

INFORMAS PROTOCOL

FOOD RETAIL MODULE

Food Availability in Supermarkets

University of Auckland

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Terms and conditions

Use of this protocol is subject to terms and conditions. Please refer to Annex 1 for these terms and conditions.

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1. Introduction

The World Health Organisation's (WHO) Global Action Plan for the prevention and control of non-communicable diseases 2013-2020 encourages member states to promote a healthy diet (1). Recommended policy actions include the development of guidelines, recommendations or policy measures that engage different relevant sectors, such as food producers and processors, and other relevant commercial operators, as well as consumers, to increase the availability, affordability and consumption of fruit and vegetables; and the development of policy measures that engage food retailers and caterers to improve the availability, affordability and acceptability of healthier food products (plant foods, including fruit and vegetables, and products with reduced content of salt/sodium, saturated fatty acids, trans-fatty acids and free sugars).

Worldwide, the proportion of adults with a body-mass index (BMI) of 25 kg/m² or greater increased from 28.8% to 36.9% in men, and from 29.8% to 38.0% in women between 1980 and 2013 (2). Dietary risk factors increasingly contribute to the surging global burden of obesity and diet-related non-communicable diseases (NCDs) (2, 3). Since unhealthy diets are driven by unhealthy food environments (4), comprehensive actions by major players, such as governments and the food industry, will be needed to improve the healthiness of food environments and achieve the World Health Organisation (WHO)'s targets to halt the rise in obesity and diabetes, and reduce NCDs by 25% by 2025 (5). Achieving WHO's risk factor targets will delay or prevent more than 37 million deaths from the main NCDs (6).

The International Network for Food and Obesity/NCDs Research, Monitoring and Action Support (INFORMAS) is a global network of public-interest organizations and researchers that aims to monitor, benchmark and support public and private sector policies and actions to create healthy food environments and reduce obesity, diet-related NCDs and their related inequalities globally (7, 8). Food environments are defined as the collective physical, economic, policy and socio-cultural surroundings, opportunities and conditions that influence people's food and beverage choices and nutritional status (8). INFORMAS developed 10 modules for which the monitoring frameworks have been designed and the indicators determined (9-18), and which will be translated into detailed measurement protocols. The **process** modules focus on monitoring the implementation of priority policies and actions on food environments by governments (9) and the private sector (10). The **impact** modules focus on monitoring key aspects of food environments, including the nutrient composition of foods (11), food labelling (12), exposure of children to unhealthy food promotion (13), nutritional quality of foods in public sector settings (16), the availability and accessibility of healthy and unhealthy foods in communities (15), food prices and affordability of healthy versus unhealthy diets (14) and aspects of foods in trade and investment agreements (17). The **outcome** modules focus on monitoring population risk factors (including behavioural, physiological and metabolic risk factors), population diet quality (19) and health outcomes. Aspects of these outcome components are being developed by WHO as part of their work on a Global NCD monitoring framework (5).

2.1 Protocol aims

Research indicates that there is an association between the availability and promotion of (healthy and unhealthy) foods within retail environments and food purchasing behaviour (15, 20-23).

However, the association with dietary outcomes is not consistent, which is potentially the result of a range of the variety and complexity of methods that have been used to date (15, 22, 24-26).

This protocol aims to detail the methods for systematically and consistently collecting and analysing information to monitor the **availability of healthy and unhealthy foods and non-alcoholic beverages in consumer retail environments** within the countries participating in INFORMAS; and ensure that the data and derived indicators provided are comparable across countries and over time.

The protocol covers the underpinning aims and rationale for the monitoring, data definitions, sampling design and methods, data collection, data collection templates, data coding frameworks, data formats, data storage, data analysis, derived indicators and reporting.

2.2 Scope

The food retail outlets covered by this protocol are **medium and large supermarkets / grocery stores**. These are defined as primarily self-service grocery stores selling food and other household items with a minimum of 2 or more checkout stations/aisles.

In some countries, other retail outlets might be (more) important to include; for example, street markets, train/metro station shops, convenience stores, take-away shops, or indoor markets. We recommend that each country starts by examining what the **most important points of purchase** are for foods (see details below) and anticipate that countries write separate protocols for these different outlets (using this supermarket protocol as basis) as the INFORMAS research progresses.

Product availability and product placement of unhealthy and healthy foods within food outlets (specifically medium and large sized supermarkets / grocery stores) is the focus of the data collection in this protocol. Data collections relating to product price, promotion and labelling are investigated within other INFORMAS modules. These protocols are available at the INFORMAS website www.informas.org.nz.

2. Objectives

The monitoring aims for this protocol are to determine a nationally (or regionally) representative estimate of the in-store **availability, prominence and promotion** of healthy and unhealthy foods and non-alcoholic beverages within consumer food environments (that is within food retail outlets).

Overall the monitoring aims to:

- Determine the relative availability (shelf space), prominence (location visibility) and promotion allocated to healthy and unhealthy food products and non-alcoholic beverages in food retail outlets using a validated indicator.
- Compare changes over time within countries
- Compare estimates across countries
- Provide an evidence base to inform the development of appropriate and effective policy responses

3. Methods

This section provides a detailed overview of each step involved to obtain nationally (or regionally) representative estimates of the in-store availability of healthy and unhealthy foods and non-alcoholic beverages.

4.1 Types of retail outlets to include

This protocol focuses on **medium and large supermarkets / grocery stores** because these are the most important points of purchase for foods in most developed countries. However, for some countries, other retail outlets (for example street markets) might be more important to include. We recommend that each country starts by examining what the most important points of purchase are for food (see details below) and anticipate that countries write separate protocols for these different outlets (using this supermarket protocol as basis) as the INFORMAS research progresses.

‘Medium’ sized (included) versus small (excluded) supermarkets are differentiated on the basis of the number of staffed check out stations/aisles¹. Using this definition, supermarkets with 2 or more staffed checkout aisles/cash registers are included and those with less excluded. If, during data collection, a sampled retail outlet is found to be ineligible based on number of staffed checkout aisles, then the outlet should be replaced in the sample.

STEP 1

Each country should start with a detailed examination of their retail landscape. This should include market shares or percentage of food products purchased at different outlets (e.g., in NZ, 86% of household food is purchased at the supermarket). Countries should make sure that the most important food retail outlets are included in the sample.

STEP 2

The sampling design should consider stratification by retail outlet size or major chain. This is particularly important where there is heterogeneity in the retail outlet market (for example in supermarket sizes and chains) because we found such heterogeneity is associated with differences in the proportion of healthy versus unhealthy food products that are stocked. The decision on which supermarket chain to include should be based on market share information.

4.2 Details on sampling supermarkets

For many high-income countries, supermarkets will be the main food retail outlet. The information below describes how supermarkets should be selected. If countries would like to include other food

¹ Establishing the number of staffed checkout aisles/locations should be straightforward and does not require any intrusive measurement or questioning.

retail outlets, the INFORMAS team would be happy to support the design and development of an appropriate data collection protocol.

STEP 3

To help ensure a representative sample of food outlets nationally or regionally within different types of localities, the sampling design takes into account the:

- Number of supermarkets by chain and size (minimal approach)
- Locality, whether a location is urban or rural (related to population density and likely density of retail outlets) (expanded approach).
- Area level socio-economic deprivation measures of the locality (optimal approach).

4.2.1 Minimal approach

The minimal approach concentrates on the selection of retail outlets within a single region. To achieve a balanced national representation, the number of supermarkets selected within each of the selected regions is to be determined based on the number of supermarkets (by chain and size) within these regions and the proportion of these supermarkets across the country. The websites of the major chains often have listings of supermarkets by locality which will allow the construction of the sample frame. These websites are likely to be the most up to date source of information. Otherwise Yellow Pages, Google searches, or a community retail outlet listing can be used.

Construct a sample frame within the selected localities/regions by listing all the large and medium sized supermarkets. Where the size of the supermarket is not known an estimate should be used.

4.2.2 Expanded approach

The expanded approach includes locality sampling (urban/rural). To achieve this, identify a full list of mutually exclusive geographical units (e.g., local government areas, provinces) covering the whole of the country (or region/province), excluding areas without populations or with very sparse populations. Determine the urban -rural status of each of these geographical units. Note the size of the population within each geographical unit.

4.2.3 Optimal approach

For the optimal approach, it is proposed that data are combined into socio-economic deprivation strata. To achieve this:

- Identify a full list of mutually exclusive geographical units (e.g., local government areas, provinces) covering the whole of the country (or region/province), excluding areas without populations or with very sparse populations.
- Determine the urban -rural status and the area level deprivation status of each of these geographical units.
- Note the size of the population within each geographical unit.

- Create categories from urban-rural status and area level socio-economic deprivation.
- Classify all the local government / local territorial areas within the country/region into one of the categories. The total number of categories will depend on the number of categories within the urban-rural status variable and the area level socio-economic deprivation variable.

4.3 Seasonality effects

STEP 4

To avoid seasonality effects in the estimates, it is recommended that data collection is conducted:

- Equally across the four seasons – to obtain a yearly estimate; or
- during one season only and use the same season for any data collections in subsequent years.
- Outside times of significant national holidays where the promotion of specific products is high (e.g., Christmas, Thanksgiving)

4.4 Selection of food product groups: Food Classification system

STEP 5

Develop reliable indicators to measure in-store (un)healthy food availability

4.4.1 Validation study to develop reliable indicators for (un)healthy food availability

Ideally, researchers would measure the entire supermarket to determine the availability of healthy and unhealthy foods. However, this approach is very time consuming and therefore often impossible to implement, especially when researchers aim to measure many stores over multiple points of time. Therefore, researchers could opt to develop indicator measures that would offer a fair representation of the product availability of the entire supermarket. Below we provide details of a New Zealand study that was conducted for this purpose.

In 2016, we conducted a validation study to develop a simple, valid, and reliable indicator to collect comparable data on in-store food availability (27). The study can be found here: [Indicators of the relative availability of healthy versus unhealthy foods in supermarkets: a validation study.](#)

First, we developed a gold-standard method that the indicator measures could be compared against. The gold-standard method involved the measurement of 22 healthy and 28 unhealthy food groups, which were determined using three nutrient profiling systems. Healthy and unhealthy food availability within these 50 groups were assessed by measuring both cumulative linear shelf length, as well as variety in 15 New Zealand supermarkets. These are two different concepts, as shelf length indicates the shelf space taken up by certain food groups regardless of the variety of foods within those food groups, while variety indicates the different choices available within each food group, regardless of the shelf space taken up by those food groups.

Second, the gold-standard data were used to develop more simple indicators. Availability ratios of all possible 'healthy' versus 'un-healthy' food group combinations from the original 50 food categories

in the ‘gold standard’ would result in an unrealistic amount of possibilities to test for reliability and validity. Therefore, five simple indicators (see Table 2 below) were selected from previous literature looking at availability of ‘healthy’ and ‘unhealthy’ foods in-store, and which included not too many foods for the simple indicators to become impractical. All selected indicators comprised a subset of healthy and unhealthy food groups as included in the ‘gold standard’.

Table 2 Selected simple indicators for measuring the relative availability of healthy versus unhealthy foods in supermarkets

Indicator	Healthy and unhealthy food groups included	Rationale
1	fresh and frozen fruit and vegetables (including packaged) vs. soft drinks, crisps and snacks, sweet biscuits, cakes and slices, confectionery	Based on food categories used in previous studies by Farley et al 2009 [38], Rose et al 2009 [23], Miller 2012 [24], and Bodor et al 2013 [39]. These studies did include canned fruit and vegetables but these were not included in the ‘gold standard’ in this study, so excluded.
2	fresh fruit and vegetables (including packaged) vs. soft drinks and energy drinks	These food groups represent the most commonly included healthy and unhealthy food categories in previous research on food availability in-store
3	fresh fruit and vegetables (including packaged) vs. soft drinks, crisps and snacks, confectionery	The food groups in this indicator are those used in the Australian study by Cameron et al 2013 [40]. Fresh fruit and vegetables were used by 15 studies as the only healthy food items measured. Soft drinks, crisps, and confectionery were the three most commonly measured unhealthy foods in previous studies.
4	fresh and frozen fruit and vegetables (including packaged) vs. soft drinks, energy drinks, crisps and snacks, sweet biscuits, confectionery	Similar to indicator 1 but excludes the cakes and slices to improve feasibility of measurements in-store.
5	frozen fruit and vegetables vs. soft drinks, energy drinks, crisps and snacks	The included food categories were all common inclusions as healthy or unhealthy foods in previous studies. Excludes fresh fruit and vegetables as these products require more complex measurements to be performed in-store (e.g. measuring bins, no clear shelves).

Third, the construct validity of the five simple indicators for the relative availability of healthy versus unhealthy foods in supermarkets was tested through: 1) a Wilcoxon signed rank test to assess the difference between each simple indicator and the ‘gold standard’, and 2) Spearman rank correlation coefficients to assess associations between the ‘gold standard’ and each simple indicator.

Results showed that cumulative linear shelf length was shown to be a more sensitive measure for food availability in supermarkets than variety. The measures of shelf length are also less time consuming than those for variety, and more acceptable to supermarket retailers who expressed some concerns about taking pictures of shelf sections in-store. A limitation of the shelf length ratio measure is that some food products are not placed on a physical shelf (e.g. hanging confectionery or fruit in freestanding bins) and methods were slightly adapted to be able to measure shelf length for those products.

To measure validity of the five shelf length ratio indicators against a gold standard, we evaluated both correlations between indicators and the gold standard, as well as the difference between indicators and the gold standard. For New Zealand supermarkets specifically, the gold standard includes all healthy and unhealthy foods in-store and thus measures the relative availability of healthy versus unhealthy foods in-store adequately. Therefore, for New Zealand supermarkets, shelf length indicators 1 and 4 show the most potential as simple and valid indicators of in-store availability of healthy versus unhealthy foods. These indicators show a non-significant difference from the ‘gold standard’ indicator for shelf length as well as a significant correlation with the gold standard. Both of these indicators would be much faster and easier to measure in-store food availability than the ‘gold standard’ and still be representative of the ‘gold standard’ ratio of healthy versus unhealthy foods in each store. Indicator 4 is further preferred in view of the difficulty of measuring cakes and slices in-store (as they are found in many different locations across the store)

and thus has a higher feasibility for monitoring. Therefore, indicator 4 (cumulative linear shelf length of fresh and frozen fruit and vegetables versus soft drinks and energy drinks, crisps and snacks, sweet biscuits and confectionery) would be the best indicator to use in future research and monitoring as a valid indicator of the availability of healthy and unhealthy foods in New Zealand supermarkets.

The selected food groups and food products to be measured in New Zealand supermarkets (indicator 4) are provided in Table 1.

Table 1: List of food product groups to include in the '(un)healthy' food indicator

Fresh fruit and vegetables	All fresh fruits and vegetables, excluding potatoes, herbs
Frozen fruit and vegetables	All frozen fruits and (flavoured and unflavoured) vegetables, excluding potato products and ready to eat meals
Confectionary	All varieties of lollies, sweets, gum and chocolate
Crisps / chips	Including potato chips, pre-made popcorn, bagel chips and pretzels ,corn chips, taro chips, etc.
Soft drinks	All carbonated non-alcoholic beverages, including sugar-free soft drinks and sugar-sweetened soft drinks.
Sweet biscuits	All types of biscuits (e.g., plain biscuits, filled biscuits or unfilled biscuits) excluding any form of savoury cracker.

- Product counts (as opposed to shelf space) are likely to be less useful as a measure of the in-store availability of healthy versus unhealthy foods, as there is much less variation between stores compared to shelf space.

4. Data collection in supermarkets

Data collection in supermarkets will involve:

- Measurement of the floor length allocated to particular products.
- A count of shelves allocated to the products.
- Categorisation of the location of the products.

5.1 Before you start data collection

STEP 6

Researchers will need to consult with their local ethics committee regarding the requirements (informed consent/participation/etc.) for entering a supermarket for data collection.

Researchers should obtain approval from the supermarket manager before entering the store for data collection. Depending on the type of supermarket (independent, franchise, chain) approval might be needed from the head office. We advise to first ask local store managers and only consult the head office if local managers don't have the authority to approve the data collection.

It is advised that supermarket managers are notified of the research by letter (or in person). If in person, a letter of introduction, information sheet and consent form (if applicable) should be provided to the retail outlet manager. Minimising any potential disruption to retail outlet operations is advised. This might mean that the data collection is conducted at a time of day when there are few customers in-store.

5.2 Measurements dimensions – supermarkets

STEP 7

Measure the supermarket in-store environment following the minimal or expanded approach.

5.2.1 Minimal approach:

Includes only the measurement of 1) shelf space for the selected product categories (all locations of the selected product groups are measured) and 2) the total supermarket floor space.

Prior to starting the actual measurements, it is important to visit the different supermarket chains that will be included in the study and specify the measurement protocol in a way that:

- The measurements provide a fair comparison between different supermarket chains (e.g., the way supermarkets display their products might influence the measurements. For example, some supermarkets may have multiple smaller shelves with fruit and vegetables while others have one large bin).
- The measurements provide an accurate estimation of the proportion of healthy and unhealthy food (e.g., if you decide to measure length and depth of fruit and vegetables, it is important to also measure length and depth of unhealthy food).

Potential measurement options include:

1. Measurement of shelf space by measuring shelf length. This approach has three components: 1) floor or shelf length (cm) of the selected product type; 2) number of shelves; and 3) total supermarket floor space. The length (cm) is multiplied by the number of shelves to give the total length of shelving allocated to the product type. This approach is adapted from the methodologies of Farley et al. (28), Rose et al. (29) and Ferguson (30) for measuring shelf space of foods. The linear and cumulative shelf space (in cm) for the selected products classified as 'healthy' or 'unhealthy' is to be measured by wheeling a tape measure along the length of the shelf or along the floor directly below the shelf directly below the specified products. The number of centimetres should be recorded in a table and then the number of shelves dedicated to the specified products for each measured distance. If an item is displayed in more than one location, then each location is measured separately and the total shelf space added once all measurements have been conducted.
2. **Preferred option:** A potential problem with option 1 could occur when supermarkets use different display formats. For example, if supermarket 1 displays fruit and vegetables on 5 smaller shelves placed on top of each other (where one would measure the shelf length of all 5 shelves) and supermarket 2 places the product in one large (high/deep) bin (where one would only measure 1 shelf length); supermarket 1 might appear to have more fruit and vegetables than supermarket 2, while actually supermarket 2 might have more if you measured the quantity. Therefore it is preferred to measure shelf space by measuring shelf **length and depth** (cm²).

5.2.2 Expanded approach

This measurement takes into account the amount of shelf space (as described above) and the prominence (location) of the selected product groups.

To measure the prominence (visibility only) of foods in supermarkets we propose two measures, including: 1) in-store prominence using components of the GroPromo audit tool (product locations and the weighting of these locations) (23, 30); and 2) analysis of promotional flyers.

5.2.2.1 In-store prominence using GroPromo tool

The GroPromo tool labels product prominence as high, medium or low depending on customer exposure to the area where the product is placed (e.g., an item located in a checkout is more likely to be noticed than an item placed on the edge of the store (31, 32). The prominence of products is recorded by noting down the presence of the selected product types at different locations within supermarkets, including aisle end-caps, in check-out lines, and on floor displays. These locations are described in Table 2.

Data collection sheets are provided in **Annex 2**.

Table 2: Weighting and description of in-store locations

Location	Weighting	Description
Entrance	Medium	Area within 3m in front of the store entrance (or security barrier)
Endcap A	High	Endcaps (also known as the end of aisles) that face the front of the store (i.e. where the checkouts are). If the store has multiple rows of aisles, then 'endcap A' also includes the endcaps that face the centre of the store. Endcaps are only counted for the main aisles that are not moved.
Endcap B	Medium	Endcap B refers to the endcaps that face the back of the store. If a store has aisles that face the side edges instead of the front and back, then endcap B refers to the endcaps that face the side (perimeter) of the store. Endcaps are only counted for the main aisles that are not moved.
Aisle	Medium	All permanent aisle structures within the store. These include any permanent aisles, even if they are half the length of the main aisles. These also include any permanent islands e.g. vegetable bins
Edge	Low	This location includes anything along the perimeter of the store. This includes any temporary displays that are pushed up along the edge – if these displays are not touching the edge then they are classed as islands.
Island	Medium	These are temporary displays that are often moved or altered. These include temporary tables and shelf displays, as well as temporary bins or stacks. If the bins are permanent (e.g. vegetable bins) then these are counted as aisles.
Checkout side	High	The area alongside and just in front of the checkout – often looks like a small aisle
Checkout end	High	The endcap of the checkout which faces the rest of the store.

Taken from Kerr et al (2012) (23). Entrance locations have been adapted to suit New Zealand supermarket setups.

Figure 1 Example form for in-store assessment of shelf space and display location

Supermarket name				
Geographical location				
Collection date & time				
Data collector (name)				
Number of staffed checkouts	(NB: if less than 2 staffed checkouts, exclude from data collection and replace with next on list)			
Consent obtained/refused	Signed consent obtained – yes <input type="checkbox"/> ; Verbal consent obtained – yes <input type="checkbox"/> Consent refused – yes <input type="checkbox"/>			
Type of food:				
Location	Prominent location	Product in location	Lateral shelf space (cm)	Number of shelves
Entrance	Medium	Yes / No		
Endcap A	High	Yes / No		
Endcap B	Medium	Yes / No		
Aisle	Medium	Yes / No		
Edge	Low	Yes / No		
Island	Medium	Yes / No		
Checkout side	High	Yes / No		
Checkout edge	High	Yes / No		
Total				

5.2.2.2 In-store prominence using supermarket promotional flyers

To capture the in-store promotion of food products, researchers could analyse supermarket promotional flyers. This can be done as part of the expanded approach or as a separate study. Analysis of promotional flyers using the INFORMAS approach involves the following steps:

- Step 1: Identify the major supermarket chains in your country, for example by determining their market share (see Section 4.2).
- Step 2: For each of the major supermarket chains, identify whether they have promotional flyers, the frequency they are sent out and whether they differ for individual stores or regions.
- Step 3: Collect the promotional flyers at the frequency they are distributed (often weekly) for all major supermarket chains for a period of at least 2 months (preferably longer)².
 - If a supermarket chain has different promotional flyers for individual stores or certain regions ensure that the selected promotional flyers form a fair representation for the supermarket chain. For example, researchers could select a flyer for regions with low, medium and high social-deprivation.
- Step 4: Analyse the adverts where the cover (front and back page of flyer) adverts and adverts within the flyer should be analysed separately.

² Other studies have done:

8 weeks: <https://bmcpublihealth.biomedcentral.com/articles/10.1186/s12889-015-1748-8>

12 weeks: <https://academic.oup.com/heapro/article/32/1/113/2950945/Do-the-foods-advertised-in-Australian-supermarket>

- Analysis should be conducted by 2 separate researchers and differences in findings should be discussed.

A. Analysis of Inner Flyer Pages:

This is defined as the whole flyer with the exception of the front and back cover pages.

Information to be collected

- 1) Total number of **food adverts** present in the inner flyer pages (see **Annex 3**).
- 2) Number of adverts containing **junk food** (see **Annex 3**).
 - When there is one advert presenting multiple items, if at least one of these is junk food the advert is classified as being a junk food advert.
 - For example, an advert presenting both frozen fries and peas would be considered a junk food advert.
- 3) Number and type of **promotional characters** in the flyer. These will be limited to promotional characters that are associated with particular food products, rather than those on the packaging of individual products (see **Annex 3**).
- 4) Number and type of **premium offers** in the flyer, including only game and app downloads and/or contests and/or gift or collectable type premium offers (see **Annex 3**).

Data is to be recorded in the below format (or similar):

Analysis of Advertisements on Flyer Pages (Excludes front and back cover of flyer)

Supermarket	Week (Dates)	Total food adverts	Junk food adverts	Number of promotional characters	Number of premium offers	
A						
B						
C						

Example: Inner Flyer Pages Analysis

						
Total Number of Food Adverts	1					
Total number of junk Food Adverts	0					
Number of Premium Offers	1 (Contests)					
Number of Promotional Characters	1 (Famous sports person/team e.g. All Blacks)					

B. Analysis of Flyer Cover

This is defined as the front and back pages of the flyer.

The analysis completed as described above, with the additional “**Fresh**” category/variable. This category is divided into ‘Fruit & Vegetables’ and ‘Meat and Fish.’

Data is to be recorded in the below format (or similar):

Analysis of Advertisements on Flyer Cover (Includes only front and back cover of flyer)

Supermarket	Week (Dates)	Total food adverts	Junk food adverts	Fresh		Number and type of promotional characters	Number and type of premium offers
				Fruit & veges	Meat & fish		
A							
B							
C							

5. Quality control – data collection, coding and entry process

STEP 8

To ensure the results are reliable, quality control checks should be conducted during data collection, coding and data entry processes.

6.1 Training

All data collectors should receive training prior to collecting data and their first data collection should be supervised and the measurements checked. If there are discrepancies, further training and clarification should be provided.

6.2 Audit and reliability checks

For a proportion of the supermarkets (around 10%), the data collected should be checked by conducting a second measurement by a different researcher. This check should occur as soon as possible after the original data collection – although preferably at the same time as the original data collection to avoid store promotional changeovers etc.

Using the data from both measurements, calculate reliability for shelving length, number of shelves and locations by:

Number of agreements shelving length / (Number of agreements shelving length + number of disagreements shelving length) x 100.

A disagreement in shelving length is defined as a >10% difference. When reliability is below 90%, another 10% of supermarkets should be measured a second time.

Similarly the coding and data entry processes should be checked.

6.2.1 Quality control checks

Column 1: Percentage of supermarket measurements audited

Column 2: Inter-rater reliability score for shelving length

Column 3: Inter-rater reliability score for number of shelves

Column 4: Inter-rater reliability score for location of products

Column 5: Inter-rater reliability score for coding

Column 6: Inter-rater reliability score for data entry

6. Data analysis

STEP 9

Calculate the lengths and ratios using (1) a stratified approach and then (2) a weighted approach by determining:

- Shelving length (or cm^2) for each healthy product type in total and by visibility strata
- Shelving length (or cm^2) for all healthy product types in total and by visibility strata
- Shelving length (or cm^2) for each unhealthy product type in total and by visibility strata
- Shelving length (or cm^2) for all unhealthy product types in total and by visibility strata

The final indicator of:

- A ratio of all unhealthy to all healthy products by visibility strata

Two different reporting options are recommended:

1. For each of the selected product types determine the length of shelving (length x number of shelves) (or cm^2) for each of the locations' product types, then stratify locations into low, medium, and high visibility and add the shelving lengths (length x number of shelves) (or cm^2) within each strata to obtain a total within each of the strata for each product type. Retaining separate strata, obtain a total for low, medium and high visibility locations.
2. To use a weighted approach, first obtain a weight for low, medium, and high visibility locations, that reflects the influence (empirically derived) of the product type location on purchasing behaviour of that 'healthy' product type. Include the weight in the calculation of each product type floor i.e., length (length x number of shelves) x weight for the healthy product types and the unhealthy product types. From these two measures determine:
 - A ratio of all unhealthy to all healthy products

7. Data sets for INFORMAS

STEP 10

The INFORMAS group will store, oversee and monitor the data collection from all countries. Therefore, we ask all researchers using this protocol to send their data to the INFORMAS core team as agreed in the Investigator Agreement (**Annex 1**).

The data will be managed in two datasets:

1. Full data sets with cleaned data from each INFORMAS party. These data are visible for INFORMAS parties that provided the data and the INFORMAS core team only.
 - a. Full set of cleaned data
2. Research data base with summary data extracted from full data set and with derived indicators needed for comparisons across countries and over time
 - a. This will include all necessary information to conduct the analyses with separate tables for indicator information.
 - b. This database will be visible for all INFORMAS parties.

8. References

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9. ANNEX 1 – INFORMAS PROTOCOLS *Terms & Conditions v1.1* *May 2017*

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The undersigned:

INFORMAS Secretariat (represented by Prof Boyd Swinburn) at the University of Auckland, New Zealand (hereinafter referred to as **INFORMAS Secretariat**).

And

Party interested in using the INFORMAS protocols, hereinafter referred to as **INFORMAS party**. INFORMAS party can be an institution, department, group or individual researcher.

INFORMAS party becomes an **INFORMAS user** after signing this document.

A. Definitions

INFORMAS (International Network for Food and Obesity / non-communicable Diseases Research, Monitoring and Action Support) is a global network of public-interest organisations and researchers that aims to monitor, benchmark and support public and private sector actions to create healthy food environments and reduce obesity and non-communicable diseases (NCDs) and their related inequalities. INFORMAS serves as a capacity building platform for sharing tools, methods, experiences, support and data for monitoring and benchmarking food environments and policies globally and is supported by/seeking support from a wide range of different funding sources.

INFORMAS Secretariat is the INFORMAS core team at the University of Auckland coordinating the INFORMAS globally represented by Professor Boyd Swinburn, INFORMAS Research Fellows and senior secretariat members.

INFORMAS Module leader teams are assigned INFORMAS researchers to lead one of the 10 modules within INFORMAS.

INFORMAS researcher is a researcher who belongs to the INFORMAS network, providing input through module leadership or data and analysis contributions and signed the INFORMAS data use and sharing Terms and Conditions.

INFORMAS users are researchers linked to INFORMAS who use INFORMAS protocols and materials and who signed this INFORMAS Protocols Terms and Conditions form.

INFORMAS group is INFORMAS Secretariat and INFORMAS researchers and INFORMAS Module leader teams.

INFORMAS research is projects using (any of) the available INFORMAS resources, methods and / or protocols for data collection and analysis.

INFORMAS resources is the protocols and data collection methods as available on the INFORMAS website (www.informas.org), published in peer reviewed journals and accessible on the INFORMAS Google Drive (where INFORMAS party will receive access to after signing this agreement). This does not cover INFORMAS data which is part of a separate agreement.

INFORMAS user is parties who signed this document and are using INFORMAS protocols or resources, but are not necessarily contributing to or making use of INFORMAS data (this is part of a separate agreement).

B. Aims of the document

Large collaborative projects that include many participants can have unique challenges to determine levels of ownership and contribution. This document therefore aims outline the terms and conditions (i.e., expectations) with regard to the use and sharing of INFORMAS resources. The goal is to facilitate collaboration between researchers (not between institutions).

This is not a legally binding agreement between institutions, but merely a mutual understanding between researchers outlining the expectations relating to INFORMAS. The INFORMAS party can add additional conditions to this agreement as appropriate (see section C).

After signing this document, the INFORMAS party will become an INFORMAS user and will receive full access to the latest INFORMAS resources as hosted on the INFORMAS Google Drive.

In the first instance, INFORMAS Secretariat aims to work with one contact person for each INFORMAS party. This agreement will need to be signed by that contact person, but please also provide contact details for other researchers in your INFORMAS party so we contact you in case the contact person leaves.

The main goals of this agreement are to:

- Safeguard consistency of INFORMAS resources (e.g., protocols and data collection method)s within and between different countries (for example to allow multi-country analysis)
- Safeguard the quality of INFORMAS resources (e.g., protocols and the collected data)
- Safeguard version management for INFORMAS resources (e.g., protocols, databases and publications)
- Encourage collaboration between INFORMAS researchers who are using INFORMAS resources.

1. General Principles

- **Copyleft:** The INFORMAS research follows the principle of ‘copyleft’ where INFORMAS researchers receiving INFORMAS resources have the same rights for using and sharing INFORMAS resources as the authors of the original documents and INFORMAS Secretariat, with the condition that they follow the same copyleft principles when distributing the work.
- **Reciprocity:** The INFORMAS research follows the principle of ‘reciprocity’ where there is expected mutual benefits from contributing and sharing to INFORMAS research. Here it is expected that when the INFORMAS party or INFORMAS researcher benefits from the INFORMAS resources, they repay by contributing resources and skills of their own.

This document does *not* relate to any financial agreements between institutions (e.g., when you pay or get paid to use particular INFORMAS resources) which will need to be covered in separate agreements.

2. General terms and conditions

By signing this document, you agree to:

- Adhere to the INFORMAS resources as outlined in each document
- The INFORMAS party communicates with INFORMAS Secretariat about any changes they (are planning to) make to the INFORMAS resources (e.g., when they adapt a protocol for their own country or for a specific setting) and share the final protocol within the INFORMAS group (which can be in the INFORMAS party’s own language)

- INFORMAS party is free to publish their (adapted versions of the) protocol, following the INFORMAS Publications and Authorship Terms and Conditions. Publication can be in an open access or regular journal as long as the INFORMAS party shares the protocol within the INFORMAS group.
- The data the INFORMAS party collects using the INFORMAS resources will be owned by the INFORMAS party. However, there is an expectation that the INFORMAS party shares the cleaned data with the INFORMAS group (i.e., copyleft principle). For further details please refer to the INFORMAS Data Use & Sharing Terms & Conditions.
- Not share INFORMAS resources outside your INFORMAS party without informing the INFORMAS group.
- Agree to the principles as outlined in the INFORMAS Publications and Authorship Terms and Conditions
- Not directly or indirectly exploit the INFORMAS resources in any way for the INFORMAS party his/her own or any other person's benefit, profit or advantage.
- Have in place adequate security measures to protect any Personal Information and Confidential Information against unauthorised access, modification, use, disclosure or loss.
- Agree to the copyleft principles.

C. Additional conditions

INFORMAS party can specific terms and conditions here for use of their data by INFORMAS if applicable.

D. Please provide the following details:

- a. INFORMAS party contact person name:
- b. Institution:
- c. Country:
- d. Email address:
- e. IFORMAS party involved researchers
 - i. Researcher name 1:
 - ii. Researcher institution 1:
 - iii. Researcher email 1:
 - iv. Researcher name 2:
 - v. Researcher institution 2:
 - vi. Researcher email 2:
 - vii. Researcher name 3:
 - viii. Researcher institution 3:

- ix. Researcher email 3:
- x. Please expand as necessary

f. INFORMAS modules you are most interested in:

- ☐ Public sector policies and actions
- ☐ Private sector policies and actions
- ☐ Food composition
- ☐ Food labelling
- ☐ Food promotion
- ☐ Food provision
- ☐ Food retail
- ☐ Food prices
- ☐ Food trade and investment
- ☐ Population diet

E. Signatures

INFORMAS Secretariat

Prof Boyd Swinburn

Date:

Signature:

INFORMAS party

Name:

Date:

Signature:

10. Annex 2 – Data collection sheets for supermarkets

Contextual information (Sheet 1) Country and design information

Spreadsheet column	Description of data field	Variable format
Column:	Country name (or state/region) in which survey sampling being conducted	Text
Column:	Total number of geographical regions included (e.g., local government districts / territorial authorities)	Numeric
Column:	Number of sampled geographical units	Numeric
Column:	Sampling approach (text description - ####)	Text
Column:	Number of retail strata (Retail outlet type) for which estimates are required	Numeric
Column:	Strata 1 name	Text
Column:	Strata description	Text
Column:	Strata 2 name	Text
Column:	Strata description	Text
Column:	Strata 3 name	Text
Column:	Strata description	Text
Column:	Number of supermarkets in sample frame strata 1	Numeric
Column:	Number of supermarkets contacted strata 1	Numeric
Column:	Number of supermarkets eligible strata 1	Numeric
Column:	Number of supermarkets completed data collection strata 1	Numeric
Column:	Number of supermarkets in sample frame strata 2	Numeric
Column:	Number of supermarkets contacted strata 2	Numeric
Column:	Number of supermarkets eligible strata 2	Numeric
Column:	Number of supermarkets completed data collection strata 2	Numeric
Column:	Number of supermarkets in sample frame strata 3	Numeric
Column:	Number of supermarkets contacted strata 3	Numeric
Column:	Number of supermarkets eligible strata 3	Numeric
Column:	Number of supermarkets completed data collection strata 3	Numeric

Information to be included from the data collection in each supermarket

Spreadsheet column	Description of data field	Variable format
Variable:	Supermarket name	Text
Variable:	Supermarket code	Numeric
Variable:	Date of data collection	dd/mm/yyyy

Spreadsheet column	Description of data field	Variable format
Variable	Data collector code	numeric
Variable	Opening hour	numeric
Variable	Closing hour	numeric
Variable:	Geographical unit (Locality / local government area / territorial authority name) (text field)	Text
Variable:	Geographical unit (Locality / local government area / territorial authority name) (code)	Numeric
Variable:	Urban / rural status(code) 1= 2= 3=	Numeric
Variable:	Area level deprivation status (For New Zealand – NZDep13 code)	Numeric
Variable:	Supermarket type (Chain brand) (NZ e.g., 1=Countdown 2=Supervalue 3=Freshchoice 4=Four Square 5=New World 6=PaknSave 7=On the Spot 8=Other)	Numeric
Variable:	Number of checkout aisles (self -checkout stations = 1 checkout)	Numeric
Variable:	Total supermarket floor space	Numeric
Variable:	Type of food product group1 (name)	Text
Variable:	Type of food product code1 1=Vegetable fresh 2=Vegetable frozen etc	Numeric
Variable:	Entrance product1 length (cm)	Numeric
Variable:	Entrance product1 number of shelves	Numeric
Variable:	Endcap A product1 length (cm)	Numeric
Variable:	Endcap A product1 number of shelves)	Numeric
Variable:	Endcap B product1 length (cm)	Numeric
Variable:	Endcap B product1 number of shelves)	Numeric
Variable:	Aisle product1 length (cm)	Numeric
Variable:	Aisle product1 number of shelves	Numeric
Variable:	Edge product1 length (cm)	Numeric

Spreadsheet column	Description of data field	Variable format
Variable:	Edge product1 number of shelves)	Numeric
Variable:	Island product1 length (cm)	Numeric
Variable:	Island product1 number of shelves)	Numeric
Variable:	Checkout side product1 length (cm)	Numeric
Variable:	Checkout side product1 number of shelves	Numeric
Variable:	Checkout edge product1 length (cm)	Numeric
Variable:	Checkout edge product1 number of shelves	Numeric
Variable:	Type of food product group2	Text
Variable:	Type of food product code2 1= 2= 3= 4= 5=	Numeric
Variable:	Entrance product2 length (cm)	Numeric
Variable:	Entrance product2 number of shelves	Numeric
Variable:	Endcap A product2 length (cm)	Numeric
Variable:	Endcap A product2 number of shelves)	Numeric
Variable:	Endcap B product2 length (cm)	Numeric
Variable:	Endcap B product2 number of shelves)	Numeric
Variable:	Aisle product2 length (cm)	Numeric
Variable:	Aisle product2 number of shelves	Numeric
Variable:	Edge product2 length (cm)	Numeric
Variable:	Edge product2 number of shelves)	Numeric
Variable:	Island product2 length (cm)	Numeric
Variable:	Island product2 number of shelves)	Numeric
Variable:	Checkout side product2 length (cm)	Numeric
Variable:	Checkout side product2 number of shelves	Numeric
Variable:	Checkout edge product2 length (cm)	Numeric
Variable:	Checkout edge product2 number of shelves	Numeric
Variable:	Type of food product group3	Text
Variable:	Type of food product code3 1= 2= 3= 4= 5=	Numeric
Variable:	Entrance product3 length (cm)	Numeric
Variable:	Entrance product3 number of shelves	Numeric

Spreadsheet column	Description of data field	Variable format
Variable:	Endcap A product3 length (cm)	Numeric
Variable:	Endcap A product3 number of shelves)	Numeric
Variable:	Endcap B product3 length (cm)	Numeric
Variable:	Endcap B product3 number of shelves)	Numeric
Variable:	Aisle product3 length (cm)	Numeric
Variable:	Aisle product3 number of shelves	Numeric
Variable:	Edge product3 length (cm)	Numeric
Variable:	Edge product3 number of shelves)	Numeric
Variable:	Island product3 length (cm)	Numeric
Variable:	Island product3 number of shelves)	Numeric
Variable:	Checkout side product3 length (cm)	Numeric
Variable:	Checkout side product3 number of shelves	Numeric
Variable:	Checkout edge product3 length (cm)	Numeric
Variable:	Checkout edge product3 number of shelves	Numeric
	<i>Continue until the full range of products has been covered</i>	
	<i>Repeat for next Supermarket</i>	

11. Annex 3 - Flyer Analysis Definitions

Flyer Cover	Front and back cover of a flyer.
Flyer Pages	Inner flyer pages including all except the flyer cover.
Junk Food Refer to <i>Note 1</i> , below.	Confectionary/chocolate; Ice cream/ frozen yoghurt/sorbet; Sugar sweetened beverages (soft drinks, fruit and vegetable juice, flavoured milk, sports drinks); Artificially sweetened beverages; Energy drinks; Crisps; Snack bars (muesli, granola and fruit); Biscuits/cakes/muffins/pastries; 2 minute noodles/ instant soup; Deep fried foods; Pies/ sausage rolls; Burgers/ pizzas.
Food Advert Refer to <i>Note 1</i> .	Food item/s displayed with a price (e.g. recipe sections with no specific food products and prices are not included as adverts).
Junk Food Advert	A food advert containing at least one junk food item (e.g. 1 advert displaying both frozen peas and frozen chips) will be considered a junk food advert.
Fresh Fruit and Vegetables	Number of adverts for fresh fruit, vegetables. Only fresh products are included, i.e. frozen vegetables are <u>excluded</u> .
Fresh Meat and Fish	Number of adverts for fresh meat and fish. This includes fresh, unprocessed (or minimally processed) products. I.e. Frozen products are excluded, along with pre-prepared meat patties and sausages. Fresh minced meat is included.
Promotional Characters Refer to <i>Note 2</i> , above.	Promotional characters are limited to those associated with food items, rather than those present on a given items packaging. Types of promotional characters: <ul style="list-style-type: none"> ○ Cartoon/Company owned character e.g. M&Ms ○ Licenced character e.g. Dora the explorer ○ Amateur sportsperson e.g. person playing a sport ○ Celebrity (non-sports) e.g. Jamie Oliver ○ Movie tie-in e.g. Shrek ○ Famous sportsperson/team e.g. All Blacks ○ Non-sports/historical events/festivals e.g. Christmas ○ 'For kids' e.g. image of a child, 'great for school lunches' ○ Awards e.g. Best Food Award 2014, award winning ○ Sports event ○ Other
Premium Offers Refer to <i>Note 2</i> , above.	Food-related premium offers that are to be considered: <ul style="list-style-type: none"> ○ Game and app downloads ○ Contests ○ Gift or collectable

Note 1: Alcohol, baby food (baby formula and other baby foods), supplements and meal replacements (and related products) are excluded.

Note 2: Promotional Characters and Premium Offers

- Premium offers/promotional characters that are clearly associated with NON food advertisements are not counted/captured
- Premium offers/promotional characters that are on pages that do not contain ANY food advertisements are not counted/captured
- Premium offers/promotional characters that are on pages that contain at least one food advertisement are captured, unless they are clearly and only associated with one or more NON food advertisements.