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[11-10]

Nutrient Reference Values in the *Australia New Zealand Food Standards Code* – Potential Revision
Consultation Paper

Please note that a companion Explanatory Guide is also available to assist readers of this Consultation Paper at
http://www.foodstandards.gov.au/foodstandards/changingthecode/documentsforpublicco868.cfm.

Executive Summary

In May 2006, the National Health and Medical Research Council (NHMRC) and the New Zealand Ministry of Health (NZ MOH) released nutrient reference values for Australia and New Zealand (2006 NRVs). These nutrient reference values are a set of recommendations for nutritional intake based on currently available scientific knowledge. They include measures of both adequacy and safety.

These 2006 NRVs expand and replace the *Recommended Dietary Intakes for Use in Australia* published in 1991 (1991 RDIs) that were formally adopted later by the NZ MOH.

The 2006 NRVs introduced several significant changes to the previous official nutrient reference values. In particular, the publication:

expanded the range of nutrients assigned nutrient reference values
introduced new types of reference values including for macronutrients
revised many of the 1991 RDIs
modified the age ranges
modified the units for folate
revised the presentation of energy requirements.

The *Australia New Zealand Food Standards Code* (the Code) currently makes use of regulatory Nutrient Reference Values (rNRVs) for vitamins, minerals[1] and protein based on the 1991 RDIs and, where such values were unavailable, the 1989 United States Estimated Safe and Adequate Daily Dietary Intakes (ESADDI). The rNRVs for macronutrients and their components were drawn from other government recommendations.

These rNRVs are used in the Code as the basis for:

[1] In this Paper, sodium is considered separate from the minerals group.

label declaration of the nutrient content as % daily intake (%DI) (macronutrients and sodium) and %rRDI (vitamins and minerals)
criteria for minimum content claims of vitamins and minerals (%rRDI and % rESADDI)
criteria for maximum content claims of vitamins and minerals to regulate the voluntary addition of vitamins and minerals (%rRDI and %rESADDI) to foods.

Purpose and approach

In the light of the 2006 NRVs, and as a first step, Food Standards Australia New Zealand (FSANZ) is considering the issues involved in, and potential approaches to, a revision of the current rNRVs in the Code. The approaches relate to the selection and derivation of the rNRVs based on the various and new aspects of the 2006 NRVs.

Any revision of the rNRVs in the Code is expected to be a complex process. Therefore FSANZ has identified a number of underlying principles to guide the consideration of revising the rNRVs. These are:

consistency where possible across the Code
consistency with international approaches
workable integration of approaches
seeking balance between effective outcomes and unnecessary impact
simplicity of future revisions

The purpose of this Paper is to invite comment from interested parties on these underlying principles, and the relevant issues and potential approaches to revising the rNRVs in the Code. This will inform any future action including possible development of a proposal(s) to amend the rNRVs in the Code.

The following table summarises the issues and the preferred and alternative approaches, as discussed in this Paper.

ISSUE	PREFERRED APPROACH	ALTERNATIVE APPROACH	RATIONALE FOR PREFERRED APPROACH
Protein, Vitamins and Minerals			
Selection of 2006 NRVs for subset of nutrients – nutrient adequacy or reduction of chronic disease risk?	*Establish rNRVs based on 2006 NRV measures of adequacy wherever possible*	*Establish rNRVs based on 2006 NRV measures for reducing chronic disease risk wherever possible*	*Majority of rNRVs can be underpinned by a consistent measure of adequacy. Also, consistent with Codex*
Selection of 2006 NRVs: Which measure of nutrient adequacy – EAR or RDI?	*Maintain the RDI as the basis of the rNRV*	*Revise the basis of the rNRV from RDI to EAR*	*Greater certainty of meeting adequacy requirements. Consistent with Codex. Less confusion for consumers*
Selection of 2006 NRVs: Adequate intakes	*Revise the basis of the rNRV from rESADDI to regulatory AI*	*Maintain current rESADDIs except for nutrients with EAR and 2006 RDI*	*Consistent with domestic NRVs rather than overseas values*

ISSUE	PREFERRED APPROACH	ALTERNATIVE APPROACH	RATIONALE FOR PREFERRED APPROACH
Calculation methods for rNRVs	*Calculate rNRVs on the basis of a simple averaging of 3 or 4 adult age categories (either 19 – 70 or 19 – 70+ years) for males and females*	*Calculate rNRVs on the basis of one of the other methods*	*Simplicity and comparability of result compared to more complex approaches. Consistent with Codex.*
Reference Energy Value			
Basis for reference energy value	*Review the energy reference value for the general population*	*Maintain the current energy reference value of 8,700 kJ*	*Consistent use of the 2006 NRVs as the basis of the rNRVs rather than drawing on a separate dietary intake data set*
Carbohydrate, Most Fats and Sodium			
Calculation methods for rNRVs	*Base rNRVs for carbohydrate and fat within their respective AMDR percentage energy range and adapting for protein rNRV energy gap*	*Base rNRVs for protein, carbohydrate and fat within their respective AMDR percentage energy range*	*Maximum use of measures of adequacy with inclusion of protein*
Selection of 2006 NRVs: Sodium	*Base rNRV for sodium on SDT*	*Base rNRV for sodium on AI*	*SDT provides a more 'reachable' rNRV in light of current sodium consumption*
Other Matters Related to Current Nutrients			
Units for niacin	*Update rNRV to mg niacin equivalents (NE)*	*Maintain current approach based on mg pre-formed niacin*	*Consistent with the 2006 NRV units. Consistent with Codex. More accurate consumer information*
Units for folate	*Update rNRV to dietary folate equivalents (DFE)*	*Maintain current approach of micrograms total folates*	*Accounts for increased bioavailability of folic acid. Consistent with the 2006 NRV units*
Dietary fibre	*Adopt 2006 NRV for dietary fibre and update Code to add a method(s) of analysis for total resistant starch*	*Adjust downwards the 2006 NRV for dietary fibre to maintain consistency with Code definition and methods of analysis for dietary fibre*	*Consistent with the basis of the 2006 NRVs for dietary fibre*

ISSUE	PREFERRED APPROACH	ALTERNATIVE APPROACH	RATIONALE FOR PREFERRED APPROACH
New Nutrients and New Age Categories in the Code			
'New' nutrients not currently in the Code	*Include rNRVs for all 'new' nutrients in the Code unless stakeholder comment indicates no support for a particular nutrient e.g. total water.*	*Do not include rNRVs for 'new' nutrients in the Code*	*Consistent with 2006 NRVs*
Potential new age categories for labelling purposes	*No preferred approach*	*Do not include rNRVs for more age categories and/or life stages; or consider including additional age categories and/or life stages*	*No preferred approach at this stage*

Next steps

FSANZ is releasing this Paper for public consultation. FSANZ is also undertaking targeted consultation with key stakeholders particularly in light of the detail and complexity of the issues discussed in this Paper. Stakeholder consultation will inform a Report which is expected to include recommendations on a rationale for, and approach to, any future action on revising the rNRVs in the Code. This Report will be made available on FSANZ's website once it has been considered and endorsed by the FSANZ Board.

Invitation for Submissions

FSANZ invites public comment on this Consultation Paper for the purpose of considering issues and potential approaches to revising the rNRVs in the Code and for informing future action.

Written submissions are invited from interested individuals and organisations to assist FSANZ in this review. Claims made in submissions should be supported wherever possible by referencing or including relevant studies, research findings, trials, surveys etc. Technical information should be in sufficient detail to allow independent scientific assessment.

The processes of FSANZ are open to public scrutiny, and any submissions received will ordinarily be placed on the public register of FSANZ and made available for inspection. If you wish any information contained in a submission to remain confidential to FSANZ, you should clearly identify the sensitive information, separate it from your submission and provide justification for treating it as confidential commercial material. Section 114 of the *Food Standards Australia New Zealand Act* (FSANZ Act) requires FSANZ to treat in-confidence, trade secrets relating to food and any other information relating to food, the commercial value of which would be, or could reasonably be expected to be, destroyed or diminished by disclosure.

Submissions must be made in writing and should clearly be marked with the word 'Submission' and quote 'NRVs'. While FSANZ accepts submissions in hard copy to our offices, it is more convenient and quicker to receive submissions electronically through the FSANZ website using the Changing the Code tab and then through Documents for Public Comment. Alternatively, you may email your submission directly to the Standards Management Officer at submissions@foodstandards.gov.au. There is no need to send a hard copy of your submission if you have submitted it by email or the FSANZ website. FSANZ endeavours to formally acknowledge receipt of submissions within 3 business days.

<u>DEADLINE FOR PUBLIC SUBMISSIONS</u>: <u>6pm (Canberra time) 30 July 2010</u>

SUBMISSIONS RECEIVED AFTER THIS DEADLINE WILL <u>NOT</u> BE CONSIDERED

Submissions received after this date will only be considered if agreement for an extension has been given prior to this closing date. Agreement to an extension of time will only be given if extraordinary circumstances warrant an extension to the submission period. Any agreed extension will be notified on the FSANZ website and will apply to all submitters.

Questions relating to making submissions or the application process can be directed to the Standards Management Officer at standards.management@foodstandards.gov.au.

If you are unable to submit your submission electronically, hard copy submissions may be sent to one of the following addresses:

Food Standards Australia New Zealand
PO Box 7186
Canberra BC ACT 2610
AUSTRALIA
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1. Introduction

In May 2006, the National Health and Medical Research Council (NHMRC) and the New Zealand Ministry of Health (NZ MOH) published nutrient reference values for Australia and New Zealand (2006 NRVs) (NHMRC and NZ MOH, 2006). These nutrient reference values comprise a set of recommendations for nutritional intake based on currently available scientific knowledge. They include measures of both nutrient adequacy and safety. The 2006 NRVs expand and replace the *Recommended Dietary Intakes for Use in Australia* published in 1991 (1991 RDIs) (NHMRC, 1991)[2]) that were formally adopted later by NZ MOH.

The 2006 NRVs introduced several significant changes to the previous official nutrient reference values. In particular, the publication:

expanded the range of nutrients assigned nutrient reference values
introduced new types of reference values including for macronutrients
revised many of the 1991 RDIs
modified the age ranges
modified the units for folate
revised the presentation of energy requirements.

The *Australia New Zealand Food Standards Code* (the Code) currently makes use of regulatory Nutrient Reference Values (rNRVs)[3] for vitamins, minerals and protein based on the 1991 RDIs and, where such values were unavailable, the 1989 United States Estimated Safe and Adequate Daily Dietary Intakes (ESADDI) (IOM, 1989). The current rNRVs for macronutrients and their components were drawn from other government recommendations.

In light of the 2006 NRVs, and as a first step, Food Standards Australia New Zealand (FSANZ) is considering the issues involved in, and potential approaches to, the revision of the current rNRVs and possibly other related work in the Code. This approach has been taken because of the anticipated complexity of the issues involved and range of possible approaches that could be taken in revising the rNRVs.

The purpose of this Consultation Paper is to invite comment from interested parties on issues and potential approaches to the revision of the rNRVs particularly in response to the questions outlined in this Paper. This will inform any future action including any possible proposal(s) to amend the rNRVs in the Code.

Advice to Submitters:

The Paper is technical in nature and assumes a knowledge and level of understanding of nutrient reference values. Given the close association between the various suites of nutrient reference values, readers would benefit from having access to both the 2006 NRV and the 1991 RDI publications when working through this Paper. Because of the level of detail in the 2006 NRV publication, FSANZ has not attempted to reproduce that detail in this Paper but, where necessary, a summary of the relevant detail has been provided in tabular form. Also, to assist readers less familiar with the various terms used in the Paper, it may be useful to separate out Attachment 1 to this document so it can be more easily referred to while working through the Paper.

[2] The 1991 RDIs have been rescinded by the NHMRC and are available electronically for historical purposes only.
[3] The term regulatory Nutrient Reference Value (rNRV) is used in this Paper to differentiate current and any future values in the Code from those provided in the 2006 NRV publication or from a conceptual discussion of nutrient reference values.

2. Objectives

The appropriateness of continuing the use of the existing rNRVs in the Code based on values established in the 1980s and 1990s needs to be considered in light of the 2006 NRVs. Given the extent of the changes in the 2006 NRVs, there are a number of different approaches that could be taken to revise and update the rNRVs in the Code. These need to be assessed prior to recommending any amendments to the Code.

Thus, the objectives are to:

explore the scope of the issues to be addressed
consider relevant issues and potential approaches to the revision of the rNRVs in the Code
identify through stakeholder consultation possible implications of these differing potential approaches
make recommendations on the rationale for, and approach to, future work on revising the rNRVs in the Code.

Following stakeholder consultation, a Report is expected to be considered by the FSANZ Board. Pending their approval, this Report will be made available on FSANZ's website.

3. Scope

The review will consider the current rNRVs and their implementation in the Code, the range of changes made in the 2006 NRVs, the various approaches that could be taken to revising the rNRVs in the Code. Also, the potential impacts on key stakeholder groups will be identified. This includes consideration of new types of nutrient reference values that are not currently included in the Code.

The review will not result in any proposed amendments to the Code. Rather, the focus will be on stakeholder consultation to inform possible future work, which could include development of a proposal(s) to amend the Code.

It should be noted that FSANZ already uses Estimated Average Requirements (EARs) and Upper Levels of Intake (ULs) from the 2006 NRVs in the scientific assessment of proposals and applications to amend the Code.

3.1 Exclusions / outside scope

Any undertaking to revise the existing rNRVs in the Code has the potential to be broad in scope. It is therefore necessary to clearly identify what will be outside scope.

3.1.1 Evaluation of the 2006 Nutrient Reference Values beyond their use in the Code

The NHMRC and NZ MOH have been responsible for setting the most recent suite of nutrient reference values for Australia and New Zealand.

FSANZ proposes to make use of the 2006 NRVs as published and to consider them only in the context of their contribution to rNRVs in the Code. Any comments relating to the appropriateness of specific nutrient reference values for individual age and gender groups should be directed to the NHMRC to consider during any future reviews of the NRVs.

3.1.2 Adoption of 2006 Nutrient Reference Values directly into the Code

It might appear more efficient to consider a straight translation of the 2006 NRVs into rNRVs in the Code. However this is generally not possible in practice because of the range of alternatives available given by the nutrient references values. While in some cases a direct transfer of a selected value may be appropriate, in other cases calculation of representative values are needed to ensure an appropriate rNRV is derived. This is particularly so for EARs and Recommended Dietary Intakes (RDIs) that have a wider range of age/life stage groups published in the 2006 NRVs than given for rNRVs.

Furthermore, FSANZ is not responsible for the revision of nutrient reference values, the timing of any future revision or when the 2006 NRVs might be rescinded pending review. Consequently from a regulatory perspective, there is a need to establish appropriate rNRVs in the Code at a particular point in time so as to provide certainty for all stakeholders, independent of any revision of nutrient reference values as they might occur over time. FSANZ notes that the 2006 NRVs could be reviewed in the foreseeable future however this Consultation Paper focuses on the key decisions to establish a framework and approach into the future.

Therefore the scope of this review is confined to considering the possible approaches to reflect the 2006 NRVs as updated and contemporary rNRVs in the Code. In addition, the review aims to identify an approach that will simplify the process of incorporating any future changes to NRVs in the Code as and when they occur.

3.1.3 Fortification with vitamins and minerals

The mandatory fortification requirements in the Code relating to folic acid, thiamin and vitamin D in Australia and to iodine in both Australia and New Zealand will not be reviewed. This is because the recent decisions on folic acid and iodine fortification have made use of relevant 2006 NRVs. Any possible future amendment to the mandatory requirements for thiamin and vitamin D should be based on an assessment of the nutrient status and health of the population rather than relying solely on population intakes relative to a revised nutrient reference value.

In the case of voluntary fortification, the Code permits voluntary fortification of certain foods with selected vitamins and minerals for a variety of specific purposes. The permission to add a particular vitamin or mineral to a food will not be reviewed. However, the amount of a vitamin or mineral that could be added or claimed is within scope because such amounts (as mg or µg) are derived from a percentage of the rNRV (%rNRV).

Figure 5.2 (see subsection 5.3.3) provides an extract from the Table to clause 3, Standard 1.3.2 – Vitamins and Minerals, in which the unshaded columns 1, 2 and 3 are outside scope, but the shaded columns 4 and 5 are within scope.

3.1.4 Labelling

The review will consider how the rNRVs are used in labelling e.g. percentage regulatory RDI (%rRDI) and percentage daily intake (%DI[4]). However, consideration of where and how such declarations are made on the label (e.g. as part of Nutrition Information Panel (NIP), front of pack etc.), the outline and format of the NIP or the setting of tolerance levels for label declarations, are outside scope. Criteria for claims also will not be addressed unless directly affected as a result of possible changes to rNRVs.

[4] Daily intake (DI) is a term used in the Code but not in the 2006 NRV publication so is not described as *regulatory* daily intake.

4. Approach – Underlying Principles

Should the outcome of this review lead to a proposal(s) to amend the Code, the revision of rNRVs is expected to be a complex process. There are a number of potential approaches that could be undertaken. The scope of the problem, the various issues, potential approaches and any possible impacts all need to be considered prior to determining whether a change to the Code is required and how best to incorporate any required change(s).

It is therefore useful to identify and consider underlying principles that may assist future decision making. Thus far, FSANZ has identified and considered the following:

Consistency where possible across the Code – The Code currently incorporates differing approaches to the use of rNRVs with regard to how values are expressed e.g. percentage versus absolute amounts, and how they are applied e.g. for setting compositional limits or for the purpose of allowing claims. FSANZ is considering whether these current and varied approaches should continue to apply, or whether as a basic principle, there should be a more consistent approach across the Code where possible.

Consistency with international approaches – Consistent with FSANZ's statutory objectives, seeking consistency with international approaches to rNRVs, particularly those adopted by Codex standards and guidelines, is an appropriate consideration for this review.

Workable integration of approaches - The approach taken to each individual issue needs to be ultimately combined to produce an integrated approach across the Code. Consequently it will be important to ensure that the preferred approaches identified are able to be integrated into an overall workable approach.

Seeking balance between effective outcomes and unnecessary impact – There is also a need to balance achieving an effective outcome with minimising unnecessary impacts on affected parties. FSANZ is very mindful that rNRVs are broadly applied and integral to the operation of the Code and that the differing approaches will have varied impacts.

Simplicity of future revisions – The 2006 NRVs present a significant update to the previous nutrient reference values including the consolidation of all relevant values into one publication. In considering approaches to revising the rNRVs, it is timely to consider an approach that can be consistently and simply applied to future revisions of rNRVs in the Code.

FSANZ has taken these principles into consideration in Sections 6, 7 and 8 of this Consultation Paper where the approaches currently used in the Code are outlined, potential approaches identified and questions asked regarding possible ways to revising the rNRVs in the Code.

It is anticipated that the consultation process may identify further principles that could guide the review process and any future actions in relation to revising rNRVs in the Code. Therefore, FSANZ is interested in stakeholder views as to whether there are other principles or aspects that should also be considered as a framework for decision-making.

Questions:

Do you agree with the underlying principles as listed above?

Are there other principles which should be considered in the revision of rNRVs in the Code? Please provide details to support your response.

5. Background

This Section provides an overview of the features of the 2006 NRVs and other previous sources of nutrient reference values, as well as the derivation and implementation of existing rNRVs in the Code. Relevant international and overseas regulations are also briefly discussed.

5.1 Features of previous nutrient reference values and the 2006 NRVs

This subsection summarises the differences between the 2006 NRVs and previous sources of nutrient reference values i.e. 1991 RDIs, 1989 ESADDIs, and Australian reference values for several macronutrients. Further examination of these differences and their implications for rNRVs is provided in Section 6.

5.1.1 Types of nutrient reference values based on nutrient adequacy

The NHMRC's 1991 publication provides only one type of reference value for micronutrients and protein – the Recommended Dietary Intake. In contrast, the 2006 publication of NRVs contain a suite of revised RDIs plus two new types of reference value that address nutritional adequacy. These new types are the EAR and the Adequate Intake (AI). The AI has a similar conceptual basis to the ESADDI. Where evidence was insufficient or too conflicting to establish an EAR (and therefore an RDI), AIs were established based on experimentally determined approximations or population median intakes of a nutrient (usually using national nutrition intake survey data) provided there is no evidence of a deficiency.

With the exception of the iron and zinc EAR and RDI for older infants, all measures of nutrient adequacy for infants are given as AIs rather than EARs and RDIs based on nutrient intake from breast milk and, for older infants, complementary food; or extrapolation from other age categories. Table 1, Attachment 1 provides definitions of EAR, RDI (2006 version) and AI.

5.1.2 Types of nutrient reference values based on reduction of risk of diet-related chronic disease

The 2006 NRVs also include two types of nutrient reference values for selected nutrients for which there was sufficient evidence related to a reduction in the risk of diet-related chronic disease. These are the Acceptable Macronutrient Distribution Range (AMDR) and Suggested Dietary Target (SDT). Table 1, Attachment 1 provides definitions of AMDR and SDT.

The 2006 NRVs state that AMDRs and SDTs 'related to nutrients for which there was a reasonable body of evidence of a potential chronic disease preventive effect at levels substantially higher than the EAR and RDI or AI'. However, 'research findings related to chronic disease prevention often related to nutrient mixes or food intake patterns, rather than the intake of individual nutrients.' As the evidence for reducing the risk of chronic disease is mainly derived from studies and health outcomes in adults, the AMDRs and SDTs apply only to adults and adolescents aged 14 years and over.

AMDRs are established for protein, total fat and carbohydrate as well as for saturated-and-trans fat (combined), and three polyunsaturated fats. All AMDRs are expressed as a range of percentage energy intakes except for saturated-and-trans fat which has an upper bound only. The basis for the protein AMDR differs from that of carbohydrate and total fat in that it allows for protein-associated micronutrients to be consumed at or above their respective EARs from foods commonly eaten in Australia and New Zealand. Some nutrients also have other types of 2006 NRVs such as AIs for the polyunsaturated fats for all ages, whereas carbohydrate and total fat have AIs only for infants. Protein has an EAR and 2006 RDI for all age categories except infants (AI) as well as an AMDR. No AMDR is established for sugars.

SDTs are established for a small group of vitamins, sodium and dietary fibre. The majority of SDTs are set at the 90th percentile of population dietary intakes whereas the other SDTs are based on evidence of a relationship with an aspect of health.

5.1.3 Nutrients covered

The 2006 NRVs extend the range of vitamins and minerals in the 1991 RDIs and also include several macronutrients as NRVs for the first time. Nutrients included in the 2006 NRVs are listed in Table 2, Attachment 1.

5.1.4 Age, gender and life stages

The 2006 NRV age categories differ from those of the 1991 RDIs. The children's age categories are reduced from eight to six whereas the adult age categories are expanded from two to four. The age categories for pregnancy and lactation life stages are increased from one to three. The age and life stage categories in the 2006 NRVs and 1991 RDIs are listed in Table 3, Attachment 1.

5.1.5 Energy

Energy requirements are tailored to meet likely energy expenditure of individuals taking into account the factors that cause energy expenditure to vary. The 2006 NRVs report an Estimated Energy Requirement (EER) for different ages, genders, heights for a given Body Mass Index (BMI), and physical activity levels (PAL). Unlike the 1991 RDIs, the 2006 NRVs do not give a range of energy intakes for any age-gender group; instead a table is presented showing the estimated energy requirement for adult males and females having a BMI of 22 kg/m^2 in four different age bands, of six different heights and for six different PALs. Table 1, Attachment 1 provides the definition of EER.

5.1.6 Upper levels of intake

Values for ULs for micronutrients are established for the first time in the 2006 NRVs. The ULs are established by age category and only the adult category is divided into males and females. The UL is defined in Table 1, Attachment 1. Table 4 of Attachment 1 provides a list of micronutrients for which a UL is or is not set.

5.2 Regulatory NRVs listed in the Code

This subsection lists the nutrients that are assigned rNRVs and describes the basis and source of the selected rNRVs. Subsection 5.3 then goes on to describe how these values are used in the Code.

5.2.1 *Vitamins and minerals*

The rNRVs for vitamins and minerals are listed in two Standards in the Code (see subsection 5.3):

Standard 1.1.1 – Preliminary Provisions, Application, Interpretation and General Prohibitions
Standard 2.9.2 – Foods for Infants.

These Standards list rNRVs that apply to the general population and young children 1-3 years old (Standard 1.1.1) and infants (Standard 2.9.2) respectively.

All rNRVs for vitamins and minerals are currently based on nutrient reference values that are measures of nutrient adequacy (either RDI or ESADDI). Table 5.1 lists the source of the rNRVs. Most rNRVs for the general population are derived from the 1991 RDIs for adult males aged 19-64 years. Many of these male 1991 RDIs have the same value as for adult females aged 19-54 years. Iron is an exception because its rNRV is derived from the lower bound of the 1991 RDI range for adult females to accommodate greater iron needs due to menstrual losses. Selenium is another exception because it is based on the (lower) adult female 1991 RDI due to concerns about risk of excess intake in the absence of official ULs.

The 1991 RDIs for young children aged 1-3 years were directly transferred into the Code because the 1991 RDI age range exactly matches the Code's age range. The rNRVs for infants are based on the 1991 RDIs for infants aged 7-12 months. Iron has an additional rNRV taken from the 1991 RDI for bottle-fed infants aged 0- months; this is to enable declaration of iron content as percentage regulatory RDI (%rRDI) on foods for infants 4-6 months.

The 1989 ESADDIs have a slightly different range of age categories of relevance to the Code comprising all adults, children aged 1-3 years and infants aged 6-12 months. Most of the 1989 ESADDIs are expressed in a range so each micronutrient's rNRV is derived from either the upper bound or midpoint of the range depending on the age category and nutrient. Vitamin K is taken from the 1989 US Recommended Dietary Allowances (RDA) (IOM, 1989) because it is not listed in either the 1991 RDIs or 1989 ESADDIs. Two rNRVs for pantothenate and biotin, originally based on 1989 ESADDIs, were updated in Standard 1.1.1 using AIs from the 1998 US Dietary Reference Intakes (IOM, 1998) during the development of the joint Code completed in 2000.

Table 5.1: Current rNRVs for vitamins and minerals in the Code

Nutrient	Based on 1991 RDIs: general population; children 1-3 yrs; infants 7-12 months	Based on US 1989 ESADDIs or RDA; or US 1998 AIs: general population; children 1-3 yrs; infants 6/7-12 months
Vitamins		
Vitamin A	✓	
Thiamin	✓	
Riboflavin	✓	
Niacin (pre-formed)	✓	
Vitamin B6	✓	
Vitamin B12	✓	
Folate	✓	
Pantothenic acid		✓(1998 US AI)

Nutrient	Based on 1991 RDIs: general population; children 1-3 yrs; infants 7-12 months	Based on US 1989 ESADDIs or RDA; or US 1998 AIs: general population; children 1-3 yrs; infants 6/7-12 months
Biotin		✓(1998 US AI)
Vitamin C	✓	
Vitamin D	-†	
Vitamin E	✓	
Vitamin K		✓(1989 US RDA)
Minerals		
Calcium	✓	
Chromium		✓
Copper		✓
Iodine	✓	
Iron	✓ infants 4 – 6 months; infants 6 – 12 months	
Magnesium	✓	
Manganese		✓
Molybdenum		✓
Phosphorus	✓	
Selenium	✓	
Zinc	✓	

† rNRV based on recommended daily oral intake as a supplement for those Australians not exposed to sunlight. Because of the major role of sunlight in determining vitamin D status in Australia, a RDI for vitamin D was not established.

5.2.2. Macronutrients and sodium

The rNRVs for macronutrients, their components and sodium were first introduced into the Code in Standard 1.2.8 – Nutrition Information Requirements as part of the development of the joint Australia New Zealand Food Standards Code. These rNRVs were drawn from various Australian (and for carbohydrate, one US) sources (see Table 5.2). The rNRV for sodium is currently based on the upper bound of the 1991 RDI. They apply to the general population only; no values are given in the Code for infants or young children.

An energy reference value of 8,700 kilojoules (2,100 kilocalories) was selected as a suitable representation of energy intakes applying to the general population. The value of 8,700 kJ was derived from the average intake of adult males and females surveyed in Australia (9,265 kJ) and New Zealand (8,200 kJ) (ABS, 1997; Howarth *et al*, 1991).

This regulatory energy reference value was then used to derive the rNRVs expressed in grams for (available) carbohydrate, sugars, total fat and saturated fat. The rNRVs for dietary fibre and sodium are independent of energy intake.

Table 5.2: Basis of macronutrient and sodium rNRVs in the Code (pre 2006 NRVs)

Nutrient	rNRV	Basis of rNRV	Source of rNRV
Protein	50 g	Average 1991 RDI for adult males (55g) and adult females (45g), excluding pregnancy and lactation[2]. (Corresponds to 9.8% reference energy value)	NHMRC 1991[1]
Total fat	70 g	30% energy[2]	CDHSH 1994[3]
Saturated fat	24 g	10% energy[2]	CDHSH 1994[3]
Carbohydrate	310 g	US value for labelling set at 60% energy[2]	No RDI or targets set in Australia or New Zealand.
Sugars	90 g	17.5% energy[2] i.e. the mid-point of the dietary recommendation for sugars of up to 15-20% energy for adults	NHMRC 2003[4]
Dietary fibre	30 g	Target for dietary fibre intake in 2000	CDH 1987[5]
Sodium	2300 mg	Upper bound 1991 RDI for adults	NHMRC 1991[1]

1 NHMRC (1991) Recommended dietary intakes for use in Australia. AGPS, Canberra.

2 Reference energy value, 8,700 kJ.

3 Commonwealth Department of Human Services and Health (1994) Better health outcomes for Australians. National goals, targets and strategies for better health outcomes into the next century. CDHSH, Canberra.

4 NHMRC (2003) Dietary guidelines for Australian Adults. Commonwealth of Australia, Canberra.

5 Commonwealth Department of Health (1987) Towards better nutrition for Australians. Report of the Nutrition Taskforce of the Better Health Commission. AGPS, Canberra.

5.3 Use of rNRVs in the Code

The present set of rNRVs in the Code has three uses related to food labelling and voluntary fortification with vitamins and minerals. These rNRVs are used as the basis for:

label declaration of the nutrient content per serving of food as % DI (macronutrients and sodium for the general population only) and %rRDI

criteria for minimum content claims of vitamins and minerals (%rRDI and % regulatory ESADDI (rESADDI)

criteria for maximum content claims of vitamins and minerals that are used to regulate the voluntary addition of vitamins and minerals (%rRDI and % rESADDI) to foods .

The Standards that refer to the rNRVs are shown in Table 5.3 together with a general description of the way in which NRVs are used in these standards.

Table 5.3: Current use of rNRVs in the Code

Standard	Name of Standard	Use of rNRV
1.1.1	Preliminary Provisions – Application, Interpretation & General Prohibitions	List of rNRVs for vitamins and minerals for the general population, 1 - 3 year olds
1.2.8	Nutrition Information Requirements	List of rNRVs for macronutrients and sodium for the general population
1.3.2	Vitamins & Minerals	Maximum claim amounts for voluntary fortification with vitamins and minerals. Minimum amounts for vitamin and mineral content claims.
2.9.2	Foods for Infants	List of rNRVs for vitamins and minerals for infants 4 months and older. Minimum amounts for vitamin and mineral content claims. Maximum claim amounts for voluntary fortification of infant cereals with vitamins and minerals
2.9.3	Formulated Meal Replacements and Formulated Supplementary Foods	Minimum amounts for vitamin and mineral content claims. Maximum claim amounts and maximum permitted quantity for voluntary fortification with vitamins and minerals. Formulated supplementary foods are regulated separately for the general population and for young children.
2.9.4	Formulated Supplementary Sports Food	List of rNRVs for certain vitamins and minerals. Minimum amounts for vitamin and mineral content claims. Maximum claim amounts for voluntary fortification with vitamins and minerals
2.10.3	Chewing Gum	Minimum and maximum claim amounts for voluntary fortification with releasable calcium

5.3.1 Percentage daily intake (%DI)

The term %DI refers to the percentage of macronutrients and sodium contributed by one serving of a food to a reference daily intake (see Table 5.1). Information about the %DI of nutrients may be provided on the label as prescribed in Standard 1.2.8. If provided, this information is given in an additional column of the Nutrition Information Panel (NIP). Some manufacturers also provide this information on the front of pack e.g. as ‘thumbnails’. The %DI information is intended to assist consumers to understand the relationship between the nutrient content in a serving of the food and reference intakes of particular nutrients. Where %DI is displayed, the %DI for energy, protein, total fat, saturated fat, carbohydrate, sugars, and sodium provided by one serving of the food must all be included. The reference values listed in Table 5.1 apply to the general population only and are used as the basis for calculating the %DIs. The following statement is also required in the NIP *Percentage daily intakes are based on an average adult diet of 8700 kJ. Your daily intakes may be higher or lower depending on your energy needs*.

An example of a NIP incorporating both %rRDI and %DI based on the current rNRVs in the Code is provided in Figure 5.1.

Nutrition Information			
Servings per package: 12 Serving size: 45 g	Quantity per serving	%DI* per serving	Quantity per 100 g
Energy	540 kJ	6%	1190 kJ
Protein	5.8 g	12%	12.8 g
Fat, total	1.7 g	2%	3.8 g
– saturated	0.3 g	1%	0.6 g
Carbohydrate	11.7 g	4%	26.0 g
– sugars	6.5 g	7%	14.5 g
Sodium	180 mg	8%	395 mg
Vitamins and minerals		%RDI	
Thiamin	0.44 mg	40%	0.98 mg
Folate	100 µg	50%	222 µg
Calcium	200 mg	25%	445 mg
Iron	3.0 mg	25%	6.7 mg

* Percentage Daily Intakes are based on an average adult diet of 8700 kJ.
Your daily intakes may be higher or lower depending on your energy needs.

Figure 5.1: Example of a Nutrition Information Panel

5.3.2 Vitamin and mineral content claims

In order to make a claim about the vitamin or mineral content of a food, the food must be a 'claimable food' as defined in Standard 1.3.2 and must contain at least 10% of the regulatory RDI (rRDI) or regulatory ESADDI (rESADDI) per serve for the vitamin or mineral. The %rRDI of the vitamin or mineral contributed by a serving of food must be declared on the label, in addition to the average quantity per 100 g or 100 mL of that vitamin or mineral in the food. Where a rESADDI exists for a vitamin or mineral, the average quantity of the vitamin or mineral in a serving of the food must be declared on the label but its percentage of rESADDI is not required.

For special purpose foods such as infant foods and formulated supplementary foods, the Code provides specific requirements for making claims on the vitamin or mineral content for these foods.

5.3.3 Voluntary fortification with vitamins and minerals

Voluntary fortification relies on the use of minimum and maximum claim amounts per reference quantity of food to regulate the total amount (naturally occurring and added) of vitamins and minerals in fortified foods.

The minimum claim amounts for fortification are the same as the qualifying amount for a vitamin or mineral content claim. The maximum vitamin and mineral content of voluntarily fortified foods is regulated by way of a maximum claim amount and, for high risk nutrients, also an absolute (higher) maximum amount. Maximum claim amounts are generally shown in the Code as the quantity of micronutrient in mg or µg followed by that quantity expressed as % rNRV in brackets. Figure 5.2 provides an example of this format from the Code in the shaded columns 4 and 5 of the Table to clause 3, Standard 1.3.2. However, some Standards state only the quantity such as Standard 2.9.4 – Formulated Supplementary Sports Foods; or conversely state only the %rNRV such as Standard 2.9.2 – Foods for Infants.

Column 1	Column 2	Column 3	Column 4	Column 5
Food	**Reference Quantity**	**Vitamins and Minerals That May Be Added**	**Maximum Claim per Reference Quantity (Proportion RDI)**	**Maximum Permitted Quantity of Vitamin or Mineral per Reference Quantity**
Yoghurts (with or without other foods)	150 g	Vitamin A Vitamin D Calcium	110 µg (15%) 1.0 µg (10%) 320 mg (40%)	125 µg 1.6 µg
Dairy desserts containing no less that 3.1% m/m milk protein	150 g	Vitamin A Vitamin D Calcium	110 µg (15%) 1.0 µg (10%) 320 mg (40%)	125 µg 1.6 µg
Ice cream and ice confections containing no less that 3.1% m/m milk protein	75 g	Calcium	200 mg (25%)	

Figure 5.2: Extract of Table to clause 3, Standard 1.3.2

5.4 Relevant international regulations

5.4.1 Codex Alimentarius

The Codex nutrient reference values for labelling purposes are listed in the Codex Guidelines on Nutrition Labelling (CAC/GL 2 - 1985); these are now under revision by the Codex Committee on Nutrition and Foods for Special Dietary Uses (CCNFSDU). At the November 2009 meeting of the CCNFSDU, the following draft general principles were developed to guide the revision of Codex labelling values.

At this stage, Codex draft principles consider that:

the general population comprises those aged over 36 months
nutrient reference values will be derived primarily from FAO/WHO values for nutrient requirements
nutrient reference values will be based on the INL_{98} (Individual Nutrient Level at the 98th percentile) (which corresponds approximately to the Australia New Zealand RDI)
the method of derivation will be the mean of nutrient reference values for adult males and females aged 19-50 years.

This Codex work provides guidance on possible approaches to the possible revision of the rNRVs in the Australian and New Zealand context. FSANZ therefore plans to closely watch developments as work in this area progresses. The CCNFSDU will consider in detail the proposed revised nutrient reference values for labelling purposes at its next meeting in late 2010.

5.4.2 Overseas regulations

From a survey of several overseas jurisdictions: Europe[5,6], Canada[7] and the United States[8], the equivalent of rNRVs in these jurisdictions is derived from only a RDI or national equivalent, which likely reflects the sole availability of this type of nutrient reference value until very recently.

The issue of which of the two types of measures of nutrient adequacy, EAR or RDI, is appropriate for food labelling in the United States has been discussed among academics, regulators and policy makers[9]. In addition, the US Institute of Medicine released guiding principles for the use of Dietary Reference Intakes in nutrition labelling and fortification (IOM, 2003). That publication recommended that the EAR (based on population-weighted values) be used as the basis for nutrition labelling. In 2007, the US Food and Drug Administration (FDA) issued an advance notice of proposed rulemaking (FDA, 2007) to update the reference values for micronutrients (based on 1968 RDAs) and other nutrients (based on later recommendations) which proposed using:

population-weighted EARs in preference to RDAs where available
population-weighted AIs where no EAR was available
AMDR midpoints for protein, fat and carbohydrate.

The FDA is currently drafting a proposed rule for public consultation.

6. Potential Approaches to the Revision of rNRVs for Current Nutrients in the Code

This Section considers approaches for the selection of different types of 2006 NRVs that could be used to revise the current range of rNRVs in the Code and where appropriate, the possible methods of calculation to derive the rNRVs. The Section is presented by nutrient groupings that have a common type of 2006 NRV.

The format of most subsections in this Section is arranged in order of:

features of the 2006 NRVs
the current situation in the Code
the possible approaches that could be applied
the advantages and disadvantages of these approaches

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[5] European Commission. *Commission Directive 2009/100/EC of 28 October 2008 amending Council Directive 90/496/EEC on nutrition labelling for foodstuffs as regards recommended daily allowances, energy conversion factors and definitions.* http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32008L0100:EN:NOT Accessed on 14 December 2009

[6] European Commission. *Council Directive 90/496/EEC of 24 September 1990 on nutrition labelling of foodstuffs* http://eurlex.europa.eu/smartapi/cgi/sga_doc?smartapi!celexapi!prod!CELEXnumdoc&lg=EN&numdoc=31990L0496&model=guichett Accessed on 14 December 2009.

[7] Department of Justice of Canada. *Regulations Respecting Food and Drugs (C.R.C., c.870) Part D Vitamins, Minerals and Amino Acids* http://laws.justice.gc.ca/eng/C.R.C.-C.870/page-2.html#anchorbo-ga:l_D-gb:l_1 Accessed on 14 December 2009.

[8] US Food and Drug Administration. *US Code of Federal Regulations, Section 101.9* Nutrition labeling of food http://edocket.access.gpo.gov/cfr_2009/aprqtr/pdf/21cfr101.9.pdf Accessed on 16 December 2009.

[9] See *American Journal of Clinical Nutrition* supplement to Vol. 83(5) – Dietary Reference Intakes (DRIs) for Food Labeling.

a preferred approach.

Some subsections include a boxed question seeking specific input from interested parties. These are in addition to general questions posed in Section 9. New nutrients in the 2006 NRVs that are not currently included in the Code are discussed in Section 8.

6.1 Selection of 2006 NRVs for a subset of nutrients – nutrient adequacy or reduction of chronic disease risk?

As discussed in subsections 5.1.1 and 5.1.2, 2006 NRVs that address nutrient adequacy are the EAR and RDI, or AI; one or other type is provided for all listed vitamins and minerals and age categories. The 2006 NRVs also introduce AMDRs and SDTs for some nutrients based on evidence of reduction of chronic disease risk. Protein has an EAR and RDI covering all age categories as well as an AMDR.

The establishment of SDTs for a subgroup of vitamins, sodium and dietary fibre also prompts the question about which type of 2006 NRV is appropriate as the basis for these nutrients' rNRVs. Selenium is assigned a SDT but without a quantified value so its STD is not considered further. SDTs for vitamins A, C, E and dietary fibre are set at the 90th percentile of population dietary intakes whereas SDTs for folate and sodium are based on evidence of a relationship with an aspect of health.

Table 6.1 lists the nutrients with more than one type of 2006 NRV and the age categories to which the relevant NRVs apply.

Table 6.1: Nutrients with more than one type of 2006 NRV

Nutrient with more than one type of NRV	Age categories for NRV measure of adequacy	Age categories for AMDR or SDT
Protein	All ages	14 years and older
Carbohydrate	Infants only	14 years and older
Fat	Infants only	14 years and older
Dietary fibre	All ages except infants	14 years and older
Sodium	All ages	14 years and older
Vitamin A	All ages	14 years and older
Folate	All ages	14 years and older
Vitamin C	All ages	14 years and older
Vitamin E	All ages	14 years and older

One consideration for this subgroup of nutrients is that measures of adequacy are established for all defined age categories across the life cycle thus providing values for the Code's three age categories and any others that might be subsequently created. On the other hand, the AMDR or SDT for each nutrient leaves gaps in the coverage of the Code's present age categories.

Another consideration is that measures of adequacy are given in amounts (g, mg or µg) whereas AMDRs are expressed as a range of percentage energy and therefore their corresponding amounts depend on the reference energy value selected.

In cases where the 2006 NRVs have both nutrient adequacy and SDT values for the same nutrient and age category, the SDT is always higher than the measure of nutrient adequacy.

However, the protein AMDR value could be higher or lower than its corresponding measure of adequacy depending on the particular energy reference value used for conversion of the percentage energy to a gram amount.

6.1.1 Current situation in the Code

Nutrients that can be voluntarily declared in the NIP as %DI (relevant to the general population only) are based on a mix of measures: adequacy (protein, sodium), risk reduction (total fat, saturated fat), and recommendations for a healthy diet (sugars, dietary fibre) as indicated in Table 5.1. Carbohydrate is defined for labelling purposes as available carbohydrate which excludes dietary fibre.

The rNRVs for all vitamins and minerals are based on measures of nutrient adequacy and divided into three age categories: the general population (i.e. people aged 4 years and older), young children aged 1-3 years, and infants aged 4-2 months.

6.1.2. Possible approaches

1 Establish rNRVs based on 2006 NRV measures of adequacy wherever possible.

2 Establish rNRVs based on 2006 NRV measures for reducing chronic disease risk wherever possible.

6.1.3 Advantages and disadvantages

Approach 1 would deliver the greatest consistency in the Code by ensuring nearly all rNRVs are based on measures of adequacy for all age categories. All rNRVs would be based on measures of adequacy with the exception of sodium (see subsection 6.7), carbohydrate and total fat, saturated fat or saturated-and-trans fat. Such exceptions need to be made because of the lack of nutrient adequacy measures for all or nearly all age categories. The rNRVs for carbohydrate, total fat and saturated fat or saturated-and-trans fat would be based on their respective AMDRs for the general population and if needed, their AIs for infants and values to be determined for young children.

Approach 1 could potentially have the least impact on consumers as most nutrients would be assigned measures of adequacy, which is the current situation in the Code. However, the impact depends on which measures of adequacy are selected (see subsection 6.2). The impact on industry would depend on the extent to which current rNRVs change (number and magnitude) and the likely flow-on effects to product formulation and/or labelling. However, the outcome for industry would be the same irrespective of whether Approach 1 or 2 were chosen.

Approach 2 would adopt rNRVs based on reduction of chronic disease risk where such NRVs are provided in the 2006 publication. This means that as many rNRVs as possible would be based on either an AMDR or SDT. Applying the consistency principle, this Approach would apply to all three major macronutrients, plus saturated fat, the four vitamins, dietary fibre and sodium for the general population even though the AMDR or SDT applies to people aged 14 years and older (see Table 6.1). FSANZ notes that a 2006 NRV is given for saturated-and-trans fat but that the current DI in the Code relates to saturated fat only. Also, no AMDR was established for sugars. Consideration would need to be given to addressing these discrepancies.

In setting rNRVs for all age categories, consideration would also need to be given to the relevance of, and extrapolation method for, SDTs applied to age categories below 14 years of age. It is noted that alternative measures of adequacy are given in the 2006 NRVs for some of these nutrients and for some younger age categories.

Under Approach 2, the rNRVs for the general population based on the few SDTs would be relatively higher than for the majority of other nutrients, and the affected micronutrients also could be relatively higher for the general population than for other age categories depending on the extrapolation method. Although this Approach could potentially influence dietary change, it would not be sensitive to all population needs particularly for those who are not the target for recommendations about reduction of chronic disease risk.

6.1.4 Preferred approach

Approach 1 is preferred because it enables the vast majority of rNRVs (i.e. micronutrients and protein) to be underpinned by a consistent measure of nutrient adequacy for all age categories that are or could be included in the Code. In view of the limited data in support of the health relationships for some SDTs and AMDRs, FSANZ regards Approach 1 as the one which can stand the test of time and be applied more consistently into the future.

6.2 Selection of 2006 NRVs for protein, vitamins and minerals

6.2.1 Which measure of nutrient adequacy – EAR or RDI?

The EAR and RDI are particular percentiles of the distribution of nutrient requirement in a population group. The true nutrient requirement of an individual is unknown.

An EAR is the intake level that represents the average nutrient requirement in a specific population (i.e. at the 50^{th} percentile of the distribution of nutrient requirement). EARs are established only when sufficient data in humans are available. RDI values for each nutrient are derived from the EAR (such that the RDI = EAR + 2 SD_{EAR} (where SD is the standard deviation), then rounded), to cover the requirements of about 97.7% of the specific population. This is represented graphically in Figure 6.1. (If data on the distribution of requirements are insufficient to calculate an SD, then it is assumed that the SD equals 10% of the EAR[10]).

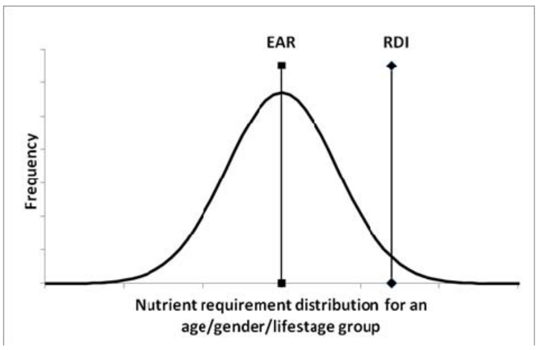

Figure 6.1: Nutrient requirement distribution for an age-gender/lifestage group

The 2006 NRV publication notes that EARs are designed for use by individuals to ‘examine the probability that usual intake is inadequate’, and to ‘estimate the prevalence of inadequate intakes within a group’.

[10] Further information on the calculation of RDIs can be obtained from the 2006 NRVs publication.

For RDIs however, nutrient intakes for an individual 'at or above the RDI level is associated with a low probability of inadequacy' for that individual. The NHMRC and NZ MOH recommend not using RDIs to assess intakes of groups. When planning population intakes, it is suggested that a suitable goal might be to have 3% or less of usual population intakes below the EAR (IOM, 2003).

The 2006 NRVs provide both EARs and RDIs for some nutrients for all age categories and life stages except infants (see Table 6.2). In addition, EARs and RDIs for iron and for zinc are established for older infants. Where evidence was insufficient or conflicting, an AI was established (see subsection 6.2.2).

Table 6.2: Nutrients with EAR and RDI in 2006 NRVs for all ages except infants

Vitamins	Minerals	Other
Vitamin A	Calcium	Protein
Thiamin	Iodine	
Riboflavin	Iron†	
Niacin	Magnesium	
Vitamin B6	Molybdenum*	
Vitamin B12	Phosphorus	
Folate	Selenium	
Vitamin C	Zinc†	

* EAR and RDI first established in 2006
† EAR and RDI also established for older infants

<u>6.2.1.1 Current situation in the Code</u>

As mentioned previously, the Code has established rNRVs as rRDIs and rESADDIs (which are conceptually similar to AIs).

The 1991 RDI publication did not describe the EAR and so it has not previously been possible to consider whether the rNRV should be based on the EAR. Table 6.3 provides a comparison of rRDIs, mostly based on the 1991 RDI for adult males aged 19-64 years, with EARs and 2006 RDIs for adult males aged 31-50 years. With the exception of molybdenum, all vitamins and minerals listed in Table 6.3 have 1991 RDIs and therefore have rRDIs in the Code for the general population, young children 1-3 years and infants 4-12 months. In addition, rRDIs are established for vitamins D and E for these population groups based on 1991 RDIs. Note however, that these vitamins are not shown in Table 6.3 since no EAR and RDI are given for them in 2006 NRVs. Although based on the 1991 RDI, protein is listed as a Daily Intake value in the Code and given only for the general population.

The comparison provided in Table 6.3 demonstrates the approximate relativities between EARs and 2006 RDIs and the Code's rRDIs for a single age and gender group. The data indicate that, for about a third of listed nutrients, the 2006 EAR is the same or higher than the current rRDI.

Table 6.3: Comparison of rRDIs with EARs and 2006 RDIs for males aged 31-50 years

Nutrient	Current rRDI	EAR	2006 RDI
Protein	50*	52	64
Vitamin A	750	625	900
Thiamin	1.1	1.0	1.2
Riboflavin	1.7	1.1	1.3
Niacin (NE)	10 (pre-formed niacin)	12	16
Vitamin B6	1.6	1.1	1.3
Vitamin B12	2.0	2.0	2.4
Folate (DFE)	200 (not DFE)	320	400
Vitamin C	40	30	45
Calcium	800	840	1000
Iodine	150	100	150
Iron	12	6/8 (Male/Female)	8/18 (Male/Female)
Magnesium	320	350	420
Molybdenum	--	34	45
Phosphorus	250	580	1000
Selenium	70	60	70
Zinc	12	12	14

* Given as a reference Daily Intake in the Code

Issues related to the difference in units between the Code and 2006 NRVs for niacin and folate are discussed in subsections 7.1 and 7.2.

6.2.1.2 Possible approaches

1 Maintain the basis of the rNRV as Recommended Dietary Intake (RDI).

2 Revise the basis of the rNRV from RDI to Estimated Average Requirement (EAR).

The matter of which of the two related nutrient reference values (i.e. EAR (50^{th}) or RDI (about 97.7^{th}) percentile of distribution of nutrient requirement) is the more appropriate for nutrition labelling has been debated in the literature since additional nutrient reference values to the RDI or equivalent became available (see footnote 9 for reference).

6.2.1.3 Advantages and disadvantages

Approach 1 provides a population-coverage approach where the selected nutrient reference value, based on RDI, is equal to or exceeds the true and unknown nutrient requirement for nearly all individuals in the population group. This Approach thus minimises the likelihood of the rNRV being lower than an individual's true requirement. Although the RDI might exceed the true requirement of most people, nutrient intakes at the RDI do not pose a risk to health because the RDI is lower than the UL for the same population group.

The choice of which type of nutrient reference value for use in regulation is also considered in terms of the probability of nutrient adequacy for an individual reading a label. Murphy and Barr (2006) put it this way 'consumers are likely to expect that a product with 100% [US] Daily Value has a high probability of nutrient adequacy (i.e. from use of RDI), not a 50% probability of adequacy (from use of EAR)'. Basing the rNRV on the population coverage approach means that the percentage contribution of a food to true nutrient requirement would be understated for most of the population group.

From a nutrient intake perspective, if the average nutrient intake of the population were to meet the EAR, then there would be a 50% prevalence of inadequate intakes in the population (IOM, 2003). One of the criteria for using the EAR cut-off method to estimate the prevalence of inadequate intake is that the standard deviation of the intake distribution should be greater than the standard deviation of the requirement distribution (IOM, 2003). That is, the mean intake of the population must be no lower than the RDI to ensure that only a small proportion (2-3%) have intakes below the EAR. The argument could thus be made that the RDI is a reasonable recommendation for the general population because it is closer to the population mean intake that is needed to ensure a low prevalence of inadequate intakes.

Approach 1 is consistent with the proposed Codex revision, thus increasing its likelihood of being supported internationally in the future.

For the above reasons, Approach 1 is preferred and would maintain the current approach in the Code even though the actual values could change.

Approach 2 supports the view that the EAR is the best estimate of the requirement of a randomly selected individual from an equivalent population group. For example, Tarasuk (2006) suggests that although an individual's true nutrient requirements are unknown, they are likely to lie within the range of requirements of the age and gender group to which that individual belongs. Thus, the best estimate of an individual's requirement is the midpoint of the distribution of requirements to which that individual belongs i.e. the EAR. The EAR 'provides the most scientifically valid, single point of comparison for an appraisal of the probable contribution of a specific food to the overall nutrient needs of individuals in the target population'. However, FSANZ notes that the RDI is a closer estimate of requirement than EAR for the smaller proportion of the population group whose requirements lie in about the top 16% of the nutrient requirement distribution.

The Food and Nutrition Board of the US Institute of Medicine (2003) recommended the EAR as the basis for labelling values. Compared to the RDI, the EAR is more representative of the true nutrient requirement for the larger proportion of the population group whose requirements lie in the lower 84% of the nutrient requirement distribution (≤EAR + 1 standard deviation). On the other hand, half the population group's true requirements are higher than the EAR because the EAR by definition falls below the true requirement for half the individuals in the group.

Approach 2 would be a significant departure from previous approaches in the Code. It would introduce a situation for the first time in Australia New Zealand where half the population would have nutrient requirements <u>higher</u> than the rNRV. The EAR is always a lower value than its related RDI, although an EAR is not necessarily always lower than the 1991 RDI for the same nutrient and age category (see Table 6.3).

Under Approach 2, changing from RDI to EAR may decrease the value of the rNRV for some vitamins and minerals in cases where the 1991 and 2006 RDIs are similar. Under this scenario, the declared percentage contribution of a food's nutrient content to the rNRV might increase. For example, for the same serving size, a food's contribution of 20% rNRV based on RDI would increase to about 30% rNRV based on EAR. Also, such a change might lower the minimum amount necessary to qualify for a content claim and therefore allow more food products to carry vitamin and mineral claims on their labels, particularly related to naturally-occurring vitamins and minerals. Equally, that change might also reduce the amount of vitamins and minerals added to food because of a decrease in the maximum claim amount. This would depend on whether the current percentages of rNRVs are retained or amended in the Code.

Approach 1 could pose slightly more risk than Approach 2 related to the small number of nutrients that are assigned a UL. This is because a general population rNRV based on a RDI is more likely to exceed the UL for young children (1-3 years) than if it were based on an EAR (see Attachment 2). The risk would occur only where the general population RDI and the young child UL are similar, and where young children regularly ate sufficient quantities of particular foods, including fortified packaged foods, to reach or exceed nutrient intakes at the level of their UL.

There are very few nutrients that have a general population RDI similar to the UL of young children however zinc and iodine are two of these. Recent published data from an Australian national nutrition survey (CSIRO, 2008) indicate that the mean zinc intake of young children aged 2-3 years exceeded their UL. It is uncertain to what extent zinc fortification of foods commonly eaten by young children such as breakfast cereals (maximum claim 15% rRDI/serving) and formulated supplementary foods (maximum claim 40% rRDI/serving as prepared) might contribute to this intake. This could be further investigated in any proposal to revise the rNRVs including consideration of complementary risk management strategies.

For foods specifically directed to young children, the rNRV would be based on a nutrient reference value relevant to that age category, which is always lower than the corresponding UL.

From a labelling perspective, Approach 2 provides for the contribution of a single food to the average nutrient requirement for population groups. In addition, changing from RDI to EAR represents a departure from the current approach of referring to %RDI in the NIP. Consumers would be unfamiliar with any new reference value concept, and may find different terms confusing. Consumers already have a limited understanding of the use of %RDI values on food labels. In June 2006, FSANZ commissioned a small qualitative study to explore, in part, consumer understanding and ability to use %RDI information to make product decisions (TNS, 2007). The research found that the current use of %RDI information was very low, despite medium to high levels of awareness and consumers' ability to correctly use the information when prompted.

If Approach 2 were adopted, any future consideration of labelling changes might consider how EARs could be represented in the NIP. In the United States, the Nutrition Facts label includes only one reference value (percentage daily value, %DV) for all declared nutrients. This may be an approach worth considering, if other reference value concepts, such as AIs and SDTs, are also adopted in the Code. However, it would mean that %DI for some nutrients indicate that reaching 100% is desirable whereas for other nutrients, less than 100% is desirable. At present, %RDI is used to indicate the former. Consumer research on potential labelling options would be essential to determine an acceptable and consumer-friendly approach.

6.2.1.4 Preferred approach

Approach 1 is preferred because it provides greater certainty that a nutrient intake that met the rNRVs would be adequate for the vast majority of the target population. It better supports the goal of the population as a whole having an adequate intake, and it is more appropriate for a smaller proportion of the population than the EAR. The risk of exceedance of the young children's UL is expected to be very low but this would be further investigated before any decisions are made.

This Approach maintains the concept of RDI for consumers although social research indicates that consumers take the %DI or %RDI information on a label as indicative rather than the basis for adjusting their daily diets to meet 100% of an rNRV.

Both Approaches are likely to place a similar burden on industry to adjust labelling and possibly fortification composition since the quantum of change appears to be about the same with very few numbers remaining unchanged.

Approach 1 is also consistent with the proposed Codex revision, thus increasing its likelihood of being supported internationally in the future.

6.2.2 Adequate intakes

The 2006 NRVs provide AIs for several vitamins and minerals instead of EARs and 2006 RDIs (see Table 6.4). These AIs were developed in cases where there was insufficient evidence to establish an EAR or where the evidence was conflicting. Two types of AI were developed based either on experimental evidence or according to population median intake assuming that neither the Australian nor New Zealand population was deficient. Because of the assumptions made or the uncertainties in the evidence base, AIs are not as reliable as EARs and RDIs.

Table 6.4: Nutrients with AI in 2006 NRVs for all ages except infants

Vitamins	Minerals	Other
Pantothenic acid	Chromium	Dietary fibre
Biotin	Copper	
Vitamin D*	Manganese	
Vitamin E*	Sodium*	
Vitamin K		

* Previously given as RDI in 1991 RDI publication

For infants 0-6 months, all 2006 NRVs are given as AIs based on the composition and usual volume of breast milk. For infants 7-12 months, nearly all 2006 NRVs are given as AIs with the exception of iron and zinc.

6.2.2.1 Current situation in the Code

As previously stated, the Code includes rESADDIs for micronutrients that were not allocated an RDI in 1991 (see Table 6.5). Most rESADDIs are drawn from the US 1989 ESADDIs. The inclusion in the Code of rESADDIs for the general population, young children 1-3 years and infants allows for some of the same uses as for rRDIs. Comparison of the rESADDIs in the Code with their 2006 NRV counterparts shows a downward trend (see Attachment 3).

Table 6.5: List of nutrients with rESADDIs in the Code

Vitamins	Minerals
Pantothenic acid	Chromium
Biotin	Copper
Vitamin K*	Manganese
	Molybdenum**

* Based on 1989 US RDA males 25+ years; children 1-3 years; and infants 6-12 months
** Molybdenum has an EAR and RDI in the 2006 NRV publication.

6.2.2.2 Possible approaches

1. Maintain current rESADDIs except for nutrients with EAR and 2006 RDI (i.e. molybdenum).

2. Revise the basis of the rNRV from rESADDI to regulatory AI.

6.2.2.3 Advantages and disadvantages

Approach 1 would have minimal impact on industry or consumers but would leave discrepant and out of date rESADDIs in the Code. Approach 2 on the other hand provides the opportunity to replace overseas-based rESADDIs with local equivalent regulatory AIs (rAIs). The direction of revisions potentially varies according to each affected vitamin or mineral, but noting a downward trend, some nutrient content claim criteria could be reduced thus expanding the range of foods that could claim nutrient content. However, for these and other nutrients, changes to nutrition labelling or reformulation of foods fortified with these nutrients might be necessary to remain compliant.

6.2.2.4 Preferred approach

Approach 2 is preferred if other rNRVs are revised, to provide a total set of rNRVs that reflect contemporary official Australia New Zealand values. This Approach promotes greater consistency across the Code in relation to rNRVs.

6.3. Calculation methods for rNRVs for protein, vitamins and minerals, dietary fibre

The 2006 NRVs provide the opportunity to consider the most appropriate calculation methods to obtain a single rNRV for each of the relevant nutrients in the age categories in the Code. The 2006 NRV publication maintained similar age groups for infants and children but expanded the adult age groups from two to four: (19-30, 31-50, 51-70, >70 years). Of the 37 nutrients with measures of nutrient adequacy, only seven: vitamin A, folate, vitamin C, vitamin B12, iodine, molybdenum and phosphorus have the same value for all adult age and gender categories.

6.3.1. Current situation in the Code

Most rNRVs for the general population were derived from a single value or from within a range of an age and gender category. No calculation methods were needed since in most cases only one value (adult males) was selected. Values for the general population are those established for ages 4 years and older excluding pregnancy and lactation. The minimum age is set at 4 years because two other sets of rNRVs are given for infants and for young children even though these are acknowledged as also consuming foods available to the general population.

6.3.2 rNRVs based on EAR and RDI; or AI

The selected calculation method for rNRVs for most measures of adequacy in the 2006 NRV publication will be the same because all methods use the same age categories. The exception is the population-distribution method which cannot apply to the AI because these values are not based on a distribution of nutrient requirements. The chosen method would apply to protein, vitamins and minerals, dietary fibre and any new nutrients having 2006 NRVs based on a mass amount.

Several options have been put forward in the recent literature (see footnote 9) for the calculation of rNRVs that represent key or a broad range of population groups. These options are:

choose a single value of EAR, RDI or AI such as the highest value from among the values for the relevant age categories

apply a population weighting to the EAR, RDI or AI according to the relevant age-gender categories based on census data (called the population-weighted EAR or population-weighted RDI respectively)

calculate the 97.7th percentile of the aggregated distribution of requirement of a population age range e.g. those aged 4 years and older (called the population-distribution EAR or RDI)

derive the mean of two or more age-gender categories for EARs, RDIs or AIs to represent the general population from among the available age categories e.g. adult males and females.

The differences in values for vitamin A for all options (three EAR; four RDI) are shown in Figure 6.2 based on a simulated distribution of Vitamin A requirements (µg RE/day). The nutrient distribution was calculated using the estimates of the combined Australian and New Zealand populations as at mid 2009 (ABS, 2009; Statistics New Zealand, 2009) and the method described by Tarasuk (2006).

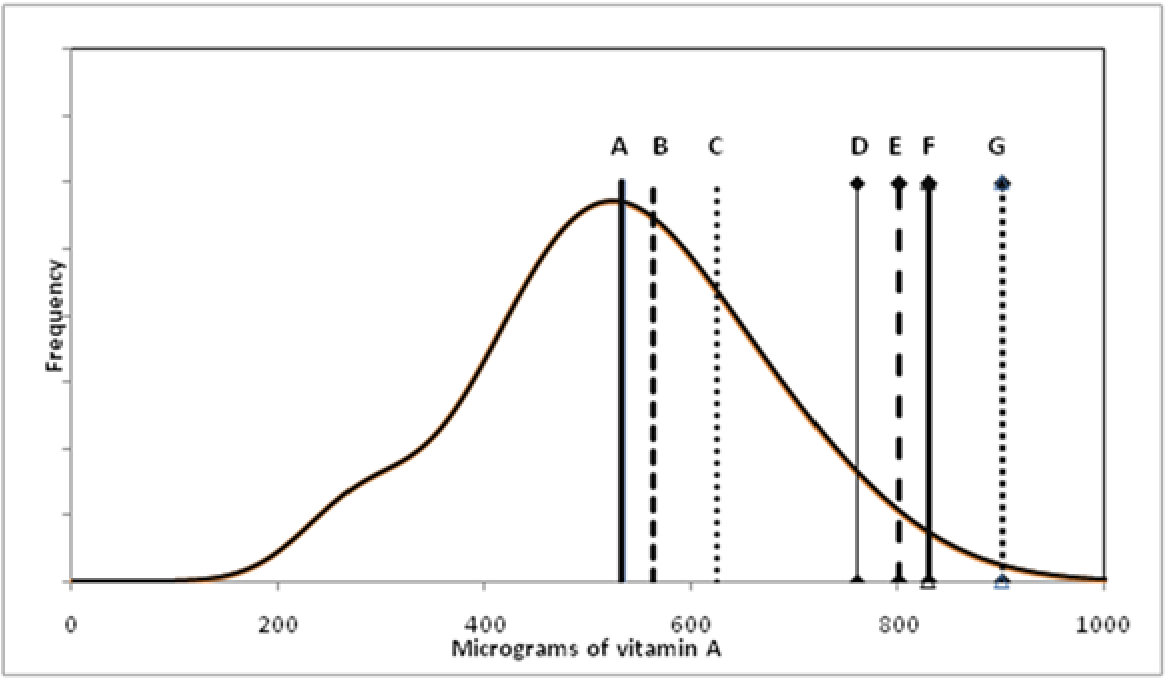

Figure 6.2: Possible rNRVs based on various derivatives of EARs and RDIs for the population group 4 years and older

The vertical lines in Figure 6.2 indicate the different rNRVs when calculated lowest to highest value as the:

population-<u>weighted</u> EAR; population-<u>distribution</u> EAR (Line A) (only 1 µg difference)
simple average of the EAR for eight adult age-gender categories (Line B)
highest EAR for any single age-gender category in the population (Line C)
population-<u>weighted</u> RDI (Line D)
simple average of the RDI for eight adult age-gender categories (Line E)

population-distribution RDI (RDI set at about 97.7th percentile of the distribution of combined Australian New Zealand population requirements) (Line F)
highest RDI for any single age-gender category in the population (Line G).

Comparison of values calculated for combined Australia New Zealand populations according to the possible methods using the 2006 NRVs for several nutrients are given in Attachment 2.

As can be seen from Figure 6.2, the choice of EAR or RDI is a more influential determinant of the final rNRV than the choice of calculation method.

The calculation methods vary in their complexity but their outcomes differ from the current rNRV by an insignificant to moderate extent. For example, the current rNRV for vitamin A (RDI, 750 µg RE) would increase by 1.1% (weighted), 6.7% (adult mean), 10.5% (distribution) or 20% (highest) when based on the RDI and would decrease by 29% if based on the (weighted) EAR. This example does not necessarily represent the magnitude of changes for other micronutrients such as calcium where the current rNRV could increase 63% (highest), and the anomalous molybdenum where the current rNRV could decrease 82% (highest) (see Attachment 2). Basing rNRVs on the highest NRV is simple but the result could potentially exceed the UL for young age category. If the RDI is selected in preference to the EAR, this value becomes exceedingly high for the general population.

Both the population-weighted and population-distribution approaches take account of the NRVs of different age categories and are thus more representative of all the age categories within the general population aged 4 years and older. The population-weighted approach weights the value (whether EAR or RDI) by the proportion of the population in each age category and results in a single figure. The population-distribution approach applies both the EAR and its coefficient of variation for each age-gender category to the proportion of the population in that group to generate a total population distribution of requirements. The population-distribution RDI is located about the 97.7th percentile of this distribution and will always be higher than the population-weighted RDI. It is the most complex of all methods.

Calculating the mean of adult males and females within the previous 19-54/64 year age band would be a more complex task than previously because of the increase in the number of adult age categories for the 2006 NRVs. The 1991 RDIs for older age categories above 54 years (females) or 64 years (males) were not included in the current rNRVs because the larger, younger adult 19-64 year age category was considered to be broadly representative of the general population. However, the adult age range could be expanded to include the above 70 years age category in recognition of the ageing population. Alternatively, the oldest age category could be excluded to partially counterbalance the omission of children and adolescents in an attempt achieve a similar result as the more complex weighting method.

It is proposed to calculate a simple average of 2006 NRVs from the three or four male and three or four female adult age categories spanning 19-70 years or 19-70+ years. In the case of the vitamin A example, the calculated rNRV (using RDI as the basis of the NRV) would be 800 µg. This value lies between the population-weighted RDI of 758.4 µg and the population-distribution RDI of 827.2 µg (see Attachment 2).

All of these decision points can be applied to AIs with the exception of the population-distribution method because AIs are not based on a distribution of nutrient requirements. The derivation of possible rNRVs based on AIs, compared to the ULs for 1-3 year olds is provided in Attachment 3.

6.3.3 Possible approaches

1 Calculate rNRVs on the basis of a simple averaging of the three or four adult age categories (19 – 70 or 19 – 70+ years) for males and females.

2 Calculate rNRVs on the basis of one of the other methods.

6.3.4 Advantage and disadvantages

Approach 1 is likely to deliver a more representative result for less effort than Approach 2. However, the impacts would be dependent on the results for the individual nutrients. The proposed approach is similar to the Codex revision.

6.3.5 Preferred approach

Approach 1 is preferred because of its simplicity and comparability of result with more complex weighted approaches. Also, it better represents all age categories in the general population than the selection of the highest NRV.

6.4 Selection of reference energy value

The 2006 NRVs include an Estimated Energy Requirement (EER) for adults at BMI 22 kg/m^2 for a range of ages, heights and physical activity levels (PAL) for each gender.

6.4.1 Current situation in the Code

Unless otherwise exempted from NIP requirements, the energy contribution of a serving of food must always be declared in the NIP on products for the general population. An energy reference value of 8,700 kJ (2,100 kcal) is prescribed in the Code as the benchmark for nutrition labelling. This value of 8,700 kJ was derived from the average intake of adult males and females from national dietary surveys in Australia (9,265 kJ) and New Zealand (8,200 kJ) (ABS, 1997; Howarth *et al*, 1991).

As shown in Table 5.1, the rNRVs for total fat, saturated fat, (available) carbohydrate and sugars are derived from a percentage of energy reference value. These rNRVs, converted to gram amounts and listed in Standard 1.2.8, may be used by food manufacturers to label the %DI of energy, total fat, saturated fat, (available) carbohydrate, and sugars in a serving of the food.

Declaration of %DI has a similar format to that of %rRDI for vitamins and minerals. However, where %DI is used, the following statement is required to be placed under the NIP:

> **Percentage daily intakes are based on an average adult diet of 8,700 kJ. Your daily intakes may be higher or lower depending upon your energy needs.*

This statement generally refers to the intake of all nutrients shown in the NIP including those voluntarily declared. It was instituted in recognition of the wide range of energy intakes that are needed to support varying energy expenditures across the population. Energy reference values for other age categories are not set in the Code.

6.4.2 Possible approaches

1 Maintain the current energy reference value of 8700 kJ.

2 Review the energy reference value for the general population.

6.4.3 *Advantages and disadvantages*

The choice of regulatory EER is important because this reference provides the basis for the rNRVs (in grams) of macronutrients and subcomponents calculated according to their respective percentages of energy given in the AMDRs.

Approach 1 would maintain the current energy reference value however absolute values for (available) carbohydrate, total fat and their subcomponents could still change depending on selection of the particular percentage energy values within the bounds of the AMDRs (see subsection 6.6).

Approach 2 would revise the current energy reference value for the general population and shift the basis of the derivation from national adult energy intake data to adult energy requirements because intake data do not necessarily reflect energy needs. This is particularly so since the prevalence of overweight and obesity has risen in recent years. The energy reference value could be derived by taking the 2006 BMI assumption of 22 kg/m^2 and considering appropriate values for age, height and PAL for each gender. The EERs for the six or eight adult age-gender categories (3 or 4 male; 3 or 4 female) could be derived from the 2006 EER table based on average height in both countries of each age-gender category and an assumed PAL of 1.2 or 1.4, whichever best represents the various levels of sedentary lifestyles. The six or eight EERs would be averaged in the same way as described for the nutrients, i.e. including or not the oldest age group. In relation to the choice of BMI, FSANZ notes that, for the same gender, age, height and PAL, maintenance of an ideal BMI has a lower energy requirement than for an overweight or obese BMI. Whether an ideal BMI of 22 kg/m^2 or another BMI representing actual body weight of the population should be used is a question that needs further consideration.

Under Approach 2, manufacturers that voluntarily include %DI information on food labels would be required to align that information with any amendment to the energy reference value and any consequential amendments to the rNRVs for (available) carbohydrate, total fat and their subcomponents. Also, the accompanying information statement in the Code relating to %DI would need to be amended to reflect any change to the energy reference value.

6.4.4 *Preferred approach*

Approach 2 is preferred because it would result in consistent use of the 2006 NRVs as the basis of the rNRVs rather than drawing on a separate data set as in Approach 1. The choice of appropriate BMI in Approach 2 needs further consideration.

Question:

Are you aware of data that could appropriately serve as a basis for a review of the energy reference value?

6.5 Selection of 2006 NRVs for carbohydrates and most fats

The rNRVs for total fat and carbohydrates and their subcomponents in the Code are given as gram amounts which were derived from a percentage of the prescribed energy reference value. These energy percentages and the corresponding amounts of macronutrients are shown in Table 5.2.

As indicated in subsections 6.1 and 6.2, the rNRV for protein is preferred to be based on the 2006 RDI even though it contributes dietary energy.

The rNRVs for carbohydrate and total fat have no alternative but to be based at a point along their respective 2006 AMDRs which are expressed in terms of percentage energy. .An upper bound only is allocated to saturated-and-trans fat but no AMDR is given for sugars nor is carbohydrate defined as total or available carbohydrate. The 2006 AMDRs are:

Protein	15 – 25% energy
Carbohydrate	45 – 65% energy
Total Fat	20 – 35% energy
Saturated-and-trans fat	≤8 – 10% energy.

6.6 Calculation methods for rNRVs for carbohydrates and most fats

The 2006 AMDRs are established for the three major macronutrients. Since the preferred option is to base the protein rNRV on its adequacy measure, the RDI, only the other two: carbohydrate and total fat would have rNRVs based on the AMDR ranges of percentage energy. To derive an rNRV in gram amounts for these nutrients, the first step is to select a particular % energy point from each respective AMDR after taking account of the % energy contribution from the protein rNRV. The three energy percentages for carbohydrate, total fat and protein should then sum to about 100% (currently 99.8% in the Code). Note that this approach makes no allowance for energy from alcohol or the very small energy contribution from dietary fibre.

If the rNRV for protein is based on the 2006 RDI, the contribution of protein to the reference energy value is likely to be below the lower bound of the protein AMDR. This means that the selected % energy for total fat and/or carbohydrate would need to compensate for the lower % energy from protein.

An AMDR is also given for saturated-and-trans fat but not for sugars. In the absence of an AMDR for sugars, the final percentage point should be based on dietary advice from another source and be an appropriate percentage of carbohydrate.

Table 6.6 provides some examples of possible rNRVs for the macronutrients at different reference energy values. These examples sum to 100%t and have assumed a preferred protein rNRV of 59 g. If the midpoint of each of the AMDR % energy ranges were adopted, these percentages would be: protein 20%; total fat 28%; and carbohydrate 55% (total 103%). However, the protein % energy based on RDI is 10-12% which is about 8-10 percentage points below its AMDR midpoint. This gap could be compensated by increases in the % energy of total fat or carbohydrate or both, but the examples in the Table show that carbohydrate only is increased (to 60% energy which corresponds to the current % energy). The Table also shows possible AMDRs for saturated fat alone (current Code), saturated-and-trans fat (based on the upper bound of AMDR) and sugars (based on current 17.5% energy). The energy conversion factors used are: protein 17 kJ/g; total fat and fatty acids 37 kJ/g; and carbohydrate and sugars 17 kJ/g.

Table 6.6: Examples of rNRVs for macronutrients (g) and their components (g) at different reference energy values

Reference Energy Value (kJ)	Protein, 59g (% En)	Total fat (g; % En)	Sat fat, 8% En; (g)	Sat-trans fat, 10% En; (g)	Carbo-hydrate, 60% En, (g)	Sugars, 17.5% En; (g)
8,000	12.5%	59 (27.5%)	17	22	282	82
8,700	11.5%	67 (28.5%)	19	24	307	90
9,500	10.6%	76 (29.4%)	21	26	336	98

6.6.1 Preferred approach

FSANZ has not determined the energy percentages for the macronutrients in this Paper because these decisions need to be made in tandem with decisions on the reference energy value and protein rNRV. However at this stage, it is reasonable to suggest that only minor adjustments would be made to the current percentages, mostly to accommodate a revised percentage energy contribution from protein based on the RDI.

6.7 Selection of 2006 NRV for sodium

The current rNRV for sodium (2,300 mg) is based on the upper bound of the adult 1991 RDI. However this value became the adult UL for sodium in the 2006 NRVs. FSANZ believes that, on principle, the UL should not form the basis of a future rNRV.

Sodium is different from most other nutrients in that it is the only one with both an adequacy measure (i.e. AI) and an SDT and for which the population intake generally exceeds the SDT.

The adult AI is set as a range to accommodate physiological requirements in hot climates. The adult AI (460-920 mg) is lower than the SDT (1600 mg) which is lower than the adult UL (2300 mg). All these reference values are lower than the estimated mean adult (19+ years) sodium intake (without discretionary table or cooking salt) of 2,670 mg/day in Australia and 2890 mg/day in New Zealand [11]. More than a decade ago, total sodium intakes have been estimated from measurement of adult 24-hour urinary sodium excretion in Australia and New Zealand. In Australia (Hobart only), Beard *et al*. (1997) estimated total sodium intakes in 1995 to be about 4340 mg/day (males) and 3015 mg/day (females). In two areas of New Zealand, intakes surveyed 1993-1998 (Thomson and Colls, 1998) were estimated to be about 3840 mg/day (males) and 3105 mg/day (females).

Australians and New Zealanders are currently advised to reduce their level of sodium consumption to targets similar to the now adult UL (previously upper bound of 1991 RDI) or the SDT. These population targets are widely promoted by government (e.g. DoHA and NHMRC, 2003), health-focused non-government organisations (e.g. websites of the New Zealand Stroke Foundation; Australian National Heart Foundation; Australian Division of World Action on Salt and Health) and the World Health Organization (WHO, 2003).

In considering which of the two 2006 NRVs is appropriate (AI or SDT), FSANZ acknowledges that maximal health benefits would likely accrue at the lower AI but considers that the SDT, which also confers a preventative health benefit, provides a more ‘reachable’ rNRV in view of current sodium consumption.

In relation to voluntary label declaration of %DI, adoption of either the SDT or the AI (values that are both lower than the current rNRV) would increase the %DI of sodium/serving, but of the two, use of the AI would produce the higher declaration. For example, the label declaration of a food containing 400 mg sodium/serving is currently about 17% DI based on rNRV of 2300 mg but this would rise per serving to 25% DI based on a SDT of 1600 mg and to 50% DI based on an AI of 800 mg (i.e. taken from 400-920 mg range).

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[11] Food Consumption: For Australia, 1995 National Nutrition Survey; for New Zealand, 1997 National Nutrition Survey.
Food Composition: For Australia, AUSNUT Special Edition 3 database, 2004 (data mostly from 1990s); for New Zealand, 1997 New Zealand National Nutrition Survey database.

Adopting a reference value in the Code that increases the %DI on labels of current products with no change in product formulation has the potential to cause consumer confusion if not accompanied by information that explains the change. However, a decreased rNRV has the potential to encourage industry to reduce or continue to reduce the sodium content of their products. Selecting the SDT over the AI means that a potential moderate increase in declared %DI could encourage an incremental reduction in sodium content without loss of consumer support.

The SDT for sodium for all adult males and females is one number therefore no calculation is needed.

6.7.1 Preferred approach

FSANZ believes that the value of the rNRV for sodium must be revised downwards since the current rNRV now represents the UL for sodium. Population sodium intakes are above the UL but efforts by public health bodies and some manufacturers are encouraging its reduction. Of the two options available from the 2006 NRVs, a, rNRV based on the SDT is preferred because it provides a more practical target given current intakes while also conferring a preventative health benefit.

6.8 Summary

Table 6.7 summarises the issues and the preferred approaches and alternative approaches as discussed in Section 6.

Table 6.7: Summary of issues and potential approaches to the revision of the rNRVs for current nutrients in the Code

ISSUE	PREFERRED APPROACH	ALTERNATIVE APPROACH	RATIONALE FOR PREFERRED APPROACH
Protein, Vitamins and Minerals			
Selection of 2006 NRVs for subset of nutrients – nutrient adequacy or reduction of chronic disease risk?	*Establish rNRVs based on 2006 NRV measures of adequacy wherever possible*	*Establish rNRVs based on 2006 NRV measures for reducing chronic disease risk wherever possible*	*Majority of rNRVs can be underpinned by a consistent measure of adequacy. Also, consistent with Codex*
Selection of 2006 NRVs: Which measure of nutrient adequacy – EAR or RDI?	*Maintain the RDI as the basis of the rNRV*	*Revise the basis of the rNRV from RDI to EAR*	*Greater certainty of meeting adequacy requirements. Consistent with Codex. Less confusion for consumers*
Selection of 2006 NRVs: Adequate intakes	*Revise the basis of the rNRV from rESADDI to regulatory AI*	*Maintain current rESADDIs except for nutrients with EAR and 2006 RDI*	*Consistent with domestic NRVs rather than overseas values*

ISSUE	PREFERRED APPROACH	ALTERNATIVE APPROACH	RATIONALE FOR PREFERRED APPROACH
Calculation methods for rNRVs	*Calculate rNRVs on the basis of a simple averaging of the three or four adult age categories (either 19 – 70 or 19 – 70+ years) for males and females*	*Calculate rNRVs on the basis of one of the other methods*	*Simplicity and comparability of result compared to more complex approaches. Consistent with Codex.*
Reference Energy Value			
Basis for reference energy value	*Review the energy reference value for the general population*	*Maintain the current energy reference value of 8,700 kJ*	*Consistent use of the 2006 NRVs as the basis of the rNRVs rather than drawing on a separate dietary intake data set*
Carbohydrate, Most Fats and Sodium			
Calculation methods for rNRVs	*Base rNRVs for carbohydrate and fat within their respective AMDR percentage energy range and adapting for protein rNRV energy gap*	*Base rNRVs for protein, carbohydrate and fat within their respective AMDR percentage energy range*	*Maximum use of measures of adequacy with inclusion of protein*
Selection of 2006 NRVs: Sodium	*Base rNRV for sodium on SDT*	*Base rNRV for sodium on AI*	*SDT provides a more 'reachable' rNRV in light of current sodium consumption*

7 Other Matters relating to Current Nutrients in the Code

This Section discusses potential revisions to the units of the niacin and folate rNRVs and the basis for the dietary fibre rNRV in order to align with the 2006 NRVs.

7.1 Units for niacin

The 2006 NRVs for niacin are expressed as niacin equivalents (NE) to account for a contribution from dietary protein of the essential amino acid tryptophan[12]. If tryptophan data are not available, NE can be calculated from total protein content on the assumption that the protein content contains tryptophan. Hence the NE of a food is greater than its pre-formed niacin content when a food contains tryptophan or protein. This is the case for most foods.

The current Codex revision has selected NEs as the unit of measurement for niacin for labelling purposes and notes that it is consistent with the units used in the FAO/WHO publication on human requirements (FAO/WHO, 2004).

[12] NE (mg) = pre-formed niacin (mg) + [tryptophan (mg)/60 or protein (g)/6]

7.1.1 Current situation in the Code

The rNRV for niacin in the Code is only a proportion of its 1991 RDI (mg NE) and is expressed as mg niacin rather than mg NE. The niacin rNRV is derived from the 1991 RDI (average 16 mg NE, men and women) but adjusted to account for the proportion of Australian dietary NE intake contributed by pre-formed niacin i.e. 10 mg pre-formed niacin. In the absence of official ULs, basing the rNRV on a proportionate value had the effect of restricting the amount of niacin that could be added to foods.

7.1.2 Possible approaches

1 Maintain current approach of niacin based on pre-formed niacin.

2 Base rNRV on niacin equivalents from pre-formed niacin and tryptophan or protein.

7.1.3 Advantages and disadvantages

Approach 1 uses the pre-formed niacin content of the diet as the benchmark for niacin content claims and voluntary addition of niacin to foods. It was instituted to protect against higher amounts of niacin fortification in the absence of official ULs. Since pre-formed niacin is the basis of the current rNRV, only the pre-formed niacin content of a food can be declared. The rationale was that a minimum content claim criterion based on *a proportion* of the NE requirement allowed lower amounts of niacin than would otherwise be permitted (as NE) to be claimed or added to foods. However, basing the label declaration as well as the content claim criteria and the amount of niacin added to foods on pre-formed niacin alone does not provide consumers with a true reflection of niacin requirements and the contribution of foods to those requirements.

Data for pre-formed niacin content of foods are readily available as this nutrient is analysed and generally reported in food composition databases. Many food composition databases, including those in Australia and New Zealand, provide both pre-formed niacin and NE values that are derived preferably from tryptophan content, or if unavailable, from protein.

Approach 2 directly adopts NEs as the units for the niacin rNRV and accounts for the contribution of protein to niacin requirement. Under Approach 2, all current reference to niacin in relation to content declaration, criteria for content claims and voluntary fortification would change from pre-formed niacin to niacin equivalents. This means that the niacin rNRV as NE could increase in value by as much as 50% e.g. from 10 mg pre-formed niacin to 15 or 16 mg NE. Table 7.1 shows conceptually how a change to NE units might impact on a food's eligibility to declare niacin content or make a niacin content claim according to its protein and niacin content. These outcomes assume that the existing prescribed minimum %rNRV/serving in the Code will remain the same i.e. as 10% rNRV while the corresponding mass amounts would increase e.g. 1.0 mg pre-formed niacin (=10% x 10) to 1.5 mg NE (=10% x 15).

Table 7.1: Impact of NE units on eligibility to declare and claim niacin content

Nutrient content		Eligibility	
Pre-formed niacin*	**Protein**	**Current Code**	**NE units**
Sufficient	Low	Yes	No
Sufficient	High	Yes	Yes
Insufficient	Low	No	No
Insufficient	High	No	Yes

*Sufficient or insufficient amount of niacin to declare or claim according to the current Code

The first and fourth rows in the Table indicate the types of foods whose eligibility to declare and claim niacin might become ineligible (row 1) such as unfortified cereals or be newly created such as for high protein low niacin foods (row 4).

Niacin-fortified foods might need to increase the amount of added niacin to meet an increased minimum criterion in order to maintain eligibility. Because the purpose of the current arrangement was to restrict the amount of niacin that could be added to food in the absence of a UL, adopting Approach 2 would require consideration of alternative strategies to maintain food safety if necessary. The availability of two ULs for different fortificants will enable any risk of excess intake to be mitigated.

7.1.4 Preferred approach

Approach 2 is preferred because it would provide consumers with information about the contribution of foods to their NE requirements while still ensuring that niacin-fortified foods would not pose a risk from excessive niacin intakes.

7.2 Units for folate

The 2006 NRVs for folate are expressed as Dietary Folate Equivalents (DFEs) in recognition of the increased bioavailability[13] of folic acid relative to natural folates in food. Previously, the 1991 RDIs assumed no difference in bioavailability of the various forms of folates.

Internationally, Codex proposes the use of Dietary Folate Equivalents (DFEs[14]) for labelling purposes.

7.2.1 Current situation in the Code

The rNRV for folate was derived from the 1991 RDI for total folate (μg). The Code thus requires folate to be declared as μg folate which assumes the same bioavailability of natural folates and folic acid.

7.2.2 Possible approaches

1 Maintain current approach of micrograms of total folates.

2 Update units to micrograms of dietary folate equivalents.

7.2.3 Advantages and disadvantages

Adoption of the DFE unit would affect only those foods fortified with folic acid because of the additional weighting given to folic acid relative to natural folates in the definition of the DFE unit.

Approach 1 would attribute the same value to folic acid as natural folates whereas Approach 2 would attribute a higher value to folic acid compared with natural folates. If the numerical value of the rNRV were to increase, a fortified food could potentially meet higher content claim requirements more easily if the units were DFE rather than μg total folates. However this would depend on the proportion of total folate content as folic acid.

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[13] Bioavailability means the proportion of the ingested nutrient that is absorbed and utilised through normal metabolic pathways. It is influenced by dietary factors such as chemical form, interactions with other nutrients and food components, and food processing/preparations, and host-related intestinal and systemic factors.

[14] DFEs = μg natural folates in food + 1.67 μg folic acid

An example of the eligibility of a folate-fortified food to meet content claim requirements under both Approaches is provided in Figure 7.1

Folate content/serving of:
FOOD1: 200 µg natural folates + 100 µg folic acid
FOOD2: 140 µg natural folates + 160 µg folic acid
FOOD3: 0 µg natural folates + 300 µg folic acid

	Approach 1	**Approach 2**
FOOD1	300 µg total folates	367 µg DFE i.e. 200 + (100 x 1.67)
FOOD2	300 µg total folates	410 µg DFE i.e. 140 + (160 x 1.67)
FOOD3	300 µg total folates	500 µg DFE i.e. 300 x 1.67

Approach 1
If minimum amount for folate content claim was any amount, then FOOD1, FOOD2 and FOOD3 would all be eligible or ineligible depending on the actual value. For example, if the current rNRV remained unchanged, i.e. 200 µg total folates/serving, all three foods would be eligible.

Approach 2
If minimum amount for folate content claim was 400 µg DFE/serving then FOOD1 would be ineligible but FOOD2 and FOOD3 would be eligible

Figure 7.1: Example of the eligibility of a folate-fortified food to meet content claim requirements

Approach 1 is not consistent with the 2006 NRV view of folates. If the amount of the rNRV were to double but the units remained unchanged as in Approach 1 e.g. 400 µg total folates, some current products might be rendered ineligible to claim folate content or at least be required to decrease the %rNRV claimed on the label.

Alternatively, more folic acid might be added to products to maintain eligibility to make a claim or to 'top up' to maintain the currently declared %rNRV. Now that mandatory folic acid fortification is in effect in Australia, any change to the rNRVs that promoted a significant increase in the voluntary addition of folic acid so as to cause some population groups to exceed their UL would need to be assessed carefully. In this context, complementary risk management strategies might be required.

Approach 2 takes into account the increased bioavailability of folic acid and is consistent with the 2006 NRV units. Approach 2 could also promote a response by manufacturers to increase voluntary folate fortification with folic acid as for Approach 1, but because Approach 2 enables foods with higher proportions of folic acid to meet minimum criteria more easily, the magnitude of the effect could be smaller.

7.2.4 Preferred approach

Approach 2 is preferred because it is consistent with official recommendations and international trends. However, FSANZ notes that any increase in risk of excess intake for younger age categories from increased fortification levels would need to be carefully managed.

7.3 Dietary fibre

There are some differences in definition of dietary fibre between the 2006 NRVs and the Code. These might need to be taken into account were the rNRVs to be revised.

The 2006 NRVs establish an AI for dietary fibre derived from on median intakes from national Australian and New Zealand surveys. However, the dietary fibre values in the supporting food composition databases were analysed by AOAC International methods (Australia) or the Englyst method (New Zealand), neither of which fully measure resistant starch. Since the 2006 NRV publication regards resistant starch as a type of dietary fibre, the median intakes of dietary fibre of each age-gender group were adjusted upwards by 2-4 g to take account of estimated resistant starch intake.

7.3.1 Current situation in the Code

The Code contains a definition of dietary fibre and also lists several AOAC International methods of analysis that can be used for analysis of dietary fibre content of foods for the purposes of label declaration. These methods also underpin the existing Daily Intake value and [draft] criteria for dietary fibre content claims in Proposal P293 – Review of Nutrition, Health & Related Claims. Some of the listed methods partially measure resistant starch although no method is listed that measures resistant starch only.

7.3.2 Possible approaches

1 Adjust downwards the 2006 NRV for dietary fibre to maintain consistency with dietary fibre as measured by existing methods of analysis in the Code.

2 Adopt 2006 NRV for dietary fibre and update Code to add a method of analysis for total resistant starch to the list of approved methods of analysis for dietary fibre.

7.3.3 Advantages and disadvantages

Approach 1 maintains the current approach of the Code, but is inconsistent with the 2006 NRV for dietary fibre because it does not fully account for resistant starch in the diet. Approach 1 would also put the rNRV out of step with other uses of the 2006 NRV for dietary fibre such as menu planning or dietary advice. This could be confusing for those relying on the 2006 dietary fibre NRV for other purposes including providing dietary advice to consumers. This Approach would not impact on current labelling or amend the basis for the Proposal P293 [draft] minimum criteria for dietary fibre content claims.

Approach 2 would ensure consistency of both 2006 NRVs and the Code but would require work to be done to update the Code by approving methods of analysis for resistant starch and to update the food composition database. FSANZ notes that the 2006 NRV publication considers that resistant starch is not only a type of dietary fibre, but that it also falls within the definition of dietary fibre in the Code. Should Approach 2 be adopted, work to potentially approve method(s) of analysis for resistant starch could be separate from any proposal to revise the rNRVs. Should such approval be granted, this would provide industry with an opportunity to increase the dietary fibre values of foods containing resistant starch. One or more methods for resistant starch might provide further incentive for products to meet the [draft] criteria for dietary fibre content claims. It also might encourage the greater use of high resistant starch food ingredients.

7.3.4 Preferred approach

Approach 2 is preferred to maintain consistency with the basis of the 2006 NRVs for dietary fibre. It could also provide more opportunities for industry and consumers to meet their dietary fibre needs.

7.4 Summary

Table 7.2 summarises the issues and the preferred approaches and alternative approaches as discussed in Section 7.

Table 7.2: Summary of issues and potential approaches to the revision of the rNRVs for current nutrients in the Code

ISSUE	PREFERRED APPROACH	ALTERNATIVE APPROACH	RATIONALE FOR PREFERRED APPROACH
Units for niacin	*Update rNRV to mg niacin equivalents (NE)*	*Maintain current approach based on mg pre-formed niacin*	*Consistent with the 2006 NRV units. Consistent with Codex. More accurate consumer information*
Units for folate	*Update rNRV to dietary folate equivalents (DFE)*	*Maintain current approach of micrograms of total folates*	*Accounts for increased bioavailability of folic acid. Consistent with the 2006 NRV units*
Dietary fibre	*Adopt 2006 NRV for dietary fibre and update Code to add a method(s) of analysis for total resistant starch*	*Adjust downwards the 2006 NRV for dietary fibre to maintain consistency with Code definition and methods of analysis for dietary fibre*	*Consistent with the basis of the 2006 NRVs for dietary fibre*

8. Potential New Nutrients and New Age Categories in the Code

This Section discusses the potential for nutrients that were assigned NRVs for the first time in 2006 to have rNRVs created in the Code. It also discusses the possibility of creating new age ranges for rNRVs in the Code.

This Section discusses features of the selection process, the current situation in the Code, the possible approaches that could be applied, the advantages and disadvantages of these approaches and a preferred approach. A boxed question seeking specific input from interested parties is included in some subsections.

8.1 New nutrients

A number of nutrients appear in the 2006 NRVs for the first time. These nutrients are listed in Table 8.1 together with their type(s) of 2006 NRVs. Although a RDI for potassium was set in the 1991 RDIs, it is the only nutrient that does not have an rNRV listed in the Code.

Table 8.1: 'New' nutrients in 2006 NRVs

Nutrient	Type of 2006 NRV*	Age categories for AI
Linoleic acid	AI; AMDR	All ages except infants
α-Linolenic acid	AI; AMDR	All ages except infants
Long chain omega-3 fat	AI; SDT	All ages except infants
Total Water	AI	All
Choline	AI	All
Fluoride	AI	All
Potassium	AI; SDT	All

* Age categories for AMDR and SDT measures of reduction of chronic disease risk is 14 years and older

8.1.1 Current situation in the Code

Although none of these 'new' nutrients have rNRVs in the Code at present, some are referenced in other ways as shown in Table 8.2.

Table 8.2: Current regulation of 'new' nutrients in the Code

Nutrient	Current reference in the Code
Linoleic acid	Composition regulated in Standard 2.9.1. Content claim criteria for omega 6 claims expressed as minimum % polyunsaturated fatty acids in Standard 1.2.8.
α-Linolenic acid	Composition regulated in Standard 2.9.1. Content claim criterion for omega 3 *source* claims in Standard 1.2.8 based on α-linolenic acid (n-3) but criterion not expressed as %NRV.
Long chain omega-3 fat	Composition regulated in Standard 2.9.1. Content claim criteria for *good source* omega 3 claims in Standard 1.2.8 – Nutrition Information Requirements based on LC n-3 (EPA+DHA) fatty acid content but criteria not expressed as % rNRV.
Total water and/or fluid component	Not currently considered to be a nutrient in the Code
Choline	Composition regulated in Standard 2.9.1 and Standard 2.9.4.
Fluoride	Composition regulated in Standard 2.6.2.
Potassium	Composition regulated in Standard 2.9.1 – Infant Formula Products and in Standards 2.6.2 – Non-Alcoholic Beverages and Brewed Soft Drinks, and 2.9.4 – Formulated Supplementary Sports Foods.

8.1.2 Possible approaches

1 Do not include rNRVs for 'new' nutrients in the Code.

2 Include rNRVs for 'new' nutrients in the Code.

8.1.3 Advantages and disadvantages

Approach 2 would update the Code in relation to nutrients for which there is an officially recognised nutrient requirement. This would allow more extensive declaration of nutrient content on food labels and possibly flow on to other uses of rNRVs such as nutrient content claim criteria. Approach 1 does not permit food labels to be a source of information about the nutrients that have recently established 2006 NRVs.

8.1.4 Preferred approach

The preferred Approach is to include rNRVs for all 'new' nutrients in the Code unless stakeholder comment (e.g. from consumers and industry) indicates no support for a particular nutrient such as total water.

Based on the precedents discussed in subsection 6.3, FSANZ proposes that the rNRVs for the 'new' nutrients given in Table 8.1 be based on AIs where no other option exists. Where more than one 2006 NRV exists per nutrient, basing the rNRV on the AI is consistent with aforementioned proposed approaches for protein (also has an AMDR) and certain vitamins (also have SDTs). FSANZ notes that the 2006 NRVs do not treat total fat and fatty acids consistently i.e. fat, saturated-and-trans fat, linoleic acid and linolenic acid have AMDRs but long chain n-3 fat has a SDT. All these constituents except saturated-and-trans fat are assigned AIs and for all age categories with the exception of total fat which is assigned an AI only for infants.

The 2006 NRV publication reports that potassium can blunt the effect of sodium chloride on blood pressure and it could be argued that for the general population, the rNRV for potassium should not be based on the AI but rather on the SDT to be consistent with the SDT for sodium. FSANZ will give further consideration to this particular issue.

Where rNRVs for new nutrients are included in the Code, both existing and new nutrition claim criteria should be considered. Currently, nutrition claims in relation to the omega fatty acid content of a food can be made however these claims are not related to, or expressed as, a proportion of the rNRV. For example, under clause 13 of Standard 1.2.8, claims for 'source' of omega 3 fatty acids are based on absolute values i.e. 200 mg α-linolenic acid (ALA) per serve or 30 mg total EPA and DHA[15] per serve. It may be appropriate to consider whether the criteria for these types of claims should be based on, and expressed as, a percentage of the rNRV. Consideration may also be given to the development of content claim criteria for other new nutrients such as potassium, choline.

Question:

Should rNRVs for new nutrients in the Code be used as the basis for developing content claim criteria? If so, which nutrients should be considered?

8.2 Potential new age categories for labelling purposes

The 2006 NRVs for micronutrients, protein, dietary fibre and some fatty acids are reported in 10 age categories divided by gender beginning at 9 years of age as well as for three age categories for pregnancy and lactation as shown in Table 8.3. The 2006 NRVs for carbohydrate, total fat and sodium (as SDT) are reported for one age category aged 14 years and older and these nutrients are not reported separately for pregnancy and lactation.

[15] EPA is eicosapentaenoic acid and DHA is docosahexaenoic acid.

Table 8.3: Age categories and life stages included in 2006 NRVs for the majority nutrients

Age category	Gender	Life stage
0-6 months	All	
7-12 months	All	
1-3 years	All	
4-8 years	All	
9-13 years	Males	
	Females	
14-18 years	Males	Pregnancy
	Females	Lactation
19-30 years	Males	Pregnancy
	Females	Lactation
31-50 years	Males	Pregnancy
	Females	Lactation
51-70 years	Males	
	Females	
> 70 years	Males	
	Females	

8.2.1 Current situation in the Code

The Code refers to three age categories (without reference to gender) in relation to rNRVs:

7-12 months (except for iron, 4-12 months)
1-3 years
4 years and over (general population).

The rNRVs for the latter two groups are listed in Standard 1.1.1, whereas Standard 2.9.2 lists rNRVs for infants.

8.2.2 Possible approaches

1 Do not include rNRVs for more age categories and life stages.

2 Consider including additional age categories and/or life stages.

8.2.3 Advantages and disadvantages

FSANZ does not have a view on whether rNRVs should be established for new age categories or life stages. The purpose of setting new age categories or life stages is to allow for nutrient declaration to be expressed in terms of nutrient requirements for these new categories. Should new categories be established, it would be necessary to determine whether they replace the general population rNRVs as reference values for current % DI and %RDI in the NIP or alternatively provide an additional source of rNRVs for declaration of nutrient content expressed in terms of nutrient requirements for other age categories.

Under Approach 1, there would probably be a smaller impact on product labelling since the format of the NIP would not need to change to accommodate different age categories or life stages. As consumers would be familiar with the current format, there would be no need for additional education.

However, having only the current range of age categories for rNRVs may not be considered representative of the various population groups, or reflect contemporary science or nutrition policy.

Under Approach 2, a broader range of rNRVs such as for pre-school children, school age children and for pregnancy and lactation could be devised depending on stakeholder interest. These could act as reference values for declaration of the nutrient content of a food for several age categories and/or life stages. However, consideration would need to be given to the particular nutrients involved. Would it relate to vitamins and minerals only, or also energy, macronutrients and sodium? If macronutrients were considered, they would need to be established not only for new age categories but also for existing young children and infant categories. In that case, the reference energy and rNRVs for carbohydrate, total fat and sodium would need to be extrapolated from AMDRs and SDTs to ages under 14 years.

Two ways in which new age categories could be implemented in the Code would be to allow the newly-created age categories to provide rNRVs for specific age categories in addition to that for the general population. However, for niche products marketed to specific age categories or life stages, the relevant rNRVs could replace those for the general population. In that case, rNRVs for energy and macronutrients and sodium also would need to be established. Furthermore, the inclusion of rNRVs for new age categories and life stages could be used to develop new criteria for nutrient content claims.

Currently the Code's notation of 10% RDI/serving applies to three sets of rRDIs to produce three sets of criteria for vitamin and mineral content claims expressed as mg or µg amounts. This form of notation could be a particularly useful approach for niche products targeted to a particular population group.

The declaration of more than one set of % rNRVs on the label would require separate columns in the NIP or some additional means of identifying which reference values apply to which particular group. In this regard, consumer research may need to be undertaken to inform how best to represent new information in a clear and understandable format. An additional column in the NIP and/or the use of any additional statements has the potential to confuse consumers and may be more complex for enforcement agencies.

In circumstances where a food is formulated and marketed for a specific age category or life stage, the format of the NIP is unlikely to be affected, although a statement specifying the intended target population might be required for enforcement purposes and to prevent consumers from being misled.

Question:

Should FSANZ consider introducing new NRV age and life stage groups in the Code? If so what types should be included, and to perform which functions? Please provide details.

8.3 Summary

Table 8.4 summarises the issues and the preferred approaches and alternative approaches as discussed in Section 8.

Table 8.4: Summary of issues and potential approaches to new nutrients and new age categories in the Code

ISSUE	PREFERRED APPROACH	ALTERNATIVE APPROACH	RATIONALE FOR PREFERRED APPROACH
'New' nutrients not currently in the Code	*Include rNRVs for all 'new' nutrients in the Code unless stakeholder comment indicates no support for a particular nutrient, such as total water*	*Do not include rNRVs for 'new' nutrients in the Code*	*Consistent with 2006 NRVs*
Potential new age categories for labelling purposes	*No preferred approach*	*Do not include rNRVs for more age categories and life stages; or consider including additional age categories and/or life stages*	*No preferred approach at this stage*

9. Consultation

FSANZ is seeking to consult with interested parties on the issues raised in this Paper, particularly in relation to the series of boxed questions seeking specific input and more generally in relation to the following:

Questions:

Do you have a view on whether the existing rNRVs in the Code should be revised in light of the 2006 NRV's? Please provide details to explain your response.

If the rNRVs are revised, do you support the preferred approaches as discussed in Sections 6, 7 and 8 – if not why?

Are there other approaches we have not considered? Please provide details.

Are there additional issues in relation to revising the rNRVs in the Code we have not identified? Please provide details.

There is a need to ensure that the approach taken to each individual issue can be combined to produce an integrated and consistent approach across the Code. When considering stakeholder views on the potential approaches to the various issues identified in this Paper, FSANZ will also need to consider the final overall approach to ensure a workable outcome.

Additionally, in considering how best to update and incorporate new rNRVs in the Code to reflect the 2006 NRVs, there are potential impacts in relation to the issues raised and the various possible approaches outlined in this Paper.

As there are a range of potential impacts, FSANZ is seeking information from key stakeholders to identify these possible impacts. Parties likely to be affected by a revision of the rNRVs include:

consumers who may use the food labels for product information and to guide their food purchases

health educators who may use labels on food products to support health education and promotion activities

the food industry who manufacture and label food products in Australia and New Zealand

Government enforcement agencies of Australia and New Zealand.

Questions:
What are the likely impacts on consumers, industry and government in relation to the various issues and approaches outlined by FSANZ?
Are there additional interested parties that FSANZ has not identified? If so, what are the likely impacts on these parties?

10. Next Steps

FSANZ is releasing this Paper for public consultation. FSANZ is also undertaking targeted consultation though presentations, teleconferences and meetings with key stakeholders to discuss the technical concepts and issues in the Consultation paper. These discussions and the public submissions will inform a Report which is expected to include recommendations on a rationale for, and approach to, any future action on revising the rNRVs in the Code.

This Report will be made available on FSANZ's website once it has been considered and endorsed by the FSANZ Board.

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ATTACHMENTS

1 Details of 2006 Nutrient Reference Values (Tables 1-4)
2 Derivation of Regulatory NRVs from EARs and RDIs in 2006 NRVs
3 Derivation of Regulatory NRVs from AIs in 2006 NRVs

Attachment 1

Details of 2006 Nutrient Reference Values

Table 1: Definitions of 2006 Nutrient Reference Values

EAR	***Estimated Average Requirement*** A daily nutrient level estimated to meet the requirements of half the healthy individuals in a particular life stage and gender group.
RDI	**Recommended Dietary Intake** The average daily dietary intake level that is sufficient to meet the nutrient requirements of nearly all (97–98 per cent) healthy individuals in a particular life stage and gender group.
AI*	***Adequate Intake (used when an RDI cannot be determined)*** The average daily nutrient intake level based on observed or experimentally-determined approximations or estimates of nutrient intake by a group (or groups) of apparently healthy people that are assumed to be adequate.
EER	**Estimated Energy Requirement** The average dietary energy intake that is predicted to maintain energy balance in a healthy adult of defined age, gender, weight, height and level of physical activity, consistent with good health. In childhood, pregnancy and lactation the EER is taken to include the needs associated with the deposition of tissues or the secretion of milk at rates consistent with good health.
UL*	***Upper Level of Intake*** The highest average daily nutrient intake level likely to pose no adverse health effects to almost all individuals in the general population. As intake increases above the UL, the potential risk of adverse effects increases.
AMDR*	***Acceptable Macronutrient Distribution Range*** An estimate of the range intake for each macronutrient for individuals (expressed as per cent contribution to energy), which would allow for an adequate intake of all the other nutrients whilst maximising general health outcome.
SDT*	***Suggested Dietary Target*** A daily average intake from food and beverages for certain nutrients that may help in prevention of chronic disease.

* Reference value types in *italics* are new, i.e. they were not part of the 1991 RDIs

Table 2: Nutrients Covered in 2006 NRVs*

Macronutrients	Vitamins	Minerals & Trace Elements
Energy	Vitamin A	Calcium
Protein	Thiamin	*Chromium*
Total fat (for infants only)	Riboflavin	*Copper*
Linoleic acid	Niacin	*Fluoride*
α-Linolenic acid	Vitamin B_6	Iodine
Long Chain omega-3 fat	Vitamin B_{12}	Iron
Saturated-and-trans fat (AMDR only)	Folate[†]	Magnesium
Carbohydrates (for infants only)	*Pantothenic acid*	*Manganese*
Dietary fibre	*Biotin*	*Molybdenum*
Total water	*Choline*	Phosphorus
	Vitamin C	Potassium
	Vitamin D[‡]	Selenium
	Vitamin E[‡]	Sodium[†]
	Vitamin K	Zinc

* Nutrients omitted from 1991 RDIs are in *italics;* where included in the Code these nutrients currently are based on 1989 ESADDI.
[†] Provided as dietary folate equivalents (DFE) in 2006 NRVs but as folate in 1991 RDIs
[‡] Provided as RDI in the 1991 RDIs but as AI in the 2006 NRVs

Table 3: Age Ranges and Life Stages in 1991 RDIs and 2006 NRVs

1991 RDI	2006 NRVs	1991 RDI	2006 NRVs
0-6 Breastfed (all)	0-6 months (all)	Pregnant (all ages)	14-18 pregnant
0-6 Bottle-fed (all)	7-12 months (all)		19-30 pregnant
7-12 months (all)	1-3 years (all)		31-50 pregnant
1-3 years (all)	4-8 years (all)	Lactation (all ages)	14-18 lactation
4-7 years (all)	9-13 years (females/males)		19-30 lactation
8-11 years (females/males)	14-18 years (females/males)		31-50 lactation
12-15 years (females/males)	19-30 years (females/males)		
16-18 years (females/males)	31-50 years (females/males)		
19-54 years (females) 19-64 years (males)	51-70 years (females/males)		
54+ years (females) 64+ years (males)	>70 years (females/males)		

Table 4: Nutrients, age categories of 2006 Upper Levels

Nutrient*	Age category
Protein	*Not set*
Linoleic acid	*Not set*†
α-Linolenic acid	*Not set*†
Long chain omega-3 fat	1 year and above
Dietary fibre	*Not set*
Total water	*Not set*
Vitamin A (retinol)	All ages
Thiamin	*Not set*
Riboflavin	*Not set*
Niacin (nicotinamide)	1 year and above
Niacin (nicotinic acid)	1 year and above
Vitamin B_6 (pyridoxine)	1 year and above
Vitamin B_{12}	*Not set*
Folate (folic acid)	1 year and above
Pantothenic acid	*Not set*
Biotin	*Not set*
Choline	1 year and above
Vitamin C	*Not set*†
Vitamin D	All ages
Vitamin E	1 year and above
Vitamin K	*Not set*
Calcium	1 year and above
Chromium	*Not set*
Copper	1 year and above
Fluoride	All ages
Iodine	1 year and above
Iron	All ages
Magnesium (supplements)	1 year and above
Manganese	*Not set*
Molybdenum	1 year and above
Phosphorus	1 year and above
Potassium	*Not set*
Selenium	All ages
Sodium	1 year and above
Zinc	All ages

* Nutrients are also assigned a measure of adequacy; upper bounds of AMDRs as % energy are assigned to total fat and carbohydrate but these nutrients are not listed
† Prudent limit

Attachment 2

Derivation of Regulatory NRVs from EARs and RDIs in 2006 NRVs‡

Nutrients	Standard 1.1.1	Weighted EAR†	Distribut'n EAR†*	Average Adult EAR§	Highest EAR	Weighted RDI†	Distribut'n RDI†*	Average Adult RDI§	Highest RDI	UL 1-3 yrs
Protein (g)	50++	42.1	41.6	47.3	65	52.6	65.8	58.5	81	25% energy
Vitamin A (µg RE)	750	533.3	532.1	562.5	630	758.4	827.2	800.0	900	600 (retinol)
Thiamin (mg)	1.1	0.90	0.93	0.95	1.0	1.10	1.16	1.15	1.2	-
Riboflavin (mg)	1.7	0.97	0.97	1.05	1.3	1.16	1.33	1.26	1.6	-
Niacin (mg NE)	10 (niacin)	11.0	11.2	11.5	12	14.3	15.1	15.0	16	10/150 (fortificants)
Vitamin B6 (mg)	1.6	1.11	1.13	1.23	1.4	1.32	1.56	1.45	1.7	15
Vitamin B12 (µg)	2	1.90	1.96	2.00	2.0	2.28	2.39	2.40	2.4	-
Folate (µg DFE)	200 (total folates)	305.2	314.5	320.0	330	379.8	383.2	400.0	400	300 (folic acid)
Vitamin C (mg)	40	29.4	29.4	30.0	30	43.6	41.5	45.0	45	-
Calcium (mg)	800	809.9	873.7	937.5	1,100	1,071.0	1,262.7	1,112.5	1,300	2,500
Iron (mg)	12	6.3	6.1	6.3	8	10.9	12.6	10.5	18	20
Iodine (µg)	150	95.0	96.0	100.0	100	144.0	138.2	150.0	150	200
Magnesium (mg)	320	284.6	287.2	303.8	350	342.8	402.0	366.3	420	65 (suppl'ts)
Molybdenum (µg)	250	32.2	32.9	34.0	34	42.6	43.8	45.0	45	300
Phosphorus (mg)	1,000	635.0	603.7	580.0	1,055	1001.6	1163.3	1,000.0	1,250	3,000
Selenium (µg)	70	51.9	52.9	55.0	60	61.6	69.6	65.0	70	90
Zinc (mg)	12	8.5	7.1	9.3	12	10.1	13.9	11.0	14	7

‡ Excludes values for pregnancy and lactation

† Weighted and distribution values based on population data for 4+ years. Values shown to greater precision than for regulation to allow comparison.

* Except for iron, distributions were generated using the EAR and coefficient of variation from the 2006 NRVs. The distribution of iron requirements was generated using either a normal or a log-normal formula for the various age-gender groups based on percentiles given in the IOM report (IOM, 2001). For each nutrient, the age-gender specific distribution was weighted by the relevant proportion of the population group and summed over all age-gender groups. The 50th and 97.7 percentiles were derived using the Excel add-in, SOLVER.

§ Average values based on population data for 19-70+ years. Values shown to greater precision than for regulation to allow comparison.

++ Standard 1.2.8.

Attachment 3

Derivation of Regulatory NRVs from AIs in 2006 NRVs‡

Nutrients	Basis of AI*	Standard 1.1.1	Weighted AI†	Average Adult AI§	Highest AI	UL 1-3 yrs
Pantothenic acid (mg)	1	5	4.9	5.0	6	-
Biotin (μg)	2	30	25.9	27.5	30	-
Choline (mg)	2	-	462	488	550	1,000
Vitamin D (μg)	2	10	6.6	7.5	15	80
Vitamin E (mg α–TE)	1	10	8.4	8.5	10	70
Vitamin K (μg)	1	80	60.8	65.0	70	-
Chromium (μg)	2	200	28.4	30.0	35	-
Copper (mg)	2	3	1.4	1.5	1.7	1
Fluoride (mg)	2	-	3.2	3.5	4.0	1.3
Manganese (mg)	1	5	4.7	5.3	5.5	-
Potassium (mg)	2	-	3,175	3,300	3,800	-
Linoleic acid (g)	1	-	10.2	10.5	13	-
α-Linolenic acid (g)	1	-	1.02	1.05	1.3	-
Long chain omega-3 fat (mg)	1	-	114.7	125.0	160	3,000
Dietary fibre (g) (inc Resistant Starch)	1	30++ (exc Res St)	26.3	27.5	30	-
Total water (L)	1	-	2.88	3.10	3.4	-

‡ Excludes values for pregnancy and lactation
* 1 = National Nutrition Survey; 2 = Limited evidence base
† Weighted values based on population data 4+ years. Values shown to greater precision than for regulation to allow comparison.
§ Average values based on population data 19-70+ years. Values shown to greater precision than in regulation to allow comparison.
++ Standard 1.2.8