

The Food "Lifeboat": food and nutrition considerations in the event of a pandemic or other catastrophe

Large catastrophes have caused the collapse of empires and civilizations. Science and knowledge may help prevent some catastrophes, but urbanisation and narrowly concentrated food supplies, climate change and terrorism contribute to considerable risk. Viruses such as SARS (severe acute respiratory syndrome) and influenza A/(H5N1) or "bird flu" are among the most immediately identifiable risks. In the event of a highly lethal pandemic, emergency measures such as closing schools, staying home with family and friends, avoiding contact with other people (until all have been immunized) will be instrumental in avoiding infection. Individuals in essential services or occupations may be required to reside at their workplace for the whole period of the crisis. To achieve this type of isolation, sufficient food must be available, and ways to distribute the food must be planned.

But which foods and in what quantities? It is logical that they should be staples and well accepted, easy to store, packed where possible in an inert gas for a longer shelf life and not dependent on refrigeration. Importantly, they will be nutrient dense providing the recommended macro- and micronutrients for all members of the family. Ideally, they can be eaten without cooking in case gas and electricity fail. Cost, volume and storage space are further considerations.



In Table 1 we provide an example of a food list providing 9 MJ per day for 10 weeks for one person that covers all known nutrient needs. This example was generated using the nutrient analysis software Foodworks® (5), which is based on the composition of Australian foods and commonly used by Australian dietitians. The recommended daily intake of specific macronutrients and micronutrients for adults and children is published by the Australian Government Department of Health and Ageing. Together, these two sources make it possible to compose diets with the appropriate quantity of nutrients. As the majority of the population has no access to detailed nutrient data, we have developed these examples to demonstrate what is needed and typical of what might be acceptable. We acknowledge that such food lists

are culturally and ethnic-specific and that other food combinations are possible.

Table 1

An example of a food list providing 9 MJ per day. Daily food ration and purchase list for 10 weeks for one person is shown. The food covers all nutrient needs.

Food	g/day	kg/person/10 weeks
Milk powder, NS fat, dry*	65	4.6
Weet-Bix (regular) (Breakfast cereal)	30	2.1
Pasta, regular, dry	20	1.4
Instant noodles	20	1.4
Rice	25	1.8
Dehydrated potato flakes	15	1.1
Tortilla	10	0.7
Biscuit, savoury	15	1.1
Biscuit, wholemeal	20	1.4
Oil, canola	20	1.4
Powdered soup	20	1.4
Sweet chilli sauce	10	0.7
Tomato concentrate	10	0.7
Tuna, canned	60	4.2
Spam, regular	40	2.8
Lentils, dry	20	1.4
Peas, green canned	20	1.4
Three beans mix	50	3.5
Baked beans, canned in tomato sauce	20	1.4
Corn, canned	50	3.5
Sun-dried tomatoes	20	1.4
Milo (Beverage base)	10	0.7
Seaweed, dried	10	0.7
Raisins	30	2.1
Honey	10	0.7
Almonds	20	1.4
Apricots, dried, raw	20	1.4
Juice, carrot	50	3.5
Juice, orange	50	3.5
Vegemite (Yeast extract)	2	0.1
Chocolate	30	2.1

Total daily ration gives 9.0 MJ, providing 80 g protein, 80 g fat, thereof 23 g saturated fat (10 % of total energy intake is coming from saturated fat, and 31% of the fat intake is saturated fat), 18 g polyunsaturated fat (22% of the fat intake), 35 g monounsaturated fat (47% of the

fat intake). The cholesterol intake is 101 mg per day. Percent of energy from protein, fat and carbohydrate: 16 E% protein, 34 E% fat, 50 E% carbohydrates. Recommended intake of all nutrients is covered for women and men, except for folate intake which is not covered for women of childbearing age, therefore they may consider a folate supplement. *In case of lactose intolerance, the intake of dry milk powder may be reduced and replaced by soy protein powder. Alternatively, the milk may be fermented and used in form of sour milk.

The cost of this diet for 10 weeks for one person is about \$500. The most expensive items are: Milk powder, Weet-Bix, spam, chocolate.

Table 2

Example of a list of simple dry foods that will cover basic energy needs (9 MJ per day), and most nutrients except vitamin C and vitamin A. Daily food ration and purchase list for 10 weeks for one person is shown. The food items could be packed in airtight packages filled with inert gas of a few kilos per package, and stored in food stores throughout the country. In addition multivitamin tablets have to be provided.

Food	g/day	kg/person/10weeks
Wheat flour, wholemeal plain	150	10.5
Oats, raw	100	7.0
Oil, Canola	25	1.8
Milk powder, dry*	65	4.6
Lentils, dry	30	2.1
Peas, split, green/yellow, dry	40	2.8
Noodles, dry	50	3.5
Vegemite (yeast extract)	2	0.1
Fruit, mixed, dried	35	2.5
Almonds, raw	40	2.8
Multivitamin/mineral supplement	One tablet	One box

This example gives 9 MJ per day, with 80 g protein and 76 g fat, thereof 14 g saturated fat (6 % of the energy intake comes from saturated fat and 20% of the fat intake is saturated fat), 18 g polyunsaturated fat (26% of the fat is polyunsaturated fat) and 39 g monounsaturated fat (54% of the fat is monounsaturated fat). The daily cholesterol intake is 43 mg. Percent of energy from protein, fat and carbohydrate: 16 E% protein, 32 E% fat, 52 E% carbohydrates. Recommended intake of nutrients is covered for women and men, except for vitamin C and vitamin A, and these would have to be given as supplements and for women at childbearing age the intake of folate and iron is lower than recommended.

*In case of lactose intolerance, the intake of dry milk powder may be reduced and replaced by soy protein powder. Alternatively, the milk may be fermented and used in fermented, sour form.

In addition, about 2 litres of water per day per person would be required.

This diet costs about 250 \$ for one person for 10 weeks. The most expensive items are: dry

milk powder and noodles.

Preparing Your Pantry and Meals

Overview

The food items listed provide sufficient nutrition for the body's needs. This does not mean you are limited to the suggested foods; however substitutions can impact on the nutrients provided by the diet.

Pantry Maintenance

It is important when foods are stored for use later in the week, month or year that the use by date is evident and that older supplies are used first. It is recommended that 10 weeks supply of food items is necessary to be stored in the pantry, freezer and refrigerator. Practicality recommends that freezer and refrigerator items should be kept to the minimum. Start by ascertaining the meals /foods that you and your family prefer eating and whether they can replace some of the items on the food lists with nutritional security. Identify the foods on our list that do not routinely appear in your meals or snacks and begin trying new recipes so you have a series of meals and snacks that your family will eat if necessary. Each week buy a few additional foods for the pantry with a good date life eg some pasta have 2-3 years shelf life. Do not stockpile foods in a separate place allowing them to go out of date. Make them part of your normal pantry and replace when used. When purchasing foods, consider the size of the packaging. Some foods deteriorate quickly once opened and for these, buy the packaging size sufficient for one meal only.

Meal Preparation

Review your regular family recipes. Water and power supplies may be disrupted during an outbreak of pandemic flu and this will influence meal preparation. Because of this the meals that can be prepared with minimal implements and equipment are ideal ie one pot cookery. Make a file of these recipes. Another member of the family may need to prepare the meals if you are unwell. It is important that we do drink water everyday and not waste supplies for the washing and cleaning of excessive pots nor wasting cooking water. Rice should be cooked using the absorption method and the water left over from cooking pasta should be reused in soups and casseroles, wherever possible. Consider a supply of paper plates should water for dishwashing becomes limited.

Essential Kitchen Equipment

2 can openers
Glass measuring jug
Metal stirring / serving spoon
Plastic, non porous chopping / preparation board
Large Mixing Bowl
Saucepan with tight fitting lid
Aluminium Foil Cling Wrap

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