives, recruitment bias and drop-out rates for household panels.

Food sales/purchase data have traditionally been used by the food industry to monitor brand share and market trends and are seen as valuable to the industry, so they can be expensive. Some data providers may also impose publication restrictions, especially in relation to company/brand names.

5. Linking food purchase and nutrient composition datasets

5.1 Nutrient composition data

Nutrient composition data provide information on the energy and nutrient content per 100g/ml, and sometimes also per serving, of foods and drinks. In the European Union, prepackaged foods must display energy, carbohydrate, total fat, saturated fat, total sugars, protein and salt content in g/100 g at the point of sale, but other nutrients such as fibre may also be labelled, particularly if the product includes a nutrition or health claim.[6]

It is hard to validate the accuracy of nutrition labels, either because the nutrients reported may have been miscalculated or because the labels are not regularly updated. Ingredients information can also be used to identify the use of ingredients of interest, such as artificial sweeteners, colours and flavours.

5.2 Sources of nutrient composition data

There are three approaches policy-makers might consider when searching for an appropriate nutrient composition database to pair with food sales or purchase data.

5.2.1 Food composition tables

Some countries have national food composition tables which are usually free and publicly available. However, they may not be regularly updated and may only contain information on generic, non-branded foods. Nutritional information for generic foods may be based on chemical analyses, label information, recipe calculations derived from other food composition tables, or a combination of these methods. Given the wide range of products available on the market, the values given in food composition tables for generic products may not be accurate or representative. Some European countries have begun collecting composition data on branded foods and integrating them into food composition tables. A list of national nutrient composition tables by country can be found online on the European Food Information Resource (EuroFIR) website. [7]

5.2.2 Commercial nutrient composition databases

There are numerous commercial nutrient composition databases available. Composition data may be collected online through retailer or brand websites, recorded from the backs of packs during an in-store audit, or – in the case of the global-standards organization GS1 – collected as part of supply-chain logistics. Some commercial food purchase/sales databases may also contain composition data reported on the label (see **Table 1**), although this is not often available for micronutrients.

5.2.3 Building your own nutrient composition database

Commissioning researchers to build a nutrient composition database for branded foods can be resource-intensive but may be useful if a national composition table is not available, does not contain sufficient information, or is not kept up to date. Methods for building macronutrient composition databases include:

- collecting data in-store from the back of packets;[8]

- collecting data directly from manufacturers;[9] and

- collecting data online, including through web-scraping tools such as foodDB. [10]

These methods often do not include data on micronutrients, which are not reported on labels. Other methods, such as using generic micronutrient values from food composition tables, may need to be applied.

5.3 Linking food purchase data with nutrient composition data

Linking food sales and purchase data with nutrient composition data allows the foods sold in the greatest numbers to be identified and the volume of nutrients purchased to be estimated. This can be used as a proxy for nutrient intake and allows a more nuanced evaluation of policies that may influence food and drink consumption. There are two key approaches to linking food purchase and nutrient composition datasets.

1. Product-level datasets can be linked together based on a barcode, also known as an EAN (European Article Number) or UPC (Universal Product Code). This is the simplest way of linking a product's sales data with its nutrient content, but it is dependent on both the nutrient composition dataset and the food purchasing dataset having a common identifier (i.e. barcode). However, barcode data can be very volatile – for example, new products are constantly added and removed from the market and barcodes are reused for new and reformulated products, which may introduce inaccuracies. There may also be a lack of data on unpackaged products that do not carry a barcode, such as fresh fruit and vegetables, and bread baked on site.

2. When barcode data are not available, datasets can be linked based on product and brand name, category and company. This can be done manually, which is time-consuming but very thorough, or by using an algorithm that identifies keywords in a string.

Further details on linking food sales and nutrient composition datasets can be found in the case studies in Section 7 below and in the literature. [11,12]
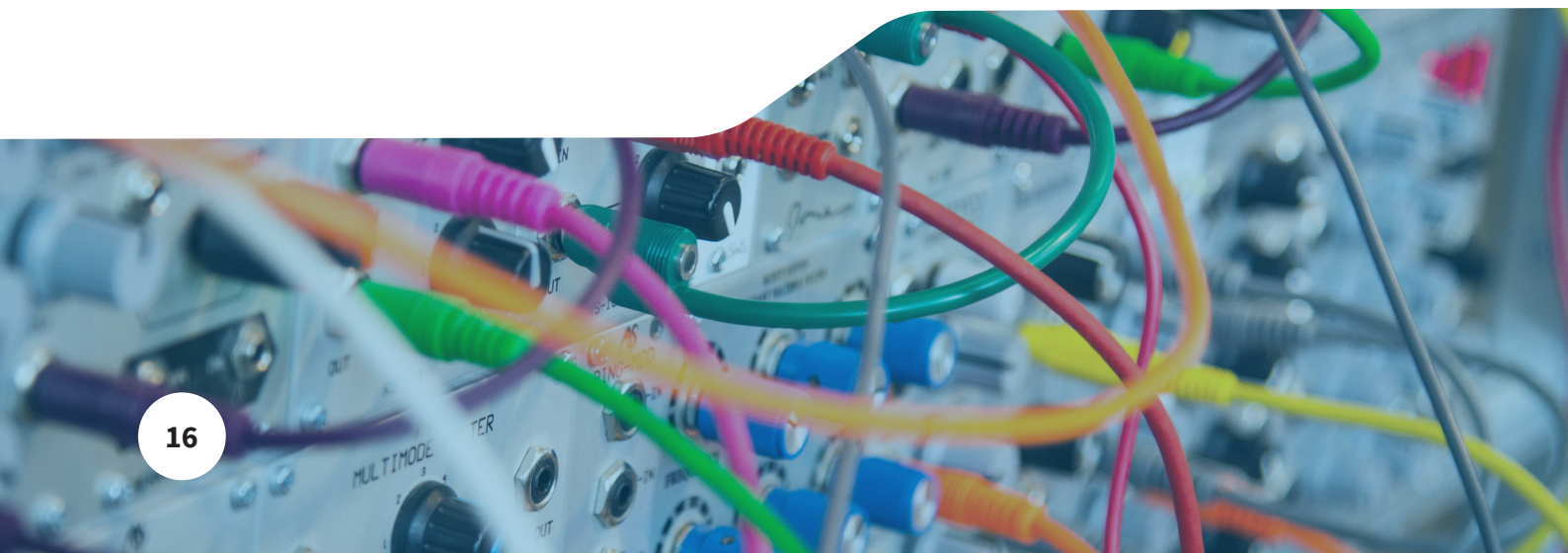
6. When should policy makers use food sales data?

Examples of nutrition-related policies that can be monitored and evaluated using food sales data include:

- ◉ **product-related policies**, such as salt or sugar reduction targets, use of trans fats in foods, FoP labelling, carbon footprints of foods and other sustainability indicators;

- ◉ **price-related policies**, including the impact of food and drink taxes and subsidies on price and consumption;

- ◉ **promotion-related policies**, including marketing to children and restrictions on the type of price promotion;

- ◉ **place-related policies**, including healthy checkout and store layout policies; and

- ◉ **monitoring adherence to national dietary guidelines**.

If policy-makers have access to the results of national dietary or household expenditure surveys that have sufficient detail for the task, then there is no need for third-party data sources. However, if the monitoring and evaluation process requires more granular detail, such as information on product price, brand and nutrient composition, third-party data sources become particularly useful.

There are a number of issues that should be considered if you are planning to use a third-party data source.

- ◉ **Budget**   Get quotes from different data sources before committing, as some companies are more willing to negotiate with academic and public budgets than others. Ask to see a sample data extract to check it is suitable before making an agreement.

- ◉ **Preparing and analysing data**   As well as factoring in the cost of data, consider how much time and what skills are necessary to prepare and analyse large datasets, especially when linking multiple datasets (for example, food sales and nutrition composition data).

- ◉ **Time pressures**   Datasets from commercial providers may be delivered more quickly than datasets that come direct from retailers, as legal agreements, contracts and data protection requirements can take time to negotiate.

- ◉ **Quality**   Not all data will include a breakdown of specific demographic factors of a population, such as age, geographical location and socioeconomic status. Agree first what the target population of your study is and whether sufficient detail is available. Also consider whether the data collection methods used by a third-party company are rigorous enough for your study.

- ◉ **Copyright and publishing**   Confirm with the data provider whether there are any restrictions on the publication of results. For example, some data providers do not allow brand or company names to be published, while others may require all papers to be approved by them before publication

7. Case studies: How food purchase data have been used to monitor nutrition policies

7.1 Monitoring the sugar content of soft drinks over time [13]

Country: UK

Sales/purchase data source: Kantar Worldpanel, Euromonitor

Composition data source: Brand View (now Edge by Ascential)

Policy: Sugar reduction programme, including Soft Drinks Industry Levy (tax) [14]

Related WHO Best-buy: Reduce sugar consumption through effective taxation on sugar-sweetened beverages [15]

In 2016, the United Kingdom announced a tiered tax on soft drinks, which was implemented in 2018.[14] The Soft Drinks Industry Levy (SDIL) charges manufacturers and importers £0.24 (US$0.30) per litre for drinks containing 5 g sugar or more per 100 ml, and £0.18 (US$0.23) per litre for drinks containing 5–8 g sugar per 100 ml. There is no charge for drinks containing less than 5 g sugar per 100 ml. The levy is currently subject to a formal government-led evaluation. This uses composition data collected online in combination with purchase data from Kantar Worldpanel to monitor changes in both the sugar content and the volume of soft drinks purchased. These indicators are used to assess the success and impact of the levy.

An additional study published in 2020 assessed the total volume of sugar sold from soft drinks, at a category and company level, between 2015 and 2018.[13] The study used composition data from Brand View (now Edge by Ascential) and sales data from Euromonitor. It showed that the sales-weighted mean sugar content of products fell from 4.4 g to 2.9 g/100 ml between 2015 and 2018 – a 34% reduction. It also found that the total volume of sugar sold from soft drinks fell from 15.5 g to 10.8 g per person per day – a reduction of 30%.

Using food sales data at the brand and company level also allowed analysis of how individual soft drinks companies had responded to calls to lower the sugar content of their products (**Fig. 1**). This level of detail allows policy-makers actively working with the industry to identify examples of best practice and target specific areas for improvement. However, the composition data and sales data had to be paired manually based on product and brand name, as there were no barcode data or other common factor that would permit the pairing process to be automated. Sales data were available at the brand level and composition data at the individual product level, meaning that a single sales figure was often paired with an average sugar content of multiple individual products.

Fig. 1. Total volume of sugar sold from soft drinks by top 10 United Kingdom companies, 2015 and 2018
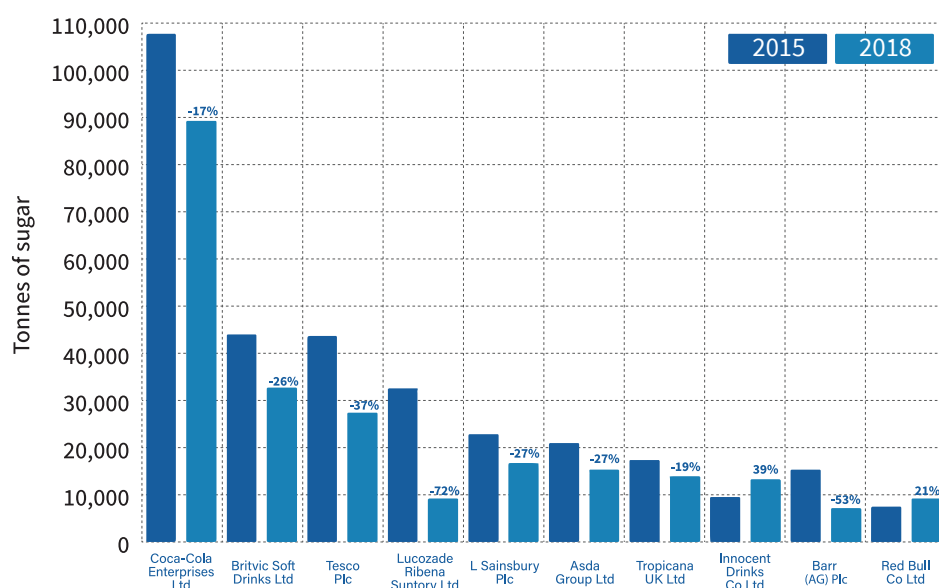
Source: Bandy et al. (2020)[13]

7.2 Monitoring adherence to voluntary salt reduction targets [16]

Country: UK (data available only for England)

Sales/purchase data source: Kantar Worldpanel

**Composition data source:** Brand Bank / Kantar Worldpanel

Policy: Voluntary salt reduction targets

Related WHO best-buy: Reduce salt intake through the reformulation of food products to contain less salt and the setting of target levels for the amount of salt in foods and meals [15]

Public Health England (PHE), the agency responsible for public health programmes in England, has implemented a series of category-specific salt reduction targets, based either on sales-weighted mean salt content or on maximum salt content.[17] Using Kantar Worldpanel data, PHE assessed the progress made by the food industry to meet reformulation targets for at-home and fast-food products by 2017.[16] PHE's report showed that 81% of products had met maximum salt content targets set for foods consumed at home. The granularity of the data was such that individual manufacturers and retailers could be analysed; **Fig. 2** shows the proportion of retailer own-brand products that met the targets. These data allow policy-makers to identify which categories have been reformulated successfully and which require further improvement.

PHE also assessed the salt content of products sold out of the home (OOH) in restaurants, take-aways and fast-food outlets. Data were collected either online or by asking businesses to provide the information direct. However, several data caveats were identified, including nutrition information for OOH food products not being readily available. Many data sources collect only the value of sales, not the volume sales, of OOH foods and meals consumed. This highlights the challenge in collecting data from the OOH sector compared to grocery products sold in retailers.

Fig. 2. Proportion of retailer-own products that are at/below maximum salt targets, by category*
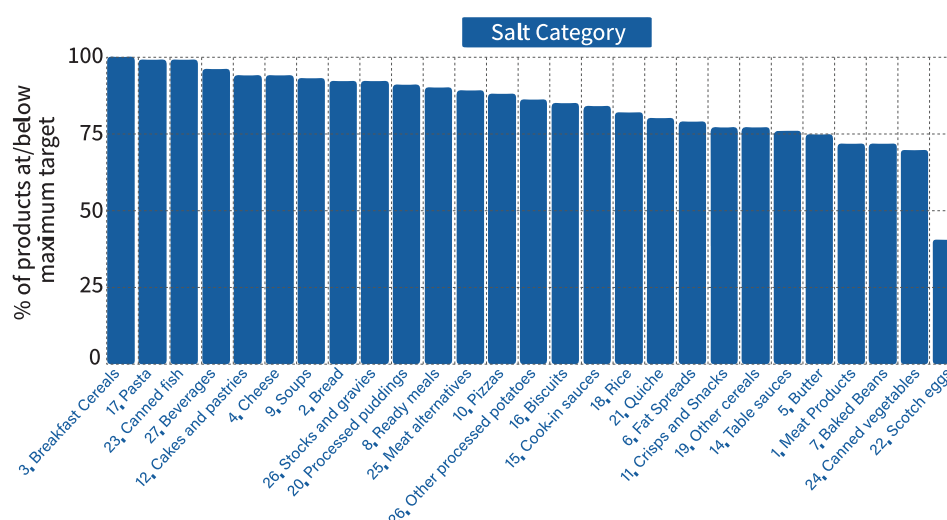
* Product numbers refer to the category numbers given by PHE in their published salt reduction target table.[16]

Source: PHE (2018)[16]

7.3 Monitoring the impact of FoP labels on the nutritional quality of supermarket food purchases [18]

Country: France

Sales/purchase data source: Loyalty card data from 40 stores of three retailers (Carrefour, Casino, Simply Market)

Composition data source: "GETIQ", Instut de la Recherche Agronomique (INRA)

Policy: FoP labelling (including Nutri-score)

Related WHO best-buy: Implement nutrition labelling to reduce total energy intake (kcal), sugars, sodium and fats [15]

FoP nutrient labels are designed to encourage healthier food purchases by providing consumers with clear, colour-coded information about the nutrient quality of a product. In France, in 2016, four different FoP labels were competing for government endorsement.[18] In order to distinguish the impact of each label on the healthiness of consumer choices, a consortium of researchers used loyalty card data from three leading retailers to monitor how purchases of products with FoP labels changed over time.[18]

Some 1.9 million labels were put on 1266 products in 60 supermarket stores, with composition data from the Institut de la Recherche Agronomique (INRA) used to classify the labels. The Nutri-Score label was found to be the most effective, increasing purchases of products with the highest nutrient quality by 14%.

This study, conducted in a real-life grocery setting, helped to inform policy-makers of the most effective type of label to indicate a product's healthiness. Nutri-Score has been widely implemented in France, as well as in other European countries including Belgium, Germany, the Netherlands and Spain.[19] Information on whether a product carries an FoP label is not regularly collected by third-party data sources and therefore monitoring labelling policies can be resource-intensive.

In Australia and New Zealand, food purchase and nutrient composition data have been similarly used to monitor the uptake of the Health Star Rating label, allowing policy-makers to monitor industry adherence to voluntary labelling policy and its impact on reformulation.[20,21]

## 7.4 Measuring the use of partially hydrogenated vegetable oils in foods[22]

Country: Slovenia

Sales/purchase data source: Direct from retailers (Spar and Mercator)

Composition data source: Recorded from back of packs via in-store audits

Policy: Lowering levels of trans-fatty acids in foods

Related WHO best-buy: Eliminate industrial trans-fats through the development of legislation to ban their use in the food chain [15]
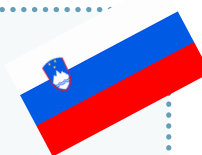
Consumption of trans-fatty acids (TFAs), naturally occurring in animal products and found in partially hydrogenated vegetable oils (PHOs), increases the risk of cardiovascular disease.[23]

In 2015, Slovenia launched a series of awareness campaigns for consumers and industry, with the goal of significantly lowering the use of PHO ingredients in prepackaged foods. In order to evaluate whether this had been achieved, researchers used in-store data collected from photographs of product packaging, and sales data direct from retailers, to establish how the proportion of products that contained PHOs changed over time.[22] They found that reductions were large in certain categories (**Fig. 3**) but that voluntary guidelines and public communications were not enough to remove PHOs from foods completely. In 2018 Slovenia introduced legislation that set maximum permitted levels of TFAs in foodstuffs.[24]

This study used sales data direct from retailers that represent a 50% market share of the total Slovenian market. While the authors were confident that the products included in the study were representative, they did not cover the entire market. Nutrition and ingredients information were collected from a series of store checks, which were resource-intensive.

Fig. 3. Proportion of prepackaged foods that contain PHO ingredients in Slovenia, by category, 2015 and 2017
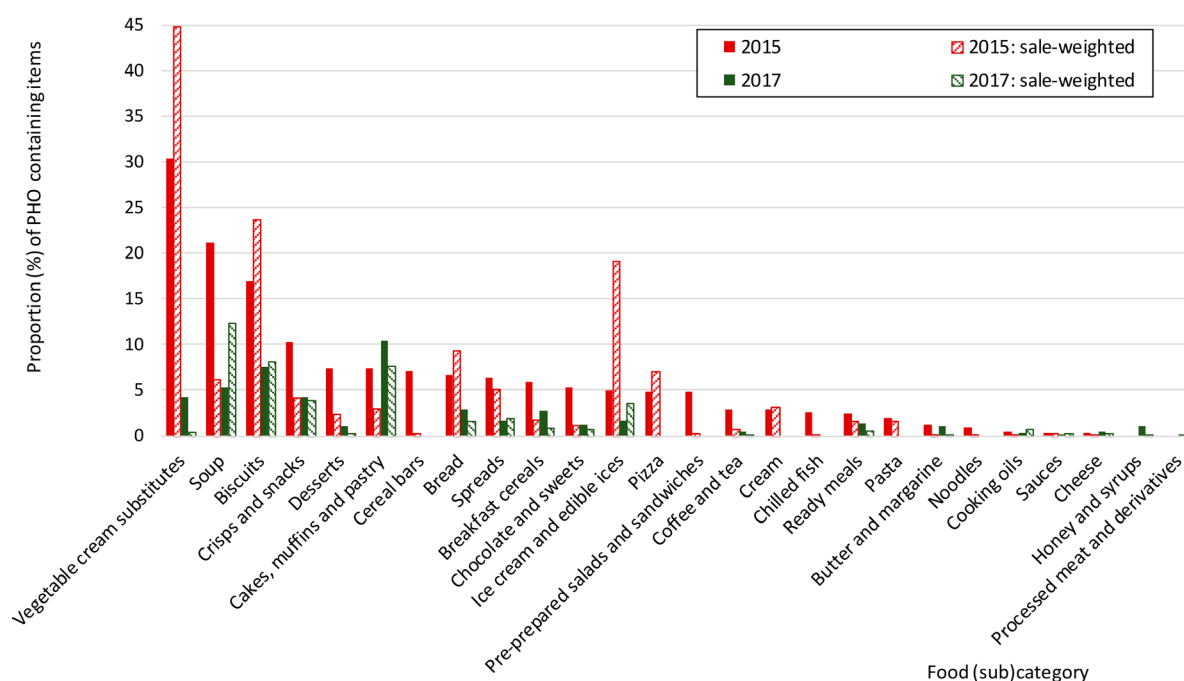
Source: Zupanič et al. (2018)[22]

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The WHO Regional Office for Europe

The World Health Organization (WHO) is a specialized agency of the United Nations created in 1948 with the primary responsibility for international health matters and public health. The WHO Regional Office for Europe is one of six regional offices throughout the world, each with its own programme geared to the particular health conditions of the countries it serves.

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