INFORMAS Food Price and Affordability Module

MEALS for NCD prevention

First Africa Food Environment Research Meeting

November 2020

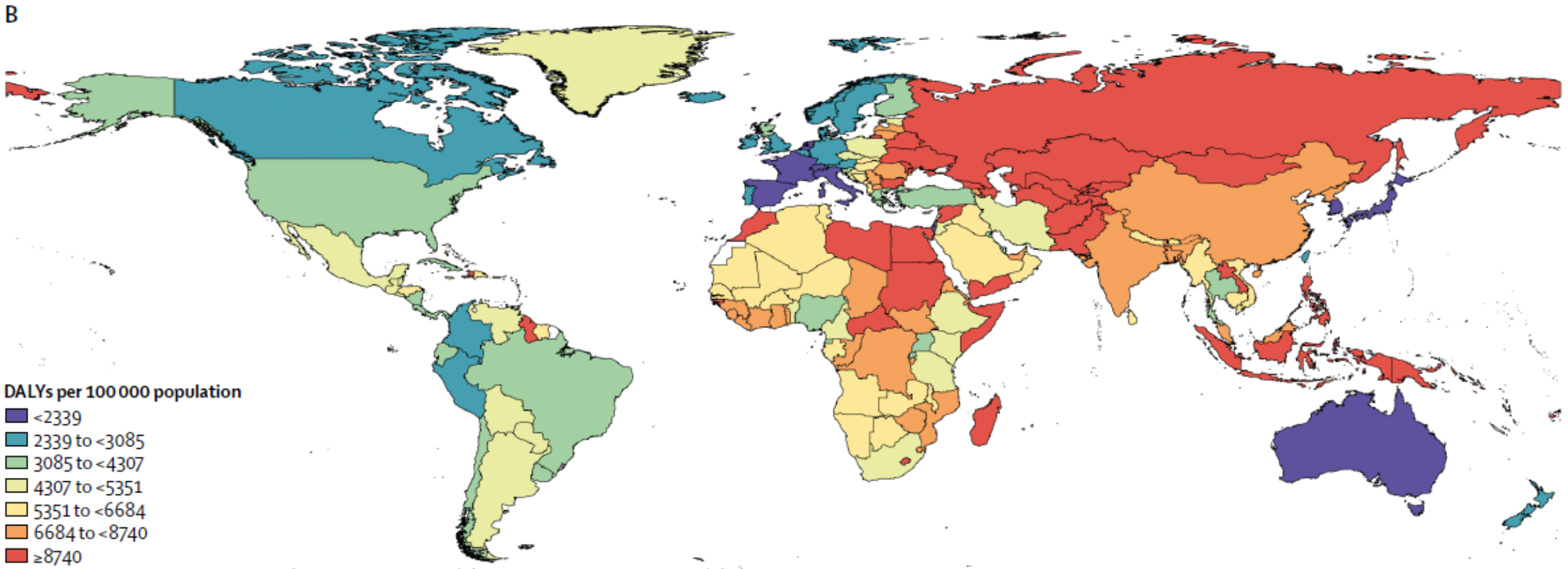
Amanda Lee
Prof Public Health Policy | Head of Division Health Promotion and Equity
Affiliate Prof | UQ Poche Centre for Indigenous Health
School of Public Health | Faculty of Medicine
Lead, INFORMAS Food price and affordability module
Amanda.Lee@uq.edu.au
@_Amanda_J_Lee_

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

State of diet-related health globally

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

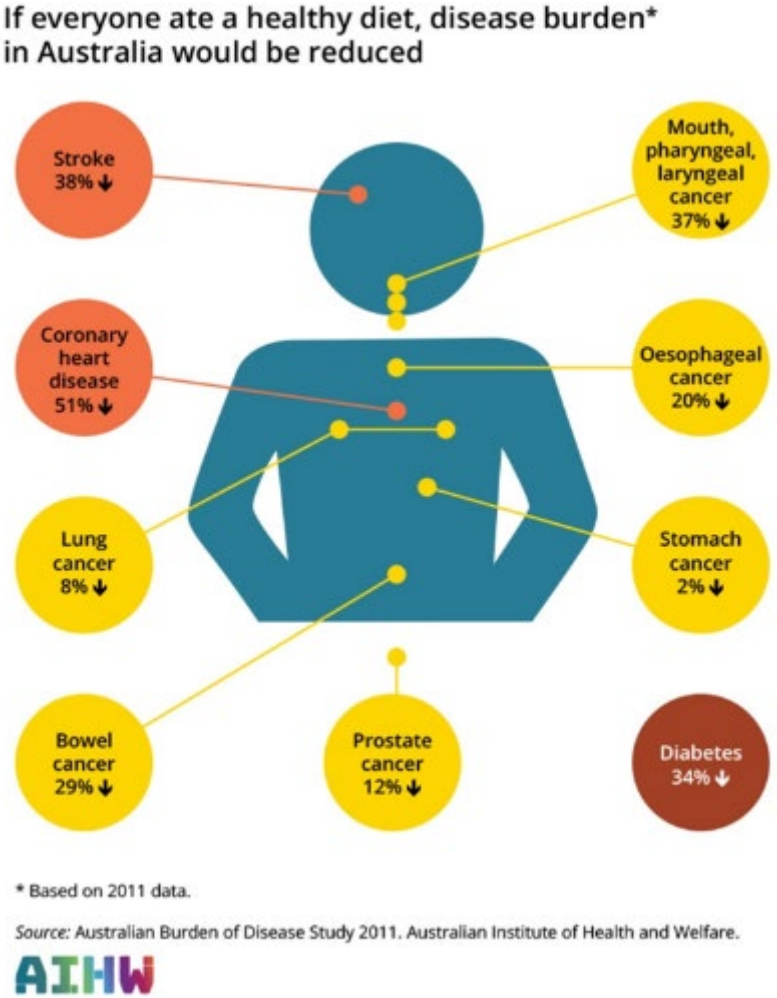


- Globally, 22% deaths and 15% DALYs are attributable to dietary risks
- Higher in Africa

Source: GBD 2017 Collaborators, Health effects of dietary risks in 195 countries, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017, the Lancet, published 3 April 2019 DOI: https://doi.org/10.1016/S0140-6736(19)30041-8

More recent data: GBD Collaborators 2019, Global burden of 87 risk factors in 204 countries and territories, 1990–2019: a systematic analysis for the Global Burden of Disease Study 2019, The Lancet, published 17 October 2020, DOI:https://doi.org/10.1016/S0140-6736(20)30752-2

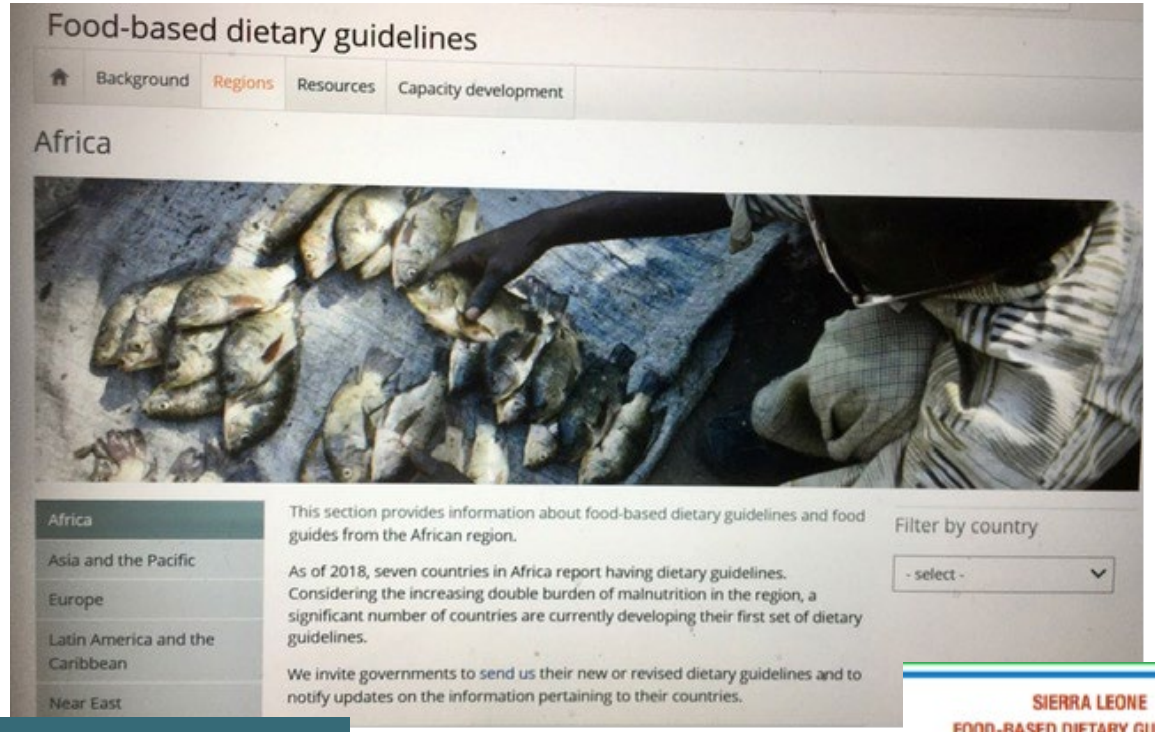
What should people eat?

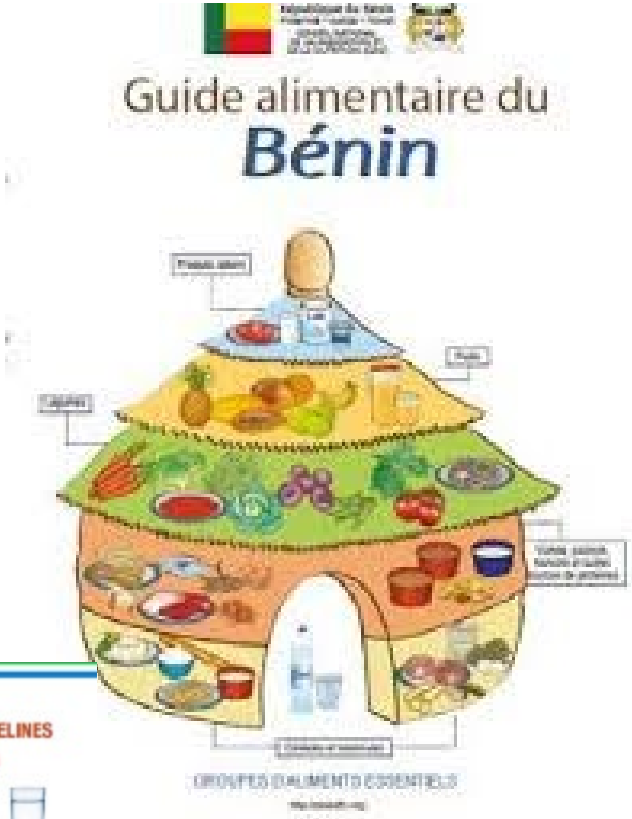


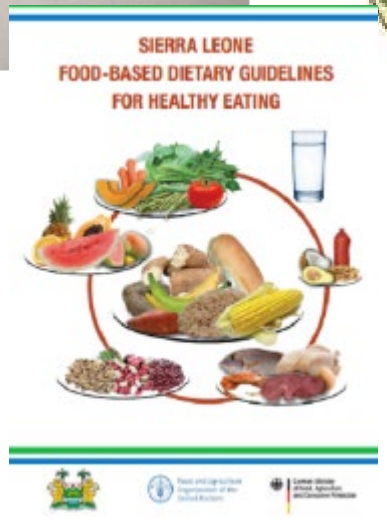
..and GHG would decrease by 25%...

THE UNIVERSITY OF QUEENSLAND AUSTRALIA

What should people eat?







But, what are people eating?

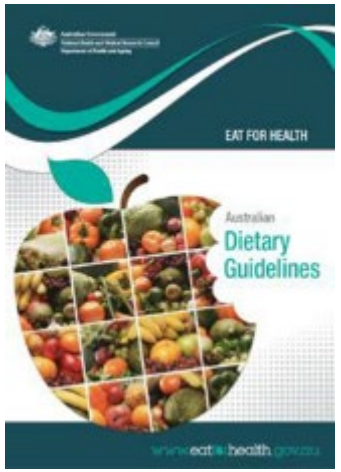
E.g. <1% of population follow Dietary Guidelines in Australia…

Scorecard :
Proportion Australians eating recommended

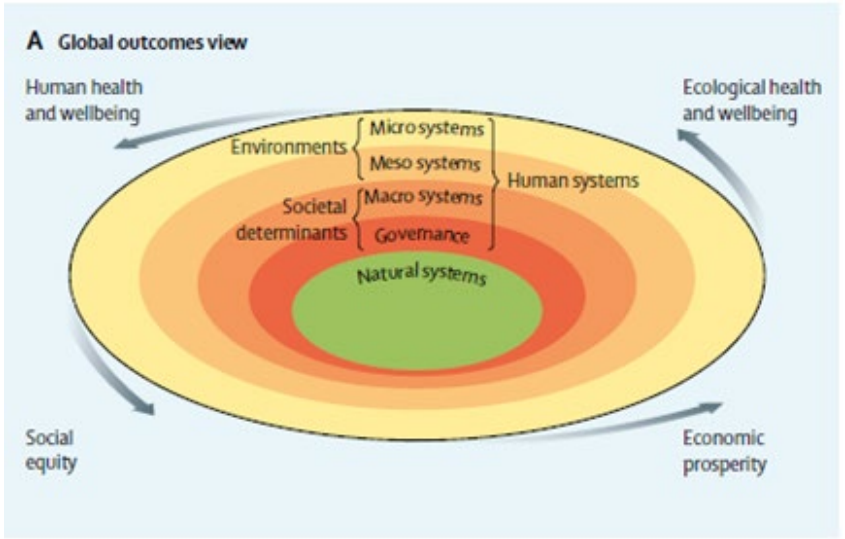
Australian Health Survey, 2011-12

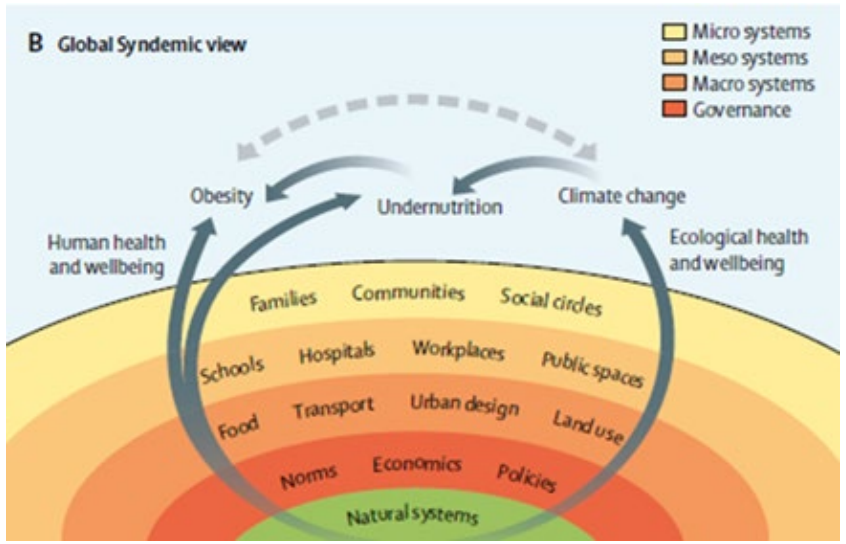
Radical dietary transformation is required

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



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**

Source: The Global Syndemic of Obesity, Undernutrition, and Climate Change: The Lancet Commission report. Available at: https://www.thelancet.com/commissions/global-syndemic

Factors affecting food choice

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

?

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

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

Sources: Lee A et al. Monitoring the price and affordability of foods and diets globally Obes Rev 2013;14 Suppl 1:82-95;
Hawkes C et al Obesity 2-Smart Food policies for Obesity Prevention The Lancet Published on line 18 February 2015;
Thow AM et al. A systematic review of the effectiveness of food taxes and subsidies to improve diets: understanding the recent evidence. Nutrition Reviews2014:72:551-565; WHO Fiscal Policies for Diet and Prevention of Non-communicable Diseases October2016

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

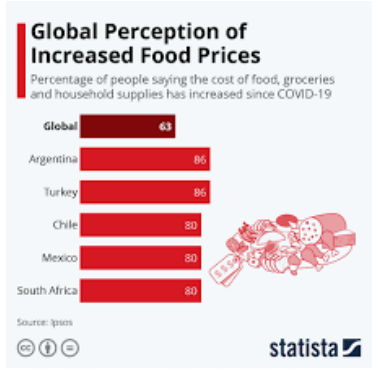
Major global food price indicators

- 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:

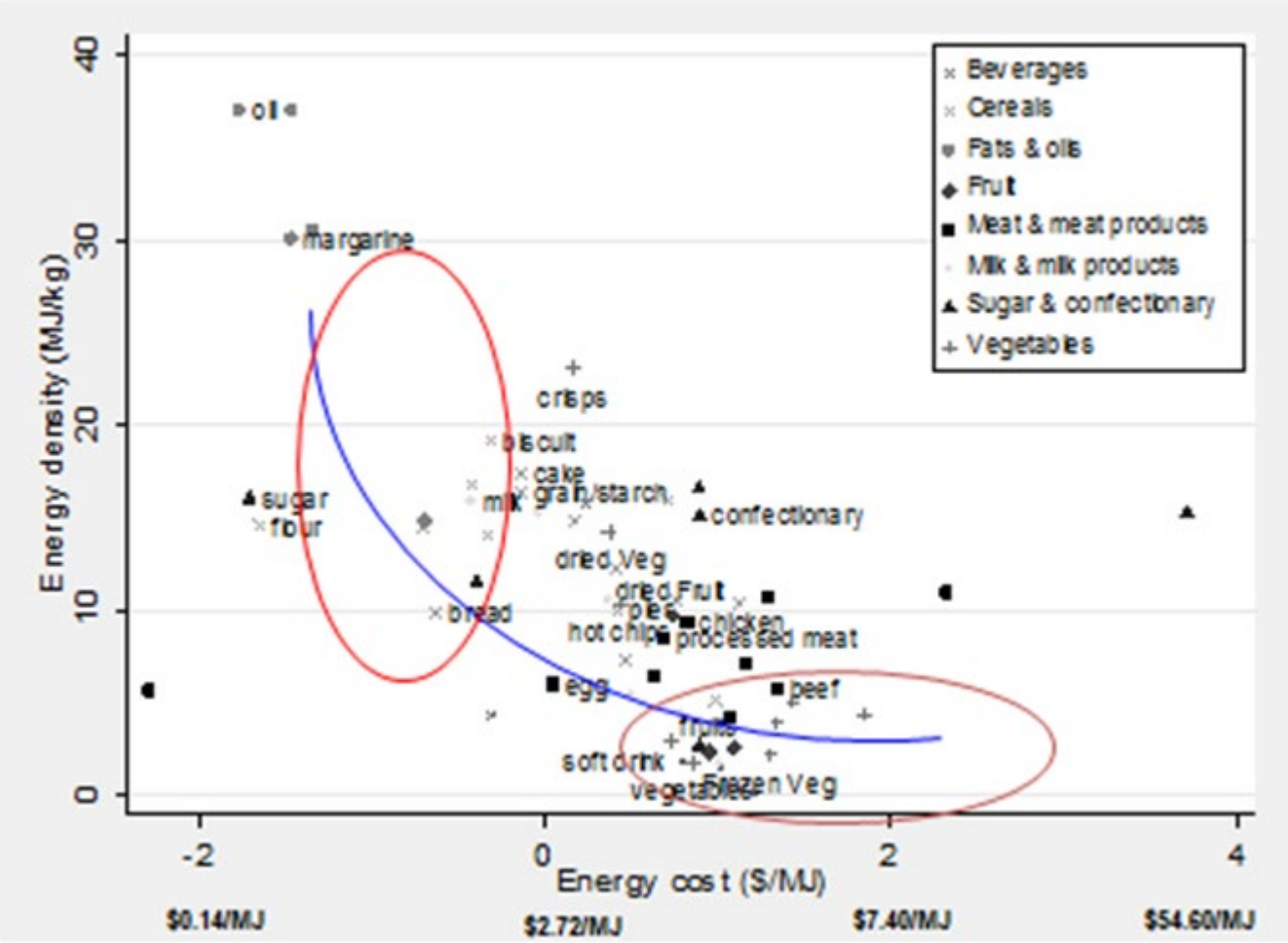
- Costed food items can be limited, highly selected and highly aggregated
- Tension between requirements re stability for time series and currency
- Reported regularly by few countries as CPI (foods)
- Very few countries currently estimate or report CPI (healthy foods)
  - eg. assessed once in Australia 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

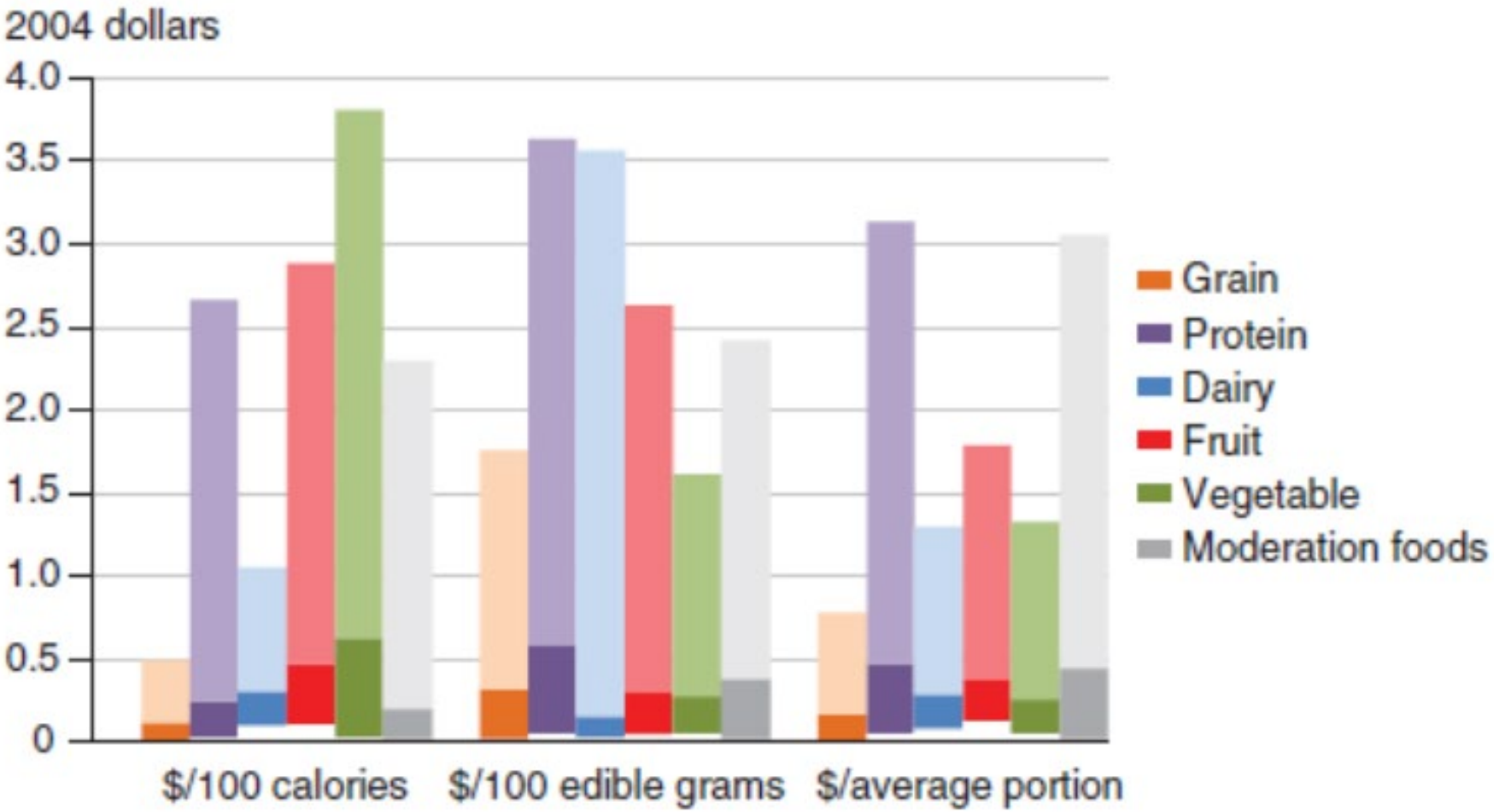


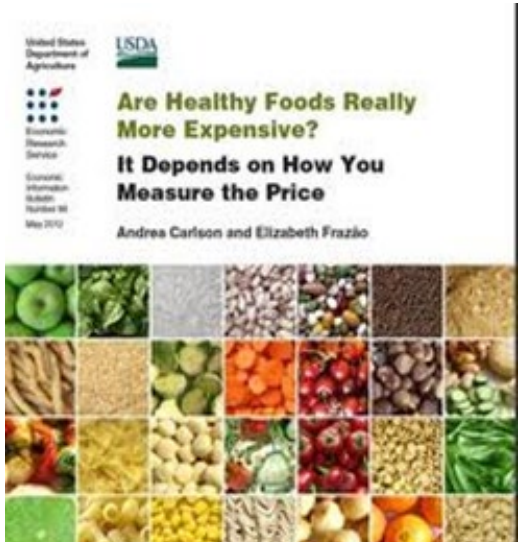
- Results are usually reported on the basis of energy cost ($/kJ) per energy density.
- This is spurious due to statistical coupling
- Leads to circular reasoning

Brimblecombe and O'Dea MJA 2009; ; slide courtesy K O'Dea

Drewnowski and Darmon, AJCN, 2005

The relative price of 'healthy' and 'unhealthy' foods varies with the method of measurement (units reported)

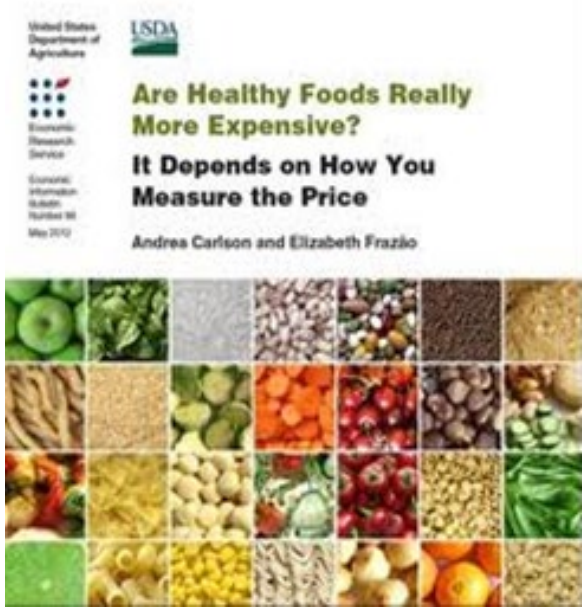




Source: Carlson, Andrea, and Elizabeth Frazão. Are Healthy Foods Really More Expensive? It depends on How You Measure the Price, EIB-96, U.S. Department of Agriculture, Economic Research Service, May 2012.

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

Unit	Result
Energy	"Core" 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
Edible weight	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
Average portion size	Grains, dairy, vegetables and fruit are less expensive than: -most protein foods (meat, poultry, fish, eggs, peanut butter) - most energy-dense nutrient-poor foods



- 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: -Carlson, Andrea, and Elizabeth Frazão. Are Healthy Foods Really More Expensive? It depends on How You Measure the Price, EIB-96, U.S. Department of Agriculture, Economic Research Service, May 2012.
-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

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

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?

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

Less healthy meal	Healthier meal
Take away fried chicken and chips 	Grilled chicken and potatoes 
Take away hamburger 	Home made hamburger 
Hot potato chips 	Boiled/baked potatoes 
Fried dough 	Fresh breads  
Take-away curry 	Home-made curry 
Fried rice 	Mixed rice 
Desert cake 	Fruit 

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?

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**

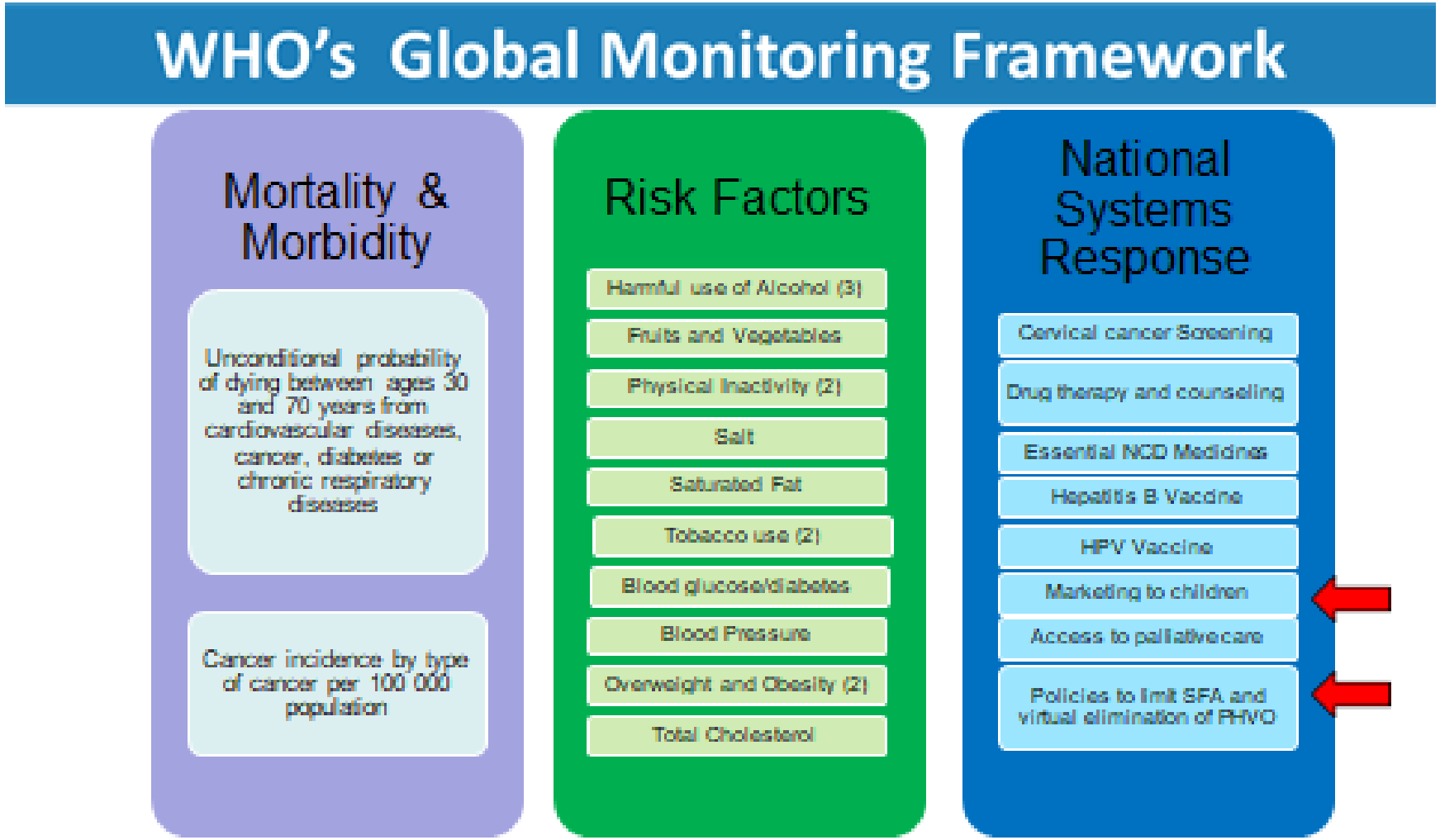
- **Range of measures available:**
  - median household income (OECD 2011)
  - disposable household income (Luxembourg Income Study 2012)
  - household budget survey data (European Commission 2005)
  - household expenditure and income data for transitional economies (The World Bank 2012)
  - several 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

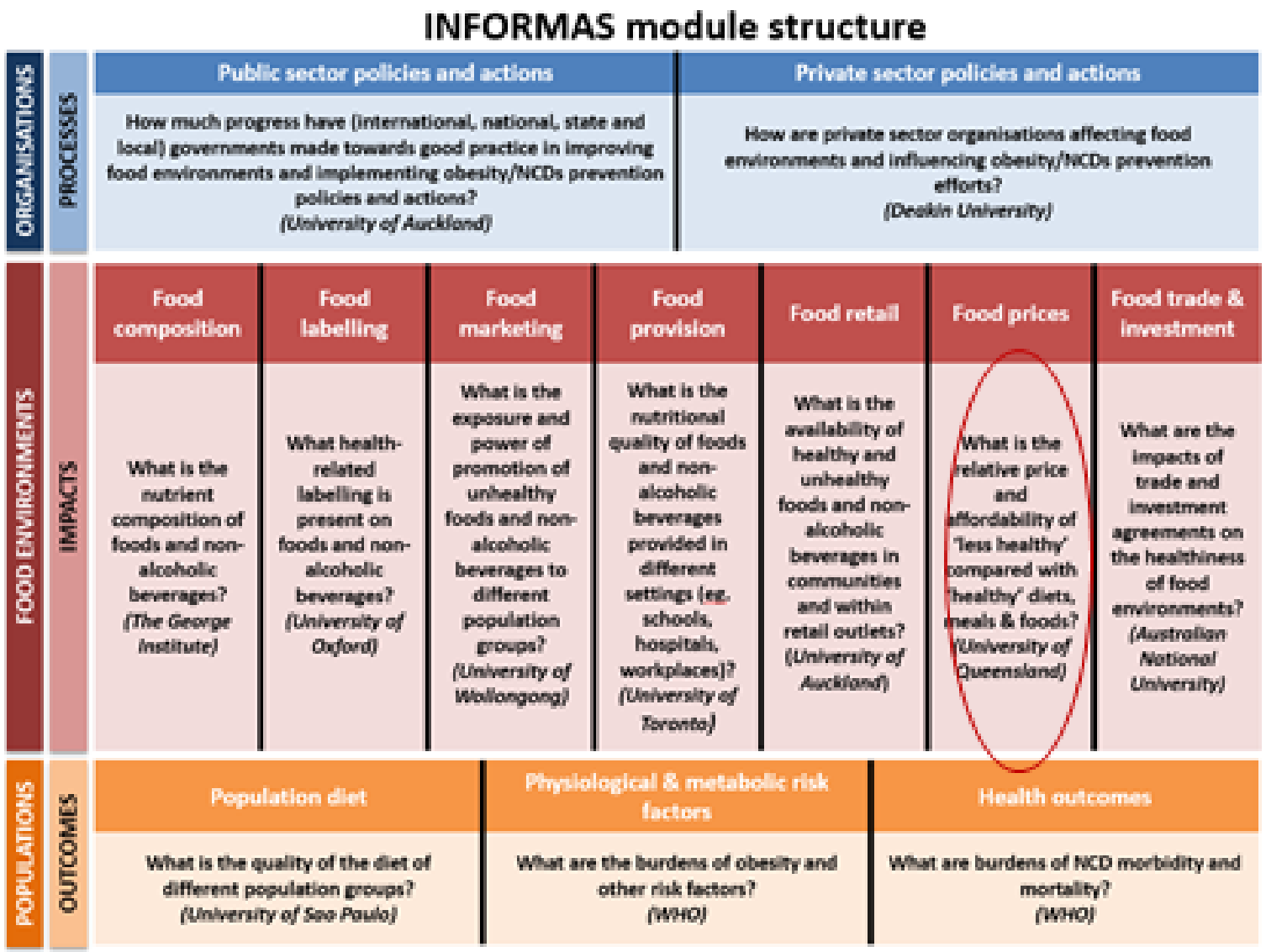


? Other Aspects of Food Environments?

The INFORMAS approach

INFORMAS
Benchmarking food environments

- 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



obesityreviews

Source: http://onlinelibrary.wiley.com/doi/10.1111/obr.2013.14.issue-s1/issuetoc

THE UNIVERSITY OF QUEENSLAND AUSTRALIA

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?

INFORMAS

Benchmarking food environments

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

	'Minimal' approach	'Expanded' approach	'Optimal' approach
Indicator	Differential between the price of selected 'healthy' foods and 'less healthy' foods	Differential between the price of 'healthy' diets and meals, and 'less healthy' diets and meals	Affordability of 'healthy' and 'less healthy' diets and meals
Data sources	Retail prices of foods Nutrient profiling system to differentiate nutritional quality of comparable foods	Relevant country dietary guidelines and national dietary intake data (where available) Relevant country food composition tables, dietary modelling and/or food selection guides (where available)	As 'expanded' approach together with median household income data
Analysis	Comparison of the cost (and tax component) of 'healthy' and 'less healthy' equivalent foods	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)	As for 'expanded' but expressed as costs in relation to median household income
Stratification	No stratification	Stratification by region	Stratification by region and by household socioeconomic status
Representativeness	Country-wide	Country-wide/regional	Country-wide/regional Socioeconomic groups

INFORMAS
Benchmarking food environments

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

Minimal approach

INFORMAS
Benchmarking food environments

THE UNIVERSITY OF AUCKLAND
Te Whare Wānanga o Tāmaki Makaurau
NEW ZEALAND
MEDICAL AND HEALTH SCIENCES

INFORMAS minimal approach

Pairs	Compare the cost of pairs of healthy foods and unhealthy foods* OR similar items with a difference in nutrient content
Food groups	Price changes **over time** of healthy foods and unhealthy foods*
Degree of processing	Change in price **over time** of minimally processed, processed and ultra-processed foods

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

THE UNIVERSITY OF QUEENSLAND AUSTRALIA

Minimal approach

INFORMAS
Benchmarking food environments

Choosing food pairs

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

* But which nutrient to privilege?

THE UNIVERSITY OF QUEENSLAND AUSTRALIA

Minimal approach

INFORMAS
Benchmarking food environments

Sources of data on food prices

Data source	Advantages	Disadvantages
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

INFORMAS
Benchmarking food environments

THE UNIVERSITY OF AUCKLAND
Te Whare Wānanga o Tāmaki Makaurau
NEW ZEALAND

MEDICAL AND HEALTH SCIENCES

Minimal Approach: Changes in prices over time

Example from New Zealand using Food Price Index

Source: Mackay et al Ten-year trends in the price differential between healthier and less healthy foods in New Zealand, Nutrition & Dietetics 2018, DOI: 10.1111/1747-0080.12457

THE UNIVERSITY OF QUEENSLAND AUSTRALIA

INFORMAS
Benchmarking food environments

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

Food groups
Fruit
Vegetables
Meat
Seafood
Grains
Dairy/eggs
Oils/fats
Condiments
Snacks
Other grocery
Ready-to-eat foods
Hot and cold beverages

THE UNIVERSITY OF QUEENSLAND AUSTRALIA

INFORMAS
Benchmarking food environments

Minimal approach

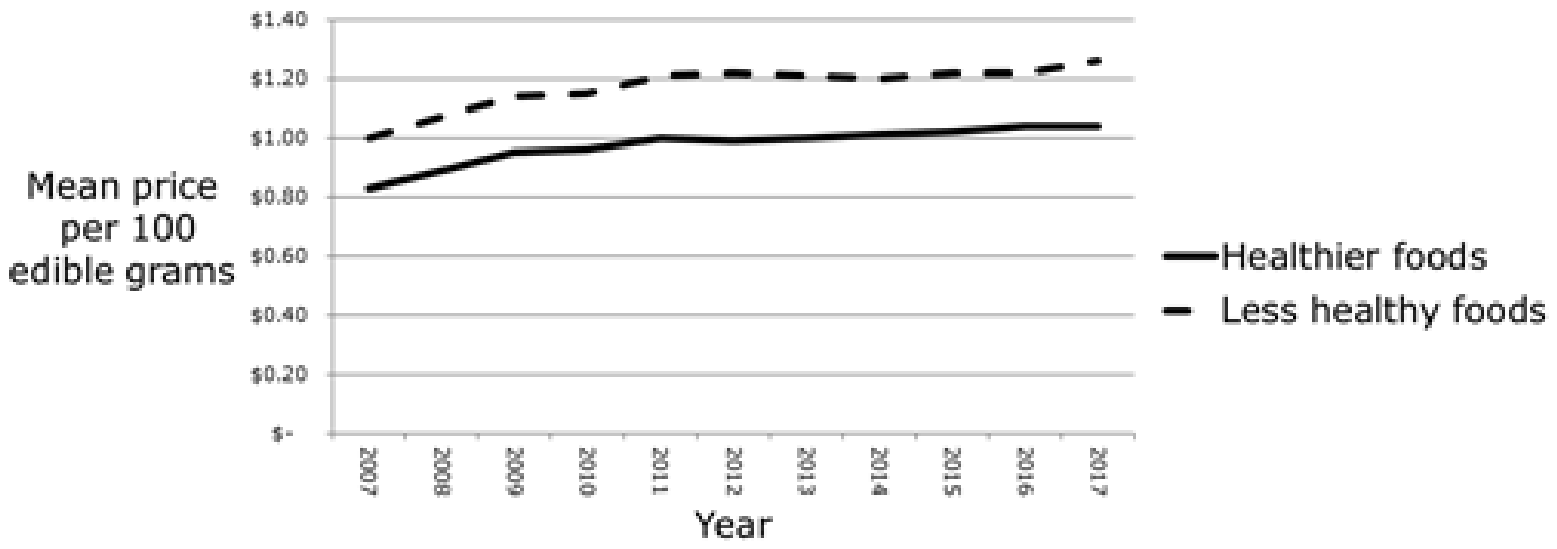
Example of data from Statistics NZ

Month	Apples 1kg ($)	Beef mince 1kg	Biscuits 200g	Eggs, dozen	Meat pie, each
2016MO1	3.9	8.54	2.50	3.12	2.68
2016MO2	3.94	8.42	5.45	3.15	2.68
2016MO3	3.85	8.63	2.43	3.04	2.69
2016MO4	3.86	8.89	2.27	3.23	2.71
2016MO5	4	9.01	2.46	3.19	2.69
2016MO6	3.65	9.21	2.54	3.12	2.73

NB: Data provide monthly for 155 foods

Minimal approach

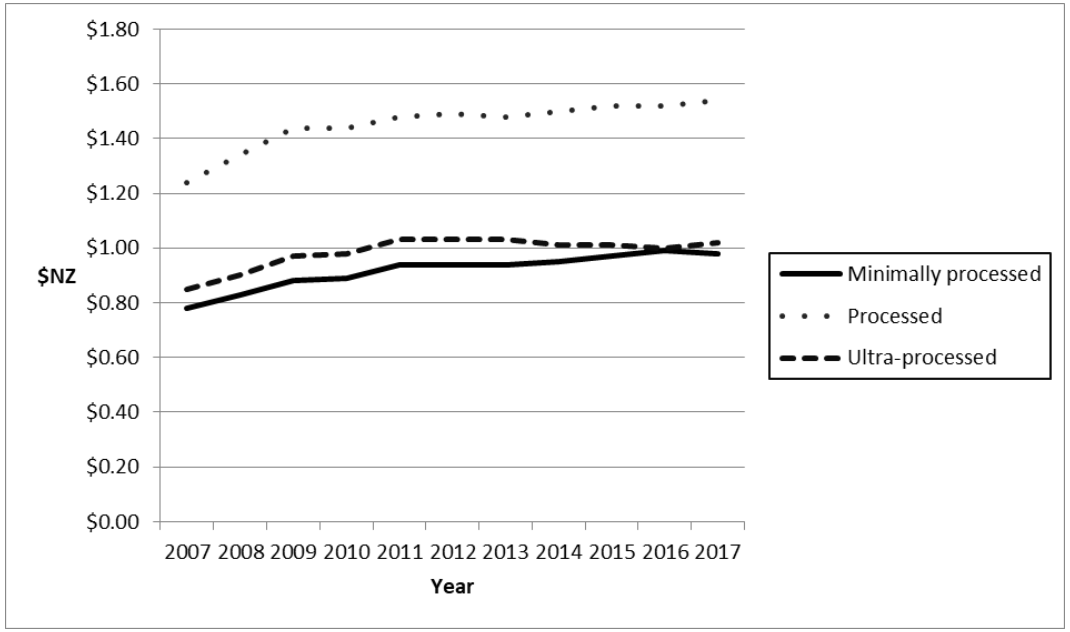
Healthier vs less healthy foods: Food Price Index



Source: Mackay et al Ten-year trends in the price differential between healthier and less healthy foods in New Zealand, Nutrition & Dietetics 2018, DOI: 10.1111/1747-0080.12457

Minimal approach

Minimally processed vs ultra-processed foods: Food Price Index



Source: Mackay et al Ten-year trends in the price differential between healthier and less healthy foods in New Zealand, Nutrition & Dietetics 2018, DOI: 10.1111/1747-0080.12457

Expanded approach

INFORMAS
Benchmarking food environments

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

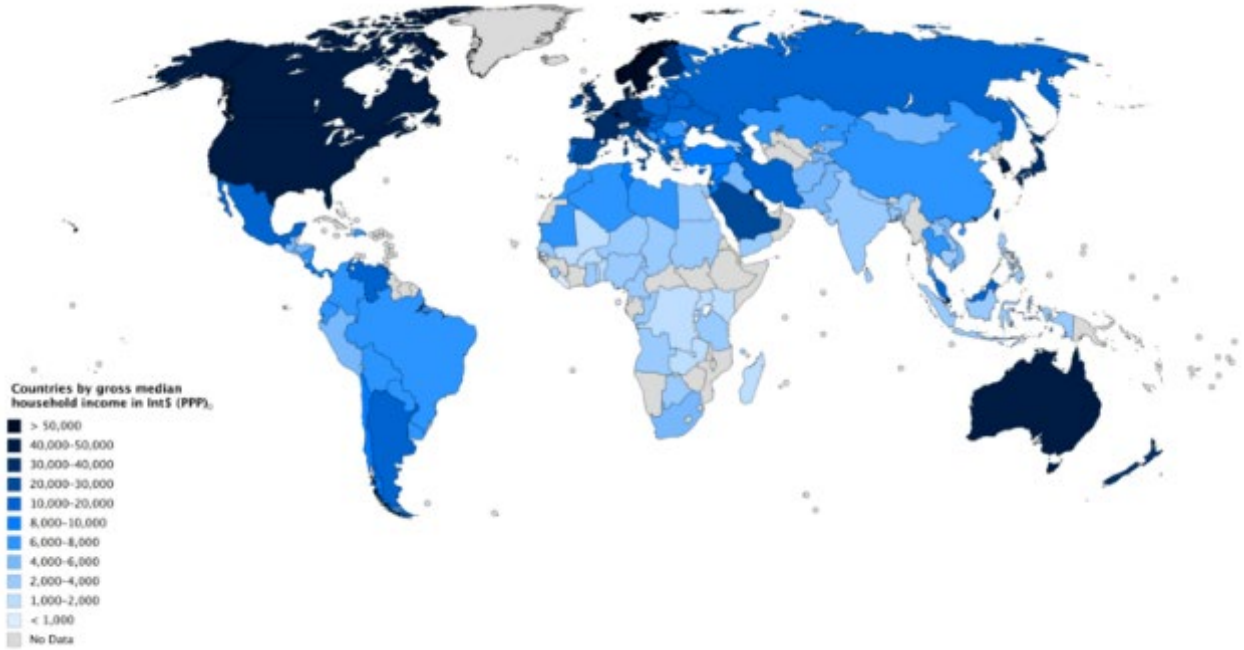
- Healthy options:
  - Need modelling of Global/ Regional Foundation Diets for a reference household based on country food-based Dietary Guidelines and Food selection guides.
  - Need to translate Foundation Diets into standardised ‘healthy’ diets to construct ‘healthy’ menu plans for two weeks for the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

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

INFORMAS
Benchmarking food environments

Source: Lee A et al. Monitoring the price and affordability of foods and diets globally Obes Rev 2013;14 Suppl 1:82-95;
Lewis and Lee, Costing 'healthy' food baskets in Australia – A systematic review, Public Health Nutrition 19: (2016) 2872-2886

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

INFORMAS
Benchmarking food environments

Results not comparable and difficult to use to inform policy

Source: Lee A et al. Monitoring the price and affordability of foods and diets globally Obes Rev 2013;14 Suppl 1:82-95;
Lewis and Lee. Costing 'healthy' food baskets in Australia – A systematic review. Public Health Nutrition 19: (2016) 2872-2886

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
- Brisbane Pilot (2014) published in 2016
- Convened Food Pricing Workshop ISBNPA Edinburgh (2014)
- Consulted globally via INFORMAS meetings
- Collaborated with academic colleagues to finalise baskets
- Applied draft Healthy diets ASAP methods in Sydney and Canberra (2015)
- 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

INFORMAS
Benchmarking food environments

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
-Lee et al,Healthy diets ASAP – Australian Standardised Affordability and Pricing methods protocol. Nutrition Journal 2018;17:88. doi: org/10.1186/s12937-018-0396-0
-Love et al, Healthy Diets in Rural Victoria-Cheaper than Unhealthy Alternatives, Yet Unaffordable. Int. J. Environ. Res. Public Health 2018, 15, 2469.
-Lee et al, Testing the Price of Healthy and Current Diets in Remote Aboriginal Communities to Improve Food Security: Development of the Aboriginal and Torres Strait Islander Healthy Diets ASAP Methods. Int J Environ Res Public Health. 2018 Dec 19;15(12).

Optimal approach: Case study Healthy Diets ASAP methods protocol

1. Standardised Diet Pricing tools

Household 5, per fortnight 2 adults and 2 children	
Current (unhealthy)	Healthy (recommended)
31,330kJ	29,450 kJ

Foods comprising healthy (recommended) & current (unhealthy) diet baskets, five households

Current (unhealthy) diet basket					
Food	HH1[1]	HH2[2]	HH3[3]	HH4[4]	HH5[5]
Bottled water, still	5948	3275	2021	923	5296
Artificially sweetened soft drink (diet coke)	2660	1419	972	523	2391
Fruit					
Apples, red, loose (g)	5072	2774	722	1271	3497
Bananas, Cavendish, loose (g)	1741	606	293	743	899
Oranges, loose (g)	2496	1304	360	791	1664
Fruit salad, canned in juice (g)	3819	1425	621	2017	2046
Fruit juice	4572	2367	3027	952	3026
Vegetables					
Potato, white, loose (g)	2181	944	516	1304	1460
Sweetcorn, canned, no added salt (g)	427	130	77	161	206
Broccoli, loose (g)	620	277	144	249	422
White cabbage, loose (g)	331	141	94	174	235
Iceberg lettuce, whole (g)	1071	468	327	418	795
Carrot, loose (g)	1130	583	170	493	753
Pumpkin (g)	407	154	86	287	240
Four bean mix, canned (g)	111	50	24	36	74
Diced tomatoes, canned, in tomato juice(g)	308	141	93	82	234
Onion, brown, loose (g)	124	37	48	128	84
Tomatoes, loose (g)	712	301	187	423	488
Frozen mixed vegetables, pre-					

Healthy (recommended) diet basket					
Food	HH1[1]	HH2[2]	HH3[3]	HH4[4]	HH5[5]
Bottled water, still	5948	3275	2021	923	5296
Artificially sweetened soft drink (diet coke)					
Fruit					
Apples, red, loose (g)	7910	4060	1400	2800	5460
Bananas, Cavendish, loose (g)	7910	4060	1400	2800	5460
Oranges, loose (g)	7910	4060	1400	2800	5460
Vegetables					
Potato, white, loose (g)	2970	1620	700	800	2320
Sweetcorn, canned, no added salt (g)	1485	810	350	400	1160
Broccoli, loose (g)	2170	1120	350	700	1470
White cabbage, loose (g)	2170	1120	350	700	1470
Iceberg lettuce, whole (g)	2170	1120	350	700	1470
Carrot, loose (g)	3255	1680	525	1050	2205
Pumpkin (g)	3255	1680	525	1050	2205
Four bean mix, canned (g)	1380	480	525	375	1005
Diced tomatoes, canned, in tomato juice(g)	2373	1218	420	840	1638
Onion, brown, loose (g)	2373	1218	420	840	1638
Tomatoes, loose (g)	2373	1218	420	840	1638
Frozen mixed vegetables, pre-					

INFORMAS
Benchmarking food environments

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

Optimal approach: Case study Healthy Diets ASAP methods protocol

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

Healthy Diets ASAP (Australian Standardised Affordability and Price) Survey Form Final

Store name _____ Store Location: _____ Date: _____ Collector: ___

NOTE: Please read the methods for collection on Page 2, prior to collecting data.

Food	Specific brand	Your brand	Specific size	Your size	Your cost	Comments
Bottled water, still	Mt Franklin		600mL			
Fruit						
Apples, red, loose			per kg			
Bananas, cavendish, loose			per kg			
Orange, loose			per kg			
Vegetables & Legumes						
White potato, loose, brushed/washed			per kg			
Tinned sweet corn, kernels, no added salt	Edgell		420g			
Broccoli, loose			per kg			
Cabbage, white, ¼ cabbage (1/2=1.5kg) (weigh if necessary)			1.5kg			
Lettuce, iceberg, whole (1=0.6kg)			0.6kg			
Carrot, loose			per kg			
Pumpkin, ¼ pumpkin (1/2 av. Japan. 5kg, 1/2 av. Butternut 3kg) (weigh if necessary)			per kg			
Tinned 4 bean mix	Edgell		420g			
Tinned diced/chopped tomatoes, in tomato juice	Ardmona		400g			
Brown onion, loose			per kg			
Tomato, loose (not vine-ripened)			per kg			
Frozen mixed vegetables (cheapest specified brand)	Heinz, Birdseye or McCain		300g			
Frozen peas (cheapest specified brand)	Edgell, Birdseye or McCain		500g			
Tinned baked beans, in tomato sauce	Heinz		420g			
Grain (Cereal) Foods						
Weet-bix	Sanitarium		375g			
Wholemeal Bread	Tip Top Sunblest		650g			
Rolled oats, whole, traditional (not quick oats)	Uncle Toby's		1kg			
White Bread	Tip Top Sunblest		650g			
Cornflakes	Kellogg's		725g			
Spaghetti (white)	San Remo		500g			
White rice, medium grain	Sunrice		1kg			
Water Crackers, plain	Arnott's		125g			
Meat, Poultry, Fish & Alternatives						

76 food and drink items:

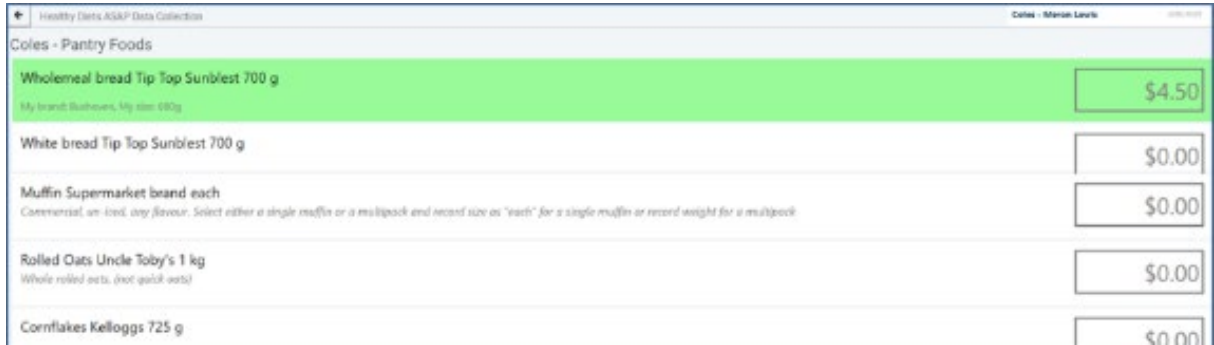
- Fresh fruit & vegetables
- Meats & dairy
- Pantry items
- Chilled & frozen foods
- Chips, chocolates, biscuits etc.
- Alcohol
- Take away foods

- Branded products

Collect:

- in store
- online
- i-pad

https://healthydiets.azurewebsites.net/Collect



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.

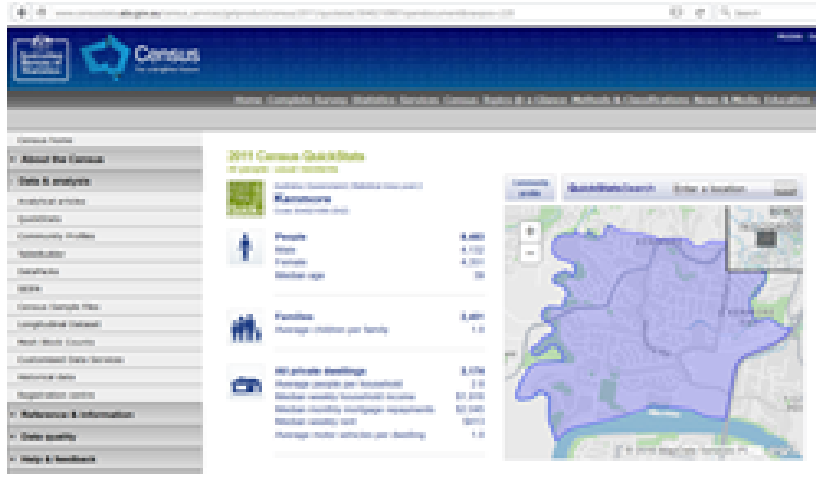
INFORMAS
Benchmarking food environments

Optimal approach: Case study Healthy Diets ASAP methods protocol

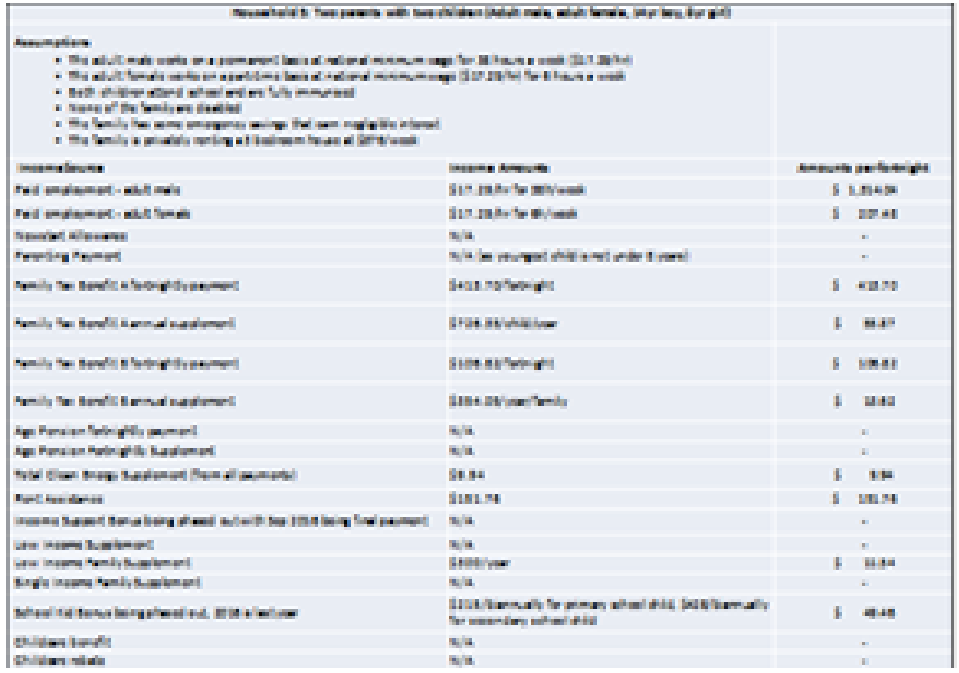
4. Standardised methods to estimate household income

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

- ABS 2011 Census Community Profiles
  - http://www.abs.gov.au/websitedbs/censushome.nsf/home/communityprofiles?opendocument&navpos=230



B. Standardised protocols to calculate low household income



- Dept. Human Services
  - Payment Finder
  - Rate Estimator
- Standard assumptions
- Payments change with policy change (including COVID)
- Minimum wage rates

INFORMAS
Benchmarking food environments

Optimal approach: Case study Healthy Diets ASAP methods protocol

INFORMAS
Benchmarking food environments

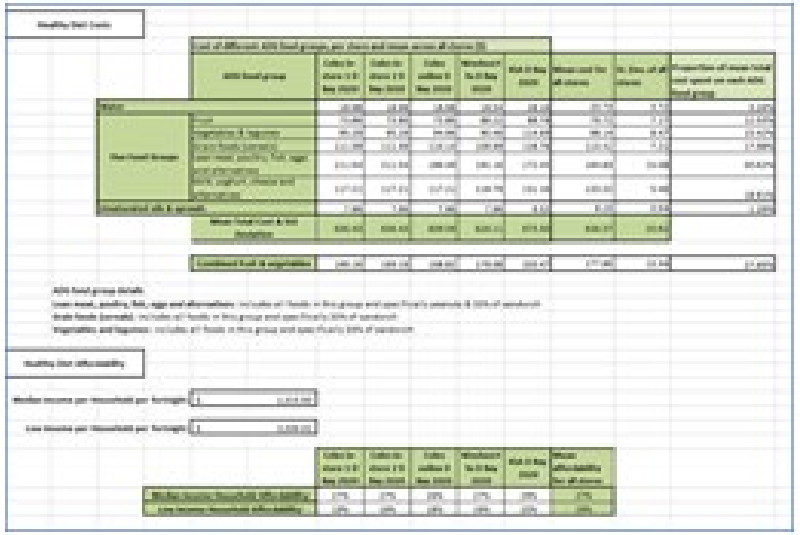
5. Standardised protocols for representative sampling

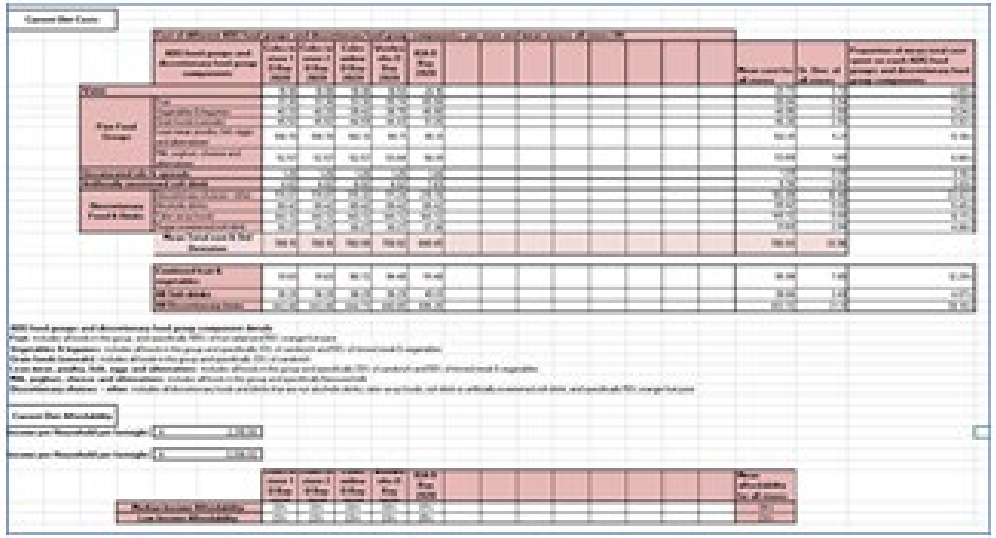
- SA2 level locations in each city were stratified by SEIFA quintile
  - Maps as SA4, SA3 and SA2 level are available at: http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/1270.0.55.001July%202011?OpenDocument
  - ABS 2033.0.55.001 Census of Population and Housing: Socio-Economic Indexes for Areas (SEIFA), Australia, 2011 Statistical Area Level 2 Indexes, SEIFA 2011 Table 3. Statistical Area Level 2 (SA2) Index of Relative Socio-economic Disadvantage, 2011 Available at: http://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/2033.0.55.0012011?OpenDocument
- 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

Optimal approach: Case study Healthy Diets ASAP methods protocol

INFORMAS
Benchmarking food environments

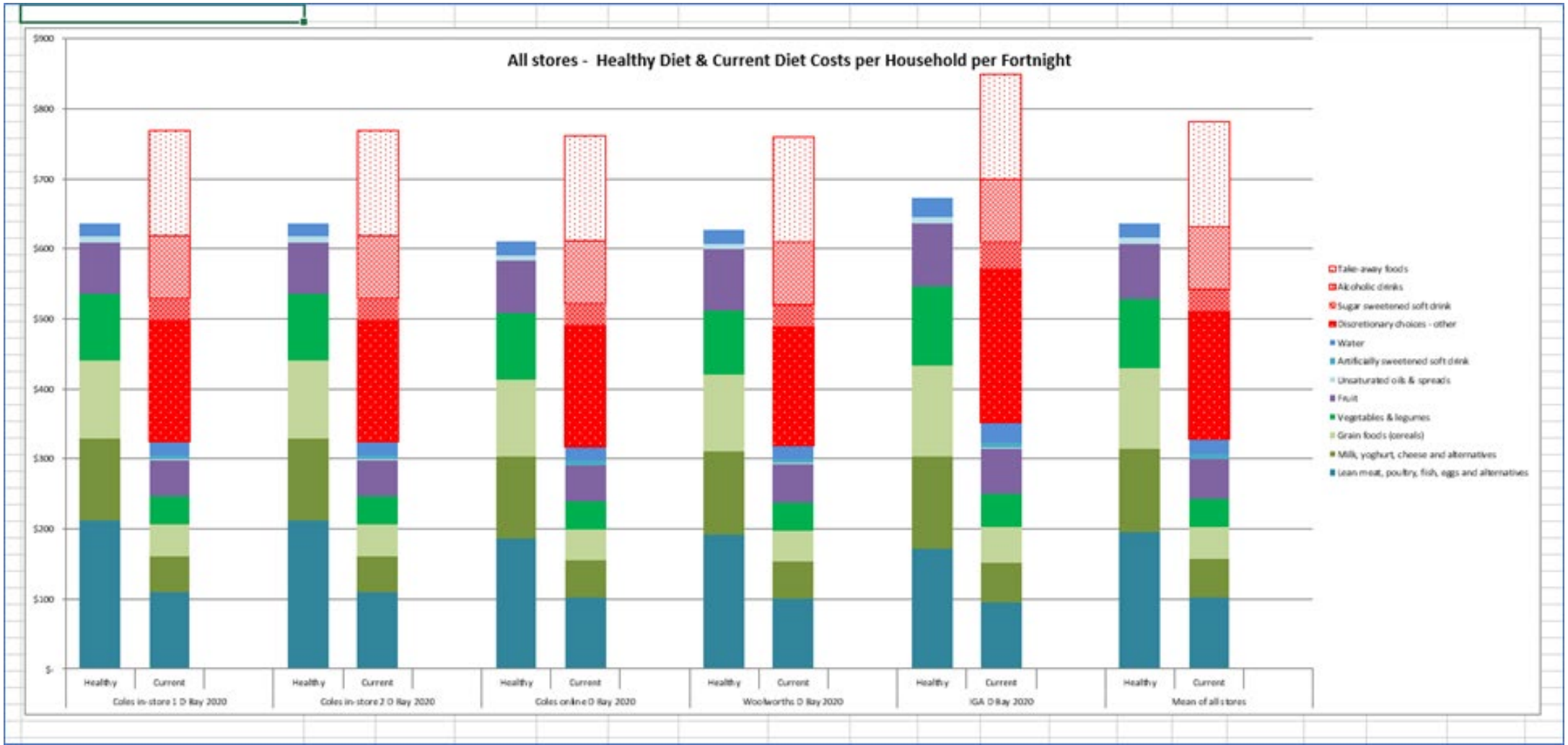
Calculate



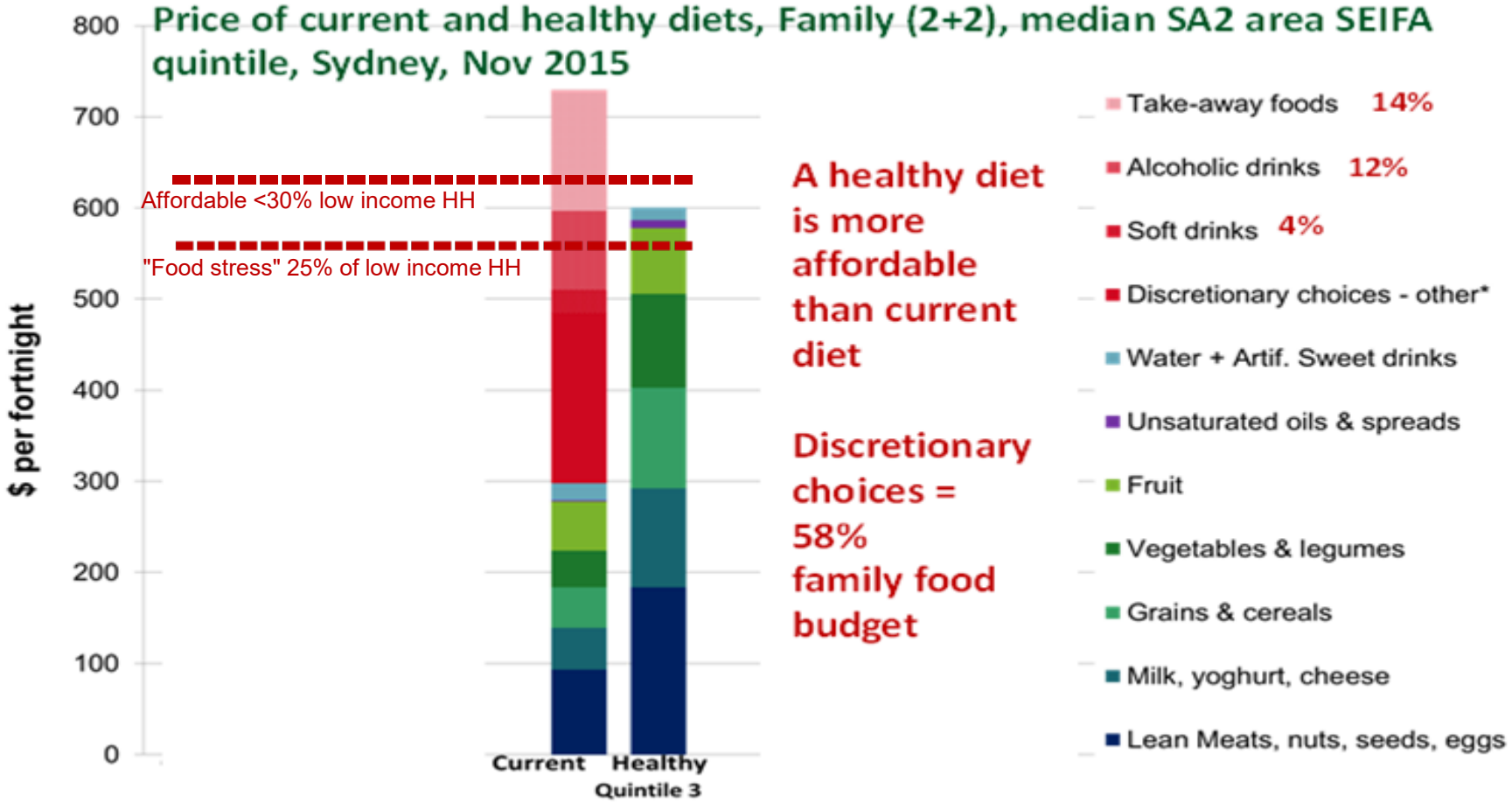


Optimal approach: Case study Healthy Diets ASAP methods protocol

INFORMAS
Benchmarking food environments



Optimal approach: Case study Healthy Diets ASAP Results



INFORMAS
Benchmarking food environments

Healthy Diets ASAP (Australian Standardised Affordability and Price) protocols

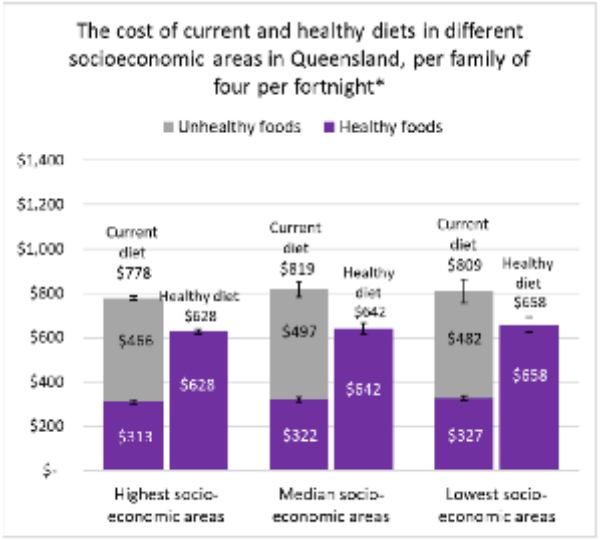
Food choice influenced by:

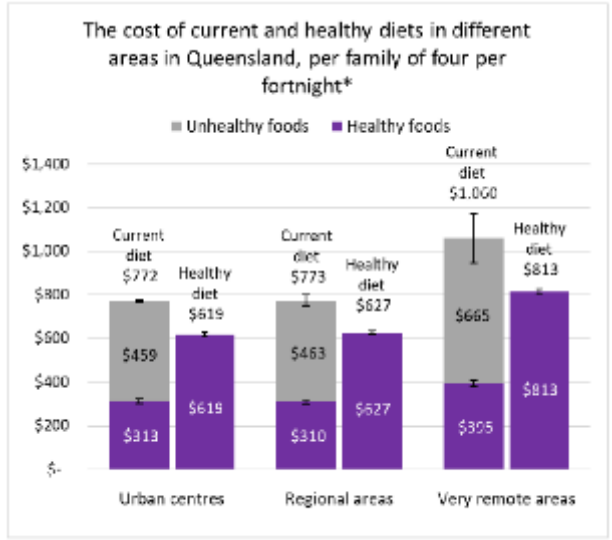
- Price?
- Convenience?
- Advertising/promotion?
- Availability?
- 'Entertainment'?
- Taste?

-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
-Lee et al,Healthy diets ASAP – Australian Standardised Affordability and Pricing methods protocol. Nutrition Journal 2018;17:88. doi: org/10.1186/s12937-018-0396-0
-Love et al, Healthy Diets in Rural Victoria-Cheaper than Unhealthy Alternatives, Yet Unaffordable, Int. J. Environ. Res. Public Health 2018, 15, 2469

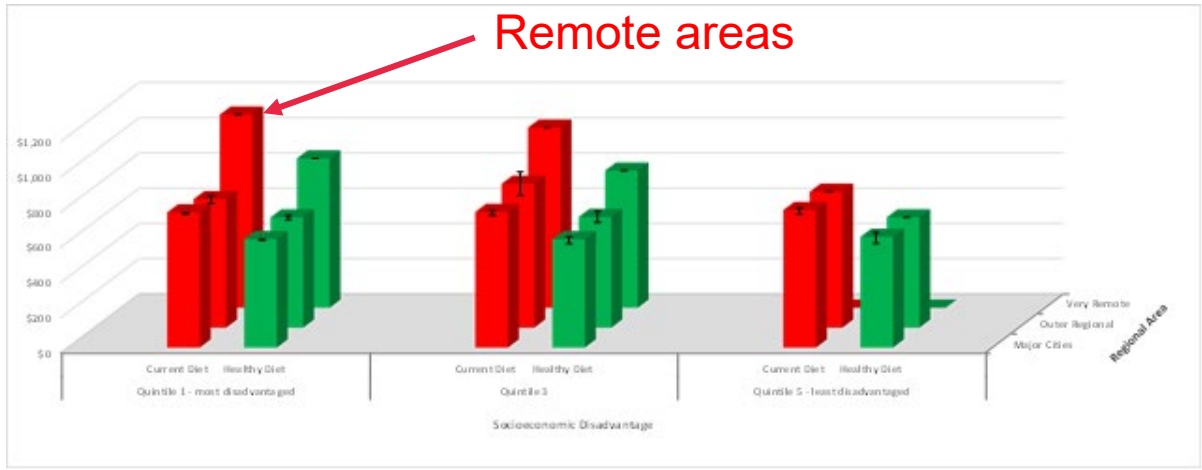
Optimal approach: Case study Healthy Diets ASAP Results

Queensland 2019





*Error bars indicate the standard error, reflecting the variation in prices between stores

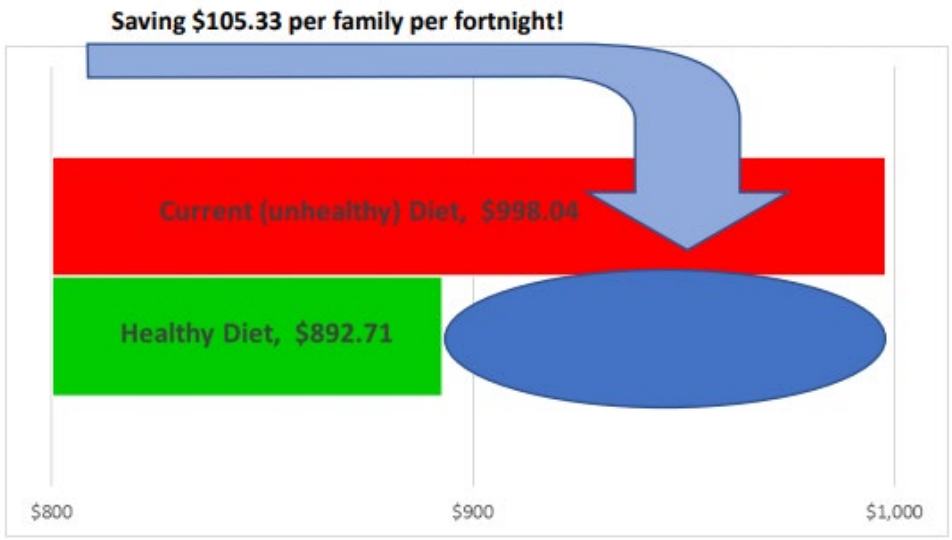


INFORMAS
Benchmarking food environments

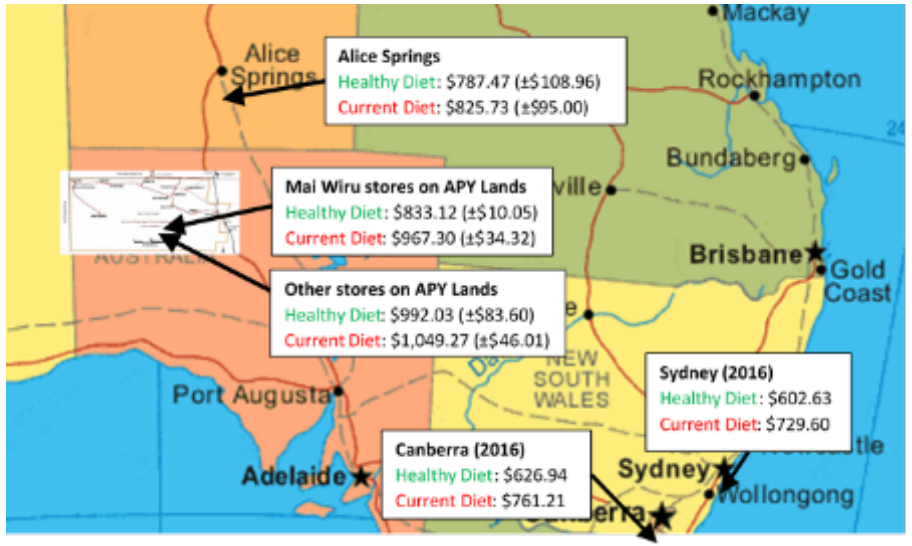
Research Excellence in Food Retail Environments for Health (RE-FRESH)

Healthy Diet ASAP: Results

Application: use by Aboriginal communities



April 2018

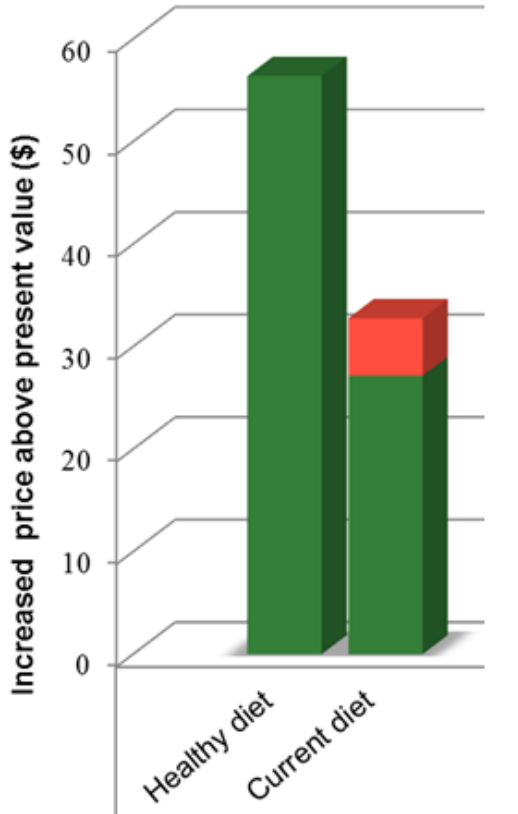


May 2019

- 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)

Source: Lee et al, Testing the Price of Healthy and Current Diets in Remote Aboriginal Communities to Improve Food Security: Development of the Aboriginal and Torres Strait Islander Healthy Diets ASAP Methods. Int J Environ Res Public Health. 2018 Dec 19;15(12).

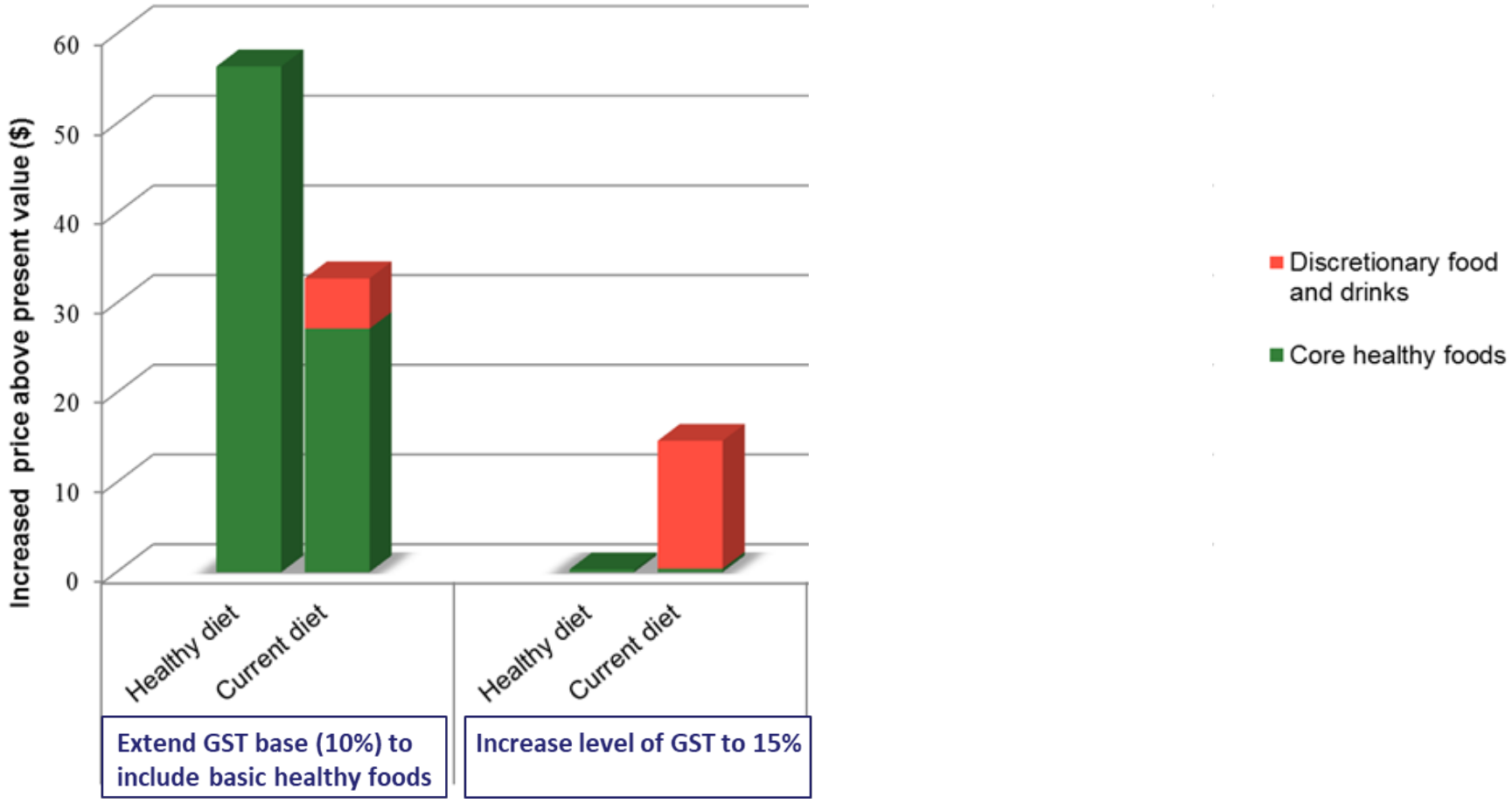
Optimal approach: Case study Healthy Diets ASAP Application



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

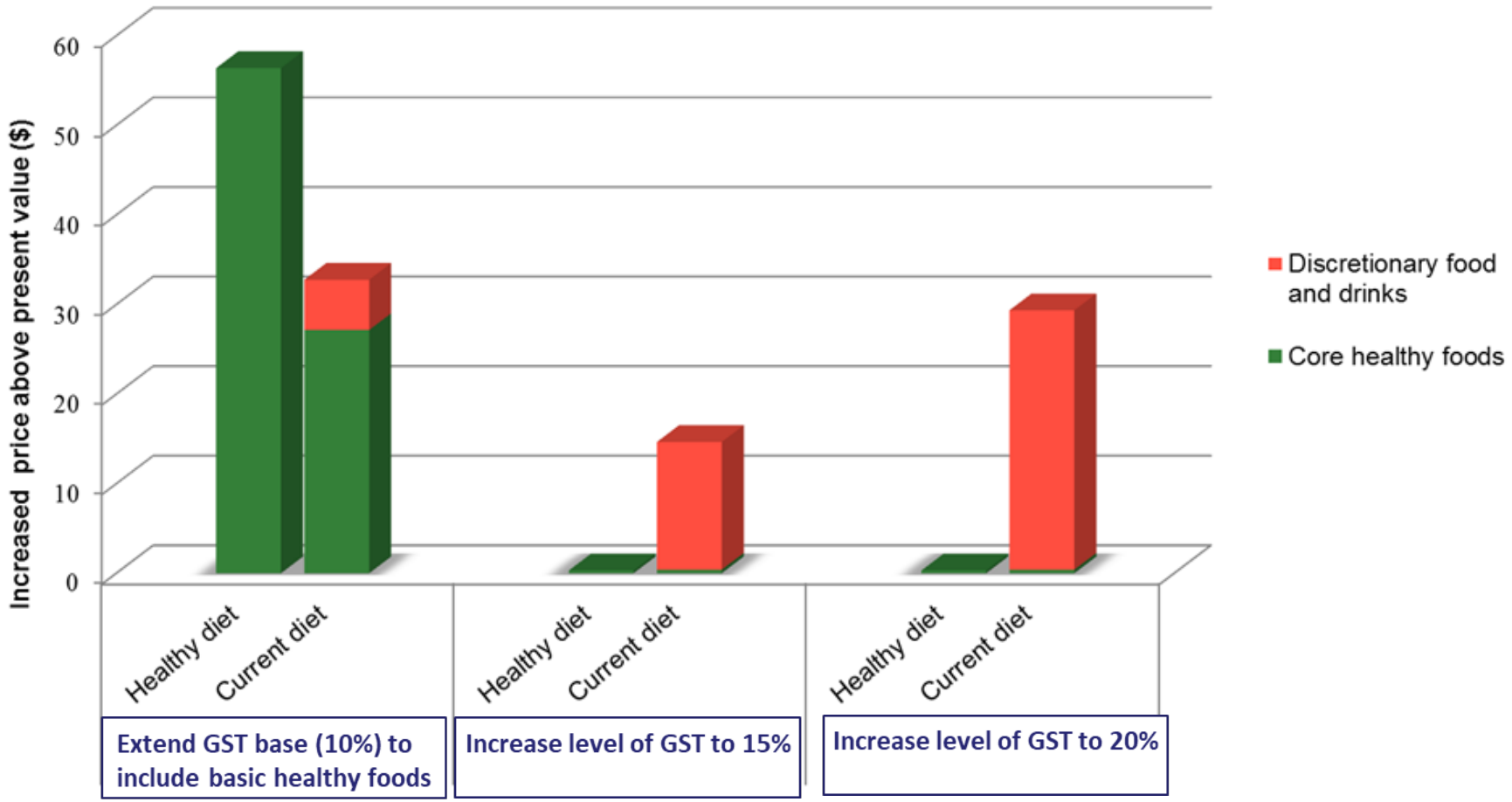
Increased cost of diet with potential change to Australian taxation system, Household (2 adults and 2 children)

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)

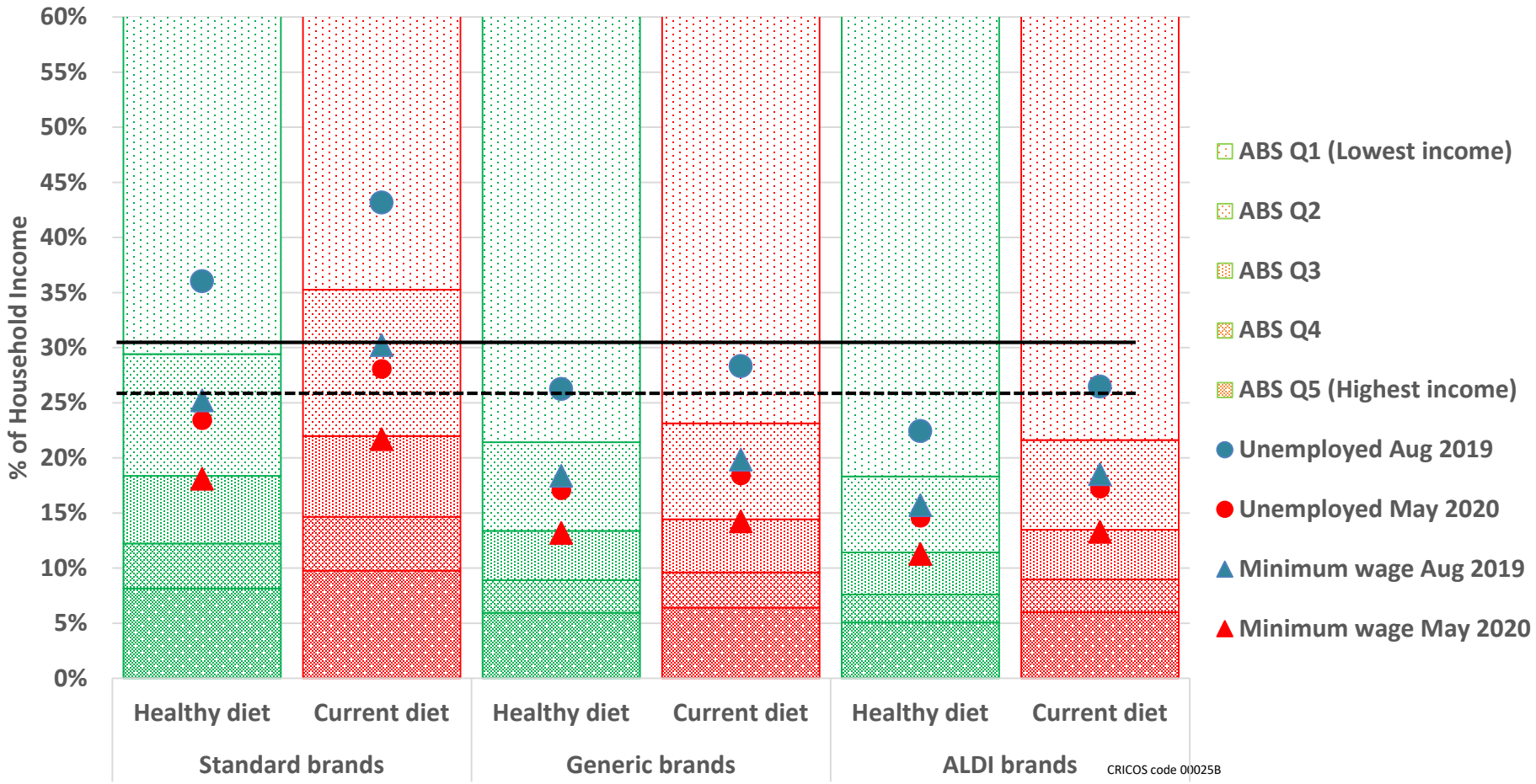
Optimal approach: Case study Healthy Diets ASAP Application



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

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

Optimal approach: example 2- DIETCOST

DIETCOST

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

Sally Mackay

Acknowledgements:
Stefanie Vandevijvere

THE UNIVERSITY OF AUCKLAND
Te Whare Wānanga o Tāmaki Makaurau
NEW ZEALAND

MEDICAL AND HEALTH SCIENCES

INFORMAS
Benchmarking food environments

Dr Sally Mackay

https://youtu.be/xveDnFXUhuY

- Mackay et al (2017). Paying for convenience: Comparing the cost of takeaway meals with their healthier home-cooked counterparts in New Zealand. Public Health Nutrition, 20 (13), 2269-2276.
- Waterlander & Mackay (2016). Costing a healthy diet: Measurement and policy implications. Public Health Nutrition, 19 (16), 2867-2871.
- Mackay et al, Cost and affordability of diets modelled on current eating patterns and on dietary guidelines for New Zealand total population, Maori and Pacific household, Int J Environ. Res. Public Health 2018, 15 (6), 1255
- Vandevijvere et al Modelling the cost differential between healthy and current diets: the New Zealand case study, Int J Behav Nutr Phys Act. 2018 Feb 9;15(1):16. doi: 10.1186/s12966-018-0648-6.

Optimal approach: example 3

Cost different % UPF and % MPF in diets in Belgium

Dr Stefanie Vandevijvere

- 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

Vandevijvere et al, The Cost of Diets According to their Caloric Share of Ultraprocessed and Minimally Processed Foods in Belgium Nutrients, 2020, 12(9), 2787; https://doi.org/10.3390/nu12092787

Optimal approach: example 3

NOVA groups	Examples
1) Unprocessed or minimally processed foods Edible parts of plants and animals after separation from nature or preserved by minimal processes (no substances added)	
2) Processed culinary ingredients Substances extracted from foods or nature and used to prepare, cook and season Group 1 foods	
3) Processed foods Group 1 foods modified with the addition of Group 2 ingredients aiming food preservation and/or enhancement of its sensory qualities	
4) Ultra-processed foods 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	

Source: Monteiro et al, 2017, Public Health Nutrition

Optimal approach: example 3

Results: %E from UPF and MPF in Belgium

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

%E from UPF highest among children

%E from MPF higher among high versus low SES

Optimal approach: example 3

Results: Cost differential (EUR/2000 kcal) between diets with higher and lower proportions of E from UPF and MPF

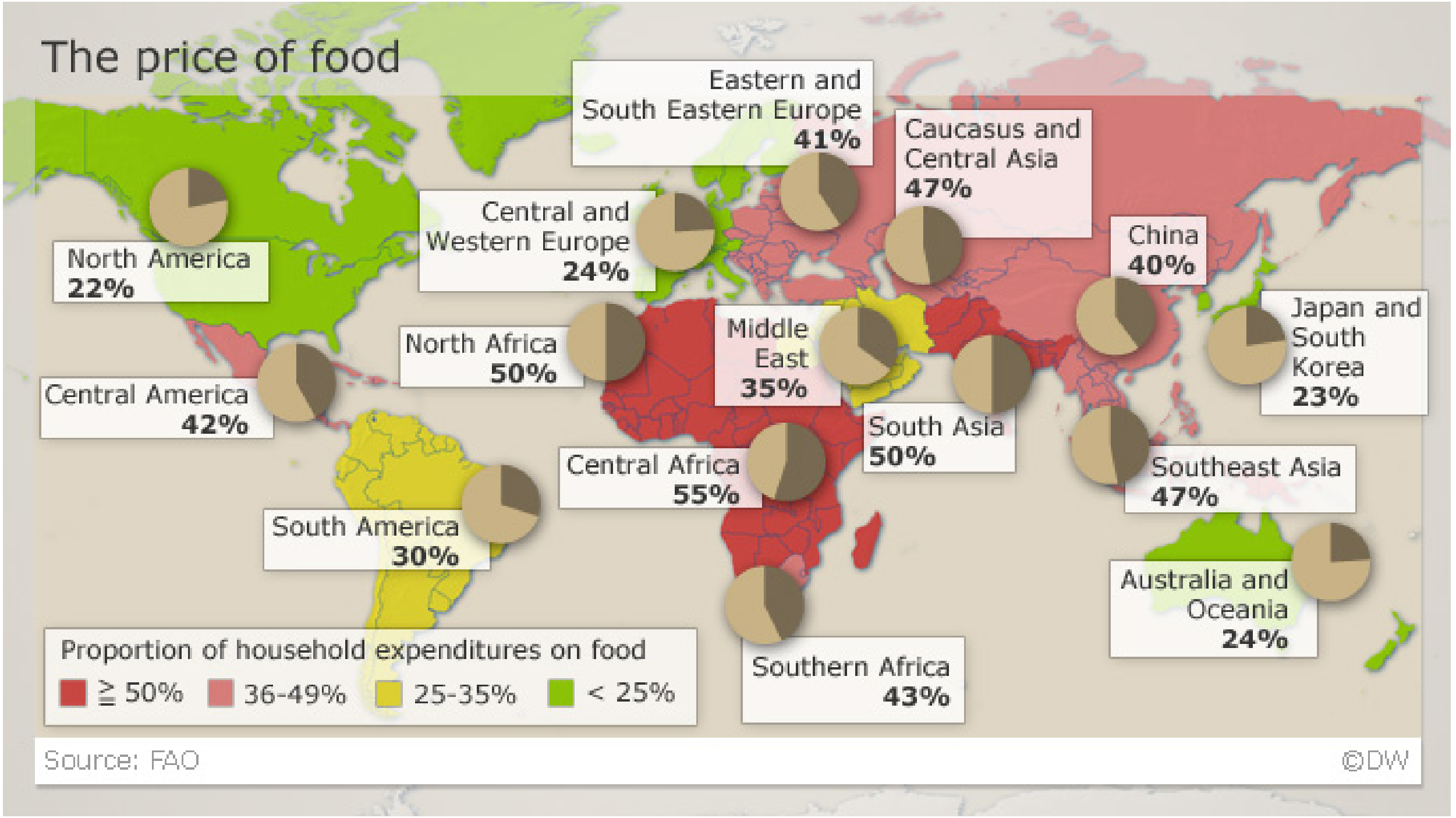
Ultraprocessed Food Products				Unprocessed/Minimally Processed Foods			
Parameter	Estimate	SE	*p*	Parameter	Estimate	SE	*p*
UPF 2 medium %E	0.12	0.13	0.33	MPF 2 medium %E	0.61	0.11	<0.0001
UPF 3 highest %E	−0.37	0.13	0.006	MPF 3 highest %E	1.18	0.12	<0.0001
UPF 1 lowest %E	(ref)			MPF 1 lowest %E	(ref)		
Sex: female	0.43	0.09	<0.0001	Sex: female	0.46	0.09	<0.0001
Sex: male	(ref)			Sex: male	(ref)		
Age group: children	−1.47	0.08	<0.0001	Age group:children	−1.43	0.08	<0.0001
Age group: adolescents	−1.46	0.08	<0.0001	Age group:adolescents	−1.44	0.08	<0.0001
Age group: adults	(ref)			Age group:adults	(ref)		
Household EL: medium	0.30	0.11	0.005	Household EL: medium	0.27	0.10	0.009
Household EL: high	0.34	0.12	0.0006	Household EL: high	0.26	0.12	0.030
Household EL: low	(ref)			Household EL: low	(ref)		
region 2: Brussels	0.18	0.16	0.27	region 2: Brussels	0.09	0.1	0.55
region 3: Wallonia	−0.06	0.09	0.53	region 3: Wallonia	−0.08	0.09	0.39
region 1: Flanders	(ref)			region 1: Flanders	(ref)		

SE: standard error; Ref: reference category.

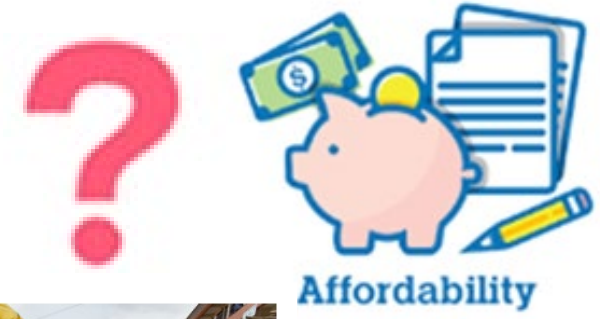
Diets with a larger caloric share of UPF were significantly cheaper than those with a lower contribution of these products, while the opposite was found for MPF

Approach in other countries

Country (approach)	Methods	Results	Comments
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	• Machado et al, 2017 • Passes et al, 2020 • Moubarac et al, 2013


The price of food
Eastern and South Eastern Europe 41%
Caucasus and Central Asia 47%
Central and Western Europe 24%
China 40%
North America 22%
Japan and South Korea 23%
North Africa 50%
Middle East 35%
Central America 42%
South Asia 50%
Central Africa 55%
Southeast Asia 47%
South America 30%
Australia and Oceania 24%
Southern Africa 43%
Proportion of household expenditures on food
≧ 50%
36-49%
25-35%
< 25%
Source: FAO
©DW

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?

For example- can we use the minimal approach:

INFORMAS
Benchmarking food environments

THE UNIVERSITY OF AUCKLAND NEW ZEALAND | MEDICAL AND HEALTH SCIENCES

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?

THE UNIVERSITY OF QUEENSLAND AUSTRALIA

For example- can we use the optimal approach:

National nutrition survey

Gender

Age

Household Income quintile

Amounts of all food and drinks reported in 24 hour recall

Or

Model common foods within Energy and nutrient requirements

Current diet: Aggregate amounts per fortnight (nutritionally similar representative food and drinks)

Dietary Guidelines OR Model healthy, sustainable, equitable diets per fortnight

Develop food lists to cost

Collect prices in food outlets

Or

Scrape electronic price data

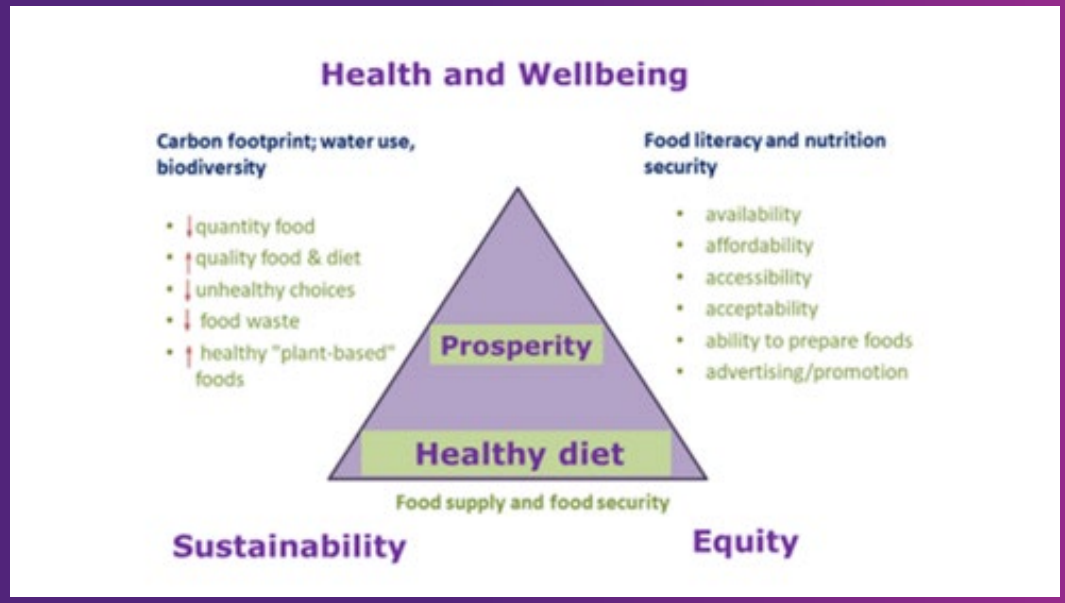
THE UNIVERSITY OF QUEENSLAND AUSTRALIA | CREATE CHANGE

INFORMAS
Benchmarking food environments

INFORMAS Food Price and Affordability Module

Questions?

Thank you



MEALS for NCD prevention

First Africa Food Environment Research Meeting November 2020

Amanda Lee
Prof Public Health Policy | Head of Division Health Promotion and Equity
Affiliate Prof | UQ Poche Centre for Indigenous Health
School of Public Health | Faculty of Medicine
Amanda.Lee@uq.edu.au
@_Amanda_J_Lee_

The Australian Prevention Partnership Centre
Systems and solutions for better health
Medical Research Future Fund