INFORMAS Food Price and Affordability Module

MEALS for NCD prevention
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INFORMAS Food Price and Affordability Module

- Why focus on food prices?
- Challenges assessing price and affordability of foods, meals and diets?
- The INFORMAS approach
  - Minimal
  - Expanded
  - Optimal
- Examples and results
  - Australia, Argentina, Belgium, Brazil, Mexico, New Zealand
- What is the best approach for your country?
- Questions
Why focus on food prices?

State of diet-related health globally

Age-standardised DALY rate per 100,000 population attributable to diet in 2017

- Globally, 22% deaths and 15% DALYs are attributable to dietary risks
- Higher in Africa


What should people eat?

Why focus on food prices?

If everyone ate a healthy diet, disease burden* in Australia would be reduced

- Stroke 38%
- Coronary heart disease 51%
- Mouth, pharyngeal, laryngeal cancer 37%
- Gastrointestinal cancer 20%
- Lung cancer 8%
- Bowel cancer 29%
- Stomach cancer 2%
- Prostate cancer 1.2%
- Diabetes 34%

* Based on 2011 data.

..and GHG would decrease by 25%...
What should people eat?
Why focus on food prices?

But, what are people eating?

E.g. <1% of population follow Dietary Guidelines in Australia…

Scorecard:
Proportion Australians eating recommended

- 30% cereals
- 14% lean meats
- 10% dairy foods
- 4% veg
- 31% fruit

Australian Guide to Healthy Eating

Australian Health Survey, 2011-12
Radical dietary transformation is required

Approximate change in average adult dietary intake to meet modelled omnivorous dietary patterns (Note care required in interpretation)

- TOTAL VEGETABLES
  - starchy veg: up ~30%
  - green leafy/brassica: up ~40%
  - orange veg: up ~10%
  - other veg: up ~30%
  - Legumes: up ~40%
- TOTAL FRUIT: up ~110%
- Nut/seeds: up ~350%
- ALL GRAINS (CEREALS)
  - wholegrain/↑ fibre grains: up ~160%
  - refined/↓ fibre grains: ↓~30%
- MEAT, POULTRY, FISH, EGGS, LEGUMES &...
  - poultry, fish, eggs, legumes etc: up ~40%
  - red meats: ↓~20% (mainly men)
- fish and seafood: ↓~7%
- TOTAL MILK PRODUCTS (excluding butter and...)
  - reduced fat milk products: ↓~40%
  - high-medium fat milk products: ↓~50%
- DISCRETIONARY FOODS: ↓~5% energy intake from 35% to 25%
Why focus on food prices?

Radical dietary transformation is required

- Many evidence-based solutions are known and have been endorsed— but patchy progress in all areas is indicative of policy inertia
- Political will and public demand are lacking

- Improving food and nutrition security through a **systems** approach
  - Nutrition specific interventions addressing immediate determinants (primary care)
  - Nutrition sensitive interventions addressing underlying drivers and determinants (i.e. social, economic, political, environmental, technological, and commercial determinants of health)

- Need to work collaboratively across sectors to address malnutrition in all its forms
- Need double or triple duty actions

Factors affecting food choice

- Price?
- Convenience?
- Availability?
- Taste?
- Advertising/promotion?
- Facilities: storage, preparation, cooking, energy etc
- Transport?
- 'Entertainment'?

Why focus on food prices?

The perceived cost of healthy food can be a barrier to healthy diets.
Food prices, food choice and health

- Food prices are affected by complex political, economic, socio-cultural and environmental factors at the local, national and international levels.
- Food prices can be manipulated through regulation and other policy approaches.
- The exposure variable affecting health outcomes is habitual diet, not selected foods.
- To inform policy need both price/affordability of current diet and healthy diet, and differential cost.
- But people tend to chose foods or meals, not diets, so need price data on foods and meals too.
- When INFORMAS formed in 2013, there was NO globally standardised method to provide such price data from a health and nutrition perspective.

Why focus on food prices?
How are food prices manipulated?

1: Globally and regionally

- Setting commodity floor price
- Trade agreements

2: By national governments, with common strategies including:

- Taxes on specific foods ("fat taxes") e.g. on sugary drinks;
- Exemption of selected goods from a GST or value added tax; and
- Subsidies such as agricultural and transport subsidies, or voucher systems targeted to high-risk groups

3: By private enterprise in retail stores, for example:

- For marketing purposes, such as price promotions and two-for-one deals
- In specific areas, such as remote First Nations communities

Global food price monitoring

- Primarily applied in an economic context
- Data on different staple foods compiled for different purposes
- Influenced by: international oil prices, climate, weather, crop and production yields, global and domestic demand, surplus stocks, market speculation, financial issues
- Stressors include: climate change, pandemics, global financial crisis, population growth/changes, diet

Challenges

- Volatile
- Little focus on health aspects
- Available data tend to be highly aggregated at commodity level
Major global food price indicators

- FAO Food Price Index- measure of the monthly change in international prices of a basket of cereals, dairy foods, oils/fats, meats and sugar
- Food and beverage components of the IMF Primary Commodity Price Index
- Food and beverage components of the World Bank Commodity Index (LMI countries)
- Contextualised commodity food prices adjust for local conditions: weather, political upheaval, pandemics etc
  - Global Information and Early Warning System on Food and Agriculture (GIEWS)
  - Food Price Data and Analysis Tool (FAO 2012)
  - World Food Program’s Vulnerability Analysis and Mapping (VAM)
    Food and Commodity Price Data Store
Major regional/national food price indicators

- Few detailed, comprehensive food price data sets are readily accessible
- Examples include:
  - US Dept Agriculture’s Centre for Nutrition Policy and Promotion data from NHANES surveys
  - European Commission's harmonised economic monitoring tools through food supply chain
  - Agriculture departments eg South Africa
  - Consumer Price Index (food) eg Australia, New Zealand
  - Stressor monitoring eg COVID-19 pandemic

Challenges:

- Highly selected and variable foods
- Different methods: data, collection, analysis, reporting
Example: Consumer Price Index/Consumer Price Index, CPI (Food)

Commonly available and used as measure of inflation
- Covers range of goods and services- proportions vary and change over time
- Includes wide variation of foods and beverages
- 2 main methods weighting based on:
  - household consumption data
  - expenditure from national accounts
- Approximates price change in 'current' diet (i.e. unhealthy diet)

Challenges:
- Costed food items can be limited, highly selected and highly aggregated
- Tension between requirements re stability for time series and currency
- Reported regularly by few countries as CPI (foods)
- Very few countries currently estimate or report CPI (healthy foods)
  - eg. assessed once in Australia in 2015
National/community prices of selected foods, meals, 'baskets'

- World Bank uses cost of 1200 kCal food basket to set the world poverty line
- Purchasing Power Parity eg Big Mac Index
- European Union costs selected products in 37 countries (many challenges)
- Various approaches have been used to measure:
  - the cost of selected lists of 'healthy' foods and 'unhealthy' foods
  - the cost of a ‘healthier/healthy’ diet
- Rarely have studies assessed the price of:
  - 'healthy' and ‘unhealthy’ meals
  - ‘current/standard’ diets
- When INFORMAS was formed in 2013, no studies had accessed the cost differential of 'healthy' and 'current' diets needed to inform health policy
National/community: The economics of food choice?

Cost of selected lists of 'healthy' foods and 'unhealthy' foods

• Results are usually reported on the basis of energy cost ($/kJ) per energy density.

• This is spurious due to statistical coupling.

• Leads to circular reasoning.

Drewnowski and Darmon, AJCN, 2005
The relative price of ‘healthy’ and ‘unhealthy’ foods varies with the method of measurement (units reported)

Different approaches and challenges?

The relative price of ‘healthy’ and ‘unhealthy’ foods varies with the method of measurement and units reported

<table>
<thead>
<tr>
<th>Unit</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>&quot;Core&quot; foods high in nutrients and low in energy density, such as fruits and vegetables, are relatively expensive compared with energy-dense nutrient-poor foods, especially those high in saturated fat and added sugar</td>
</tr>
<tr>
<td>Edible weight</td>
<td>Grains, vegetables, fruit and dairy foods are less expensive than: - most protein foods (meat, poultry, fish, eggs, peanut butter) - most energy-dense nutrient-poor foods</td>
</tr>
<tr>
<td>Average portion size</td>
<td>Grains, dairy, vegetables and fruit are less expensive than: - most protein foods (meat, poultry, fish, eggs, peanut butter) - most energy-dense nutrient-poor foods</td>
</tr>
</tbody>
</table>

- It appears less costly to meet US dietary recommendations for grain products, dairy foods and fruit, than for vegetables and protein (meat, poultry, fish) foods.
- On average, healthier dietary patterns were only about $1.50 more expensive than less healthy patterns, whether based on an actual day’s intake or per 2000 kcal.

Sources:  
-Rao et al, Do healthier foods and diet patterns cost more than less healthy options? A systematic review and meta-analysis, BMJ Open, 2013
### Cost of selected lists of 'healthy' foods and 'unhealthy' foods

<table>
<thead>
<tr>
<th>Food Group</th>
<th>'Less healthy' food</th>
<th>'Healthier' food</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meat and alternatives</td>
<td>Fatty red meat</td>
<td>Trimmed red meat?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fish?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nuts/pulses?</td>
</tr>
<tr>
<td></td>
<td>Fatty sausages</td>
<td>Lean sausages</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fresh sausages</td>
</tr>
<tr>
<td></td>
<td>Fried tofu</td>
<td>Fresh tofu</td>
</tr>
<tr>
<td>Milk and alternatives</td>
<td>Full cream milk, cheese, yoghurt</td>
<td>Reduced fat milk, cheese, yoghurt</td>
</tr>
<tr>
<td>Cereal (grain) foods</td>
<td>White breads</td>
<td>Wholegrain breads</td>
</tr>
<tr>
<td></td>
<td>White rice</td>
<td>Brown rice</td>
</tr>
<tr>
<td>Fruit and vegetables</td>
<td>Potato crisps</td>
<td>Nuts</td>
</tr>
<tr>
<td></td>
<td>Hot potato chips</td>
<td>Boiled/baked potatoes</td>
</tr>
<tr>
<td></td>
<td>Dried fruit</td>
<td>Fresh fruit</td>
</tr>
<tr>
<td></td>
<td>Fruit juice</td>
<td>Fresh fruit</td>
</tr>
<tr>
<td>Oils/spreads</td>
<td>Butter</td>
<td>Polyunsaturated spread</td>
</tr>
<tr>
<td></td>
<td>Palm oil</td>
<td>Olive oil</td>
</tr>
<tr>
<td>Unhealthy, UPF, discretionary, junk foods</td>
<td>Sugar-sweetened beverages</td>
<td>Artificially sweetened beverages</td>
</tr>
<tr>
<td></td>
<td>Sweet biscuits</td>
<td>Fruit</td>
</tr>
</tbody>
</table>

**Which foods and amounts to cost?**

**Which brand?**

**Equity?**

**Sustainability?**

**Culturally appropriate?**

**Are the healthier foods really healthy?**

**Are the less healthy foods really less healthy?**

**Should the lists have the same energy content or weight or serves?**
### Different approaches and challenges?

#### Cost of selected lists of 'healthy' meals and 'unhealthy' meals

<table>
<thead>
<tr>
<th>Less healthy meal</th>
<th>Healthier meal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Take away fried chicken and chips</td>
<td>Grilled chicken and potatoes</td>
</tr>
<tr>
<td>Take away hamburger</td>
<td>Home made hamburger</td>
</tr>
<tr>
<td>Hot potato chips</td>
<td>Boiled/baked potatoes</td>
</tr>
<tr>
<td>Fried dough</td>
<td>Fresh breads</td>
</tr>
<tr>
<td>Take-away curry</td>
<td>Home-made curry</td>
</tr>
<tr>
<td>Fried rice</td>
<td>Mixed rice</td>
</tr>
<tr>
<td>Desert cake</td>
<td>Fruit</td>
</tr>
</tbody>
</table>

- Which meals and amounts to cost?
- Which brand?
- Equity?
- Sustainability?
- Culturally appropriate?
- Are the healthier meals really healthy?
- Are the less healthy meals really less healthy?
- Should the meals have the same energy content or weight or serves?
Different approaches and challenges?

Costs associated with time and energy required for:

- domestic food production
- transport
- going to the markets
- storage
- preparation
- cooking
- stoves/heat source
- cooking pots
- utensils
- plates and bowls
- washing equipment
Affordability: assessment of household income

- Relatively few pricing studies assess affordability at household level

- Range of measures available:
  - median household income (OECD 2011)
  - disposable household income (Luxembourg Income Study 2012)
  - household budget survey data (European Commission 2005)
  - household expenditure and income data for transitional economies (The World Bank 2012)
  - several studies in high income countries use relevant welfare payments as income

- In LMIC the proportion of gross income spent on food:
  - poor families 50-80%
  - middle-class households 35-65%

- In HIC a healthy diet can cost households:
  - 20% for those on average income in Australia
  - 28-40% for those on welfare in Australia
  - 35-40% for those with low-income in LA, USA
Affordability of selected foods, baskets of foods, meals, diets
Policies affecting household income

• Welfare policy
• Taxation policy
• Minimum wage policy
• Regional policy, eg remote allowances
• Policies targeting special populations
• Policies targeting special circumstances eg COVID-19 pandemic
The INFORMAS approach

**WHO’s Global Monitoring Framework**

- **Mortality & Morbidity**
  - Unconditional probability of dying between ages 30 and 70 years from cardiovascular diseases, cancer, diabetes or chronic respiratory diseases
  - Cancer incidence by type of cancer per 100,000 population

- **Risk Factors**
  - Harmful use of Alcohol (3)
  - Fruits and Vegetables
  - Physical Inactivity (2)
  - Salt
  - Saturated Fat
  - Tobacco use (2)
  - Blood glucose/diabetes
  - Blood Pressure
  - Overweight and Obesity (2)
  - Total Cholesterol

- **National Systems Response**
  - Cervical cancer Screening
  - Drug therapy and counseling
  - Essential NCD Medicines
  - Hepatitis B Vaccine
  - HPV Vaccine
  - Marketing to children
  - Access to palliative care
  - Policies to limit SFA and virtual elimination of FHVO

? Other Aspects of Food Environments?
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- **INFORMAS**: International Network for Food and Obesity/NCD Research, Monitoring and Action Support

- 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 NCDs
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Food prices as a barrier to healthy eating: relevant health policy questions

- What are the price, price differential and affordability of ‘healthy’ and current ‘unhealthy’ diets?
- How would these metrics change under different fiscal/health policy scenarios?
- What would be the health and economic outcomes?
### The INFORMAS approach

#### Step-wise approach to monitor price and affordability of ‘healthy’ and ‘less healthy’ foods, meals and diets

<table>
<thead>
<tr>
<th>Indicator</th>
<th>‘Minimal’ approach</th>
<th>‘Expanded’ approach</th>
<th>‘Optimal’ approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data sources</td>
<td>Differential between the price of selected ‘healthy’ foods and ‘less healthy’ foods</td>
<td>Differential between the price of ‘healthy’ diets and meals, and ‘less healthy’ diets and meals</td>
<td>Affordability of ‘healthy’ and ‘less healthy’ diets and meals</td>
</tr>
<tr>
<td>Analysis</td>
<td>Comparison of the cost (and tax component) of ‘healthy’ and ‘less healthy’ equivalent foods</td>
<td>Diets: Comparison of the cost of a ‘healthy’ diet for a reference (healthy weight) family over 2 weeks versus cost of the ‘current’ diet for a reference (current weight) family over 2 weeks Meals: cost of a reference ‘healthy’ meal vs. the cost of a similar but less healthy meal (of equivalent weight)</td>
<td>As ‘expanded’ approach together with median household income data</td>
</tr>
<tr>
<td>Stratification</td>
<td>No stratification</td>
<td>Stratification by region</td>
<td>Stratification by region and by household socioeconomic status</td>
</tr>
<tr>
<td>Representativeness</td>
<td>Country-wide</td>
<td>Country-wide/regional</td>
<td>Country-wide/regional</td>
</tr>
</tbody>
</table>

Source: Lee A et al Monitoring the price and affordability of foods and diets globally. Obesity Reviews, 2013; 14 (Suppl1) 82 95
## The INFORMAS approach

### Minimal approach

<table>
<thead>
<tr>
<th>Pairs</th>
<th>Compare the cost of pairs of healthy foods and unhealthy foods* OR similar items with a difference in nutrient content</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food groups</td>
<td>Price changes over time of healthy foods and unhealthy foods*</td>
</tr>
<tr>
<td>Degree of processing</td>
<td>Change in price over time of minimally processed, processed and ultra-processed foods</td>
</tr>
</tbody>
</table>

* Defined in different ways e.g. by national; food-based Dietary Guidelines OR by energy and nutrient density
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Minimal approach

Choosing food pairs

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relate to a potential policy option</td>
<td>White flour compared to whole meal flour a more useful comparison than plain and chocolate biscuit</td>
</tr>
<tr>
<td>Be based on the same main ingredient(s) or components</td>
<td>Trim milk and standard milk</td>
</tr>
<tr>
<td>Have the same end purpose</td>
<td>‘Do I spread butter or margarine on my bread?’</td>
</tr>
<tr>
<td>Be a choice made at the point of purchase within the same food group</td>
<td>‘Do I choose a fruit bun or a croissant for a snack?’ rather than ‘do I choose a banana or a croissant?’</td>
</tr>
<tr>
<td>Have a difference in a key nutrient(s): saturated fat, salt, added sugar or fibre</td>
<td>A wheat breakfast biscuit has more fibre, less salt and less added sugar than cornflakes</td>
</tr>
<tr>
<td>Have a difference in the form of the food item recommended in food-based dietary guidelines: low or reduced fat, wholegrain, lean meat etc</td>
<td>Wholegrain bread compared to white bread</td>
</tr>
<tr>
<td>The healthier option should be recommended under the country’s food-based dietary guidelines</td>
<td>Wholegrain bread compared to white bread. NOT A plain biscuit compared to a chocolate biscuit, as the healthier item is not recommended</td>
</tr>
<tr>
<td>Be readily available</td>
<td>If wholemeal pasta not available at most supermarkets than not appropriate to pair with standard pasta</td>
</tr>
</tbody>
</table>

* But which nutrient to privilege?
## Minimal approach

### Sources of data on food prices

<table>
<thead>
<tr>
<th>Data source</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
</table>
| Collecting food prices in supermarkets / retail settings | • Data at product level (specific brands, etc.)  
  • Recent data  
  • Researcher can make decisions on data to collect (which products to select, how to deal with price promotions,)  
  • Can be used to compare healthy and unhealthy groupings  
  • Enables comparison between cost in different places | • Resource intensive  
  • Need a lot of data to be nationally representative |  
| Consumer Price Index (CPI)                           | • Data already collected  
  • Data are representative  
  • Data include population weights by pricing region and expenditure weights by group.                                                                                                                                                                                                 | • Often no data at product (brand) level  
  • Difficult to construct healthy and unhealthy baskets  
  • Prices are means, so can’t extract price promotions, specific prices |  
| Home-scan panel (for example Nielsen, Kantar)         | • Data already collected  
  • Might be able to obtain data at product level                                                                                                                                                                                                                              | • Often expensive to buy  
  • Panel might not be representative |  
| National food price database (for example USDA)       | • Data already collected  
  • Data available for a wide range of foods  
  • Can be used to compare healthy and unhealthy groupings                                                                                                                                                                                                                     | • Data often not recent  
  • Prices are means, so can’t extract price promotions, specific prices |
Minimal approach

Minimal Approach: Changes in prices over time

Example from New Zealand using Food Price Index

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**Minimal approach**

**Food Price Index**

- Representative food basket
- Items selected based on expenditure in Household Economic Survey
- Prices collected by Statistics NZ from 12 regional centres, supermarkets, small grocers, takeaways, restaurants
- Prices provided monthly

<table>
<thead>
<tr>
<th>Food groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit</td>
</tr>
<tr>
<td>Vegetables</td>
</tr>
<tr>
<td>Meat</td>
</tr>
<tr>
<td>Seafood</td>
</tr>
<tr>
<td>Grains</td>
</tr>
<tr>
<td>Dairy/eggs</td>
</tr>
<tr>
<td>Oils/fats</td>
</tr>
<tr>
<td>Condiments</td>
</tr>
<tr>
<td>Snacks</td>
</tr>
<tr>
<td>Other grocery</td>
</tr>
<tr>
<td>Ready-to-eat foods</td>
</tr>
<tr>
<td>Hot and cold beverages</td>
</tr>
</tbody>
</table>
### Minimal approach

**Example of data from Statistics NZ**

<table>
<thead>
<tr>
<th>Month</th>
<th>Apples 1kg ($)</th>
<th>Beef mince 1kg</th>
<th>Biscuits 200g</th>
<th>Eggs, dozen</th>
<th>Meat pie, each</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016M01</td>
<td>3.9</td>
<td>8.54</td>
<td>2.50</td>
<td>3.12</td>
<td>2.68</td>
</tr>
<tr>
<td>2016M02</td>
<td>3.94</td>
<td>8.42</td>
<td>5.45</td>
<td>3.15</td>
<td>2.68</td>
</tr>
<tr>
<td>2016M03</td>
<td>3.85</td>
<td>8.63</td>
<td>2.43</td>
<td>3.04</td>
<td>2.69</td>
</tr>
<tr>
<td>2016M04</td>
<td>3.86</td>
<td>8.89</td>
<td>2.27</td>
<td>3.23</td>
<td>2.71</td>
</tr>
<tr>
<td>2016M05</td>
<td>4</td>
<td>9.01</td>
<td>2.46</td>
<td>3.19</td>
<td>2.69</td>
</tr>
<tr>
<td>2016M06</td>
<td>3.65</td>
<td>9.21</td>
<td>2.54</td>
<td>3.12</td>
<td>2.73</td>
</tr>
</tbody>
</table>

NB: Data provide monthly for 155 foods
Minimal approach

Healthier vs less healthy foods: Food Price Index

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Minimal approach

Minimally processed vs ultra-processed foods:
Food Price Index

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Expanded approach

• Assesses differential between cost of ‘healthy’ and ‘less healthy’ meals and diets.

• Healthy options:
  • Need modelling of Global/Regional Foundation Diets for a reference household based on country food-based Dietary Guidelines and Food selection guides.
  • Need to translate Foundation Diets into standardised ‘healthy’ diets to construct ‘healthy’ menu plans for two weeks for the reference household.

• Unhealthy options:
  • Need quality dietary intake data (foods and nutrients)
  • Need to translate into current (unhealthy) diets to construct 'unhealthy' menu plans for two weeks for the reference household
  • Where dietary data are lacking, can substitute/replace foods in ‘healthy’ menu plans with standard/regular items

• The menu plans can be transcribed into lists ready for pricing, as per the ‘minimal’ approach.
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Optimal approach

• Assesses the affordability of ‘healthy’ and ‘less healthy’ diets at the household level

• Consists of the ‘expanded’ pricing tool as well as tools to collect / collate household income data

• Ideally access median disposable household income

• Ideally develop income measures, including welfare payments, for low socio-economic groups
Optimal approach: example 1. Healthy Diets ASAP-
Australian Standardised Affordability and Pricing- method protocol

Review previous national food and 'healthy' diet pricing methods

- High variability with over 11 different methods used
  - 39 reports and 24 journal articles
  - 59 discrete healthy food pricing surveys (state, regional, local)
  - 5 major and 6 minor methods
- Variation in results

Source: Lee A et al. Monitoring the price and affordability of foods and diets globally Obes Rev 2013;14 Suppl 1:82-95;
The INFORMAS approach

Optimal approach: Case study Healthy Diets ASAP methods protocol

Review previous national food and 'healthy' diet pricing methods: Findings

1. Relative food price by different locations
   • More expensive in rural and remote areas than in major cities

2. Relative food price by SES of area
   • Not significantly different in disadvantaged areas

3. Relative food price over time
   • Prices increase over time

4. Affordability of food over time
   • Relatively consistent
   • Overall ‘healthy’ baskets cost 25-40% of household income
   • Suggested affordability level of 30% of income

Results not comparable and difficult to use to inform policy

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Optimal approach: Case study Healthy Diets ASAP methods protocol

**Aim:** To develop a standardised approach to assess price, price differential and affordability of current (unhealthy) and healthy (recommended) diets in Australia, consistent with the INFORMAS optimal approach.

**Process:**
- Key stakeholder engagement critical
- Secured support-in-principle (2013); funded by TAPPC
- Identified 5 key components; involved key Qld Health staff in methods development
- Convened Food Pricing Workshop ISBNPA Edinburgh (2014)
- Consulted globally via INFORMAS meetings
- Collaborated with academic colleagues to finalise baskets
- Convened National Healthy Diets ASAP Methods Forum (2016) agreed on arbitrary decision points
- Applied final methods to reanalyze data for Sydney and Canberra
- Reported results to stakeholders, considered and incorporated feedback
- Published Protocols (2018), Sydney and Canberra results (2020), Qld results (2020)
- Modified protocols for special population groups

Lee et al, Monitoring the price and affordability of foods and diets globally Obes Rev : 2013; 14 Suppl 1:82-95;
-Lee et al, Testing the price and affordability of healthy diets, implication for public health policy, BMC Public Health 2016, 16:315
The INFORMAS approach

Optimal approach: Case study Healthy Diets ASAP methods protocol

1. Standardised Diet Pricing tools

<table>
<thead>
<tr>
<th>Foods comprising healthy (recommended) &amp; current (unhealthy) diet baskets, five households</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Food</th>
<th>Current (unhealthy) diet basket</th>
<th>Healthy (recommended) diet basket</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HH1</td>
<td>HH2</td>
</tr>
<tr>
<td>Bottled water, still</td>
<td>5948</td>
<td>3275</td>
</tr>
<tr>
<td>Artificially sweetened soft drink</td>
<td>2660</td>
<td>1419</td>
</tr>
<tr>
<td>(diet coke)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fruit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apples, red, loose (g)</td>
<td>5072</td>
<td>2774</td>
</tr>
<tr>
<td>Bananas, Cavendish, loose (g)</td>
<td>1741</td>
<td>606</td>
</tr>
<tr>
<td>Oranges, loose (g)</td>
<td>2496</td>
<td>1304</td>
</tr>
<tr>
<td>Fruit salad, canned in juice (g)</td>
<td>3819</td>
<td>1425</td>
</tr>
<tr>
<td>Fruit juice</td>
<td>4572</td>
<td>2367</td>
</tr>
<tr>
<td>Vegetables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potato, white, loose (g)</td>
<td>2181</td>
<td>944</td>
</tr>
<tr>
<td>Sweetcorn, canned, no added salt (g)</td>
<td>427</td>
<td>130</td>
</tr>
<tr>
<td>Broccoli, loose (g)</td>
<td>620</td>
<td>277</td>
</tr>
<tr>
<td>White cabbage, loose (g)</td>
<td>331</td>
<td>141</td>
</tr>
<tr>
<td>Iceberg lettuce, whole (g)</td>
<td>1071</td>
<td>468</td>
</tr>
<tr>
<td>Carrot, loose (g)</td>
<td>1130</td>
<td>583</td>
</tr>
<tr>
<td>Pumpkin (g)</td>
<td>407</td>
<td>154</td>
</tr>
<tr>
<td>Four bean mix, canned (g)</td>
<td>111</td>
<td>50</td>
</tr>
<tr>
<td>Diced tomatoes, canned, in tomato juice(g)</td>
<td>308</td>
<td>141</td>
</tr>
<tr>
<td>Onion, brown, loose (g)</td>
<td>124</td>
<td>37</td>
</tr>
<tr>
<td>Tomatoes, loose (g)</td>
<td>712</td>
<td>301</td>
</tr>
<tr>
<td>Frozen mixed vegetables, prepared</td>
<td>124</td>
<td>37</td>
</tr>
</tbody>
</table>
Current (unhealthy) Australian Diet, Household of 4 per fortnight

31,330 kJ
Healthy Australian Diet, Household of 4 per fortnight

- 29,450 kJ
- GHGe 25% less
- Less water use
- Greater biodiversity
- More equitable
The INFORMAS approach

Optimal approach: Case study Healthy Diets ASAP methods protocol

2. Standardised Price Collection forms (now web interface and program)

<table>
<thead>
<tr>
<th>Food</th>
<th>Specific brand</th>
<th>Your brand</th>
<th>Specific size</th>
<th>Your size</th>
<th>Your cost</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bottled water, still</td>
<td></td>
<td></td>
<td>600mL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fresh fruit &amp; vegetables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meats &amp; dairy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pantry items</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chilled &amp; frozen foods</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chips, chocolates, biscuits etc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Take away foods</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Branded products</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Collect:
- in store
- online
- i-pad

https://healthydiets.azurewebsites.net/Collect
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Optimal approach: Case study Healthy Diets ASAP methods protocol

3. Standardised price collection protocols

1. Record the usual price of an item, i.e. not the sale/special price unless it is the only price available (if so, note in comment column);
2. Look for the specified brand and specified size for each food item, and record the price on the form:
   • If the specified brand is not available: choose the cheapest brand (non-generic) available in the specified size. Note this brand in the “Your brand” column;
   • If the specified size is not available: choose the nearest larger size in the specified brand. If a larger size is not available, choose the nearest smaller size. Note this size in the “Your size” column;
   • If both the specified brand and specified size are not available: Choose the cheapest in the nearest larger size of another brand (non-generic). If a larger size is not available, choose the nearest smaller size;
   • If multiple brands are specified, record the price of the cheapest one and note brand in the “Your brand” column;
   • If the item is only available in a generic form (e.g. Home Brand, Coles, Woolworths Select, Black and Gold) choose the most expensive generic item in the specified size. If the specified size is not available, choose the nearest larger size. If a larger size is not available, choose the nearest smaller size. Note the generic name in the “Your brand” and the size in the “Your size” columns.
3. Loose produce: choose the usual cheapest price per kg of the variety not on special. If the only variety available is on special, record the special price and note in comments column.
4. Peanuts: choose the branded packet size closest to 250g. If packaged, roasted, unsalted peanuts are not available, record the price of the loose ‘bulk – scoop & weight’ roasted, unsalted peanuts per 100g.
5. Check all data are recorded as above before leaving the store.
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Optimal approach: Case study Healthy Diets ASAP methods protocol

4. Standardised methods to estimate household income

A. Standardised protocols to calculate median household income in each SA2 area

- ABS 2011 Census Community Profiles

B. Standardised protocol to calculate low household income

- Dept. Human Services
  - Payment Finder
  - Rate Estimator
- Standard assumptions
- Payments change with policy change (including COVID)
- Minimum wage rates
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Optimal approach: Case study Healthy Diets ASAP methods protocol

5. Standardised protocols for representative sampling

- SA2 level locations in each city were stratified by SEIFA quintile

- 2 SA2 locations within SEIFA quintiles 1, 3 & 5 were randomly selected
- Food outlets within 7km by car of the centre of each SA2 area were identified with Google Maps and included
- Stores included all supermarkets, relevant fast food outlets, two liquor outlets & an independent bakery
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Optimal approach: Case study Healthy Diets ASAP methods protocol

[Image of Deception Bay 2020 Location Report]

[Images of Healthy Diet Collections and Healthy Net Costs]

[Image of Deception Bay 2020 Location Report]

[Images of Healthy Diet Collections and Healthy Net Costs]
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Optimal approach: Case study Healthy Diets ASAP methods protocol
Optimal approach: Case study Healthy Diets ASAP Results

Healthy Diets ASAP (Australian Standardised Affordability and Price) protocols

Food choice influenced by:
- Price?
- Convenience?
- Advertising/promotion?
- Availability?
- 'Entertainment'?
- Taste?
The INFORMAS approach

Optimal approach: Case study Healthy Diets ASAP Results
Queensland 2019

Summary Results Brief
Healthy Diet Cost and Affordability in Queensland

INFORMAS
Benchmarking food environments

Research Excellence in Food Retail Environments for Health (RE-FRESH)
Healthy Diet ASAP: Results
Application: use by Aboriginal communities

- Price comparisons between healthy diets and current (unhealthy) diets in April 2018
- As a result, the store group, Mai Wiru reduced costs of key healthy foods and water by cross-subsidisation
- Prices had increased for both healthy diet (2%) and current diet (5%) since April 2018.
- On average a healthy diet costs 15% less than current diet on the APY Lands (saving families more than $100 every fortnight)

Increased cost of diet with potential change to Australian taxation system, Household (2 adults and 2 children)

Extend GST base (10%) to include basic healthy foods
The INFORMAS approach

Optimal approach: Case study Healthy Diets ASAP Application

Increased cost of diet with potential change to Australian taxation system, Household (2 adults and 2 children)

- Extend GST base (10%) to include basic healthy foods
- Increase level of GST to 15%

- Discretionary food and drinks
- Core healthy foods

Re:think
Tax discussion paper
March 2016
Better tax system, better Australia
Optimal approach: Case study Healthy Diets ASAP Application

Increased cost of diet with potential change to Australian taxation system, per household (2 adults and 2 children)

- Extend GST base (10%) to include basic healthy foods
- Increase level of GST to 15%
- Increase level of GST to 20%
Affordability of healthy diets with COVID supplement

Household: Two parent, two children
Optimal approach: Case study Healthy Diets ASAP Limitations

- No adjustment for marked under-reporting in the AHS 2011-12
- Based on national mean intake so doesn’t focus on diet reported by different groups eg vegetarians and cost may not reflect actual expenditure in specific areas
- Minimal adjustment for greater proportion of pre-prepared convenience items
- Based on Foundation diets in adults not Total diets, given 65% Australian adults are overweight and obese
- No adjustment for total energy as energy is a determinant (produces spurious data)
- No allowance for wastage (of edible portion)
- No control for quality of fresh produce
- Nutritionally similar products with similar utility are aggregated to minimize number of items included in both baskets, but products may not be homogenous in term of price
- Includes same quantity of bottled water in both diet basket pricing tools
- No adjustment for externalities such as transport, cooking equipment, utilities..。
- Assume food shared equitably throughout household
- Assume minimal home production
- Handling missing items (availability/accessibility)
- Arbitrary definitions of family, household, income
- Arbitrary sampling frameworks, SA2, stores
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Optimal approach: example 2- DIETCOST

DIETCOST

Modelling the cost differential between healthy versus current, less healthy diets

Sally Mackay

Acknowledgements:
Stefanie Vandevijvere

https://youtu.be/xveDnFXUhuY


The INFORMAS approach

Optimal approach: example 3

Cost different % UPF and % MPF in diets in Belgium

• Nationally representative Belgian food consumption survey (FCS) 2014/15, including 992 children of 3–9 years, 928 adolescents of 10–17 years and 1226 adults of 18–64 years

• Two non-consecutive 24-hour dietary recalls (records for children) using GloboDiet © software

• SES assessed through highest education level of the household

• Food prices data
  • Average (over the entire year 2014) prices for >2000 different food items as per the FCS, including fresh products, were retrieved from the GfK ConsumerScan panel, which includes a representative sample of 5000 Belgian households

The INFORMAS approach

Optimal approach: example 3

<table>
<thead>
<tr>
<th>NOVA groups</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1) Unprocessed or minimally processed foods</strong></td>
<td></td>
</tr>
<tr>
<td>Edible parts of plants and animals after separation from nature or preserved by minimal processes (no substances added)</td>
<td>![Images of fruits, vegetables, milk, and chicken]</td>
</tr>
<tr>
<td><strong>2) Processed culinary ingredients</strong></td>
<td></td>
</tr>
<tr>
<td>Substances extracted from foods or nature and used to prepare, cook and season Group 1 foods</td>
<td>![Images of olive oil, butter, Morton salt, and Domino sugar]</td>
</tr>
<tr>
<td><strong>3) Processed foods</strong></td>
<td></td>
</tr>
<tr>
<td>Group 1 foods modified with the addition of Group 2 ingredients aiming food preservation and/or enhancement of its sensory qualities</td>
<td>![Images of peanuts, bread, peanut butter, and coffee]</td>
</tr>
<tr>
<td><strong>4) Ultra-processed foods</strong></td>
<td></td>
</tr>
<tr>
<td>Formulations of several ingredients that include original or chemically modified food substances obtained with the fractioning of whole foods and additives used to make the final product palatable or hyper-palatable. The aim is to make convenient, tasteful and low cost products liable to replace all other NOVA food groups</td>
<td>![Images of Coca-Cola, Tang, Oreo, and Kelloggs Rice Krispies]</td>
</tr>
</tbody>
</table>

## Optimal approach: example 3

### Results: %E from UPF and MPF in Belgium

<table>
<thead>
<tr>
<th>Population Group</th>
<th>N</th>
<th>Mean</th>
<th>95%CI</th>
<th>P75</th>
<th>P95</th>
<th>Mean</th>
<th>95%CI</th>
<th>P75</th>
<th>P95</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All</strong></td>
<td>3146</td>
<td>29.9</td>
<td>29.0–30.8</td>
<td>38.9</td>
<td>53.3</td>
<td>21.3</td>
<td>20.7–21.9</td>
<td>26.9</td>
<td>38.7</td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Females</td>
<td>1598</td>
<td>29.7</td>
<td>28.7–31.2</td>
<td>38.0</td>
<td>51.5</td>
<td>22.9</td>
<td>22.2–23.7</td>
<td>28.6</td>
<td>40.2</td>
</tr>
<tr>
<td>Males</td>
<td>1548</td>
<td>29.9</td>
<td>28.6–31.2</td>
<td>39.5</td>
<td>54.6</td>
<td>19.6</td>
<td>18.8–20.4</td>
<td>24.9</td>
<td>36.4</td>
</tr>
<tr>
<td><strong>Age category</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3–9 years</td>
<td>992</td>
<td>33.3</td>
<td>32.1–35.0</td>
<td>44.4</td>
<td>60.3</td>
<td>20.1</td>
<td>19.3–20.7</td>
<td>25.4</td>
<td>36.8</td>
</tr>
<tr>
<td>10–17 years</td>
<td>928</td>
<td>29.2</td>
<td>27.7–30.3</td>
<td>39.3</td>
<td>54.7</td>
<td>17.9</td>
<td>17.4–18.7</td>
<td>22.8</td>
<td>33.2</td>
</tr>
<tr>
<td>18–64 years</td>
<td>1226</td>
<td>29.6</td>
<td>28.5–30.7</td>
<td>38.2</td>
<td>51.8</td>
<td>22.0</td>
<td>21.2–22.7</td>
<td>27.7</td>
<td>39.5</td>
</tr>
<tr>
<td><strong>Education level</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>1290</td>
<td>30.5</td>
<td>28.6–31.5</td>
<td>39.0</td>
<td>52.0</td>
<td>19.9</td>
<td>19.2–20.9</td>
<td>25.4</td>
<td>37.9</td>
</tr>
<tr>
<td>Medium</td>
<td>885</td>
<td>29.9</td>
<td>28.0–31.4</td>
<td>40.2</td>
<td>56.4</td>
<td>21.4</td>
<td>20.2–22.5</td>
<td>27.1</td>
<td>39.1</td>
</tr>
<tr>
<td>High</td>
<td>916</td>
<td>30.5</td>
<td>28.9–31.9</td>
<td>38.8</td>
<td>52.0</td>
<td>22.8</td>
<td>21.8–23.8</td>
<td>28.1</td>
<td>38.2</td>
</tr>
</tbody>
</table>

%E from UPF highest among children
%E from MPF higher among high versus low SES
Results: Cost differential (EUR/2000 kcal) between diets with higher and lower proportions of E from UPF and MPF

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Estimate</th>
<th>SE</th>
<th>p</th>
<th>Parameter</th>
<th>Estimate</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPF 2 medium %E</td>
<td>0.12</td>
<td>0.13</td>
<td>0.35</td>
<td>MPF 2 medium %E</td>
<td>0.61</td>
<td>0.11</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>UPF 3 highest %E</td>
<td>-0.37</td>
<td>0.13</td>
<td>0.006</td>
<td>MPF 3 highest %E</td>
<td>1.18</td>
<td>0.12</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>UPF 1 lowest %E</td>
<td>(ref)</td>
<td></td>
<td></td>
<td>MPF 1 lowest %E</td>
<td>(ref)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex: female</td>
<td>0.43</td>
<td>0.09</td>
<td>&lt;0.0001</td>
<td>Sex: female</td>
<td>0.46</td>
<td>0.09</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Age group: children</td>
<td>-1.47</td>
<td>0.08</td>
<td>&lt;0.0001</td>
<td>Age group: children</td>
<td>-1.43</td>
<td>0.08</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Age group: adolescents</td>
<td>-1.46</td>
<td>0.08</td>
<td>&lt;0.0001</td>
<td>Age group: adolescents</td>
<td>-1.44</td>
<td>0.08</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Household EL: medium</td>
<td>0.30</td>
<td>0.11</td>
<td>0.005</td>
<td>Household EL: medium</td>
<td>0.27</td>
<td>0.10</td>
<td>0.009</td>
</tr>
<tr>
<td>Household EL: high</td>
<td>0.34</td>
<td>0.12</td>
<td>0.0006</td>
<td>Household EL: high</td>
<td>0.26</td>
<td>0.12</td>
<td>0.030</td>
</tr>
<tr>
<td>Household EL: low</td>
<td>(ref)</td>
<td></td>
<td></td>
<td>Household EL: low</td>
<td>(ref)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>region 2: Brussels</td>
<td>0.18</td>
<td>0.16</td>
<td>0.27</td>
<td>region 2: Brussels</td>
<td>0.09</td>
<td>0.1</td>
<td>0.55</td>
</tr>
<tr>
<td>region 3: Wallonia</td>
<td>-0.06</td>
<td>0.09</td>
<td>0.53</td>
<td>region 3: Wallonia</td>
<td>-0.08</td>
<td>0.09</td>
<td>0.39</td>
</tr>
<tr>
<td>region 1: Flanders</td>
<td>(ref)</td>
<td></td>
<td></td>
<td>region 1: Flanders</td>
<td>(ref)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SE: standard error; Ref: reference category.

Diets with a larger caloric share of UPF were significantly cheaper than those with a lower contribution of these products, while the opposite was found for MPF.
<table>
<thead>
<tr>
<th>Country (approach)</th>
<th>Methods</th>
<th>Results</th>
<th>Comments</th>
</tr>
</thead>
</table>
| **Argentina (Optimal)** | • Commonly consumed foods purchased by at least 5% of households in the Household Expenditure Survey.  
• Modelled diets with Excel Solver  
• Monte Carlo simulation of 10,000 product options/diet types  
• Calculated affordability by comparing to the average reference household income for all households, for poor and extremely poor households and per household income deciles. | • The healthy diet cost more than the current diet for both equal energy and when the healthy diet had less energy.  
• 40% of the population could not afford the current diet, let alone the healthy diet. | Submitted to BMC Public Health |
| **Mexico (Optimal)** | • Costed two-weekly household menus using DIETCOST  
• Menus followed a) existing Mexican Dietary Guidelines  
  b) the EAT-Lancet recommendations  
  c) the current intake of the Mexican Nutrition Survey  
• Costed different energy intakes | • N/A | Not yet published  
Exploring focus on sustainability |
| **Brazil (Minimal)** | • Focus on food prices rather than diets to date.  
• Used Brazilian Household Budget Survey 2008-2009 | • Mean price foods in supermarkets 37% lower than other stores  
• Share UPF in purchases at supermarkets 25% higher than other stores  
• Inverse association between price of UPF (per kg) and prevalence of overweight and obesity, mainly in the lowest socioeconomic groups  
• Caloric share of PF & UPF in UK (63.4%) higher than Brazil (27.7%), but their cost relative to the remainder | • Machado et al, 2017  
• Passes et al, 2020  
• Moubarac et al, 2013 |
What is the best approach for your country?

To answer this need to know:

**Contextual information:**
- Dietary habits and food preferences?
- Do people grow their own food?
- Where do people buy food?
- Do people cook and/or eat out?
- What factors affect food prices eg taxes, subsidies?
- Does your country have a food and nutrition policy?

**Specific information:**
1. Do you know what people eat?
2. What about people of different ages, gender, socio-economic status, geographic area etc?
3. Do you have food-based dietary guidelines? or a Food Guide?
4. If so, do people follow these? What differences are there?
5. Do you have other dietary recommendations?
6. What about environmental sustainability?
7. What is the median household income?
8. Are other data on household income available?
9. What relevant policies are in place?
What is the best approach for your country?

For example- can we use the minimal approach:

Can you conduct the minimal approach?

- What data do you have?
- Can you identify the commonly eaten foods?
- How can you categorise foods?
- Are prices available over time?
What is the best approach for your country?

For example- can we use the optimal approach:

- National nutrition survey
- Gender
- Age
- Amounts of all food and drinks reported in 24 hour recall
- Current diet: Aggregate amounts per fortnight (nutritionally similar representative food and drinks)
- Develop food lists to cost
- Collect prices in food outlets
- Or
- Model common foods within Energy and nutrient requirements
- Dietary Guidelines OR Model healthy, sustainable, equitable diets per fortnight
- Or
- Scrape electronic price data
INFORMAS Food Price and Affordability Module

Questions?
Thank you

MEALS for NCD prevention

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