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FOREWORD

Recommended Dietary Allowances (RDAs) are the level of intake of nutrients that, on the basis of scientific knowledge, are judged to be adequate to meet the known nutrient needs of practically all healthy persons.

RDAs are prepared by nutritionists in individual countries as a standard against which the nutrients in food eaten by different sections of the community or a whole country can be assessed. They are typically used for

- planning and procuring food supplies for population subgroups,
- interpreting food consumption records of individuals and populations,
- establishing standards for food assistance programmes,
- evaluating the adequacy of food supplies in meeting national nutritional needs,
- designing nutrition education programmes and
- developing new products in industry.

The Irish RDAs were last compiled in 1983. The Nutrition Sub-committee of the Food Safety Authority of Ireland established a Working Group to review these on the basis that RDAs should reflect the most up to date scientific data available. The Working Group, on analysis of the 1983 RDAs, showed that they needed to be updated and thus undertook revision of the data.

The EU population reference intake (PRI) published by the EU Scientific Committee for Food in 1993 formed the basis for reviewing and updating the Irish RDA tables. The majority of EU PRIs were adopted for the Irish population, however there were some nutrients for which different recommendations were required. Based on their findings the Working Group produced this report providing updated RDAs for Ireland.

I would like to thank the members of the RDA Working Group, the nutritionists who advised the Working Group and all those that assisted in producing this report.

Dr Helen M. Roche
Chairperson
RDA Working Group

EXECUTIVE SUMMARY

In 1996, the Nutrition Sub-committee of the Food Safety Authority of Ireland established a Working Group to review the Irish Recommended Dietary Allowances (RDAs) that were devised in 1983.

The terms of reference of the RDA Working Group were to:

- review the Irish RDAs
- compare the Irish RDAs with the EU Population Reference Intakes (PRIs) and assess their suitability to the Irish population
- review current scientific evidence in relation to nutrients where a discrepancy existed between the EU and Irish recommendations with respect to nutrient requirements of the Irish population and
- prepare a report on the revised nutrient requirements of the Irish population.

Having reviewed the RDAs, the Working Group concluded that they were outdated and needed revision.

This report presents a review of the requirements of all nutrients in relation to the needs of the Irish population and gives the updated Recommended Dietary Allowances for Ireland.

In preparing this report the Working Group did not attempt to review all of the scientific evidence on which RDAs could be based as this evidence had already been reviewed thoroughly by expert committees in the USA in 1989 (1), in the UK in 1991 (2) and most recently, in the EU in 1993 (3). The Working Group studied each of these reports and concluded that the EU PRI values, based on the most recent review available, should be adopted in Ireland for most nutrients. In the case of folate, iron, calcium and vitamin C, the Working Group recommended values for Ireland that differ from the EU PRI. This view was based on newer research findings (5) and consideration of prevailing Irish conditions.

The Irish RDAs of 1983 did not provide recommendations for a number of trace elements: potassium, phosphorus, copper, selenium and iodine. The EU PRI however, did provide these figures. The report outlines nutrients for which there are insufficient data to provide recommendations.

The Working Group included the Lower Threshold Intake (LTI - the level of nutrient intake below which nearly all individuals will be unable to maintain metabolic integrity) as this is a useful reference value in evaluating the adequacy of the diets of individuals.

The UK recommendations for infants from 0 to 12 months are the most comprehensive recommendations available. Neither the EU PRIs nor the 1983 Irish RDAs provide data for this sub-population and so the Reference Nutrient Intakes (RNIs) for infants, as provided by the Department of Health and Social Services in the UK are adopted in this report.

It is recommended that the Minister for Health and Children should adopt these revised Irish RDAs and an explanatory leaflet should be prepared in consultation with the Nutrition Sub-committee. This leaflet should be distributed widely.

KEY RECOMMENDATIONS

- The 1983 Irish Recommended Dietary Allowances (RDAs) should be updated. With the exception of folate, iron, calcium and vitamin C, the new recommendations are in accordance with the Population Reference Intakes (PRI) of the European Union and are presented in Table 1 and Tables 3-6.
- The term Recommended Dietary Allowance (RDA) should be used rather than the EU term Population Reference Intake.
- For infants under 1 year, the UK Dietary Reference Values are more comprehensive than the EU recommendations and should be adopted (Table 2).
- The term Lowest Threshold Intake (LTI) that represents the lowest level of nutrient intake which is required for health, should be adopted from the EU dietary recommendations. The LTI values are presented in Table 5 along with the Average Requirements and the RDAs.
- The Minister for Health and Children should adopt these revised Irish RDAs and an explanatory leaflet should be prepared in consultation with the Nutrition Sub-committee. This leaflet should be distributed widely.

CHAPTER 1: INTRODUCTION AND TABLES OF RECOMMENDATIONS FOR IRELAND

1.1 Background to the RDA Working Group

In 1996, the Nutrition Sub-committee of the Food Safety Advisory Board established a Working Group to review the Irish Recommended Dietary Allowances (RDAs) that were devised in 1983. Having reviewed the RDAs, the Working Group concluded that they were outdated and needed revision. The actual source of the Irish RDAs is unknown, however, they were based on the ninth edition of the US Recommended Dietary Allowances (1980) (4), a publication which is no longer available. The US RDAs have since been updated (1) and are currently undergoing revision.

In 1993, the EU Scientific Committee for Food published Population Reference Intakes (PRIs) for the European Union in a report entitled "Nutrient and Energy Intakes for the European Community" (3). To assess the suitability of the PRIs for the Irish population, a systematic review of the Irish RDAs and the PRIs of the European Union was completed. The report, entitled "A Comparison of the Irish Recommended Dietary Allowances with the Dietary Recommendations of the European Union"(5) was presented to the Nutrition Sub-committee. While there was a high degree of concordance between the Irish RDAs and the EU PRIs for most nutrients, there were a number of nutrients (folate, iron, vitamin C and calcium) for which there were important differences.

This report presents a review of the requirements of all nutrients in relation to the needs of the Irish population and gives the updated Recommended Dietary Allowances for Ireland. The Irish RDAs of 1983 did not provide recommendations for a number of trace elements; potassium, phosphorus, copper, selenium and iodine. The EU PRIs however, do provide these figures - see Table 1. Table 6 outlines nutrients for which there are insufficient data to provide recommendations.

1.2 Terms of Reference of the RDA Working Group

The terms of reference of the RDA Working Group were as follows:

- To review the Irish RDAs
- To compare the Irish RDAs with the EU PRIs and assess suitability to the Irish population
- Where there was discrepancy between the EU and Irish recommendations (or the EU recommendations were not appropriate for the Irish population), the Working Group should review current scientific evidence in relation to these nutrients and make their own recommendations with respect to nutrient requirements of the Irish population
- To prepare a report on the revised nutrient requirements of the Irish population.

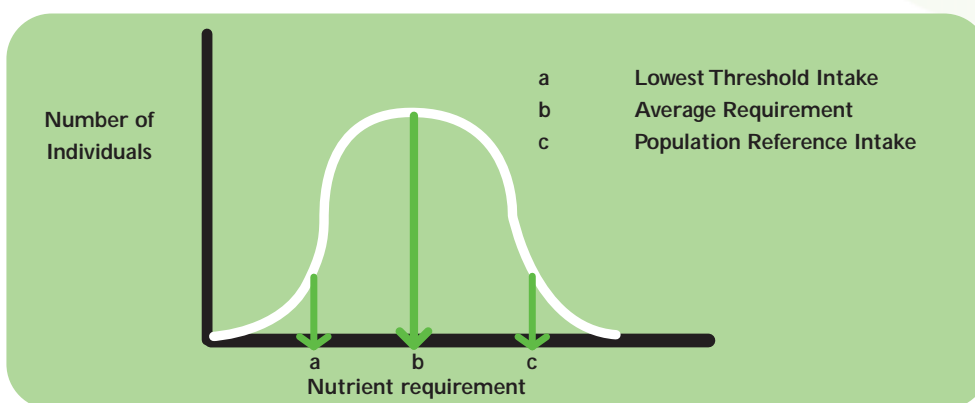
1.3 Nomenclature

A variety of terms are commonly used in reference to dietary recommendations such as recommended dietary allowances, recommended daily allowances, recommended daily amounts, recommended nutrient intakes, among others. In this report, the term recommended dietary allowance (RDA) will be used (3).


The Food and Nutrition Board that devised the RDAs in the USA defined Recommended Daily Allowance as "the level of intake of essential nutrients that, on the basis of scientific knowledge, are judged by the Food and Nutrient Board to be adequate to meet the known nutrient needs of practically all healthy persons" (4). The existing Irish RDAs are based on this definition.

The EU Scientific Committee for Food developed a new nomenclature with respect to dietary recommendations (3). This nomenclature is based on the frequency of distribution of individual requirements for a nutrient, which is presented in Figure 1.

Figure 1 The Frequency of Distribution of Individual Requirements for a Nutrient



Point b represents the mean requirement of the population. This is referred to as the **average requirement**. Point c equals the mean requirement plus two standard deviations (SD) i.e. meeting the dietary requirements of nearly all (97.5 %) healthy people in a population. This requirement is referred to as the **population reference intake** (PRI), and corresponds with the traditional term RDA. Point a (mean -2SD) is the intake below which nearly all individuals will be unable to maintain metabolic integrity according to the criterion chosen, this point is referred to as the **lowest threshold intake** (LTI). The three reference levels of intake were devised because the single value of the RDA is often misinterpreted. Despite being clearly defined as substantially more than an individual needs, the RDA is often regarded as the lowest acceptable intake for the majority of the population.



The Working Group decided to maintain the use of the term RDA and it should be noted that this corresponds to the EU term PRI and the UK term Reference Nutrient Intake (RNI).

1.4 Scientific Basis of the Recommendations

In preparing this report the Working Group did not attempt to review all of the scientific evidence on which RDAs could be based. This evidence has been reviewed thoroughly by expert committees in the USA in 1989 (1), in the UK in 1991 (2) and most recently, in the EU in 1993 (3). The Working Group carefully reviewed each of these reports and concluded that the EU PRI values, based on the most recent review available, should be adopted in Ireland for most nutrients. However, in the case of folate, iron, calcium and vitamin C, the Working Group recommends values that differ from the EU PRIs. This view was based on newer research findings and consideration of prevailing Irish conditions, as outlined in the report.

For infants from 0 to 12 months, the UK recommendations are more comprehensive. Neither the EU PRIs nor the 1983 Irish RDAs provide data for this sub-population and so the RNIs for infants, as provided by the Department of Health and Social Services in the UK (2) are adopted in this report (Table 2).

The Working Group also decided to include the Lower Threshold Intake (LTI - the level of nutrient intake below which nearly all individuals will be unable to maintain metabolic integrity) as this is a useful reference value in evaluating the adequacy of diets of individuals. The LTIs are outlined in Table 5.

Tables 1 - 6 outline the RDAs as recommended by this Working Group.

1.5 Definitions

- Adults are defined as those individuals aged 18 years or more. Age specified recommendations are only provided for energy requirements.
- There is no evidence that the nutrient requirements (as distinct from the energy requirements) of the elderly (over 65 years) differ from those of adults, and except for vitamin D, no different values are given.
- Dietary recommendations for pregnant females are provided for the second half of the pregnancy only.
- Dietary recommendations for lactating females are provided for the first six months of lactation only.

1.6 Abbreviations

- BMI Body mass index
- BMR Basal metabolic rate
- DRV Dietary reference value
- LTI Lowest threshold intake
- NTD Neural tube defect
- PAL Physical activity level
- PRI Population reference intake
- PUFA Polyunsaturated fatty acid
- RDA Recommended dietary allowance
- RNI Reference nutrient intake
- TEE Total energy expenditure

1.7 Recommended Dietary Allowances for Ireland

Table 1 Recommended Dietary Allowances																					
Age	Protein	n-6 PUFA ^a	n-3 PUFA ^a	Vitamin A ^b	Thiamin	Riboflavin	Niacin	Vitamin C	Vitamin B ₆	Folate	Vitamin B ₁₂	Vitamin D	Calcium	Phosphorus	Potassium	Iron	Zinc	Copper	Selenium	Iodine	
years	g/kg body weight/d	% dietary energy	% dietary energy	µg/d	µg/d	mg/d	mg/d	mg/d	µg/d	µg/d	µg/d	µg/d	mg/d	mg/d	mg/d	mg/d	mg/d	mg/d	µg/d	µg/d	
Children																					
1-3	1.1	3	0.5	400	100	0.8	1.6	45	15	100	0.7	10	800	300	800	8	4	0.4	10	70	
4-6	1.0	2	0.5	400	100	1.0	1.6	45	15	200	0.9	0-10	800	350	1100	9	6	0.6	15	90	
7-10	1.0	2	0.5	500	100	1.2	1.6	45	15	200	1.0	0-10	800	450	2000	10	7	0.7	25	100	
Males																					
11-14	1.0	2	0.5	600	100	1.4	1.6	50	15	300	1.3	0-15	1200	775	3100	13	9	0.8	35	120	
15-17	0.9	2	0.5	700	100	1.6	1.6	60	15	300	1.4	0-15	1200	775	3100	14	9	1.0	45	130	
†Females																					
11-14	0.95	2	0.5	600	100	1.2	1.6	50	15	300	1.3	0-15	1200	625	3100	14	9	0.8	35	120	
15-17	0.85	2	0.5	600	100	1.3	1.6	60	15	300	1.4	0-15	1200	625	3100	14	7	1.0	45	130	
Males																					
18-64	0.75	2	0.5	700	100	1.6	1.6	60	15	300	1.4	0-10	800	550	3100	10	9.5	1.1	55	130	
65+	0.75	2	0.5	700	100	1.6	1.6	60	15	300	1.4	10	800	550	3100	10	9.5	1.1	55	130	
†Females																					
18-64	0.75	2	0.5	600	100	1.3	1.6	60	15	300	1.4	0-10	800	550	3100	14	7	1.1	55	130	
65+	0.75	2	0.5	600	100	1.3	1.6	60	15	300	1.4	10	800	550	3100	9	7	1.1	55	130	
Pregnancy*	0.75 (+10g/d)	2	0.5	700	100	1.6	1.6	80	15	500	1.6	10	1200	550	3100	15	7	1.1	55	130	
Lactation ^{††}	0.75 (+10g/d)	2	0.5	950	100	1.7	1.6 (+2)	80	15	400	1.9	10	1200	950	3100	15	12	1.4	75	160	

*Second half of pregnancy; ^{††} First six months of lactation

^a Polyunsaturated fatty acids; ^b Retinol equivalents (µg/d)

[†] Neural tube defects can be prevented by periconceptual supplementation of folic acid

Recommendations for infants (0-12 months) are outlined in Table 2.

Table 2 Recommended Dietary Allowances for Infants from 0-12 Months (DHSS, UK,1991) (2)

Age (months)		0-3	4-6	7-9	10-12
Weight* (kg)		5.9	7.7	8.8	9.7
Energy MJ/d	Males	2.28	2.89	3.44	3.85
	Females	2.16	2.69	3.20	3.61
Protein (g/d)		12.5	12.7	13.7	14.9
Vitamin A# (µg/d)		350	350	350	350
Thiamin (mg/d)		0.2	0.2	0.2	0.3
Riboflavin (mg/d)		0.4	0.4	0.4	0.4
Niacin†		3	3	4	5
Vitamin B ₆ (mg/d)		0.2	0.2	0.3	0.4
Vitamin B ₁₂ (µg/d)		0.3	0.3	0.4	0.4
Folate (µg/d)		50	50	50	50
Vitamin C (mg/d)		25	25	25	25
Vitamin D (µg/d)		8.5	8.5	7	7
Calcium (mg/d)		525	525	525	525
Magnesium (mg/d)		55	60	75	80
Sodium (mg/d)		210	280	320	350
Potassium (mg/d)		800	850	700	700
Chloride¶ (mg/d)		320	400	500	500
Iron (mg/d)		1.7	4.3	7.8	7.8
Zinc (mg/d)		4.0	4.0	5.0	5.0
Copper (mg/d)		0.3	0.3	0.3	0.3
Selenium (µg/d)		10	13	10	10
Iodine (µg/d)		50‡	60	60	60

* where applicable

µg retinol equivalent/d

† mg niacin equivalent/1000 kcal

‡ formula fed

¶ corresponds to sodium 1 mmol =35.5 mg

Table 3 Children and Adolescent Energy Requirements				
Age (years)	Average weight (kg)		Estimated energy requirements (MJ/d)	
Boys	Girls	Boys	Girls	
18 months	11.5	11.0	4.60	4.40
24 months	12.5	12.0	5.00	4.80
30 months	14.0	13.0	5.60	5.20
36 months	15.0	14.0	6.00	5.60
3.5	15.5	15.0	6.10	5.65
4.5	17.5	17.0	6.55	6.20
5.5	19.5	19.5	7.10	6.80
6.5	22.0	21.5	7.70	7.10
7.5	24.5	24.0	8.10	7.30
8.5	27.0	27.0	8.25	7.40
9.5	30.0	30.5	8.55	7.50
10.5	33.0	34.0	8.73	7.64
11.5	36.5	37.5	9.19	7.95
12.5	41.0	43.0	9.80	8.55
13.5	47.0	48.0	10.63	8.95
14.5	53.0	50.5	10.89	8.74
15.5	58.0	52.5	11.41	8.88
16.5	62.5	54.0	11.92	8.97
17.5	64.5	54.5	12.00	8.96

For infants (0-12 months) see Table 2.

Age (years)	Desirable Body Weight* (kg)	With desired physical activity (MJ/d)	Without desired physical activity (MJ/d)	Actual Body Weight** (kg)	With desired physical activity (MJ/d)	Without desired physical activity (MJ/d)
Males						
18-29	66.3	12.5	11.9	74.6	13.4	12.7
30-59	66.3	11.5	10.7	74.6	12.1	11.3
60-74	63.5	9.2	8.5	73.5	10.0	9.2
75+	63.5	8.5	7.5	73.5	9.1	8.0
Females						
18-29	57.3	9.1	8.5	62.1	9.6	9.0
30-59	57.3	8.9	8.3	62.1	9.2	8.5
60-74	55.5	7.8	7.2	66.1	8.5	7.8
75+	55.5	7.6	6.7	66.1	8.3	7.3

* Desirable weights for observed heights were calculated taking a Body Mass Index (BMI) of 22.

** Weighted median weights as observed in several studies (1).

It is important to note that energy requirements are calculated in terms of desirable and actual body weight, and at two levels of physical activity.

Additional Energy Requirements (MJ/d)[#]	
Pregnancy	
Pre-pregnancy BMI (kg/m ²)	
18.5 – 19.9	+1.7
20.0 – 25.9	+1.5
>25.9	+1.0
Lactation (months)	
0 - 1	+1.5
1 - 2	+1.8
2 - 3	+1.92

[#] Energy requirements provided are in addition to those recommendations outlined in Table 4 (a).

For the purposes of these calculations, all women were assumed to be 1.65 m in height and moderately active.

Table 5 Multiple Values Proposed for Adults - Average Requirements, RDA and Lowest Threshold Intake*

Nutrient	Average Requirement	RDA	Lowest Threshold Intake
Protein (g/kg body wt)	0.6	0.75	0.45
n-6 PUFA (% energy)	1	2	0.5
n-3 PUFA (% energy)	0.2	0.5	0.1
Vitamin A (µg)	500 (400)	700 (600)	300 (250)
Thiamin (µg/MJ)	72	100	50
Riboflavin (mg)	1.3 (1.1)	1.6 (1.3)	0.6
Niacin (mg niacin equivalents/MJ)	1.3	1.6	1.0
Vitamin B ₆ (µg/g protein)	13	15	-
Folate (µg)	230	300	160
Vitamin B ₁₂ (µg)	1.0	1.4	0.6
Vitamin C (mg)	46	60	32
Vitamin D (mg)	-	0 - 10	-
Calcium (mg)	615	800	430
Phosphorus (mg)	400	550	300
Potassium (mg)	-	3100	1600
Iron (mg)	7.7 (10.8)	10 (14)	5.4 (7.5)
Zinc (mg)	7.5 (5.5)	9.5 (7)	5 (4)
Copper (mg)	0.8	1.1	0.6
Selenium (µg)	40	55	20
Iodine (µg)	100	130	70

* Amounts per day, unless given in other terms. If that for women is different from that for men, it is given in parenthesis.

Table 6 Nutrients for which there is Insufficient Data to Provide Recommendations

β Carotene and other carotenoids	Pantothenic acid
Vitamin K	Magnesium
Sodium	Molybdenum
Manganese	Biotin
Fluoride	Chloride
Chromium	Vitamin E

CHAPTER 2: NUTRIENTS FOR WHICH THE EU POPULATION REFERENCE INTAKES ARE TO BE ADOPTED

2.1 Energy Requirements

2.1.1 Adult Energy Requirements

EU recommendations express energy requirements in terms of actual body weight, ideal body weight (based on a body mass index of 22 kg/m²) with and without desirable activity levels, where desirable activity is that level which is being promoted by public health campaigns. Conversely, the 1983 Irish RDAs for energy are based on an assessment of energy intakes. This method is now considered to be inappropriate, as intakes may not match the energy demands of the body and the intake may be incompatible with the long-term maintenance of desirable levels of body weight and physical activity.

The EU energy recommendations during pregnancy and lactation are more specific than the Irish RDAs. These recommendations base energy requirements on pre-pregnancy body mass index and energy requirements during lactation are graded, depending on the duration of lactation.

Age (years)	Activity Level	Weight (kg)	RDA (MJ/d)
19-34	Sedentary	70	10.5
	Moderately Active	70	12.0
	Very Active	70	14.0
35-64	Sedentary	70	10.0
	Moderately Active	70	11.5
	Very Active	70	14.0
65-74	Moderately Active	70	10.0
75+	Moderately Active	70	9.0

Table 7 (b) Adult Male Energy Requirements - EU Data (1993)

Age (years)	Desirable Body Weight* (kg)	With desired physical activity (MJ/d)	Without desired physical activity (MJ/d)	Actual Body Weight** (kg)	With desired physical activity (MJ/d)	Without desired physical activity (MJ/d)
18-29	66.3	12.5	11.9	74.6	13.4	12.7
30-59	66.3	11.5	10.7	74.6	12.1	11.3
60-74	63.5	9.2	8.5	73.5	10.0	9.2
75+	63.5	8.5	7.5	73.5	9.1	8.0

* Desirable body weight - desirable weights for observed heights were calculated taking a body mass index (BMI) of 22.

** Actual body weight - weighted median weights observed in several studies (1).

Table 8 (a) Adult Female Energy Requirements - Irish Data (1983)

Age (years)	Activity Level	Weight (kg)	RDA (MJ/d)
19-54	Most Occupations	55	9.0
	Very Active	55	10.5
55-74	Moderately Active	55	8.0
75+	Moderately Active	55	7.0
Pregnancy*	Moderately Active	-	10.0
Lactation†	Moderately Active	-	11.5

* Second half of pregnancy.

† First six months of lactation.

Table 8 (b) Adult Female Energy Requirements - EU Data (1993)

Age (years)	Desirable Body Weight* (kg)	With desired physical activity (MJ/d)	Without desired physical activity (MJ/d)	Actual Body Weight** (kg)	With desired physical activity (MJ/d)	Without desired physical activity (MJ/d)
18-29	57.3	9.1	8.5	62.1	9.6	9.0
30-59	57.3	8.9	8.3	62.1	9.2	8.5
60-74	55.5	7.8	7.2	66.1	8.5	7.8
75+	55.5	7.6	6.7	66.1	8.3	7.3

* Desirable weights for observed heights were calculated taking a body mass index (BMI) of 22.

** Actual body weight - weighted median weights observed in several studies (1).

Table 8 (c) Additional Energy Requirements for Pregnant and Lactating Women - EU Data (1993)

Additional Energy Requirements (MJ/d) [#]	
Pregnancy	
Pre-pregnancy BMI (kg/m ²)	
18.5-19.9	+1.7
20.0-25.9	+1.5
>25.9	+1.0
Lactation (Months)	
0-1	+1.5
1-2	+1.8
2-3	+1.92

[#] Energy requirements provided are in addition to those recommendations outlined in Table 8 (b).

For the purposes of these calculations, all women were assumed to be 1.65 m and moderately active.

2.1.2 Children's Energy Requirements

For children the EU recommendations for energy are more specific, giving guidelines at particular ages rather than over a range of ages. The EU recommendations also have set different requirements for boys and girls. (Note that all recommendations for infants (including those for energy) are adopted from the more specific UK RNI figures, as outlined in Table 2.)

Table 9 (a) Children's Energy Requirements - Irish Data (1983)

Age (years)	Weight (kg)	RDA (MJ/d)
1-3	13	5.6
4-6	20	7.0
7-10	28	8.5

Table 9 (b) Children's Energy Requirements - EU Data (1993)

Age (years)	Average weight (kg)		Intake (kJ/kg)		Estimated energy requirements (MJ/d)	
	Boys	Girls	Boys	Girls	Boys	Girls
3.5	15.5	15.0	395	375	6.10	5.65
4.5	17.5	17.0	375	365	6.55	6.20
5.5	19.5	19.5	365	350	7.10	6.80
6.5	22.0	21.5	350	330	7.70	7.10
7.5	24.5	24.0	330	305	8.10	7.30
8.5	27.0	27.0	305	275	8.25	7.40
9.5	30.0	30.5	285	245	8.55	7.50

Table 9 (c) Older Children and Adolescent (10-17 years) Energy Requirements - EU Data (1993)								
Age (years)	10.5	11.5	12.5	13.5	14.5	15.5	16.5	17.5
Boys								
Weight (kg)	33.0	36.5	41.0	47.0	53.0	58.0	62.5	64.5
BMR (MJ/d)	5.19	5.45	5.78	6.23	6.67	7.04	7.38	7.52
TEE (MJ/d)*	8.56	8.99	9.54	10.28	10.54	11.12	11.66	11.88
Growth (MJ/d)**	0.17	0.20	0.26	0.35	0.35	0.29	0.26	0.12
Estimated energy requirement (MJ/d)	8.73	9.19	9.80	10.63	10.89	11.41	11.92	12.00
Girls								
Weight (kg)	34.0	37.5	43.0	48.0	50.5	52.5	54.0	54.5
BMR (MJ/d)	4.80	5.00	5.31	5.59	5.73	5.84	5.92	5.95
TEE (MJ/d)*	7.44	7.75	8.23	8.66	8.60	8.76	8.88	8.93
Growth (MJ/d)**	0.20	0.20	0.32	0.29	0.14	0.12	0.09	0.03
Estimated energy requirement (MJ/d)	7.64	7.95	8.55	8.95	8.74***	8.88	8.97	8.96

* At a PAL of 1.65 for boys and 1.58 for girls aged 10-13 years, and 1.55 for boys and 1.50 for girls aged 14-17 years.

** At a cost of 21 kJ per daily weight gain.

***The small decrease in energy requirement at this stage relates mainly to the fall in the growth rate.

2.1.3 Working Group Recommendations

The Working Group recommends that the EU PRI for energy for children (1-17 years) and adults be adopted in Ireland.

2.2 Protein Requirements

The 1983 Irish RDA for protein was based on the factorial method for predicting protein requirements. This is the amount of protein needed to replace the obligatory nitrogen loss, after adjustment for inefficiency of utilisation of dietary protein and for the quality of protein consumed. For children, pregnant and lactating women, an additional amount of protein for tissue growth or milk formation was added to the factorial estimate of protein requirement.

The EU PRIs for protein are, on the other hand, based on nitrogen balance studies. These studies are considered to be more complete due to the large number of assumptions made by the factorial method. Due to this completeness, the US RDAs on which the Irish RDAs were based, have since been updated and are now based on the World Health Organization (WHO) recommendations (6).

2.2.1 Adult Protein Requirements

Table 10 (a) Adult Male Protein Requirements - Irish Data (1983)

Age (years)	Activity Level	Weight (kg)	RDA (g/d)	RDA (g/kg)
19-34	Sedentary	70	63	0.90
	Moderately Active	70	72	1.03
	Very Active	70	84	1.20
35-64	Sedentary	70	60	0.86
	Moderately Active	70	69	0.99
	Very Active	70	84	1.20
65-74	Moderately Active	70	60	0.86
75+	Moderately Active	70	54	0.77

Table 10 (b) Adult Female Protein Requirements - Irish Data (1983)

Age (years)	Activity Level	Weight (kg)	RDA (g/d)	RDA (g/kg)
19-54	Most Occupations	55	54	0.98
	Very Active	55	62	1.13
55-74	Moderately Active	55	47	0.85
75+	Moderately Active	55	42	0.76
Pregnancy*	Moderately Active	-	60	-
Lactation [¶]	Moderately Active	-	69	-

* Second half of pregnancy;

[¶] First six months of lactation

Table 11 (a) Adult Male and Female Protein Requirements - EU Data (1993)

	PRI (g/kg bodyweight/d)	PRI (g/d)
Males	0.75	56
Females	0.75	47

Table 11 (b) Additional Protein Requirements for Pregnant and Lactating Women - EU Data (1993)

	Additional Protein Requirements (g/d)
Pregnancy	10
Lactation (months)	
1 st 6 months	16
2 nd 6 months	12

2.2.2 Protein Requirements - Infants and Children

For children and infants, the EU PRIs for protein are based on the Food and Agriculture Organization/World Health Organization/United Nations Universities (FAO/WHO/UNU) Consultation (1985) (6). These recommendations are based on the amount of high quality egg or milk protein needed to achieve nitrogen balance plus additional need for growth. The Irish RDA for protein substantially exceeds the EU PRI (1.5 to twofold). The US RDA for protein, on which the 1983 Irish RDAs were based, have since been updated and are now based on the FAO/WHO/UNU Consultation (1985) (6).

Table 12 (a) Children's Protein Requirements - Irish Data (1983)

	Age (years)	Weight (kg)	RDA (g/d)
Children	1-3	13	33
	4-6	20	43
	7-10	28	51
Males	11-14	45	66
	15-18	66	72
Females	11-14	46	53
	15-18	55	53

Table 12 (b) Protein Requirements of Infants, Children and Adolescent Males and Females - EU Data (1993)

	Age (years)	Weight (kg)	PRI (g/kg/d)	Total intake (g/d)
Children	1.0-1.5	11.0	1.26	14.0
	1.5-2.0	12.5	1.17	14.5
	2-3	13.5	1.13	15.5
	3-4	15.5	1.09	17.0
	4-5	17.5	1.06	18.5
	5-6	19.5	1.02	20.0
	6-7	22.0	1.01	22.0
	7-8	24.5	1.01	24.5
	8-9	27.0	1.01	27.5
	9-10	30.0	0.99	29.5
Males	10	33.0	0.99	32.5
	11	36.5	0.98	36.0
	12	41.0	1.00	41.0
	13	47.0	0.97	45.5
	14	53.0	0.96	51.0
	15	58.0	0.92	53.5
	16	62.5	0.90	56.5
	17	64.5	0.86	55.5
Females	10	34.0	1.00	34.0
	11	37.5	0.98	37.0
	12	43.0	0.96	41.5
	13	48.0	0.94	45.0
	14	50.5	0.90	45.5
	15	52.5	0.87	45.5
	16	54.0	0.83	45.0
	17	54.5	0.80	43.5

2.2.3 Working Group Recommendations

The Working Group recommends the adoption of the EU PRI for protein for children (1-17 years) and adults for the Irish population.

2.3 Thiamin Requirements

As the principal metabolic role of thiamin is in energy-yielding metabolism, the EU PRI for thiamin is expressed in terms of energy intake. However, when these recommendations are expressed for average energy expenditure in mg thiamin/day, the PRI falls short of the Irish RDA. The basis of the Irish RDA for thiamin has been impossible to find but when expressed as a function of energy intake, the Irish RDA is 80 - 100 µg/MJ. The Irish RDA and EU PRI recommend similar levels of thiamin during pregnancy and lactation. EU PRI and Irish RDA for thiamin in infants and children are equivalent.

Table 13 (a) Adult Thiamin Requirements - Irish Data (1983)

Males (years)	Activity Level	RDA (g/d)	Females (years)	Activity Level	RDA (g/d)
19-34	Sedentary	1.0	19-54	Most Occupations	0.9
	Moderately Active	1.2		Very Active	1.0
	Very Active	1.3	55-74	Moderately Active	0.8
35-64	Sedentary	1.0	75+	Moderately Active	0.7
	Moderately Active	1.1			
	Very Active	1.3	Pregnancy*		1.0
65-74	Moderately Active	1.0	Lactation [¶]		1.1
75+	Moderately Active	0.9			

* Second half of pregnancy.

¶ First six months of lactation.

Table 13 (b) Adult Thiamin Requirements - EU Data (1993)

	PRI (µg/MJ)	Males (mg thiamin/d)	Females (mg thiamin/d)
Population reference intake	100	1.1	0.9
Average requirement	72	0.8	0.6
Lowest threshold intake	50	0.6	0.4
Pregnancy*	-	-	1.0*
Lactation	-	-	1.1

* From 10th week of pregnancy.

Table 13 (c) Children's Thiamin Requirements - Irish and EU Data

	Irish Recommendations (1983)		EU Recommendations (1993)	
	Age (years)	RDA (mg/d)	Age (years)	PRI (mg/d)
Children	1-3	0.5	1-3	0.5
	4-6	0.7	4-6	0.7
	7-10	0.8	7-10	0.8
Males	11-14	1.1	11-14	1.0
	15-18	1.2	15-17	1.2
Females	11-14	0.9	11-14	0.9
	15-18	0.9	15-17	0.9

2.3.1 Working Group Recommendations

The Working Group recommends the adoption of the EU PRI for thiamin for children (1-17 years) and adults for the Irish population.

2.4 Riboflavin Requirements

EU PRI and Irish RDAs for riboflavin intake in infants, children and adults are almost equivalent.

Table 14 Irish and EU Riboflavin Recommendations

	Irish Recommendations (1983)		EU Recommendations (1993)	
	Age (years)	RDA (mg/d)	Age (years)	PRI (mg/d)
Children	1-3	0.7	1-3	0.8
	4-6	0.9	4-6	1.0
	7-10	1.1	7-10	1.2
Males	11-14	1.4	11-14	1.4
	15-18	1.7	15-17	1.6
Females	11-14	1.4	11-14	1.2
	15-18	1.7	15-17	1.3
Adults	Males	1.6	Males	1.6
	Females	1.3	Females	1.3
	Pregnancy*	1.6	Pregnancy	1.6
	Lactation [¶]	1.8	Lactation	1.7

* Second half of pregnancy.

¶ First six months of lactation.

2.4.1 Working Group Recommendations

The Working Group recommends that the EU PRI for riboflavin be adopted for children (1-17 years) and adults in the Irish population.

2.5 Niacin Requirements

There is little difference between the EU PRI and Irish RDA for niacin intake in infants, children and adults. The EU PRI for niacin for adolescent females is lower than the Irish RDA. The EU PRI do not have an additional requirement for niacin during pregnancy and lactation, whereas the Irish RDA for niacin is increased for pregnancy and lactation. The EU Scientific Committee for Food proposed that the hormonal changes during pregnancy increases the efficiency of the synthesis of nicotinamide nucleotides from tryptophan and therefore there is no additional requirement above pre-pregnancy levels (3).

Table 15 Irish and EU Niacin Recommendations

	Irish Recommendations (1983)		EU Recommendations (1993)		
	Age (years)	RDA (mg/d)	Age (years)	PRI (mg/d)	PRI (mg/MJ)
Children	1-3	8	1-3	9	1.6
	4-6	10	4-6	11	1.6
	7-10	12	7-10	13	1.6
Males	11-14	16	11-14	15	1.6
	15-18	19	15-17	18	1.6
Females	11-14	16	11-14	14	1.6
	15-18	19	15-17	14	1.6
Adults	Males	18	Males	18	1.6
	Females	15	Females	14	1.6
	Pregnancy*	18	Pregnancy	14	1.6
	Lactation [†]	21	Lactation	16	1.6 (+2)

* Second half of pregnancy.

[†] First six months of lactation.

2.5.1 Working Group Recommendations

The Working Group recommends that the EU PRI for niacin be adopted for children (1-17 years) and adults in the Irish population.

2.6 Vitamin B₁₂ Requirements

The EU PRI for vitamin B₁₂ are consistently lower than the Irish RDAs. The US recommendations, on which the Irish RDAs are based, have since been reduced as more up to date research demonstrates that the lower levels adequately sustain metabolic function and meet physiological requirements.

Table 16 Irish and EU Vitamin B₁₂ Recommendations

	Irish Recommendations (1983)		EU Recommendations (1993)	
	Age (years)	RDA (µg/d)	Age (years)	PRI (µg/d)
Children	1-3	2.0	1-3	0.7
	4-6	2.5	4-6	0.9
	7-10	3.0	7-10	1.0
Males	11-14	3.0	11-14	1.3
	15-18	3.0	15-17	1.4
Females	11-14	3.0	11-14	1.3
	15-18	3.0	15-17	1.4
Adults	Males	3.0	Males	1.4
	Females	3.0	Females	1.4
	Pregnancy*	4.0	Pregnancy	1.6
	Lactation [¶]	4.0	Lactation	1.9

* Second half of pregnancy.

[¶] First six months of lactation.

2.6.1 Working Group Recommendations

The Working Group recommends that the EU PRI for Vitamin B₁₂ be adopted for children (1-17 years) and adults in the Irish population.

2.7 Vitamin B₆ (Pyridoxine) Requirements

The 1983 Irish RDAs for vitamin B₆ are greater than the EU PRI, especially for adults and during pregnancy and lactation. Given the close metabolic relationship between vitamin B₆ and protein, the EU PRI is 15 mg vitamin B₆/g dietary protein, for adults and children. Even though plasma concentrations of pyridoxal phosphate fall during pregnancy, the EU Scientific Committee for Food (3) concluded that it was neither necessary nor desirable to increase the recommended level of

vitamin B₆ intake above 15 mg vitamin B₆/g dietary protein, therefore partly explaining the lower EU PRI. Equally during lactation, the vitamin B₆ requirement was not deemed to exceed 15 mg vitamin B₆/g dietary protein. The US recommendations, on which the Irish RDAs are based, have since been reduced in light of more recent scientific evidence.

The EU Scientific Committee for Food also included a cautionary note in relation to high intakes of vitamin B₆: - Intakes greater than 500 mg/d are associated with neurological damage and subsequently intakes of more than 50 mg/d are potentially harmful in adults (3).

Table 17 Irish and EU Vitamin B₆ (Pyridoxine) Recommendations

	Irish Recommendations (1983)		EU Recommendations (1993)		
	Age (years)	RDA (mg/d)	Age (years)	PRI (mg/d)	PRI (µg/g protein)
Children	1-3	0.9	1-3	0.7	15
	4-6	1.3	4-6	0.9	15
	7-10	1.6	7-10	1.1	15
Males	11-14	1.8	11-14	1.3	15
	15-18	2.0	15-17	1.5	15
Females	11-14	1.8	11-14	1.1	15
	15-18	2.0	15-17	1.1	15
Adults	Males	2.2	Males	1.5	15
	Females	2.0	Females	1.1	15
	Pregnancy*	2.6	Pregnancy	1.3	15
	Lactation [†]	2.5	Lactation	1.4	15

* Second half of pregnancy.

[†] First six months of lactation

2.7.1 Working Group Recommendations

The Working Group recommends the adoption of the EU PRI for vitamin B₆ for children (1-17 years) and adults in the Irish population.

2.8 Vitamin A Requirements

The 1983 Irish RDAs and the EU PRI for vitamin A are almost equivalent, with the exception of a much greater Irish RDA during lactation. The EU PRI for vitamin A during lactation is based on the assumption that 350 µg retinol is supplied in the milk. As a result the EU PRI during lactation is 350µg more than the non-pregnant requirement. The US recommendations are based on a greater estimation of retinol supply (300 - 525 µg) in the milk and lead to a greater RDA.

Intakes of vitamin A in excess of needs are used to build up liver reserves of retinyl esters and these are known to be highly teratogenic. The EU Scientific Committee for Food (3) established upper limits of vitamin A, which represent potentially harmful intakes of retinol - both free and esterified. It was recommended that single doses should not exceed the following levels:

- Men - 9000 µg/d
- Women - 7500 µg/d
- Children - 1-3 years - 1800 µg/d
4-6 years - 3000 µg/d
7-10 years - 4500 µg/d
11-17 years - 6000 µg/d

Table 18 Irish and EU Vitamin A Recommendations

	Irish recommendations (1983)		EU Recommendations (1993)	
	Age (years)	RDA (µg/d retinol equivalents)	Age (years)	PRI (µg/d retinol equivalents)
Children	1-3	300	1-3	400
	4-6	300	4-6	400
	7-10	480	7-10	500
Males	11-14	725	11-14	600
	15-18	750	15-17	700
Females	11-14	725	11-14	600
	15-18	750	15-17	600
Adults	Males	750	Males	700
	Females	750	Females	700
	Pregnancy*	750	Pregnancy*	700
	Lactation [¶]	1200	Lactation [¶]	900

* Second half of pregnancy.

[¶] First six months of lactation.

2.8.1 Working Group Recommendations

The Working Group recommends the adoption of the EU PRI for Vitamin A for children (1-17 years) and adults in the Irish population.

2.9 Vitamin D Requirements

The 1983 Irish RDAs and the EU PRI for vitamin D are almost equivalent. However, to allow for the variety of sun exposure across the continent, the EU Scientific Committee for Food (3) established a range of recommended intakes for vitamin D.

Table 19 Irish and EU Vitamin D Recommendations

	Irish Recommendations (1983)		EU Recommendations (1993)	
	Age (years)	RDA (µg/d)	Age (years)	PRI (µg/d)
Children	1-3	10	1-3	10
	4-6	10	4-6	0-10
	7-10	10	7-10	0-10
Males & Females	11-14	10	11-14	0-15
	15-18	10	15-17	0-15
Males & Females	19-64	7.5	18-64	0-10
	65+	7.5	65+	10
	Pregnancy*	10	Pregnancy	10
	Lactation [†]	10	Lactation	10

* Second half of pregnancy.

[†] First six months of lactation.

2.9.1 Working Group Recommendations

The Working Group recommends that the EU PRI for Vitamin D be adopted for children (1-17 years) and adults in the Irish population.

2.10 Vitamin E Requirements

There is no EU PRI for vitamin E because the frequency distribution of intakes of vitamin E are not normally distributed but are skewed with some very high intakes. To base a PRI on such data would have the undesirable effect of indicating to people with a much lower but adequate intake of polyunsaturated fatty acids (PUFA), that they ought to consume substantially more vitamin E. As vitamin E requirements are related to PUFA intake, a guideline expressing vitamin E requirements in terms of dietary PUFA intake (0.4 α-tocopherol equivalents : g PUFA) was proposed. This figure is based on current intakes in the US which seem adequate. Since foods rich in PUFA are also rich in

vitamin E this Working Group felt that requirements would be met even though a recommendation has not been set.

For infants (6 - 11 months) the recommendation of 0.4 mg α -tocopherol equivalents : g PUFA was set as it seems adequate to maintain health.

Table 20 Irish Vitamin E Recommendations		
Irish Recommendations (1983)		
	Age (years)	RDA (mg/d)
Children	1-3	5
	4-6	6
	7-10	7
Males	11-14	8
	15-18	10
Females	11-14	8
	15-18	8
Males	19-64	10
	65+	10
Females	19-64	8
	65+	8
	Pregnancy*	10
	Lactation [†]	11

* Second half of pregnancy

[†] First six months of lactation

2.10.1 Working Group Recommendations

The Working Group recommends that, in accordance with the EU Scientific Committee for Food, there should be no recommendation for Vitamin E.

2.11 Zinc Recommendations

The EU PRI for zinc are lower than the Irish RDAs in all age groups.

Table 21 Irish and EU Zinc Recommendations

	Irish Recommendations (1983)		EU Recommendations (1993)		
	Age (years)	RDA (mg/d)	Age (years)	PRI (mg/d)	
Infants	<1	5	6-11 months	4	
Children	1-3	10	1-3	4	
	4-6	10	4-6	6	
	7-10	10	7-10	7	
Males	11-18	15	11-18	9	
	Females	11-14	15	11-14	9
		15-18	15	15-17	7
Males	19-64	15	18-64	9.5	
	65+	15	65+	9.5	
Females	19-64	15	18-64	7	
	65+	15	65+	7	
	Pregnancy*	20	Pregnancy	7	
	Lactation [†]	25	Lactation	12	

* Second half of pregnancy.

[†] First six months of lactation.

2.11.1 Working Group Recommendations

The Working Group recommends that the EU PRI for zinc for children (1-17 years) and adults should be adopted in the Irish population.

2.12 Other Trace Elements

The 1983 Irish RDAs do not provide recommendations for the following trace elements: potassium, phosphorous, copper, selenium and iodine, however the EU Scientific Committee for Food has produced recommendations.

Table 22 EU Trace Element Recommendations

Age (years)	Trace Element				
	Potassium (mg/d)	Phosphorous (mg/d)	Selenium (µg/d)	Iodine (µg/d)	Copper (mg/d)
1-3	800	300	10	70	0.4
4-6	1100	350	15	90	0.6
7-10	2000	450	25	100	0.7
Males					
11-14	3100	775	35	120	0.8
15-17	3100	775	45	130	1.0
Females					
11-14	3100	625	35	120	0.8
15-17	3100	625	45	130	1.0
Males					
18-64	3100	550	55	130	1.1
65+	3100	550	55	130	1.1
Females					
18-64	3100	550	55	130	1.1
65+	3100	550	55	130	1.1
Pregnancy	3100	550	55	130	1.1
Lactation	3100	950	70	130	1.4

2.12.1 Working Group Recommendations

As the EU recommendations include figures for these trace elements, the Working Group recommends the adoption of the EU PRI for potassium, phosphorous, iodine, copper and selenium for children (1-17 years) and adults in the Irish population.

CHAPTER 3: NUTRIENTS FOR WHICH THE IRISH RECOMMENDED DIETARY ALLOWANCES OF 1983 ARE TO BE RETAINED

(Note that in this chapter, the UK Reference Nutrient Intake (RNI) and US RDAs are provided for information only.)

3.1 Iron Requirements

3.1.1 Dietary Recommendations

The 1983 Irish RDA for iron in children, young adolescents (11 – 14 years), adolescent and adult males are similar to the US RDA and the UK RNI, but greater than the EU PRI. The EU PRI for iron in adolescent and adult females are much greater than the Irish and US RDA and the UK RNI (Table 23). This difference relates to the different basis for establishing iron requirements which is used by the EU Scientific Committee for Food. Menstrual iron losses account for a significant proportion of the iron requirement of menstruating females and these losses are not normally distributed. Consequently, the distribution of iron requirements for menstruating females are not normally distributed either, but are skewed to the left. Therefore the EU PRI, which is based on a normal distribution, is far greater than the actual dietary requirements of most women. On the other hand, the UK RNI for iron is based on the 75th centile of iron requirements (due to the non-normal distribution) and corresponds well with the Irish (1983) and US RDA for iron.

3.1.2 Physiological and Dietary Requirements

Iron is a component of haemoglobin, myoglobin and many enzymes. Dietary iron may be derived from haem and non-haem sources. Haem iron is provided by meat and meat products and about 25% of it is absorbed. Non-haem iron represents 90% of dietary iron. It is supplied by bread, cereals, fruits and vegetables. The proportion of dietary non-haem iron which is absorbed depends on individual iron status, with absorption increasing when iron stores are low (7). Some dietary constituents promote non-haem iron absorption (vitamin C, haem iron, alcohol), while other dietary substances (phytates, tannins, polyphenols, fibre and inorganic elements) reduce non-haem iron absorption (7). Iron deficiency results in defective erythropoiesis leading to a normocytic or microcytic hypochromic anaemia.

Table 23 Dietary Iron Recommendations (mg/d)

	[†] Age Groups (years)	Irish RDA (1983)	EU PRI (1993)	UK RNI (1991)	US RDA (1989)
Children	1-3	8	4	6.9	10
	4-6	9	4	6.1	10
	7-10	10	6	8.7	10
Males	11-14	13	10	11.3	12
	15-18	14	13	11.3	12
Females	11-14	14	9**, 22 ^{††} or 18 [§]	14.8	15
	15-18	14	21 ^{††} or 17 [§]	14.8	15
Males	19-64	10	9	8.7	10
	65+	10	9	8.7	10
Females	19-54	14	21 ^{††} , 17 [§] or 8**	14.8	15
	55+	9	8	14.8	10
Pregnancy*		15	20	14.8	30
Lactation [¶]		15	10	14.8	15

[†] Age groups of the Irish RDAs which are similar to the categories used by the other recommending bodies.

* Second half of pregnancy.

[¶] First six months of lactation.

** Non-menstruating.

^{††} To cover 95% of the population.

[§] To cover 90% of the population.

3.1.3 Working Group Recommendations

The 1983 Irish RDAs should not be adjusted to the greater EU PRI. With respect to adult female iron requirements, the Working Group is in agreement with the UK report of the Panel on Dietary Reference Values (2) and it accepts that the requirements of up to 25% of menstruating women will not be achieved at the level of iron intake which is recommended by EU PRI. It is unlikely that their requirements can be achieved through dietary iron and those females with high menstrual losses should take iron supplements to meet their higher requirements.

The EU PRI for iron for children are lower than the 1983 Irish RDAs. There is a high incidence of iron deficiency anaemia in children and young adolescent females in Ireland (5) and the low EU PRI should therefore not be adopted. Furthermore a reduction in the iron requirement may be misinterpreted and precipitate a further reduction in iron intake by those already consuming low levels and who have low iron status.

3.2 Calcium Requirements

3.2.1 Physiological and Dietary Requirements

The adult male contains approximately 1.2 kg of calcium, 99% of which is in the skeleton and the teeth; the residual 1% is distributed between soft tissues and the extracellular fluid including plasma. In addition to its structural function in bone, calcium also has an important regulatory role and is involved in a variety of metabolic events such as enzyme activation, muscle contraction, neurotransmission, vesicular secretion, cellular aggregation, transformation and cell division.

Table 24 Dietary Calcium Recommendations (mg/d)

	†Age (years)	Irish RDA (1983)	EU PRI (1993)	UK RNI (1991)	US RDA (1989)
Children	1-3	800	400	350	800
	4-6	800	450	450	800
	7-10	800	550	550	800
Males	11-14	1200	1000	1000	1200
	15-18	1200	1000	1000	1200
Females	11-14	1200	800	800	1200
	15-18	1200	800	800	1200
Males		800	700	700	800**
Females		800	700	700	800**
Pregnancy*		1200	700	700	1200
Lactation [¶]		1200	1200	1250	1200

† Age groups of the Irish RDAs which are similar to the categories used by the other recommending bodies.

* Second half of pregnancy.

¶ First six months of lactation.

**1200 for 19-24 years

3.2.2 Working Group Recommendations

The EU PRI values are significantly lower than the existing Irish RDAs for calcium, which are closer to the US values. The Working Group was of the view that newer scientific evidence on the calcium requirements for the development and maintenance of bone mass (7) supports the higher values and therefore, that the existing Irish values should be retained.

3.3 Folate Requirements

3.3.1 Physiological and Dietary Requirements

Folate is the general name given to compounds that have nutritional properties similar to those of folic acid (pteroylglutamic acid). Folic acid is not naturally present in foods. Most dietary folate is derived from polyglutamates, which are present in liver, yeast extract and highly coloured vegetables. Folic acid may be obtained from nutritional supplements or from foods which have been fortified. Folate deficiency is characterised by megaloblastic anaemia. Low folate status is also associated with the occurrence of congenital abnormalities, spina bifida and anencephalus, collectively known as neural tube defects (NTDs). There is strong evidence to support that improved dietary intake of folate may confer protection from NTDs but it would be difficult to achieve the required increase in folic acid from food. The Food Safety Authority of Ireland's Working Group on Folic Acid and Neural Tube Defects recommend that all women capable of becoming pregnant should consume 400µg of folic acid daily in order to reduce the risk of having a baby with a neural tube defect. The EU Scientific Committee for Food is also of the opinion that 400µg of folic acid per day for women in their very early pregnancy, would help confer protection against the occurrence of neural tube defects (3).

3.3.2 Dietary Recommendations

The 1983 Irish RDAs for dietary folate intake are consistently higher than the levels recommended by the other groups (see Table 25).

	†Age Groups (years)	Irish RDA (1983)	EU PRI (1993)	UK RNI (1991)	US RDA (1989)
Children	1-3	100	100	70	50
	4-6	200	130	100	75
	7-10	200	150	150	100
Males	11-14	300	180	200	150
	15-18	300	200	200	200
Females	11-14	300	180	200	150
	15-18	300	200	200	180
Males	18+	300	200	200	200
Females	18+	300	200	200	180
Pregnancy*		500	400	300	400
Lactation††		400	350	260	280

† Age groups of the Irish RDAs which are similar to the categories used by the other recommending bodies.

* Second half of pregnancy.

†† First six months of lactation.

3.3.3 Working Group Recommendations

In light of recent evidence in relation to the protective effect of folic acid against NTDs and the high incidence of NTDs in Ireland, the Working Group proposes that the Irish recommendations of 1983 should not be adjusted downwards to concur with the EU recommendations. Furthermore, a system of supplementing the folic acid intake of the population should be devised. This source of folic acid may be derived from a folic acid supplement or from foods fortified with folic acid. The Working Group recommends that this issue should be addressed immediately.

3.4 Ascorbic Acid (Vitamin C) Requirements

3.4.1 Physiological and Dietary Requirements

A vitamin C intake of 60 mg/day will prevent scorbutic symptoms. This amount replaces catabolic losses and maintains vitamin C plasma concentrations (8). With respect to these criteria, the RDA is different for some people due to differences in catabolism of vitamin C. For example, to account for maternal losses to the foetus, the RDA for pregnant women is 80 and 70 mg/day according to Irish and US recommendations respectively. Similarly the RDA for lactating women is also set at 80 and 90-95 mg/day by the Irish and US panels respectively. In addition, there is interaction between non-haem iron absorption and vitamin C. Vitamin C increases non-haem iron absorption if both nutrients are present in the same meal. There is also evidence to suggest that higher vitamin C intakes may lower the risk of some chronic diseases such as cataract, cancer and cardiovascular diseases (9).

3.4.2 Dietary Recommendations

The 1983 Irish RDAs for ascorbic acid recommend an intake of 60 mg/day for healthy adults (5). These RDAs are higher than the EU PRI and the UK RNI which have a corresponding recommendation of 40 mg/day (Table 26).

Table 26 Dietary Vitamin C Recommendations (mg/d)

	†Age (years)	Irish RDA (1983)	EU PRI (1993)	UK RNI (1991)	US RDA (1989)
Children	1-3	45	25	30	40
	4-6	45	25	30	45
	7-10	45	30	30	45
Males	11-14	50	35	35	50
	15-18	60	40	40	60
Females	11-14	50	35	35	50
	15-18	60	40	40	60
Adults					
Males	18+	60	45	40	60
Females	18+	60	45	40	60
Pregnancy*		80	55	50	70
Lactation††		80	70	70	95

† Age groups of the Irish RDAs which are similar to the categories used by the other recommending bodies.

* Second half of pregnancy.

†† First six months of lactation.

3.4.3 Working Group Recommendations

Due to the interaction between non-haem iron and vitamin C and the evidence suggesting that high vitamin C intake lowers the risk of some chronic diseases, the Working Group proposes that the vitamin C Irish RDA of 1983 should remain in place and that the lower EU PRI should not be adopted. While the National Research Council (that devised the US RDAs) and this Working Group recognise that smokers may have increased requirements for vitamin C (10), there is as yet insufficient evidence on which to make a recommendation on a particular intake level of vitamin C for smokers.

CHAPTER 4: NUTRIENTS FOR WHICH THERE ARE NO SPECIFIC RECOMMENDATIONS IN THE 1983 IRISH RECOMMENDED DIETARY ALLOWANCES

4.1 Essential Fatty Acids

Table 27 Essential Fatty Acids - EU Recommendations (1993)		
Adults	% Dietary energy	
	n-6 PUFA	n-3 PUFA
Average requirement	1	0.2
Population reference intake	2	0.5
Lowest threshold intake	0.5	0.1
Pregnancy	As for all adults	
Lactation	As for all adults	
Children		
Age (years)	PRI	
	n-6 PUFA	n-3 PUFA
1-3	3.0	0.5
4-6	2.0	0.5
7-10	2.0	0.5
11-14	2.0	0.5
15-17	2.0	0.5

Level above which concern should be expressed about possible development of metabolic abnormalities:

- n-3 PUFA - 5 % of dietary energy
- n-3 PUFA + n-6 PUFA - 15 % of dietary energy.

4.1.1 Working Group Recommendations

The Working Group recommends the adoption of the EU PRI for essential fatty acids.

4.2 Other Nutrients

Table 28 Other Nutrients

β Carotene and other carotenoids	Pantothenic acid	Biotin	Vitamin K
Magnesium	Phosphorus*	Sodium	Potassium*
Chloride	Copper*	Selenium*	Iodine*
Manganese	Molybdenum	Chromium	Fluoride

* The EU recommendations include figures for these trace elements.

4.2.1 Working Group Recommendations

The Working Group recommends the adoption of the EU PRI for the trace elements - potassium, phosphorous, iodine, copper and selenium for children (1-17 years) and adults in the Irish population.

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