DIETCOST Programme
MANUAL
for users

INFORMAS

Benchmarking food environments

The University of Auckland

School of Population Health

Centre for e-Research

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Contents

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Summary

This manual is an appendix to the food prices protocol [1] developed by the International Network for Food and Obesity/NCDs Research, Monitoring and Action Support (INFORMAS)[2] to monitor and benchmark the cost differential between healthier and less healthy foods and healthy and current, less healthy population diets globally. This manual focuses on how to install and use the DIETCOST programme for calculating the distribution of the cost of healthy and current, less healthy household diets. **It is strongly encouraged to first read the background information in the detailed protocol about the different steps within the DIETS approach of the INFORMAS food prices module**.

The DIETCOST programme was developed with funding from the Food and Health Programme of the University of Auckland with the aim to model the cost of healthy and current, less healthy population diets using combinations of a list of commonly consumed foods, a set of min and max quantity/serves constraints for each, and specified food group and nutrient intakes based on dietary guidelines (healthy diets) and nutrition survey data (current diets for different population groups). The DIETCOST programme provides an additional approach to the traditional approach of manually constructing meal plans for healthy and current household diets and allows the distribution of the costs of diets to be determined and statistically compare the cost of healthy and current population diets.

Installation

There are no costs involved with the installation of the DIETCOST programme. In order to run the programme locally, Python needs to be installed, which is a free software and can be downloaded from the following link:

https://www.python.org/downloads/

Either Python 3 or Python 2 should work fine.

Upon installation, please do not forget to add Python to your PATH and check this option otherwise the programme won't work.

The DIETCOST programme can be downloaded as a ZIP file from the following link:

https://github.com/UoA-eResearch/dietcost/archive/master.zip

Extract the ZIP file onto your local computer.

If you're running Windows, double click the "install_requirements.bat" script to install the requirements.

If you're running Mac OS X, or Linux/UNIX, double click the "install_requirements.sh" script.

Once that's complete, exit and double click "web_server.py". If it's working, you should see the output "Bottle v0.12.7 server starting up (using WSGIRefServer())...

Listening on http://0.0.0.0:8080/

At this point, open http://localhost:8080/ in your preferred browser to use the programme.

Input files

A series of input files needs to be prepared for the programme to work. An example of this is found when downloading the programme ZIP file which includes the New Zealand example file to be adapted to your local context (dataset.xlsx).

In the downloaded ZIP file there are 2 Excel files:

1. dataset.xlsx

2. cpiprices.xlsx

The dataset.xlsx file is the most important and needs to be adapted to the local context before the programme can be used.

The cpiprices.xlsx dataset only needs to be used and completed when using prices data over several time series and when there is interest to calculate and compare the cost of the diets over time (e.g. when using Food Price Index data). If this is not the case, this file can be left empty.

The variables in the dataset.xlsx file that are specifically used by the programme are highlighted in yellow, while the variables that are not used by the programme, but are useful for the researchers, are highlighted in blue.

If the analysis is undertaken for different population groups (e.g. ethnic populations) a separate CSV file will need to be created. The new CSV file will need replace the existing file but keep the existing filename when uploading or the programme will not be able to find the CSV file.

The dataset.xlsx file contains the following sheets and variables:

Common foods

The commonly consumed foods of the country are identified (See Step 3.4 of Food Prices protocol). These can be specified for the total population and/or for different ethnic or other population groups.

Variable	Description
Food Group Food group ID	Categorise each food into the following food groups: 01: Fruit 02: Vegetables 03: Grains 04: Dairy 05: Protein foods: Meat, poultry, seafood, eggs, legumes, nuts 06: Fats and oils 07: Discretionary foods: Snacks, processed meats, sweets, chocolate, high sugar/high fat cereals 08: Sauces, dressings, spreads, sugars 09: Beverages 10: Takeaways 11: Alcohol
Commonly consumed food	Detailed description of the common food, e.g. Tomatoes, canned, low salt
Commonly consumed food ID	Five digits: e.g. 01001 First two digits are the Food group ID (01 to 11)
Variety	1: Foods that are the most commonly consumed within the food group so need to be included in all diets 2: Foods commonly consumed but less common than level 1 foods 3: Foods that are less commonly consumed than level 1 or 2 foods but still commonly consumed Note: *It is optional to either use or not use this variable. It is also possible to include more variety options (e.g. 4,5) and define them as appropriate for your context. These variety*

	levels can be used to model a particular scenario comparing more and less varied diets or can be used to allow higher or lower min/max constraints for the commonly consumed foods in the healthy/current diet baskets
Core/discretionary	C: core D: discretionary Some food groups only have core or discretionary food items while some food groups can have a mix of core and discretionary items.
Population group	All: all population Enter the population group if conducting scenarios, e.g. Pacific, Maori Note: This is mainly if there are certain food items that are common foods for some populations but not for others. This is an optional variable and is not used by the programme.
Child Adult	All: the food is included in the diet of all population groups Adult: only in adult diet, e.g. alcohol Child: only in children's diet e.g. froot loops Note: This variable is not used by the modelling programme but is a guide for the user when setting min/max constraints for the common foods in the healthy and current diet, for example a food only in the child's diet would need to have a min and max value of 0 in the adult's diet and vice versa.

Edible cooking yield factors

This sheet is not used in the DIETCOST programme but is required to calculate the price per 100g of the amount to purchase (for the variable price/100g AP).

Variable	Description
Food Group Food group ID Commonly consumed food Commonly consumed food ID	See common foods table

Yield factor	Edible portion and yield factors are required to convert the edible amount of a food to the amount to be purchased. Edible portion factors are important for fruits, vegetables and nuts (skins, seeds, shells etc.) and meat, fish and seafood (bones, skin etc.). Yield factors are applied to foods to allow for weight changes during cooking due to changes in the water or fat content of the food. Retention and yield factors for a country may be available, or existing data from another country can be used. For example: Bognár A. Tables on weight yield of food and retention factors of food constituents for the calculation of nutrient composition of cooked foods (dishes). 2002. Germany. http://www.fao.org/uploads/media/bognar_bfe-r-02-03.pdf U.S. Department of Agriculture, Agricultural Research Service. USDA table of cooking yields for meat and poultry. 2012: http://www.ars.usda.gov/nutrientdata. Food Standards Agency. McCance and Widdowson's The Composition of Foods, Sixth summary edition. 2002. https://www.gov.uk/government/publications/composition-of-foods-integrated-dataset-cofid $$\frac{100g \text{ edible portion}}{\text{yield factor}} = \text{amount raw product}$$

Nutrients

The nutrient composition of each commonly consumed food is entered into this spreadsheet.

Variable	Description
Food Group Commonly consumed food Commonly consumed food ID	See common foods table
Energy kJ/100g Fat g/100g Sat fat g/100g CHO g/100g Sugars g/100g Fibre g/100g Protein g/100g Sodium mg/100g	Saturated fat Carbohydrate Total sugars (added and naturally occurring)
Source nutrient information	Optional State if nutrient information from a food composition database, food company website, Nutrient Information Panel etc.
Remarks	Optional

Nutrient targets

A minimum and maximum constraint for the relevant nutrients and food groups must be provided for each member of the reference household (adult man, adult woman, girl, and boy) for healthy and current diets separately.

The healthy diet is required to meet the Nutrient Reference Values of the country, or if not available, the WHO Population Nutrient Intake Goals. The recommended intakes are converted to minimum and maximum constraints.

The current diet is required to meet the average current nutrient intake reported in the most recent national nutrition survey. The current intakes are converted to minimum and maximum constraints. The latter can be done in several ways (to be decided by the country). In New Zealand, the minimum and maximum for each constraint were calculated as the mean intake ± 30%, except for energy intake which needs to be more tightly controlled.

If the analysis is undertaken for different population groups (e.g. ethnic populations), the constraints may need to be modified. It is likely that the healthy diet constraints will be applicable to all population groups. However the current diet constraints reflect current nutrient intakes so will need to be updated for the population group if survey data is provided for that specific group. The required energy level for the current diet reflects the current BMI of the population so may differ between population groups. The food prices protocol describes how to calculate the required energy per day for each household member.

Variable	Description
Energy MJ per day	The method to calculate the required energy level for the healthy and current diets is described in the food prices protocol. The energy constraints are designed to be tight so are within 1.5% of the target energy intake for the reference household member
Healthy diet per day constraints Fat % energy Saturated fat % energy CHO % energy Protein % energy	 The range of % energy from protein, fat and carbohydrate are the ranges recommended by Nutrient Reference Values. There is no minimum constraint for saturated fat.
Free sugars % energy Total sugars % energy	This constraint is not used since there is no composition data on free sugar in products and healthy diet does not make recommendations for total sugar. There is the option to use those where possible
Fibre g	Suggested dietary target for fibre from Nutrient Reference Values. The reference value is the

Sodium mg	minimum amount of fibre required. There is no constraint on the maximum amount. The suggested dietary target for the country or WHO target for maximum sodium. The minimum amount of sodium is that required for health (e.g. adequate intake) while the maximum amount is the country or WHO target for maximum sodium.
Fruit (s) Starchy vege (s) Vege (s) Dairy (s) Grains (s) Protein (s) Red meat (g)	The min constraint is the recommended number of serves of each food group from the country's food-based dietary guidelines. There is no maximum constraint, though this can be added if required. Vege is non-starchy vegetables. There is a maximum amount of 100g red meat per day as guidelines recommend that red meat should only be consumed in moderation. This maximum can be changed if country guidelines are different.
Current diet per day - constraints Fat grams Saturated fat grams CHO grams Total sugars grams Fibre grams Protein grams Sodium mg CHO % energy Protein % energy Fat % energy Saturated fat % energy Alcohol % energy	The grams or % energy of each nutrient are those reported consumed in a national nutrition survey. The grams of each nutrient reported consumed in a national nutrition survey are converted to a minimum and maximum constraint by adding or subtracting 30%. The % energy of each nutrient reported consumed in a national nutrition survey are converted to the min and max constraint by subtracting or adding 30%, e.g. 54.2% of energy from CHO has a min 37.9% and max 70.5%.
Fruit (s) Starchy vege (s) Vege (s) Dairy (s) Grains (s) Protein (s)	The number of serves is calculated from the reported number of serves from each food group consumed in a national nutrition survey. The min and max constraints are -+ 30%. Vege is non-starchy vegetables.

Constraints Healthy

This sheet contains the foods that are used to create the healthy household diets. Discretionary foods, alcohol and takeaways and beverages are also included to enable using those for specific scenarios. Please pay attention to put the min and max for beverages at 0 if only creating standard healthy diets since the programme does not do this automatically. For alcohol, takeaways and discretionary foods, this can be done through the interface.

If the analysis is undertaken for different population groups (e.g. ethnic population), the constraints may need to be modified to reflect the common foods and dietary patterns.

Variable	Description
Food group Food group ID Commonly consumed food Commonly consumed food ID Variety	See common foods table
Serve size Fruit Vegetables Starchy vegetables Grains Dairy Protein foods Fats and oils Sauces, dressings, spreads, sugars	Recommended serve size for each food from a country's food-based dietary guidelines. For most food groups there is one recommended serve but for some groups (e.g. protein foods) the serve size may vary for different types of foods (nuts, meat, legumes). Countries may not have specific serve size recommendations for children.
Discretionary foods Beverages Takeaway Alcohol	Normally these foods are not considered part of a healthy diet. However scenarios can be run to still allow a certain % of energy provided by discretionary foods (and beverages) in the healthy diet. In case this scenario is selected, the programme will randomly select 40% of the discretionary foods and beverages to be included as part of the healthy diet and within their min/max ranges of consumption. The 40% is hard coded in the programme code but can be changed if required (see further). Consider guidelines for safe alcohol consumption when alcohol is included in a healthy diet scenario.
Target for each member of reference household Food group totals	 E.g. 'Fruit number of serves, grams'

Min per week	Recommended serves per day from food-based dietary guidelines converted to per week
	Generally min per week multiplied by 1.5 or 2, depending on food group.
Max per week	
	Related to energy, e.g. adult male has higher max per week than young girl.
Healthy diet target	
Grams	Mean of min and max constraints per week Grams of food group: multiply 'min per week' and 'max per week' by serve size for the individual food.
Fats and oils grams	Food-based dietary guidelines may only have recommendations for type of fat rather than amounts of fats, therefore the min and max values are wide.
Common foods Min per week Max per week	The constraints are required to ensure that each food is included in the diet, and that diets do not have an excessive amount of one food. Some judgement is required about what is considered 'excessive' for each food. Generally, foods with variety 1 have a min value of 1 serve (per week) and a max value of 14 serves (per week). Foods with variety 2 & 3 have a min value of 0.5 serves (per week) and a max value of 7 serves (per week)
Red meat	Red meat is constrained in the DIETCOST programme to 100g per day so the min per week is 0 and the max per week is 700g. The red meat food codes are bolded in red. Unlike for the other food groups where the common food IDs can be different from country to country, the red food common food IDs are hard coded in the programme and thus either some of those can be put at 0 or the programme code can be adapted (see further) to change those commonly consumed food IDs and have more or less read meats. The five red meat common food codes are: 05065 05067 05073 05074 05089
Beverages	Please make sure that these are put at 0 for min and max for the standard healthy diet unless doing a scenario allowing discretionary foods.

Constraints current

This sheet contains the foods that are used to create the healthy household diets. They may be similar as for healthy diets. There is an option to include less variety (less items) of fruits and vegetables compared to the healthy diets.

If the analysis is undertaken for different population groups (e.g. ethnic population), the constraints may need to be modified to reflect the consumption of common foods if nutrition survey data is provided for that specific group.

Variable	Description
Food group Food group ID Commonly consumed food Commonly consumed food ID Variety	See common foods table
Serve size	See constraints healthy diet table
Target for each member of reference household	See constraints healthy diet table
Fats and oils grams	See constraints healthy diet table
Discretionary foods Sauces, sauces, spreads Beverages Takeaways	The serve size is determined by a range of sources: food-based dietary guidelines, food composition tables, recommended serve size by manufacturer. A judgement is required by the researcher on the appropriate serve size. There may be discretionary items included within the core food groups, e.g. processed meat (proteins), muffin (grains)
Alcohol	Based on the amount reported consumed in a national survey. The suggested min value is 0.5 serves (per week) and max 7 serves (per week)

Important note: for both the sheets "Constraints Current" and "Constraints Healthy", it is important to note that some foods are linked to each other to make the diets acceptable. This is the case for milk and cereals and bread and spreads and these corresponding codes are hard coded in the programme, but can be changed through updating the programme code:

'milk-cereal': The total number of serves of milk is higher than or equal to the total number of serves of breakfast cereals

   'lower': ["03046", "03047", "03048", "03065", "03068", "03050"], # cereal

   'higher' : ["04059", "04060"], # milk

'spread-bread': The total number of serves of spread is equal to or lower than the total number of serves of bread and crackers

   'lower': ["03036", "03037", "03038", "03040", "03044"], # spread

   'higher': ["05083", "06088", "06089", "05087", "08098", "08108", "08097"], # bread/crackers

Food Prices

In addition to the diet costs for the total population, the cost of the diets for a range of scenarios can be calculated depending on the research interests of, and the available resources to collect prices. The data entered is determined by the country. In this file variables can be added and they will show under "scenarios" on the interface. There is also the option of not using certain variables if no data is available. Please note that if the purpose is to look at costs over time, the dataset prices.xls must be used.

If the analysis is undertaken for different population groups (e.g. ethnic population), the prices collected for the general population may be used, or a separate price collection may be undertaken to reflect the retail outlets commonly used by the population group.

Variable	Description
Country	
Population group	Prices collected for 'all' the population or a specific population group that is named.
Region	Region where prices were collected
Urban	Yes/no. Urban is defined by an individual country.
Date	Date of price collection
Season	Season of price collection
Deprivation	Level of deprivation of the price collection outlets, levels can be collapsed into less or more categories
Outlet type	Type of retail outlet, e.g. supermarket, the options can be country specific
Outlet name	Name of retail outlet, if a chain then include area, e.g. Countdown Milford
Chain	Name of chain, e.g. Countdown
Food group Commonly consumed food Commonly consumed food Id	See common foods table
Brand	Brand name of food, enter NA if no brand name (e.g. fresh produce)
Type	'Branded' or 'generic' label, enter NA if no brand name (e.g. fresh produce)
Unitsize g/ml	Size of package, if purchased per kg enter '1000'
Discount	'No' or 'yes' depending if product at a discount price available to all customers
Price Price/100g Price/100 AP	Price of product, if purchased per kg enter price per kg Calculate price per 100g Multiply price per 100g by the edible factor to calculate the amount to purchase (e.g. $2.00 / 0.85 = $2.35

Food Prices to use

Variable	Description
Food group Commonly consumed food Commonly consumed food ID	See common foods table
Price/100 AP	Price of food to purchase to provide the edible portion required Sourced from 'price/100AP' 'food prices' sheet but average prices for each commonly consumed food May be from one price or the mean of prices for an individual food (with same commonly consumed food ID) This database is used by default by the programme while the "prices to use" database is used for conducting scenario analyses.

Interface

The programme interface [3] allows the user to specify the daily targets for the food groups and nutrients for all household members for current and healthy diets separately.

The first step is to select the particular household member that you want to create the diets for. There are 8 options:

* Adult man healthy diet

* Adult woman healthy diet

* Young girl healthy diet

* Young boy healthy diet

* Adult man current diet

* Adult woman current diet

* Young girl current diet

* Young boy current diet

Daily nutritional constraints:
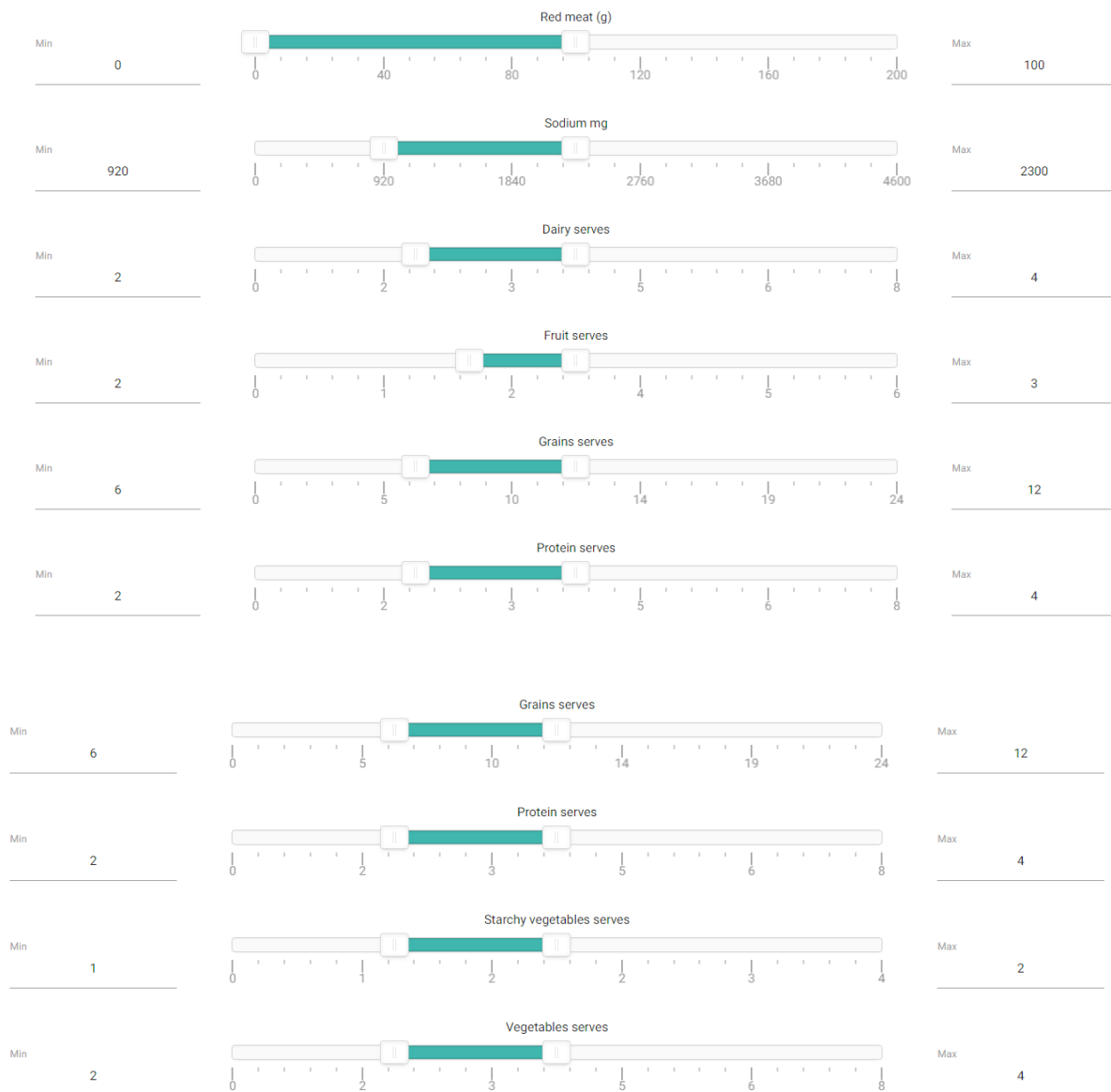
VIEW PREVIOUS RUNS

Persona

adult man H

The programme needs to be run for each of those household members separately. The results for each member can be downloaded as a CSV file (which

will include the costs and contributions of food groups to the cost) for each individual meal plan created) and will also be saved under the tab "previous runs".

Please note that when you close the browser, all previous runs will be lost!

After the selection of the household member you can set the food group and nutrient targets on the interface. Normally these are automatically filled in based on the nutrient target Excel input file, but need to be carefully checked before running the programme and adapted or changed where needed. Please check carefully that discretionary foods and alcohol are set at zero for standard healthy diets. The group beverages is not included here and therefore for standard healthy diets min and max in the Excel file need to be 0 for all household members.

Red meat (g) — Min: 0, Max: 100 (scale: 0, 40, 80, 120, 160, 200)

Sodium mg — Min: 920, Max: 2300 (scale: 0, 920, 1840, 2760, 3680, 4600)

Dairy serves — Min: 2, Max: 4 (scale: 0, 2, 3, 5, 6, 8)

Fruit serves — Min: 2, Max: 3 (scale: 0, 1, 2, 4, 5, 6)

Grains serves — Min: 6, Max: 12 (scale: 0, 5, 10, 14, 19, 24)

Protein serves — Min: 2, Max: 4 (scale: 0, 2, 3, 5, 6, 8)

Grains serves — Min: 6, Max: 12 (scale: 0, 5, 10, 14, 19, 24)

Protein serves — Min: 2, Max: 4 (scale: 0, 2, 3, 5, 6, 8)

Starchy vegetables serves — Min: 1, Max: 2 (scale: 0, 1, 2, 2, 3, 4)

Vegetables serves — Min: 2, Max: 4 (scale: 0, 2, 3, 5, 6, 8)

Please note that it is possible to leave certain constraints open (e.g. not use certain constraints) if no data are available.

In addition, the interface allows the user to specify whether or not to include takeaway meals part of the diets. The minimum serve size difference between any two generated individual meal plans is set at half a serve for any common food by default but this can be changed if required. For each individual household member, the current and healthy diet scenarios can be run with a set number of iterations (e.g. 1million, 2million and 20million iterations). Normally it takes about 5 seconds for 10000 iterations and about 10minutes for 1million iterations. In the New Zealand study it was found that 1million iterations allows the average cost to be accurately estimated for healthy diets but for current diets 2million iterations were necessary.

Iterations (every 10000 iterations takes about 5 seconds)

10000

Minimum serve size difference

.5

Allowed variety ratings

1, 2, 3   ▼

☐ Allow takeaways

In case you want to run certain scenarios (e.g. as specified by variables in the prices database), you can select the box and the programme will automatically run all possible scenarios. You can then use the ones you are interested in from the output window. Please note that the distribution (e.g. average) of each unique scenario is calculated from the prices database and is then averaged for each category of a certain variable.

Variable price conditions

Enabled ✓

deprivation
0 ▾

☐ discount

outlet type
▾

population group
Pacific ▾

region
▾
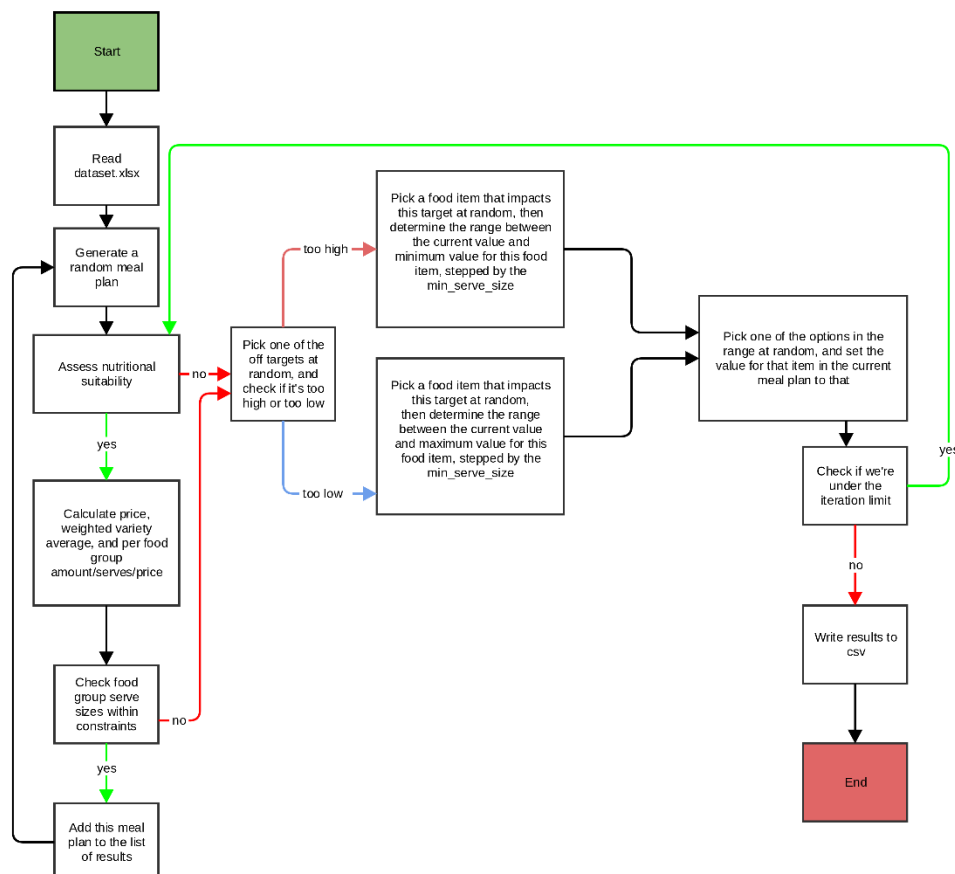
season
▾

type
▾

☐ urban

After you have run the programme for the 4 household members you can click on the tab "previous runs" and just simply click the household members you want to combine into a household diet. The output window with results on the costs will then automatically be printed on the screen (see example further).

If you conduct an analysis for a different population group, click on the appropriate group.

Programme algorithm

The programme algorithm uses the Mersenne Twister as a random number generator to specify the starting meal plan and the starting value in grams for each of the common foods. If a meal plan meets all targets and is not already in the list of matching meal plans, it is added to the results. If it doesn't (i.e. it fails some constraint), the algorithm will then try to fix that constraint (by raising/lowering the amount of some item that affects that constraint randomly between the min and max amount for that food item).

If the modification results in a matching meal plan, the meal plan is added to the results and, the same procedure starts again until the specified number of iterations has been run. If the modification does not result in a matching meal plan, the algorithm will continue to try to resolve one of the failing constraints in each subsequent iteration. All success meal plans are independent from each other.

Outputs

The output window is automatically displayed after combining the individual household members. All possible combinations of two-weekly meal plans for the four individual household members are assembled into two-weekly household diets. The range and distribution of the cost of the fortnightly household meal plans and the contributions of each food group and discretionary foods, alcohol and takeaways to the cost of the diets are calculated and displayed.

The impact of different prices, diets and policy scenarios on the cost differential between healthy and less healthy, current household diets was also calculated.

Since there are many household diets created based on the individual household member results, unlike for the individual household member results, it is not possible to download all the different household results, but in R or SAS it is possible to do the combinations yourself using the individual CSV results. This is helpful if you are interested in calculating the proportion of healthy diets that are cheaper than the average current diet for example.

A simple example is provided below of the output window for an individual diet, part of two fortnightly meal plans and a combination of the diets of the four household members.

Food group breakdown

Category	Amount	Price	Serves
Beverages	10875g	$11.75	43.5
Dairy	6625g	$15.11	31.66
Discretionary foods	0g	$0	0
Fats & Oils	95g	$0.88	7
Fruit	3420g	$17.75	28.5
Grains	8874.5g	$19.45	136.53
Protein	4302.5g	$82.83	46
Sauces	765g	$4	51
Starchy vegetables	2970g	$6.55	22
Takeaways	0g	$0	0
Vegetables	4126g	$17.89	55.01

Price: $176.2   Variety: 1.33

Food group breakdown

Category	Amount	Price	Serves
Beverages	8500g	$9.84	34
Dairy	9860g	$27.31	51.16
Discretionary foods	0g	$0	0
Fats & Oils	135g	$1.26	10
Fruit	4320g	$22.28	36
Grains	5722g	$19.29	88.03
Protein	4400g	$72.32	45.5
Sauces	465g	$2.87	31
Starchy vegetables	3442.5g	$10.98	25.5
Takeaways	0g	$0	0
Vegetables	3938.5g	$17.6	52.51

Price: $183.74   Variety: 1.45

Fortnightly meal plans:

Total meal plans: 2. Average price: $179.97. Average variety: 1.39.

 [DOWNLOAD AS CSV]

Name	Amount
Apples, fresh	780g
Avocados, fresh	225g
Bananas, fresh	240g
Beef steak, blade	1650g
Beef, mince	0g
Bread, wheatmeal	325g
Bread, white	130g
Bread, wholegrain	651g
Broccoli, fresh	150g

Name	Amount
Apples, fresh	240g
Avocados, fresh	75g
Bananas, fresh	1260g
Beef steak, blade	0g
Beef, mince	0g
Bread, wheatmeal	325g
Bread, white	1787.5g
Bread, wholegrain	358.5g
Broccoli, fresh	150g

Combined statistics

Total combined meal plans: 4
Price range: $657.1 - $670.51 ($663.8 avg). σ = 6.7, 95% CI range = $657.23 - $670.37
Variety range: 1.5-1.55 (1.52 avg)

Food group breakdown

Category	Amount	Price	Serves
Beverages	19750g-30375g (25062.5 avg)	$23.12-$34.45 ($28.79 avg)	79-121.5 (100.25 avg)
Dairy	32720g-36930g (34825 avg)	$75.26-$87.91 ($81.58 avg)	154.14-175.14 (164.64 avg)
Discretionary foods	1952.5g-2310g (2131.25 avg)	$17.44-$22.03 ($19.74 avg)	49.5-67.2 (58.35 avg)
Fats & Oils	335g-445g (390 avg)	$3.14-$4.34 ($3.74 avg)	25-35 (30 avg)

Strengths

Once the input files are prepared DIETCOST automatically generates the cost of diets that meet the constraints. By altering the inputs on the interface, a range of scenarios altering the type of price, location, reference household, population groups, region, or aspects of the diets can be simply generated.

Unlike studies to date that have compared the cost of one healthy and one current diet, DIETCOST allows the cost of many meal plans for a particular set of constraints to be generated and enabling comparison of the distribution of costs of current and healthy diets.

Limitations

The limitations of the tool are related to the limitations of the input files. This could include no recent national nutrition survey, insufficient information on food composition and serve sizes or food-based dietary guidelines that do not provide quantitative recommendations. Unlike manually developing the diets, the tool does not produce a menu with the food for each meal for each day outlined, only a list of the amounts of foods consumed for two weeks. This limits the translation of the modelling tool for practical application in nutrition education and health promotion as one example of a menu cannot easily be provided

Additional recommendations

It is recommended to validate a random selection of meal plans for the different household members generated by the programme and make fortnightly meal plans manually to make sure that the meal plans are acceptable.

To edit the programme code in Python, you can open it with your preferred text editor, for example gedit or Notepad++

(https://en.wikipedia.org/wiki/Gedit).

 (https://en.wikipedia.org/wiki/Notepad%2B%2B).

Publications

Vandevijvere S, Young N, Mackay S, Swinburn B, Gahegan M. Modelling the cost differential between healthy and current, less healthy population diets: The New Zealand case study. Under review.

References

1. Lee A, Mhurchu CN, Sacks G, Swinburn B, Snowdon W, Vandevijvere S, Hawkes C, L'Abbe M, Rayner M, Sanders D *et al*: **Monitoring the price and affordability of foods and diets globally**. *Obes Rev* 2013, **14 Suppl 1**:82-95.
2. Swinburn B, Sacks G, Vandevijvere S, Kumanyika S, Lobstein T, Neal B, Barquera S, Friel S, Hawkes C, Kelly B *et al*: **INFORMAS (International Network for Food and Obesity/non-communicable diseases Research, Monitoring and Action Support): overview and key principles**. *Obes Rev* 2013, **14 Suppl 1**:1-12.
3. **DIETCOST** [http://dietcost.cer.auckland.ac.nz/]