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ANTHROPOMETRIC INDICATORS

- Use and interpretation of anthropometric indicators
- Global surveillance
- References

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Use and interpretation of anthropometric indicators of nutritional status*

WHO WORKING GROUP[1]

Studies carried out during the last decade have led to a better understanding of the value of anthropometric indicators of nutritional status. The present report concentrates on data concerning 0–5-year-old children and examines the indices of weight and height and the biological significance of "wasting" and "stunting". The need for a reference population as well as for a standard or target is recognized and the advantages and disadvantages of local versus international reference populations are discussed. In the analysis of data, preference is given to the use of standard deviation (SD) scores and to the presentation of whole distributions. Cut-offs, for example −2SD, are needed for comparison of prevalences and for screening of populations. Sequential or serial measurements and the increasing use of growth velocities are discussed and their uses and difficulties are outlined.

INTRODUCTION

It is widely accepted that for practical purposes anthropometry is the most useful tool for assessing the nutritional status of children. Admittedly almost any illness will impair a child's growth, but in practice in developing countries growth deficits are caused by two preventable factors, inadequate food and infections. In general, infections influence body size and growth through their effects on metabolism and nutrition. The classical use of anthropometry as the most readily available method of assessing nutritional status is therefore logical although other methods, such as biochemical and immunological tests, are being increasingly used in clinical practice. However, a deficit in growth is not necessarily the most sensitive indicator of inadequate nutrition; for example, a marginally inadequate energy intake may cause a reduction in physical activity before there is any impairment of growth (*1*). It is also recognized that the extent to which genetic factors, both within and between populations, may affect growth cannot be ignored. With these caveats, we may continue to accept the central role of anthropometry in nutritional assessment, particularly of children in groups or communities.

At first sight the assessment of nutritional status by anthropometry may seem to be a simple matter, in which the main constraints are practical, such as the availability of equipment and personnel and, in many cases, the difficulty of reaching the sample to be covered. However, anthropometric data are collected in order to be used, and experience shows that, in addition to the problems of data collection, there are important considerations in the presentation, analysis and interpretation of the data.

* This article is based on the report of a WHO Working Group on the Purpose, Use and Interpretation of Anthropometric Indicators of Nutritional Status, which met in Geneva, Switzerland, on 12–14 October 1983. Requests for reprints should be addressed to Chief, Nutrition Unit, World Health Organization, 1211 Geneva 27, Switzerland.

[1] The members of the Working Group are listed on p. 939.

In a 1977 report on this subject (*2*), the following proposals were made:

(1) Anthropometric measurements should be reported in relation to international reference values. For this purpose it was recommended that the reference population defined by the US National Center for Health Statistics (NCHS) should be used (*3*), a recommendation subsequently endorsed by WHO (*4*).

(2) The basic data are age, sex, weight and height. In most circumstances separate indices should be constructed of weight-for-height and height-for-age, in addition to or in place of the classical index, weight-for-age.

(3) For statistical reasons, measurements of a study population should be related to the reference population by standard deviation scores (Z-scores) rather than as a percentage of the median of the reference, which had been the general practice up to that time.

(4) All anthropometric data on children should be presented for separate age groups; recommendations were made about appropriate age ranges.

Most workers seem to have accepted these proposals in principle, if not always in practice, and there does not seem to be any need to modify them. However, experience since 1977 in making use of the results of anthropometric surveys has revealed a number of problems which were not considered in the earlier report (*2*). Anthropometric assessment is useful in many different contexts, ranging from national planning to the identification of individuals at risk. Depending on the purpose there will be differences in the measurements that are most useful, in the indices and indicators that are most appropriate, and in the method for presenting the findings. There will also be differences in the practical constraints on data collection and analysis. Some examples of the choices that may be appropriate in particular situations are discussed below in more detail (see pp. 936–937).

The object of this paper is to discuss some principles based on the experience gained in the last few years. Just as the 1977 report (*2*) laid the groundwork for the WHO manual *Measuring change in nutritional status* (*4*), so it is hoped that this present paper will form the basis of another text for practical use. As before, we have considered only the three basic measurements — age, weight and height — in assessing the nutritional status of children. No attempt is made here to discuss the usefulness of other measurements, such as skinfold thickness, mid-arm circumference (AC) or head circumference (HC). As has often been pointed out, skinfold thickness gives information about body composition which is additional to that given by weight. On the other hand, AC and HC measurements are generally regarded as proxies for weight and height. Their usefulness in particular situations is largely determined by practical considerations. It is also outside the scope of this paper to examine in detail the use of anthropometric measurements to assess the nutritional status of subjects other than children. However, some problems in the assessment of adolescents, adults and pregnant women are identified below (see pp. 937–939) for further study.

TERMINOLOGY

Frequent utilization of the terms *measurements*, *indices* and *indicators* in this text makes it useful to be able to distinguish between them:

— The basic *measurements* to be considered are age, weight and height.

— *Indices* are combinations of measurements. Thus, it is evident that a value for weight alone has no meaning unless it is related to age or height. Indices have two functions: they are necessary for the interpretation of measurements and for grouping them. They may take different forms; for example, the relationship of weight to height may be expressed arithmetically, e.g., by the Body Mass Index (BMI) of Quetelet (Wt/Ht^2), or by relating the weight to that of a reference subject of the same height.

— The term *indicator* relates to the use or application of indices and the indicator is often constructed from them. Thus the proportion of children below a certain level of weight-for-age is widely used as an indicator of community status. Sometimes an index and an indicator may be the same. For example, the infant mortality rate is an index (ratio of deaths to births), but it is also used as an indicator of the state of public health.

An index may be thought of as a biological concept; one can usefully discuss the different biological meanings of indices such as weight-for-height and height-for-age (see below, p. 932). An indicator would represent a social concept; one can discuss its value, e.g., its sensitivity and specificity, for a particular application. These distinctions, although apparently academic, may sometimes avoid confusion. Other terms will be defined, as needed, throughout the text.

BIOLOGICAL SIGNIFICANCE OF INDICES OF WEIGHT AND HEIGHT

When it began to be recognized that it may be important to distinguish between deficits in weight-for-height and in height-for-age (*2*, *11–13*), it was necessary to find names to describe these two deficits

and the processes which cause them. The words "wasting" and "stunting" were proposed, as they are purely descriptive of what is observed (*12*).

Other words which could fulfil the same function and which are more readily translated are thinness (for wasting) and shortness (for stunting). Terms such as "acute" malnutrition (for wasting), "chronic" malnutrition (for stunting) and "acute-on-chronic" for the combination of wasting plus stunting, are not direct observations but deductions which may not always be correct. In particular, the word "chronic" is unsatisfactory, because it is sometimes used to mean "long continuing", at other times to mean "a residue of the past". (It may be noted that strictly speaking in the English language, "wasting" and "stunting" represent processes, while "wasted" and "stunted" represent end-results, determined according to the criteria defined below.)

Wasting indicates a deficit in tissue and fat mass compared with the amount expected in a child of the same height or length, and may result either from failure to gain weight or from actual weight loss. It may be precipitated by infection or some other household crisis and usually occurs in situations where the family food supply is limited and the food intake of children is low. The determinants will differ in different environments. Very often there are seasonal episodes of wasting, related to variations either in food supply or in disease prevalence. One of the main characteristics of wasting is that it can develop very rapidly, and under favourable conditions can be restored rapidly (*14*).

Stunting signifies slowing in skeletal growth. The growth rate may be reduced from birth, but a significant degree of stunting, representing the accumulated consequences of retarded growth, may not be evident for some years. Stunting is frequently found to be associated with poor overall economic conditions, especially mild to moderate, chronic or repeated infections, as well as inadequate nutrient intake.

There are several obvious biological differences between wasting and stunting. In the first place, one can fail to gain height but one cannot lose it. Secondly, linear growth is a slower process than growth in body mass. A child should treble its weight in the first year, but only double its height; in consequence, a significant degree of stunting takes longer to be established. Thirdly, although catch-up in height undoubtedly can occur, as shown by the effects of treatment in severely stunted children with coeliac disease (*15*), it takes a relatively long time even with a favourable environment.

Wasting and stunting are frequently combined; nevertheless, analysis of a number of representative population groups shows no statistically significant association (*16*). The two deficits show different patterns at different ages and in different populations (*17*). The prevalence of wasting is greatest between 12 and 24 months of age, when dietary deficiencies are common and diarrhoeal diseases more frequent, and tends to decrease later on. By contrast, the prevalence of stunting increases over time up to the age of 24 or 36 months and then shows a tendency to level off.

It follows from these age-related differences in prevalence that, as pointed out earlier, for the proper interpretation of surveys on children, the results should be analysed separately according to age. Useful age ranges were provided in the 1977 report (*2*). Since, as pointed out above, wasting may be established and restored quite rapidly, the *prevalence* of wasting at one point of time may be a reasonable indicator of the *incidence* of the process that is causing weight deficit. However, this is certainly not the case for stunting. Thus, it is totally incorrect to suppose that because the prevalence of stunting in a population of children is greater at 4 years than at 2 years, more 4-year-old children are "malnourished". The prevalence is greater simply because the process of retardation has been going on for a longer time (*18*).

There are not only age-related differences in the prevalence of wasting and stunting, but also differences in geographical distribution. In some groups there is a relatively high prevalence of wasting with a relatively low prevalence of stunting, whereas in other areas the opposite is found (*17*, *19*). For these comparisons prevalences were derived from the proportion of children below the conventional cut-off points of $-2SD$, or 80% of the reference median weight-for-height and 90% of the reference median height-for-age. Studies of this kind show, for example, marked differences between Asia and Latin America, wasting being much commoner in Asian populations.

It seems clear, therefore, on biological, epidemiological and statistical grounds, that wasting and stunting represent different processes of malnutrition. More information is needed on the determinants of the two processes and the relative effectiveness of given interventions for their prevention and treatment. Particularly important questions deal with the functional implications of stunting and its eventual reversibility. A detailed examination of stunted growth by velocity data may provide a better understanding of the process.

Experience will show how far the distinction between wasting and stunting is of practical importance. For the evaluation of nutritional and health interventions it is clearly essential, because of differences in the responsiveness of the two indicators. For long-range planning, the distinction may not be so important (*20*).

It has been shown that weight-for-height and height-for-age together account for more than 95% of the variance in weight-for-age (*16*). This means that weight-for-age represents the sum of the information given by the other two indices. For this very reason it may remain an appropriate index only for certain applications (see below, pp. 936-937).

USE OF THE NCHS POPULATION AS A STANDARD

Discussion has continued in recent years on whether or not it is necessary and appropriate to utilize an international reference (*5-7*). In analysing this question, it is important to distinguish between a *reference* and a *standard*.

A *reference* is a device for grouping and analysing data. Thus the average weight of a group of children has no meaning unless they happen to be exactly the same age, whereas the average value of the index "weight-for-age" does have meaning. For the construction of such an index a reference population is necessary. In principle, it does not matter what set of reference data is used, provided that it is large enough to contain adequate statistical information and the population is reasonably healthy and well-nourished to avoid major distortions. It is also clearly desirable, for comparative purposes, that there should be a common reference. These principles underlay the recommendation, which was made in 1977 (*2*) and subsequently endorsed by WHO (*8*), to adopt the NCHS population as a reference for international use.

A *standard* embodies the concept of a norm or target—that is, a value judgement. It is this concept that has led to difficulty, since the international reference is widely used also as a standard. The justification for this usage is the evidence collected by Habicht and others (*5, 7*) that in populations the effect of ethnic differences on the growth of young children is small compared with the effects of the environment. It is accepted that there may be some ethnic differences between groups, just as there are genetic differences between individuals, but for practical purposes they are not considered large enough to invalidate the general use of the NCHS population both as reference and as a standard. This judgement has been endorsed in the report of a recent FAO/WHO/UNU Expert Consultation (*9*).

There are, however, circumstances in which this usage is felt to be inappropriate and in which local standards are preferred. As a matter of principle, those who are concerned with planning in a particular country may find it unacceptable to base their targets on the characteristics of an alien population. In countries where growth failure in children is widespread and severe, such targets would be unrealistic and unattainable and therefore serve as a hindrance to practical planning.

A realistic target or local "norm" could be set by shifting the international reference downwards. This approach is acceptable if it means simply altering the target, so that, for example, the stated aim would be for the mean height of children to be within 95% rather than 100% of the international reference. It is not acceptable if it means that in the calculation of height-for-age the expected height is taken as 95% of the reference median rather than 100%. When that is done, it is not possible to use the centiles and standard deviations of the reference population, so that the statistical value of the reference is lost.

It is necessary to distinguish between two types of local standards: that derived from an elite, presumably well-nourished group and that which represents the average of the population. A disadvantage of the former is that often an elite group may not be ethnically representative of the population as a whole. Where elite standards have been established in some cases (e.g., Colombia, Mexico, Brazil), they differ little from the NCHS reference. Local standards which represent an average of the population rather than an elite are only useful for identifying groups or individuals who differ from the rest of the population and who may therefore constitute priority targets for intervention. However, many developing countries are experiencing secular trends of increasing weight and height (*10*), making it necessary to update local population-average references after several years. The development of statistically valid national reference values is costly and often beset with logistic problems, particularly in a very large country such as India. There appear to be no major advantages to offset these drawbacks, and therefore the establishment of local or national reference values is not an urgent priority.

ANALYSIS AND PRESENTATION OF DATA

There are two approaches to the analysis and presentation of data. The first describes the whole distribution; the second provides an estimate of the number or proportion outside the reference distribution. The approaches are complementary and the purpose will determine which is preferred, as discussed in more detail below (pp. 936-937). This type of choice exists in many fields of public health nutrition, and is succinctly described as the choice between shifting the distribution and truncating it.

Whichever approach is to be used, there is then, as discussed in the 1977 report (*2*), a choice of three ways in which each observed measurement can be

related to the reference: by its position within the centile distribution of the reference; as a standard deviation score (Z-score); or as a percentage of the reference median.

Descriptions of the whole distribution

Fig. 1 is an example of how the distribution of the total population may be represented in *centiles*. The figure is drawn from an actual study and illustrates how a change in the distribution, as the result of an intervention, can be visualized very easily. Statistical methods, such as the chi-square test, can be used for comparing these distributions. However, problems in using centiles for cut-off points are discussed later.

The presentation and statistical treatment of the numbers is the same, whether they represent *Z-scores* or *percentages of the reference median*. The simplest descriptor of the whole distribution is the mean Z-score with the SD, or the mean percentage of the reference median with the SD. Standard statistical tests can be applied to these numbers.[a]

A method of representing the whole distribution, which has been useful in population studies, is to construct a cumulative distribution curve and calculate its slope (Fig. 2). The slopes found for different populations and the position of the curve can then be compared, along with the median Z-scores. However, it is unclear just how much of the cumulative distribution slope can be explained by measurement variability.

It appears that the best way of giving a complete picture of the whole distribution which can be compared with that of the reference population is a frequency curve or histogram of Z-scores (Fig. 3). The first step in constructing such a distribution curve would be tabulation of the data in the form shown in Table 1, which can be done for any age group, with any index. The size of the interval used for grouping the data, e.g., 0.5 or 1.0 Z-score unit, will depend on the number of measurements available, the facilities for analysing them, and the extent to which fine grouping is likely to be of practical value. For percentage of the median, the distribution curve is not practical because the data for the reference population are

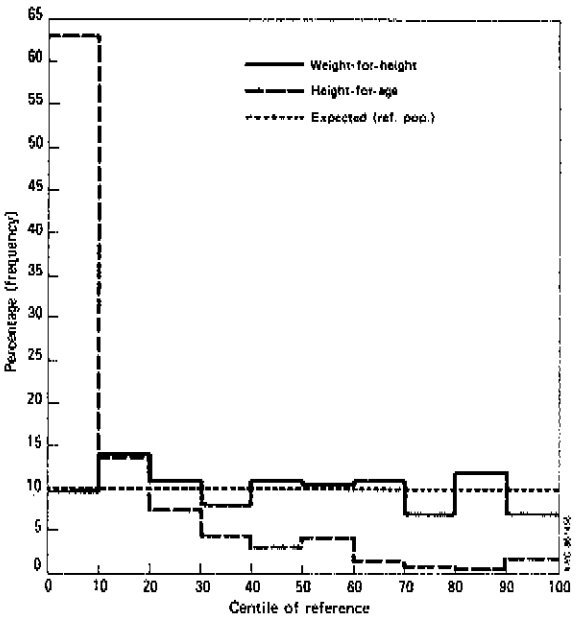

Fig. 1. Centile distribution of weight-for-height and height-for-age.

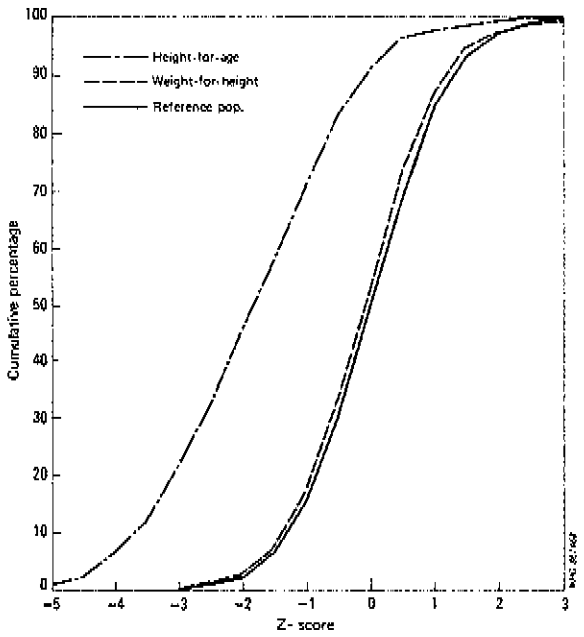

Fig. 2. Cumulative distribution curves of Z-scores, the weight-for-height and height-for-age values are for a population that is stunted but not wasted.

[a] Concern has been expressed about the application of statistical tests when the distribution is skewed. In most populations the distribution of height-for-age is approximately normal (Gaussian), whereas the distributions of weight-for-age and weight-for-height are skewed. In most groups from developing countries the distribution is less skewed than that of the reference population, because the latter contains more overweight children. Therefore, in constructing the NCHS reference tables (*3*) the population was divided into two halves at the median, and standard deviations calculated separately for each half. Since both observed and reference populations are skewed, relating one to the other will reduce the effect of skewness. Standard statistical tests based on the assumption of a normal distribution can then be applied to the values so derived.

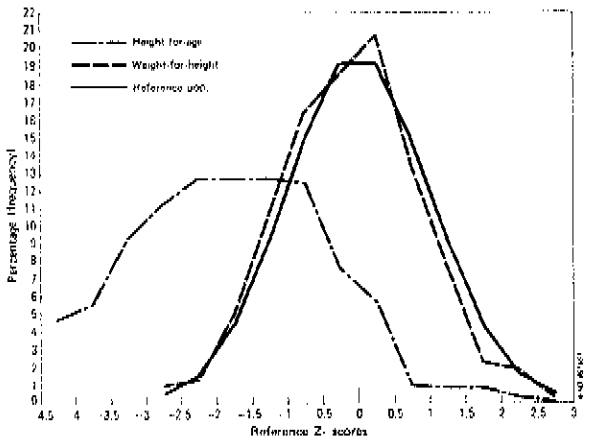

Fig. 3. Distribution curves of weight-for-height and height-for-age in relation to reference Z-scores.

age-dependent when expressed in these terms and are not readily available.

Definition of the number at risk and choice of cut-off points

For many purposes the most useful way of describing the nutritional situation is to present an estimate of the number or proportion who might be considered at risk. In principle such an estimate is given by the number outside the reference population. In practice it is conventional to use cut-off points, which are *indicators*, in the sense defined above; for example, the number below the 3rd centile; the number with Z-scores less than −2SD; or the number with weight-for-height less than 80% of the median. With centiles and Z-scores it is an advantage that the same cut-off can be used for both weight and height, whereas with percentage of the median the cut-offs are necessarily different.

The disadvantage of using centiles for cut-offs is that the number at extreme degrees of risk cannot be quantified, since centiles below the 3rd or above the 97th cannot be defined from the reference population except by back-calculation from the standard deviations.

It is in the choice of cut-offs that the difference between Z-scores and percentage of the median becomes particularly important. For example, in one survey of weight-for-height of children between 1 and 2 years old, 27% had Z-scores of −2 or below, whereas only 15% were below 80% of the reference median (*17*). This discrepancy cannot be eliminated simply by adjusting one or the other cut-off, because the coefficient of measurement variation varies with age. By definition, Z-score cut-offs take this into account, percentage of the median cut-offs do not.

Two objections have been made to the use of fixed cut-off points such as those cited above. The first is that at best they represent a purely statistical separ-

Table 1. Anthropometric data on the distribution of Z-scores in a sample population, used for constructing the distributions in Fig. 1 and 3; the reference distribution in column 4 is a normal distribution, by definition

Z-score range	Sample population distribution		Reference distribution (all indices and age groups) (%)
	Weight-for-height of 2-year-olds (%)	Height-for-age of 2-year-olds (%)	
5.49 to 5.0		0.8	
4.99 to 4.5		1.3	
−4.49 to −4.0		4.7	
−3.99 to −3.5		5.5	
−3.49 to −3.0	0.0	9.4	0.1
−2.99 to −2.5	1.0	11.2	0.5
−2.49 to −2.0	1.3	12.8	1.7
−1.99 to −1.5	5.0	12.8	4.4
−1.49 to −1.0	10.7	12.8	9.2
−0.99 to −0.5	16.4	12.5	15.0
−0.49 to 0	18.6	7.6	19.1
0.01 to 0.5	20.8	5.7	19.1
0.51 to 1.0	13.5	1.0	15.0
1.01 to 1.5	7.6	0.8	9.2
1.51 to 2.0	2.3	0.8	4.4
2.01 to 2.5	1.8	0.3	1.7
2.51 to 3.0	0.3	0.0	0.5
3.01 to 3.5	0.0	0.0	0.1

ation of "malnourished" from "normal". Ideally, cut-off points should be based on biological considerations, such as increased risk of mortality or of functional impairment. The cut-off should distinguish a deficit that matters from one that is of no real significance. This is a valid objection, but the practical problems of establishing a relation to risk are very great. Prospective studies of mortality, such as those of Chen and co-workers in Bangladesh (*29*), make it possible to determine the predictive value of different indices and to define the cut-off points which produce the optimum combination of sensitivity and specificity (*30–32*). However, death is not the only outcome which needs to be considered, and even for this particular outcome the results almost certainly cannot be generalized from one region to another. The quantitative relation between mortality risk and anthropometric deficit will vary, among other things, with infectious load. It also varies with age, a given deficit carrying greater risk in younger children (*33*).

The second objection is that the conventional cut-off of −2SD or its equivalent may be unrealistic and of limited use in practice. Thus, in an emergency situation where resources are restricted a lower cut-off point might have to be used to identify the children most in need, i.e., an increase in specificity at the expense of sensitivity (*20, 30, 31*). Again, if 60% of children in a particular country are described as significantly stunted, because they are below −2SD in height-for-age, this cut-off would defeat one of the aims of concentrating on the tails of the distribution, which is to identify those particularly and exceptionally at risk. In this case, if one wants to determine which children are most severely stunted, a lower cut-off point could be used.

Cut-offs should be chosen at the point most appropriate for the particular purpose in view, the reasons for choice being clearly stated. For most group or population comparisons, where uniformity is important, the standard statistical cut-off points of ±2SD from the mean should be maintained (*17*). In order to utilize a single method of relating measurements to the reference, it would also be necessary to use Z-scores in the presentation of whole distributions (Fig. 3). This is in accordance with the 1977 report (*2*), which recommended the use of Z-scores to express both distributions and cut-off points because they have a statistical meaning. Since then, WHO has also recommended to Member countries (*8*) the use of Z-scores for monitoring nutrition and health progress.

SEQUENTIAL OR LONGITUDINAL MEASUREMENTS

When serial measurements are made, the *velocity* of weight or height gain can be calculated. The significance of a change in weight or height clearly depends on the time over which that change is observed. Failure to gain weight over 3 days has a different significance from failure to gain weight over 3 months. Therefore when velocities are reported, it is important to indicate the time over which they are measured. Different time intervals will be appropriate in different situations; it will depend on the age of the children, whether weight or height gain is the main object of interest, and whether the process being studied is of short or long duration. The smaller time intervals will have the greatest error. These points must be taken into account at the time when a sequential or longitudinal study is being planned.

Accurate estimates of velocity require that the same children should be examined at defined intervals. Longitudinal studies of this kind will usually not be feasible as a general survey method, but for particular purposes they can give very important information. For example, data on the velocity of weight gain in children and adults have been used to demonstrate seasonal variations (*21*), the effects of infections (*22*), and the effects of interventions and impacts of programmes on population groups (P. Rao, personal communication, 1983). Studies of the rate of increase in length have revealed that the widespread stunting seen in many less developed countries in children aged between 3 and 5 years is the result of a process of slowed skeletal growth that starts in infancy (*23*). A reduction in velocity is an earlier and more sensitive index of growth failure than a deficit in *attained* weight or height. Yet it is uncertain when the degree or duration of this growth failure has importance to the child's wellbeing.

Because of their sensitivity, measurements of velocity can show significant differences in quite a small sample. In a study of seasonal growth changes in Nepal, average weight gains over two-month intervals were calculated for 28 children (*21*). The standard errors of the differences between values for successive two-monthly weight gains were small enough for a difference of 250 g to be statistically significant (D. Nabarro, personal communication, 1984). The same applies to the results of studies examining relationships between illness and growth. If velocity data are to be used to compare the effects of interventions on different groups of children, the subjects in each group should be examined at the same time of year because of possible seasonal differences in growth and comparisons should be made only between children of similar ages. If these precautions are not observed, the differences detected may be wrongly attributed to the effects of the intervention.

At present there is no completely satisfactory reference for measurements of growth velocity in young children. Since the NCHS reference is cross-sectional, the difference between weights or heights at

two ages in any centile column provides an estimate of the expected gain in a child who starts in that centile, but there is no estimate of the variability of gain, so that no statistical significance can be attached to any deviation from the expected rate. Tanner's velocity standards (*24*) were obtained from a longitudinal sample, but the intervals of 3 months are too long for them to be useful for young children or for detecting short-term, e.g., seasonal changes. Fomon (*25*) has published data for weight and height gain over periods of 2–4 weeks from birth to 6 months, but the sample was small. Even in this group of healthy infants the coefficients of variation were very large (up to 37%). There is, therefore, an urgent need for an international reference for growth velocity.

Difficulties are encountered in the analysis and presentation of velocity data when a number of sequential measurements have been made on the same child, often at irregular intervals. Pomerance & Krahl (*26*) showed that gains in weight and height are linear when plotted against a logarithmic function of time. Slopes were obtained and centiles established for weight and height gain from 1 to 36 months in a sample of 3500 children. It remains to be seen whether this somewhat complex method would be satisfactory for quantifying deviations from the expected growth over a relatively short period. Dugdale (*27*) has proposed a method of summarizing the gains over any chosen period in a single statistic, even though the intervals between measurements are not regular, but this method has not so far been widely used.

Seasons have been found to have distinct effects on weight and height gains in developed nations (*28*), but it is unclear which seasons will have these effects in various developing countries and if the degree of seasonal effect on growth velocity is comparable to that which can be expected among well-nourished populations in the developing countries. For health workers who are concerned with identifying children at risk it may be useful to know the expected rates of weight and height gain of healthy children in their own communities, at different ages and different seasons. For this purpose averages based on locally constructed data may be more realistic targets than those derived from an international reference. However, the logistics in obtaining statistically significant local reference data by season would be even more difficult than those of cross-sectional local references.

Changes in weight over time, recorded on growth charts, are widely used in health centres for assessing the growth of individual children. These records potentially provide a source of information on the growth of those children who attend health centres, considered as a group (clearly a biased group) and not simply as individuals. In fact, very little use has been made of this information, for the purpose of *community* assessment.

PURPOSES OF ANTHROPOMETRIC ASSESSMENT

In this paper we are mainly concerned with the use of anthropometric indices and indicators for the assessment of populations or groups. Their application for the diagnosis and follow-up of individuals, e.g., in health centres or obesity clinics, is also important but will only be briefly considered.

The basic objective of anthropometric assessment at the community level is to provide an estimate of the prevalence and severity of malnutrition. This information is of obvious importance for the formulation of health and development policies. Within this general objective there are a number of specific purposes which will determine the type of population to be studied, the type of information to be collected, the indices to be used, and the most useful method of presentation.

Choice of appropriate indices and indicators

The choice of indices and indicators is subject to constraints. There are practical limits to the feasibility, accuracy, and precision of all measurements, including that of age. The size of the sample and the number of measurements that can be made are constrained by the resources available.

For children, the use of two indices, weight-for-height and height-for-age, is to be recommended for most purposes but not necessarily for all. In certain instances the combined index, weight-for-age, may be practical for giving an overview of the distribution of nutritional problems in a country, or the direction of change.

Weight-for-height is an index that is particularly important for the description of current health status (see above, p. 932). This index alone, or its equivalent — arm-circumference-for-height — may be a sufficient tool for screening in emergencies, that is, for counting the undernourished.

Deficits in height-for-age seem to reflect overall social conditions. Therefore an indicator based on height-for-age, such as the proportion of stunted children, has been suggested as a measure of overall social deprivation.

It will generally be desirable to use more than one method for presenting and analysing the data: both to describe the distribution as a whole by one of the techniques discussed above (p. 933), and to give information about the extremes of the distribution by the use of cut-off points (pp. 934–935). For some purposes, it may be enough to present the proportion

below a particular cut-off, e.g., for screening or for overall international comparisons (*17*).

Some examples of different situations in which anthropometric assessment may be used are given below.

(1) *Overall assessment of a population* requires a widely representative sample. It is generally accepted that such a study should concentrate on children up to 5 years of age, because their condition constitutes a sensitive indicator of that of the population as a whole. When comparisons are being made, an appropriate method of presentation is the population below −2SD as a cut-off point (e.g., see ref. *17*).

(2) For *identification of target groups or areas for priority action* a combination of indices of weight-for-height and height-for-age is needed in order to assess the nature of the problem as well as its magnitude (see above, p. 932).

(3) *Nutritional surveillance* is a tool for planning and involves the continuous or periodic collection of agricultural and economic information as well as of anthropometric data. The basic problems here relate to the choice of the sampling frame and the coordination, analysis and interpretation of the information.

(4) As a specialized aspect of surveillance, the *monitoring of nutritional status* to determine trends is of particular importance to national health authorities. Here it is desirable to use, wherever possible, a combination of health indices including weight-for-height and height-for-age. The most useful method of analysis will be by examining the total distribution, rather than only the extremes.

(5) In *evaluating the impact of programmes*, anthropometric assessment has a dual function: it provides information about the nutritional status of children, which is important in its own right, but it also constitutes a sensitive indicator of impact on the population as a whole. In the special case of evaluating supplementary feeding programmes, it is important to take account of the period of time over which the evaluation is made, as different indices may be more appropriate for shorter or longer times. For example, even with a successful programme it will be some time before significant changes in height can be observed.

(6) In *emergency situations*, where the needs are urgent but resources limited, anthropometric indicators, based on a cut-off point of a particular index such as weight-for-height, are used for screening, to select those who need priority attention. For this use the cut-off point has to be chosen to provide optimum sensitivity and specificity, according to the particular circumstances. This question has been discussed in detail by Habicht (*30*) and will not be further considered here.

(7) *Sequential measurements* are particularly valuable for studying the effects of seasonal changes in food supply or disease prevalence, and for identifying alterations in growth at an early stage (see pp. 935–936). Large samples are not required. On the other hand, the information obtained should be as detailed as possible.

(8) *Anthropometric assessment of individuals* is regularly carried out in clinics with the help of growth charts. This method of assessment depends on consecutive measurements, which make it possible to determine whether growth is proceeding satisfactorily. Assessment of an individual from a single measurement is inevitably insensitive because of the wide range of intra-individual variation. The records from such clinics are of potential value for assessing the status of the population, but they have seldom been used for this purpose, partly because of the difficulty of analysing sequential data (see pp. 932–935).

ANTHROPOMETRIC INDICES AND INDICATORS IN OTHER AGE GROUPS

It is not the intention of this paper to discuss in great detail the anthropometric assessment of nutritional status in subjects other than children. More work needs to be done before practical recommendations can be made. The remarks below, however, indicate some of the problems to which attention should be given.

Adolescents

Because of the variable timing of the pubertal growth spurt the indices of weight and height in relation to age are of little value for the assessment of nutritional status in this age group. Weight-for-height is useful, but the NCHS reference does not include this information for children over 10 years of age. A recent FAO/WHO/UNU Expert Consultation (*9*) used the data of Baldwin (*34*) for children and adolescents aged from 10 to 18 years.

The interpretation of weight-for-height data in adolescents is complicated by the fact that body composition is more variable at this age than in healthy young children and differences in fatness and muscle mass between the two sexes increase with age.

Adults

There are very large variations worldwide in the average heights of different groups (*10*). The FAO/WHO/UNU Expert Consultation (*9*) accepted that

no judgement can be made about a desirable range of heights for adults. Therefore anthropometric assessment of nutritional status in adults must be based on weight-for-height or proxies for weight, such as arm circumference.

The body mass index defined above is being increasingly used in place of the percentage of "ideal" weight. The BMI is a numerical index which does not in itself relate to any reference. It would be possible to compare the thinness or fatness of different populations by comparing the distribution of BMI, but this has seldom been done. There is, in fact, not very much information about the distribution of BMI in representative age and sex groups of different populations. A representative average value in an industrialized country is 25 ± 2.5 kg/m^2 (*36*).

In order to interpret values of the body mass index for individuals or groups it is necessary to establish cut-off points or levels of risk. The "ideal" weights of the American Life Assurance Association (*37*) attempted to do this by relating the weight at each height to mortality experience. This population, however, is a highly selected one. From this and other evidence (*36*) it is suggested that, at the upper end of the range, a BMI of 30 kg/m^2 (corresponding roughly to the average +2SD) can be taken as a cut-off point, above which there is a significantly increased mortality risk. There is little information or consensus about risks attached to low levels of BMI.

Birth weight

The prevalence of low birth weight, defined by WHO as a weight less than 2500 g, is much greater in developing than in industrialized countries (*38*). Since low birth weight is the single most important determinant of infant mortality, it may, like the infant mortality rate, be regarded as an indicator of the general social development of the population. Moreover, to the extent that retarded fetal growth is caused by malnutrition of the mother before and during pregnancy (*39–41*), low birth weight can be regarded as an indicator of the health and nutritional status of the pregnant mother. The value of this indicator depends on establishing the causal relationship more firmly and for this more work is needed. Supplementary feeding trials of pregnant women have provided useful evidence on this point (*40, 42*).

It is probably only smallness for gestational age, rather than prematurity, that is influenced by maternal nutrition. In developing countries about 80% of low-birth-weight infants are small for gestational age rather than premature. Ideally, therefore, premature infants should be excluded when birth weight is being used as a nutritional indicator, but in practice this may be difficult.

The presentation of data on birth weight for the purposes of assessment and comparison follows the same principles as those discussed above (see pp. 932–935). For some purposes the most useful statistic may be the mean and standard deviation, for others the proportion of birth weights below the internationally accepted cut-off point (2500 g). The relation between birth weight and mortality risk is not necessarily the same in developed and less developed countries (*43*) and therefore the same cut-off point may not be appropriate. This is a subject on which more work is needed in order to establish realistic cut-off points for risk.

The weight-for-height of the mother at the beginning of pregnancy is an index of her nutritional status which might be more widely used for identifying those at risk of an unfavourable outcome. In mild to moderately malnourished populations maternal weight gain during pregnancy is positively associated with the nutrient intake of the mother and also with birth weight (*44*). For these reasons increasing attention is now being given to the development of reference values of weight gain in pregnancy (*35*), although the available evidence suggests that there is a very wide scatter (*44*). It remains to be seen how far pregnancy weight gain could develop into a useful method of nutritional assessment. The practical difficulties are clearly great, since the mother has to be identified and weighed at the beginning of her pregnancy.

CONCLUSIONS

An attempt has been made to clarify various questions which have appeared during the last few years on the use of anthropometric indicators. Several terms causing confusion have also been identified and defined. The main conclusions are:

— The terms "wasted" and "stunted" or "thin" and "short" are preferable to "acute" and "chronic" malnutrition, which can sometimes be misleading.
— Since wasting and stunting refer to different biological processes of malnutrition, their indicators, weight-for-height (wasting) and height-for-age (stunting), should be used whenever possible in anthropometric surveys.
— Because of logistical problems in creating local reference values, creation of such values is not considered a high priority. The continued use of the NCHS population as a reference is supported; if necessary, realistic goals can be set by lowering the cut-off points.
— It is generally desirable to use more than one method of presenting and analysing anthropometric data: both to describe the distribution as a whole and to utilize cut-off points to give information about the extremes of distribution.

— For most group or population comparisons, where uniformity is important, the standard statistical cut-off points of mean ±2SD and presentation of the whole distribution utilizing Z-scores should be maintained.
— A reduction in growth velocity, as determined by sequential measurements, can be used as an earlier, more sensitive index of growth failure than can a deficit in attained weight or height. This is especially relevant to growth monitoring in primary health care.
— Anthropometric nutritional assessment has several public health and development uses, such as overall population assessment, identification of target groups or areas for intervention, continuous nutritional surveillance as a tool for development planning, monitoring nutritional status to determine trends of particular health importance, evaluating the impact of programmes, selecting persons in need of immediate attention in emergency situations, studying the effects of seasonal changes in food supply or disease prevalence, and individual nutritional assessment, including use of sequential measurements to determine if growth is proceeding properly.

Many areas requiring further research have been pinpointed, three of which have been discussed in some detail:

(1) *Wasting and stunting.* More information is necessary on the natural history of the processes which lead to wasting and stunting. There is also a gap in information on the effectiveness of interventions for prevention and treatment of these two conditions. Very little is known on the functional implications of stunting and its reversibility.

(2) *Sequential measurements.* There is an urgent need for an international reference for growth velocity which will give an idea of the expected coefficient of variation on which to base criteria to assess longitudinal growth. There is at present limited knowledge on the differences between countries in seasonal changes in growth velocity. The most appropriate analysis and presentation of velocity and sequential data have yet to be determined.

(3) *Anthropometry of non-child populations.* Since the majority of anthropometric research has been done on children, knowledge about other age groups presents many more gaps; only a few of these gaps have been touched upon in this paper. More information is necessary on the distribution of body mass index by age and sex in different populations, and whether or not this is the best indicator for adult anthropometry needs to be determined. It is unclear how well pregnancy weight gain can be used for nutritional assessment and prediction of pregnancy outcome or whether another indicator could be developed. The interpretation of weight-for-height in adolescents is still unclear.

Although there are many other questions regarding the use and interpretation of anthropometric indicators of nutritional status, the importance of anthropometry as a public health indicator has been firmly established.

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RÉSUMÉ

UTILISATION ET INTERPRÉTATION D'INDICATEURS ANTHROPOMÉTRIQUES DE L'ÉTAT NUTRITIONNEL

L'anthropométrie est considérée comme la méthode la plus commode d'évaluation de l'état nutritionnel de groupes d'enfants bien que les variations des courbes de croissance tiennent à diverses raisons et pas seulement à la nutrition. A mesure que l'on acquiert une plus grande expérience de l'anthropométrie, il devient nécessaire d'en revoir de temps à autre le présentation et l'interprétation. Cet article fait suite à un rapport publié en 1977 par un groupe de travail semblable (J. C. Waterlow et al., *Bull. Org. mond. Santé*, 55: 489–498 (1977)) dont les propositions sur l'utilisation des données relatives à la taille et au poids ont été largement acceptées. La signification biologique de l'émaciation (maigreur) et du retard de croissance (petite taille) est maintenant mieux comprise et l'on connaît mieux l'épidémiologie de cas états pathologiques. De même, on sait davantage de choses sur les utilisations et les applications des populations et des normes de référence. Des références internationales sont utiles pour des comparaisons entre pays ou groupes de population et la surveillance d'éventuelles modifications. Pour la planification de services il est possible que l'on préfère des références locales assorties de cibles ou de normes temporaires adaptées aux conditions locales. Pour la présentation des données, on accorde maintenant davantage d'importance aux valeurs de l'écart-type. Le recours à des séquences ou à des séries de mesures et le calcul de la vitesse de croissance plutôt que l'enregistrement de valeurs isolées présentent de nombreux avantages mais pâtissent encore de l'absence de valeurs de référence bien établies.

Les indicateurs anthropométriques doivent être choisis en fonction d'objectifs précis et cet article en offre quelques exemples. Il donne aussi une liste des secteurs qui devraient faire l'objet de recherches, par exemple les processus conduisant à l'émaciation et au retard de croissance, les implications fonctionnelles du retard de croissance, les influences saisonnières et autres sur la vitesse de croissance et l'anthropométrie nutritionnelle des adolescents et des adultes.

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NUTRITION

Global surveillance through anthropometric measurements

Part I

The nutritional status of an individual is an integral part of his health and wellbeing. In turn, the assessment of the nutritional status of populations is of critical social, economic and public health significance. Although the focus of nutritional surveillance has been to evaluate undernutrition, it is increasingly recognized today that problems of overnutrition and obesity can greatly affect the health of individuals and the general welfare of population groups. In order to alleviate the problems related to malnutrition, it is necessary to assess their magnitude and distribution. Hence, various methods and techniques have been employed in establishing nutritional surveillance systems.

Although different methods (clinical, biochemical and immunological tests) have been used to evaluate nutritional status, anthropometry, from the point of view of practicality and efficiency, is the most valuable technique for the assessment of the nutritional status of children. Valuable information on growth and development in size and body composition, the most immediate and important expressions (consequences) of an inadequate nutritional condition, can be obtained through relatively simple anthropometric measurements. Different measurements are taken depending upon the objectives of a survey, but for most purposes the basic data collected are age, sex, weight and height. From these, separate indices or relationships of weight-for-height and height-for-age can be established, in addition or as an alternative to the classical index, weight-for-age.

Weight-for-age has been the most frequently used anthropometric criterion for assessing nutritional status in infants and children. The measurement of body weight or total body mass is the simplest, most direct and therefore most common assessment of growth. The observation of growth "velocity" as expressed by repeated measurements can be an important indicator of a child's health. If a single measurement is taken, it must be compared with a child at the same age considered normal, and reference populations are used for this purpose. However, the weight attained at a given age is the combined result of 2 factors, body mass and body-frame size. To use weight independently as an indicator of undernutrition does not differentiate between nutritional "wasting" (a low weight-for-height) and "stunting" (a low height-for-age).

Wasting is a condition expressed by a deficit in tissue and fat mass relative to the amount in a child of the same height, or recumbent length. It is brought on either by a decreased intake of food or as the result of elevated morbidity, or by a combination of both. Quite often seasonal and geographical differences have been observed, where there are fluctuations in food supply or incidence

Surveillance mondiale au moyen de données anthropométriques

Partie I

L'état nutritionnel d'un individu est l'un des éléments de sa santé et de son bien-être. Par ailleurs, il est très important sur les plans social et économique, aussi bien que sur celui de la santé publique, d'apprécier l'état nutritionnel des populations. La surveillance nutritionnelle s'est surtout concentrée sur l'évaluation de la sous-alimentation, mais on reconnaît aujourd'hui de plus en plus que la suralimentation et l'obésité peuvent affecter notablement la santé des individus et le bien-être global de groupes de population. Si l'on veut atténuer les problèmes en rapport avec la malnutrition, il est nécessaire d'en évaluer l'ampleur et la distribution. Aussi a-t-on utilisé diverses méthodes et techniques pour instituer des systèmes de surveillance nutritionnelle.

Différentes méthodes (cliniques, biochimiques et immunologiques) ont été appliquées pour évaluer l'état nutritionnel; c'est toutefois l'anthropométrie qui est la technique la plus valable, pratique et efficace, pour apprécier l'état nutritionnel des enfants. Des mesures relativement simples fournissent de précieuses informations sur la croissance et le développement du corps et sa composition, expressions (conséquences) les plus immédiates et les plus importantes d'un mauvais état nutritionnel. Les mesures relevées peuvent varier selon les objectifs de l'enquête, mais dans la plupart des cas on notera comme données de base l'âge, le sexe, le poids et la taille. A partir de ces indications, on peut établir des indices (ou rapports) poids/taille et taille/âge, qui pourront s'ajouter ou se substituer à l'indice classique, celui du poids pour l'âge.

Le critère anthropométrique le plus fréquemment utilisé pour évaluer l'état nutritionnel des nourrissons et des enfants est celui du poids par rapport à l'âge. La mesure du poids corporel ou de la masse corporelle totale est la façon la plus simple, la plus directe, et par conséquent la plus répandue d'évaluer la croissance. La "rapidité" de la croissance, observée par des mesures répétées, peut être un important indicateur de la santé d'un enfant. Si les mesures sont relevées une fois seulement, il faut comparer les valeurs obtenues avec celles d'un enfant «normal» du même âge, et l'on utilise pour cela des populations de référence. Cependant, le poids qu'a un enfant à un âge donné est la résultante de 2 facteurs, la masse corporelle et la stature. Considéré seul, le poids, comme indicateur de sous-alimentation, ne permet pas de faire la différence entre «l'émaciation» (poids insuffisant pour la taille) et «le retard de croissance» (insuffisance de taille pour l'âge).

L'émaciation est un état pathologique qui s'exprime par un déficit de la masse tissulaire et graisseuse, inférieure à celle que doit présenter un enfant de la même taille. Elle peut avoir pour cause une réduction de l'apport alimentaire, une plus grande morbidité, ou l'association de ces 2 facteurs. Des différences saisonnières et géographiques ont été observées très souvent, là où il y avait des variations dans l'approvisionnement

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of infectious diseases. In turn, wasting is usually thought to be, though not exclusively, "acute" malnutrition. In the WHO global surveillance system, attention has been paid to the time of year and the characteristics of the period when the prevalence of wasting is greatest.

Stunting is a slowing of skeletal growth and of stature. A low height-for-age can be used as an indicator of the nutritional status of population groups as it estimates past, or chronic malnutrition. This condition is in general the manifestation of poor economic conditions, as well as extended food deficits and increased morbidity. In some situations, especially under drought or severely adverse environments, wasting and stunting are combined. However, the 2 conditions are different and show distinct patterns in different age groups in different populations. This fact has made it essential to gather age-specific anthropometric data, rather than pooling together all pre-school children aged 0-5 years.

The prevalence of wasting has been shown to be at its highest during the second year of life, from 12 to 23 months. It is during this post-weaning period that dietary deficiencies can manifest and that the incidence of diarrhoeal and other diseases is quite high. By contrast, stunting is most prevalent in the third and fourth years of life. This is often due to the fact that a deficit in height takes some time to develop and may not occur in infant malnutrition. In fact, where stunting does take place in early infancy, it may be a slightly different condition, occurring as a consequence of a small birth-size, rather than as a result of postnatal undernutrition.

As part of its Nutrition Programme, WHO has been gathering anthropometric data on children in Member States to evaluate the global prevalence of malnutrition, both under- and over-nutrition. These data are useful not only for intercountry comparisons, but also at the country and community level. The growth data of children can be of considerable interest for countries, especially if trends are observed over time. Still, a single evaluation of the nutritional situation can be important for determining health priorities.

In some countries, nutritional surveillance has been carried out for a number of years, and trends in growth and nutritional status can be evaluated with respect to other health indicators. This provides a more detailed picture of the health situation and of positive and negative changes in specific areas, information that is of direct relevance to development and health policies. In many countries, the growth data available today indicate that acute malnutrition is no longer a national problem, as there are only a few wasted pre-school children. However, children still remain short and small in stature, expressed in a low height-for-age, or stunted condition. This situation may call for a re-examination of resource allocation for nutrition, perhaps shifting emphasis in favour of environmental programmes and a general strengthening of health care.

en produits alimentaires ou l'incidence des maladies infectieuses. On pense généralement que l'émaciation est — mais pas exclusivement — une malnutrition «aiguë». Le système mondial de surveillance de l'OMS prend en considération la saison de l'année et les caractéristiques de la période durant laquelle la prévalence de l'émaciation est la plus élevée.

Le retard de croissance est un ralentissement dans le développement du squelette et de la stature. Un rapport taille/âge faible peut servir d'indicateur de l'état nutritionnel de groupes de population, car il reflète une malnutrition passée ou chronique. Cet état pathologique est généralement la traduction d'une mauvaise situation économique, ainsi que d'importants déficits alimentaires et d'une morbidité accrue. Émaciation et retard de croissance vont parfois de pair, notamment lorsque sévit la sécheresse ou dans des environnements extrêmement défavorables. Cependant, ces 2 états ne sont pas identiques et se présentent différemment dans les divers groupes d'âge de populations variées. De ce fait, il est essentiel de rassembler des données anthropométriques spécifiques selon l'âge, plutôt que de confondre tous les enfants de 0 à 5 ans dans un seul groupe dit «d'âge préscolaire».

On a montré que la prévalence de l'émaciation atteignait son maximum au cours de la seconde année de la vie, entre 12 et 23 mois. Durant la période qui suit immédiatement le sevrage, des carences peuvent apparaître dans le régime alimentaire, et l'incidence des maladies diarrhéiques et autres est passablement élevée. Si le retard de croissance, lui, se constate surtout au cours des troisième et quatrième années de la vie, c'est sou[illegible]nt parce qu'il faut un certain temps pour que se manifeste l'insuffisance staturale, qui peut ne pas se produire chez un nourrisson malnutri. En fait, un retard de croissance au cours de la première enfance peut être la manifestation d'un état pathologique légèrement différent, la conséquence d'une petite taille à la naissance plutôt que le résultat d'une malnutrition postnatale.

Dans le cadre de son programme de nutrition, l'OMS a rassemblé des données anthropométriques sur les enfants dans différents Etats Membres afin d'évaluer la prévalence mondiale de la malnutrition, par insuffisance comme par excès. Ces données permettent de faire des comparaisons non seulement entre les pays, mais aussi au niveau d'un même pays et de la communauté. Les données relatives à la croissance des enfants peuvent présenter un intérêt considérable pour les pays, surtout si l'on observe les tendances dans le temps. Mais une évaluation unique de la situation nutritionnelle peut, elle aussi, être importante pour déterminer les priorités de santé.

Dans quelques pays, la surveillance nutritionnelle s'exerce depuis un certain nombre d'années déjà, et l'on peut évaluer les tendances en matière de croissance et d'état nutritionnel par rapport à d'autres indicateurs sanitaires. On obtient ainsi un tableau plus détaillé de la situation sanitaire et des changements positifs et négatifs dans certains domaines spécifiques, informations qui ont un intérêt direct pour les politiques de développement et de santé. Dans de nombreux pays, les données dont on dispose aujourd'hui sur la croissance des enfants montrent que la malnutrition aiguë n'est plus désormais un problème national, car les enfants d'âge préscolaire qui souffrent d'émaciation sont en petit nombre. Cependant, les enfants restent petits et frêles, ce que traduit un rapport taille/âge abaissé, autrement dit un retard de croissance. Pareille situation peut appeler un réexamen des allocations de ressources en faveur de la nutrition, qui conduira peut-être à accorder plus d'importance aux programmes environnementaux et à un renforcement général des soins de santé.

Part II – Prevalence of wasting and stunting in the African Region

WHO has for some time recommended a standardization for the analysis and presentation of anthropometric data in nutritional surveillance. This not only facilitates intercountry comparison at the global level to obtain an overall picture of the extent of health and nutrition problems, but also makes it possible to evaluate the nutritional situation at the country level. WHO has recommended the use of the NCHS (National Center for Health Statistics) reference population, and specifically the cut-off point ±2 S.D. (standard deviation) of the median to designate malnutrition (and obesity) from different anthropometric indices. This provides a statistical figure which expresses the number of individuals in a particular population, or study group, at increased risk of morbidity and/or mortality.

Table 1 presents prevalence data on stunting and wasting in Member States of the WHO Region for Africa. Forthcoming issues of the WER will carry similar information on other Regions.

The anthropometric data available from African countries are somewhat limited because different methods of analysis have been employed. In turn, the data presented here are divided into 2 sections: the first (*Table 1*) presents prevalences calculated from raw data with S.D. scores, and the second (*Table 2*) shows prevalences estimated from figures derived from other methods of analysis.

Estimated prevalence data *(Table 2)*

The African countries appearing in *Table 2* have prevalence data which were originally analysed in a different manner than that recommended by WHO. In most cases, the prevalence figures from these surveys were originally presented as the proportion of children falling below a specified percentage of the reference median, i.e. below 80% weight-for-height of the NCHS reference median. However, for purposes of standardization, these data have been re-analysed, providing estimates of wasting and stunting prevalences in terms of the cut-off points ±2 S.D. of the NCHS median. Estimates have been made from these surveys by assuming that the weight distribution curves of the study populations are identical to those of the NCHS reference population. By measuring against the NCHS distribution curve, estimates of the percentage of the study group below −2 S.D. can be calculated. Although these numbers are slightly different from those which would have been calculated from the raw data originally analysed with S.D. scores, they are nevertheless a valid approximation of the order of magnitude of the prevalences.

Partie II – Prévalence de l'émaciation et du retard de croissance dans la Région africaine

Depuis quelque temps déjà, l'OMS recommande de normaliser l'analyse et la présentation des données anthropométriques en matière de surveillance nutritionnelle, non seulement pour pouvoir faire des comparaisons entre pays et obtenir ainsi une vue globale de l'ampleur des problèmes sanitaires et nutritionnels à l'échelle mondiale, mais encore pour évaluer la situation nutritionnelle au niveau des différents pays. L'OMS a recommandé d'utiliser la population de référence du NCHS (*National Center for Health Statistics*) et plus particulièrement de prendre le seuil de ±2 E.T. (écart type) de la médiane pour identifier la malnutrition (et l'obésité) à partir de différents indices anthropométriques. On obtient ainsi une représentation statistique exprimant le nombre d'individus dans une population déterminée, ou un groupe d'étude, exposés à un risque accru de morbidité et/ou de mortalité.

Le *Tableau 1* regroupe les données sur la prévalence de l'émaciation et du retard de croissance dans divers États Membres de la Région africaine de l'OMS. Des informations similaires seront données pour d'autres Régions de l'OMS dans les prochains numéros du REH.

Les données anthropométriques que l'on possède concernant les pays africains sont quelque peu limitées du fait que différentes méthodes d'analyse ont été utilisées. Les données présentées ici sont divisées en 2 sections: la première (*Tableau 1*) montre les prévalences estimées à partir de valeurs obtenues par d'autres méthodes d'analyse.

Données estimatives de prévalence *(Tableau 2)*

Pour les pays africains qui figurent sur le *Tableau 2*, les données de prévalence ont été à l'origine analysées selon une méthode autre que celle qui est recommandée par l'OMS; elles ont été, en effet, le plus souvent présentées sous la forme de la proportion d'enfants qui se situent au-dessous d'un pourcentage déterminé de la médiane de référence, c'est-à-dire ayant un rapport poids/taille inférieur à 80% de la médiane de référence NCHS. Mais, dans un but de normalisation, on les a soumises à une nouvelle analyse, aboutissant à l'estimation des prévalences de l'émaciation et du retard de croissance en fonction des seuils ±2 E.T. de la médiane NCHS. Les estimations ainsi faites ont été établies en partant de l'hypothèse que les courbes de distribution de poids dans les populations étudiées étaient identiques à celles de la population de référence NCHS. On peut estimer le pourcentage du groupe d'étude situé au-dessous de −2 E.T. par comparaison avec la courbe de distribution NCHS. Bien que ces chiffres soient légèrement différents de ceux que l'on calculerait à partir des données brutes analysées par la méthode des écarts réduits, ils constituent néanmoins une approximation valable de l'ordre de grandeur des prévalences.

Table 1.[a] **Anthropometric indicators of nutritional status in the WHO African Region: prevalence of wasting and stunting**
Tableau 1.[a] **Indicateurs anthropométriques de l'état nutritionnel dans la Région OMS de l'Afrique: prévalence de l'émaciation et du retard de croissance**

Region, country, area Région, pays, zone	Date of survey Dates des enquêtes		Number examined Nombre examiné	Age group (years) Groupe d'âge (années)	Wasted Emaciation	Stunted Retard de croissance	Low Insuffisance	Obese Obésité	Notes	Ref. No.[b] Réf. N°[b]
					weight-for-height (poids/taille)	height-for-age (taille/âge)	weight-for-age (poids/âge)	weight-for-height (poids/taille)		
	Month(s) Mois	Year(s) Année(s)			Percentage below/above median Pourcentage au-dessous/au-dessus de la médiane					
					−2 S.D. −2 E.T.	−2 S.D. −2 E.T.	−2 S.D. −2 E.T.	+2 S.D. +2 E.T.		
Botswana										
District		1978-79	136E	0-0.99	2.0	24.7	18.8		2 villages in Central District 2 villages du District central	0003
			136E	1	12.5	55.9	49.3			
			136E	2	6.8	36.8	47.0			
			136E	3	5.7	46.1	44.0			
			136E	4	7.0	40.0	42.6			
Burkina Faso										
Local	Jan.-Dec. Janv.-déc.	1973-82	902	0-0.49	2.0	3.7	3.4		Mossi Tribe – Tribu des Mossi	0142
			1458	0.5-0.99	12.1	19.2	32.5			
			2189	1	18.2	29.2	39.2			
			1843	2	7.8	20.8	32.9			
			1226	3	6.7	23.2	26.0			
			470	4	7.0	28.1	28.9			
		1974	225E	0-0.99	7.4	24.2	25.2			0028
			225E	1	16.6	36.5	46.9			
			225E	2	12.1	26.3	39.7			
			225E	3	7.6	26.3	30.8			
			225E	4	12.9	25.8	38.7			
Burundi										
District	Dec. Déc.	1979	80E	0.25-0.99	0.5	20.4	13.2		Ruyaga	0184
			90E	1	4.1	52.3	35.2			
			90E	2	2.6	65.5	32.5			
			90E	3	0	54.5	19.6			
			90E	4	1.1	60.7	31.8			
Ethiopia – Ethiopie										
Local		1980	99	0.5-0.99	6.1	28.3	25.5		Addis Ababa – Addis-Abeba	0079
			326	1	4.2	69.6	41.4			
			581	2-3.99	3.4	40.8	30.5			
			168	4-5.99	0.6	56.5	30.8			
National		1982	462	0-0.99	7.1	27.3	24.5		Data from 9 zones — Données provenant de 9 zones	0081
			556	1	18.7	53.1	53.8			
			512	2	12.1	47.7	40.2			
			559	3	10.2	42.0	35.8			
			774	4	9.9	39.5	35.3			
Gabon										
Regional – Régional	Feb.-Apr. Févr.-avril	1984	118	0-0.49		5.9	3.4		Lambarene – Lambaréné	0188
			166	0.5-0.99		11.4	9.0			
			218	1		26.6	22.0			
			207	2		21.7	15.0			
			176	3		20.4	8.0			
			139	4		15.8	13.7			
			99	5		29.0	14.0			
Gambia — Gambie										
Local	Feb. Févr.	1982	46E	0.5-0.99	0.0	4.0	10.0		Bakau (old town) – (vieille ville)	0198
			93E	1	4.5	21.5	15.5			
			93E	2	4.0	33.0	14.0			
	Sept.		64E	0.5-0.99	5.0	11.0	19.0			
			129E	1	13.5	17.0	21.5			
			129E	2	7.0	37.5	23.5			
Kenya										
National-urban – National-urbain	Nov.-Jan. Nov.-janv.	1978-79	96E	0.5-0.99	4.5	17.9				0013
			192E	1	13.8	26.0				
			384E	2.0-3.99	3.8	34.7				
			192E	4	7.0	14.4				
National-rural			295E	0.5-0.99	7.6	27.2				
			591E	1	7.4	38.7				
			1182E	2.0-3.99	3.9	39.3				
			591E	4	3.5	34.7				
National			391E	0.5-0.99	7.2	25.8			Weighted; 15% urban — Pondéré; 15% urbain	
			783E	1	8.4	36.8				
			1566E	2.0-3.99	3.9	38.6				
			783E	4	4.1	32.2				
National-rural	June-Sep. Juin-sept.	1982	905	0.25-0.99	2.4	22.4				0017
			1064	1	10.2	41.1				
			1224	2	3.8	49.2				
			1118	3	2.5	39.1				
			1011	4	3.8	34.9				
Lesotho										
National	Jan. Janv.	1981	800	0-0.99	3.0	24.6	8.5			0092
			1559	1	7.4	32.8	18.7			
			1474	2	3.5	23.8	18.1			
			965	3	3.3	22.7	15.0			
			669	4	3.1	22.3	12.0			

Table 1 (continued) — Tableau 1 (suite)

Region, country, area Région, pays, zone	Date of survey Dates des enquêtes Month(s) Mois	Year(s) Année(s)	Number examined Nombre examiné	Age group (years) Groupe d'âge (années)	Wasted Emaciation weight-for-height (poids/taille) Percentage below/above median Pourcentage au-dessous/au-dessus de la médiane −2 S.D. −2 E.T.	Stunted Retard de croissance height-for-age (taille/âge) −2 S.D. −2 E.T.	Low Insuffisance weight-for-age (poids/âge) −2 S.D. −2 E.T.	Obese Obésité weight-for-height (poids/taille) +2 S.D. +2 E.T.	Notes	Ref. No.[b] Réf. N°[b]
Malawi										
National	Aug. Août	1981	1000E	0.5-0.99	2.3	34.1				0098
			1000E	1	3.5	54.6				
			1000E	2	1.2	65.2				
			1000E	3	0.2	60.7				
			1000E	4	0.3	60.5				
	March Mars	1982	1000E	0.5-0.99	1.6	36.6				
			1000E	1	8.0	53.9				
			1000E	2	1.4	64.7				
			1000E	3	0.6	61.5				
			1000E	4	0.7	57.4				
Mali										
Regional - Régional	Dec. Déc.	1985	909	0.0-4.99	7.5				Gao, nomads <110 cm — Gao, nomades <110 cm	0176
			920	0.0-4.99	29.9				Gao, agro-pastularists <110 cm — Gao, agro-pasteurs <110 cm	
Mauritius - Maurice										
District		1982	64E	0.25-0.99			7.9		Sainte-Croix MCH Centre — Centre PMI	0195
			129E	1.0-2.99			24.4			
			63E	0.25-0.99			17.0		L'Escalier Health Centre — Centre de santé	
			129E	1.0-2.99			32.6			
			51E	1			10.7		Riviere des Anguilles PCC — CSSP	
			51E	2			19.6			
			51E	3			21.4			
			100E	4.0-5.99			34.0			
Niger										
Province	Nov.-Dec. Nov.-déc.	1985	126	0-0.49	4.0				Maradi, Tahoua, Zinder	0193
			192	0.49-0.99	13.5					
			618	1	25.6					
			752	2	19.9					
			876	3	14.4					
			808	4	8.9					
Local	June-Aug. Juin-août	1980	189	0.25-0.49	3.7	7.9	4.1		Niamey, Filingue, Ouallam	0104
			232	0.5-0.99	11.6	22.8	29.6			
			499	1	23.7	32.3	49.1			
			678	2	4.6	34.5	41.1			
			520	3	9.8	28.1	26.5			
			430	4	11.7	24.4	28.0			
Nigeria - Nigéria										
National-urban - National-urbain	Apr.-June Avr.-juin	1983	1280	0-4.99	21.1					0183
National-rural			499	0-4.99	21.4					
Rwanda										
National		1976	622	0-0.99	1.8	12.3	11.3			0019
			628	1	11.4	38.6	35.2			
			591	2	4.4	39.6	30.8			
			545	3	3.7	44.2	29.5			
			515	4	3.9	52.2	33.4			
Sierra Leone										
National		1974-75	392E	0-0.99	8.5	32.5	14.6			0023
			392E	1	25.6	35.5	35.3			
			392E	2	17.6	35.1	32.8			
			392E	3	18.7	36.0	33.3			
			392E	4	24.1	31.8	38.9			
South Africa - Afrique du Sud										
National-rural		1976-78	76	1	9.2	42.1	22.4		Black-rural - Noirs-milieu rural	0211
			95	2	14.7	33.7	35.8			
			120	3	10.0	25.8	26.7			
			149	4	9.4	29.5	28.9			
			107	5	10.3	38.3	30.8			
			51	6	17.6	49.0	54.9			
		1980-82	122	0-0.99	4.1	46.7	15.6			
			266	1	9.8	58.3	40.6			
			198	2	8.1	43.9	38.9			
			152	3	10.5	40.1	32.2			
			125	4	10.4	46.4	41.6			
			97	5	15.5	48.4	41.2			
		1984	170	1	3.5	76.5	41.8			
			156	2	5.8	64.7	41.0			
			128	3	5.5	63.3	39.1			
			525	4	10.3	43.8	38.3			
			279	5	17.9	43.7	54.8			

Table 1 (continued) — Tableau 1 (suite)

Region, country, area Région, pays, zone	Date of survey Dates des enquêtes		Number examined Nombre examiné	Age group (years) Groupe d'âge (années)	Wasted Emaciation weight-for-height (poids/taille) Percentage below/above median Pourcentage au-dessous/au-dessus de la médiane −2 S.D. −2 E.T.	Stunted Retard de croissance height-for-age (taille/âge) −2 S.D. −2 E.T.	Low Insuffisance weight-for-age (poids/âge) −2 S.D. −2 E.T.	Obese Obésité weight-for-height (poids/taille) +2 S.D. +2 E.T.	Notes	Ref. No.[b] Réf. N°[b]
	Month(s) Mois	Year(s) Année(s)								
South Africa - Afrique du Sud *(continued - suite)*										
National-urban — National-urbain		1976, 77, 80	52	1	19.2	36.5	34.6		Black-urban — Noirs-milieu urbain	
			149	2	6.0	22.2	20.1			
			223	3	11.7	23.8	26.5			
			126	4	11.1	26.2	23.8			
			121	5	10.7	31.4	20.7			
			239	6	6.7	38.1	20.1			
		1981	98	2	0.0	13.3	17.1			
			268	3	0.8	12.7	7.1			
			302	4	0.7	16.9	7.0			
			217	5	1.8	15.7	7.8			
			165	6	3.0	21.8	10.3			
		1984	355	4	5.9	17.2	13.5			
			599	5	7.4	17.7	14.0			
		1976	96	2	6.2	3.1	7.3		White-urban - Blancs-milieu urbain	
			99	3	8.1	4.0	8.1			
			135	4	0.0	5.9	1.5			
			109	5	0.0	5.5	2.8			
		1981	117	2	0.0	1.7	0.8			
			257	3	2.7	2.7	3.9			
			301	4	3.3	3.0	2.3			
			320	5	1.2	3.4	2.8			
		1984	401	4	3.5	4.0	4.2			
			317	5	2.8	8.5	4.7			
		1979	61	1	23.0	27.9	27.9		Indian-urban - Indiens-milieu urbain	
			50	2	26.0	18.0	38.0			
			505	5	13.3	9.9	20.4			
			209	6	29.2	12.4	28.7			
		1984	314	4	14.7	10.2	24.5			
			282	5	17.4	10.6	22.0			
		1978, 80	58	2	8.6	17.2	29.3		Coloured-urban - Métis-milieu urbain	
			91	3	9.9	8.8	19.8			
			126	4	8.7	11.1	15.9			
			65	5	13.8	12.3	18.5			
National-rural		1978	122	1	11.5	45.1	38.5		Coloured-rural - Métis-milieu rural	
			153	2	11.1	44.4	43.8			
			124	3	12.1	46.0	51.6			
			148	4	18.2	36.5	39.9			
			146	5	13.0	32.6	35.4			
Swaziland										
National-rural	Sep.-Jan. Sept.-janv.	1983-84	4133	0-4.99	0.8	30.3	9.7			0140
Togo										
Local		1973-82	156	0-0.49	2.6	5.7	4.4		Moba Tribe — Tribu des Moba	0141
			164	0.5-0.99	12.8	21.3	31.7			
			247	1	27.9	38.0	47.8			
			194	2	9.3	38.6	40.2			
			170	3	7.6	51.2	35.8			
			149	4	11.4	42.9	42.3			
			58	0-0.49	1.8	8.6	10.3		Gourma Tribe — Tribu des Gourma	
			76	0.5-0.99	19.7	28.9	51.3			
			118	1	33.9	45.7	59.4			
			86	2	12.8	61.7	54.7			
			101	3	3.0	52.8	37.6			
			58	4	8.6	55.1	43.1			
National		1977	753	0.5-0.99	4.5	17.5	22.3			0026
			1328	1	9.4	34.0	31.5			
			1179	2	2.8	30.9	27.7			
			1139	3	1.5	40.0	21.3			
			1008	4	1.8	37.5	21.1			
Local		1973	116E	0-0.99	8.1	19.4	28.0		Lomé	0025
			116E	1	35.6	50.0	59.1			
			116E	2	12.2	51.0	50.0			
			116E	3	13.7	56.9	52.0			
			116E	4	14.9	52.7	48.6			
Uganda - Ouganda										
Local	Apr.-May Avr.-mai	1985	137	0-0.99	1.4	8.0	5.1		Lira, Apac, Soroti, Kumi	0137
			157	1	2.5	26.7	19.1			
			125	2	5.6	19.2	13.6			
			110	3	0.0	43.6	12.7			
			94	4	0.0	31.9	11.7			
Zaire - Zaïre										
National		1975	251	0-0.99	4.8	31.0	22.2			0030
			271	1	9.6	48.0	37.6			
			217	2	6.0	46.1	31.3			
			225	3	1.8	46.7	24.0			
			144	4	2.8	46.5	24.3			
			143	5	0.7	48.3	28.0			
			80	6	3.8	55.0	36.2			

Table 1 (continued) — Tableau 1 (suite)

Region, country, area Région, pays, zone	Date of survey Dates des enquêtes		Number examined Nombre examiné	Age group (years) Groupe d'âge (années)	Wasted Emaciation	Stunted Retard de croissance	Low Insuffisance	Obese Obésité	Notes	Ref. No.[b] Réf. N°[b]
					weight-for-height (poids/taille)	height-for-age (taille/âge)	weight-for-age (poids/âge)	weight-for-height (poids/taille)		
	Month(s) Mois	Year(s) Année(s)			Percentage below/above median Pourcentage au-dessous/au-dessus de la médiane					
					−2 S.D. −2 E.T.	−2 S.D. −2 E.T.	−2 S.D. −2 E.T.	+2 S.D. +2 E.T.		
Zaire — Zaïre *(continued — suite)*										
Local		1973-82	62	0.5-0.99	0.0	17.7	4.8		Yaka tribe - Tribu des Yaka	0107
			48	0-0.5	6.3	45.9	37.5			
			87	1	4.5	57.5	45.9			
			66	2	9.1	59.1	45.4			
			50	3	2.0	58.0	52.0			
			47	4	12.8	55.4	51.1			
			31	5	9.7	61.3	54.8			
			229	0-0.5	12.4	30.6	27.1		Bashi tribe - Tribu des Bashi	
			182	0.5-0.99	1.1	57.7	36.3			
			128	1	1.6	65.6	45.4			
		1979-81	227	0-0.5	1.9	16.7	7.9		Wareba tribe - Tribu des Wareba	0108
			270	0.5-0.99	4.9	39.6	33.3			
			538	1	22.6	59.7	42.8			
			465	2	2.6	54.0	35.9			
			356	3	2.0	68.0	32.7			
			276	4	1.8	69.6	32.6			
			138	5	2.1	76.7	36.2			
	Dec. Déc.	1976	136	0-0.49	0.7	9.6	4.4		Bantandu Tribe - Tribu des Bantandu	0107
			128	0.5-0.99	0.8	27.3	29.7			
			193	1	12.4	33.8	35.2			
			156	2	6.4	35.2	37.8			
			145	3	14.5	30.7	45.5			
			115	4	8.7	43.5	41.8			
	Nov.	1975	199	0-0.49	1.5	10.0	3.0		Bangu Tribe - Tribu des Bangu	
			149	0.5-0.99	2.7	24.2	16.1			
			341	1	1.5	36.4	19.4			
			261	2	1.9	34.9	24.5			
			239	3	2.5	31.4	19.3			
			204	4	2.5	28.0	16.2			
		1975-76	201	0-0.49	8.0	8.0	7.0		Wazimba Tribe - Tribu des Wazimba	
			198	0.5-0.99	10.1	27.3	35.8			
			404	1	16.9	43.8	41.6			
			372	2	4.9	43.0	30.6			
			290	3	1.7	38.2	18.2			
			287	4	1.7	39.7	23.0			
District		1983	2467	0-0.49		10.7	3.5		Kasongo	0192
			3158	0.5-0.99		20.2	15.7			
			7470	1		28.2	21.6			
			7514	2		29.9	21.3		Kasongo, recumbent length - taille en position couchée	
			7498	3		30.9	21.2		Kasongo	
			5677	4		28.8	17.7			
Zambia - Zambie National-rural		1970-72	506	0-0.99	3.9	20.5	11.2			0136
			474	1	12.0	47.1	38.9			
			454	2	4.4	35.7	26.7			
			398	3	4.0	42.0	22.1			
			307	4	0.3	44.0	15.0			
			281	5	1.4	43.1	18.9			
			190	6	3.2	38.4	21.6			
			292	7	0.7	26.0	13.0			
			311	8	2.3	25.3	12.2			
			328	9	1.5	26.7	14.3			
Zimbabwe Local		1983	290	6	2.0	11.3				0185
			882	7	1.5	15.7				
			842	8	1.0	15.9				
			675	9	1.4	12.9				

[a] It has been necessary to standardize the analysis and presentation of anthropometric data in order to make international comparisons possible. Prevalences of wasting and stunting were therefore calculated using the median ±2 S.D. cut-off point, rather than a specified percentage (e.g. 80%) of the reference median. For a justification of this approach, see Waterlow *et al.*, *Bulletin of the World Health Organization* 55, pp. 489-498. — Il a été nécessaire de normaliser l'analyse et la présentation des données anthropométriques en vue de permettre les comparaisons internationales. Pour calculer la prévalence de l'émaciation et du retard de croissance, on a donc pris pour « seuil » 2 E.T. au-dessus ou au-dessous de la médiane, plutôt qu'un pourcentage déterminé (par ex., 80%) de la médiane de référence. Voir la justification de cette approche dans Waterlow *et al.*, *Bulletin de l'Organisation mondiale de la Santé*, 55, pp. 489-498.

[b] The list of sources is available on request from the Nutrition Unit, Division of Family Health, World Health Organization, 1211 Geneva 27, Switzerland. — Pour obtenir la liste des sources, s'adresser au service de la Nutrition, Division de la Santé de la Famille, Organisation mondiale de la Santé, 1211 Genève 27, Suisse.

E = Estimate. — Estimation.

S.D. = Standard deviation. — E.T. = Ecart-type.

Table 2.[a] **Anthropometric indicators of nutritional status in the WHO African Region: estimated prevalence data**
Tableau 2.[a] **Indicateurs anthropométriques de l'état nutritionnel dans la Région OMS de l'Afrique: Données estimatives de prévalence**

Region, country, area Région, pays, zone	Date of survey Dates des enquêtes		Number examined Nombre examiné	Age group (years) Groupe d'âge (années)	Wasted Emaciation	Stunted Retard de croissance	Low Insuffisance	Obese Obésité	Notes	Ref. No.[b] Réf. N°[b]
					weight-for-height (poids/taille)	height-for-age (taille/âge)	weight-for-age (poids/âge)	weight-for-height (poids/taille)		
	Month(s) Mois	Year(s) Année(s)			Percentage below/above median Pourcentage au-dessous/au-dessus de la médiane					
					−2 S.D. −2 E.T.	−2 S.D. −2 E.T.	−2 S.D. −2 E.T.	+2 S.D. +2 E.T.		
Benin – Bénin										
Local	May Mai	1976	47 49 31	0-0.99 1 2-5.99	8.5E 14.4E 0.0E				Rural Boukombe – Boukombé (rural)	0001
Botswana										
National		1979-81	11262E 11262E 11262E 11262E 11262E	0-0.99 1 2 3 4	6.4E 19.2E 8.7E 5.9E 5.5E	27.1E 44.8E 54.4E 50.4E 44.8E			Clinic data – Données des dispensaires	0004
Burundi										
Local		1973	828 241 65 59	0-0.99 1 2 3.0-4.9	2.3E 35.6E 33.7E 13.8E	1.1E 30.5E 37.1E 39.4E	8.2E 45.2E 43.2E 42.5E		Ngagasa	0005
Cameroon – Cameroun										
National		1977-78	400E 400E 401E 401E	0.25-0.99 1 2 3	1.3E 2.4E 2.2E 1.8E	20.3E 34.8E 44.0E 42.1E	6.9E 25.5E 20.0E 14.2E		Urban and rural – Urbain et rural	0006
Ghana										
Local	Jan.-Dec. Janv.-déc.	1978-80	858E 858E 858E 858E 858E	0-0.99 1 2 3 4	6.6E 27.8E 20.6E 24.8E 21.5E	0.0E 31.2E 37.8E 37.1E 34.1E	11.5E 35.6E 40.5E 35.2E 27.8E		Accra clinics – Dispensaires d'Accra	0010
Liberia – Libéria										
National		1976	677E 677E 677E 677E 677E	0-0.99 1 2 3 4	3.1E 6.8E 1.4E 0.9E 2.2E	24.2E 48.0E 40.5E 35.6E 39.0E	17.4E 30.8E 20.0E 12.3E 13.4E			0015
Malawi		1969-70	408 327 335 254 256	0-0.99 1 2 3 4	6.8E 27.8E 16.9E 10.4E 2.3E	45.2E 58.7E 64.8E 58.7E 64.4E	23.5E 47.2E 46.4E 35.6E 32.6E		Noabu, Chanzi, Namitambo	0103
Senegal – Sénégal										
Regional = Régional		1979	40 77 220	0-0.99 1 2-4.99	10.6E 19.8E 12.9E				Casamance	0001
United Republic of Tanzania République-Unie de Tanzanie										
Local	Jan.	1970	85 145 129 95 43	0-0.99 1 2 3 4	3.3E 16.1E 4.2E 3.9E 3.9E		20.0E 44.0E 47.2E 38.2E 36.7E		Miola, Lushoto, Tanga, 5 villages	0119

[a] It has been necessary to standardize the analysis and presentation of anthropometric data in order to make international comparisons possible. Prevalences of wasting and stunting were therefore calculated using the median ± 2 S.D. cut-off point, rather than a specified percentage (e.g. 80%) of the reference median. For a justification of this approach, see Waterlow *et al.*, *Bulletin of the World Health Organization* 55, pp. 489-498. — Il a été nécessaire de normaliser l'analyse et la présentation des données anthropométriques en vue de permettre les comparaisons internationales. Pour calculer la prévalence de l'émaciation et du retard de croissance, on a donc pris pour « seuil » 2 E.T. au-dessus ou au-dessous de la médiane, plutôt qu'un pourcentage déterminé (par ex., 80%) de la médiane de référence. Voir la justification de cette approche dans Waterlow *et al.*, *Bulletin de l'Organisation mondiale de la Santé*, 55, pp. 489-498.

[b] The list of sources is available on request from the Nutrition Unit, Division of Family Health, World Health Organization, 1211 Geneva 27, Switzerland. — Pour obtenir la liste des sources, s'adresser au service de la Nutrition, Division de la Santé de la Famille, Organisation mondiale de la Santé, 1211 Genève 27, Suisse.

E = Estimate. — Estimation.

S.D. = Standard deviation. — E.T. = Ecart-type.

Part III — Prevalence of wasting and stunting in the Region of the Americas

WHO gathers anthropometric data from around the world on the nutritional status of children to complement the monitoring of progress towards achieving health for all. The Nutrition Unit has maintained a global nutritional surveillance data base and is presenting a series of tables with the prevalence of wasting and stunting in the WHO Regions.

This article provides information on malnutrition in the Americas. National prevalence figures are given whenever possible, but it should be recognized that there are often substantial differences between areas within countries as well as between seasons. Therefore, special care has been taken to note the months and specific geographical regions from which data have been collected in all surveys.

In almost all countries in the Region of the Americas, acute malnutrition (wasting) is extremely low, although it does increase in the post-weaning period (12-23 months) before stabilizing at low levels. The notable exception is in the lower socioeconomic classes in Trinidad and Tobago, and Honduras. On the the other hand, stunting occurs at high levels in some Central American countries, which may be due partly to the high proportion of a native population living at an overall low socioeconomic level.

Partie III — Prévalence de l'émaciation et du retard de croissance dans la Région des Amériques

L'OMS rassemble dans le monde entier des données anthropométriques sur l'état nutritionnel des enfants afin de compléter la surveillance des progrès réalisés dans la voie de la santé pour tous. Le service de la Nutrition a établi une base de données mondiales sur la surveillance nutritionnelle et présente une série de tableaux indiquant la prévalence de l'émaciation et du retard de croissance dans les diverses Régions de l'OMS.

On trouvera dans le présent article des informations sur la malnutrition dans les Amériques. Si l'on a donné chaque fois que possible les chiffres nationaux de prévalence, il ne faut pas oublier qu'il existe souvent des différences importantes entre les diverses zones d'un même pays, ou encore d'une saison à l'autre. C'est pourquoi l'on s'est particulièrement attaché à préciser les mois et les régions géographiques où les données ont été recueillies dans le cadre de chaque enquête.

Dans presque tous les pays de la Région des Amériques, le taux de malnutrition aiguë (émaciation) est extrêmement faible, bien qu'il augmente dans la période qui suit immédiatement le sevrage (12-23 mois) avant de se stabiliser à un bas niveau — à la notable exception des classes socio-économiques défavorisées de la Trinité-et-Tobago et du Honduras. Pour le retard de croissance, en revanche, les taux restent élevés dans certains pays d'Amérique centrale, ce qui est peut-être dû pour une part à la forte proportion de population aborigène dont le niveau socio-économique est généralement faible.

Table 1.[a] **Anthropometric indicators of nutritional status in the WHO Region of the Americas: prevalence of wasting and stunting**
Tableau 1.[a] **Indicateurs anthropométriques de l'état nutritionnel dans la Région OMS des Amériques: prévalence de l'émaciation et du retard de croissance**

Region, country, area Région, pays, zone	Date of survey Dates des enquêtes		Number examined Nombre examiné	Age group (years) Groupe d'âge (années)	Wasted Emaciation	Stunted Retard de croissance	Low Insuffisance	Obese Obésité	Notes	Ref. No.[b] Réf. N°[b]
					weight-for-height (poids/taille)	height-for-age (taille/âge)	weight-for-age (poids/âge)	weight-for-height (poids/taille)		
	Month(s) Mois	Year(s) Année(s)			Percentage below/above median Pourcentage au-dessous/au-dessus de la médiane					
					−2 S.D. −2 E.T.	−2 S.D. −2 E.T.	−2 S.D. −2 E.T.	+2 S.D. +2 E.T.		
Antigua and Barbuda Antigua-et-Barbuda		1981	88	0-0.99	14.9	3.4	6.8		Vulnerable groups — Groupes vulnérables	0205
			81	1	15.0	17.3	14.8			
			90	2	8.9	3.3	10.0			
			74	3	5.4	5.4	9.5			
			79	4	5.1	3.8	8.9			
			51	5	7.8	7.8	2.0			
Belize District		1979	227	0-0.99	2.7	14.5	9.7		2 districts (1 coastal — côtier, 1 inland — intérieur)	0074
			175	1	5.1	36.0	24.0			
			128	2	2.3	32.0	22.7			
			130	3	1.5	38.5	16.2			
			86	4	4.6	34.9	24.4			
Bolivia — Bolivie National-urban National-urbain		1981	330	0.5-0.99	1.2	14.2	7.6			0075
			687	1	1.8	36.6	16.0			
			580	2	0.3	30.3	8.4			
			558	3		38.9	6.8			
			516	4	0.4	42.6	8.3			
National-rural			457	0.5-0.99	1.8	25.7	14.3			
			706	1	0.5	57.4	31.3			
			723	2	1.1	43.9	14.4			
			569	3	0.0	60.5	17.0			
			637	4	0.0	54.3	11.0			

Table 1 (continued) — Tableau 1 (suite)

Region, country, area Région, pays, zone	Date of survey Dates des enquêtes Month(s) Mois	Year(s) Année(s)	Number examined Nombre examiné	Age group (years) Groupe d'âge (années)	Wasted Emaciation weight-for-height (poids/taille) Percentage below/above median Pourcentage au-dessous/au-dessus de la médiane −2 S.D. −2 E.T.	Stunted Retard de croissance height-for-age (taille/âge) −2 S.D. −2 E.T.	Low Insuffisance weight-for-age (poids/âge) −2 S.D. −2 E.T.	Obese Obésité weight-for-height (poids/taille) +2 S.D. +2 E.T.	Notes	Ref. No.[b] Réf. N°[b]
Brazil — Brésil										
Local		1973-74	137E	0.25-0.49	2.3	27.7	13.1		São Paulo and/et Recife rural	0064
			274E	0.5-0.99	0.5	40.9	18.7			
			409E	1	5.6	45.9	28.8			
			409E	2	1.8	36.1	24.0			
			409E	3	2.4	36.6	19.3			
			409E	4	2.0	38.0	23.4			
Regional — Régional		1981-82	156	0-0.49	1.3	8.3	3.2		Paraiba	0164
			201	0.5-0.99	1.0	26.9	19.9			
			384	1	2.3	45.6	25.5			
			408	2	1.2	39.2	17.6			
			441	3	0.2	40.6	17.9			
			413	4	0.7	44.6	16.7			
			348	5	0.3	45.1	18.7			
Local	July-Aug. Juill.-août	1982	395	1	1.0	12.4	4.8		Rio Grande do Sul	0210
			396	2	0.0	12.3	2.8			
Urban — Urbain		1980-83	3576	1	1.7	3.4			Manguinhos, Rio de Janeiro	0215
			964	2	2.5	8.1				
			582	3	2.1	8.5				
		1983	700	0-0.49	0.7	6.3				0212
			283	0.5-0.99	0.4	5.3				
			297	1	1.0	7.8				
			219	2	2.2	6.8				
Local		1980	56	1	5.4	44.6			Zona de Azucar, Pernambuco	0213
			58	2	5.2	55.2				
			58	3	5.2	48.3				
			53	4	1.9	54.7				
			935	0.5-0.99	6.3	15.8	24.6		Salvador, Bahia	0214
			675	1	5.9	33.8	36.5			
			519	2	4.3	40.5	36.5			
Chile — Chili	Dec. Déc.	1985	30180	0-0.99	0.5	6.4	2.1		80% of all children under 6 — 80% de tous les enfants de moins de 6 ans	0128
			28886	1	0.6	9.4	3.4			
			99999E	2.0-5.9	0.4	10.3	2.0			
Colombia — Colombie										
National		1977-80	405	0-0.99	6.4	5.0	8.6			0077
			319	1	9.8	26.6	23.9			
			369	2	4.1	20.0	15.5			
			338	3	0.0	32.8	18.7			
			331	4	2.4	31.9	19.1			
Costa Rica										
National	July-Nov. Juill.-nov.	1982	374E	0-0.99	1.1	7.8	2.4			0130
			374E	1	2.5	6.9	6.6			
			374E	2	1.9	4.9	6.8			
			374E	3	2.5	7.9	6.2			
			374E	4	1.8	11.6	7.9			
			374E	5	1.7	13.8	8.8			
Dominica — Dominique										
National		1985	86	0-0.49	1.2	1.0	0.0		Colihaut and/et Coulibistre (rural), St Joseph (semi-rural), Newton (urban – urbain)	0209
			100	0.5-0.99	1.0	3.1	3.1			
			130	1	4.2	10.9	9.2			
El Salvador										
National		1965-67	105E	0-0.99	7.0	31.0	18.0			0066
			105E	1	5.9	67.6	50.0			
			105E	2	2.7	64.9	34.2			
			105E	3	1.8	59.1	24.6			
National-rural		1975	472	0.5-0.99	1.8	25.8	14.4			0131
			851	1	2.3	52.7	27.3			
			956	2	1.2	50.1	27.4			
			925	3	0.5	57.2	21.7			
			1076	4	0.2	55.8	17.0			
Guatemala		1965-67	144E	0-0.99	5.2	33.8	23.0			0066
			144E	1	7.4	77.0	53.4			
			144E	2	3.1	66.7	42.6			
			144E	3	0.6	70.3	33.3			
		1969	86	0-1.99	2.4	52.3	29.1		Control villages – Villages témoins; Ladino	0200
			87	2.0-3.99	5.8	70.1	50.6			
			58	4.0-5.99	0.0	77.6	39.7			
Haiti - Haïti										
National		1978	349	0.25-0.49	2.0	6.5	3.8			0068
			722	0.5-0.99	6.8	14.3	23.9			
			1252	1	18.2	35.9	41.5			
			1108	2	8.0	49.8	47.6			
			1047	3	5.9	51.6	39.7			
			868	4	6.4	54.8	44.7			

[a] It has been necessary to standardize the analysis and presentation of anthropometric data in order to make international comparisons possible. Prevalences of wasting and stunting were therefore calculated using the median + 2 S.D. cut-off point, rather than a specified percentage (e.g. 80%) of the reference median. For a justification of this approach, see Waterlow *et al., Bulletin of the World Health Organization* 55, pp. 489-498. — Il a été nécessaire de normaliser l'analyse et la présentation des données anthropométriques en vue de permettre les comparaisons internationales. Pour calculer la prévalence de l'émaciation et du retard de croissance, on a donc pris pour « seuil » 2 E.T. au-dessus ou au-dessous de la médiane, plutôt qu'un pourcentage déterminé (par ex., 80%) de la médiane de référence. Voir la justification de cette approche dans Waterlow *et al., Bulletin de l'Organisation mondiale de la Santé*, 55, pp. 489-498.

Honduras										
Local		1973-82	593	0-0.99	5.8	16.7	13.8		Suburban Suyapa — Faubourgs de Suyapa	0083
			288	1	9.4	39.2	28.1			
			89	2	7.8	48.3	34.8			
			36	3	8.4	74.9	41.7			
		1965-67	102E	0-0.99	4.6	30.2	22.1			0066
			102E	1	9.6	56.4	38.3			
			102E	2	4.0	51.5	36.6			
			102E	3	4.0	54.4	32.0			
Jamaica — Jamaïque										
National		1978	720	0-0.99	3.8	15.7	8.2			0088
			651	1	6.3	14.6	10.9			
			592	2	5.6	9.5	10.5			
			515	3	4.1	9.1	8.4			
			370	4	5.4	8.9	8.4			
Mexico — Mexique										
Local	June-Aug. Juin-août	1978	7	1	0.0	57.1	28.6		Tabasco	0139
			62	2	0.0	41.9	22.9			
			49	3	2.1	59.2	26.1			
			29	4	0.0	58.6	17.9			
Nicaragua										
National	Jan.-Dec. Janv.-déc.	1980-82	230	0-0.99	1.3	10.9	9.1			0100
			324	1	0.3	28.9	9.9			
			364	2	0.6	17.0	9.1			
			333	3	0.3	23.1	11.1			
			360	4	0.6	26.7	12.8			
			135	5	0.0	20.2	3.7			
Panama										
Local		1965-67	101E	0-0.99	2.2	23.9	12.0			0066
			101E	1	8.6	36.5	24.0			
			101E	2	1.0	26.8	14.4			
			101E	3	0.9	32.5	11.4			
National		1980	277	0-0.49	7.9	5.0	6.1			0194
			355	0.5-0.99	8.1	11.6	9.5			
			607	1	6.9	28.8	17.1			
			709	2	6.8	20.3	18.9			
			633	3	4.9	24.2	17.5			
			753	4	5.7	27.2	16.5			
Peru — Pérou										
Local		1971-79	271	0-0.49	1.5	6.6	5.9			0110
			184	0.5-0.99	1.1	22.8	24.5			
			253	1	1.2	42.3	13.4			
			235	2	0.0	33.6	7.7			
			249	3	0.0	33.7	5.2			
			278	4	0.0	38.8	6.5			
			295	5	0.7	41.7	8.1			
			299	6	0.0	48.5	7.0			
			325	7	0.0	46.5	6.5			
			302	8	0.3	47.7	3.0			
			308	9	0.3	49.0	4.9			
District		1985	341	0-0.99	5.1	17.0			Cusco District	0189
			350	1	11.4	58.5				
			332	2	2.4	51.8				
			371	3	1.3	52.0				
			319	4	0.6	48.3				
			293	5	0.0	48.8				
			340	6	0.9	51.5				
			291	7	0.3	45.0				
			230	8	0.8	50.0				
			191	9	0.0	49.7				
Saint Vincent and the Grenadines										
Saint-Vincent-et-Grenadines										
National-rural		1967-70	204E	0-0.99		16.0	11.0		Clinics; cut-off 3rd centile — Dispensaires; seuil 3e percentile	0114
			204E	1		20.0	23.0			
			204E	2		33.0	23.0			
			204E	3		25.0	21.0			
Trinidad and Tobago										
Trinité-et-Tobago										
National		1976	138	0-0.99	3.0	11.6	5.8		Black - Noirs	0071
			148	1	6.8	11.0	10.8			
			150	2	7.3	10.0	10.0			
			129	3	3.9	3.9	4.6			
			99	4	4.0	7.1	6.1			
			116	0-0.99	4.6	10.9	12.1		East Indian - Indiens	
			125	1	16.8	19.2	28.0			
			143	2	17.5	18.2	35.7			
			129	3	18.6	7.8	26.4			
			100	4	20.0	15.0	30.0			
			61	0-0.99	3.4	11.5	9.8		Mixed — Métis	
			61	1	8.2	13.1	11.5			
			69	2	7.3	14.5	13.0			
			60	3	10.0	15.0	13.3			
United States of America										
Etats-Unis d'Amérique		1963-74	2100E	0-0.99	2.3	2.3	2.3		Reference population — Population de référence	0123
			2100E	1	2.3	2.3	2.3			
			2100E	2	2.3	2.3	2.3			
			2100E	3	2.3	2.3	2.3			
			2100E	4	2.3	2.3	2.3			

[b] The list of sources is available on request from the Nutrition Unit, Division of Family Health, World Health Organization, 1211 Geneva 27, Switzerland. — Pour obtenir la liste des sources, s'adresser au service de la Nutrition, Division de la Santé de la Famille, Organisation mondiale de la Santé, 1211 Genève 27, Suisse.

E = Estimate. — Estimation.

S.D. = Standard deviation. — E.T. = Ecart-type.

Part IV — Prevalence of wasting and stunting in the South-East Asia Region

The anthropometric information available from countries in South-East Asia clearly distinguishes this area from others in the world, as there is still a considerable amount of wasting in pre-school and school-age children. The most dramatic levels of acute undernutrition continue to exist in Bangladesh, India and Sri Lanka, and despite the fact that the Nutrition Unit does not have nationally representative information from these countries, the available data do indicate that wasting occurs in about a quarter of the pre-school children, and stunting in approximately one-half of the children from the same age group.

The pattern of stunting in these countries shows an increase with age. However, where there is a high degree of stunting and little wasting, stunted growth may be seen as an adaptation to unfavourable living conditions including lack of adequate food.

In several cases repeated surveys indicate slight improvements in wasting as well as stunting. This seems to have happened in Burma, in some localities of South India, and in Sri Lanka over the past decade. More data, both recent and valid, would be needed to verify such trends.

Partie IV — Prévalence de l'émaciation et du retard de croissance dans la Région de l'Asie du Sud-Est

Les données anthropométriques provenant des pays de l'Asie du Sud-Est font apparaître une nette différence entre cette région du monde et les autres, en ce que l'émaciation y est encore très fréquente chez les enfants d'âge préscolaire et scolaire. Des taux impressionnants de dénutrition aiguë se rencontrent encore au Bangladesh, en Inde et à Sri Lanka, et bien que le service de la Nutrition ne possède pas pour ces pays d'informations représentatives sur le plan national, il ressort des indications disponibles que chez les enfants d'âge préscolaire, 1 sur 4 à peu près souffre d'émaciation et la moitié environ présente un retard de croissance.

Dans ces pays, le retard de croissance augmente avec l'âge. Toutefois, là où le retard de croissance est fréquent et l'émaciation peu répandue, ce retard peut être considéré comme une adaptation à des conditions de vie défavorables, y compris le manque d'aliments adéquats.

Dans plusieurs cas, des enquêtes répétées montrent une légère amélioration de la situation, en ce qui concerne aussi bien l'émaciation que le retard de croissance. C'est ce qui semble s'être produit au cours des 10 dernières années en Birmanie, dans certaines localités du sud de l'Inde, et à Sri Lanka. Pour vérifier ces tendances, il faudrait disposer d'un plus grand nombre de données à la fois récentes et valides.

Table 1.[a] **Anthropometric indicators of nutritional status in the WHO South-East Asia Region: prevalence of wasting and stunting**
Tableau 1.[a] **Indicateurs anthropométriques de l'état nutritionnel dans la Région OMS de l'Asie du Sud-Est: prévalence de l'émaciation et du retard de croissance**

Region, country, area Région, pays, zone	Date of survey Dates des enquêtes		Number examined Nombre examiné	Age group (years) Groupe d'âge (années)	Wasted Emaciation	Stunted Retard de croissance	Low Insuffisance	Obese Obésité	Notes	Ref. No.[b] Réf. N°[b]
					weight-for-height (poids/taille)	height-for-age (taille/âge)	weight-for-age (poids/âge)	weight-for-height (poids/taille)		
	Month(s) Mois	Year(s) Année(s)			Percentage below/above median Pourcentage au-dessous/au-dessus de la médiane					
					−2 S.D. −2 E.T.	−2 S.D. −2 E.T.	−2 S.D. −2 E.T.	+2 S.D. +2 E.T.		
Bangladesh										
National-rural		1982-83	411	0.25-0.99	2.2	50.4	44.0		Except/sauf Chittagong Hill Tracts	0073
			581	1	21.2	72.8	75.0			
			591	2	18.4	76.5	80.5			
			781	3	16.0	78.9	78.8			
			772	4	14.5	84.6	80.4			
			1174	5	17.5	80.5	81.2			
Burma — Birmanie										
National		1980-81	424	0-0.99	21.0	26.4	25.0			0076
			356	1	48.3	57.0	65.5			
			271	2	30.6	69.7	55.0			
National-urban — National-urbain		1983-85	308	0-0.49	0.7	14.9	5.8			0207
			339	0.5-0.99	2.9	31.6	22.7			
			553	1	11.2	52.3	46.3			
			435	2	11.3	64.8	48.5			
National-periurban — National-périurbain			180	0-0.49	7.2	15.6	10.0			
			161	0.5-0.99	14.9	37.3	32.3			
			308	1	27.3	59.4	52.6			
			229	2	22.3	77.7	51.5			
National-rural			708	0-0.49	3.4	19.5	6.8			
			727	0.5-0.99	7.0	34.2	29.2			
			1259	1	17.5	58.2	53.1			
			1048	2	9.4	77.8	51.2			
India – Inde										
Local	Jan.-March Janv.-mars	1983	53	0-0.49	5.7	13.2	11.4		Tamil Nadu	0124
			151	0.5-0.99	25.2	25.2	38.2			
			252	1	36.6	43.3	48.2			
			279	2	22.6	57.0	43.3			
			245	3	9.0	63.7	45.8			
			243	4	14.8	63.8	51.9			
Local		1981-82	416	0-0.99	17.1	23.2	23.4		2 localities in Kerala — 2 localités du Kerala	0196
			451	1	26.8	35.4	51.4			
			443	2	23.5	45.4	62.2			
			451	3	29.5	49.2	62.8			
			460	4	27.9	49.1	61.1			
			442	5	24.4	46.0	59.1			
			398	6	29.7	46.5	65.8			
			394	7	25.6	46.0	59.7			
			391	8	28.5	48.1	59.9			
			364	9	23.5	51.9	60.9			
		1982-83	602	0-0.99	7.8	17.5	15.0		3 localities in Kerala — 3 localités du Kerala	
			649	1	33.6	48.1	57.9			
			721	2	29.9	46.6	65.9			
			739	3	23.9	48.8	62.1			
			741	4	27.9	46.7	59.0			
			739	5	27.3	48.6	61.2			
			682	6	29.0	44.4	64.2			
			674	7	29.1	44.3	60.6			
			651	8	27.1	45.0	61.2			
			530	9	25.6	47.1	64.5			
		1983-84	397	0-0.99	12.3	10.3	16.5			
			586	1	23.7	47.8	51.4			
			671	2	16.9	49.4	55.6			
			743	3	12.8	52.9	53.0			
			730	4	13.0	55.9	52.3			
			709	5	17.1	52.4	53.0			
			780	6	16.2	51.7	57.9			
			642	7	19.5	46.5	57.1			
			654	8	20.0	50.2	61.4			

Table 1 (continued) — Tableau 1 (suite)

Region, country, area Région, pays, zone	Date of survey Dates des enquêtes		Number examined Nombre examiné	Age group (years) Groupe d'âge (années)	Wasted Emaciation weight-for-height (poids/taille) Percentage below/above median Pourcentage au-dessous/au-dessus de la médiane −2 S.D. −2 É.T.	Stunted Retard de croissance height-for-age (taille/âge) −2 S.D. −2 É.T.	Low Insuffisance weight-for-age (poids/âge) −2 S.D. −2 É.T.	Obese Obésité weight-for-height (poids/taille) +2 S.D. +2 É.T.	Notes	Ref. No.[b] Réf. N°[b]
	Month(s) Mois	Year(s) Année(s)								
Indonesia – Indonésie										
Local		1977	512	0-0.99	4.5	27.9	22.3		East Java sample — Echantillon Java oriental	0047
			546	1	16.7	61.9	59.9			
			484	2	11.6	77.7	71.5			
			679	3	6.5	78.9	69.4			
			677	4	7.4	82.0	70.5			
			742	5	6.6	83.2	71.8			
			618	6	7.1	81.9	75.7			
Maldives										
National		1981	133	0.0-4.99	29.3	48.1	56.1		6 island sample — Echantillon de 6 îles	0048
		1983	261	0-0.99	3.1					0099
			350	1	10.3					
			275	2	9.4					
			298	3	5.4					
			301	4	2.6					
Local		1981-82	154	0-4.99	15.6	51.3	53.3		Seenu Atoll — Atoll Seenu	0220
Nepal — Népal										
National		1975	722	0.5-0.99	11.2	48.8	63.2			0049
			1252	1	26.9	73.4	79.0			
			1108	2	12.8	64.2	70.3			
			1047	3	7.3	73.1	65.3			
			868	4	7.0	78.3	65.9			
Sri Lanka										
National		1975-76	1337	0.5-0.99	6.4	28.9	36.9			0051
			2555	1	21.8	47.0	58.6			
			2438	2	12.5	47.0	60.6			
			2491	3	12.8	58.6	60.7			
			2490	4	13.3	62.9	64.7			
National-rural		1978	457	0.5-0.99	8.6	32.8	42.8			0052
			998	1	22.8	49.6	59.8			
			912	2	14.7	47.7	62.3			
			834	3	10.6	54.3	57.2			
			670	4	13.6	59.0	61.9			
Thailand – Thaïlande										
Local		1978	194	0-0.99	3.8	15.0			Khon Kaen Province, rural — Province de Khon Kaen, milieu rural	0053
			273	1	17.9	21.5				
			251	2	7.6	51.4				
			237	3	7.6	38.2				
			272	4	10.7	28.8				
		1983	420	0-0.49	1.2	15.5	2.4		Chiang Mai region — Région de Chiang Mai	0169
			364	0.5-0.99	1.6	17.3	13.5			
			406	1	8.4	34.0	29.3			
			130	2	6.2	32.3	29.2			
			248	3	3.2	26.6	25.8			
			238	4	3.8	31.9	27.3			
			219	5	5.0	36.1	34.3			
District	Jan, Janv.	1984	63E	0.5-0.99	4.7	9.5	18.6		2 tambons in Ubon Province — de la province d'Ubon	0181
			126E	1	13.5	22.5	31.2			
			126E	2	3.0	27.0	23.1			
			126E	3	4.9	36.0	28.8			
			126E	4	5.3	36.1	26.9			
			126E	5	3.4	38.1	30.0			
			126E	6	4.4	41.7	34.0			
		1975	87E	0.5-0.99	5.9	19.1	19.1			0182
			174E	1			38.5			
			174E	2	8.2	43.9	46.8			
			174E	3	6.9	45.7	43.2			
			174E	4	6.6	49.7	42.6			

[a] It has been necessary to standardize the analysis and presentation of anthropometric data in order to make international comparisons possible. Prevalences of wasting and stunting were therefore calculated using the median ± 2 S.D. cut-off point, rather than a specified percentage (e.g. 80%) of the reference median. For a justification of this approach, see Waterlow *et al., Bulletin of the World Health Organization* **55**, pp. 489-498. — Il a été nécessaire de normaliser l'analyse et la présentation des données anthropométriques en vue de permettre les comparaisons internationales. Pour calculer la prévalence de l'émaciation et du retard de croissance, on a donc pris pour « seuil » 2 E.T. au-dessus ou au-dessous de la médiane, plutôt qu'un pourcentage déterminé (par ex., 80%) de la médiane de référence. Voir la justification de cette approche dans Waterlow *et al., Bulletin de l'Organisation mondiale de la Santé*, **55**, pp. 489-498.

[b] The list of sources is available on request from the Nutrition Unit, Division of Family Health, World Health Organization, 1211 Geneva 27, Switzerland. — Pour obtenir la liste des sources, s'adresser au service de la Nutrition, Division de la Santé de la Famille, Organisation mondiale de la Santé, 1211 Genève 27, Suisse.

E = Estimate. — Estimation.

S.D. = Standard deviation. — E.T. = Ecart-type.

Part V — Prevalence of wasting and stunting in the Eastern Mediterranean Region

The anthropometric data from the Eastern Mediterranean Region indicate that in most countries, acute malnutrition (wasting) is not a major problem. The exception to this is in both Somalia and Sudan where wasting occurs in over 30% of preschool age children. However, it should be noted that both of these data sets were collected immediately following drought and emergency situations in which food availability was severely limited. It can be clearly seen that children aged 12-23 months are most sensitive to wasting, both under exceptional conditions as in Somalia and Sudan and under "normal" conditions. This highlights the need to collect and analyse age-specific data on the basis of which food and nutrition policies, including priority interventions and education programmes, can be targeted to the post-weaning period—a crucial stage of early childhood.

Partie V — Prévalence de l'émaciation et du retard de croissance dans la Région de la Méditerranée orientale

Les données anthropométriques provenant des pays de la Région de la Méditerranée orientale montrent que dans la plupart d'entre eux la malnutrition aiguë (émaciation) n'est pas un problème majeur. Deux pays cependant font exception, la Somalie et le Soudan, où l'émaciation se rencontre chez plus de 30% des enfants d'âge préscolaire. Il faut signaler cependant que, dans les 2 cas, les données ont été recueillies après des épisodes de sécheresse et de crise entraînant une pénurie importante de denrées alimentaires. On voit clairement que les enfants âgés de 12 à 23 mois sont les plus vulnérables, que ce soit dans des conditions exceptionnelles comme en Somalie et au Soudan, ou dans des conditions «normales». Cela fait ressortir la nécessité de réunir et d'analyser des données spécifiques selon l'âge, sur la base desquelles on pourra établir des politiques alimentaires et nutritionnelles, avec interventions prioritaires et programmes éducatifs, spécifiquement axées sur la période succédant immédiatement au sevrage, phase critique de la petite enfance.

Table 1.[a] **Anthropometric indicators of nutritional status in the WHO Eastern Mediterranean Region: prevalence of wasting and stunting**
Tableau 1.[a] **Indicateurs anthropométriques de l'état nutritionnel dans la Région OMS de la Méditerranée orientale: prévalence de l'émaciation et du retard de croissance**

Region, country, area Région, pays, zone	Date of survey Dates des enquêtes		Number examined Nombre examiné	Age group (years) Groupe d'âge (années)	Wasted Emaciation	Stunted Retard de croissance	Low Insuffisance	Obese Obésité	Notes	Ref. No.[b] Réf. N°[b]
					weight-for-height (poids/taille)	height-for-age (taille/âge)	weight-for-age (poids/âge)	weight-for-height (poids/taille)		
	Month(s) Mois	Year(s) Année(s)			Percentage below/above median Pourcentage au-dessous/au-dessus de la médiane					
					−2 S.D. −2 E.T.	−2 S.D. −2 E.T.	−2 S.D. −2 E.T.	+2 S.D. +2 E.T.		
Egypt – Egypte										
National	Jan.-Apr. Janv.-avril	1978	807	0.5-0.99	1.7	24.8	18.0		Season of low diarrhoea — Saison de faibles diarrhées	0035
			1815	1	2.6	49.0	29.3			
			1656	2	0.4	41.7	16.1			
			1422	3	0.1	37.5	8.7			
			1265	4	0.3	30.7	7.1			
Iran (Islamic Republic of) — Iran (République islamique d')										
Local		1977	145E	0-0.49	9.2	16.6	9.2		Isfahan, low income — Ispahan, bas revenu	0087
			145E	0.5-0.99	7.8	28.1	24.2			
National-rural		1980	290	0-0.99	14.1	41.4	32.0			0219
			179	1	22.9	57.5	53.1			
			90	2	8.9	56.7	48.9			
			106	3	5.7	63.2	54.3			
			90	4	2.2	58.9	40.0			
			21	5	9.5	33.3				
Jordan – Jordanie										
Local		1975	588E	0-0.99	5.3	22.5	15.4		Rural Amman — Amman (rural)	0036
			588E	1	9.4	38.6	25.4			
			588E	2	2.1	32.8	18.0			
			588E	3	2.1	33.5	13.8			
			588E	4	1.6	35.8	14.2			
Kuwait – Koweït										
National		1983-84	331	0-0.99	9.5	6.3	6.6		Low socioeconomic group — Groupe socio-économique revenu faible	0143
			211	1	3.3	19.9	10.4			
			217	2	2.3	21.7	12.9			
			210	3	1.4	20.5	14.8			
			257	4	0.4	30.6	5.1			
			251	5	1.2	19.5	6.8			
			379	0-0.99	0.8	4.7	0.8		High socioeconomic group — Groupe socio-économique revenu élevé	
			235	1	0.9	7.2	3.4			
			177	2	2.8	3.4	5.1			
			163	3	2.5	3.7	4.3			
			92	4	1.1	4.3	3.3			
			31	5	0.0	12.9	0.0			
			710	0-0.99	4.8	5.5	3.5		Low and high socioeconomic groups — Groupes socio-économiques revenus faibles et élevés	
			446	1	2.0	13.2	6.7			
			394	2	2.5	13.5	9.4			
			373	3	1.9	13.1	10.2			
			349	4	0.6	16.3	4.6			
			282	5	1.1	18.8	6.0			
Libyan Arab Jamahiriya — Jamahiriya arabe libyenne										
Local		1970	92E	0-0.99			14.5		MCH centres Tripoli — Centres PMI Tripoli	0093
			92E	1			27.4			
			92E	2			11.7			
			92E	3			12.5			
			92E	4			6.2			
Pakistan		1984	284	0-0.49		1.0			Attock rural areas — Zones rurales d'Attock	0203
			156	0.5-0.99		3.9				
			288	1		1.0				
			245	2		24.5				
			362	3		13.8				
			354	4		4.5				
			500	5		3.2				
Palestinian refugees – Réfugiés palestiniens		1974	1366	0-0.99	9.0	6.9	13.0		Jordan, Gaza UNRWA camps — Jordanie, Gaza, camps de l'UNRWA	0177
			1219	1	9.4	23.5	23.8			
			953	2	3.6	20.4	16.3			
		1975	963	0-0.99	2.1	7.1	6.9		Jordan, Gaza UNRWA camps — Jordanie, Gaza, camps de l'UNRWA	0179
			821	1	3.3	22.4	14.8			
			571	2	0.9	22.4	12.3			

Table 1 (continued) — Tableau 1 (suite)

Region, country, area Région, pays, zone	Date of survey Dates des enquêtes		Number examined Nombre examiné	Age group (years) Groupe d'âge (années)	Wasted Emaciation	Stunted Retard de croissance	Low Insuffisance	Obese Obésité	Notes	Ref. No.[b] Réf. N°[b]
					weight-for-height (poids/taille)	height-for-age (taille/âge)	weight-for-age (poids/âge)	weight-for-height (poids/taille)		
	Month(s) Mois	Year(s) Année(s)			Percentage below/above median Pourcentage au-dessous/au-dessus de la médiane					
					−2 S.D. −2 E.T.	−2 S.D. −2 E.T.	−2 S.D. −2 E.T.	+2 S.D. +2 E.T.		
Palestinian refugees — Réfugiés palestiniens *(continued – suite)*		1978	1205	0-0.99	4.8	17.2	14.6		UNRWA camps — Camps de l'UNRWA	0038
			1717	1	3.8	34.0	19.2			
			1095	2	1.6	23.6	10.8			
		1984	719	0-0.49	2.0	9.5	5.8		Jordan, Gaza, W. Bank UNRWA camps — Jordanie, Gaza, Rive occidentale, camps de l'UNRWA	0178
			1023	0.5-0.99	2.9	15.2	9.2			
			1758	1	2.5	21.7	7.5			
			1568	2	0.8	14.1	5.3			
			480	3	1.3	16.9	5.0			
			429	4	1.4	18.2	5.4			
Somalia - Somalie	Sept.	1975	58	0-0.99	25.9	14.5	25.8		Drought camps — Camps de la sécheresse	0163
			69	1	63.8	27.1	55.1			
			70	2	48.6	35.4	62.7			
			63	3	17.5	45.9	53.2			
			87	4	41.4	26.4	65.9			
			54	5	14.8	34.5	44.4			
			70	6	21.4	28.6	48.6			
			69	7	17.4	44.9	69.6			
			43	8	14.0	37.2	46.5			
			51	9	13.7	21.6	56.8			
Urban — Urbain			65	6	6.2	12.3	15.4		Mogadiscio	0217
			106	7	11.4	11.3	12.3			
			136	8	10.4	7.4	11.0			
			129	9	13.1	8.5	10.8			
Sudan — Soudan										
Province	March Mars	1983	514	0-0.99	19.6	39.7	37.0		Famine data - Red Sea Province — Données sur la famine - province de la Mer Rouge	0134
			629	1	47.7	62.6	67.7			
			749	2	46.1	53.7	65.4			
			786	3	35.6	45.5	55.2			
			780	4	27.1	38.6	47.4			
Tunisia - Tunisie										
National		1973, 75	293	0-0.99	2.1	24.3	19.1			0042
			279	1	2.6	43.7	27.0			
			267	2	0.4	45.2	20.7			
			307	3	1.0	47.2	22.6			
			344	4	1.2	41.7	17.8			
Yemen - Yémen										
National		1979	164	0.25-0.49	3.6	25.5	20.7			0043
			368	0.5-0.99	8.6	51.7	53.5			
			646	1	16.7	66.2	65.8			
			552	2	9.9	62.7	67.4			
			476	3	8.2	72.6	62.5			
			295	4	10.7	73.0	69.3			

[a] It has been necessary to standardize the analysis and presentation of anthropometric data in order to make international comparisons possible. Prevalences of wasting and stunting were therefore calculated using the median ± 2 S.D. cut-off point, rather than a specified percentage (e.g. 80%) of the reference median. For a justification of this approach, see Waterlow *et al.*, *Bulletin of the World Health Organization* 55, pp. 489-498. — Il a été nécessaire de normaliser l'analyse et la présentation des données anthropométriques en vue de permettre les comparaisons internationales. Pour calculer la prévalence de l'émaciation et du retard de croissance, on a donc pris pour « seuil » 2 E.T. au-dessus ou au-dessous de la médiane, plutôt qu'un pourcentage déterminé (par ex., 80%) de la médiane de référence. Voir la justification de cette approche dans Waterlow *et al.*, *Bulletin de l'Organisation mondiale de la Santé*, 55, pp. 489-498.

[b] The list of sources is available on request from the Nutrition Unit, Division of Family Health, World Health Organization, 1211 Geneva 27, Switzerland. — Pour obtenir la liste des sources, s'adresser au service de la Nutrition, Division de la Santé de la Famille, Organisation mondiale de la Santé, 1211 Genève 27, Suisse.

E = Estimate. — Estimation.

S.D. = Standard deviation. — E.T. = Ecart-type.

Part VI — Prevalence of wasting and stunting in the Western Pacific Region

More than a quarter of the world's total population is found in the WHO Western Pacific Region. The countries of this Region vary considerably with respect to their level of development, and this feature is reflected in the different degrees of wasting and stunting. From the data available, it appears that wasting is extremely low, except in the age group 12-23 months in which, as mentioned in Part I, wasting is commonly at its peak. Some exceptions are also found in other age groups in the Lao People's Democratic Republic as well as in lower socioeconomic groups in Malaysia and Singapore where wasting appears in children under 5 years of age. On the other hand, there are still many children who are stunted in this Region; this is probably because it is too early to feel the impact of the rise in the level of development which has taken place in recent years. In the Philippines, where trends can be assessed from 2 surveys conducted 10 years apart, it is clear that, except for the first year of life, prevalence of wasting, stunting and underweight has decreased. It is hoped that as more data become available, trends in other countries can also be evaluated.

Partie VI — Prévalence de l'émaciation et du retard de croissance dans la Région du Pacifique occidental

La Région OMS du Pacifique occidental regroupe près d'un quart de la population totale du monde. Les pays de cette Région ont des niveaux de développement très variables et cette caractéristique se reflète dans la diversité des degrés d'émaciation et de retard de croissance. D'après les données dont on dispose, il semble que les cas d'émaciation soient extrêmement rares, sauf dans le groupe d'âge des 12 à 23 mois où, comme le mentionne la Partie I, l'émaciation est à son maximum. On trouve aussi quelques exceptions dans d'autres groupes d'âge en République démocratique populaire lao ainsi que dans des groupes socio-économiques défavorisés de Malaisie et de Singapour où l'émaciation se manifeste chez des enfants de moins de 5 ans. En revanche, nombreux sont encore les enfants qui souffrent dans cette Région de retard de croissance; ceci, probablement, parce qu'il est encore trop tôt pour que l'impact de la récente élévation du niveau de développement se fasse sentir. Aux Philippines, où 2 enquêtes organisées avec 10 ans d'écart permettent de déterminer les tendances, il est manifeste que, sauf pour les enfants de moins d'un an, la prévalence de l'émaciation, du retard de croissance et de l'insuffisance pondérale a diminué.
On espère qu'au fur et à mesure de la publication de nouvelles données, il sera également possible d'évaluer les tendances d'autres pays.

Table 1.[a] **Anthropometric indicators of nutritional status in the WHO Region for the Western Pacific: prevalence of wasting and stunting**
Tableau 1.[a] **Indicateurs anthropométriques de l'état nutritionnel dans la Région OMS du Pacifique occidental: prévalence de l'émaciation et du retard de croissance**

Region, country, area Région, pays, zone	Date of survey Dates des enquêtes		Number examined Nombre examiné	Age group (years) Groupe d'âge (années)	Wasted Emaciation	Stunted Retard de croissance	Low Insuffisance	Obese Obésité	Notes	Ref. No.[b] Réf. N°[b]
					weight-for-height (poids/taille)	height-for-age (taille/âge)	weight-for-age (poids/âge)	weight-for-height (poids/taille)		
	Month(s) Mois	Year(s) Année(s)			Percentage below/above median Pourcentage au-dessous/au-dessus de la médiane					
					−2 S.D. −2 E.T.	−2 S.D. −2 E.T.	−2 S.D. −2 E.T.	+2 S.D. +2 E.T.		
China — Chine										
Regional — Régional		1980	108	6	2.8	10.6	0.9		5 provinces	0224
			360	7	1.7	21.1	4.6			
			478	8	2.1	26.4	4.7			
			505	9	2.4	27.1	6.6			
Province of Taiwan — Province de Taiwan		1971	161	8	1.2	19.9	16.8		Pescadores	0197
			195	8	3.6	15.4	8.2			
			244	9	0.4	17.6	9.4			
			66	7	0.0	57.6	15.2		Aborigines — Aborigènes	
			53	8	0.0	56.6	11.3			
			66	9	0.0	50.0	16.7			
Democratic Kampuchea — Kampuchea démocratique . . .		1971	208	7	3.9	66.8	51.4			0201
			382	8	3.2	60.0	51.3			
			410	9	5.0	74.4	59.8			

Table 1 (continued) — Tableau 1 (suite)

Region, country, area Région, pays, zone	Date of survey Dates des enquêtes		Number examined Nombre examiné	Age group (years) Groupe d'âge (années)	Wasted Emaciation	Stunted Retard de croissance	Low Insuffisance	Obese Obésité	Notes	Ref. No.[b] Réf. N°[b]
					weight-for-height (poids/taille)	height-for-age (taille/âge)	weight-for-age (poids/âge)	weight-for-height (poids/taille)		
	Month(s) Mois	Year(s) Année(s)			Percentage below/above median Pourcentage au-dessous/au-dessus de la médiane					
					−2 S.D. −2 E.T.	−2 S.D. −2 E.T.	−2 S.D. −2 E.T.	+2 S.D. +2 E.T.		
French Polynesia — Polynésie française		1982	691	0.5-0.25	2.3	1.0	0.2		Papeete	0135
			572	1	2.5	1.7	3.7			
			635	2	0.6	1.9	1.1			
Hong Kong										
National		1961	226	8	8.4	11.5	18.1		High socioeconomic group — Groupe socio-économique à revenu élevé	0187
			184	9	6.2	6.5	10.3			
			217	6	7.8	7.8	12.5		Middle socioeconomic group — Groupe socio-économique à revenu moyen	
			249	7	9.6	13.2	18.1			
			258	8	8.2	13.9	20.2			
			209	9	7.7	18.2	23.0			
			285	6	6.3	13.3	15.8		Low socioeconomic group — Groupe socio-économique à bas revenu	
			650	7	6.8	20.2	22.6			
			531	8	7.5	27.1	33.3			
			543	9	9.4	25.2	25.1			
Japan - Japon										
National		1980	2691	0-0.99		3.4	1.3		Boys — Garçons	0138
			3322	1		5.2	4.7			
			966	2		3.6	5.4			
			867	3		4.2	2.4			
			894	4		9.2	4.6			
			950	5		8.5	4.7			
			543	6		7.7	4.0			
			2605	0-0.99		2.1	0.8		Girls — Filles	
			3177	1		3.4	3.1			
			919	2		3.0	4.2			
			817	3		4.5	5.0			
			904	4		5.8	3.1			
			962	5		6.3	2.8			
			443	6		7.7	1.7			
			5296	0-0.99		2.7	1.1		Sexes combined — Deux sexes	
			6499	1		4.3	3.9			
			1885	2		3.3	4.8			
			1684	3		4.4	3.7			
			1798	4		7.5	3.8			
			1912	5		7.4	3.8			
			986	6		7.7	2.9			
Kiribati										
Local		1979	179	0-0.99			2.5		Butaritari South, Abaing	0029
			140	1			26.8			
			87	2			17.6			
			63	3			4.0			
			17	4			12.1			
Lao People's Democratic Republic République populaire démocratique lao										
National		1984	426	0-0.49	6.0	14.0	5.0		40% creches/crèches, 60% 5 provinces	0089
			555	0.5-0.99	12.0	25.0	24.0			
			1042	1	20.0	43.0	49.0			
			975	2	12.0	42.0	43.0			
			1212	3	9.0	46.0	42.0			
			1845	4	8.0	44.0	34.0			
Malaysia — Malaisie										
Regional — Régional	March Mars	1982	17	0-0.99	6.0	0.0	6.0		Sabah State — Etat de Sabah	0091
			17	1	12.0	47.0	29.0			
			21	2	5.0	33.0	19.0			
			15	3		27.0	33.0			
			14	4		43.0	29.0			
			11	5		43.0	27.0			
Local		1980	73	0-0.99	2.7	26.0	13.7		Malays (poor rural kampungs) — Malais (kampungs ruraux défavorisés)	0090
			94	1	6.4	37.2	33.0			
			65	2	4.6	41.5	44.6			
			76	3	6.6	48.7	46.0			
			91	4	5.5	56.0	38.5			
			70E	5	1.6	54.0	49.2			
			70E	6	2.6	57.0	47.4			
			70E	7	2.8	57.0	42.1			
			70E	8	1.7	49.1	40.5			
			70E	9	1.0	47.6	37.9			

Table 1 (continued) — Tableau 1 (suite)

Region, country, area Région, pays, zone	Date of survey Dates des enquêtes		Number examined Nombre examiné	Age group (years) Groupe d'âge (années)	Wasted Emaciation	Stunted Retard de croissance	Low Insuffisance	Obese Obésité	Notes	Ref. No.[b] Réf. N°[b]
					weight-for-height (poids/taille)	height-for-age (taille/âge)	weight-for-age (poids/âge)	weight-for-height (poids/taille)		
	Month(s) Mois	Year(s) Année(s)			Percentage below/above median Pourcentage au-dessous/au-dessus de la médiane					
					−2 S.D. −2 E.T.	−2 S.D. −2 E.T.	−2 S.D. −2 E.T.	+2 S.D. +2 E.T.		
Papua New Guinea — Papouasie-Nouvelle-Guinée										
National-rural		1969-70	119	0-0.99	3.4	14.3	16.0		Kar Kar, Lufa	0223
			108	1	20.4	58.3	56.5			
			116	2	4.3	42.2	42.2			
			119	3	2.5	57.1	35.3			
			91	4	1.1	54.9	27.5			
			119	5	4.2	45.4	29.4			
Philippines										
National		1971-75	1098	0-0.99	6.1	26.0	25.0			0058
			1113	1	15.7	66.5	58.8			
			1040	2	8.5	60.6	57.3			
			1014	3	5.5	63.4	53.1			
			926	4	5.6	56.7	53.2			
National	Feb.-May Févr.-mai	1982	419	0-0.99	2.6	43.2	31.0			0218
			489	1	6.8	40.5	35.0			
			455	2	5.9	40.2	32.3			
			433	3	3.9	43.2	31.6			
			467	4	4.1	43.0	32.8			
			406	5	5.7	47.3	36.7			
			358	6	6.4	42.7	31.8			
Singapore — Singapour										
National		1970-77	1815E	0-0.99	0.9	5.9	6.3		78.5% Chinese, 14.9% Malays, 6.5% Indians — Chinois 78,5%, Malais 14,9%, Indiens 6,5%.	0059
			1815E	1	9.4	10.2	17.9			
			1815E	2	4.4	6.5	16.5			
			1815E	3	4.4	11.4	17.1			
			1815E	4	5.7	12.5	20.3			
National-urban — National-urbain			593E	0-0.99	1.8	10.2	11.3		Malays — Malais	
			593E	1	15.2	22.2	32.7			
			593E	2	7.4	21.7	37.2			
			593E	3	3.9	28.7	31.8			
			593E	4	7.6	32.2	31.3			
			937E	0-0.99	0.8	4.8	4.6		Chinese — Chinois	
			937E	1	7.6	7.8	14.4			
			937E	2	2.8	3.6	11.2			
			937E	3	3.6	7.9	12.9			
			937E	4	4.6	9.8	17.2			
			284E	0-0.99	3.9	9.6	15.6		Indian — Indiens	
			284E	1	18.2	11.9	26.1			
			284E	2	16.3	7.4	33.3			
			284E	3	15.1	13.7	34.2			
			284E	4	15.2	19.2	33.3			
Solomon Islands — Iles Salomon										
National		1970	160	0-0.99	15.2	15.0	15.6			0060
			168	1	14.9	32.7	26.8			
			138	2	2.9	29.7	20.3			
			171	3	5.3	31.0	23.4			
			150	4	1.3	42.0	24.0			
Local		1980	133	0-0.99	3.0	16.9	9.6		Atoifi	0170
			142	1	3.6	45.8	28.2			
			152	2	1.3	32.2	18.4			
			149	3	0.7	34.2	14.8			
			119	4	0.8	42.9	12.6			
Viet Nam		1986		0-4.99	7.0	59.7	51.5			0202

[a] It has been necessary to standardize the analysis and presentation of anthropometric data in order to make international comparisons possible. Prevalences of wasting and stunting were therefore calculated using the median ± 2 S.D. cut-off point, rather than a specified percentage (e.g. 80%) of the reference median. For a justification of this approach, see Waterlow *et al.*, *Bulletin of the World Health Organization* 55, pp. 489-498. — Il a été nécessaire de normaliser l'analyse et la présentation des données anthropométriques en vue de permettre les comparaisons internationales. Pour calculer la prévalence de l'émaciation et du retard de croissance, on a donc pris pour «seuil» 2 E.T. au-dessus ou au-dessous de la médiane, plutôt qu'un pourcentage déterminé (par ex., 80%) de la médiane de référence. Voir la justification de cette approche dans Waterlow *et al.*, *Bulletin de l'Organisation mondiale de la Santé*, 55, pp. 489-498.

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E = Estimate. — Estimation.

S.D. = Standard deviation. — E.T. = Ecart-type.

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