Original Article

Recommended energy and nutrient intakes for Filipinos 2002

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The Food and Nutrition Research Institute (FNRI) of the Department of Science and Technology (DOST), as in the past, led the review and revision of the 1989 Recommended Dietary Allowances (RDAs) for Filipinos, a vital and essential tool recognized in the nutrition and health community as the source of information on recommended energy and nutrient intakes for the maintenance of good health. This set of dietary standards is periodically evaluated and updated to keep pace with new knowledge on energy and nutrient requirements and metabolism. The set of updated standards is now called *Recommended Energy and Nutrient Intakes* (RENIs), defined as levels of intakes of energy and nutrients which, on the basis of current scientific knowledge, are considered adequate for the maintenance of good health and well-being of nearly all healthy Filipinos. As in the 1989 edition, intakes of energy, protein, calcium, phosphorus, iron, iodine, zinc, vitamins A, C, D and E, thiamin, riboflavin, niacin, folate, pyridoxine, water and electrolytes (sodium, potassium, chloride) are recommended in this new edition. The desirable proportions of protein, fats, carbohydrates as well as fiber are also provided, in addition to information on recommended intake levels for selenium, magnesium, manganese, fluoride, cobalamin, and vitamin K. These recommendations were derived from a review of current evidences, principally the UN-FAO/WHO's 2002 human vitamin and mineral requirements and the US-Institute of Medicine-Food and Nutrition Board (IOM-FNB)'s series of Dietary Reference Intakes, taking into consideration applicability in and achievability among specific population groups.

Key Words: Recommended Energy and Nutrient Intakes (RENI), Recommended dietary allowances (RDA), Philippines

INTRODUCTION/BACKGROUND

In the Philippines, Recommended Dietary Allowances (RDAs) for specific nutrients were first formulated in 1941 by the Nutrition Section, Division of Biological Sciences based on the standards of the League of Nations. The next revision was undertaken by the Philippine Association of Nutrition in 1947. Subsequent revisions and expansions of the RDAs carried out in 1953, 1960, 1965, 1970 and 1989 were taken over by the nutrition research agency of the government, now known as the Food and Nutrition Research Institute of the Department of Science and Technology.[1]

Developments after the release of the 1989 edition include: (1) the weight and height standards developed by the FNRI and the Philippine Pediatric Society; and (2) the national nutrition surveys of 1993 and 1998 revealing that: (a) Filipinos are generally heavier and taller than in 1989, (b) that iron, vitamin A, and iodine deficiencies are still of public concern, (c) that there are dietary deficiencies in calories and most nutrients;[2] (d) even if the Philippines may not be considered an affluent country, the prevalence of chronic degenerative diseases such as heart diseases, diabetes mellitus, and cancer is on the rise; and (3) direct studies on protein and riboflavin requirements for all population groups consuming local rice-based diets. In 2000, a Directive was issued to use the International Reference Standards (IRS) for growth assessing the nutritional status of children. In the light of these developments in the local scene, as well as those in the international scene, namely: new data on nutritional requirements, new roles of nutrients, and changes in concepts of health and nutritional adequacy, the FNRI-DOST reviewed and revised the 1989 RDAs for Filipinos.

THE REVIEW AND REVISION PROCESS

As with the 1989 edition, the review and revision was undertaken by the Committee created by the FNRI-DOST which was composed of authorities in the field of nutrition research and education[1] who were invited in their individual capacity as independent experts not as representatives of any organizations. Each Committee Member headed a Task force. A total of 18 professionals form 9 Task Forces (TF) composed the Review Committee.

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Manuscript accepted 16 January 2008.

The Committee Members took charge of inviting other professionals in the field of research and education to be members of their respective TFs. They took charge of the review and revision of recommendations for energy and a specific nutrient or a group of related nutrients. Researchers Specialists from the FNRI-DOST served as Secretariat.

The Secretariat reviewed the available data on energy and nutrient requirements and prepared the state-of-the-art papers which served as the working documents of the TFs in drafting the recommendations. The initial position papers on proposed recommended intake levels for energy and specific nutrients which were prepared by the TFs were then subjected to further review by other groups of experts (External Panel) from government research and policy-making bodies, the academe, various non-governmental organizations and professional organizations, and from the food and drug industries. The recommendations were then presented to a group of stakeholders, and/or users from varied sectors, e.g. agriculture, food industry, health, education, or further comments, before finalization by the Committee.

The conventional method/approach for estimating nutrient requirement and recommendation was used, as follows: 1) Determination of the average requirement of a healthy and representative segment of each population group for energy and the nutrient under consideration. Requirement is defined as the intake level which will meet a specific set of criteria of adequacy; and 2) Assessment of the variability among the individuals within the group. If the distribution of requirement values is not known, a Gaussian distribution is assumed; that is, the mean + 2 standard deviations (SD) to cover 97.5% of the population. If the SD is not known, a value based on physiology related to each nutrient. In most cases, a variation in the range of 10-12.5% is assumed.

For most nutrients, the recommended nutrient intake (RNI) is equal to the average physiologic requirement, corrected for incomplete utilization or dietary nutrient bioavailability, plus 2 SDs, or twice an assumed coefficient of variation (CV), to cover the needs of almost all individuals in the population. In the case of nutrients for which data on minimum requirements are insufficient, the RNI is an "adequate intake" (AI) which is based on the experimentally observed average intake of healthy individuals. For energy, the recommended intake level was set at the estimated average requirement of individuals in a group (no SD). Thus, the recommended intakes for nutrients are set at the top of the distribution of requirements to meet the needs of nearly all individuals in a group, while that for energy is set at the computed average requirement of individuals in that group.

Databases used by the UN-FAO/WHO[3] US-IOM-FNB[4-8] and other foreign organizations were examined, together with other relevant foreign and local studies.

THE 2002 RECOMMENDED ENERGY AND NUTRIENT INTAKES FOR FILIPINOS

The new dietary standard is termed *Recommended Energy and Nutrient Intake or RENI*. The change in terminology was made to emphasize that the standards are in terms of energy and nutrients, and not foods or diets. The RENIs is defined as the "levels of intakes of energy and essential nutrients which, on the basis of *current scientific knowledge*, are considered adequate for the maintenance of health and well-being of nearly all healthy persons in the population".[1] Operationally, the recommended nutrient intake is defined as, that intake level sufficient to meet the daily requirements of most individuals in a specific life-stage and gender group and is based on an estimated requirement plus two standard deviations above the mean. They are recommended intakes estimated to exceed the requirements of most individuals to ensure that the needs of nearly all individuals in the population are met. The recommendations are expressed in terms of usual intakes of nutrients that population groups should consume over a period of time. The recommendations are for apparently healthy populations, that is, those who are not ill based on clinical signs and symptoms and body function, normally assessed by routine laboratory methods and physical evaluation. These intake levels could be met by a diet of a wide variety of foods including fortified foods. Nutrient supplementation may however be needed for the vulnerable groups; for example, iron supplementation which is recognized as the only option to control or prevent anemia in pregnant women.

Population Groupings and Reference Body Weights

The population groupings are essentially the same as in the 1989 RDA edition, except for the cut-off for children, which is now 18 instead of 19 years, consistent with the International Reference Standards (IRS) for growth [9] and the 2002 FAO/WHO Recommended Nutrient Intakes (RNI) for Vitamins and Minerals.

The reference weights for adults, 59 kg for males and 51 kg for females, are the average weights derived from the 1998 Philippine National Nutrition Survey (NNS) data.[2] These are higher by 3 kg and 2 kg, respectively, than the reference weights used in the 1989 edition. The reference weights for adults, aged 19-29 years, are applied to all adult age groups.

The reference weights for infants and children up to 6 years are based on the 50th percentile of the IRS, consistent with the Philippine Department of Agriculture Directive. For older children up to adolescence, the reference weights are set at 90th percentile of the Philippine Reference Standard (PRS). The body weights at the end of adolescence approximate that of young adult population (59 kg for male and 51 kg for female adults) based on the 1998 NNS.[2] The BMIs of children are within the normal cut-offs (P15-P85) relative to the Reference data based on the 1st National Health and Nutrition Examination Survey (NHANES I), USA, using Must cut-offs points

Basis of Recommendations for Energy and Nutrients Included in the RENI 2002 Edition

For most nutrients, the RNIs for infants, from birth to <6 mo are "adequate intakes" derived from the intakes of fully breastfed infants, based on an average daily milk consumption of 750 mL for the first six months multiplied by the nutrient concentration in breast milk. For older infants (6 to <12 mo), the RNI includes the amount of nutrient provided in both breast milk (based on average breast milk consumption of 600 mL) and complementary

foods. Whenever data on the nutrient intake from complementary foods was not available, the recommended intake was extrapolated from the RNI of younger infants or from adult recommendations. Requirements for children were extrapolated from adult values. For children 1-18 y, RNIs for most nutrients were extrapolated from adult values. Additional requirements during pregnancy were based on estimates of amounts laid down in fetal and maternal tissues, while those for lactating women were based on amounts secreted in breast milk. These amounts were then added to the requirements of non-pregnant, non-lactating women.

Because of the scarcity of direct/local studies on nutrient requirements, the Philippine Committee drew heavily from the reports of the FAO/WHO and IOM-FNB and other foreign organizations. The bases of the 2002 energy and nutrient recommendations are as follows:

Energy. The recommendation for infants are based on new estimates derived from total energy expenditure (TEE) by the doubly labeled water (DLW) method, and energy deposition based on rates of protein and fat gains. The recommendations for children are based on an extensive review on energy expenditure, growth and activity patterns of free-living, healthy children and adolescents. Estimation of TEE also considered studies using DLW and heart rate method. Timed-motion observations and activity diaries were used to gather information on the activity patterns and habitual physical activities. For adults, the Oxford equation which included BMR data on tropical people [10] was used rather than the Schofield equation used in the 1985 FAO/WHO/UNU Report.[11]

Protein. The RNIs for children, pregnant and lactating women were based on the 1985 FAO/WHO/UNU [11] estimates for a reference protein (milk), adjusted for protein quality of Filipino rice-based diets of 70% PDCAAS (Protein Digestibility Adjusted Amino Acid Score). The RNIs for adults were based on the average requirement derived from a meta-analysis of nitrogen balance studies among adults from several countries, adjusted for 70% PDCAAS. These intake levels are very close to estimates obtained from direct studies on Filipinos consuming usual diets.[12]

Desirable Contribution of Carbohydrates, Fats, and Protein to Total Dietary Energy.

Carbohydrates	55%-70%
Fats and fatty acids	
Infants	30%-40%
All others	20-30%
Protein	10%-15%

Carbohydrates may contribute 55%-70% of total dietary energy, 70% of which should come from complex carbohydrates and not more than 10% should come from simple sugars. Following IOM and FAO/WHO recommendations, a daily intake of 20-25 g dietary fiber is also suggested.

The recommended fat intake for Filipinos is 20-30% for all age groups, except for infants which is 30%-40% following the FAO/WHO recommendation. The lower limit for adults is slightly higher than the minimum of 15% set by the FAO/WHO to promote absorption of vitamin A which has been found to be generally low in the average Filipino diet. The upper limit is taken as a preventive measure against the risk of cardiovascular disease.

Vitamin A. Requirement was calculated based on amount of dietary vitamin A required to maintain a given body-pool size in well-nourished subjects. The calculation took into account the percent of body vitamin A stores lost per day when ingesting a vitamin A-free diet; minimum acceptable liver vitamin A reserve, liver:body weight ratio; reference weight for specific age group and gender, ratio of total body:liver vitamin A reserves and efficiency of storage of ingested vitamin A. For adults, the RNI is equivalent to the estimated average requirement plus 2SDs.[3] The intake for children was compared with the distribution of intakes and comparable serum vitamin A levels reported for children, 0-6 years of age, from the US and Australia where evidence of VAD is rare.

Vitamin C. The 1989 recommendation was retained based on a local study which determined intake level that maintained "acceptable" serum vitamin C levels among Filipino men and women.

Thiamin. The IOM and FAO/WHO recommendations were adopted, which were both based on the average requirement for adequate-for-normal erythrocyte transketolase (ETK) and urinary thiamin excretion and an assumed CV of 10% to cover the needs of 97.5% of individuals in the group. The IOM and FAO/WHO-derived estimates, adjusted for Philippine reference body weights, are similar to the 1989 RDAs which were based on a local study done in the '60s on 10 adult Filipinos.

Riboflavin. The requirement estimate of the IOM was adopted which was based on the amount of riboflavin intake to maintain riboflavin status at satisfactory erythrocyte glutathione reductase activity (EGR-Ac) level. These intake levels which conforms with the FAO/WHO recommendations, are close to the 1989 recommendation which was based on requirement estimates obtained from Filipino adults consuming the usual rice-based diets.

Niacin. The FAO/WHO and IOM estimates were adopted for Filipinos, which are based on the amount of niacin intake corresponding to an excretion of N'methylnicotinamide that is above the minimal excretion at which deficiency symptoms occur. These values are lower than the 1989 RDA because no correction was made for bioavailability. The US FNB reported that the bioavailability of niacin is not considered in setting the RDA because of the "lack of data on which to base the correction value".

Folate. The FAO/WHO and IOM recommendations were adopted for Filipinos. The requirement estimates of these two organizations were derived from the amount of folate

that will maintain adequate folate status based on erythrocyte folate and plasma homocysteine levels. To meet the new much higher recommendations, higher intakes of vegetables and fruits, which are among the best of folate sources, are recommended.

Calcium. The FAO/WHO Recommended Nutrient Intake (RNI) which was adopted for Filipinos was based on intake at which excreted calcium equals net absorbed calcium. The FAO/WHO RNIs also provide hypothetical allowances based on reduction in theoretical calcium requirement with animal protein restriction, for possible application to nations where the animal protein intake per capita is around 20-40 g only, compared to 60-80 g in developed counties. These allowances took into account the need to protect children, in whom skeletal needs are much more important determinants of calcium requirement than are urinary losses and in whom calcium supplementation was found to have a beneficial effect on Gambian children accustomed to low calcium intakes.

Iron. The needs for iron is based on the amount of dietary iron needed to meet absorbed-iron requirements. This would correspond to the amount needed to cover basal losses plus growth for children and menstrual losses for women of reproductive age, adjusted for bioavailablity of iron in typical complete meals consumed by population groups being studied. The Philippine RNI for iron was based on FAO/WHO estimates for basal losses, and on local data on menstrual losses and on bioavailability, based on iron absorption rates in the average Filipino diets from food consumption surveys and from in-vitro studies on non-heme iron availability from rice-based diets. Iron supplementation is recommended to meet the needs of pregnant and lactating women. The estimated iron requirement during the first trimester of pregnancy and the first six months of lactation are lower, but the recommended intake for non-pregnant non-lactating women was adopted to allow for build-up of iron stores.

Iodine. The FAO/WHO recommendation for iodine which concurs with the IOM was adopted. The recommended intake level for adults corresponds to the intake necessary to maintain the plasma iodide level above the critical level likely to be associated with the onset of goiter. It corresponds to a urinary iodine excretion of 100 µg/L, which in turn is associated with normal thyroid function.

While local data on food composition, deficiency problems, or roles in chronic degenerative diseases, and direct studies on requirements and nutrient-nutrient interrelationship are not available for vitamins D, E, K, B_6 and B_{12}, and the following minerals: magnesium, phosphorus, zinc, selenium, fluoride and manganese, foreign literature is replete with information on their essentiality and data on requirements and/or adequate intakes are available. Recommendations of IOM-FNB (1997-2002)[4-8] and the FAO/WHO (2002)[3] are adopted as guidelines for these nutrients.

The recommended intake levels for energy and nutrients are summarized in Tables 1 and 2.

Water and electrolytes. Although water and the principal electrolytes (sodium, potassium, and chloride) are often excluded from lists of nutrients, these substances are essential dietary components in that they must be acquired from the diet either exclusively or, in the case of water, in amounts well in excess of that produced by metabolism in the body. Sodium, potassium and chloride are among the factors that are essential to maintain acid-base balance and osmotic equilibrium in the body.

The recommended water requirement for adults under average conditions of energy expenditure and environmental exposure is 1mL/ kcal of energy expenditure. It is

Table 1. Recommended energy and nutrient intakes per day

Population group	Weight kg	Energy kcal	Protein g	Vitamin A µg RE	Vitamin C mg	Thiamin mg	Riboflavin mg	Niacin mg NE	Folate µg DFE	Calcium mg	Iron mg	Iodine µg
Infants, mos												
Birth - < 6	6	560	9	375	30	0.2	0.3	1.5	65	200	0.38	90
6 - < 12	9	720	14	400	30	0.4	0.4	4	80	400	10	90
Children, y												
1 – 3	13	1070	28	400	30	0.5	0.5	6	160	500	8	90
4 – 6	19	1410	38	400	30	0.6	0.6	7	200	550	9	90
7 – 9	24	1600	43	400	35	0.7	0.7	9	300	700	11	120
Males, y												
10 – 12	34	2140	54	400	45	0.9	1.0	12	400	1000	13	120
13 – 15	50	2800	71	550	65	1.2	1.3	16	400	1000	20	150
16 – 18	58	2840	73	600	75	1.4	1.5	16	400	1000	14	150
19 – 29	59	2490	67	550	75	1.2	1.3	16	400	750	12	150
30 – 49	59	2420	67	550	75	1.2	1.3	16	400	750	12	150
50 – 64	59	2170	67	550	75	1.2	1.3	16	400	750	12	150
65 +	59	1890	67	550	75	1.2	1.3	16	400	800	12	150
Females, y												
10 – 12	35	1920	49	400	45	0.9	0.9	12	400	1000	19	120
13 – 15	49	2250	63	450	65	1.0	1.0	14	400	1000	21	150
16 – 18	50	2050	59	450	70	1.1	1.1	14	400	1000	27	150
19 – 29	51	1860	58	500	70	1.1	1.1	14	400	750	27	150
30 – 49	51	1810	58	500	70	1.1	1.1	14	400	750	27	150
50 – 64	51	1620	58	500	70	1.1	1.1	14	400	800	27	150
65 +	51	1410	58	500	70	1.1	1.1	14	400	800	10	150
Pregnant women												
Trimester												
First			66	800	80	1.4	1.7	18	600	800	27	200
Second		+300	66	800	80	1.4	1.7	18	600	800	34	200
Third		+300	66	800	80	1.4	1.7	18	600	800	38	200
Lactating women												
1st 6mos.		+500	81	900	105	1.5	1.7	17	500	750	27	200
2nd 6 mos		+500	76	900	100	1.5	1.7	17	500	750	30	200

Table 2. Recommended daily intakes for other minerals and vitamins

Population group	Weight	MINERALS						VITAMINS				
		Magnesium	Phosphorus	Zinc	Selenium	Fluoride	Manganese	D	E*	K	B_6	B_{12}
	kg	mg	mg	mg	μg	mg	mg	μg	mg	μg	mg	μg
Infants, mos												
Birth - < 6	6	26	90	1.4	6	0.01	0.003	5	3	6	0.1	0.3
6 - < 12	9	54	275	4.2	10	0.5	0.6	5	4	9	0.3	0.4
Children, y												
1 – 3	13	65	460	4.5	18	0.7	1.2	5	5	13	0.5	0.9
4 – 6	19	76	500	5.4	22	1.0	1.5	5	6	19	0.6	1.2
7 – 9	24	100	500	5.4	20	1.2	1.7	5	7	24	1.0	1.8
Males, y												
10 – 12	34	155	1250	6.8	21	1.7	1.9	5	10	34	1.3	2.4
13 – 15	50	225	1250	9.0	31	2.5	2.2	5	12	50	1.3	2.4
16 – 18	58	260	1250	8.9	36	2.9	2.2	5	13	58	1.3	2.4
19 – 29	59	235	700	6.4	31	3.0	2.3	5	12	59	1.3	2.4
30 – 49	59	235	700	6.4	31	3.0	2.3	5	12	59	1.3	2.4
50 – 64	59	235	700	6.4	31	3.0	2.3	10	12	59	1.7	2.4
65 +	59	235	700	6.4	31	3.0	2.3	15	12	59	1.7	2.4
Females, y												
10 – 12	35	160	1250	6.0	21	1.8	1.6	5	11	35	1.2	2.4
13 – 15	49	220	1250	7.9	31	2.5	1.6	5	12	49	1.2	2.4
16 – 18	50	240	1250	7.0	36	2.5	1.6	5	12	50	1.2	2.4
19 – 29	51	205	700	4.5	31	2.5	1.8	5	12	51	1.3	2.4
30 – 49	51	205	700	4.5	31	2.5	1.8	5	12	51	1.3	2.4
50 – 64	51	205	700	4.5	31	2.5	1.8	10	12	51	1.5	2.4
65 +	51	205	700	4.5	31	2.5	1.8	15	12	51	1.5	2.4
Pregnant women												
Trimester												
First		205	700	5.1	35	2.5	2.0	5	12	51	1.9	2.6
Second		205	700	6.6	35	2.5	2.0	5	12	51	1.9	2.6
Third		205	700	9.6	35	2.5	2.0	5	12	51	1.9	2.6
Lactating women												
1st 6mos.		250	700	11.5	40	2.5	2.6	5	16	51	2.0	2.8
2nd 6 mos		250	700	11.5	40	2.5	2.6	5	16	51	2.0	2.8

* α- tocopherol

often increased to 1.5 mL/kcal to cover variations in activity level, sweating, and solute load. Thirst is normally a good indicator of the amount of extra water needed to meet the daily requirement, except for older persons whose thirst mechanism may be impaired. For infants, 1.5 mL/kcal of energy expenditure is recommended and this corresponds to the water-to-energy ratio in human milk and has been established as a satisfactory level for the growing infant.

Uses and Applications

The RENIs are meant to serve the following purposes and applications:

- Goals for energy and nutrient intakes of groups and nutrient intakes of individuals. The goal for the energy intake of an individual should be based on the individual's body weight since the recommended energy intake is for a specified reference weight.
- Reference standards for the assessment of the habitual energy and nutrient intakes of the population or population sub-groups. When used for this purpose, the percentage of individuals with habitual intakes below the RNI should be estimated. As this percentage increases, so does the likelihood that the group is inadequately provided for. The comparison of intakes with RDA is a statement of risk of inadequacy that is, the chance that the intake is inadequate to meet the actual requirement. It is a probability statement and is not a measure of severity of inadequacy.
- Goals for agricultural production. Targets should be set at levels higher than the RENIs to allow for unequal distribution of the food supply.
- Reference standards for assessment of the adequacy of food supplies.
- Basis for public health and food and nutrition policies, e.g., on food importation, food fortification, food and nutrition labeling, supplementation programs
- Tool for nutrition education and advocacy.

TRANSLATIONS OF RENIs INTO NUTRITIONAL GUIDELINES, FOOD GUIDES, POLICIES AND PROGRAMS

Good health begins with good nutrition and good nutrition starts with a diet that provides the necessary levels of energy and essential nutrients. The RENI 2002 is the nutrient–based dietary standard recognized in the Philippine nutrition and health community as the source of information on recommended intakes of energy and nutrient for the maintenance of good health. It has become integral to food and nutrition policy that it is difficult to conceive of planning a food program or changing a nutrition policy without considering how either would affect the population's dietary intakes expressed in relation to RDAs.

The RENIs however deal with individual nutrients, the invisible molecular constituents of diet. The further translation of RENIs into foods/food guides, like the pyramid, which explain how persons can consume adequate nutrients in terms of foods that consumers can buy, cook and eat, will be most useful for health professionals, the food industry and consumers.

The RENIs serve as basis for promoting (and updating) Nutritional Guidelines. The 2002 recommendations for calcium, folate, and iodine are much higher than the 1989 RDA. Strategies to meet the higher recommendations must be developed to achieve sufficient intakes among the population, such as food fortification and enrichment programs and promotion of consumption of milk and other foods rich in these nutrients. There are now several

fortified or enriched products in the market. The promotion to increase consumption of milk and milk products which are rich in calcium, and vitamin A and riboflavin, which are still inadequate in our usual diets, must be matched by efforts to increase available milk supply and to improve access to milk by a significant segment of the population. The RNIs for iron are higher for Filipinos than for most Western population groups because of the low bioavailability of iron in the average Filipino diet. The recommended intake levels for iron may be lowered by an overall improvement in dietary quality such as inclusion of sources of vitamin C and heme iron (e.g. animal products) at every meal. Dietary sources of vitamin C are readily available but intake is determined by food selection. The promotion to increase the consumption of green leafy vegetables, yellow fruits and vegetables, milk and eggs, found to be low in the Filipino diet based on national nutrition survey results, can materially increase intakes of the nutrients which are generally limiting in the Filipino diets. In several areas in the Philippines identified as endemic for IDD, the only reliable sources of iodine are fortified foods (iodized salt) and supplements. While food fortification and supplementation initiatives have been undertaken by the government, there is a need for a more vigorous and rigorous implementation of these programs than presently accomplished to meet the higher requirements for iodine.

AUTHOR DISCLOSURES

Corazon VC Barba and Ma Isabel Z Cabrera, no conflicts of interest.

REFERENCES

1. Food and Nutrition Research Institute, Department of Science and Technology (FNRI-DOST). 2002. Recommended Energy and Nutrient Intakes. Philippines, 2002 Edition.
2. Food and Nutrition Research Institute, Department of Science and Technology (FNRI-DOST). 2001. Philippine Nutrition Facts and Figures. Philippines.
3. Food and Agriculture Organization/World Health Organization (FAO/WHO). Human vitamin and mineral requirements. Report of a joint FAO/WHO expert consultation. FAO/WHO. 2002
4. Institute of Medicine, Food and Nutrition Board (IOM_FNB). 1997. Dietary Reference Intakes for Calcium, Phosphorus, Magnesium, Vitamin D, and Fluoride. National Academy of Sciences, Washington, DC.
5. Institute of Medicine, Food and Nutrition Board (IOM_FNB). 1998. Dietary Reference Intakes for Thiamin, Riboflavin, Niacin, Vitamin B6, Folate, Vitamin B 12, Pantothenic Acid, Biotin, and Choline. National Academy of Sciences, Washington, DC.
6. Institute of Medicine, Food and Nutrition Board (IOM_FNB). 2000. Dietary Reference Intakes for Vitamin C, Vitamin E, Selenium and Carotenoids. National Academy of Sciences, Washington, DC.
7. Institute of Medicine, Food and Nutrition Board (IOM_FNB). 2001. Dietary Reference Intakes for Vitamin A, Vitamin K, Arsenic, Boron, Chromium, Copper, Iodine, Iron, Manganese, Molybdenum, Nickel, Silicon, Vanadium, and Zinc. National Academy of Sciences, Washington, DC.
8. Institute of Medicine, Food and Nutrition Board (IOM_FNB). 2002. Dietary Reference Intakes for Energy, Carbohydrates, Fiber, Fat, Fatty Acids (Macronutrients). National Academy of Sciences, Washington, DC.
9. WHO. 1983. Measuring Changes in Nutritional Status, Guidelines for Assessing the Nutritional Impact of Supplementary Feeding Programmes for Vulnerable Groups. World Health Organizations, Geneva.
10. Henry, CJ. Basal metabolic rates in humans: Measurement and applications. Working draft prepared for the FAO/WHO/UNU Working Grroup on Energy and Protein in Human Nutrition. June 27-July5, 2001. (With permission).
11. Food and Agriculture Organization/Word Health Organization/United Nations University (FAO/WHO/UNU). 1985. Energy and Protein Requirements. Joint FAO/WHO/UNU Expert Consultation. WHO TRS No. 724. Geneva: FAO.
12. Intengan, CL. 1984. Long-term protein requirements of adult Filipinos consuming local diets. In: Rand, WM, Uauy, R and Scrimshaw, NS (ed). Protein and Energy Requirement Studies In Developing Countries: Results of International Research. UNU Food Nutr Bull Supplement 10.