3. **Assess prevalence and severity**:
   (a) **Laboratory Data**—If a simple laboratory is available and malaria smears can be taken, examine the laboratory records to determine the number of smears done, the number positive, and whether each smear was positive for vivax or falciparum malaria.
   (b) *Check morbidity and mortality records* to assess the prevalence of the disease in the camp.
4. **Institute control measures**:
   (a) If displaced people are in a highly endemic area for falciparum malaria, but came from a non-endemic (malaria-free) area, it can be assumed that malaria may be or might become a problem (during the malaria season). Mosquito spraying, or other appropriate control measures in displaced persons areas, and close surveillance for possible malaria should be instituted.
   (b) If malaria is already a major problem, mosquito control becomes more urgent. Consideration should also be given to prophylaxis of the entire population with antimalarial drugs (if this is possible) until mosquito abatement programs can be instituted.

Measles

Measles is a highly contagious viral infection characterized initially by fever, cough, running nose, and red eyes. This is followed in 3–7 days by a dusty red, blotchy rash which begins on the face and then extends over the rest of the body and lasts for 4–6 days *Measles is a disease that can result in very high mortality, especially in an undernourished population.*

Measles is spread by airborne contact with nasal or throat secretions or by contact with articles freshly soiled with secretions from the nose and throat.

The incubation period is about 10 days from exposure to disease to onset of first symptom.

The infected individual can reinfect others from the first appearance of symptoms, until 4 days after the appearance of a rash. However, once a person has had measles, he/she will develop a lifelong immunity and cannot again be a carrier.

Measles vaccine should be given before an outbreak occurs, ideally as soon as the displaced persons can be assisted. If significant malnutrition is present, it is absolutely essential to implement a measles vaccination program as soon as possible.

Only one injection is necessary. Vaccine should be administered to all children between 9 months and 5 years of age. If vaccine supplies are limited, the top priority is to vaccinate *all malnourished and hospitalized children*. The next priority is to vaccinate 9-month to 2-year-old children, regardless of nutritional status. If vaccine supplies are ample, all children to age 12 should be vaccinated. Vaccine should not be given to pregnant women, persons with high fevers, or those with severe egg allergies.

Since measles is such a highly contagious disease, it is likely that most susceptible individuals have been exposed, and are incubating the disease by the time several cases have been reported. Although it is not dangerous to vaccinate an individual incubating measles, it is important not to waste vaccine and manpower trying to stop the spread of measles in a camp where the disease is already established because it takes approximately 1 week after vaccination for a vaccinee to develop immunity to measles. Vaccine given several days after a vaccinee has been exposed to measles is unlikely to offer protection against the disease. The attention should instead be focused toward camps where measles has not yet appeared, especially toward villages immediately surrounding the infected camp.

If measles vaccine is not available prior to, or in the early stages of an outbreak, it should still be ordered on an emergency basis. The decision whether to immunize children in an effected camp will depend on factors including, estimates of the remaining susceptible population, and can be deferred until the vaccine is actually available.

About 5–15 percent of vaccinees will develop a temperature greater than 39.4C (103F) generally between the fifth and twelfth day after vaccination that usually lasts 1 to 2 days. Transient rashes have also been reported in approximately 5 percent of vaccinees.

Meningitis

Meningitis is characterized by fever, stiff neck, and headaches. If left untreated, it can progress rapidly to confusion, delirium, coma, and death. Meningitis can be caused by bacteria, viruses, and parasites, including malaria.

Some types of meningitis are contagious, especially those due to certain bacteria (meningococcus and hemophilus). The level of contagion is low, but occasionally meningococcus can occur in outbreaks and then it becomes a serious cause of morbidity and

mortality. Ascertaining the specific cause of meningitis is often very important since, with meningococcal meningitis, it may be appropriate to vaccinate, or perhaps treat, high risk groups with an antibiotic.

If meningitis is suspected, the following measures should be taken:

1. Confirmation of the type of meningitis often requires specialized techniques (e.g., spinal taps and cultures of fluid), not generally available in displaced person camps.
2. If there are several cases of meningitis reported with rash, it can be assumed this is meningococcal meningitis. In such cases, the following steps should be taken:
   (a) If spinal taps can be done, obtain fluid and send it to a medical laboratory for confirmation of diagnosis and determination of the type of meningitis.
   (b) Treat and isolate all cases in a separate area for 24 hours following treatment.
   (c) Keep an accurate tally of the number of cases and their ages.
   (d) An effective vaccine is available for some types of meningitis. Contact appropriate health authorities in the host country or at the World Health Organization for further advice.

Nutritional Diseases

Protein-Energy Malnutrition (PEM)

PEM can refer to either acute or chronic undernutrition. Because children less than 5 years of age are among the most acutely affected by undernutrition, assessment of this age group by physical measurement is usually done to determine PEM prevalence in a population. In general, acute undernutrition results in wasting and is assessed by an index of weight-for-height (WFH); however edema of the extremities may be associated with acute undernutrition, in which case a clinical assessment is necessary. Chronic undernutrition produces stunting and typically results in a diminished height-for-age index.

The prevalence of moderate to severe acute undernutrition in a random sample of children less than 5 years of age is generally a reliable indicator of this condition in population. Since weight is more sensitive to sudden changes in food availability than height, nutritional assessments during emergencies focus on measuring WFH. Also, WFH is a more appropriate measurement for ongoing

monitoring of the effectiveness of feeding programs. As a screening measurement, the mid-upper arm circumference (MUAC) may also be used to assess acute undernutrition.

Micronutrient Deficiency Diseases

In addition to PEM, micronutrient deficiencies play a key role in nutrition-related morbidity and mortality.

Vitamin A Deficiency:
The most common deficiency syndrome in displaced populations is caused by a lack of vitamin A. Vitamin A deficiency is also known as *xerophthalmia* can cause night blindness in early stages and permanent eye damage and blindness in later stages. Famine-affected and displaced populations often have low levels of dietary vitamin A intake before experiencing famine or displacement, and therefore, may have very low vitamin A reserves. Furthermore, the typical rations provided in large-scale relief efforts lack vitamin A, putting these populations at high risk. In addition, some diarrheal diseases rapidly deplete vitamin A stores. Depleted vitamin A stores need to be adequately replenished during recovery from these diseases to prevent the disease from becoming worse. Vitamin A is stored in the liver and after initial treatment, supplemental doses can be as much as three months apart.

Vitamin C Deficiency (Scurvy):
Although scurvy rarely occurs in stable populations in developing countries, many outbreaks have occurred in displaced and famine-affected populations, primarily because of inadequate vitamin C in rations. Scurvy is marked by spongy gums, loosening of the teeth, and a bleeding into the skin and mucous membranes. Fortification of foods with vitamin C is problematic because vitamin C is unstable and cannot be stored in the body. The best solution is to provide a variety of fresh foods either by including them in the general ration or by promoting access to local markets. In addition, local cultivation of vitamin C-containing foods should be encouraged. Patients with clinical scurvy should be treated with 250 mg of oral vitamin C two times a week for 3 weeks.

Niacin Deficiency (Pellagra):
Pellagra is caused by a severe deficiency of biologically available niacin in the diet. It is marked by dermatitis, gastrointestinal disorders, and central nervous system problems. Treatment of maize flour with lime (which converts niacin to a biologically available form of niacin) and the inclusion of beans, peanuts

(ground nuts), or fortified cereals in daily rations increases the total intake of available niacin and will prevent the development of pellagra.

Anemia:
Anemia is caused by a lack of hemoglobin and indicates a lack of iron in the diet. It is marked by a lack of energy. Severe anemia in a displaced population can be a major cause of mortality for young children and pregnant women. Treatment for anemia includes a daily administration of iron/folate tablets and vitamin C. Supplementary feeding of high-risk groups with corn-soya-milk (CSM) will also help reduce the likelihood of anemia (CSM contains 18 g iron/100 g).

Thiamine Deficiency (Beriberi):
Beriberi is caused by a an inability to assimilate thiamine. It is marked by inflammatory or degenerative changes of the nerves, digestive system, and heart.

Polio

Polio is an acute viral infection characterized by fever, malaise, headache, nausea, vomiting, and stiffness of neck and back, with or without paralysis. Polio can range in severity from an apparent infection without any symptoms or meningitis, to paralytic disease and even death due to paralysis of the muscles or respiration. The incidence of an apparent infection or "minor" illness usually exceeds that of paralytic cases by more than a hundredfold.

The paralysis of polio is typically asymmetrical (i.e., involving only one leg or one arm). In displaced persons situations, the diagnosis is generally made on symptoms alone, since laboratory diagnosis involves the difficult task of isolating the virus from feces or saliva.

Polio is spread by close contact with infected individuals, but rarely by food or water. In developing countries, older children and adults are usually immune to polio, having had contact with the virus during childhood.

The incubation period for polio is from 3–21 days, but commonly 7–12 days.

The polio virus persists in the throat for about 1 week, and in the feces for 3–6 weeks or longer. Cases are most infectious for 1 week before and after onset of symptoms.

One should assume that fever followed by asymmetric (one-sided) paralysis is polio. Even a few cases of paralytic polio indicate an epidemic and should be treated by a mass childhood vaccination campaign with oral polio vaccine. Oral polio vaccine is safe, inexpensive, has few side effects, and is easy to administer. Inactivated polio vaccine is available in injection form, but the easiest and most effective way to administer the vaccine is orally.

Skin Infections

Scabies is a common displaced person skin infection, especially for those living in crowded conditions with inadequate water supplies for washing. Scabies is caused by a mite and is characterized by intense itching and small sores caused by the mite burrowing under the skin.

Impetigo (streptococcal infection of the skin) is another contagious skin infection common in displaced people.

Skin infections are generally a low priority in the emergency phase of the relief operation; but since these infections may be an indication of deficiencies in the supply of soap and water and of overcrowding, they should be investigated.

If skin infections are a major problem, the following measures should be taken:

1. Check to be sure displaced persons have enough soap and water for washing.
2. Specific treatment (medicine) is available for both scabies and impetigo and should be given as needed.
3. Clothes worn by displaced persons during the day prior to treatment should be washed thoroughly.

Tetanus (See "Diphtheria")

Tuberculosis (TB)

TB is usually not an illness that needs to be considered in the first few weeks of a displaced person emergency. The disease can take years to develop after original exposure. It is a chronic, progressively debilitating disease most commonly involving the lungs that is characterized by fever, cough with sputum (phlegm) production, and weight loss. TB is usually not a rapid fatal disease except in very young children who can die rapidly of disseminated TB or TB meningitis. Various treatment regimens have been developed, but even the shortest regimen requires 6 months of continuous treatment.

Although TB may not be a first priority in an emergency, it should not be forgotten. Crowded camps housing debilitated displaced people provide a fertile ground for transmission of the disease. Two arguments are often raised to justify not instituting a TB control program:

- TB requires prolonged treatment which is unlikely to be completed in an emergency displaced person situation
- Inadequate short-term treatment may cause the development of resistant TB strains.

These are not always valid arguments in displaced person situations for the following reasons:

- Ill individuals have difficulty travelling and are unlikely to leave a safe haven where food and water are available In addition, secure camps tend to remain in existence for more than 6–9 months (i.e., displaced person situations tend to exist much longer than desired or anticipated).
- Short-term treatment with adequate TB combination therapy regimens is unlikely to develop resistance and may actually prevent the spread of TB in a crowded camp.

If TB is suspected, the following measures should be taken:

1. Attempt to confirm the diagnosis. TB can be easily diagnosed by a laboratory technician if a microscope is available. If laboratory confirmation is not available, assume that *fever and cough that persists for more than three weeks is TB* until proven otherwise.
2. If sputum smears can be done, examine laboratory records to determine the total number of smears examined and the number found to be positive for TB The higher the percentage of positive TB smears to number of smears examined, the more likely it is that TB is a major problem in the displaced person population.
3. Check morbidity and mortality records to assess the number of deaths attributable to TB. Check also the number of patients reporting to the hospital or aid station with fever and chronic cough.
4. If TB is a major problem, a treatment program should be instituted by an experienced agency or physician and case finding should begin. Patients with chronic cough and fever should have their sputum screened for TB. If tested positive, they should be enrolled in the TB control program. The treatment program does *not* need to be hospital-based.
5. Consideration should be given to starting a BCG vaccination program. Since young children are at high risk of developing severe and rapidly progressive cases, BCG vaccine

should be targeted at the young, especially children under 1 year of age. In some countries, this vaccine is routinely given at birth.

Typhoid

Typhoid is characterized by fever, headache, malaise, and occasionally a mild rash on the trunk. Constipation occurs more commonly than diarrhea.

Typhoid is spread by food or water that has been contaminated by feces or urine from a patient or carrier of the disease. Flies can also transmit the disease.

The incubation period is 1–3 weeks.

Usually the typhoid bacteria is excreted in the stool while the patient is sick. About 70 percent of patients will excrete bacteria for three months, and 2–5 percent become permanent carriers.

As with cholera vaccine, typhoid immunization is *not* recommended in displaced person situations or following natural disasters. The vaccine requires two shots 1 month apart to be effective. The vaccine is associated with a high incidence of side effects such as 1 to 2 days of localized pain around the injection site, fever, malaise, and headache.

In an outbreak situation, vaccination programs can be harmful since they divert scarce resources and attention that should be directed at ensuring safe food and water supplies.

If a typhoid outbreak is suspected, the following measures should be taken:

1. *Confirm the diagnosis.* In displaced person settings, collect urine or stool samples after the first week of illness and send the specimen(s) to a regional public health lab or hospital.
2. *Check the hygiene loop* to be sure water is safe and protected from sewage contamination.
3. If no obvious source is found, even though typhoid is *confirmed* as a major problem, additional help should be requested from regional or national health authorities.

Whooping Cough (See "Diphtheria")

4. Displaced Person Health Care

Displaced person health care must include preventive and curative measures. Although the amount of curative measures needed will vary with each emergency, it is often dependent on the amount and quality of preventive care that is achieved.

Particularly where several organizations are involved, close attention must be paid to ensure a common standard of appropriate health care. *Standardized treatment schedules are essential.* In situations where qualified personnel are scarce and a confirmed diagnosis is not possible, standard treatment should be given for presenting symptoms. Unless treatment is administered immediately, clear oral and written guidance on the dosage and schedule must be given to each patient in his or her native language. In addition, organizations should work together to ensure a fair distribution of available services at all displaced person camps.

Treatment inappropriate to both the needs of the people and their circumstances may be not only useless and wasteful, but can also have a negative effect on the displaced people's attitude toward health care and preventive measures in general.

a. The Provision of Health Care

Displaced people must be given responsibility for their own health. Outside health workers must understand the population's own concepts of health and disease. Services should be operated *with, rather than for*, the displaced people. If not, health care services will be less effective, may be distrusted by the population, and are likely to collapse when key outside personnel leave.

Strong emphasis should be placed on the training and upgrading of the medical skills of selected displaced people, particularly in their former roles within the community (e.g., traditional healers and midwives). Even a displaced person with no prior experience can be a very effective health worker following basic on-the-spot instructions in a few relevant tasks.

As a general principle, the order of preference for selecting health personnel in cooperation with the national services, is displaced people first, experienced nationals or residents next, and finally, outsiders.

Most emergencies will require some combination of these sources. *An important consideration may be the government's attitude toward foreign medical personnel*, including the recognition of qualifications and authority to practice medicine.

In a major emergency, a health coordinator may be assigned responsibility for planning and developing appropriate health care programs, establishing standards, monitoring the quality of services, and ensuring proper liaison and coordination among the health ministry and other international organizations on health matters.

Displaced people must have easy access to appropriate treatment. Unless treatment is provided at the right level, hospitals or major health centers will be swamped by displaced people demanding treatment for simple conditions. What is required, therefore, is a community-based health service that identifies those in need of health care and provides it at the appropriate level.

The first level of health care for displaced people is the community health worker who is responsible for a section of the population and works among them to provide outreach services such as home visits, case finding, and followup. He/she is also responsible for basic community-wide preventive measures, including public health education. The community health worker should be a displaced person with appropriate training who can identify health and nutritional problems and refer patients to the clinic if simple on-the-spot treatment is not possible. While displaced people may go to clinics without referral, it is important to remember that not all who are most in need will go to the clinic. The diseases of those who do, therefore, may not reflect the most common problems in the community

As a general rule, *one clinic should be established for every 5,000 displaced people.* The clinic should be staffed by one nurse and 2–3 displaced people or national health workers. The clinic should provide both preventative and curative services and supervise community health workers' outreach services. Water and sanitation are essential services at all health facilities.

The next level would be a *health center for each displaced person settlement with limited beds for overnight stays at a ratio of approximately one bed per 5,000 displaced people.* The health center should be staffed by 2 doctors, and 8–10 nurses per 20,000 displaced people. One doctor should work in the center

while the other covers clinic level activities Health centers have responsibility for supervising settlement health services including training health workers and implementing selective feeding programs, treating/referring cases not handled at the clinic level, as well as controlling, distributing, and administering drugs.

There may also be a regional/district hospital with a staff assisted by one doctor and two nurses from the emergency organization, that handles complicated maternity cases and surgical emergencies on referral from the settlement.

If possible, special hospitals for displaced people should be avoided. They are skilled-labor intensive, provide only curative services, rarely continue to be properly run once outside support is withdrawn, and are inappropriate for long-term needs. Once established they are extremely difficult to close. Such hospitals, therefore, should only be provided if a clear and continuing need exists that cannot be met by existing or strengthened national hospitals. If the need for such a special hospital exists, the number of beds required would depend on the condition of the population. For example, one bed might be required per 2,000 displaced people in the early stages of an emergency, requiring two doctors and six nurses plus auxiliary support. Temporary hospitals constructed with local materials may be appropriate for cholera treatment.

"Portable field hospitals" have several disadvantages including the complicated logistics of transporting and setup, cost, and inappropriate systems and equipment that are overly sensitive and dependent on outside power. Field hospitals are rarely satisfactory for meeting continuing needs. Unfortunately, donors sometimes encourage such hospitals even when unsuitable, due to their great public relations value.

b. Medical Supplies

Emergency medical supplies should draw on in-country resources to the greatest extent possible. Special arrangements may be necessary, however, to respond to initial needs for adequate quantities of basic drugs and a strict control of unsolicited donations.

The World Health Organization has developed an updated standard list of essential drugs and medical supplies for use in an emergency. They are included in *The WHO New Emergency Health Kit* that has been adopted by many organizations and national authorities as a reliable, standardized, inexpensive, and

quickly available source of essential drugs and health equipment urgently needed in an emergency situation. Its contents are calculated to meet the needs of a population of 10,000 persons for 3 months.

The Kit consists of two different units of drugs and medical supplies: the basic unit (10/kit) and the supplementary unit (1/kit).

The *10 basic units* contain drugs, medical supplies and some essential equipment for use by primary health care workers with limited training. *Each basic unit is designed for a population of 1000 for 3 months, weighs 45 kg, and is .2 cubic meters.* It contains twelve drugs, none of which are injectable. Simple guidelines have been developed to help the training of personnel in the proper use of the drugs.

The *supplementary unit is designed for a population of 10,000 for 3 months, weighs 410 kg, and is 2 cubic meters.* It contains drugs and medical supplies to be used only by professional health workers or physicians. It does not contain any drugs or supplies from the basic units and therefore can only be used as a supplement to the basic unit kit.

The total emergency health kit includes *10 basic units and one supplementary unit, weighs approximately 860 kg, and is 4 cubic meters.* An entire kit could be strapped into the back of a pickup. It should be noted that emergency Health Kits are designed to meet only initial needs pending the establishment of a regular system for medical supplies.

Medical supplies can also be ordered through *the UNICEF Packing and Assembly Center (UNIPAC)*, a U.N. facility in Copenhagen, sponsored by the Danish government with a stockpile of prepacked drugs and supplies identified on the WHO and UNHCR list. These supplies must be ordered through OFDA/W, not directly from the field.

Vaccines should be borrowed from local stocks if available. If vaccines are to be provided from overseas supplies, special considerations must be taken. *Most vaccines require refrigeration and careful handling to remain effective. Without a "**Cold Chain**", the refrigerated transportation system for vaccines from manufacturer to individual, the immunization program will be ineffective.* Time and temperature control cards should be posted on cold storage facilities. Temperatures should be checked twice daily and noted on cards accompanying the vaccine. Storage facilities

located at the central (capital city) and regional level should have temperature alarms and backup (emergency) generators. Vaccines should be stored on central shelves and *not in refrigerator doors*. Take in to account also the time needed to clear customs.

Donations of unsolicited drugs may present a problem, as their quantity and quality may vary greatly. Unsolicited drug donations may consist of small quantities of mixed drugs, free samples, expired medicines, inappropriate vaccines, and drugs identified only by brand names or in a foreign language.

c. Health Education

The importance of health education is widely accepted. It is a difficult task, however, which outsiders may not understand, to convince and persuade at-risk populations to change long-established habits that will increase their health risks. During *the emergency phase, priority topics of any health education program should be directly related to immediate public health problems, such as the disposal of human excreta and refuse.* Trained teachers from the population and respected elders are likely to be more effective than outsiders in communicating basic principles and practices of health to their own people.

F. Displaced Person Camps: Site Selection, Planning, and Shelter

1. General

Although circumstances may make displaced person camps unavoidable, the establishment of displaced person camps must be a last resort, because of the attendant problems of camps discussed throughout this chapter. The location of a displaced person camp may range from a spontaneous settlement over a wide area, to an organized rural settlement, to a concentration in a very limited area. A solution that maintains and fosters self-reliance among the displaced is always preferable.

If no prospects are in sight for a resolution to the displacement, planning for the displaced population's needs should assume a long-term outlook. Temporary arrangements can be very difficult to change once established. Site selection, planning, and the provision of shelter have a direct bearing on the provision of other assistance. They are important considerations in the overall assessment of needs and the planning of emergency response.

Decisions must be made as part of an integrated approach taking into account, advice from experts, and views of displaced people.

Expertise may be required in the fields of geology, settlement, planning, engineering, and public health. Familiarity with local conditions in both the displaced population's area of origin and the present location of the displaced is important, as is previous experience in similar emergency situations.

There may be a need to set up a reception or transit center, through which displaced people pass on the way to a longer-term settlement site. These centers must have the same considerations as those relevant to long-term settlements.

2. Criteria for Site Selection

a. Social Needs

If possible, the social and cultural backgrounds of the displaced should be considered when determining a camp location. However, in most circumstances the choice will be limited and any land that meets even minimum standards may be scarce. Once a site is located, it is wise to determine why the site was not already in use and examine whether the reason (e.g., no water or because it floods in the monsoon) would exclude use by displaced people.

b. Water

The single most important site selection criteria is the availability of an adequate amount of water on a year-round basis. It is also commonly the most problematic. A site should not be selected on the *assumption* that water can be acquired merely by drilling, digging, or hauling. Drilling may not be feasible and may not provide adequate water. No site should be selected where the hauling of water will be required over a long period. Professional assessment of water availability should be a prerequisite in selecting a site.

Where water is readily available, drainage often becomes the key criterion. For effective drainage therefore, the entire site should be located above flood level at a minimum of 3 meters above the water table, preferably on a gently sloping area. Flat sites can present serious problems for the drainage of waste and storm water. Marshes or areas likely to become marshy or soggy during the rainy season should be avoided. The watershed of the area may be a consideration.

c. Open Space

The site must provide a sufficient amount of usable space for the displaced population. *WHO recommends a minimum of 30 square meters per person, plus the necessary land for communal and agricultural activities and livestock.* Of this, 3.5 square meters is the absolute minimum floor space per person in emergency shelter. Since there is always the possibility that more people may arrive, the site should be large enough to allow for major expansion.

If the population has been displaced due to civil strife, the site should be removed from areas of potential conflict.

d. Accessibility

The site must be accessible by vehicles and close to communication links and sources of supplies and services such as food, cooking fuel, shelter material, and national community services.

e. Environmental

The area should be free of major environmental health hazards such as malaria, onchocerciasis (river blindness), schistosomiasis (bilharzia), or tsetse fly. Climatic conditions should be suitable for habitation throughout the year. For instance, a suitable site in the dry season may be unusable during the rain season. While a daily breeze is an advantage, strong winds may damage emergency and temporary housing, especially tents. To the extent possible, displaced people should not be settled in an area where the climate differs greatly from that to which they are accustomed.

f. Soil and Ground Cover

The soil should allow for water absorption and the retention of human waste. Rocky or impermeable sites should be avoided. If possible, land suitable for vegetable gardens and small scale agriculture should be selected for the site.

The site should have a good ground cover of grass, or bushes, or trees, as covering vegetation provides shade and reduces erosion and dust. During construction of the camp, care should be taken to cause as little damage as possible to the vegetation and topsoil. Bulldozers, if used, should avoid scrapping topsoil off the site, as often occurs. *If wood must be used for domestic cooking fuel, it should not be taken from vegetation on the site.* Alternative sources of fuel must be found as soon as possible to avoid irreplaceable loss of surrounding wood.

g. Land Rights

The land should be exempt from ownership, grazing, and other uses by local populations. This can be a major cause of local resentment. Some authorities proposing the site are unaware of customary rights exercised by local populations. Sites are often provided on public land by the government. Any use of the land must be based on formal legal arrangements in accordance with the laws of the country.

3. Site Planning

a. General Considerations

- At the onset of an emergency, the immediate provision of essential goods and services is more important than efforts to change the way people have already arranged themselves.
- Site planning should take potential need for expansion into account.
- Site planning should first consider the characteristics and needs of the individual family, and reflect the wishes of the community as much as possible.
- A displaced person settlement is not a natural community. Particular care will be required to ensure that special needs are met.
- The overall physical layout of a site as well as other aspects of the site should reflect a decentralized community-based approach focusing on family, village, or ethnic group.

4. Specific Infrastructure Design Considerations

a. Latrines

While water requirements often determine site selection, sanitation requirements can dictate the site layout. *If latrines are used, there should be at least one for every 20 persons. They should be located no less than 6 meters and no further than 50 meters from any house. If latrines are too far away, they will not be used.* Sufficient space must also be left for replacement latrines. If communal latrines are unavoidable, they should be accessible by road to facilitate maintenance. To avoid contaminating water sources, latrines should have an effective drainage system that is easy to repair, both for rainwater and waste water.

b. Water Distribution

Where possible, *the maximum distance between any house and a water distribution point should be no more than 100 meters or a*

few minutes walk. Water will often be pumped from the source to an elevated point in order to allow gravity feed distribution. Planning of the site should take this into account.

c. Roads and Pathways

The site should be accessible from other sites, and contain all-weather roads and pathways connecting the various areas and facilities. Roads should be built above flood level and have adequate drainage. If there will be a significant vehicle traffic on the site, it should be separated from foot traffic.

d. Firebreaks

A firebreak (an area with no buildings) 50 meters wide is recommended for approximately every 300 meters of building area. This area can be used to grow vegetables or for recreation. If space allows, the distance between individual buildings should be great enough to prevent collapsing burning buildings from touching adjacent buildings. The direction of the prevailing wind should be a consideration.

e. Administrative and Community Services

At the onset of an emergency, it may be difficult to foresee all the administrative and community services likely to be required. Underestimation of the space required for future communal needs is a common problem in camps of limited area. Therefore, where adequate space is available, free areas must be allocated for future expansion of these services. The following lists administrative and community services that are often required:

Likely to be centralized:

- camp administrative office.
- essential services coordination offices (health care, feeding programs, water supply, education).
- warehousing and storage.
- initial registration/health screening area.
- tracing service.
- therapeutic feeding center (if required).

Likely to be decentralized:

- bathing and washing areas.
- community services (health centers, social service centers).
- supplementary feeding centers (if required).
- education facilities.
- institutional centers (such as for the disabled or unaccompanied children), if required.

f. Physical Layout

The basic principle of any physical layout of a camp is that it should *be organized into small community units or villages made up of approximately five sectors (1000 people per sector)* containing the decentralized community services mentioned above. These village units are in turn organized around the central core services.

The location of centralized services will depend on the specific situation and in particular, the space available. Where space is available, it may be advantageous to have the centralized services located in the center of the camp. Where space is scarce, it may be better if centralized services are located near the entrance to the site. This will avoid trucks having to drive through a densely populated camp. Whatever the layout, warehouses should be located near the administrative office for security reasons.

The linear or grid layout, with square or rectangular areas separated by parallel streets is often used. It has a simple design, is quick to implement, and allows a high population density. It should be avoided however, as environmental health problems and disease are directly proportional to population density. Furthermore, a rigid grid design makes the creation of community identity difficult, as the displaced people are not usually accustomed to living in such a pattern.

5. Shelter

At a minimum, shelter must provide protection from the elements, space to live and store belongings, privacy, and emotional security. Shelter is one of the most important determinants of general living conditions and is often one of the largest items of non-recurring expenditure. While the basic need for shelter is similar in most emergencies, other considerations such as the kind of housing needed, what materials and design are used, who constructs the housing, and how long it must last will differ significantly in each situation.

Lack of adequate shelter and clothing can have a major adverse effect on the health and nutritional status of displaced people. Thus, in addition to shelter, the provision of sufficient blankets, appropriate clothing, and possibly heaters will be a high priority.

Neither pre-fabricated buildings nor specially developed emergency shelter units have proved effective in displaced person emergencies. Both are ineffective due to their inappropriateness, high unit cost, transport problems, and inflexibility. Also, emergency shelter arrangements will already have been constructed before such systems can arrive. For similar reasons, tents are often not an effective means of providing shelter either They are difficult to live in and provide little insulation from temperature extremes. Tents, however, may be useful for displaced people of nomadic origin, and when local materials are not available or are only seasonally available. Where tents are used, repair materials should be provided.

The best way to meet emergency shelter needs is to provide materials or shelter similar to those used by the displaced population or the local population. Only if such materials cannot be adequately acquired locally should emergency shelter material be brought into the country. Above all, the simpler the shelter, the better.

Shelter must be available before other services can be developed properly. Emergency materials should be reusable for the construction of improved housing, wherever possible. Where local materials are in short supply or have a short life, consideration should be given to acquiring more permanent materials. If a continued high density of occupation is unavoidable, fire resistant materials may be needed.

The key to providing adequate shelter is the provision of a roof. If materials for constructing a complete shelter are inadequate, priority should be given to constructing at least the roof. Walls can be made of earth or other materials found on site or made locally available.

Housing should meet the cultural and social requirements of a displaced person's home. Similar housing will help reduce the disorientation and emotional stress suffered by the displaced population. To the extent possible, longer-term housing must be similar in design and construction to that with which the displaced are familiar, while reflecting local conditions and practice. This will generally mean single-family shelters, unless the displaced are accustomed to multifamily units. Although more costly, the benefits of individual homes for the displaced cannot be overestimated. *The risk of communicable diseases increases enormously in communal shelters.* If multifamily shelters must be used, no more than 35 persons (approximately seven families)

should be assigned to any one structure. Experience has shown that social and environmental problems may also rise if more people live in multifamily shelters. Also, buildings made from local materials may be approaching their structural limits at this size.

Materials and design should meet the minimum technical standards for the different local seasons. For example, roof material must be strong enough to withstand damage by the sun, rain, snow, and winds. (OFDA-supplied plastic sheeting has been very effective as roofing material. See stockpile section of this manual for more information). Raised flooring is required in areas of high rainfall. Wall material must afford privacy and protection from the elements. If the site lies in a hazard-prone area (e.g., subject to earthquakes or cyclones), the design of buildings and their siting should conform to hazard-resistant criteria. In buildings where cleanliness and hygiene are particularly important, the floor should be cement or at least washable.

Even in an emergency shelter, including communal buildings, should be built by the displaced people themselves, provided adequate organization and material support is given. This will help to ensure that housing will meet their particular needs. Work by displaced people will reduce their sense of dependence and can cut costs considerably.

G. Sanitation and Environmental Service

1. General

The disruption and overcrowding of people accustomed to living in different and less crowded conditions make sanitation a critical issue.

Indiscriminate disposal of human and other waste will pose serious threats to the health of individuals, family groups, and the whole community. In a displaced person emergency, sanitation facilities to which they were accustomed are no longer available. Basic services are often lacking and habits may have to be changed.

For this reason, an effective environmental system must be established to include the following: the provision of safe water; disposal of human excreta, waste water, and garbage; insect and rodent control; safe food-handling practices; and site drainage. These services and the provision of health care are interrelated and should be considered together.

An acceptable and practical system for the disposal of human excreta is the key to reducing health hazards. The system must be developed in cooperation with the displaced, and be culturally appropriate, even if circumstances necessitate a departure from traditional practices. Even special public health education may be required to ensure that the system will be used by the displaced population

2. Organization

Environmental sanitation will be a very important consideration in campsite layout; its organization and operation must be integrated with other community services.
Expert advice should be sought from a public health engineer or sanitarian familiar with the habits of displaced people, the local population, and experienced with displaced person emergencies.

Good sanitation depends to a great extent on attitudes of the community and the people who run the system. The system and services developed should be able to operate effectively with a minimum of outside involvement. Therefore, selected displaced people must be trained to run the sanitation and environmental programs.

The most common cause of complete failure of a sanitation system is the establishment of the wrong system. This is a result of inadequate discussions with the population and a failure to take all relevant factors into consideration.

The most common cause of ***breakdown*** *of a sanitation system is inadequate maintenance*, even for properly designed and installed systems. Breakdown of latrines will lead to contamination of the environment and a high risk of infection and disease. Regular inspection and maintenance of the latrines should be enforced. The best guarantee of proper maintenance is the allocation of latrines to individual families.

Even when in working order, latrines will not be used unless they are clean. Individual families should be responsible for the cleanliness of their own units. If communal latrines are unavoidable, special arrangements to keep them clean may be necessary (i.e., compensating individuals who are responsible for keeping them clean and operational on a daily basis). Particular attention must be given to the maintenance and cleanliness of latrines serving community facilities such as health centers. It should be noted that disinfectants should not be poured into pits or tanks of latrines that dispose of excreta by biological degradation.

Instead, the regular addition of soil, ashes, or oil may be used to control insect breeding and reduce odor.

A public health education program should be established and emphasize the importance of sound environmental sanitation practices. The link between excreta contamination and disease must be clearly understood by all, including children. Children are not only the main sufferers from excreta-related diseases, but also the main excreters of many pathogens that cause diarrhea. Since children are often frightened by unfamiliar latrines, particular care will be needed to ensure that latrines are safe and physically suitable for children.

3. Disposal of Excreta

Safe disposal of excreta is critical since agents of most infectious diseases are passed from the body in excreta. These excreted infections fall into four main groups: viruses, bacteria, protozoa, and worms (helminths). Excreta, unless properly isolated, can also provide a breeding ground for insects, which act as either direct or indirect transmitters of disease.

Links between diseases, infections, means of transmission, and the sanitation system must be kept under constant surveillance. But the links are not always the most obvious. For example, the most important human link in transmission of an infection is the carrier who shows little or no sign of disease. Conversely, persons in an advanced state of disease may have little or no importance in transmission.

Human waste is more dangerous than animal waste; the safe disposal of human excreta is more important than the disposal of animal waste. Human feces are much more dangerous than urine. In areas of Africa and the Middle East where the *Schistosoma haematobium* species of bilharzia exists, and in all areas where typhoid is common and endemic, disposal of urine requires special attention.

a. Selection of a System—Immediate Considerations

The selection of an appropriate excreta disposal system requires consideration of a number of factors. In an emergency, however, time is the critical factor. Pollution of the environment by excreta, with all its attendant risks, cannot be stopped without immediate sanitation measures. Thus the range of choices is always much more limited at the very outset of an emergency; weeks or months cannot be lost in waiting for expert advice, construction to be

completed, or material to arrive. In an emergency situation, act first and improve later. Temporary systems to meet immediate needs can be improved or replaced later.

Emergency conditions may therefore dictate at least the initial use of trench latrines. These can be dug quickly and need less space than individual family units. While shallow trenches may be an initial quick solution, deep trench latrines are incomparably more effective. Where space and soil conditions allow, the simplest and most common individual family unit is the pit latrine.

Once a temporary system has been established, more time and care should be expended to establish the most appropriate waste disposal system. Two main factors will affect the choice of an excreta disposal system: traditional sanitation practices of the displaced people and the physical characteristics of the area, including the geology, availability of water, rainfall, and drainage. Failure to take proper account of either factor can cause the system to rapidly become a health hazard. Above all, cleanliness of latrines and their ease of access will determine whether or not they are used.

First it must be determined how the displaced people can modify their traditional practices to reduce health hazards during the emergency situation. Over half the world population does not use latrines. This and other factors must be considered at the planning stage and will directly affect the type of system to be established. Other cultural factors to consider include:

- previous sanitation system and practices.
- method of anal cleaning.
- preferred position (sitting or squatting).
- need for privacy.
- segregation of sexes and other groups or individuals with whom it is culturally unacceptable to share a latrine.
- cultural practices for children.
- cultural taboos (e.g., avoiding contact with anything that may have touched excreta of others).
- social factors, including likelihood of community action to ensure proper use of proposed system.
- need for special orientation (direction) of latrine.
- systems used locally in neighborhood of site.

In addition to these considerations, arrangements must be made to assure the availability of appropriate anal cleaning materials at or near all latrines. This is essential to the maintenance of hygiene. Also, latrines must be safe for children and women, and

accessible at night. For individual units, families may provide their own lamps, but some form of lighting should be provided for communal units.

In some cases, guards may be needed near the latrines to ensure security.

b. Immediate Action

The first group of displaced people arriving at a site should construct an adequate disposal system. Without proper facilities, displaced people are likely to defecate indiscriminately, contaminating their environment and possibly, their water supply. In consultation with community leaders, *the first step is to localize excreta;* i.e., control surface defecation. If space allows, designate an area or areas away from dwellings and downwind, but accessible and close in proximity. Fence the area(s), ensure privacy, and provide a shallow trench and spades, if possible. Site such areas where the surface runoff during rain will not cause contamination and protect the area with cut-off ditches.

A publicity campaign will be required to encourage the population to use specified areas and not defecate indiscriminately near dwellings. Measures must also be taken to prevent defecation or urination in or near the water supply. Immediate action in both regards can significantly reduce public health hazards.

If the ground is flooded, marshy, or has a high water table, arrangements must be made as soon as possible to physically contain the excreta. Under such conditions, the location of the area away from the dwellings and water source is very important. Pending a proper containment system, a simple raised structure (e.g., a wooden stage some 50 cm high) can prevent the population from being contaminated by their own excreta. Empty 200 liter (45 gallon) oil drums can also be used if one end of the drum is cut out and inserted end down into a hole in the ground, that is as deep as the water allows, with the last half meter of the drum left out of the ground. A small hole should be cut into the other end of the drum to transform it into a squatting plate. These options should be viewed as *very short-term* sanitation interventions.

c. Long-Term Options

For a number of reasons, expert advice is required to develop the most appropriate waste disposal system. The nature of the soil will be important; if it is highly impervious, some systems will be precluded. The availability of water and cultural considerations

must also be considered. There are many simple options, if properly constructed and maintained, that will meet all public health requirements. In most emergencies, two main types of latrines will be required, even for displaced people unaccustomed to them. *Trenches, pits, or holes in the ground can be used as dry latrines. Water dependent latrines can be flushed.* There are also systems based on composting or the cartage of excreta.

In hot, dry climates where sufficient space is available, localized defecation areas located away from dwellings may be the best long-term arrangement, as heat and sunlight render the feces harmless with time. Black rock is the best surface. Under these conditions, potential health hazards in the area (e.g., increased number of rats) should be periodically reviewed.
If the camp is on the coast, displaced people may choose to defecate in the water. While this is less harmful for the displaced people than to indiscriminately defecate on land, it should be discouraged unless there is no other option. The dangers of defecating in the water increase greatly with numbers. Such practices contaminate the high water line, and increase the health hazards of washing in the sea. Defecation in bays, estuaries, or lagoons where fish or shellfish are caught should be greatly discouraged, since this may be a source of infection.

d. Latrine Styles and Considerations

There are three basic *latrine styles*: individual family units, centralized units with each latrine allocated to an individual family, and communal systems. Individual family units are the preferred solution, since people will always make more effort to keep their own latrine clean than a communal facility.

To determine the most appropriate latrine style, consideration must be given to a number of factors: the number and siting of latrines, population density, soil, available water, drainage, and construction materials.

(1) Number and siting of latrines

As a rule, *at least one latrine should be provided for every 20 people.* Latrines should be located at least 6 meters from dwellings, 10 meters from feeding and health centers, and at least 15 meters, and preferably further from wells or other drinking water sources. Although all these distances depend on latrine and soil type, latrines should be located no more than 50 meters from users. If people must walk a considerable distance to a latrine, they will defecate in a more convenient location, regardless of the health hazard.