LESSON 4

ASSESSMENT AND SURVEILLANCE OF NUTRITIONAL STATUS

Suitable methods must be adopted for the rapid and objective measurement of the nutritional status:

- of individuals eligible for special food relief (individual screening);

- of communities, in order to detect changes with time and decide priorities in food distribution (nutritional surveillance).

Selection of participants

The method used to select participants from the vulnerable groups is based on:

- nutritional status of infants and pre-schoolers, e.g. weight is less than 80% of reference weight-for-age or weight-for-height (p.__);

- factors known, from baseline data, to be associated with malnutrition (such as economic status) so "at risk" individuals are identified (Table __, p.__);

- the resources available.

Participants should, if possible, be enrolled in the SFP as soon as they are identified, for example, a malnourished child in a health unit, a pregnant woman at a pre-natal clinic. Sometimes participants are selected during a health screening as they enter a refugee camp. Others are identified in surveys of the community/camp.

Weight-for-height is the best indicator for the diagnosis of nutritional status, nutritional surveillance, and individual screening. Weight-for-age and arm circumference are less reliable for assessment and screening but can be used to measure changes with time. Edema rates are a valuable indicator when kwashiorkor is the prevalent form of PEM in the area.

Results of surveys and surveillance must be interpreted with caution. They can be misleading unless the individuals measured are representative of the whole population and the technique is standardized and properly used. To obtain data which represents the entire population, it is necessary to

conduct a random sample survey of the population. (See Appendix 1 fpr specific techniques to conduct a random sample in a refugee camp.)

Why measure malnutrition in emergencies?

During a nutritional emergency, the relief foods may be scarce and should be given to the people in greatest need. Since much of a population may be able to supply part or all of its own food, it is very useful to have an objective and quantifiable measure of nutritional status.

Measurement of nutritional status in emergencies relies mainly upon taking body measurements (anthropometry), particularly height, weight, and arm circumference. Valuable information may also be obtained from simpler methods, for example, monitoring clinic records or measuring the prevalence of edema.

Body measurements

A very great effort should be made to measure children accurately. Small errors (e.g., 2-3 cm in height) in the measurement of a younger child may lead to significant errors in the classification of the child's nutritional status.

Select only one indicator:

- Weight-for-height, the recommended body measurement in times of emergency, is a sensitive indicator of acute malnutrition. It is fairly independent of sex, race, and age (up to about 10 years of age). It requires a sufficient number of robust scales and adequate training of personnel. Neither condition is easy to meet in an acute emergency situation.

- If weighing scales are not available, upper middle arm circumference may be measured to determine nutritional status but changes in body size are difficult to detect by this method (p.__).

- If ages are not known, arm-circumference-for-height is the best alternative. Measuring arm circumference instead of weight results in only a marginal saving of time compared to that required for travelling and assembling people. Several techniques such as the QUAC stick (Appendix 12) have been devised to simplify field work and are useful for the screening of large numbers of children.

- As a second alternative, measurement of arm circumference alone (without measurement of height)

is acceptable in situations where resources are extremely limited. Considerable time is saved by not measuring height. The sensitivity of the measurement as an indicator is poor but is sufficient in situations where PEM is severe and widespread.

Techniques

1. Weight measurement

- Check the scales daily with the same known weight (e.g., a piece of metal or rock), having first set the scale at zero.

- Remove the child's shoes and at least heavy clothing (a standard routine should be followed). Infants can be weighed without clothing to give more accurate readings.

- If a beam balance with a tray is used, make sure that the child sits properly and is not holding his mother or the stationary part of the scales. Beam scales should lie on a stable and horizontal surface (e.g., a wide board or a table).

- Read a weight to nearest 100 g.

Various types of scales can be used in field conditions. For example:

- UNICEF standard beam balance: accurate, robust, for fixed centers. Frequent transportation on rough roads is not recommended.

- Healthometer (Continental Scale Corporation, USA): a beam balance, accurate and robust, suitable for use by mobile teams.

- Portable Salter scale (CMS Weighing Equipment, Ltd, England): (See Figure 4-1) in which the child is suspended from the scale which is hung from a branch or a tripod. Special "pans" are used to weigh babies. Robust, cheap, and easy to carry, these scales should be replaced after one year because of stretching of the spring and inaccurate readings. The mold with readings up to 25 kg (x 100 g) is recommended.

- Bar scales with platforms have been used in fixed centers. Their use requires training and caution. They may be too bulky and heavy for use by mobile teams.

- The Horms beam balance scale which is sturdy, accurate, and relatively easy to carry in a small car. It can be used for all age groups.

Bathroom scales are not recommended.

Most types of scales (especially beam scales) are sensitive to dust and mud.

Figure 4-1

Salter scale

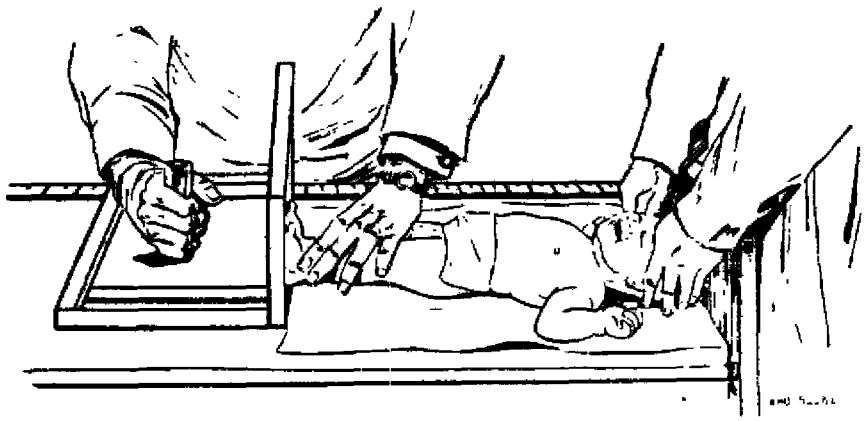
2. Height measurement

Use a baby-board (see Figure 4-2) for children unable to stand up (under 2 years or less than 85 cm). Children should be quiet, relaxed (having a parent hold the child usually helps), and lying straight. Gentle pressure should be applied upon both knees with one hand and care taken to see that the slide is in contact with the whole surface of the soles of the child's feet, not just the toes. Measure to 1 cm (round off to the nearest cm: e.g., 90.0-90.5 cm = 90 cm, 90.5-90.9 cm = 91 cm).

When an upright measure is used the subject's heels should be together and touch the base of the upright, and the buttocks, the back of the heels, and the upper back should be in contact with the measuring stick (which can be locally made). Measurement is to the highest point of the head when the child is looking straight ahead. Shoes should be removed. On average, children are about 1 cm shorter when standing up than when lying down.

Figure 4-2

Using a baby-board to measure a child

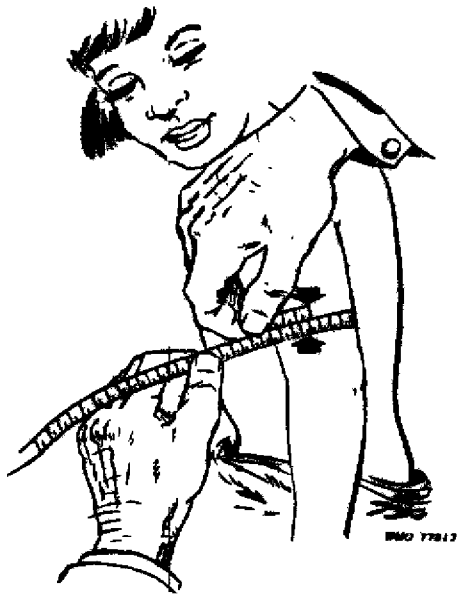


3. Arm-circumference measurement

The circumference is measured on the left upper arm half way between the end of the shoulder (acromion) and the tip of the elbow (olecranon). To locate this point, the arm is flexed at a right angle. Then the arm is allowed to hang freely and a tape-measure (preferably of fiberglass) put firmly around it. Do not pull too tight (Figure 4-3).

Figure 4.3

Measuring arm circumference



Tapes or strips can be made locally from thin cardboard or X-ray films which are marked off in centimeters. 1 Special plastic tapes (insertion tapes) have been manufactured (Figure 4-4).

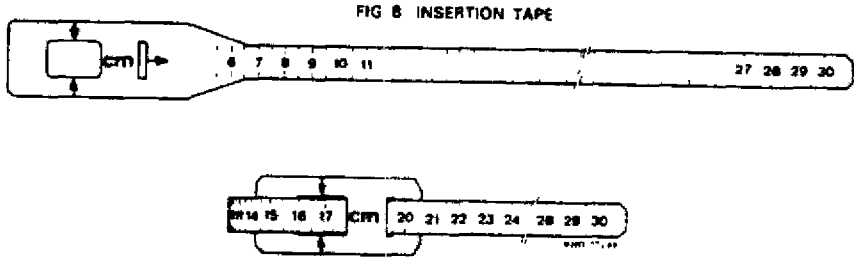
Bangles, worn as arm ornaments in some countries, can be used for a rough screening of severely malnourished

1 The cardboard tape or strips, X-ray films, or 8-mm cine films can be colored according to the classification of the reading. (The X-ray film should first be scratched with a sharp point and then colored with a spirit-based felt-tipped pen not quite up to the scratch line. Cut the film into 1-cm strips with scissors. About 40 strips can be made from one large X-ray film.)

children. A bangle of standard diameter is passed up the arm in one straight push. If it goes above the elbow, the arm circumference is too small and the child is regarded as malnourished. A bangle 4.0 cm in diameter passes up arms that are up to about 13.2 cm in circumference (the measurable circumference depends on the flexibility of the bangle). This technique is very simple and cheap, but of little accuracy because the bangle assesses the maximum arm circumference and not the circumference halfway between shoulder and elbow. It may be useful, however, when resources do not permit any other measurement to be made.

Figure 4-4

Insertion Tape



From, Zerfas, A. J. *Am. J. clin. Nutr.* 28: 782-787 (1975)

- Initial assessment. A rapid survey of the population should be done before initiating a relief program, in order to identify the areas or groups that are most affected. Surveys of this type need to be carefully designed and conducted by an experienced team. They will not be considered further. 2

- Individual screening. Body measurements may be used to select the malnourished individuals eligible for food relief for themselves or their whole family.

- Nutritional surveillance of the population. The repeated measuring of entire communities gives an idea of differences among the various population groups and changes in nutritional status with time. It may be used to decide priorities in the distribution of relief and will also provide some information about the effectiveness of the relief program. In nutritional surveillance one is not interested in monitoring the progress of a specific child, but in knowing whether the overall nutritional condition of village (or camp) A is good or bad, or better or worse than that of village B and C (and so requires more supplies and personnel), and whether it

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2 Interested readers are referred to: Guide to food and health relief operations in disasters. New York, Protein-Calorie Advisory Group of the United Nations System, 1977.

is improving or deteriorating with time. Nutritional surveillance should not be confused with the "surveillance" or follow-up of an individual child in nutrition centers or health services.

Interpreting body measurements

Certain deficiencies can be readily detected by clinical signs assessed by touching or examination without the use of instruments or tests. These include: edema, clinical marasmus, night blindness, xerophthalmia and other vitamin or mineral deficiencies (see _____).

In a very severe famine with widespread advanced starvation, clinical signs are most useful as indicators and may be temporarily sufficient when resources are limited. The main problem lies in the fact that observations by different persons are not easily comparable and can hardly be standardized. The use of body measurments to detect malnutrition must be interpreted appropriately to correct the problem.

Malnutrition can also be caused by ignorance or faulty feeding habits in the presence of sufficient food. The results of body measurements can be misleading if considered in isolation.

Chronic undernutrition leads to a slowing in a child's rate of growth. A chronically malnourished child will be short for his age ("stunted") although he may be of otherwise normal proportions.

An acute episode of severe undernutrition results in a loss of muscle and fat which are used up to provide energy, and the individual becomes thinner without significant effect upon height ("wasting").

In an emergency what is important is the measurement of acute malnutrition, the effects of chronic malnutrition being of less concern. Because both stunting and wasting result in low weight-for-age, relating body measurements to age is not recommended. Two measurements are commonly used to assess acute malnutrition ("wasting"):

- Weight-for-height. Here a child's weight is compared with the height of a "reference" (well-nourished) child of the same height. Results are expressed as "percentages of reference", e.g., 80% of standard weight-for-height or in relation to (above or below) a pre-selected cut-off point. 3

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3 Cut-off points at 2 or 3 standard deviations below the median reference values were recently recommended (see Appendix 12).

- Arm circumference (AC). Well-nourished children have a nearly constant arm circumference (about 16 cm) between 1 and 5 years. Undernourished children have a thinner upper arm and a smaller AC. Children can be classified as malnourished if their AC falls below a specified level. If ages are not known, AC can be related to height (arm-circumference-for-height), otherwise known as the QUAC stick method.

Different techniques give different rates of malnutrition. For instance, if a cut-off-point of 80% arm-circumference-for-height is used, this will often give a higher "rate" for malnutrition than will 80% weight-for-height. (In many countries where chronic malnutrition is common, 90%, 80%, and 70% weight-for-height are very roughly equivalent to 80%, 70%, and 60% weight-for-age respectively.)

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Examples of classification

	Arm circumference (AC) [a] (c/m)	AC-for-height (% of reference standard)	Weight-for-height [b] (% of reference standard)
A Three categories			
Well nourished and mild PEM	13.5 or more	85 % or more	80 % or more
Moderate PEM	12.5–13.5	70–85 %	70–80 %
Severe PEM	under 12.5	under 70 %	under 70 %
B Two categories			
Well nourished and mild PEM	13 or more	75 % or more	80 % or more
Clearly malnourished	less than 13	under 75 %	less than 80 %

[a] Arm circumference might be used alone for children under 5, although this is not recommended. A child would be classified as malnourished if the AC was less than a minimum acceptable value (cut-off point)

[b] Cut-off points 2 or 3 standard deviations below the reference median have recently been recommended (see Annex 3)

Conducting individual screening

Objectives

First decide what criteria (e.g., weight-for-height, arm-circumference-for-height, QUAC stick measurements, edema) are to be used for the screening. When body measurements are used and the choice is between four courses of action (e.g., no assistance, weekly ration, daily ration,

and intensive supervised feeding), four categories of classification should be established.

There is, for instance, very little point in selecting a large number of malnourished children unless facilities are available and organized for them. Obtain a rough estimate of the proportion of malnourished children in a large population by quickly measuring 200 children (see Appendix 12).

Decide which population is to be screened. This will depend upon the local situation, but remember that people attending relief centers are not necessarily the worst off. Malnourished individuals may remain at home, because they are unable to walk, live in relatively inaccessible areas, or, in the case of marasmic children, are not regarded by their parents as being in need of help.

Procedure

Inform the community through local leaders at least 24 hours in advance to allow them to arrange for all eligible people to attend. Choose a time that is convenient for the community.

When large numbers of people are to be screened, make sure that they are well organized and, if at all possible,

sitting down out of the sun. Convert existing buildings, wherever possible, into temporary screening locations.

Select the severely malnourished first, by clinical examination. If people are well organized, this can be done very quickly by walking along rows. Do not keep severely ill people waiting for long periods of time.

Use a system of individual identification, i.e., date-stamp the feeding card or mark the individual's finger nail with a 10% silver nitrate solution.

Use clearly defined criteria for selection, e.g., pregnant and lactating women, the very old, and/or all children shorter than some designated height--105 cm is the approximate average height of a 5-year-old.

Make sure each individual understands what is being done. Food may be distributed immediately as the direct result of a screening. In this case, the individual should be shown to the appropriate distribution point.

Screening may be done on each occasion that food is distributed or intermittently, in which case each individual (or family) is given a card that entitles him to food at several subsequent distributions.

If whole communities are being screened, record the results. These can be useful for making comparisons with future measurements. Record the results of other observations, e.g., edema (Figure 5-5)

Staff and equipment

A team of six workers given one day's training can screen from 500 to 2000 persons a day. Efficiency decreases in sparsely populated areas. It is quicker to use the QUAC stick (AC-for-height) than weight-for-height.

The equipment needs for each measuring team are:

- 2 tape-measures (ideally of fiberglass or locally made), if AC is to be measured;
- 1 scale with an adequate support (table or tripod) and 1 spare;
- 1 measuring stick and a baby-board to measure height (or length);
- a known weight to check the accuracy of the scale (e.g., a piece of metal or rock);
- ration cards, special ration entitlements, etc.;

2 rubber date-stamps one official stamp to validate the ration card (important for preventing abuses), a table, and a chair;

- tally forms for recording edema or other clinical signs (Figure 4-5) and the number of children falling into different population categories. Lactating or pregnant women should not be classified with females of 10-54 years but in a special category. The tabulation is completed at the end of the day and the percentage of edema per age groups and sex is entered on a special form.

Figure 4-5

Edema tally form

Group	Height (cm)	Male		Female	
		No oedema	Oedema	No oedema	Oedema
Unable to walk (0 – 1 years)	under 75	IIII	I	III	I
Preschool children (1–4 years)	75 - 105	𝍸	IIII	𝍸 II	IIII
School children (5–9 years)	105 136	IIII	II	III	II
Active population[b] (10–54 years)	over 136	𝍸 I		𝍸	
55 years or more		𝍸 III	I	𝍸 𝍸 I	
Lactating women				𝍸	II
Pregnant women				III	I
TOTAL		27	8	37	10

WHO 77817

[a] 𝍸 = 5
[b] Excluding lactating or pregnant women.

Conducting nutritional surveillance 4

Under most circumstances the nutritional status of children under 5 can be taken to reflect the nutritional status of the whole community. However, in cultures where the feeding of children has precedence over that of the parents, it may be the adults who are most affected by starvation.

Weight-for-height is a suitable measurement for adults between 15 and 50 years old. However, the range of values which can be regarded as normal is much wider for this age group than for young children (see Appendix 3).

To measure changes in the nutritional status of a large population accurately over a period of time requires exacting sampling standards and techniques (see Appendix 3).

However, some useful information can be obtained by relatively simple methods.

1. Where vulnerable groups are periodically screened for food distribution, using body measurement or other indicators for nutritional status

4 The surveillance of communicable diseases is dealt with in Lesson 5.

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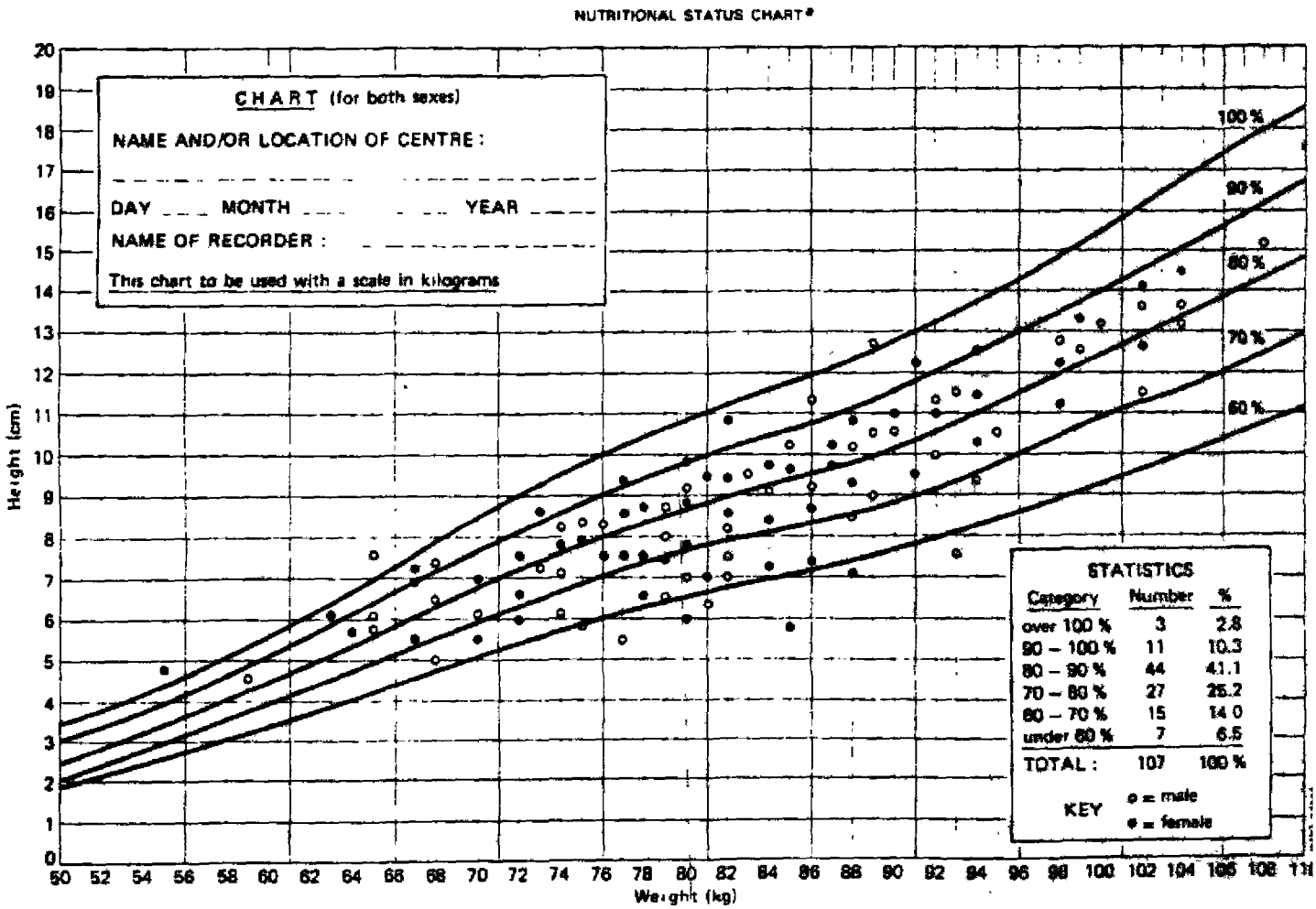
Data collected during screenings can be recorded and comparisons made between measurements. Results of anthropometric measurements should be arranged by 10% groupings, and converted to percentages (see Figure 4-6) This gives "nutritional profiles" of the community on two or more occasions. These can be compared directly to see if the proportion of the malnourished is changing, and in what way.

Figure 4-6



* Adapted from CAPONE, C. A growth surveillance system for food and nutrition programs. In *Integrating Title II program with locally operated nutrition, socio-economic and humanitarian activities* Catholic Relief Services 1977 (mimeographed)

The basic data [illegible] same as those used by WHO for [illegible] forthcoming publication which gives specifications for a model growth chart. The [illegible] measurements for children being screened are plotted on the graph [illegible] end of the day, the chart gives [illegible] nutritional status of the community co[illegible] at the time of the screening. The [illegible] for each child is easily determined from the chart. Measurements falling on a curve are included in the statistics for the category beneath the curve—e.g. *a child ranked at 90 % will be included in the category 70–80 %.*

If part of the population is being screened and having food distributed to it, this group is obviously not representative of the population at large. The required information can only be obtained by sample surveys of the whole population (see Appendix 1).

Comparisons between two measurements taken from the same community should be interpreted with caution. The fact that the death rate for malnourished children is generally very high may lead to a false impression of improvement. For example:

	1st measurement		2nd measurement
Number over 80% of reference standard	36	1 death	35
Number under 80% of reference standard	$\frac{12}{48}$ (25%)	6 deaths	$\frac{6}{41}$ (15%)

Here, there seems to have been an improvement from 25 percent to 15 percent below the reference standard whereas, in fact, the situation has deteriorated.

It should also be remembered that real improvement might be caused by climatic or economic factors in spite of an inefficient food relief program.

Even small differences in the procedure used during a screening may cause a different group of people to attend. If the first screening is held early in the morning the group measured will be different from that measured at a

second screening held at midday, when people are at work. The differences introduced by such variations can be very large and lead to false conclusions.

Indicators other than body measurements can be used for screening, either singly or in combination. Since organization and travelling take up so much working time, several indicators should be estimated on the same occasion, e.g., edema, specific signs of vitamin deficiency.

2. Where vulnerable groups are not regularly screened

Data collected weekly at fixed health facilities and maternal and child health centers can give some idea of changes, e.g., number and complaints of individuals attending for health care or nutritional relief. Data of this kind should be used with caution because they do not give a picture of the whole population but only of those who:

- feel that they need medical attention, whatever the reason;

- can physically attend the health facilities (e.g., live within walking distance, etc.).

Procedure

Local auxilaries can be temporarily recruited and trained to carry out the surveillance of simple symptoms and signs of malnutrition at the camp or village level.

The training can, for instance, be organized as follows:

1 day:

- major signs of PEM (wasting, edema)
- investigation of night blindness
- diagnosis of major eye lesions due to vitamin A deficiency
- clinical signs of other vitamin deficiencies

1 day:

- drill in measuring weight (or arm circumference) and height reporting system

1 day:

- field test

Visiting schedules for auxilaries must be carefully prepared by a census of the dwellings (houses, tents) involved. Conclusions based on a poorly organized and supervised surveillance system are not valid.

On completing a regular cycle of visits, the auxiliary will report the total number of families and children visited as well as the number of persons presenting the selected signs, by age and sex. Rates should be calculated centrally.

Other indicators for the evaluation of relief programs

The following indicators can be useful in evaluating a relief program:

- Age distribution of children attending relief centers compared with the age distribution from census data.

- Monthly attendance rate of children registered. This is obtained by dividing the monthly average number of those attending by the total number of children registered.

- Malnutrition rates in people attending relief centers compared with similar rates obtained by an occasional survey of random samples and house-to-house visits in the same area. This indicator is essential in measuring the impact on participants of the SFP.

The following data can be obtained from analysis of a random sample of registration cards or growth charts:

- Percentage of children losing weight over 1 month. Weight gain over a long period of time is no proof of a successful program. Undernourished children may gain some weight and still fall into a lower nutritional category.

- Percentage of children shifting to another nutritional category in a given period of time (e.g., from 70-80% weight-for-height up to 80-90% or down to 60-70%). This information can easily be taken from the simplified growth chart (Figure 4-7).

- Weight gain processed as weight gain divided by the last weight, the results being expressed as g/kg.

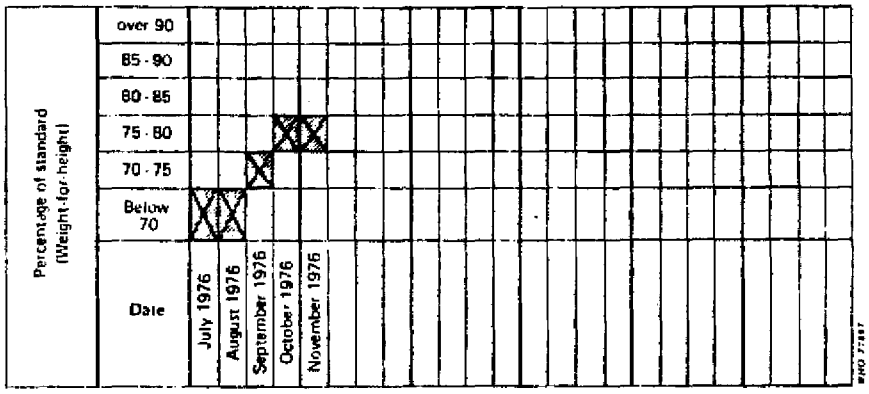
The daily weight gain in "normal" reference children between 1 and 5 years old is about 1 g/kg. In malnourished children, the gain must be higher to indicate recovery.

Figure 4

SIMPLIFIED GROWTH CHART [a]

NAME..... FATHER'S NAME.....

VILLAGE ..... DATE FIRST SEEN.....Estimated age: .....



[a] Adapted from: CAPONE, C. A growth surveillance system for food and nutrition programs. In: *Integrating Title II program with locally operated nutrition, socio-economic and humanitarian activities*. Catholic Relief Services, 1977 (mimeographed)

This chart is to be used in conjunction with the nutritional status chart (Fig. 9). Kept by the mother, it can be printed on the reverse side of a ration card. The information is recorded weekly or monthly.

LESSON 5

COMMUNICABLE DISEASE SURVEILLANCE, TREATMENT AND PREVENTION

There is a close association between infectious disease and malnutrition. The provision of basic medical care is an important part of a nutritional relief program. Where people are suffering badly from the effects of a food shortage, the provision of food is the first priority. Daily activities in the rural health services should be temporarily reoriented towards nutrition.

Surveillance

The surveillance of communicable diseases must be conducted as part of nutritional surveillance (Lesson 4). In addition to PEM (protein-energy malnutrition), there are a number of important conditions that should be monitored regularly by dispensaries, clinics, maternal and child health centers, health workers, and field teams.

At the local level, symptoms suggestive of a disease should be recorded and reported even if the diagnosis is

uncertain. For instance: fever without cough (malaria in endemic areas); diarrhea (gastroenteritis, dysentry, severe diarrhea with dehydration); cough with fever (respiratory infections--possibly tuberculosis, if lasting more than 2 weeks). The selection should be limited to diseases of major public health importance that are easy to treat or prevent.

Reports should give the age and sex of patients. The presence and absence of disease must be reported clearly in order to differentiate between lack of information and negative reporting (no cases). No information (blank) is not equivalent to no disease.

Treatment of the most important diseases during emergencies

The following guidelines may be used wherever no standardized treatment scheme is recommended by the national health services.

When qualified personnel are scarce, patients cannot be given individual attention by a physician. In most emergencies, some 75-90% of patients present with minor ailments (aches, pains, etc.). These patients divert medical attention and resources and should not be treated

during emergencies. A standard treatment should be given for the disease most likely to cause the patient's symptoms (presumptive treatment). For instance, in an area where malaria is common, any person with fever for which there is no obvious cause (abscess, respiratory infection, etc.) should be treated for malaria. Treatment of the major acute diseases should be standardized.

- Wherever possible, use single-dose treatments and avoid giving a patient a large supply of tablets.

- Do not give mixtures of tablets. One drug is usually sufficient.

- Injections are very useful and often appreciated by patients. They are sometimes dangerous and almost always relatively expensive. Do not overuse them.

- Syrups and sugar-coated pills are no more active than tablets. Their use should be avoided since they may be 5-10 times as expensive.
- Avoid expensive symptomatic treatment.

The number of drugs required is small. Often about 20 major drugs are sufficient for the most common diseases encountered in rural areas. Expatriate doctors and hospitals must not request expensive modern drugs. Medical

responsability lies whit the local health authorities. Expatriate medical relief workers should adapt themselves to local standards and procedures. Familiarity with the local culture, pattern of disease, and organization of medical services is as important as an advanced knowledge of medicine and medical techniques.

Table 5-A lists some of the most useful drugs with daily recommended dose and duration of treatment. According to the local situation, other drugs can be added to the list.

Table 5-A

THE MOST IMPORTANT DRUGS DURING NUTRITIONAL EMERGENCIES [a, b]

Drug	Patients age, height, average weight: under 1 year, under 75 cm, 5 kg	1–4 years, 110 cm, 10 kg	5–9 years, 110–140 cm, 15 kg	over 10 years, over 140 cm, 45 kg	Frequency (divide total dose as shown in this column)
	Dosage				
procaine penicillin in oil [c]	0.6 ml	1.6 ml	2.5 ml	3.3 ml	1 dose × 5 days
benzathine benzylpenicillin [c]	180 mg	360 mg	450 mg	600 mg	single dose
tetracycline capsules, 250 mg [d]	250 mg	500 mg	750 mg	1 000 mg	4 divided doses × 3–5 days (no more than 5 days to children under 8)
chloramphenicol capsules, 250-mg mycitosins	250 mg 250 mg	500 mg 500 mg	1 g 1 g	2 g 2 g	4 divided doses × 3–5 days 4 divided doses × 3–5 days
sulfonamids, 500-mg tablets (sulfadoxine + sulfamerazine + sulfadimidine)	750 mg	1.5 g	3 g	4.5 g	4 divided doses × 3–5 days
chloroquine (base) 100- 150-, 300-mg tablets treatment weekly prophylaxis	 75 mg 50 mg	 150 mg 100 mg	 300 mg 200 mg	 450 mg 300 mg	 single dose 1 dose every week
bephenium hydroxynaphthoate (Alcopar) 5-g sachet	—	2.5 g	5 g	5 g	single dose (can be combined with tetrachloroethylene)
piperazine 500-mg tablets	1 g	2 g	4 g	4 g	single dose × 2 consecutive days
tetrachloroethylene	0.5 ml	1 ml	1.5 ml	2 ml	two divided doses, 1 day
tiabendazole (Mintezol)	250 mg	500 mg	750 mg	2 g	two divided doses × 2 days
benzyl benzoate 25 % (or DDT 10 % or BHC 2 %)	—	—	—	—	local application, 1 day, repeat if necessary
acetylsalicylic acid, 500-mg tablets (aspirin tablets) [e]	150 mg	500 mg	750 mg	1 g	2–4 divided doses
1 % tetracycline ophthalmic ointment (Achromycin)	—	—	—	—	local application to the eye 1–3 times a day

[a] Iron, vitamins, etc., should be added to the list according to the specific deficiencies in the area.
[b] Oral and intravenous rehydration fluids are mentioned earlier.
[c] Doses of penicillin can be spreadsheably increased if necessary. Aqueous injectable penicillin and oral penicillin are less convenient and should be administered at 6-hourly intervals.
[d] Avoid repeated courses of tetracycline in children under 8 years, as these may cause discoloration of the teeth.
[e] Aspirin overdoses are very dangerous for infants.

Diarrhea with dehydration

Prevention and treatment of dehydration in diarrheal diseases are the most important curative measures. The child usually dies from dehydration, not from the infectious process. Adequate treatment of the dehydration is the life-saving measure. Table 5-B is a guide to whether dehydration is mild or severe; Table 5-C is a guide to rehydration. If there has been blood or mucus in the stools for 2 days, antibiotics can be given for 5 days--tetracycline, sulfonamides, or chloramphenicol (see Table 5-A). Consult national authorities on the recommended standard treatment for diarrhea.

Table 5-B

HOW TO DECIDE WHETHER DEHYDRATION IS MILD OR SEVERE[a]

	Sign	Degree of dehydration	
		Mild	Severe
(1)	Patient's appearance	Alert or restless Thirsty	Limp or unconscious Too weak to drink well or to drink at all Cold skin (shock)
(2)	Skin elasticity	Normal or slightly less than normal	Poor
(3)	Radial pulse	Present	Weak or absent
(4)	Eyes, fontanelle	Normal or slightly sunken	Sunken
(5)	Urine flow (difficult to tell in children)	Usually normal	Little or none
(6)	Acute weight loss	Less than 5 %	More than 5 %

[a] Adapted from World Health Organization, *Treatment and prevention of dehydration in diarrhoeal diseases*. Geneva, 1978

ILEGIBLE POR ORGINAL EN MAL ESTADO

Table 5-1

A GUIDE TO REHYDRATION [a]

Dehydration	What kind of fluid	How much to give	How quickly to give it
Mild			
(a) Patients who can drink	glucose-salt oral solution (continue with breast feeding)	encourage patients to drink continuously until they refuse	within 4–6 hours (usually given at home)
(b) Patients who need a nasogastric tube	glucose-salt oral solution	120 ml/kg body weight	6 hours
Severe			
Patients who need intravenous fluid [b]	(a) Ringer's lactate or Hartman's solution (compound solution of sodium lactate)	100 ml/kg body weight	within 4–6 hours (or less in adults), half of the requirement to be given in the first hour [b]
	OR		
	(b) half-strength Darrow's solution (lactated potassic saline injection) with 2.5 % glucose (not so good for adults)	150 ml/kg body weight	6 hours (half of the requirement to be given in the first hour) [b]
	OR		
	(c) normal saline (if nothing else is available)	100 ml/kg body weight	6 hours (divided evenly) [b]

[a] Adapted from World Health Organization, *Treatment and prevention of dehydration in diarrhoeal diseases* Geneva 1976

[b] If given intraperitoneally, 70 ml/kg body weight can be given in 10–20 minutes instead of 4–6 hours

The glucose-salt solution is given by mouth or with a nasogastric tube. Patients with severe dehydration and those who do not respond well to oral rehydration need intravenous fluids--either Ringer s lactate or Hartman's solution (compound solution of sodium lactate), or half-strength Darrow's solution (lactated potassium saline injection) with 2.5% glucose. Normal saline is the poorest fluid, while glucose (dextrose) 5% must not be used.

Examine the abdomen carefully so as to avoid penetrating an enlarged liver, spleen, or bladder. Attach

the sterile set to the bottle of sterile fluid, clean the skin, and push a 1.2-mm diameter (18-gauge) needle through the skin, just below the umbilicus. Then open the clamp on the tubing of the set and push the needle straight into the peritoneal cavity: when the peritoneal cavity has been reached, the liquid will flow in a steady stream. The full amount (70 ml/kg body weight) can be given in 10-20 minutes by allowing the fluid to flow as fast as possible. Remove the needle and place a dressing over the wound.

Do not give other drugs. Among the many medicines that are either no use or even dangerous in these emergency conditions are neomycin or streptomycin, purgatives, tincture of opium, paregoric or atropine, cardiotonics such as epinephrine or coramine, steroids, charcoal, kaolin, pectin, bismuth and Lomotil. Antibiotics need not be given unless there is blood or mucus in the stools or a definite clinical indication of bacterial infection.

Moderate diarrhea without dehydration

Malnourished children get diarrhea (defined as three or more loose stools per day) easily, and diarrhea makes malnutrition worse. Children with diarrhea must drink a lot. Dehydration is the major risk. Give a solution containing salt and sugar (by mouth). A glucose-salt standard solution is used for prevention as well as for the

treatment of mild dehydration. In one liter of boiled cooled water:

sodium chloride (table salt)	3.5 g (1 level teaspoon)1
glucose (or if not available: table sugar)	20.0 g (8 level teaspoons)
sodium bicarbonate (baking soda)	2.5 g (1/2 level teaspoon)
potassium chloride	1.5 g (1/2 level teaspoon)

The ingredients are commercially available in aluminum foil or polyethylene bags (e.g., UNICEF "oral rehydration salts"). If necessary, they can also be prepared locally in the dispensary. The products need not be chemically pure. Use cooled, boiled water, but do not boil the final solution. If sodium bicarbonate and potassium chloride are not available, give a solution with only salt and table sugar. For doses, see guide to rehydration in Table 6-C. Antibiotics should not be given in cases of moderate diarrhea unless there is blood or mucus in the stools. Very important: a child with diarrhea must continue to get food. If blood or mucus is present in the stools, the child should be brought back to the health services.

1 The equivalents in "teaspoons" are, of course, very rough and ready, since teaspoons vary so much in capacity and the density and volume of the ingredients also vary considerably from batch to batch.

Measles

Measles is usually easily diagnosed by the mother herself. The mortality is very high among malnourished children. The child must eat and drink even if he has no appetite, is vomiting, or has diarrhea. It may be necessary to overcome taboos forbidding food for the sick child.

There is no specific treatment for measles. If a severe cough develops (a slight cough is a normal part of the disease), this can be treated with an injection of long-acting penicillin. Watch for night blindness and xerosis: if in doubt, give 110,000 ug of water-miscible retinol palmitate (200,000 IU of vitamin A) intramuscularly. If a water-miscible preparation is not available, give the same amount orally in oil.

Malaria

In an area where malaria is common, all patients with fever should receive presumptive treatment against the disease; a single-dose treatment is used (see Table 6-A). If the fever does not subside within 12 hours of the first dose of chloroquine (and there is no possibility of chloroquine resistance), then the diagnosis is wrong.

Quinine injections are expensive and unnecessary unless there is local resistance to chloroquine. Chloroquine injections should as a rule be avoided.

Respiratory infections

The sick child must drink and eat to prevent malnutrition. Antibiotics should not be given in mild cases with slight fever and cough, but must be reserved for severe cases (penicillin or sulfonamides, preferably in combination, or tetracycline for 5 days). Long-acting penicillin injections are simplest since only one dose has to be given.

Tuberculosis

The disease must be treated for about one year, following the regimen used by the national tuberculosis program. Do not initiate treatment unless it can be maintained for at least 6 months. The exception to this is in the case of severe PEM, since children who fail to respond to treatment with food for no apparent reason (e.g., diarrhea, measles, etc.) may be suffering from tuberculosis, even though there are no clinical signs of the disease. The commencement of tuberculosis therapy may produce a rapid and dramatic nutritional improvement.

Cholera

Cholera causes sudden, severe diarrhea with frequent watery stools. The treatment consists of correcting the dehydration; use the fluid described above, giving 50-70 ml/kg during the first hour and the same quantity during the next 3 hours. Patients who are severely dehydrated or cannot accept oral fluids must be rehydrated intravenously or through a nasogastric tube. Tetracycline may be given for three days.

Any suspected cases must be notified to the health authorities and, if possible, a sample of the stools (or a rectal swab) should be sent for laboratory examination. Strict quarantine is useless.

Scabies

The treatment consists in decrusting lesions with a 2% copper sulfate solution and painting, under close supervision, all areas involved with DDT (10%), BHC (2%), or benzyl benzoate (20-25%). Clothes should be boiled if possible and the whole family treated at the same time.

Worm infestations

Intestinal worms eat part of the child's food and contribute to malnutrition.

Two types of worm are particularly common:

1. Ascaris (roundworms). If the infestation is widespread, carry out mass treatment (all children) with piperazine citrate for 3 consecutive days.

2. Hookworms. If the infestation and anemia are known to be common, give tetrachloroethylene, tiabendazole, or bephenium (safer but more expensive). If both hookworms and ascaris are present, treat first against ascariasis and then, on completion of the treatment, follow up with treatment for hookworm.

Immunization

Food distributions may provide a good opportunity to immunize population groups. This can be especially important in extending immunization campaigns to scattered or nomadic populations.

Techniques

Doses and techniques differ with each vaccine and with each manufacturer. Follow the instructions of the manufacturer or the ministry of health.

The uses of a jet injector (Ped-O-Jet) can greatly increase the speed of immunization (500-600 shots/hour) and prevents the transmission of viral hepatitis and/or tetanus.

The children must be organized into orderly lines. The jet injector is most useful when several hundreds or thousands of children can be assembled for immunization at one session.

For each type of injection, a different nozzle is needed for the injector. Make sure that the appropriate nozzle is used before starting.

the person using the injector must be trained to perform maintenance and small repairs (this training should take only one day).

If needles and syringes are used, do not use the same needle (or syringe) for more than one person, unless it has been sterilized. Hepatitis can be spread in this way but does not develop until 2-4 months later. Boiling the

material for a few minutes is not enough to kill the hepatitis virus. When available, disposable plastic syringes are recommended.

Measles immunization

Vaccination against measles (a disease closely associated with PEM) is highly effective in giving long-term protection. Mass measles immunization should be considered, wherever a cold chain (adequate refrigeration) can be maintained.

Measles vaccine is probably the most difficult vaccine to use under field conditions, since it is extremely sensitive to heat (room temperature) and to sunlight. One hour after reconstitution of the freeze-dried vaccine, it can be almost completely inactivated without any visible change. In addition, it is rather expensive.

Mass campaigns are recommended provided a foolproof cold chain can be organized. This is usually possible in large refugee camps, but may be more difficult if the population is dispersed.

The vaccine must be:

- always kept cool (under 4 degrees C., e.g., with ice) and protected from sunlight;

- reconstituted with chilled solvent and administered within one hour (destroy the partly used bottles at the end of the immunization session);

- administered before the seasonal outbreak of measles (do not vaccinate a camp or village because a severe outbreak has caused several deaths since by then it is too late);

- administered to the age groups most likely to be victims of the new outbreak (where, for instance, measles usually affects children 2-3 years old, there is no point in immunizing those over 5 years of age, most of whom will be naturally immunized);

- administered to severe cases of PEM before admission to a therapeutic feeding center.

DPT (diptheria, pertussis [whooping cough], and tetanus) immunization

Diptheria, whooping cough, and tetanus are serious childhood diseases. Neonatal tetanus (resulting from umbilical infection) and whooping cough contribute to the

very high mortality in the first year of life. Outbreaks of whooping cough can be common in refugee camps. Two to three doses of SPT vaccine must be given at suitable intervals of time to obtain a useful level of protection. The immunization of expectant mothers against tetanus (after 6 months of pregnancy) has a protective effect against umbilical tetanus of the newborn.

BCG (tuberculosis)

A good and long-lasting (at least 10 years) protection is obtained with an effective vaccine administered by intradermal injection (use the non-leaking Mantoux syringes used for tuberculin testing).2

Vaccinate all groups at risk regardless of tuberculin status (positive or negative). No screening is necessary.

BCG vaccine is sensitive to heat and sunlight. Always store the freeze-dried vaccine in a cool, dark place. Use the reconstituted vaccine immediately and do not expose the bottle to direct sunlight.

An ulcer develops at the site of the BCG injection, resulting in a permanent scar. The population should be warned in advance that this is normal.

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2 UNIPAC catalog number 07 865 00.

TAB (typhoid and paratyphoid vaccine

Mass immunization against typhoid fever is not recommended in nutritional emergencies.

Cholera vaccine

This vaccine is not very effective. Emergency mass immunization should be discouraged.