

Nutrient Reference Values for Australia and New Zealand –

Questions and Answers

1. What are Nutrient Reference Values?

The Nutrient Reference Values outline the levels of intake of essential nutrients considered, on the basis of available scientific knowledge, to be adequate to meet the known nutritional needs of practically all healthy people for prevention of deficiency states. For each nutrient, values are set for the estimated average requirement (EAR) for people in different age and gender groups as well as for pregnancy and lactation. Given the variation in absorption and metabolism of nutrients, even within age/gender groups, a second figure called a Recommended Dietary Intake (RDI) is also derived from the EAR which would cover the needs of nearly all people in that group. If the evidence is limited, instead of an EAR and RDI, an Adequate Intake (AI) figure is set either based on experimental data or median population intakes in an otherwise healthy population. Finally an Upper Level of intake (UL) is set above which regular consumption could lead to adverse effects. In this revision, for the first time, some guidance is also given for some nutrients in relation to reduction of chronic disease risk.

2. Who uses Nutrient Reference Values and what are they used for?

Nutrient Reference Values are used by health professionals such as dietitians and doctors to assess the likelihood of inadequate intake in individuals or groups of people; by universities and nutrition researchers; for meal planning or large scale catering in places such as hospitals, the armed services, nursing homes etc; by the food industry in developing and assessing new food products and by the government sector in setting food policy and legislation such as in the development of food choice guides or food labelling to help the public make informed choices.

3. Why did the current Recommended Dietary Intakes need to be revised?

The current recommendations, which are used both in Australia and New Zealand, were published in 1991, but for many of the nutrients, the reassessment of needs took place many years before this. Since that time, our scientific knowledge about nutrient needs has expanded greatly and we also have new evidence on a range of nutrients for which it was not possible to estimate needs in the past. In recognition that chronic disease now affects large sectors of the population, it was felt necessary to include additional information about levels of intake that may reduce chronic disease risk.

4. Who was involved in undertaking the revision?

The revision was undertaken by the National Health and Medical Research Council in collaboration with the Australian Government Department of Health and Ageing and the New Zealand Ministry of Health. A wide range of nutrition experts and other users such as dietitians, the food industry and food legislators from the two countries were involved in developing the recommendations.

5. What is different about these recommendations?

These recommendations:

- cover a much wider range of nutrients than earlier recommendations (eg long chain omega 3 fats, dietary fibre, water, vitamin K, fluoride);
- include a set of values for each nutrient (instead of a single value). These values address the daily needs of individuals or groups in the community for maintenance of normal function and prevention of deficiency (ie Estimated Average Requirement; Recommended Dietary Intake or Adequate Intake) or excess (Upper Level of Intake);
- include additional recommendations about intakes of certain nutrients that may reduce the risk of chronic disease such as heart disease, certain cancers or high blood pressure.

6. Compared to the old RDIs, which nutrients have significantly changed recommendations and why?

As noted above, there are some nutrients that have not previously had a recommended intake level. For other nutrients, there have been some increases in recommended intakes notably for folate and other B vitamins (thiamin, niacin, riboflavin, vitamin B6 and B12) as well as calcium and magnesium.

The increase in the B vitamin reference values generally reflects the ways they were set in the earlier version. In the 1981-89 RDIs, the values for B vitamins were generally set in relation to energy or protein needs that, in turn, were set on figures recommended at that time by the FAO: WHO. The EARs for B vitamins in this set of reference values were set using results of metabolic studies with specific biochemical endpoints in blood, tissues or urine related to potential deficiency states or on the results of depletion-repletion studies.

The increased recommendations for folate are based on new data looking at dietary intake in relation to maintenance of plasma and red blood cell folate, and homocysteine level. Whilst the recommendation may appear at first glance to have doubled, it is expressed in terms of “dietary folate equivalents” in recognition of the difference in bioavailability between food folate and folic acid, the supplemental form, also used for food fortification, which is twice as well absorbed as food folate.

In relation to calcium, the difference between the old RDI and the new relates almost entirely to the recognition that there are losses through sweat of some 60mg/day not accounted for in previous estimates.

In the case of magnesium, the new EAR/RDIs are based on maintenance of whole body magnesium over time from balance studies mostly published since the last RDIs were set. There were limited data at the time the last Australian RDIs were set which gave a wide range of estimates of need.

One nutrient for which recommendations have decreased substantially is sodium (salt). In the past, in recognition that the food supply included many valuable foods, which contained substantial amounts of salt, a generous allowance above actual physiological need was made in setting the RDI. In this revision, whilst some allowance was still made for the attainability of the recommendation in terms of the food supply in relation to adequate provision of other nutrients, the recommended range of intake was set based on the best available evidence about

physiological needs. An additional lower figure was also recommended for those with a greater likelihood of developing high blood pressure.

7. In Australia and New Zealand what nutrients are not consumed in sufficient quantities?

Nutrients which are thought to be particularly borderline in Australia and New Zealand include folate, calcium and iron for women as well as iodine and selenium. However, up to date data on dietary intake in Australia are limited.

8. Is it really possible to get all those nutrients in a “normal” diet?

As part of the development process, a modelling exercise was undertaken to ensure that the recommendations were attainable with commonly eaten foods. The modelling showed that this was possible across a wide range of energy requirements (from 6000kj/day upwards) but that flexibility of food choice increased as energy requirements increased, thus emphasising the importance of being physically active.

9. Do I have to take vitamin and mineral pills to get what I need?

No; as mentioned above, dietary modelling showed that it is possible to get all the nutrients required from eating plenty (and a variety) of vegetables and fruit including some nuts and seeds, wholegrain cereal foods, reduced-fat dairy foods and lean meats, fish (particularly those rich in omega-3 fats) or poultry, as well as small amounts of poly or monounsaturated fats and oils.

Strict vegetarians who consume no animal foods may need supplements of vitamin B12 and omega-3 fats and will need to take care that they eat sufficient iron and zinc-rich foods as these nutrients are less available from plant sources, so intake needs to be much higher than for non-vegetarians. There may be some other people such as the very elderly or those with specific medical conditions who may need supplements for medical reasons. Vitamin D supplements may also be needed by the elderly with little exposure to sunlight, and by veiled women. These recommendations are for generally healthy people in the population.

10. Is there a way of calculating the new values from the old values?

No, there is no way of calculating the new values from the old. There has been a great deal of new information produced since the last revision. For some nutrients this has led to only minor changes in the recommendations; for others, the changes are more substantial.

11. Why are there different values for some nutrients for deficiency states and chronic disease?

Different values have been set for some nutrients for prevention of “deficiency” states versus prevention of chronic disease because the nature and certainty of the evidence for these two end points differs.

Physiological needs for the prevention of deficiency states in humans can generally be more clearly defined than physiological needs for chronic disease prevention. It is possible to design controlled experiments in human volunteers to look at what levels of daily intake are required to maintain a certain level of the nutrient or a marker for deficiency in blood or body

tissues and/or to prevent a specific clinical deficiency disease (eg scurvy in the case of Vitamin C).

Data about the links between diet and chronic disease usually depend on population or epidemiological studies of food or nutrient intake and their link with increased “risk” of disease. There are limited nutrient intervention trials and these generally use only one dosage level, so it is difficult to be precise about actual needs, even in these trials. Thus, there is much less precision about the daily intake of a nutrient required to “prevent” the chronic disease. Lowering of risk for these diseases is also often related to several nutrients, some of which appear to increase risk whilst others decrease it. For chronic disease, there may also be other influences on outcome such as genetic background and other environmental factors that are not always taken into account sufficiently.

For this reason, it seemed more reasonable to provide separate recommendations for prevention of deficiency states and for prevention of chronic disease, although both need to be taken into consideration when developing food-based dietary recommendations for the population.

12. Why are there two sorts of recommendations for chronic disease?

There are two types of recommendations for chronic disease. One set addresses the balance of protein, fat and carbohydrate in the diet in terms of their relative contribution to dietary energy. These are the Acceptable Macronutrient Distribution Ranges (AMDR) and as the title suggests recommend a range of intake for a particular macronutrient that is consistent with good health (eg protein from 15-25% of energy in the diet). The other set addresses specific nutrients such as antioxidants, dietary fibre or long chain omega-3 fats for which there is some evidence of benefit for chronic disease prevention at higher than RDI levels when consumed in foods. These are generally set at the 90th percentile of current population dietary intake as being a level likely to bring benefit without long-term risk.

13. How should the energy tables be used to determine energy needs for a particular person?

The energy tables give recommendations for energy intake for maintenance of body weight across a range of ages, gender and body size. They also show the requirements within these groups for different physical activity levels (PALs) because activity affects energy needs.

It is generally accepted that a PAL above 1.75 is consistent with good health, but many people will have physical activity levels below this. The tables can thus be used to indicate what the energy needs for a particular person should be if they were doing adequate exercise and what level they will need to restrict themselves to in order to prevent weight gain if doing inadequate exercise.

14. Why do pregnant and lactating women need more nutrients than other women of the same age?

In pregnancy, there are increased needs for many (but not all) nutrients to cover additional needs of both the mother, whose own body increases in size during pregnancy, as well as for the fetus. Similarly, when a mother is breastfeeding, requirements are often increased to account for the amount “lost” in the breast milk. The increased needs can vary across

nutrients as the mother's body can sometimes compensate for the additional needs by increasing things such as the absorption of a particular nutrient.

15. Why do older people need more of some nutrients than younger adults?

Older people often have higher requirements than younger adults for intake of nutrients as their bodies are not as efficient at absorbing the nutrients from food or from processing the nutrient once it enters the body. The reverse is however true for energy requirements because the body chemistry slows down with age, and older people are generally also less active. Thus it is particularly important that older adults have a high quality, nutrient-rich diet.

16. Do these recommendations apply to every individual or are they for healthy people only?

The recommendations are for generally healthy people. Many people in the community do suffer from conditions such as diabetes, high blood pressure or heart disease and generally speaking these recommendations would also be applicable to most people in these groups and for people with many other conditions. However, requirements can be affected by a number of clinical conditions and some medications, so if in doubt, advice should be sought from specialist health professionals such as dietitians in these special cases.

17. Are there other factors such as nutrition interactions, medication and physical activity that may help or hinder achieving these recommendations?

There are a number of nutrients that can interact with other nutrients in a positive or negative way. For example, very high intakes of one nutrient such as iron may interfere with the absorption of another nutrient such as zinc, which uses the same absorption mechanism. This is one of the potential problems with supplement use. Other nutrients such as vitamin C can help in the absorption of nutrients such as iron if consumed at the same time. Some of these interactions have been taken into account in setting upper levels of intake; others are better addressed when discussing food intake patterns in Dietary Guidelines. Some medications can affect the body's ability to absorb and use nutrients, so advice should be sought especially with multiple medications. Physical activity levels can affect the requirements for a number of nutrients involved in energy metabolism such as certain B vitamins (and of course energy) but increased physical activity allows for greater food intake, thus making it easier to attain all the required nutrients.

18. Would consumers achieve even greater benefit from consuming above the Upper Level of Intake?

No, quite the contrary. The Upper Level of Intake has been set as the safe upper level for regular use above which there is a likelihood of adverse effects.

19. What does the term "equivalent" mean (eg Dietary Folate Equivalents)?

For some of the nutrients, the term "equivalent" has been used to express the recommendations (eg Vitamin A is expressed in Retinol Equivalents and Folate in Dietary Folate Equivalents; alpha-tocopherol equivalent for vitamin E). This reflects the fact that for some nutrients there is more than one chemical form in the food supply that provides a benefit. For example, for folate, there is naturally occurring food folate as well as folic acid used for food fortification. Folic acid is twice as active as food folate so not as much is

needed to get the same biological benefit. The overall requirement may be met by a mixture of these so is expressed as dietary folate equivalents.

20. How do these recommendations relate to the national Dietary Guidelines?

These nutrient requirement recommendations form the basis of the Dietary Guidelines which are qualitative guidelines about the types and amounts of foods required to get the required nutrients. These new nutrient recommendations will be used to update the Dietary Guidelines where necessary.

21. Will food labels be changing and when?

Food Standards Australia New Zealand will commence a process to update the set of nutrient reference values currently listed in the Australia New Zealand Food Standards Code. After the Code is updated, some food labels may need to change. These changes will be timed to coincide where possible with changes to other labelling requirements.

22. When will these recommendations be reviewed again?

In line with current NHMRC policy, the recommendations will be reviewed five years from their publication.

23. Where can I find the Nutrient Reference Values for Australia and New Zealand?

Both the main document and a summary document will be available from the NHMRC and NZ Ministry of Health websites (www.nhmrc.gov.au and www.moh.govt.nz).