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ADF Educators Guide to Healthy Eating (ADF EDGE)

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Defence Science and Technology Organisation

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ABSTRACT

The ADF EDucator's Guide to healthy Eating (ADF EDGE) was written largely for people who educate others about eating for good health within the Australian Defence Force (ADF). Additionally, this document provides information for catering in ADF messes. It also provides a conceptual framework for understanding the relationship between foods and nutrients. The ADF EDGE provides best-practice advice about food choices to promote health and wellbeing and reduce the risk of diet-related diseases within an ADF context. Furthermore, it provides written and diagrammatic guidance with design elements which can be adopted by the ADF to produce suitable education materials for use by individual service men and women, catering and health personnel. An example brochure and flyer for use as educational tools, are attached.

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ADF Educators Guide to Healthy Eating (ADF EDGE)

Executive Summary

In 2006, the National Health and Medical Research Council (NHMRC) updated the Nutrient Reference Values (NRVs) for Australia and New Zealand (NHMRC, 2006). Recommendations for Military NRVs (MNRVs) were subsequently developed in light of the new NRVs for Australia and New Zealand and published in a DSTO General Document titled *Australian Defence Force Nutritional Requirements in the 21st Century* (Version 1). The MNRVs differ from the Australian NRVs in a number of aspects including recommendations for certain nutrients related to high-energy expenditure and to the balance of proteins, carbohydrates and fats.

The NHMRC has also revised its analysis of what basic foods are required to attain the relevant nutrient and energy requirements for people of various ages, genders and activity Levels. This analysis has been used to develop the new *Australian Dietary Guidelines* (NHMRC, 2013).

While these guidelines are intended to apply to the general (i.e. civilian) population, they may also be used by defence personnel undertaking activities comparable to civilian jobs, many of which have lower energy needs. The higher energy needs of ADF personnel that are required when on specific and demanding military operations necessitated an additional analysis to take into account their specialised nutrient needs. Also, the types of foods for those with high energy needs have to differ from those for the general population to ensure high energy and nutrient density while limiting the overall volume of food consumed.

DSTO has, therefore, developed recommendations for Australian Defence Force (ADF) personnel that are practical and relevant to the ADF system for the provisioning of fresh food (ADF Fresh Food Provisioning Scale). The results have been incorporated into an update of the Australian Defence Force Ration Scale (ADFRS) SUPMAN 4, the catering manual used by Army and RAAF, and NAVSUPMAN 5, used by RAN.

The ADF EDGE, which is based on the ADFRS, outlines how dietary patterns can be developed for individuals of different ages, genders and activity Levels. As this is a guide for use with ADF personnel, which may be extended to their families, two different methods are presented for determining dietary choices:

- a system tailored to the special needs of the adult (mostly male) ADF personnel eating in ADF catering facilities, particularly those undertaking moderate to high physical activity (Section 5); and
- a system for ADF personnel with smaller body size and/or more sedentary occupations, which is based on the *Australian Guide to Healthy Eating (AGTHE)* for the civilian population and is presented in an Appendix.

Both systems rely on identifying the number of serves to include in the diet, based on energy requirements.

The Educators guide also provides advice regarding the nutritional needs for physical training, sensible eating for weight loss, interpreting food labels and special advice for eating from military messes while deployed overseas, and when eating combat rations.

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Christine has worked as a researcher (UQ) and in professional roles (Chemical Pathology, RBH; private-practice dietitian). Her qualifications include teaching (Dip Ed, UQ), dietetics (Grad Dip Nutr Diet, QUT) and management (Grad Cert Scientific Leadership, UMelb). As a senior scientist with DSTO, Christine has undertaken nutrition and human-performance research within Australia and internationally, including leading a military scientific expedition in Sabah, Malaysia. She has contributed to many Defence (DSTO) research and technical publications. Currently she has a part-time appointment to the University of Tasmania as Senior Lecturer, Biochemistry.

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Background information

Development of the new *Australian Dietary Guidelines* was funded by the National Health and Medical Research Council (NHMRC), the Australian Government Department of Health and Ageing (DOHA) and the Defence Science and Technology Organisation (DSTO). It was undertaken in conjunction with an update of the *Dietary Guidelines for Australian Adults,* the *Dietary Guidelines for Children and Adolescents in Australia* and the *Dietary Guidelines for Older Australians*. The new guidelines were informed by a dietary modelling exercise to translate amounts and types of foods required to provide the nutrient and energy needs of people of varying age, gender and life-stage.

In early 2007, the School of Human Life Sciences at the University of Tasmania assisted DSTO-Scottsdale with the planning and design of a project aimed at developing tailored advice for the ADF on healthy eating consistent with national guidelines. From this plan, DSTO entered into a collaborative agreement with the NHMRC to achieve military-relevant dietary guidance as part of the larger Dietary Guidelines project.

The NHMRC has now revised its analysis of what basic foods are required to attain the relevant nutrient and energy requirements for people of various ages, genders and activity Levels and developed new *Australian Dietary Guidelines.*

DSTO contributed funding and staff resources to NHMRC to undertake an update of the *Australian Guide to Healthy Eating* (CDHFS, 1998) and to develop advice on healthy eating for ADF personnel. DSTO was given observer status during this process.

A new ADF fresh food scale was employed to move ADF feeding from an entitlement based system to a needs based system based on weekly rather than daily menus.

The final stage of the project was the translation of the new *Australian Dietary Guidelines* and the new ADF fresh food scale into a food selection guide for ADF personnel; the result is the *ADF EDucator's Guide to healthy Eating (ADF EDGE).*

The Guide provides comprehensive advice and best practice about food choices to promote health and wellbeing and reduce the risk of diet-related diseases within the ADF. Furthermore, it provides written and diagrammatic guidance with design elements which can be adopted by the ADF to produce suitable education materials for use by individual service men and women, catering and health personnel.

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Dedication to Professor Katrine Baghurst

DSTO was saddened to learn of the passing of Professor Katrine Baghurst, 9th December 2012, after a long illness. Professor Baghurst worked as a consultant to government and the nutrition industry after an extensive career with the CSIRO covering nutrition, consumer research and epidemiology. She held an Adjunct Professorship in the Department of Medicine at the University of Adelaide. Katrine was a member of numerous health committees over the last 25 years and most recently the Health Advisory Committee of the National Health and Medical Council (NHMRC).

NHMRC and DSTO-Scottsdale are grateful to Professor Katrine Baghurst for her assistance in undertaking the dietary modelling for highly active ADF personnel and development of the new ADF Fresh Food Provisioning Scale.

Glossary of Terms

ADF EDucator's Guide to healthy Eating (ADF EDGE): a guide that provides healthy eating advice for individual members of the Australian Defence Forces.

Australian Defence Force Ration Scale (ADFRS): scales of entitlements to fresh food for garrison (also known as barracks or mess) feeding, and when fresh feeding can take place in the field.

Australian Guide to Healthy Eating (AGTHE): a food guide for Australia which reflects the multicultural nature of the population and which is relevant for all sectors of the food system to use as a nutrition education and information tool.

Body Mass Index (BMI): an indication of 'weight category', BMI is defined as weight (kg)/height (m)-squared. The National Health and Medical Research Council (NHMRC, 2012) recognises the following definitions: BMI < 18.5 is defined as *underweight*; BMI in the range 18.5–24.9 is *healthy weight range*; BMI in the range 25.0–29.9 is *overweight*; BMI ≥ 30.0 is *obese*. The Director General Defence Health Services (Department of Defence, 2002) recognises three classes of obesity — Class 1 is BMI in the range 30.0–34.9; Class II is BMI in the range 35.0–39.9; Class III is BMI ≥ 40.0.

Commonwealth Department of Health & Family Services (CDHFS): former Commonwealth Department responsible for preparation of the *Australian Guide to Healthy Eating* (CDHFS, 1998).

Combat Ration Packs (CRP): also known as 'ration packs', 'operational ration packs' and 'combat rations', these are packs of processed foods and other items associated with rationing (e.g. matches, cutlery, can-opener). They may be for individual or group feeding, and may be general-purpose or mission-specific (i.e. designed to support operations in a particular climate or missions of a special nature, such as short-term/high-intensity operations).

Defence Science & Technology Organisation (DSTO): DSTO is part of Australia's Department of Defence and is the Australian Government's lead agency charged with applying science and technology to protect and defend Australia and its national interests.

Diggerworks: an organisation of Army personnel in the Defence Material Organisation and the DSTO. Diggerwork's key role is to conduct soldier engagement while coordinating rapid trialling and implementation of soldier combat systems.

Foundation Diet: *Foundation Diets* are designed to meet all the nutrient needs for the least active and smallest person in each gender and age category.

Individual Water Purification systems (IWPs): water purification devices designed to provide safe water for individuals.

Jack rations: food items provided by the individual soldier, or their family and friends, for soldiers to eat when participating in military exercises or deployments.

Joule (J): the fundamental unit of energy in the *Système International* d'unit*ès* (SI) also known as the metric system of measurement). One joule is the work done when one kilogram is accelerated at one metre per second-squared across a distance of one metre.

Kilojoule (kJ): one thousand joules (i.e. 1 kJ = 1000 J). One Calorie (or 1 kcal) = 4.184 kJ.

Megajoule (MJ): one MJ is the equivalent of 1000 kJ (see Kilojoule above).

Military Nutrient Reference Value (MNRV): the military equivalent of the Nutrient Reference Value defined by the National Health and Medical Research Council (NHMRC, 2006). MNRVs include, *inter alia*, Military Estimated Average Requirements (MEARs) and Military Recommended Dietary Intakes (MRDIs).

Military Recommended Dietary Intake (MRDI): the recommended daily intake Level of a nutrient for ADF members engaged in training or operations at a particular Level of work output. MRDIs are recommended for four ADF subgroups—*adult males, adult females, adolescent males* and *adolescent females*. In this context an 'adult' is assumed to be in the age group 19–31 years, and 'adolescent' implies those aged less than 19 years (ADF adolescents will be 17 or 18 years).

Mentoring & Reconstruction Task Force (MRTF): ADF personnel deployed to Afghanistan.

Modelling: the complex statistical approach used to design dietary patterns which meet the nutritional and cultural requirements for the population.

National Health & Medical Research Council (NHMRC): Australia's peak body for supporting health and medical research; developing health advice for the Australian community, health professionals and government; and providing advice on ethical behaviour in health care and in the conduct of health and medical research.

Nutrient Reference Values (NRVs): a collective term for a series of recommended nutrient intakes published by the National Health and Medical Research Council (NHMRC, 2006). NRVs include Estimated Average Requirement (EAR), Adequate Intake (AI), Upper Level of Intake (UL), Recommended Dietary Intake (RDI) and Suggested Dietary Target (SDT).

Task VCDF 07/082: research tasking undertaken by DSTO for the Vice Chief of Defence Forces.

1. Introduction

This guide is part of a larger project to update national dietary advice for Australia, undertaken by the Office of the National Health and Medical Research Council (NHMRC), the Australian Government Department of Health and Ageing and the Defence Science Technology Organisation (DSTO).

This guide was written largely for people who educate others about eating for good health within the Australian Defence Forces (ADF). These will include:

- TAFE (Technical and Further Education) and university lecturers and instructors;
- military caterers;
- health professionals including general practitioners, dietitians, nutritionists and nurses; and
- physical training instructors (PTIs).

Additionally, this document provides information for catering in ADF messes.

The *ADF EDucator's Guide to healthy Eating* (ADF EDGE) provides a conceptual framework for understanding the relationship between foods and nutrients. The recommendations of the ADF EDGE reflect the nutrient requirements of people of various ages and gender and the nutrient composition of foods. Further details can be found in *Final report to DSTO on diets conforming to military nutrient standards at energy Levels ranging from 12.5 to 25 MJ*, Baghurst and Baghurst (2009). The ADF EDGE is primarily concerned with physical health and its purpose is to provide information about the kinds of foods to choose each day. A population level approach to food guidance has been taken which is based on the food intakes and health problems of the population as a whole.

This document provides the background information needed to:

- understand the rationale used in developing the guide so that the graphic (Figures 1 and 2) can be adapted to include the foods appropriate for different ADF personnel;
- make the best use of the ADF EDGE materials for counselling, teaching, health; promotion, menu evaluation and development; and
- explain how to develop a healthy eating pattern for individuals.

1.1 Educational Materials

Further educational material is available at www.eatforhealth.gov.au. Together with this guide, such material provides a suitable basis for developing videos, interactive tools, posters, brochures and booklets to guide ADF personnel on healthy eating. An example of an e-brochure and a flyer were prepared by DSTO and are included as attachments.

Figure 1 Australian Guide to Healthy Eating (visual presentation)

2. How the ADF Educator's Guide to Healthy Eating was developed

The intake of adequate energy and nutrients plays a fundamental role in the operational performance of ADF personnel. Rationing systems (including freshly-cooked food, i.e. 'fresh feeding') that promote a high-level of nutritional status before, during and after military operations, and during training, are important in ensuring that ADF performance is both optimal and sustainable.

In 2006, the National Health and Medical Research Council (NHMRC) updated the Nutrient Reference Values (NRVs) for Australia and New Zealand (NHMRC, 2006). Recommendations for Military NRVs (MNRVs) were subsequently developed in light of the new NRVs for Australia and New Zealand and published in a DSTO General Document titled *Australian Defence Force Nutritional Requirements in the 21st Century* (Version 1), Forbes-Ewan (2009). The MNRVs differ from the Australian NRVs in a number of aspects including recommendations for certain nutrients related to high-energy expenditure and to the balance of proteins, carbohydrates and fats.

The NHMRC has also revised its analysis of what basic foods are required to attain the relevant nutrient and energy requirements for people of various ages, genders and activity levels. This analysis has been used to develop new guidelines to replace the *Australian Guide to Healthy Eating* (AGTHE) (CDHFS, 1998). A visual representation of AGTHE is provided (Figure 1).

While the earlier AGTHE and the new *Australian Dietary Guidelines* (NHMRC, 2013) were intended to apply to the general (i.e. civilian) population, they provide advice of relevance to defence personnel undertaking activities comparable to civilian jobs, many of which have lower energy needs. The higher energy needs of ADF personnel that are required when on specific and demanding military operations necessitated an additional analysis to take into account their specialised nutrient needs. Also, the types of foods for those with high energy needs have to differ from those for the general population to ensure high energy and nutrient density while limiting the overall volume of food consumed.

DSTO has, therefore, developed recommendations for ADF personnel that are practical and relevant to the ADF system for the provisioning of fresh food (ADF Fresh Food Provisioning Scale). The results have been incorporated into an update of the Australian Defence Force Ration Scale (ADFRS) SUPMAN 4, the catering manual used by Army and RAAF, and NAVSUPMAN 5, used by RAN, as described by Forbes-Ewan and Malberg, 2010. This revision was led by Dr Christine Booth in response to a request from Joint Logistics Command's Defence Catering Policy Cell. Information about the development of the new ADF Fresh Food Provisioning Scale can be found in *Development of a new Australian Defence Force Fresh Food Provisioning Scale (SUPMAN 4/ NAVSUPMAN 5) Review*, Forbes-Ewan and Malberg (2010).

A major challenge for advising ADF personnel on healthy eating is how to incorporate sufficient flexibility within the new Fresh Food Scale (FFS) to accommodate the range of energy and nutrient requirements for widely different levels of ADF physical activity. Following this update to the ADF FFS, DSTO undertook modelling to establish the required amounts per week of food in each food group that would ensure a nutritionally-adequate base

diet providing about 13-14 MJ of energy, but with the micronutrient needs of those requiring up to 20-21 MJ a day. In this way, the majority of ADF personnel engaged in moderate physical activities would be provided with adequate micronutrients for all but the most extreme activity level by the base catering provided at all sites. The extreme activity level includes those undergoing the Special Air Service Regiment selection course or equivalent and thus applies to only a very small cohort of the ADF population.

To simplify the modelling and provide practical guidance for catering, additional 1 MJ energy modules were developed to account for increasing energy needs, Baghurst and Baghurst (2009). For the ADF FFS, suggestions were made regarding which modules could be added and when (i.e. breakfast, lunch, dinner, snacks) to maximise variety and encourage consumption, Forbes-Ewan and Malberg (2010). These modules were either composed of a mix of additional basic food groups such as vegetables, fruits, cereals, nuts and seeds, dairy or meats and meat alternatives or from discretionary food choices (higher energy, lower nutrient foods such as cakes, biscuits, snack foods, ice cream, soft drinks, chocolate, confectionary etc.) or a mix of basic and discretionary foods. A weekly scale was developed to replace the previous daily scale which then allows caterers more flexibility in choosing the variety of food provided from day-to-day.

When presenting these recommendations in materials designed to be used by individual ADF personnel (i.e. the ADF EDGE rather than the ADF FFS) for simplicity, the additional serves contained in the various modules were included in the overall food group recommendations and recommendations were given on a daily consumption basis. For personnel with lower energy needs (i.e. < 12.5 MJ/day), such as smaller men and women, or those engaged in more sedentary activities, the general advice provided in guidelines for the general Australian population can be used (Appendix A).

Once the modelling work had been completed, NHMRC and DSTO re-evaluated the general guidelines to produce tailored material to meet the needs of more active ADF personnel requiring from 13–27 MJ a day. The amounts and types of foods that meet these needs can be found in Section 5, *Developing Individual Dietary Patterns*.

3. The ADF Educator's Guide to Healthy Eating

3.1 Goal

The overall goal of the ADF EDGE is to encourage healthy eating through the consumption of a variety of foods from each of the five food groups every day in proportions that are consistent with general dietary guidelines for Australians (Appendix B) but also cater to the specific demands of ADF military operations.

3.2 Nutritional rationale

The five food groups are:

- *Grains*
- *Vegetables*
- *Fruit*
- *Dairy and alternatives*

- *Meat, poultry, fish, eggs and alternatives*

Table 3-1 Nutritional characteristics of the five food groups

Food Group name	***Grains***	***Vegetables***	***Fruit***	***Dairy and alternatives***	***Meat, poultry, fish, eggs and alternatives***
Main distinguishing nutrients	carbohydrate protein iron fibre thiamin folate iodine	beta-carotene vitamin C folate fibre	vitamin C dietary fibre	calcium protein riboflavin vitamin B12	protein iron zinc vitamin B12 (animal foods only), long chain omega 3 fats
Other significant nutrients*	energy protein magnesium zinc riboflavin niacin	carbohydrate magnesium iron potassium	carbohydrate folate beta-carotene	energy fat carbohydrate magnesium zinc sodium potassium	dietary fibre (plant foods only) energy fat niacin

**Some foods from the five food group foods (e.g. some breads and breakfast cereals and certain cheeses) can also contribute significant amounts of sodium*

The model on which this guide is based assumes that foods within each of the five food groups are eaten in types and amounts not too dissimilar to the average intakes in Australia, based on National Nutrition Surveys, (DOHA, 2008, ABS 1999). For example, the modelling for the grain group had breads versus rice versus pasta versus breakfast cereals eaten in about the same relative amounts. The greater the foods eaten depart from this pattern, the greater the possibility that nutrient needs may not be met.

3.3 Basic messages to be conveyed

For education, training and promotional purposes the basic healthy eating messages that should be conveyed include:

3.3.1 Eat a wide variety of nutritious foods from these five food groups every day. Drink water.

The message to enjoy a wide range of nutritious foods and to drink water emphasises the importance of the positive aspects of eating and drinking. This should also indicate that foods should be chosen from each food group every day. Eating healthy food should be an enjoyable experience.

Eating a wide variety of nutritious foods from these five food groups every day is important for several reasons:

1. Eating from a variety of food groups every day, in the amounts recommended, is likely to provide a diet containing sufficient amounts of all nutrients essential for health. It is not necessary to eat from each food group at every meal.

2. Because the foods in each food group vary in the amount of nutrients they provide, achieving nutritional adequacy also depends on eating a variety of food from within each group. For example, in the *Vegetables* group, orange vegetables such as carrots and pumpkins contain significantly more beta carotene than do starchy vegetables such as

potatoes. Similarly, kangaroo, beef, lamb, mussels and oysters are a better source of iron than the other foods in the meat, fish, poultry, eggs, nuts/seeds, legumes/beans group. Nuts and seeds have more Vitamin E and several other nutrients compared with animal foods in this same group. By selecting a variety of foods each day, over the week and at different times of the year, there is a much greater likelihood of obtaining sufficient quantities of all nutrients.

3. Eating a variety of foods of different biological origin is also believed to be beneficial to health. For example:

   - Dietary fibre is a constituent of food that contributes to health, e.g. dietary fibre from oats or barley may be beneficial in causing a modest reduction in blood cholesterol Level.
   - Cruciferous vegetables (such as broccoli, cabbage, cauliflower, brussel sprouts and bok choy) contain components which may be associated with protection against some cancers.
   - Some saturated fats are known to adversely affect blood cholesterol Levels, high levels of which are a known risk factor for coronary heart disease. Choosing foods from a variety of biological sources (both animal and vegetable) ensures a variety of fats in the diet and a balance of the different types of fats.

3.3.2 The range of foods in the groups is illustrative

The range of foods shown on the guide was chosen to represent the foods which are most commonly eaten in Australia. The foods shown on the guide are common, affordable foodstuffs in Australia but would typically have their counterparts in different cultures. Examples of other foods included in the various groups are given in the relevant sections.

Foods illustrated on the guide were chosen to:

- reflect foods commonly consumed in Australia;
- represent the range of foods within each food group;
- be affordable;
- reflect the nature of the food supply, including fresh, processed and packaged foods
- create the opportunity for shifts towards healthier eating (e.g. including wholemeal products); and
- be consistent with a high-fibre, low saturated fat, low-salt, and moderate sugar intake.

3.3.3 Proportion of food groups in the diet

The foods that form the basis of a healthy diet are portrayed in a pie-chart where the size of each segment of the circle is a visual representation of the recommended proportion of the diet from each food group based on recommended daily serves for men and women from 19 to 50 years of age. The proportions equate to 32% for grain (cereal) foods, 29% for vegetables including legumes/beans, 11% for fruit, 13% for milk, yoghurt, cheese and alternatives and 15% for the lean meat and poultry, fish, eggs, nuts and seeds, legumes and beans group.

This does not necessarily equate to the relative weight of foods to be eaten each day as food group serve sizes vary across groups. For example, vegetable serves are 75 g while fruit serves are 150 g.

More detailed information about using the guide to achieve a healthy eating pattern while providing total energy needed is contained in Section 5, *Developing Individual Dietary Patterns*.

3.3.4 Water

Water is an essential dietary component and can be obtained from a wide variety of sources including plain water, tea and coffee and liquid foods such as soups. More fluid is needed when being physically active and in hot weather. Plain, safe water is the best drink to quench thirst, and tap water that meets Australian Drinking Water Guidelines, (NHMRC, 2011) is a good and most affordable choice.

3.3.5 Foods not in the circle

Discretionary choices
'Use only sometimes and in small amounts' is the message which refers to foods we call *Discretionary choices* as they do not fit into the five main groups in the circle. Many are high in energy, saturated fat, added sugars or salt. They are not a necessary part of the diet, but can contribute to the overall enjoyment of eating, often in the context of social activities and family or cultural celebrations. Some people will need to increase their physical activity to accommodate the added kilojoules from *Discretionary choices*. These foods should always be considered as 'extras' in the context of selecting a healthy eating pattern.

Unsaturated spreads and oils
'Use small amounts' reflects the fact that an allowance was made in the food modelling for unsaturated spreads or oils for culinary reasons and as a concentrated source of essential fatty acids.

3.4 Adapting the guide

A simple schema for food selection has its limitations and cannot address all the factors which determine food choice, especially as the eating patterns of individuals and families are continually shaped and changed by a variety of personal, social and cultural influences.

Food choices will depend on the available food supply, taking account of constraints such as cost and the time and skills available to acquire, prepare and cook food.

Also, the guide does not specifically account for different eating styles or those with chronic health problems. It has, however, been designed to be sufficiently flexible, so that people with specialist knowledge of the needs of different target groups can adapt the guide appropriately. The template version on page 18 can be used to produce a visual guide which includes appropriate foods for use with certain groups of ADF personnel, including pregnant and lactating women and different cultural and ethnic groups, including Aboriginal and Torres Strait Islander peoples.

3.4.1 Suggested approach to adapting the guidance provided is:

1. Describe the common food items eaten by the individual or group members.
2. Place these identified foods in one of the Australian Dietary Guidelines food groups based on their similarity to the foods listed in Section 4.
3. Base the eating pattern chosen on the eating habits of the individual or group for whom the guide is being adapted.

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Eat a wide variety of foods from these five food groups every day.

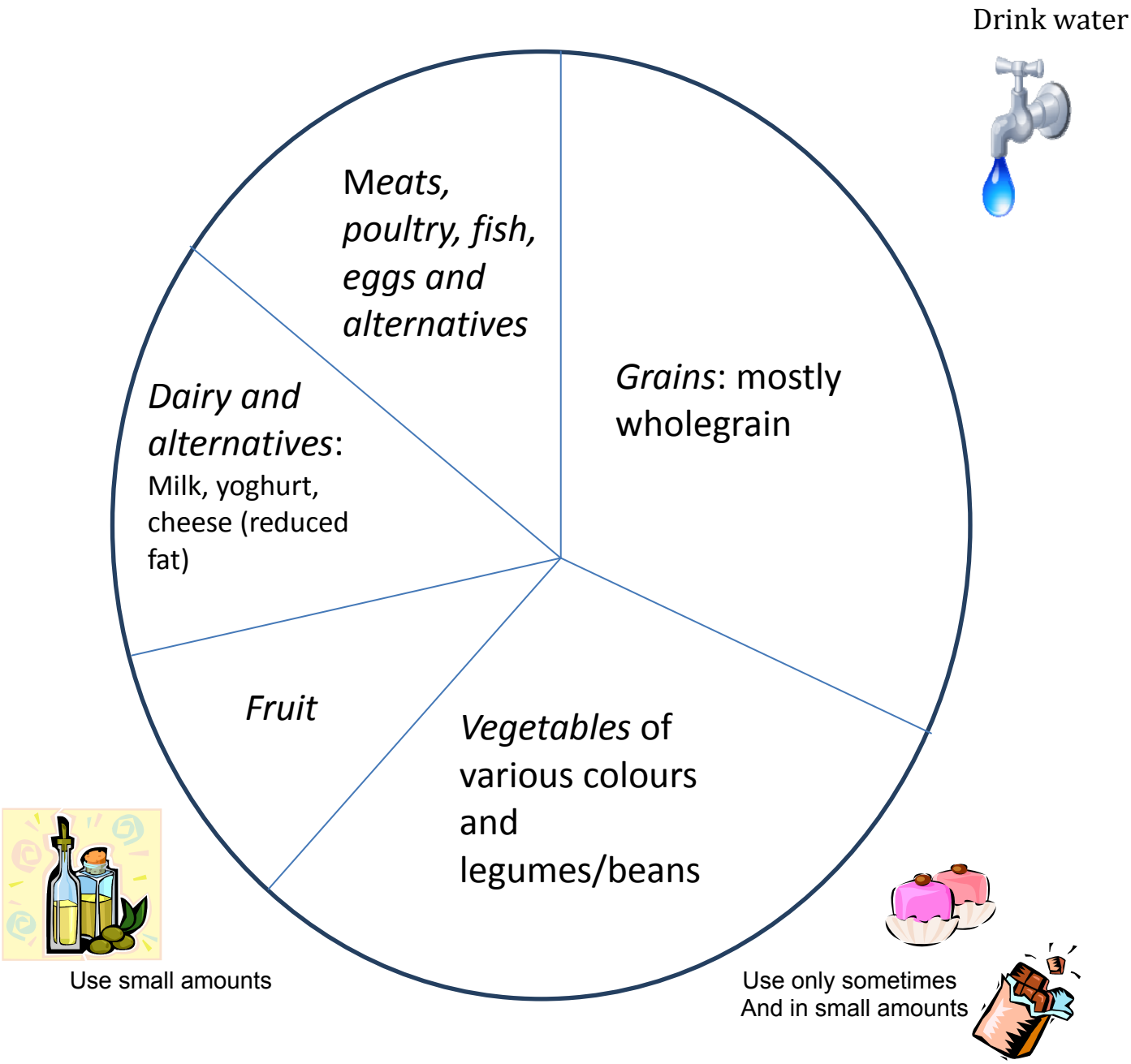

Figure 2 Australian Guide to Healthy Eating visual Template to use when adapting guidance for special groups

4. The Food Groups

4.1 Vegetables

Vegetables come from many different parts of plants, including the leaves, roots, tubers, flowers, stems, seeds and shoots. Some varieties that are not botanically classified as vegetables are included in this group because they are used as vegetables. For example, tomatoes and pumpkin which are the fruit of the plant and sweet corn, which is a grain/cereal.

Legumes are the seeds of plants from the Leguminosae family. These vegetables are eaten in the immature form as green peas and beans, and the mature form as dried peas, beans, lentils and chick peas.

Including plenty of vegetables and a variety of different colours and types of vegetables in the diet can provide a range of nutrients and phytochemicals (phyto means plants) that may help reduce the risk of obesity and some chronic diseases including heart disease and some cancers. Because of their low energy density, diets which are high in vegetables are especially important in helping reduce the risk of overweight and obesity.

Vegetables are a good source of vitamins, minerals, dietary fibre and a few vegetables such as potatoes, legumes, sweet potatoes and green peas also provide carbohydrate. All vegetables provide vitamin C: capsicum, broccoli, cauliflower, cabbage, Asian greens and tomatoes are particularly high in this vitamin. Dark green or orange vegetables like spinach, broccoli, carrots and pumpkin are an especially good source of carotenes, which the body converts to Vitamin A, and also of other carotenoids. Green vegetables (including some salad vegetables), beetroot, cauliflower, asparagus, dried peas, beans and lentils are good sources of folate.

4.1.1 Basic messages to be conveyed

For education, training and promotional purposes the basic healthy eating messages that should be conveyed include:

1. Fresh, frozen, canned or dried varieties can be included in the diet, but avoid canned varieties with high salt content (e.g. canned in brine).

2. Limit the intake of fried vegetables such as potato and vegetable chips and crisps which add extra kilojoules. Chips and crisps are included in *Discretionary choices* (see Page 31).

3. Eat plenty of vegetables, including different types and colours and legumes every day. Over the course of a week, it is advisable to include:
   - dark green or cruciferous vegetables such as bok choy, spinach, broccoli, cauliflower, cabbage, brussels sprouts;
   - orange vegetables such as sweet potato, pumpkin and carrots;
   - salad vegetables such as lettuce, tomato, cucumber and capsicum;
   - starchy vegetables such as potatoes, sweet potato, taro and corn; and
   - legumes such as dried peas, beans, lentils and chick peas.

4. Choose vegetables in season as they will be more readily available, be of higher quality and better value.

4.1.2 How much from the *Vegetables*, group is needed?

The minimum recommended intake ranges from about 5 to 6 serves per day for adolescents, adults and pregnant women, and 7½ serves per day for lactating women. Additional amounts can be included depending on energy needs (age, activity levels and body size).

Information in Section 5 should be used to work out the minimum serves per day for individual ADF personnel.

Table 4-1 Examples of the Vegetables group

Dark green or cruciferous	**Orange**	**Starchy**	**Legumes/beans**	**Other vegetables**
Asparagus Basil Broccoli Brussels sprouts Broccoflower Bok Choy All cabbages (including red) Cauliflower Kale Chicory Chives Green peas Green beans Lettuce: cos, mignonette, iceberg etc. Seaweed Silverbeet Snowpea Spinach Water spinach	Carrots Pumpkin Sweet potato	Cassava Potato Sweet potato Taro Sweetcorn	Beans such as: Blackbean, Cannellini Soybean Lima beans Red kidney Chickpeas Lentils Split peas Tofu	Artichoke Avocado Beetroot Bitter melon Capsicum Celeriac Celery Chilli Choko Cucumber Egg plant Fennel Garlic Ginger Leek Mushrooms Okra Onions Parsnip Radish Swede Tomato Turnip shoot Shallots Spring onion Sprouts Squash Zucchini

4.1.3 What is a serve?

As a guide one serve of *Vegetables* is approximately 75 g. Examples include:

- 75 g or ½ cup of raw or cooked orange or cruciferous vegetables;
- 75 g or ½ cup cooked or canned (no added salt) dried beans, peas or lentils;
- 1 cup of green leafy vegetables or green salad vegetables (raw);
- 1 small tomato (75 g); and
- 1 small or half a medium potato or equivalent for starchy vegetables such as sweet potato, taro or cassava or ½ cup of sweetcorn (75 g).

4.2 Fruit

A wide variety of fruit is available in Australia. Most fruit forms from the flower and contains the seeds of the plant. Some vegetables such as pineapple or rhubarb are included in this group because they are used as fruit. Most fruit is sweet because of their natural sugars.

Including fruit in the diet each day can help reduce the risk of some chronic diseases, including heart disease and some cancers. Because of their low energy density, diets which include relatively higher amounts of fruit may also help reduce the risk of obesity.

Fruit is a good source of vitamins, including Vitamin C and folate and a range of phytochemicals. Fruit also provides dietary fibre and carbohydrates in the form of natural sugars. Edible skins are especially high in dietary fibre, but dietary fibre is also presents in the flesh of the fruit.

4.2.1 Basic messages to be conveyed

For education, training and promotional purposes the basic healthy eating messages that should be conveyed include:

1. All fresh, frozen, canned and juiced fruits are part of this group.

2. Wherever possible choose fresh fruit that is in season. Fruits in season provide a readily available, fresher alternative that will also represent better value-for-money. For this reason it is best to include fruits in season.

3. When selecting canned fruits or juices choose those with little or no added sugar or sugary syrups (pear juice is often used as a liquid for canned fruits and is high in sugar).

4. Most fruit juices have lower dietary fibre content than fresh fruit. Fruit juices are also acidic and frequent consumption can increase the risk of dental decay.

5. Dried fruit can also be used but it adds extra kilojoules compared to a comparable amount of fresh fruit. Dried fruit can also stick to the teeth and increase the risk of dental decay.

6. Eat different types and colours of *Fruit* over the week. Examples include:
   - pome fruits such as apples and pears;
   - citrus fruit such as oranges, mandarins and grapefruit;
   - stone fruit such as apricots and peaches;
   - tropical fruit such as bananas and pineapple or melons;
   - berries; and
   - other fruits such as grapes, rhubarb, passionfruit.

4.2.2 How much from the *Fruit* group is needed?

The minimum recommended amount is 2 serves per day for all adolescents and adults. Additional amounts can be included depending on energy needs (age, activity levels and body size). Information in Section 5 should be used to work out the minimum serves per day for individual ADF personnel.

4.2.3 What is a serve?

As a guide one serve of *Fruit* is about 150 g. Examples include:

- 1 medium apple, banana, orange, pear;
- apricots, kiwi fruit, plums;
- 1 cup diced pieces or canned fruit; or occasionally
- 125 mL (½ cup) fruit juice;
- 30 g dried fruit, e.g. 4 dried apricot halves or 1½ tablespoons of sultanas.

Table 4-2 Examples of the Fruit group

Citrus	**Pome**	**Tropical**	**Berries**	**Stone**	**Other**
Orange Mandarin Tangerine Lemon Grapefruit Lime	Apple Pear Loquat Quince	Pineapple Mango Melon Banana Pawpaw Rambutan Guava	Strawberry Raspberry Blueberry Blackberry Loganberry	Peach Plum Nectarine Apricot Cherry	Grapes Kiwifruit Lychee Feijoa Passionfruit Fig Pomegranate Rhubarb

4.3 Grains

Foods in this group come from grains like wheat, oats, rice, rye, barley, millet, quinoa and corn. This group includes both refined and wholegrain varieties of grain (cereal) foods.

Consumption of *Grains* may help reduce the risk of heart disease, Type 2 diabetes and obesity. The foods in this group also provide carbohydrates, protein, dietary fibre and a wide range of vitamins and minerals including folate, thiamin, riboflavin, niacin and iron.

Some foods in this group may have nutrients added during processing. For example, in Australia, food regulations require that Vitamin B1 (thiamin) and folic acid be added to wheat flour used for breadmaking. Salt used in breadmaking must be iodised. This type of fortification is legislated because it may be difficult for some groups to achieve recommended intakes of these essential nutrients. Most breakfast cereal manufacturers also voluntarily add vitamins and minerals to their products.

4.3.1 Basic messages to be conveyed

For education, training and promotional purposes the basic healthy eating messages that should be conveyed include:

1. *Grains* can be eaten whole, ground into flour to make a variety of cereal foods like bread, pasta and noodles, or consumed as ready-to-eat breakfast cereals.
2. At least, two thirds of the *Grains* eaten should be wholegrain. Wholemeal or wholegrain varieties are preferable because they provide more dietary fibre, vitamins and minerals than refined grain (cereal) foods.
3. *Grains* which have relatively large amounts of added fats and sugars and/or salt such as certain cakes and biscuits are not included in this group but are classified under *Discretionary choices*.
4. Eat different types of *Grains* over the week. Examples are included in Table 4-3.

Table 4-3 Examples from the Grains group

Breads	Breakfast cereals	Grains	Other products
Wholemeal Wholegrain White Rye Pita, Lavash Naan, Focaccia etc. Crispbreads Damper	Ready to eat Oats Porridge Muesli	Rice Barley, pearl barley Corn, polenta Buckwheat Spelt Millet Sorghum Triticale Rye Quinoa Semolina	Pasta Noodles Crumpet English Muffin Cous cous Bulgur Popcorn Rice flour

4.3.2 How much from the *Grains* group is needed?

The minimum amount needed ranges from 7 serves per day for older adolescents; 6 serves per day in adults and may be reduced to 3–4 serves per day in older adults over 70 years of age. The recommendations for pregnant and breast feeding women are 8–9 serves per day.

Additional amounts can be included depending on energy needs (age, activity Levels and body size). Information in Section 5 should be used to work out the minimum serves per day for individual ADF personnel.

While the quantities recommended may seem large, it should be noted that such foods should be eaten in preference to *Discretionary choices*.

4.3.3 What is a serve?

Examples of one serve of *Grains* include:

- 1 slice of bread or half a medium roll or flat bread (about 40 g);
- 120 g cooked rice, pasta, noodles (about ½ cup depending on type);
- ½ cup cooked porridge, or polenta (about 120 g);
- 2/3 cup breakfast cereal flakes(30 g) or ¼ cup muesli(30 g);
- 3 crispbreads (35 g);
- 1 crumpet (60 g) or a small English muffin or plain scone (35 g); and
- 75 g cooked barley, buckwheat, semolina, cornmeal, bulgur, quinoa (approximately ½ cup).

4.4 Meat, poultry, fish, eggs, nuts and alternatives

The wide variety of foods in this group includes all kinds of lean meat, poultry, fish, eggs, nuts, seeds, and legumes/beans. In general, the foods in this group are a good source of many nutrients including protein, iron, zinc and other minerals and vitamins of the B complex. Vitamin B12 is found mainly in animal-based foods. Nuts and seeds provide protein, valuable essential fatty acids and some fat-soluble vitamins. However, they have less iron and zinc than most meats.

Within this group, lean red meats are a particularly good source of iron, zinc and Vitamin B12. The iron and zinc in lean meat, poultry, fish and eggs is more easily absorbed by the body

than the iron and zinc from plant foods. Iron is especially important for adolescent females, pregnant women, menstruating women and those undertaking high levels of physical activity.

Fish and some seafood are a valuable source of long chain Omega-3 polyunsaturated fatty acids. Regular consumption of fish may be associated with reduced risk of heart disease, stroke, dementia and macular degeneration in the eyes. Meat from grass-fed animals also contains some long chain Omega-3 fatty acids but at a lower Level than in most fish.

Legumes provide many of the same nutrients as meats, poultry, fish and eggs so have been placed in this food group, as well as with the vegetables group. Nuts and seeds can provide protein, essential fatty acids and a range of minerals, vitamins and phytochemicals but are also quite high in energy.

4.4.1 Basic messages to be conveyed

For education, training and promotional purposes the basic healthy eating messages that should be conveyed include:

1. To ensure adequate iron and zinc intake, about half the serves from this group should be lean red meat (e.g. beef, veal, lamb, pork and kangaroo).

2. Fresh, frozen and canned varieties of meats, poultry or fish can be included but canned varieties should be low in salt and fat.

3. Processed meats high in fat or sodium such as salami, mettwurst, bacon or ham are not part of this food group. They are classified as *Discretionary choices* (see Page 31).

4. Only include sausages with reduced Levels of fat and salt. Sausages can vary in their composition, and may include cereals and other components. They may count as a meat serve if made mostly from lean meat, but otherwise are considered as *Discretionary choices*.

5. About 2 serves per week should come from fish, preferably oily fish.

6. Eggs are valuable low-cost, easy to prepare sources of protein. They are especially useful for older people and children.

7. For those who do not eat meat, fish, dairy foods or eggs, the inclusion of nuts/seeds, and legumes (including tofu) together with grains in meals can provide a good mix of plant-based protein. Lacto-ovo vegetarian diets that include milk products, eggs, nuts/ seeds, and legumes can provide all of the essential nutrients required for health.

8. Eat different types of *Meats, poultry, fish, eggs, and alternatives* over the week. Examples are included in Table 4-4.

Table 4-4 Examples of the Meats, poultry, fish, eggs, and alternatives group

Lean red meats	**Lean poultry**	**Fish, seafood**	**Eggs**	**Nuts and seeds**	**Legumes/ beans**
Beef Lamb Veal Pork Kangaroo Including lean, lower salt sausages	Chicken Turkey Duck Emu Goose Bush birds	Fin fish, Prawns, Crab, Lobster etc. Turtle Dugong	Chicken eggs Duck eggs etc.	Almonds, pine nuts, walnut, macadamia, hazelnut, cashew, peanut etc. Nut spreads. Pumpkin, sesame and sunflower seeds etc.	All beans Lentils Chickpeas Split peas Tofu

4.4.2 How much from the *Meat, poultry, fish, eggs and alternatives* group is needed?

The range per person is between 1 and 3 serves per day on average depending on age (see Appendix A). Three to 4 serves per day are required in pregnancy to attain sufficient protein, iron and zinc. To obtain sufficient iron, about half the serves from this food group should comprise lean red meat. This equates to a weekly intake of approximately 450 g cooked, lean red meat. Around 2 serves per week should be from fish. Other choices include lean poultry, eggs or plant-based alternatives.

Those who choose not to eat red meats, or eat predominantly plant-based or vegetarian diets, will need higher intakes of lean poultry, fish, eggs and/or iron rich plant foods such as wholegrain cereals and legumes. For women, at least 2 to 3 serves per week of nuts and seeds are recommended; and for men, at least 7 serves per week.

Information in Section 5 should be used to work out the minimum serves per day for individual ADF personnel.

4.4.3 What is a serve?

Examples of one serve of the *Meat, poultry, fish, eggs and alternatives* include:

- 65 g cooked lean red meats (about 90–100 g raw weight of beef, veal, lamb, pork, kangaroo or goat);
- 80 g cooked poultry such as chicken (about 100 g raw weight);
- 100 g cooked fish fillet (about 115 g raw weight) or small can of fish;
- 2 medium eggs (120 g);
- 1 cup (170 g) cooked (dried) beans, lentils, chick peas, split peas, tofu or canned beans (no added salt); and
- 30 g nuts and seeds or peanut/almond butter, tahina or other nut/seed paste (no added salt or sugars) (Note: this amount for nuts and seeds gives approximately the same amount of energy as the other foods in this group but will provide less protein, iron or zinc).

Some people may like to eat their meat, poultry or fish in larger serve sizes than the serve sizes indicated above. This does not present a problem provided serve sizes or the number of serves are adjusted at other times. For example, instead of having a 65 g cooked serve of lean red meat each day, 130g cooked weight could be included every second day.

4.5 Dairy and alternatives

Milk, yoghurt and cheeses are the important foods in this group. Consumption of these foods may help reduce risk of heart disease, stroke, Type 2 diabetes and some cancers. The foods in this group are an excellent source of calcium; very few other foods in the Australian diet contain as much of this important nutrient. These foods are also a good source of other nutrients including protein, iodine, riboflavin and Vitamin B12.

A wide range of milk and yoghurt products is available with varying fat and salt levels. Some may also have added sugar and other ingredients. Milk can be fresh, dried, evaporated, or UHT long-life.

Some soft cheeses such as cottage cheese or fetta have much less calcium than firm or hard cheeses per unit weight. Fetta can also be particularly high in salt. Other milk-based products such as ice cream and fromage frais and sweetened custards can contribute some calcium to the diet, but they may be relatively high in fat and contain added sugar. These products have therefore been placed in the *Discretionary choices* category.

There is no scientific evidence of a link between milk and mucous production.

4.5.1 Basic messages to be conveyed

For education, training and promotional purposes the basic healthy eating messages that should be conveyed include:

1. *Dairy and alternatives* can increase the saturated fat content of the diet substantially if mostly full fat products are included. For most adults, the best choices are reduced-fat milks, yoghurts and cheeses.
2. Regular full-fat cheeses should be limited to 2 to 3 serves per week.
3. Some people with special needs, for example those regaining weight after an illness, may benefit from full-fat choices.
4. An accredited practising dietitian should be consulted for advice about alternative sources of calcium where a milk allergy or intolerance to lactose (natural milk sugar) has been diagnosed by a doctor.
5. Eat different types of *Dairy and alternatives* over the week. Examples are included in Table 4-5.

Table 4-5 Examples of the Dairy and alternatives group

Milks	**Yoghurt**	**Cheese**	**Other**
All reduced fat or full cream milks, plain and flavoured All long-life milks Powdered milk Evaporated milk Soy beverages (fortified with at least 100 mg calcium/100 ml)	All yoghurts including reduced fat or full cream, plain and flavoured Soy yoghurt (calcium fortified)	All hard cheeses, reduced or full fat: e.g. Cheddar, Red Leicester, Gloucester, Edam, Gouda or Soy cheeses (calcium fortified)	Unsweetened custards

4.5.2 How much from the *Dairy and alternatives* group is needed every day?

The minimum recommended amount of milk, yoghurt, cheese and alternatives ranges from 2 to 3 serves per day in younger adults to 3 to 4 serves per day in older adults, particularly women.

Information in Section 5 should be used to work out the minimum serves per day for individual ADF personnel. Some additional serves from this group can be included in the overall diet instead of *Discretionary choices*. This may provide additional energy to meet the needs of more active people and/or those of larger body size.

4.5.3 What is a serve?

Examples of one serve of the *Dairy and alternatives* include:

- 1cup (250 mL) fresh, UHT long-life or reconstituted dried milk;
- 1cup (250 ml) buttermilk;
- ½cup (120 g) evaporated milk;
- slices, or 4x3x2cm piece (40 g) hard cheese;
- 120 g ricotta cheese ;
- ¾cup or 1carton (200 g) yoghurt; and
- 1cup soy beverage or beverages made from rice or other cereals which contain at least 100 mg of added calcium per 100 mL.

For those who cannot, or prefer not to, eat foods from this group, the following foods, which contain the same amount of calcium as a serve of *Dairy and alternatives*, may be selected. (Note: the energy content of some of these serves may be higher so this needs to be accounted for in the overall diet):

- 100 g (about ½ cup) almonds with skin;
- 60 g sardines, canned in water (about 5 sardines); or
- 100 g (about ½ cup) pink salmon with bones or Australian salmon with bones.

Seafood, especially mussels, oysters and prawns and most plant foods, especially seeds, grain-based foods and vegetables also contain some calcium.

4.6 Water

Water is essential for life. It is required for digestion, absorption and transportation of nutrients, as a solvent for nutrients, for elimination of waste products and to regulate body temperature. Water is constantly lost from the body and needs to be replaced.

Military personnel, particularly those working in the tropics, often face a daily water turnover that is several times greater than for sedentary people living in thermal comfort, due to the combined heat stress of physical activity, clothing and ambient conditions.

Water requirements vary with age and at some life stages. Pregnant and breastfeeding women have a slightly increased water requirement compared to other women because of the needs of the foetus or baby and other changes that occur in the body during pregnancy and lactation.

Thirst, decreased body weight and reduced output of darker coloured urine all indicate onset of dehydration.

Older people can experience dehydration due to inadequate intake of water or other drinks. The normal decline in kidney function with age, plus hormonal changes, decreased thirst perception, medication, cognitive changes, limited mobility and increased use of diuretics and laxatives may create concern for older people. These changes may be normal adaptations of the ageing process but the outcomes of dehydration in the elderly are serious and include cognitive impairment, functional decline, falls or stroke.

4.6.1 How much water is needed?

The NHMRCs Nutrient Reference Values contain some guidance on the adequate daily intake of water. However there is no single recommended intake, as water requirements at any one time will vary depending on climate, physical activity, and individual metabolism. The following intakes can however be used as a general guide: about 6 to 8 cup per day for adolescents, 8 cups per day for women (9 cups in pregnancy and lactation) and about 10 cups per day for men. These amounts include fluids from all sources (e.g. in milks, soups, beverages such as coffee and tea, and soft drinks/cordials etc.), although safe tap water is the best and least costly option to quench thirst.

ADF personnel working in the heat should drink before, during and after all strenuous activity. During exercise, drinking more plain water is necessary (e.g. 150 to 200 mL every 20 min, or even more in hot weather, up to a rate of about 1L/h). (More detailed information is given in Sections 7 & 11.)

Safe tap water is a good source of fluoride and has an advantage over other drinks, such as fruit juices and fruit drinks, sugar-sweetened or low-kilojoule soft drinks, 'sports' and 'energy' drinks, tea or coffee in terms of its lower energy content, absence of caffeine and acidity (natural or from carbonisation). Acidity can cause erosion of tooth enamel. (Note: some water supplies in rural regions of Australia are not fluoridated.)

4.7 Unsaturated fat spreads and oils

Fats in the diet provide energy and some essential fatty acids. Foods containing fat are a source of fat-soluble vitamins such as Vitamin A and Vitamin E. Fats can be categorised as saturated fats, polyunsaturated fats and monounsaturated fats. Polyunsaturated fats can be further divided into Omega-3 and Omega-6 types. Trans-fats are unsaturated fats but they act more like saturated fats in the body. They are found in hydrogenated vegetable oils used to make some processed foods.

Saturated fats and trans-fats can be harmful to health. They adversely affect blood cholesterol Levels and are associated with increased risk of heart disease. Saturated fats are found in butter, lard and dripping, coconut and palm kernel oils, some vegetable oils (partially hydrogenated) and in lesser amounts in meat and full cream milk products, especially cheese. Saturated fats and trans-fats can also be found in hydrogenated vegetable oils, which are often used in commercial foods (such as pastries, pies, cakes, biscuits, crisps and other snack foods, crumbed and some commercially fried products). The amount of trans-fats in commercially produced foods is declining in Australia, but they may still be found in some commercial frying fats and in biscuits, doughnuts, pastries, some snack foods and crumbed fried foods. Australian spreads contain minimal quantities of trans-fat.

4.7.1 Basic messages to be conveyed

For education, training and promotional purposes the basic healthy eating messages that should be conveyed include:

1. Where possible, replace foods containing saturated and trans-fats with foods that have polyunsaturated and monounsaturated fats, which can help improve blood cholesterol Levels.

2. Including small amounts of polyunsaturated and monounsaturated fats in cooking as a salad dressing or spread, or small amounts of nuts and seeds, can provide essential fatty acids and some valuable fat-soluble vitamins.

3. Eat a variety of foods containing unsaturated fats and oils over the week. Unsaturated fats are found in foods from the main food groups, especially from seeds, nuts, legumes/beans, avocado, oats, fish, lean grass-fed meat, poultry and some eggs. Sunflower, safflower, soybean, cottonseed, sesame, corn and grapeseed oils, and spreads made from these oils, contain predominantly polyunsaturated fats. Canola, macadamia nut, peanut, rice bran and olive oils, and spreads made from these oils, contain mainly monounsaturated fats.

4.7.2 How much unsaturated spreads and oils and can be included?

The foods that provide unsaturated fat are also high in kilojoules (energy), so the amount consumed needs to be balanced with total energy needs. For active men and women, the limits for spreads and oils are 40 to 60g per day (i.e. 2 to 3 tablespoons) for spreads or 30 to 45 g (i.e. 1½ to 2½ tablespoons) for oils depending on activity Level.

4.7.3 How much is a serve of unsaturated spreads and oils?

One serve is:

- 10 g (or 2 teaspoons) of unsaturated spread (i.e. polyunsaturated or monounsaturated); and
- 7 g (or 1½ teaspoons) of unsaturated oil (e.g. sunflower, safflower, canola, olive, soybean etc). This is equivalent to 10 g of seeds or nuts.

4.8 Discretionary choices

What about all the other foods and drinks that don't fit into the main food groups?

In addition to unsaturated fats and oils, some foods and drinks do not fit into the five food groups. They may be high in saturated fat (natural or added) and/or added sugars or salt or alcohol. These foods and drinks can contribute many kilojoules and displace other more nutritious foods from the diet. Many have low Levels of essential nutrients and are referred to as energy-dense but nutrient-poor foods. Consumption of foods and drinks high in saturated and/or trans-fat, added sugars, added salt and/or alcohol may be associated with increased risk of obesity and chronic disease such as heart disease, stroke, Type 2 diabetes and some forms of cancer. These foods are referred to as *Discretionary choices*.

Currently Australian adults get nearly 36% and children get nearly 41% of their kilojoules from these foods, Rangan *et al.*,(2007); Rangan *et al.*, (2008). This is not a good balance for a healthy diet.

4.8.1 Basic messages to be conveyed

For education, training and promotional purposes the basic healthy eating messages that should be conveyed include:

1. *Discretionary choices* should be chosen only occasionally and in small amounts.

2. When consumed in occasional small amounts, *Discretionary choices* can add to variety and enjoyment of the diet.

3. Foods and drinks in this category include sweet biscuits, cakes, desserts and pastries; processed meats and fattier/salty sausages; sweetened condensed milk; custards; ice-cream and other ice confections; confectioneries and chocolate; savoury pastries and pies; commercial burgers with a high fat and/or salt content; commercially fried foods; potato chips, crisps and other fatty and/or salty snack foods; cream, butter and spreads which are high in saturated fats; sugar-sweetened soft drinks and cordials, sports and energy drinks and alcoholic drinks.

4.8.2 How many *Discretionary choices* can individuals include in a healthy diet?

Those who are highly active will need extra food that is energy-dense to meet their energy needs to avoid having a large volume of food to consume. The ideal choice is to make up any extra energy needs from the basic five food groups, particularly wholegrain cereals, vegetables including legumes/beans and fruit but some *Discretionary choices* can also be included. The allowance for *Discretionary choices* varies by activity Level (Table 5-3). Choices should be predominantly high in carbohydrate to provide necessary energy needs without excess fat or alcohol.

4.8.3 Alcohol

Alcoholic drinks are included as *Discretionary choices* as they are not essential to provide the nutrients the body needs. They should only be consumed in small amounts or not at all. Alcohol is not recommended for adolescents or pregnant or breastfeeding women.

The NHMRC's (2009) *Australian Guidelines to Reduce Health Risks from Drinking Alcohol* recommend that for healthy men and women, drinking no more than two standard drinks on any day will reduce the lifetime risk of harm from alcohol-related disease or injury. In addition, drinking no more than four standard drinks on a single occasion reduces the risk of alcohol-related injury arising from that occasion.

For women who are pregnant or planning a pregnancy, NHMRC recommends that not drinking is the safest option. For women who are breastfeeding, not drinking is also the safest option.

4.8.4 What types of food are included in this category?

Table 4-6 Examples of the Discretionary choices category

Higher added sugar	Higher fat	Higher fat &sugar	Alcohol
Sweetened soft drinks and cordials Energy drinks Sweetened waters Fruit drinks Sugar Honey Syrups Some sauces Jams, marmalade Sugar confectionary	Meat pies Spring roll Pizza Butter, cream, ghee Dairy blends Bacon, ham Frankfurts etc. Salami/mettwurst Some processed meats Some sauces/dressings Potato chips Pastry Quiche Certain tacos, nachos, enchilada	Biscuits Doughnuts Iced Buns Cake & Slices Sweet muffins Sweet pastries Sweet pies Ice-cream Some confectionary Chocolate/Bars Muesli bars Some sauces/ dressings Puddings	Beer Wines Spirits Port Sherry Liqueurs Mixed-alcoholic drinks

A sample serve of *Discretionary choices* provides about 600 kJ. Some examples are:

- 1 scoop (75 g) regular ice-cream;
- ¼cup condensed milk;
- 50-60 g processed meats, salamis;
- 1½ thick or 2 thinner higher fat/salt sausages;
- 30 g salty crackers;
- 2–3 sweet biscuits;
- 1 (40 g) doughnut;
- 1 slice (40 g) plain cake or small cake-type muffin;
- 40 g sugar confectioneries;
- 60 g jam/honey;
- ½ small bar (25 g) chocolate;
- 2 tablespoons (40 g) cream;
- 2 tablespoons (40 g) mayonnaise;
- 1 tablespoon (20 g) butter or margarine;
- 200 mL wine (2 standard drinks);
- 60 mL spirits (2 standard drinks);
- 600 mL light beer (1½ standard drinks);
- 400 mL regular beer (1½ standard drinks);
- 1 can (375 mL) soft drink;
- 1/3 (60 g) commercial meat pie or pastie; and
- 12 (60 g) fried hot chips.

None of these foods are necessary for a healthy diet

5. Developing Individual Dietary Patterns

The following Section outlines how dietary patterns can be developed for people of different ages, genders and activity levels. As this is a guide for use with ADF personnel, which may be extended to their families, two different methods are presented for determining dietary choices:

- a system tailored to the special needs of the adult (mostly male) ADF personnel eating in ADF catering facilities, particularly those undertaking moderate to high physical activity (Section 5); and
- a system for ADF personnel with smaller body size and/or more sedentary occupations, which is based on guidelines for the civilian population (Appendix A).

Recommendations for all (less physically active) Australians can be found in guidelines developed by the NHMRC (Appendix A). A guide for Health Educators has also been developed for the general population. Copies of all material relating to dietary guidelines can be found at www.eatforhealth.gov.au.

Both systems rely on identifying the number of serves to include in the diet, based on energy requirements. However not all food groups provide the same amount of energy per serve (see Table 5-1). A serve of the *Grains*, *Dairy and alternatives* and *Meats, poultry, fish, eggs and alternatives* (including nuts/seeds and legumes/beans) or *Discretionary choices* will provide about 500-600 kJ but around 2 serves of *Fruit* and from 2 serves (for starch vegetables) to 5 serves (of green leafy vegetables) of different varieties in the *Vegetables* group are needed to provide about 500 to 600 kJ.

Table 5-1 Kilojoule content of one serve of each food group

Food group or allowance category	**Kilojoules /serve**	**Food group or allowance category**	**Kilojoules/ serve**
Grains	500	*Fruit*	350
Vegetables		*Dairy and alternatives*	600
▪ *Green leafy & brassica*	100	*Meat, poultry, fish, eggs and alternatives*	600
▪ *Orange*	150	*Unsaturated spreads and oils*	250
▪ *Other/salad*	100	*Discretionary choices*	600
▪ *Starchy*	250		
▪ *Legumes/beans*	350		

5.1 Method for selecting dietary choices for physically active ADF personnel

The following Section outlines how dietary patterns can be developed for ADF personnel who have higher energy needs. These patterns are consistent with the ADF Fresh Food Provisioning Scale, which has been developed to meet the special nutrient needs of very physically active ADF personnel. Other personnel and family members with lower energy needs can seek more targeted advice by using the guidelines for the general Australian population which have been adapted for ADF families and are included in Appendix A.

5.1.1 Step 1: Identify the activity Level

The system classifies ADF activities based on the energy requirements of military tasks as determined by use of the doubly-labelled water method, Forbes-Ewan (2009).

Table 5-2 ADF activity Levels

	Activity Level	Energy range	Example activities
1	*Inactive or sedentary*	<12.5 MJ/day	Administrative tasks on base
2	*light activity*	13–14.5 MJ/day	Navy ships or submarine at sea, some moderate activity on base
3	*moderate activity*	15–16.5 MJ/day	Physical training exercises, Army recruit training, Infantry initial training, most other military exercises
4	*high activity*	17–19.5 MJ/day (low) 20-21 MJ/day (high)	Foot patrol with large load carriage, jungle warfare, naval clearance diving, patrol boat, SASR base squadron
5	*extreme activity*	≥ 21 MJ/day	SASR selection course

The lower end of the range (Level 1, < 12.5 MJ/day) equates with the 'Foundation Diet' for civilian adult men and women (see Appendix A) and suits the needs of male and female adults engaged in sedentary occupations similar to most of the civilian population. ADF personnel engaged in these occupations are therefore advised to base their dietary patterns on the new *Australian Dietary Guidelines*, as mentioned above.

While higher levels of activity require a higher daily energy intake, some account should be taken of a person's body size. The relationship between height and Body Mass Index (BMI) for those of normal weight status (shown in Figure 3) provides a cursory guide for adjusting daily energy needs to the body size of an individual. For example smaller people may only need 13-14.5 MJ/day when undertaking moderate activity.

The upper end of the range (≥ 21 MJ/day) would typically be required by only a small number of adult male ADF members involved in special operations, for example those attempting the Special Air Service Regiment selection course and other comparable activities. Other male service personnel engaged in ongoing rigorous activity may require from 16-21 MJ/day depending on the level and extent of activity and their body size.

An example: recent ADF operations

Based on supplied descriptions of recent military activities undertaken by the ADF, estimated energy requirements for ADF personnel were 12 MJ/day for light activities on base (Level 1), 15 MJ/day for moderate activities on base (Level 2) and 18 MJ/day when on foot patrol for 12 hours with a load carriage, (Level 4). For personnel at Forward Operating Bases in winter, who were engaged in alternate-day patrols, their average energy requirement averaged over a week would have been around 17 MJ/day (Level 4). Weather conditions also affect energy intake requirements. Typically, individuals who are shivering in cold conditions can experience an increased energy expenditure of around 20%.

5.1.2 Step 2: Identify energy requirements and how they might be met

The food groups and serve sizes are the same as the general population but the mix of foods within food groups used to model diets was aligned with ADF provisioning and consumption patterns. The number of serves for each food group is detailed in Table 5-3. For the purposes of developing recommended food patterns, Level 4 which covers a wide energy range, has been split into two subcategories for those at the lower end of energy needs (17-19.5 MJ/day e.g. foot patrol with load carriage over 12 hours) and those at the upper end of the range (20-21 MJ/day e.g. patrolling with load carriage 12 hours in winter or clearance divers).

It is not necessary to include *Discretionary choices* in the diet. Additional high carbohydrate foods such as *Grains*, *Fruits* or starch-rich *Vegetables* could be included instead. However, at very high energy Levels, concentrated energy sources will avoid the need to eat extremely large volumes of food.

For some personnel with small body size or sedentary occupations (low activity, Level 1), the amounts in Table 5-3 may still be too large. These personnel can cut back on cereals and starchy vegetables. Tables given in Appendix A would apply to such personnel.

Table 5-3 Daily food patterns for ADF personnel with different activity Levels

Recommended average daily number of serves from each of the food groups								
Activity Level	*Vegetables*	*Fruit*	*Nuts and seeds*	*Grains*	*Meat, poultry, fish, eggs and alternatives*	*Dairy and alternatives*	*Unsaturated spreads and oils***	*Discretionary choices***
1 (<12.5 MJ/day)*	6	2	1	6	3	2½	1	<1
2 (13-14.5 MJ/day)	10	3	2	10	3	3	1	<1
3 (15-16.5 MJ/day)	11	4	2	11	3	3	1	1½
4 (low 17-19.5 MJ/day)	12	4	2	11	3	4	1	4
4 (high 20-21 MJ/day)	12	4	3	11	4	6	1	6
5 (≥21 MJ/day)	14	5	3	12	4	7	1	13

** Personnel with smaller energy requirements can refer to Appendix A.*
***Maximum allowances are given for unsaturated spreads and oils and for Discretionary choices*

Discretionary choices (should be mostly high carbohydrate foods/drinks which are concentrated sources of energy

5.1.3 Step 3: Construct a daily eating plan

Tables 5-3 and 5-4 may be used to construct an individual meal plan. Sample daily menus for Level 2 (13-14 MJ/day) and Level 4 (lower Level 17-19 MJ/day) are provided in Appendix C.

Table 5-4 Description of Food groups and serve sizes for individual menu planning

Food Group	Serve Sizes	Kilojoules per serve
Vegetables	75 g (½ cup) cooked green Brassica or cruciferous vegetables	100
	75 g (½ cup) cooked orange vegetables	150
	75 g (½ cup) cooked dried or canned beans, chickpeas or lentils – no added salt	350
	75 g (1 cup) raw salad vegetables	100
	75 g starchy vegetables (e.g. 1 small or ½ medium potato or equivalent or sweet potato, taro, sweet corn or cassava)	250
	75 g other vegetables (e.g. 1 small-medium tomato)	100
Fruit	150 g (1 piece) of medium-sized fruit e.g. apple, banana, orange, pear 150 g (2 pieces) of small fruit e.g. apricot, kiwi fruit, plum 150 g (1 cup) cooked or canned fruit 125 mL (½ cup) 100% fruit juice 30 g dried fruit e.g. 4 dried apricot halves, 1½ tablespoons sultanas	350
Grains	1 slice of bread or ½ a medium roll or flat bread (about 40 g) ½ cup cooked rice, pasta, noodles ½ cup cooked porridge or polenta, ⅔ cup breakfast cereal flakes (30 g) or ¼ cup muesli 3 crispbreads 1 crumpet (60 g) 1 small English muffin or scone (35 g) ½ cup cooked other cereal e.g. barley, quinoa, semolina, buckwheat or cornmeal ¼ cup flour	500
Meat, poultry, fish, eggs and alternatives	65 g cooked lean red meats (e.g. beef, lamb, pork, venison or kangaroo) or ½ cup of lean mince, 2 small chops, 2 slices of roast meat (about 90–100 g raw weight) 80 g cooked poultry (about 100 g raw weight) e.g. chicken, turkey 100 g cooked fish fillet (about 115 g raw weight) or 1 small can of fish, no added salt and no in brine 2 large eggs (120 g) 1 cup (170 g) cooked dried beans, lentils, chickpeas, split peas or canned beans 170 g tofu 30 g nuts or seeds or nut/seed paste, no added salt	600
Dairy and alternatives	250 mL (1 cup) milk e.g. fresh, UHT long life or reconstituted from dried powder 125 mL (½ cup) evaporated unsweetened milk 200 g (¾ cup or 1 small carton) yoghurt 40 g (2 slices or 4x3x2cm piece) hard cheese e.g. cheddar 120 g ricotta cheese or low-fat cream-style cheese	600
Unsaturated spreads & oils	40-60 g (2-4 tablespoons) spreads (e.g. margarine) 30-45 g (1-2 tablespoons) oils(e.g. canola, olive oil, polyunsaturated oils)	250
Discretionary choices	2 scoops ice-cream ¼ cup condensed milk 50-60 g processed meats (e.g. salami, mettwurst) 1½ thick or 2 thin sausages 2-3 sweet biscuits 1 slice plain cake or small cake-type muffin ½ small bar (25 g) chocolate 30 g salty crackers 40 g sugar confectionary 60 g (2-3 tablespoons) jam or honey 12 (60 g) fried hot chips 2 standard alcoholic drinks (contains 20 g alcohol) 1 tablespoon (20-30 g) oil or spread	600

Note: Serve sizes used in planning individual diets will vary from the serve sizes used for ADF catering purposes.

6. Dietary patterns for those who are overweight

Restrictive dieting is not recommended for adolescents (or children). Individuals in this group have high nutritional needs.

A healthy eating pattern and an active lifestyle are most beneficial to health and maintenance of a healthy body weight. For adults, if body weight is above that suggested in the healthy weight for height range then food and energy intake can be reduced to lose weight. It is also beneficial to increase physical activity.

N.B.: The following guide is only approximate. The best guide as to whether adults are eating appropriate amounts for their lifestyle is whether their weight is stable.

6.1 How do you know if someone is overweight or obese?

The following graph (Figure 3) can be used as a rough guide to assess body size. It may not, however, be appropriate for those who have a high muscle mass due to sport or physical activity.

6.2 What dietary pattern will help attain a healthy weight?

Avoiding all *Discretionary choices* is a good first step. If this is not sufficient then adopting an eating pattern suitable for the next lowest activity Level (typically 2000 kJ less) each day should suffice (Table 5-3).

If the individual is of very small body size and/or they are largely sedentary, the *Foundation Diet* (Appendix A) for their age/gender group will provide all their nutrient needs but with less energy than they will need. Thus, if they eat the *Foundation Diet* for their age/gender group they should gradually lose weight.

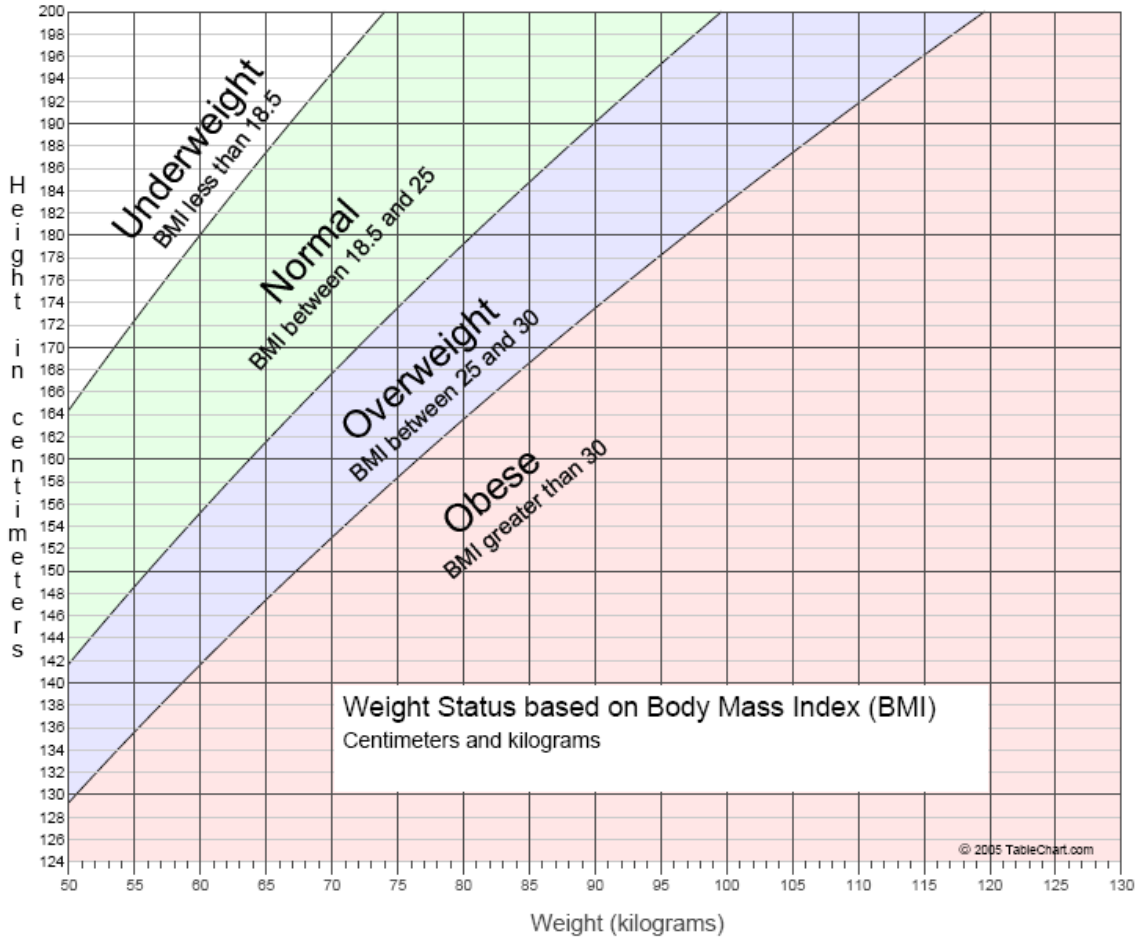

Figure 3 Weight status based on Body Mass Index (BMI)

6.3 What about physical activity?

There is increasing evidence of the importance of a healthy diet in reducing risk of excessive weight gain. A combination of healthy dietary patterns and increasing physical activity is more effective for weight loss and maintenance of weight loss than just restricting energy or kilojoule intake. Physical activity can have favourable effects on body composition during weight loss by preserving or increasing lean muscle tissue whilst promoting fat loss. The frequency and duration of physical activity affects the rate of weight loss, but weight loss will not occur unless energy intake is less than total energy expenditure. Physical activity has additional health benefits independently from its role in weight loss.

6.4 How much weight loss?

A daily reduction of up to 2000 kJ for the average size person in each age/gender group doing light physical activity should result in a weight loss of 0.5 kg per week or 1 to 4 kg per month.

6.5 How can weight loss be maintained?

Weight loss is most likely to be maintained where dietary and physical activity habits suit personal lifestyle and are healthy, acceptable and sustainable. The overall dietary patterns are important. People should be encouraged to focus on the basic, healthy foods in the listed in the Food Groups and Table 5-3 and try to avoid consuming *Discretionary choices*.

6.6 What if someone is overweight and has a chronic disease or if they are obese?

Following the advice given in this guide or the new *Australian Dietary Guidelines* (NHMRC, 2013) will assist weight loss in most people. However, if they are obese, or are overweight or obese with associated health problems such as cardiovascular disease or Type 2 diabetes, they should be encouraged to seek advice from their doctor or dietitian—a range of treatment options are available. Further guidance on managing overweight and obesity in a clinical setting can be found in the *Clinical Practice Guidelines for the Management of Overweight and Obesity in Adults*, (NHMRC, 2012).

7. Eat Smart to Train Hard

The following advice is aimed at personnel involved in moderate physical training—for sport, recruit/initial training or pre-deployment training. Moderate training is 1 to 2 hours of intense or lengthier medium-intensity physical exercise per day.

Daily food pattern Level 3 (Page 35) is suitable for most ADF physical training schedules.

- Training for jungle warfare and SASR has a higher requirement (see Section 5).
- The pre-exercise meal should be completed at least 30 minutes prior to intense physical training. Carbohydrate-rich foods should be selected in preference to protein and fat rich foods. This ensures good digestion and a supply of energy.
- Fluids should be drunk in moderate amounts and frequently (e.g. 150–200 mL every 20 min., or more in hot weather up to about 1 L/h). This ensures optimum hydration.
- Optimal recovery from exercise is important for training to be fully effective. It is important to drink fluids once exercise is completed and eat a snack containing both protein and carbohydrate within 15 minutes. Selecting one (female, small male) or two (large male) snack items from the table below is acceptable. This will replace fluids and electrolytes and muscle glycogen (the muscle's main source of energy).
- Post-exercise food should be carbohydrate-rich and eaten two hours later.

Table 7-1 Example post-exercise snacks

Example Snacks	**Food group Serves**
1 Sports drink or 2 cups cordial	2 *Discretionary choices*
1 carton Low-fat milk + 2 sweet biscuits	1 *Dairy* + 1 *Discretionary choices*
3 Fresh fruit (medium size)	3 *Fruit*
1 cup Thick soup +1 bread roll	1 *Vegetable* + 2 *Grains*
1 small Yoghurt + muesli bar	1 *Dairy* + 2 *Discretionary choices*
1 Peanut paste sandwich + 1 medium fruit	1 *Meat* + 2 *Grains* + 1 *Fruit*
1 Muffin with jam or honey	2 *Grain* + 1 *Discretionary choices*
1½ cups Noodles with sauce + grated cheese	2 *Grains* + 1 *Dairy*

8. Reducing saturated fat, salt and sugar and maximising fibre

The guidelines below are aimed at promoting healthy-eating food choices.

8.1 How to eat a diet low in saturated fat

For adolescents and adults a diet low in fat and in particular, low in saturated fat, is appropriate (see Appendix B).

8.1.1 For the five food groups

Within the five food groups, saturated fat is mainly found in the lean meat and poultry, fish, eggs, nuts and seeds, legumes/beans and the milk, yoghurt and cheese and alternatives groups.

Ways to reduce saturated fat intake from these groups include:
- trimming visible fat from meats;
- removing chicken skin;
- using reduced fat milk, yoghurt and cheese;
- eating fish and legumes more often, because they are low in fat and saturated fat; and
- using low fat cooking methods when preparing these foods, such as grilling rather than frying.

8.1.2 For *Discretionary choices*

Foods containing high levels of saturated fats should be limited; such as:
- butter, cream, cream-based dressings, solid frying fats, cooking margarine;
- cakes, biscuits, pastries, chocolate, potato crisps and other high-fat snack products;
- processed meats such as salami or mettwurst; and
- take-away foods to which saturated fat is added during processing or cooking. This is usually in the form of vegetable fat or hydrogenated vegetable oil (in baked foods) which can contain unhealthy trans-fats and palm oil (in fried foods).

8.1.3 Chick food labels for fat content

Better choices are those packaged foods which specifically state they are:

reduced fat	lower fat	low fat
low in fat	low saturated fat	low in saturated fat
reduced saturated fat	reduced in saturated fat	lower saturated fat

8.2 How to choose low-salt foods and use salt sparingly

Salt is the main contributor to sodium in the diet. Excessive sodium intakes are associated with high blood pressure which can lead to a variety of medical problems.

8.2.1 For the five food groups

Adding salt during food preparation or using salt at the table should be avoided. Balance the intake of higher salt foods with other foods from within the same food group which are lower in salt.

Table 8-1 Examples of higher and lower salt, five food group choices

Food group	Higher salt choices*	Lower salt choices
Grains	Some breads; higher salt breakfast cereals, higher salt crispbreads	Rice, pasta, noodles, lower salt breads, some breakfast cereals, some crispbreads
Dairy and alternatives	Cheese	Milk and yoghurt and reduced salt cheeses
Vegetables	Canned vegetables and beans	Fresh vegetables, no added salt varieties
Meats, poultry, fish, eggs and alternatives	Processed meats like bacon, ham, corned beef, devon Fish or beans canned in salt (brine)	Fresh cooked meats/fish, no added salt canned fish or beans

**See page 43 and Australian Government website on Food Labels (2012) for information about reading food labels*

Many processed foods in the Australian food supply have a high salt content. Therefore those with high energy requirements may find it difficult to achieve a low sodium intake from the current food supply.

8.2.2 For *Discretionary choices*

Those foods which contain high levels of salt such as marinades and sauces (e.g. soy sauce) salty snack foods like potato crisps, salty spreads like Vegemite, Marmite™, savoury biscuits, and salted flavourings like stock cubes are best avoided.

8.2.3 Checking food labels for salt content

Better choices are packaged foods which specifically state they are:

low in salt/sodium	low salt/sodium	reduced salt/sodium
reduced in salt/sodium	salt/sodium reduced	lightly salted
sodium free	no sodium	salt free
no salt		

8.3 Reducing added sugars

8.3.1 For the five food groups it is advisable to:

- Choose mainly foods with little or no added sugar. (Artificially sweetened products may be used.)
- Eat foods containing added sugars less often. Such foods include sweetened breakfast cereals, fruit canned in syrup, flavoured milks and flavoured yoghurts.

8.3.2 For *Discretionary choices*

- Avoid or eat sparingly those foods which contain high levels of sugar. These include cordial, soft drink, flavoured mineral water, lollies, jam, honey, cakes and biscuits.
- Use only a moderate amount of sugar (or an artificial sweetener) to sweeten drinks and foods.

8.3.3 Using food labels to reduce added sugars

Better choices are packaged foods which state they are:

reduced sugar	low sugar	low in sugar	sugar free
free of sugar	no sugar	no added sugar	unsweetened

Where possible a lower sugar food or beverage should be chosen. Over-consumption of sweetened drinks should be avoided. Water provides the healthier alternative and will better quench thirst.

8.4 How to maximise fibre intake

8.4.1 For the five food groups

- Sample serves from the fruit group should be chosen as fresh or canned fruit. Fruit juice is low in fibre.
- It is preferable to use wholegrain breads, breakfast cereals, brown rice and wholemeal pasta in place of white or more refined varieties.
- Edible skins should be left on fruit and vegetables and eaten along with the main part of the fruit or vegetable.
- Eating of legumes, nuts and seeds is encouraged.

8.4.2 Checking Food labels to select higher-fibre options

Better choices are packaged products which state they are:

high fibre	good source of fibre	increased fibre	fibre increased
fibre enriched	fibre added	added fibre	

9. Giving Advice on Food Labels

Comparing the nutritional content of packaged foods can be achieved by reading ingredient lists and nutrition information panels of processed and packaged foods (Australian Government website on Food Labels, 2012).

Such information can be used to choose between seemingly similar foods, such as different types of breakfast cereals, crispbread biscuits, canned fish, canned vegetables, yoghurts, pre-prepared lasagnes and pizzas.

A food label must show an ingredient list of the food. Ingredients (except water) must be listed by descending order of their proportion by weight in the food. If water is added, the label should state 'water added'.

Added substances are also listed as ingredients for a food, identified by a class name or a chemical name or a code number. Food additives include colours, flavours, antioxidants, preservatives, and emulsifiers.

All packaged foods (with some exceptions) must display a nutrition information panel. This will also state servings per pack and serving size, which can be used to compare between different brands or types of similar food choices.

A comparison of nutrition information for two notional breakfast cereals is shown in Table 9-1.

Table 9-1 A comparison of nutrient information for two imaginary breakfast cereals

	Cereal A -refined			**Cereal B- wholegrain**	
	Per 30 g serve	**Per 100 g**		**Per 30 g serve**	**Per 100 g**
Energy	455 kJ	1516 kJ	Energy	416 kJ	1390 kJ
Protein	2.3 g	7.5 g	Protein	3.2 g	10.5 g
Fat - total	0.2 g	0.7 g	Fat -total	0.4 g	1.4 g
-saturated	0.1 g	0.4 g	-saturated		
Carbohydrate			Carbohydrate		
- total	25.1 g	83.8 g	- total	24.7 g	82.4 g
- sugars	2.0 g	6.6 g	- sugars	0.8 g	2.5 g
Dietary Fibre	1.0 g	3.3 g	Dietary Fibre	3.0 g	10.1 g
Sodium	206 mg	687 mg	Sodium	84 mg	280 mg
Potassium	25 mg	84 mg	Potassium	102 mg	340 mg

The nutrition information panels show that both cereals are low in fat and high in carbohydrate. Compared to many other foods they both represent healthy choices. Cereal B,

however, is preferable as it is wholegrain and contains more fibre and potassium and less sodium and sugar than Cereal A.

10. Giving Advice on Mixed foods

Mixed foods and meals can be classified into the five food groups and *Discretionary choices*, if their components are known. Examples are given below.

Table 10-1 Estimating serves for mixed foods

	Grain	*Vegetables*	*Fruit*	*Dairy and alternatives*	*Meat, poultry, fish eggs and alternatives*	*Unsaturated spreads & oils*	*Discretionary choices*
Beef salad sandwich Bread (2 slices) Beef (30 g) Tomato 3 slices (40 g) Lettuce and cucumber (1/4 cup) Polyunsaturated Margarine (1 teaspoon)	2 serves	½ serve ¼ serve			½ serve	½ serve	
Total serves	**2 serves**	**¾ serve**			**½ serve**	**½ serve**	
Pizza Flour (1 cup) Vegetable Oil (1 tablespoon) Cheese (20 g) Tomato (38 g) Mushroom, capsicum and onion (25 g) Pineapple (75 g) Chicken (40 g)	3 serves	½ serve ¼ serve	½ serve	½ serve	½ serve	2 serves	
Total serves	**3 serves**	**¾ serve**	**½ serve**	**½ serve**	**½ serve**	**2 serves**	
Hamburger with a bucket of hot chips Medium bread roll or bun Beef patty, fried in oil (75 g) Tomato, onion, lettuce (35 g) Mayonnaise (1 tablespoon) Hot chips (bucket)	2 serves	½ serve			1 serve	1 serve	½ serve 2 serves
Total serves	**2 serves**	**½ serve**			**1 serve**	**1 serve**	**2 ½ serves**

11. Giving Advice about Deployment and Combat Rations

11.1 Eating in military messes

This guide should be used (Section 5) in making healthy choices when eating in messes — but it is important to be aware of the activities being undertaking and what typical energy needs may be. When eating in military messes, many personnel will typically be engaged in activities that fall in Level 2 (13 to14 MJ per day).

11.2 Special considerations for deployment

11.2.1 Safe Water

All water should be regarded as potentially contaminated unless cleared as fit to drink. Where potable water is not available, and the local water is dirty or cloudy, it should first be filtered (e.g. using a Millbank Individual Filter). Once filtered, sterilisation tablets should be added in accordance with directions on their packet. It is necessary to wait 5 minutes, shake well, and wait a further 30 minutes before drinking so bacteria are killed. Water may also be sterilised by boiling for a minimum of 5 minutes. Excessive amounts of water should not be consumed 'on an empty stomach'.

The latter is the current ADF advice and further detail can be found in the ADF Health Manual (Vol. 20).

While this is the current ADF advice, Australian Army, through Diggerworks, is investigating water purifications systems suitable for use by dismounted combatants. Individual Water Purification systems (IWPs) are being considered for their potential to reduce the amount of water a soldier is required to carry, and to ease the logistical burden associated of the ongoing resupply of clean or bottled water to deployed soldiers. Water is a critical capability for dismounted soldiers, and the potential to source safe drinking water from operating environments presents many benefits.

11.2.2 Extreme heat

In extreme heat, ADF personnel experience increased sweat losses and changes in energy requirements. Sweat losses increase the need for water, electrolytes (sodium, mainly) and calcium. The usual canteen menu should provide enough salt (sodium), so there should be no need to eat 'salty' snacks. It is important, however, to eat at least three serves of dairy food a day to ensure adequate calcium intake.

Around 10 litres of water per day may be needed when working for extended times in the heat. The preferred fluid is water. However, for sustained (more than 1 hour) moderate-level activities a sports-type drink can be beneficial. Ideally personnel should drink every 15 to 20 minutes when working in the heat (i.e. 0.7 to 1.0 litres of water per hour).

In very hot conditions individuals tend to reduce their physical activity, so energy requirements may be less than during cooler conditions. However, when working at a moderate level for several hours an additional energy supplement may be needed.

11.2.3 Extreme cold

When working in the extreme cold, an additional energy supplement may be needed between meals. A flask of hot soup and/or milk drink should be considered. (See other high-carbohydrate supplements in the table below). Hydration is still important as there is water loss from breath and sweat in cold dry conditions. It is important to still drink 3 to 6 litres of water per day (preferably plain water).

11.2.4 Jack rations:

As well as providing a morale boost, food from home can be a significant source of additional concentrated energy. Good choices include: dried fruits, trail and nut mixes, confectioneries (e.g. Sports Beans™, Mentos™, Skittles™, Spacefood Sticks™) rich fruit cake, muesli bars (e.g. Carmans™ varieties, SkiDLite™, Enervite™ cereal bars), muesli mixes (e.g. Morning Sun™, Farm House™, Natures Works™), chocolate bars, beef jerky bars, tinned or pouched tuna meals, instant noodles and other well-packaged meal varieties (e.g. Heinz™ and Gourmet-to-go™ varieties).

11.2.5 Patrolling from a Forward Operating Base (FOB)

On patrol days, ADF personnel should be encouraged to eat one meal at the FOB and consume as much of the Combat Ration Pack (CRP) during the patrol as is practical. In the absence of meal breaks, they should eat often when and where they can.

As it may be difficult for personnel to satisfy all their energy needs when patrolling, it is important to eat well during days of 'light activity' particularly when working in cold conditions. The CRP provides between 14.5 and 17.3 MJ of energy but in winter an individual's energy requirement may be up to 21 MJ per day, so 1 ration pack may be insufficient.

Daily food patterns set for Level 4 (Section 5) can then be followed on 'light' activity days to make up for the additional energy expended. Supplements can assist in meeting additional requirements (see below).

Examples of carbohydrate-rick supplements include:

- cup thick-vegetable soup + bread roll;
- sandwich + piece of fruit;
- 800 mL sports drink;
- 500 mL of fruit juice, soft drink, flavoured mineral water;
- 3 medium pieces of fruit;
- 1 carton low-fat UHT flavoured milk + 2 plain sweet biscuits;
- sweet biscuits + cup hot Milo/chocolate;
- tub low-fat yoghurt (200 mL) + CRP muesli bar;
- 1 ration chocolate bar + packet M&Ms;
- 1 CRP tinned fruit + 1 carton of low-fat fruit yoghurt;
- 1 CRP noodles + CRP tinned fruit;
- 1 slice rich fruit cake + 1 packet of CRP fruit grains; and
- 50g fruit nut mix + CRP chocolate bar;
- cheese, vegemite on 4 crackers; and
- 1 Sustagen™ drink + small packet nuts/dried fruit.

11.3 What about Combat Ration Packs (CRP)?

CRP are designed to be used when fresh foods are not available and in special operations or exercises. Personnel should eat all the CRP food items provided in a pack in order to meet their daily needs for carbohydrate, protein, fats, vitamins and minerals. CRP should not be used for personnel undertaking high levels of activity for more than 16 days. Following feeding with CRP personnel should eat fresh foods exclusively for at least half the time they were eating solely CRP.

CRP are not designed for use by personnel with any food allergy or special dietary requirements.

There are three types of combat rations, one designed for a group of five personnel (CR5M) and two designed for individuals (PR1M and CR1M). PR1M is lighter in weight than CR1M so is more suitable for long-range patrolling. It does, however, require water for reconstituting the main meals, and so its use is dependent on access to safe drinking water. The group-feeding ration, CR5M, may be phased out of service in the near future.

All three ration packs provide the necessary energy and nutrients for male ADF members engaged in moderately arduous physical work, and for female ADF members engaged in extremely vigorous work (i.e. Level 3 energy needs, Section 5).

Emergency Rations are for emergency situations and not designed to deliver complete nutrition. The ER (Emergency Ration) is two 50 g blocks of chocolate, fortified with a range of vitamins and packed in a foil pouch. The EFR (Emergency Flying Ration) is a small 'survival' pack that is placed in aircraft for survivors of air crashes.

11.3.1 General issues for combat rations

Avoiding Food Poisoning: It is important to only open food when it is about to be consumed. Foods mixed with water, like the freeze-dried meals, noodles and beverage powder, should be consumed once rehydrated. Portion not used should be discarded.

Avoiding dehydration: It is essential to drink plenty of water which is indicated by 'clear urine' (ADF SAFETYMAN, Vol 2, Chapter 25).

Salt Intake: Extra salt may be needed if working hard in hot environments or during periods of heat acclimatisation when salt losses are much greater. Extra salt can be taken dissolved in drinking water (not more than 1 sachet for 7 litres of water), or sprinkled on food. Extra salt should only be used in conjunction with drinking plenty of water. It can be harmful to take extra salt without extra water.

Table 11-1 Average nutritional breakdown of Australian Combat Ration Packs

Food Group	no	Example Items	Energy* (kJ)	Carb (g)	Prot (g)	Fat (g)
Main meal Hot (1 *Meat & alts* + 1 *Vegetable*)	1	Sausages & vegetables, BBQ chicken, BBQ beef	1200	20	25	15
Main meal – cold (*1 Meat & Alts*)	2	Jerky bars (2), Tinned/pouched tuna, Ham & potato, Chicken & vegetables	1200	15	40	10
High starch (1½ *Grain*)	2	Tortilla bread, Instant beef noodles	1500	60	10	10
Bf Cereal (1 *Grains*, 1 *Dairy & Alts)*	1	Fruit muesli mix (with milk powder)	1000	40	5	10
Dairy (1 *Dairy & Alts*)	2	Cheddar cheese, Sustagen™, Condensed milk	1500	40	20	15
Fruit (1 *Fruit*)	2	Dried apricots, Sultanas, Tinned fruit, Fruit grains	1000	60	NS	NS
Confectioneries (1 *Discretionary choices*)	2	Mentos™ (fruit, mint), Sport beans™, Fruitip pastilles™, Skittles™, Sports gel	1200	70	NS	NS
Biscuits (1 *Discretionary choices*)	2	Tiny Teddy biscuits™ (2), Jam sandwich, Shortbread, Krispie, Shapes™, Vita wheat™	1500	60	10	15
Muesli slice (1 *Grains*)	2	Cereal bar, Ski D'lite™ muesli bar, Uncle Toby's™ Original muesli bar	1100	40	5	5
High energy bars/mixes (1 *Discretionary choices*)	1	Protein bar (Cookie, chocolate), M&Ms™, Ration chocolate, Honey-roasted nuts, Trail mix	1200	30	10	15
Beverages (1 ½ *Discretionary choices)*	2	Sports pouch (lemon/lime, berry, pineapple), Sports beverage (different flavours)	1800	100	NS	NS
Other items (1 *Discretionary choices*)	15	Packet sugar (7 g), Cappuccino beverage, Chewing gum, Chilli sauce, Vegemite, Tomato sauce, Pepper, Tea bag, Matches, Plastic spoon, Rubber band, Toilet paper, Scouring pad, Plastic bag	650	20	5	5
Average total amount over all menus			15000	560	132	100

**Nutritional breakdown is presented as the total for each food grouping. For example 'Biscuits': 2 packets of Tiny Teddy biscuits plus 1 packet jam sandwich biscuits provides 1500 kJ, 60 g carbohydrate etc. 'High energy bars/mixes': 1 ration Chocolate provides 1200 kJ, 30 g carbohydrate etc.*

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Appendix A: Australian Guide to Healthy Eating

A.1 Method for selecting dietary choices for children, civilians and ADF personnel with smaller energy needs

This Section is for use by ADF personnel with smaller energy needs. The Tables below can be used to provide flexibility in designing individual eating patterns particularly for eating away from ADF catering facilities; whereas Section 5 takes into account the special nutrient needs of highly active ADF personnel and the ADF Fresh Food Provisioning Scale, which is utilised within ADF catering facilities.

Foundation Diets are designed to meet all the nutrient needs for the least active and smallest person in each gender and age category. Larger and/or more active individuals need to refer to the *Total Diet* tables A-2 and A-3, to see how they can add extra foods to meet their energy needs.

The modelling of these diets took into account things like current dietary intakes, cultural acceptability and factors that affect food security (availability and affordability) such as environmental sustainability, to help ensure the dietary patterns described were practical, realistic and achievable.

A.2 Step 1: Identify the *Foundation Diet* for gender and age

The *Foundation Diets* for the different age/gender groups are shown in Tables A-1.

The *Foundation Diets* are made up of the basic five food groups and a small allowance for some unsaturated fat spreads or oils. Further details of the development of the *Foundation* and *Total Diets* are given in the modelling report (NHMRC, 2011) and in Appendix D.

The amounts in Table A-1 below will provide the nutrients needed for all the men or women in the particular age band no matter what their body size or how active they are; however, the energy provided will only be sufficient for smaller, inactive people. Additional serves will be needed for those who are taller and/or more active; see Tables A3-1 and A-3. Refer to the ADF Guidelines in Section 5 for ADF personnel who are more physically active (i.e. energy requirements >12.5 MJ). Note that the *Foundation Diets* (Table A-1) for men and women 19 to 50 years of age correspond to ADF activity Level 1 (Section 5).

Table A-1 Foundation Diets (minimal serves per day) for men and women of different ages.

		Foundation Diets*					Additional choices
	Age	Vegetables and legumes/ beans	Fruit	Grain (cereal) foods, mostly wholegrain, such as breads, cereals, rice, pasta, noodles, polenta, couscous, oats, quinoa and barley	Lean meat and poultry, fish, eggs, nuts and seeds, and legumes/beans	Milk, yoghurt, cheese and/or alternatives (mostly reduced fat)	Approx. number of additional serves from food groups comprising the *Foundation Diets* or discretionary choices
Men	19–50	6	2	6	3	2½	0–3
	51–70	5½	2	6	2½	2½	0–2.5
	70+	5	2	4½	2½	3½	0–2.5
Women	19–50	5	2	6	2½	2½	0–2.5
	51–70	5	2	4	2	4	0–2.5
	70+	5	2	3	2	4	0–2
	Pregnant (19–50)	5	2	8½	3½	2½	0–2.5
	Lactating (19–50)	7½	2	9	2½	2½	0–2.5

* *Includes an allowance for unsaturated spreads or oils, nuts or seeds (4 serves [28-40g] per day for men less than 70 years of age; 2 serves [14-20g] per day for women and older men).*

A.3 Step 2: Identify energy requirements and how they might be met: *Total Diets*

Many people will need to eat food in addition to the *Foundation Diet* amounts to account for their body size, age and any increased physical activity Level in meeting energy requirements. The dietary patterns which meet energy requirements are called *Total Diets*. For the smallest, least active adults in each age and gender group the *Foundation Diets* are the same as the *Total Diets*; that is, no additional foods can be consumed beyond the *Foundation Diets* for these groups without exceeding energy requirements and contributing to excess weight gain.

As we still need to make sure that the diet is consistent with acceptable ranges of protein, fats and carbohydrate and to maximize its health potential, some guidance is also given as to how the *Foundation Diets* can be built upon to develop *Total Diets* which account for total energy needs.

Ideally, additional foods should be chosen from *Vegetables* (including legumes/beans), *Fruit* and *Grain* groups but some extra choices from the *Dairy and alternatives* and the *Meats, poultry, fish, eggs and alternatives* group is also possible within limits (the foods in the latter two groups are generally higher in fat than the other food groups.

Some allowance is also made for the inclusion of *Discretionary choices* (e.g. cakes, snack foods, pies, confectionary, soft drink etc) and additional unsaturated fat spreads and oils; but again inclusion is limited by overall energy needs.

Table 5-1 shows how many kilojoules are provided in a serve for each of the various food groups so that people can choose any additional foods that they would like to make up their energy needs. This gives people more flexibility in food choice than previous Australian food guides.

Remember: The more active you are, the more flexibility you can have in your food choices.

Additional kilojoules required in addition to the Foundation diets for men

To determine the additional kilojoules required in addition to the *Foundation diets* for men just look down Table A-2 on the left hand size for the right age band and height and then across for the activity Level. This will show you how many additional kilojoules will be needed in addition to the *Foundation Diet.* If your height falls between two height categories just estimate your needs from the heights either side.

For example, a 35 year old man who is 180 cm tall and in a sedentary occupation will need an extra 1300 kJ a day. This could be from an extra 2 *Grains* (1000 kJ) plus one extra starch-rich *Vegetable* (350 kJ) or any other preferred combination.

Table 5-1 will tell you how many extra serves a day of the various groups can be chosen for this amount of kilojoules.

Additional kilojoules required in addition to the Foundation diets for women

To determine the additional kilojoules required in addition to the Foundation Diets for women just look down Table A-3 on the left hand side for the right age band and height and then across for the activity Level. This will show you how many additional kilojoules will be needed over the *Foundation Diet.* If your height falls between two height categories just estimate your needs from the heights either side.

For example, a 35 year old woman who is 170 cm tall with high activity will need an extra 4900 kJ serves a day (Level 4-low, Table 5-1). This could be an extra 4 *Grains* serves (2000 kJ) plus an extra 2 *Fruit* serves (700 kJ) plus an extra starch-rich *Vegetable* (350 kJ); an extra legume *Vegetable* serve (350 kJ) and an extra salad *Vegetable* (100 kJ) plus 1 *Discretionary choices* (600 kJ) or any other preferred combination.

Table 5-1 will tell you how many extra serves a day of the various groups can be chosen for this amount of kilojoules.

Table 12-1 Additional kilojoules required in addition to the Foundation Diets for Men

	Additional kilojoules (energy) needed in addition to Foundation Diets for men of increasing heights in each age group with a range of physical activity Levels			
Men Age band and height (cm)	Inactive	Light Activity	Moderate Activity	High Activity
Men 19-30				
160	0	1300	2600	3900
170	700	2000	3400	4800
180	1300	2800	4300	5800
190	2100	3600	5200	6800
Men 31-50				
160	0	1300	2500	3800
170	500	1800	3200	4500
180	1000	2400	3800	5300
190	1500	3000	4500	6000
Men 51-70				
160	0	1100	2200	3300
170	400	1600	2900	4100
180	900	2200	3500	4900
190	1400	2900	4200	5600
Men 70+				
160	0	1000	2100	3100
170	500	1600	2700	3900
180	1000	2200	3400	4600
190	1600	2900	4100	5400

Table 12-2 Additional kilojoules required in addition to the Foundation Diets for Women

	Additional kilojoules (energy) needed in addition to Foundation Diets for women of increasing height in each age group with a range of physical activity Levels			
Women Age band and height (cm)	Inactive	Light Activity	Moderate Activity	High Activity
Women 19-30				
150	0	1100	2100	3100
160	600	1700	2800	4000
170	1300	2500	3700	4900
180	1900	3200	4500	5800
Women 31-50				
150	0	1100	2100	3100
160	300	1400	2500	3600
170	700	1800	3000	4100
180	1000	2200	3400	4600
Women 51-70				
150	0	1000	2000	2900
160	400	1400	2400	3500
170	700	1800	2900	3800
180	1100	2200	3400	4500
Women 70+				
150	0	900	1800	2800
160	400	1300	2300	3300
170	700	1800	2800	3800
180	1200	2200	3300	4400

A.4 Step 3: Construct a daily eating plan

1. Determine the right *Foundation Diet* plan according to the age/gender group from Table A-1.

2. Determine how many extra kilojoules are needed for the specific age or height and for the estimated physical activity Levels (Tables A-2 and A-3).

3. Determine what the relevant limit is for the non-essential *Discretionary choices* (see pp. 29 - 31) and for additional unsaturated spreads and oils (Section 4.7.1, p. 29).

4. Convert the extra kilojoules required into number of serves of additional foods using Table 5-1, keeping in mind Point 3 above.

5. Construct an individual eating pattern (*Total Diet*) and compare it to current eating patterns to see what changes may need to be made and what changes would be most realistic.

Remember this is only approximate. The best guide as to whether you are eating appropriate amounts of food overall for your lifestyle is whether your weight is stable. Weigh yourself regularly and adjust your food intake or physical activity Levels accordingly.

Table 12-3 Suggested Total Diet limits for spreads & oils

Energy needs/day	***Total limit (including Foundation Diet amounts)***
Up to 7000 kJ	30 g margarine or 20 g oils per day (210 g or 140 g/week)
7100 – 8500 kJ	40 g margarine or 30 g oils per day (280 g or 210 g/week)
8500 – 10000 kJ	50 g margarine or 35 g oils per day (350 g or 245 g/week)
> 10000 kJ	60 g margarine or 45 g oils per day (420 g or 315 g/week)

Example: a 35 year old women who is 160 cm and moderately active (~ADF Level 3).

Extra kilojoules needed (from Table A-3) = 2500 kJ

Table 12-4 Example: a 35 year old woman, 160 cm tall & moderately active

	Grain	***Vegetable***	***Fruit***	***Dairy & Alternatives***	***Meat. Poultry, Fish, Eggs & Alternatives***	***Unsaturated spreads/ oils or nuts/seeds***	***Discretionary choices***
Foundation Diet	6	5	2	2 ½	2 ½	2	
Additional food groups to make up extra 2500 kJ	2 1000 kJ	2 1 legume 1 orange-coloured 500 kJ	1 350 kJ			1 250 kJ	½ 300 kJ
Total Diet	8	7	3	3	2 ½	3	½

Appendix B: Australian Dietary Guidelines 2013

Guideline 1: To achieve and maintain a healthy weight you should be physically active and choose amounts of nutritious food and drinks to meet your energy needs.

- Children and adolescents should eat sufficient nutritious foods to grow and develop normally. They should be physically active every day and their growth should be checked regularly.
- Older people should eat nutritious foods and keep physically active to help maintain muscle strength and a healthy weight.

Guideline 2: Enjoy a wide variety of nutritious foods from these five groups every day:
- Plenty of vegetables, including different types and colours, and legumes/beans
- Fruit
- Grain (cereal) foods, mostly wholegrain, such as breads, cereals, rice, pasta, noodles, polenta, couscous, oats, quinoa and barley
- Lean meat and poultry, fish, eggs, nuts and seeds, and legumes/beans
- Milk, yoghurt, cheese and/or their alternatives, mostly reduced fat (reduced fat milks are not suitable for children under the age of 2 years).

And drink water.

Guideline 3: Limit intake of foods and drinks containing saturated and trans-fats, added salt, added sugars and alcohol.

a. Limit intake of foods high in saturated fat such as many biscuits, cakes, pastries, pies, processed meats, commercial burgers, pizza, fried foods, potato chips, crisps and other savoury snacks.
    - Replace high fat foods which contain predominantly saturated fats such as butter, cream, cooking margarine, coconut and palm oil with foods which contain predominantly polyunsaturated and monounsaturated fats such as oils, spreads, nut butters/pastes and avocado.
    - Low fat diets are not suitable for children under the age of 2 years.
b. Limit intake of foods and drinks containing added salt.
    - Read labels to choose lower sodium options among similar foods.
    - Do not add salt to foods in cooking or at the table.
c. Limit intake of foods and drinks containing added sugars such as confectionary, sugar-sweetened soft drinks and cordials, fruit drinks, vitamin waters, energy and sports drinks.
d. If you choose to drink alcohol, limit intake. For women who are pregnant, planning a pregnancy or breastfeeding, not drinking alcohol is the safest option.

Guideline 4: Encourage and support breastfeeding.
Guideline 5: Care for your food by preparing and storing it safely.

Appendix C: Sample Daily Menus for ADF personnel undertaking moderate to high physical activity

Table 12-5 Sample Daily Menu; Level 2 (13-14 MJ)

Meal	Food	Amount	Serves
Breakfast	Breakfast cereal	80 g	2 grain
	Milk	120 ml	½ dairy
	Eggs	1 egg	½ meats/alts
	Tomatoes	75 g	1 vegetable
	Mushrooms	75 g	1 vegetable
	Baked beans	75 g	1 vegetable
	Toast	2 slices	2 grain
	Polyunsaturated spread	20 g	1/3 allowance
	Tea	1 cup	-
Morning snack	Fruit bread	2 slices	2 grain
	Banana	1 banana	1 fruit
	Iced coffee	1 glass	1 dairy
Lunch	Salad with:		
	Ham	65 g	1 meat/alts
	Cheese	40 g	1 dairy
	Tomato	75 g	1 vegetable
	Avocado	110 g	1½ vegetable
	Lettuce	38 g	½ vegetable
	Oil Dressing	20 g	½ allowance
	Bread	2 slices	2 grain
	Fruit crumble	150 g fruit	1 fruit
	Yoghurt	100 g	½ dairy
	Tea	1 cup	-
Afternoon snack	Nuts	30 g	1 nuts/seeds
	Cheese dip	40 g cheese	1 dairy
	Coffee	1 cup	-
Evening meal	Vegetable soup	1 cup	2 vegetable
	Steak	110 g cooked	1½meats/alts
	Broccoli	75 g	1 vegetable
	Carrots	75 g	1 vegetable
	Rice	½ cup	1 grain
	Fruit salad	150 g	1 fruit
	Cream	1 tablespoon	½ discretion
	Tea	1 cup	½ discretion
	Wine	1 glass (100 ml)	
Evening snack	Coffee		-
	Wholemeal crackers	3	1 grain
	Nut paste	30 g	1 nuts/seeds

Additional water can be added as needed

Table 12-6 Sample Daily Menu for high physical activity, lower Level 4 (17-19 MJ)

Meal	Food	Amount	Serves
Breakfast	Breakfast cereal	80 g	2 grain
	Milk	120 ml	½ dairy
	Egg	1 egg	½ meats/alts
	Bacon	35 g	½ meats/alt
	Tomatoes	75 g	1 vegetable
	Baked beans	150 g	2 vegetable
	Wholegrain Toast	2 slices	2 grain
	Polyunsaturated spread	20 g	1/3 allowance
	Tea		-
Morning snack	Crumpets	2	2 grain
	Jam	60 g	1 discretion
	Orange	1 banana	1 fruit
	Chocolate milk	I glass	1 dairy
Lunch	Pasta with	1 cup	2 grain
	Mince	35 g	½ meat/alts
	Cheese	20 g	½ dairy
	Tomato	75 g	1 vegetable
	Lima Beans	75 g	1 vegetables
	Lettuce	75 g	1 vegetable
	Oil Dressing	20 g	½ allowance
	Wholegrain Bread	2 slices	2 grain
	Apple pie	150 g fruit	1 fruit
	Yoghurt	100 g	1/2 dairy
	Tea	1 cup	-
Afternoon snack	Nuts and dried fruit mix	60 g	1 nuts/seeds 1 fruit
	Yoghurt	100 ml	1/2 dairy
	Soft drink	1 can	1 discretion
Evening meal	Tomato soup	1 cup	2 vegetable
	Pork chop	110 g cooked	1½ meats/alts
	Spinach	150 g ½ cup	1 vegetable
	Potatoes	150 g	2 vegetables
	Peaches	1	1 fruit
	Ice cream	60 g	1discretion
	Fruit Juice	1 glass	1 fruit
Evening snack	Beer	600 ml	1 discretion
	Wholemeal crackers	3	1 grain
	Nut paste	30 g	1 nuts/seeds

Additional water can be added as needed.

Appendix D: How were the recommendations for the ADF EDGE developed?

D.1 Introduction

As part of the revision of the NHMRC Core Food Groups (CFG) and Australian Guide to Healthy Eating (AGTHE) recommendations, DSTO was provided funding to extend the analysis to include the higher energy requirements of Military Personnel and the new Military EAR/RDI/AIs (MEARs, MRDIs, MAIs) for mixed ADF populations, Baghurst and Baghurst (2009). These included both upper and lower limits for protein and carbohydrate at each energy Level as well as an upper limit for saturated plus trans-fat. The B Vitamin MEARs/RDIs also increase with energy Levels. The full report of this work is available from DSTO-Scottsdale. A summary is presented here.

D.2 Method

Diets were designed using a similar process as that outlined for the national CFG/AGHE (Appendix E) except that as the lowest energy Level required by DSTO was 12.5 MJ, this energy Level, rather than 'minimal energy', formed the base or Foundation diet for this group of people.

After discussions with DSTO, two energy Levels 12.5 MJ and 14.5 MJ were modelled and then a series of potential 1MJ add-ons were developed to increase energy Levels up to 25 MJ whilst remaining within protein and carbohydrate limits for each energy Level. Again, after discussions with DSTO the B vitamin MEAR/MRDIs for the 25 MJ diet were used when designing diets for all energy Levels, so the add-on approach could be used efficiently.

D.2.1 Which nutrients were assessed?

There were some limitations on which nutrients could be assessed as the Australian food database used for the CFG/AGHE project (AUSNUT07) is limited in the nutrients it contains. Some additional data from the UK/USA was included for Vitamin B6 and Vitamin B12 but we could not assess adequacy of pantothenic acid, biotin, choline, chromium, copper, molybdenum or manganese.

D.2.2 Initial modelling

The diets were initially designed using composite foods representing each food group. The resulting pattern was tested using simulated 7 day diets with real foods. This ensured that these food patterns still attained the MEARs and AIs when tested with a variety of 'real' foods whilst remaining within the protein, carbohydrate and saturated fat limits. Aiming the initial modelling with composites at the MRDI level is necessary to ensure compliance with MEAR as foods can vary widely in their nutrient profiles even within food categories.

In the initial analyses for 12.5 and 14.5 MJ, after discussions with DSTO, no allowance was made for what are commonly called 'extra' foods such as alcohol, confectionary, cakes, biscuits etc. The full energy requirement was modelled with the basic food groups, cereals, fruits, vegetables, meat and alternatives, milks and alternatives and fats and oils.

Subsequently, some allowance was made for these and some additional 'extras' options were also included within the suggested 1 MJ add-ons for attaining the higher energy Levels.

Diets were analysed on a weekly basis to give flexibility. It is not generally necessary to have exactly the same pattern of intake each day (e.g. there may be more green vegetables one day and somewhat less or none the next day).

D.2.3 Refining the modelling to better suit existing ADF catering practices

When DSTO had assessed the initial findings, further discussions led to some changes in approach and further refinement of what constituted the various food groups used in modelling. With the initial analyses to hand, the following suggestions were made by DSTO to further refine the analyses to be compatible with current catering practice.

Suggestions from DSTO for food patterns to be modelled for the 12.5 MJ diet

- Model the 12.5 MJ diet with the 19.5 MJ RMDIs and MEARs.
- SUPMAN 4 currently provides at least four serves of meat and alternatives a day. DSTO requested the inclusion of 2-4 serves of meat/alternatives per day (including two eggs 3-4 times per week). The DSTO analysis modelled legumes as vegetables and suggested two serves per day. Because the meat/alternatives group has little in the way of legumes then this should be also be retained.
- Include at least three dairy serves.
- Include at least 4-5 starchy vegetable serves.
- Include at least six other vegetables (two each of Dark Green Vegetables, Orange Vegetables and Other Vegetables).
- Include at least three fruit.
- Include at least 10 bread/rice/pasta, (including two serves of rice every day and two serves of pasta every day) (subsequently called *DSTO Grains* group).
- Include 1-3 *Discretionary choices* from the high carbohydrate (high sugar) and high carbohydrate /high fat groups ('high carbohydrate' extras include foods such as jams, jellies as well as sugar-based confectionary, soft drinks, cordial etc; 'high carbohydrate /fat' extras includes items such as cakes, biscuits, buns, sweet muffins, pastries, chocolate and chocolate bars). The nutrient profile for these groups was compiled by combining the nutrient profiles of all relevant items from the food data base.
- Include nuts and seeds/unsaturated oils etc as required.

D.3 Military total diet

After extensive further modelling, incorporating the DSTO-requested changes the following 12.5 MJ diet (Table D-1) was the preferred option. Based on 100 seven-day simulated diets, all diets met the MEAR/AI for all micronutrients and provided as percent energy from protein, fat and carbohydrate, 21%, 21% and 52%, respectively. The macronutrient assessment of the simulated diets is shown below in Table D.3-2.

Table 12-7 Preferred 12.5MJ diet pattern

Food group	Servings per week
Vegetables	
Dark green	14
Orange	14
High starch	28
Legumes	3
Other vegetables	14
DSTO Grains	
Composite group based on current feeding catering practice	70
Meat and Alternatives	
Nuts & seeds	2
Red meats	7
Pork or Chicken	7
Fish	2
Eggs	4
Fruit	
All types	21
Dairy Foods or alternatives	
Low-fat	7
Mid-fat	7
High-fat	7
Fats & spreads	
Unsaturated fats/oils	8

Table 12-8 Range of daily nutrient intake for 100 simulated 7-day diets.

Nutrient	Minimum	Maximum
Energy (kJ)	12200	12500
Protein (g)	148	156
Fat (g)	66	70
Saturated fat (g)	27	25
MUFA (g)	22	20
PUFA (g)	15	13
Total carbohydrate (g)	390	405
Sugars (g)	99	110
Starch	300	280
Dietary fibre	45	49

It was agreed that a 13.5 MJ base diet could then be devised with the addition of one high carbohydrate extra and one high fat/high carbohydrate extra to which further 1 MJ modules of various composition could be added to increase energy up to 25 MJ.

Five modules were constructed which could be used in different amounts and combinations to increase the energy content of the diet whilst keeping the balance of protein, fats and carbohydrates within limits and these were called Modules A, B C, D, E (Forbes-Ewan and Malberg, 2010):

- Module A was composed of equal amounts of the high carbohydrate extras and the high carbohydrate (sugar) /high fat *Discretionary choices*;

- Module B was all high carbohydrate (sugar) *Discretionary choices*;
- Module C was a 1:1:1 combination of the composite *Vegetables*, *Fruit* and *DSTO Grains* groups
- Module D was a 1:1:1 combination of the low-fat *Dairy and alternatives*, legumes and the combined *Discretionary choices* groups
- Module E was a 1:1:1:1 combination of high-fat dairy, medium-fat dairy, eggs and nuts/seeds groups

Appendix E: How were the recommendations for the *Foundation* and *Total Diets* developed?

Prof Katrine Baghurst

The goal of the dietary modelling that underpinned the development of the *Foundation* and *Total Diets* was to translate nutrient requirements into food consumption patterns that:

- delivered the nutrient requirements for people of varying age/gender, activity Levels and life-stages;
- were culturally acceptable, socially equitable and environmentally sustainable;
- reflected the current Australian food supply and food consumption patterns;
- provided some flexibility in food choice; and
- promoted health and wellbeing.

It is important to remember that the NRVs are set for healthy people and, as such, dietary models based on the NRVs such as those described here, are not designed to meet the needs of those with specific medical conditions.

The guiding principles for the revision were that the models should:

- address total diet and overall health;
- be evolutionary (incremental changes), flexible and practical; and
- be based on current scientific evidence.

The modelling report outlined the amounts of various food groups needed to meet the estimated requirements of individuals of different ages, genders and lifestyle, body size and activity, Baghurst and Baghurst (2009). Consideration of issues such as chronic disease, environmental sustainability, social equity and food culture were addressed in the modelling process after consideration of existing scientific literature and through a series of evidence-based literature reviews undertaken on behalf of the NHMRC as part of the Dietary Guidelines revision.

The intent of the modelling exercise was to provide a technical document that could be used to inform the revision of this *Australian Guide to Healthy Eating 98* (DOHA, 1998) and be referred to in the revision of the *Australian Dietary Guideline* series. The specific food groups and serve sizes used in the modelling exercise were not necessarily to be those used for the *Australian Guide to Healthy Eating* but rather to inform final groupings and practical serve sizes. This technical report focused on foods not beverages; it was not necessary to specifically address consideration of fluids in the modelling exercise as requirements could be addressed directly in the subsequent food guides and dietary guidelines.

E.1 Method

The analyses were based on the NHMRC NRVs (2006), the most recent National Food Database (AUSNUT07) developed by Food Standards Australia New Zealand (FSANZ, 2007) and the most recently available national food intake data, the 2007 Australian National Children's Nutrition and Physical Activity Survey 2007 (NCNPAS07) for children aged 2-16

years and the National Nutrition Survey 1995 (NNS95, DOHA 2008) for those over 16 years of age.

The modelling was designed to produce *Foundation Diets* for each age/gender group which accounted for the nutrient needs of everyone in that group within the energy needs of the smallest and least active members of the group. *Total Diets*, which took into account the additional energy needs of individuals related to their body size and activity, as well as personal food preferences, were also modelled.

The revision took into account usual patterns of intake in the community in terms of choices *within* food groups For example, it addressed how often apples were usually eaten compared to bananas or strawberries; milk compared to cheese or yoghurt; beef compared to pork or kangaroo. This was done using the most recent national dietary survey data available. These within group proportions were used to develop nutrient profiles for each food group which were, in turn, used to develop initial models for further testing. However, the number of serves of the various food groups emerging from the model were not determined by historical consumption Levels but were an output of the modelling process.

The recommended dietary patterns were developed in three stages.

E.2 Stage 1: Modelling with composite food groups to attain RDIs

The first stage used composite food groups to design culturally relevant *Foundation Diets* for each age/gender group that attained nutrient requirements for most people (i.e. met the Recommended Dietary Intakes, RDI) within minimal energy limits taking into account chronic disease, environmental, social and cultural constraints. As noted in the NRV (NHMRC, 2006) document, for some nutrients, the evidence for requirements is less certain than that required to establish Estimated Average Requirements (EARs) or RDIs. In this instance, an Adequate Intake (AI) is set which, for many nutrients, is simply based on current population intakes or, in other instances, on very limited experimental or physiological data. The AIs were not used to inform the modelling process as the NHMRC notes that the AIs may well overestimate needs and thus should be interpreted with caution[2]. The rationale for using RDIs and not EARs for this initial composite food group analysis is because these models aspire to meet the nutrient requirements of most individuals within each age/gender group and it is recommended that the RDI rather than the EAR be used in planning diets for individuals (NHMRC, 2006).

The nature of the composite food groups (which foods comprised each group and the serve sizes for each of the individual foods) was determined after preliminary modelling of a wide range of potential food groups. The grouping of foods took into consideration botanical, culinary and nutrient composition of the individual foods with serve size for individual foods within a group determined on the basis of energy density and the nutrient density of key nutrients for that food group. The profiles of the composite food groups were based on the types and proportions of foods consumed by different age/gender subgroups according to most recently available national dietary survey data.

Within each group, nutrient compositions for modelling purposes were calculated using 'healthier' nutrient dense options i.e. lower fat and lower sodium options were selected for the modelling. Items from the main food groups that were relatively high in energy density and high in fat, salt or added sugar or specially formulated foods were not included in developing nutrient compositions.

The final composite food groups used for modelling were fruit, green and brassica vegetables, orange vegetables, legumes, starchy vegetables, other vegetables, nuts and seeds, wholegrain cereals, refined cereals, poultry/fish/seafood/ eggs/legumes, red meats, and dairy foods (modelled as lower, medium and higher fat options). The wholegrain cereal category included both wholegrain or higher fibre options within each type of cereal food and the refined category included refined and lower fibre options from within the various types of cereal food. For simplicity these food groups are referred to as 'wholegrain' or 'refined' cereals groups in computer printouts.

To ensure models were realistic and practical, a small allowance of unsaturated oils and spreads was included in the modelling of *Foundation Diets* to reflect current culinary behaviour and to provide a concentrated source of essential fatty acids. However, unlike other foods, the inclusion of unsaturated oils and spreads in the models was not weighted for Levels of consumption of each age/gender group as relevant data are not available. In the modelling process for *Foundation Diets,* polyunsaturated margarine was included as a proxy for polyunsaturated oils, seeds or spreads to provide essential fatty acids within the energy constraints. Other foods such as unsaturated oils or spreads, nuts, seeds, legumes or could be included instead of polyunsaturated margarine at higher energy Levels.

An iterative approach to modelling was adopted and draft models were refined after comparison with RDIs.

The energy provided by several *Foundation Diet* models for the smallest and least active individuals within each age/gender group was close to these individual's total energy requirements. Hence the interim results of draft model *Foundation Diets* were also considered against other NRVs, including relevant Adequate Intakes (AI) and Acceptable Macronutrient Distribution Ranges (AMDR) to ensure that these were acceptable.

E.3 Stage 2: Cross-checking adequacy against EARs using 7-day diets and individual foods

The second stage was to cross-check the patterns obtained against outputs from 100 simulated 7-day diets for each age/gender group using individual foods to ensure that the dietary models for each group met the key nutrient requirements. For example, instead of using a composite 'fruit' group in the model, individual fruits e.g. apples, bananas, oranges, were used in the model. Patterns were generally deemed acceptable if all 100 diets met the Estimated Average Requirements (EARs) for the nutrients included in the model. EARs were used in cross-checking the diets as EARs are the recommended standard to assess the adequacy of the planned diets for population groups, (NHMRC, 2006).

E.4 Stage 3: From Foundation to Total Diets

The third stage involved the development of a range of flexible options to add to these Foundation Diets to meet the energy requirements of people of varying body size and activity. These latter diets were called 7-day Total Diets. As well as the final food groups and an allowance for unsaturated oils and spreads as used in development of the Foundation Diets.

Discretionary choices (i.e. foods and beverages with higher fat/sugar/alcohol and lower overall nutrient density) were also considered in modelling Total Diets. *Discretionary choices* include foods and drinks such as cakes, biscuits, confectionary, sugary soft drinks, burgers and pizzas,

other foods high in fats, particularly saturated fatty acids such as cream and some spreads, cordials and (for adults) alcoholic drinks.

The resultant Total Diet dietary plans are more flexible in terms of food group choice than the AGHE98. They were constructed using individual foods commonly eaten in Australia chosen in proportion to the food group patterns derived during composite food group modelling. Within-group selection of foods was made randomly by the analytical program in proportion to their current consumption using proportionality modelling.

In progressing from Foundation Diets to Total Diets which account for total energy needs, some general principles were set to ensure that modelled diets remained within acceptable limits for percentage of energy from fat and the various fat components, protein and carbohydrate (Acceptable Macronutrient Distribution Ranges, AMDRs), and the Upper Levels (ULs). They were also compared to Suggested Dietary Targets (SDTs) for chronic disease prevention but were not modelled to achieve these specifically.

The principles included modelling free addition of vegetables (including legumes), fruits, nuts and seeds, and cereal foods and encouraging a variety of choice of additional foods whilst defining the limitations around additional choices from the meat and dairy foods as well as from additional unsaturated oils and spreads. *Discretionary choices* were also included in defined amounts in the Total Diet modelling in proportion to energy requirements. However it is important to note that it is not necessary that *Discretionary choices* be included so some Total Diets containing no *Discretionary choices* were also modelled for all age and gender groups.

As the meat categories are major contributors to iron and zinc, many Foundation Diets reached the maximum modelling Levels for meat for many age and gender groups. Limitations were set for Total Diet models to no more than 455 g cooked, lean red meat per week based on the evidence-based reviews relevant to chronic disease and environmental sustainability. However, additional serves of the meat category could be included in Total Diet models instead of other *Discretionary choices* if desired.

Dairy foods were selected during modelling in the Foundation Diets because of their important role in the provision of calcium and some other key nutrients. However, they also contributed substantially to the saturated fat content of the Foundation Diets. Thus total amounts were initially capped at the amount in the relevant Foundation Diets. However, as with the meat group, some additional serves of dairy foods, including higher fat varieties, can be included in the diets instead of the *Discretionary choices* allowance.

Allowances for additional unsaturated oils and spreads and for *Discretionary choices* were modelled in relation to energy intake, with increasing amounts added as energy needs increased (see Figure E-1).

As children generally eat food as part of a family unit, an attempt was made to align the children's models with those of the younger adults. In modelling the diets and in this guide, for simplicity, the same serve sizes are used for children and adults. For younger children, the serve sizes can be made smaller but the frequency of consumption increased to compensate.

E.5 Nutrients modelled

Apart from energy, the NHMRC recommended that ten nutrients with EARs and RDIs were to be included as drivers or inputs into the modelling but that others were to be included as outputs only. The nutrients included in the models were protein, thiamin, vitamin A (as retinol equivalents), vitamin C, folic acid, calcium, iodine, iron, magnesium and zinc. All these nutrients have EARs and RDIs and were available on the AUSNUT07 database.

Riboflavin, niacin and phosphorus were not included for modelling purposes as these nutrients are abundant in the Australian diet. They were, however, included as outputs.

As the NRVs (NHMRC, 2006) state that Adequate Intakes (AI) were set for nutrients for which there was not sufficient or consistent evidence to establish an EAR and RDI, the NHMRC advised that the AI values should be interpreted with some caution, and those nutrients with AI values should not be a driver for the *Foundation Diet* modelling.

Some, as yet unpublished, but incomplete Australian data were available in NUTTAB09 for vitamin B6, vitamin B12 and selenium (nutrients not on AUSNUT07) so these were included for output only and relevant results should be interpreted with care.

The *Total Diet* patterns were compared with the NHMRC AMDRs for % total energy from fat, protein and carbohydrate and Suggested Dietary Targets (SDT) for chronic disease prevention (for those aged over 14 years) as well as the Upper Level (UL) as outputs only to ensure that excessive quantities of nutrients were unlikely to be consumed (NHMRC, 2006).

Figure E-1 Options and guiding principles used to progress from Foundation to Total Diets

Choose freely from these vegetable, fruit, cereal, nuts and seeds categories in addition to the relevant *Foundation Diets* to meet your energy needs; variety is encouraged.

Additional serves of *Dairy and alternatives*, *Meats, poultry, fish, eggs and alternatives* over those in the relevant *Foundation Diets* can be included instead of some of the *Discretionary choices* allowances. (One serve of these food groups would equate to one *Discretionary Choices* serve).

Food group	***Vegetables***					***Fruit***	***Grain***	***Dairy & Alternatives***	**Meat, poultry, fish, eggs & alternatives**	***Discretionary choices***	***Unsaturated fats and oils***
	Starchy	**Green & brassica**	**Orange**	**Legumes**	**Other**						
Serve size	75 g	75 g	75 g	75 g	75 g	150 g	Equiv 40 g bread	Equiv 250 g milk	65 g red meat;80 g poultry; 100 g fish, 2 eggs, 170 g legumes;30 g nuts/seeds	600 kJ equivalent	10 g spreads 7 g oils

Limits on *Unsaturated spreads and oils*

- For children up to about 8 years, the upper limit is 30–40 g per day of spread a day or 20–30 g oil depending on activity Levels and age. For older children and adolescents, the upper limit is 40–60 g per day spread or 30–45 g oil per day depending on activity Levels and age.
- For men and women, the upper limit is from 40–60 g per day spreads or 30–45 g oils depending on age and activity.

Limits on *Discretionary choices* (remember these foods are not a necessary part of the diet)

- For children or adults who are the youngest or smallest in their age band and also largely inactive, there is little or no room for these kinds of foods in the diet.
- For younger children**,** up to about 8 years old, *Discretionary choices* should be limited to no more than ½ serve per day unless moderately to highly active in which case they could have up to 1–2 per day.
- For older children and adolescents the upper limit is from 2–2 ½ serves per day but older adolescent boys who are highly active could have up to 3 serves per day.
- For men, the upper limits range from 2–3 serves per day depending on activity Level and, for women from 2–2 ½ serves depending on activity level.

Appendix F: How do the *Foundation and Total Diet* recommendations relate to current eating patterns in the community? What changes need to be made?

By Prof Katrine Baghurst

F.1 Adults' Foundation Diets

Table F.1-1 shows a comparison of the *Foundation Diet* recommendations for adults compared with intakes from the latest Australian National Nutrition Survey of Adults[1] (NNS95). These *Foundation Diets* would also be the *Total Diets* for smaller, sedentary people from the relevant group.

In order to meet the *Foundation Diet* recommendations a 100% higher consumption of fruit and 30% higher overall consumption of vegetables and cereals would be required compared to current intakes. Within cereals, an increase of 160% in wholegrain and decrease of 30% in refined cereals would be needed.

For vegetables, a decrease of 40% would be required for starchy vegetables compared to current intakes and increases of 30% in green and brassica, 140% in orange and 90% in other vegetables. Legumes would need to increase nearly fivefold to correspond with modelled quantities.

Within the meat categories, the *Foundation Diet models* include 40% more 'poultry, fish and seafood and eggs' but 20% less red meats than currently consumed, the latter applies mainly for men. With respect to fish and seafood specifically, the models provide 140 g to 280 g per week, which is approximately 4% higher than current intakes. Intake of nuts and seeds, with a very low average intake base of only 4 g/day, would have to increase substantially to correspond to the models. *Foundation Diet* models contain more dairy food than currently consumed, but a change from high/medium dairy foods to low fat choices would be required for intake to correspond to the models.

A comparison for polyunsaturated margarines and oils was not possible as the available national survey data for margarines or oils did not account for the amounts used in cooking. For example, in NNS95 about 8% of polyunsaturated fats are listed as coming from potatoes and a further 8% from bread.

F.2 Children and Adolescents' Foundation Diets

For children and adolescents, a comparison was made with intakes from the National Children's Nutrition and Physical Activity Survey of 2007 (NCPAS07, DOHA 2008) or the NNS95 (ABS 1999) for the 18 year olds. To meet the *Foundation Diet* models an approximate doubling of overall vegetables consumption would be required. However a one third decrease of current intake would be required for starchy vegetables and an increase of 150-350% for green and brassica vegetables, 160-370% for orange vegetables and 150-200% for other vegetables, depending on age. Legumes would need to increase nearly 200-300%.

Similar comparisons for fruit suggest that estimated current fruit intakes were close to the amounts modelled for the 2-3 year olds but would need to increase proportionately with age up to an increase of 223% for the 17-18 year olds.

Intake of cereals also varies with age and gender, with an increase of at least 19% for 9-13 year olds, and up to 60% more required for 17-18 year olds to meet the *Foundation Diet models.* A decrease in refined cereals intake of 12-32% would be required in all groups except the 2-3 year olds, to correspond with the modelled amount in the *Foundation Diets*.

For the meat categories, the *Foundation Diet* models would require 32-84% more of the 'poultry, fish and seafood and eggs' category and more lean red meats for children aged 2-16 (27-70% more) and approximately the same amount for children aged 17-18 years.

Within the dairy food categories, there is a need for greater dairy food intake particularly in children over 9 years of age and for a change from higher and medium fat choices to low fat choices. For children over 8 years of age nuts and seeds intake would have to triple to meet modelled quantities, although the overall intake of nuts and seeds would still be modest.

For both adults and children alike, in order to ensure energy requirements were not exceeded, increase in the intake of these basic nutrient-dense foods would have to come at the expense of foods which constitute the *Discretionary choices* (e.g. cakes, biscuits, soft and alcoholic drinks, pastries, burgers, confectioneries, jams, snack foods, deli-meats etc) which were not included in *Foundation Diet* modelling.

F.3 Implications for *Total Diets*

The comparisons given above and in Table F-1 are for the *Foundation Diets* (also *Total Diets* for those who are smaller and inactive). As *Total Diets* for other groups can vary markedly in food group composition, it is difficult to make a direct comparison. If recommendations are followed, the food groups which should increase most when transitioning from *Foundation* to *Total Diets* would be cereal, fruits and vegetables all of which require increased intake over current consumption Levels even for *Foundation Diets*. Thus, the increases indicated for *Foundation Diets* for these food groups are conservative estimates of the changes required to correspond to the dietary modelling for the population as a whole.

Table F-1 Intakes recommended in Foundation Diets compared to intakes from the NNS95 for adults (g/day)

	Foundation Diets			National Nutrition Survey 1995			Recommended compared to National Survey 1995
	Female	Male	Average	Female	Male	Average	
Vegetables	351	373	362	245	298	272	30% more
Starchy vegetables	51	73	62	87	125	106	40% less
Green & brassica vegetables*	75	75	75	54	60	57	30% more
Orange vegetables	75	75	75	30	32	31	140% more
Other vegetables	150	150	150	74	80	77	90% more
Legumes	26	55	40	6	9	7	470% more
Fruit	300	300	300	143	141	142	110% more
Grains	331	375	353	242	300	271	30% more
Wholegrain cereals/grains	208	226	217	72	93	83	160% more
Refined cereals/grains	123	149	136	170	207	188	30% less
Meats, poultry, fish, eggs and alternatives							
Poultry, fish, eggs	97	101	99	58	82	70	40% more
Fish and seafood	30	28	29	17	24	21	40% more
Red meats	50	65	58	54	99	77	20% less(men)
Nuts/seeds	10	25	18	3	4	4	350% more
Dairy and alternatives	749	624	684	309	360	336	103% more
High/medium fat dairy foods**	108	108	108	202	261	233	54% less
Low fat dairy foods	641	516	578	107	99	103	460% more

** excludes legumes*

***as milk equivalents*

Appendix G: Accounting for cultural, chronic disease and environmental issues

By Prof Katrine Baghurst

Food and nutrition plays an important role in promoting health for both children and adults. Different aspects of dietary intake have been shown to play a role in the prevention, incidence and/or prevalence of a range of chronic conditions including coronary heart disease, stroke, hypertension, some forms of cancer, obesity and Type 2 diabetes, osteoporosis, dental caries, gall bladder disease, diverticular disease, constipation and haemorrhoids.

In many cases, these conditions are associated with excessive intake of energy-dense foods high in saturated fat, refined sugars or salt, and/or inadequate intake of foods such as vegetables, legumes, fruits, nuts and seeds and wholegrain cereals which provide protective phytonutrients, as well as dietary fibre, and a range of vitamins and minerals.

In addition to concerns relating to chronic disease, issues such as environmental sustainability of the food supply have been of increasing concern to many public health nutritionists.

To address these issues some parameters were set by NHMRC around the amounts of some food groups that should be considered when modelling *Foundation Diets*.

The rationale for setting these parameters was based on evidence of health effects identified in the evidence-based literature reviews conducted to inform the revision of the Australian Dietary Guidelines series; cultural acceptability, variety and environmental sustainability were also considered in setting the parameters.

The table overleaf (Table G-1) shows the food group parameters used to inform the modelling for *Foundation Diets* for adults. The limits were adjusted for children.

Table G-1 Parameters for food modelling set by NHMRC on the advice of the Dietary Guidelines Working Committee to account for cultural, health and environmental considerations.

Food group	**Minimum average daily serves**	**Maximum average daily serves**	**Comments/rationale**
Grains	4	6	Model all wholegrain(wg); all white and 50-50 wg-white (subsequently 2/3 wg to 1/3 refined ratio agreed as a result of modelling)
White rice			120 g cooked rice = 1 serve. Cultural acceptability particularly for Asian cuisines
Wholegrain or brown rice			See cereals overall
Refined pasta			120 g cooked pasta = 1 serve. Cultural acceptability particularly for some Mediterranean cuisines
Wholegrain pasta			See *Grains* overall
Wholegrain or higher fibre bread			40 g bread equivalent = 1 serve
Refined or lower fibre bread			40 g bread = 1 serve
Oats		2	Serve =25 g dry
Refined or lower fibre breakfast cereals		2 serves	Suggest sliding scale based on energy content (serve 30g)
Legumes			Includes beans including baked beans, soybean, chickpeas, lentils, tofu
Green, brassica vegetables	1	2	Upper Level was modelled on basis of cultural acceptability and variety as a large number of serves (e.g. 11-15/day) are chosen in an unrestrained model because of high nutrient density of this food category. Serve =75g
Orange vegetables	1	2	As above
Starchy vegetables	1	4	Not to dominate vegetable group
Other vegetables	1	2	Includes tomatoes
Nuts and seeds		2	High kilojoules. Serve =30 g Some varieties more beneficial re health and environment than others
Meat, poultry, fish, eggs and alternatives		150g	Global contraction and convergence framework – suggests contraction over decades among high consuming populations to mean of 90 g meat/person/day for all people - allows room for low consuming populations to increase intake - based on principles of reducing green house gas emissions and reducing poor health from both over and under-nutrition.

Food group	Minimum average daily serves	Maximum average daily serves	Comments/rationale
Lean red meats		65 g	See above. Good source of limiting nutrients Includes beef, lamb, veal, pork, venison, kangaroo. Pork included as epidemiological evidence usually includes pork as red meat. Current red meat consumption is high in men. Pasture-fed varieties may be more environmentally sustainable
Lean white meats		65 g	Includes chicken, turkey, duck, quail, crocodile
Fish and seafood	20 g	40 g	Combine all categories for modelling purposes. At a 100 g serve the daily range of 20-40 g targeted for modelling of *Foundation Diets* would equate to 1.4 to 2.8 serves a week. (Note: the resulting *Foundation Diets* for adults included at least 40% more fish and seafood than reported for NNS95; additional amounts can also be consumed in *Total Diets*).Some varieties may be more environmentally sustainable than others
Eggs		1 egg	
Fruit	2	4	Serve = 150 g (edible portion). Exclude juice for modelling purposes.
Dairy and alternatives		4	Serve =250 g milk equivalent Good source of limiting nutrients Some non-lower fat dairy foods to be included for cultural acceptability. After initial modelling, dairy foods were modelled on a mix of higher fat and lower fat options for *Foundation diets.* Serve quantities were combined but with the proviso that most choices be lower fat. Some issues regarding environmental sustainability.
Higher fat dairy foods	0.5	0.5	Predominantly cheese. Good source of calcium and vitamin A and variety but limit re saturated fat content. Serve= 40 g
Medium fat dairy foods	1	unlimited	Includes full fat milks, yoghurts, some reduced fat cheese. Dairy food consumption declining in children. Serve= 250 g milk equiv
Lower fat dairy foods			Dairy food consumption declining in children Serve= 250g milk equiv
Unsaturated fats and oils		0 /unlimited depending on modelling	Consider current culinary practices- include as an allowance as per previous CFG modelling

NNS95 is the (Australian) national nutrition survey 1995.

Appendix H: Addressing diversity in cuisine

By Prof Katrine Baghurst

For this food guide, the recommendations were based on an analysis of overall population intakes and food choices. However, people in Australia come from a wide range of backgrounds and the preferred cuisines are very diverse. Some additional analyses were undertaken to assess diets that were either based on pasta or rice as the major cereal choice (to reflect Mediterranean or Asian diets) or for a lacto-ovo vegetarian diet. Consideration was given to modelling Aboriginal diets but the information available about eating patterns and food composition was insufficient to make an informed analysis.

The modelling of the pasta-based, rice-based and lacto-ovo diets was also limited by the availability of information about patterns of eating amongst Australians who prefer these cuisines. It is highly likely that those who follow vegetarian/rice/pasta-based diets will have different within food group preferences than the general public although it is, of course, recognised that even within the population as a whole, preferences within food groups could vary greatly.

The lacto-ovo vegetarian diet that was modelled contained a mix of legumes, eggs, nuts and seeds to replace the meat component of omnivore diets. The mix was devised in such a manner as to ensure amino acid balance with a ratio of approximately 5 parts (legumes): 1 (eggs): 1 (nuts and seeds).

The limitations of these analyses are recognised and the results are seen to be indicative only of areas which may need specific attention.

In general, the rice/pasta-based diets and lacto-ovo vegetarian diets that were modelled could meet requirements for most age/gender groups as long as the diets included additional amounts of foods rich in iron and zinc such as legumes or wholegrain cereals, or, in the case of rice or pasta-based diets, additional meat, poultry or fish serves.

Iron and zinc intakes can be marginal in many Australian diets especially amongst girls and younger women, so special care is needed to ensure adequate intake if the amount of meats, poultry, fish or wholegrain cereals consumed is lower than those in Foundation Diets.

Further details of these analyses are available in the modelling report available on the web site www.eatforhealth.gov.au

Appendix I: Nutrient profile of a sample of *Total Diets*

By Prof Katrine Baghurst

Table I-1 shows the results of an analysis of six sample weekly *Total Diets* for people of average height or age in any given group who engage in light to moderate activity. The six diets were originally modelled on a weekly basis (i.e. each diet summarises the results from 7 days of intake) but for energy, fibre and sodium are reported below on a per day basis.

The NHMRC Nutrient Reference Values recommends a range for the intake of each of the macronutrients for people aged 14 years and over. The Acceptable Macronutrient Distribution Range (AMDR) for protein is from 15-25% of energy, for fats from 20-35% energy and for carbohydrates from 45-65% energy. As shown below, the sample 7-day *Total Diets* which were modelled for people of average height (or age for children) and light to moderate activity who were over 14 years of age, generally fell within the AMDRs.

For maximising chronic disease prevention, the NHMRC also identified a Suggested Dietary Target (SDT) for some nutrients. For Dietary Fibre, an SDT of 38 g or more for men and 28 g/day for women was recommended. The sample *Total Diets* also attained exceeded the SDTs for fibre. For sodium, the NHMRC set an upper limit of intake of 2300 mg a day which was attained by the sample diets. However, NHMRC also identified a lower target of 1600 mg for both men and women in recognition that this lower level would bring additional health benefits to many Australians. Whilst some of the diets were below 1600 mg/day many were not, demonstrating the need for a change in the general food supply in order to attain these lower levels.

Table I-1 Nutrient profile of six sample Total Diets

Age/gender	Energy MJ/day	% energy from			Fibre g/day	Sodium mg/day
		Protein	Fat	Carbohydrate		
Men						
19-30	11.8-12.4	18-20	27-33	49-53	52-60	1860-2200
31-50	11.3-11.6	19-20	30-34	44-49	41-53	1850-2180
51-70	10.7-10.8	20-21	30-33	45-48	41-53	1770-2070
70+	9.8-10.0	21-23	24-35	41-52	34-44	1510-2020
Women						
19-30	9.8-9.9	21-23	25-33	45-53	36-50	1710-1990
31-50	9.4-9.6	20-22	25-31	46-52	35-45	1570-1840
51-70	8.9-9.1	21-24	26-35	43-50	34-44	1480-1820
70+	8.5-8.7	22-25	28-34	44-48	31-40	1440-1600
Boys						
2-3	5.6-5.7	19-21	21-27	53-58	24-32	940-1080
4-8	6.9-7.1	21-22	23-25	53-55	33-40	1130-1410
9-11	8.5-8.8	21-24	23-30	48-55	39-46	1330-1430
12-13	10.0-10.3	21-23	26-33	46-53	38-47	1560-1880
14-18	12.4-12.5	20-21	27-32	47-52	51-58	2000-2300
Girls						
2-3	4.9-5.1	21-22	21-24	54-58	22-27	850-950
4-8	6.4-6.6	22-23	21-23	54-56	33-41	1090-1280
9-11	7.9-8.1	23-24	28-32	44-48	32-37	1230-1460
12-13	9.1-9.3	22-24	30-35	41-48	35-41	1470-1750
14-18	10.0-10.2	21-23	26-30	47-52	40-48	1770-2140

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19. ABSTRACT

The ADF EDucator's Guide to healthy Eating (ADF EDGE) was written largely for people who educate others about eating for good health within the Australian Defence Force (ADF). Additionally, this document provides information for catering in ADF messes. It also provides a conceptual framework for understanding the relationship between foods and nutrients. The ADF EDGE provides best-practice advice about food choices to promote health and wellbeing and reduce the risk of diet-related diseases within an ADF context. Furthermore, it provides written and diagrammatic guidance with design elements which can be adopted by the ADF to produce suitable education materials for use by individual service men and women, catering and health personnel. An example brochure and flyer for use as educational tools, are attached.

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