Rapid health assessment of refugee or displaced populations

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Content of CDrom

Software

- E-Pop: excel tool for rapid population estimates by area sampling in emergencies (mapping)
- Componut: excel tool for calculation of food ration composition in terms of calories, percentage of proteins, fat and carbohydrates, as well as micronutrients
- Tool for prospective mortality and morbidity surveillance in complex emergencies
- WinCosas (Epiconcept, France)[1]: data entry and analysis tool for vaccination coverage surveys
- EpiData v3.1 (EpiData Association, Denmark)[2]: data entry tool (including basic analysis)

Articles and reference documents

- Relevant reference documents
- Introduction to applied epidemiology
- Measurement of malnutrition – Chapter 2 from MSF *Nutrition guidelines* – draft version, 2004
- Example of questionnaire and guidelines for survey team of interviewers
- Rapid Assessment Procedures, through Participatory Learning and Action

1 Wincosas
EpiConcept, Systèmes d'Information en Santé, 47, rue de Charenton - 75012 Paris
Tel.: 01 53 02 40 60 – Fax: 01 53 02 40 62 – http://www.epiconcept.fr

2 EpiData
Lauritsen JM. (Ed.) EpiData Data Entry, Data Management and basic Statistical Analysis System. Odense Denmark, EpiData Association, 2000-2006. http://www.epidata.dk
Lauritsen JM & Bruus M. EpiData Entry (V3.1). A comprehensive tool for validated entry and documentation of data. The EpiData Association, Odense Denmark, 2006.

Foreword

In order to plan and implement aid in an emergency, it is essential to know the health status of the affected population and to assess its vital needs.

For this purpose, information on demography, mortality, morbidity, nutritional status and immunisation of the concerned population needs to be gathered, as well as on food and water resources, and basic living conditions.

The collection and analysis of these data, before or at the start of the actual programme implementation, is called a "rapid health assessment".

This guide is intended for persons who wish to carry out a rapid assessment of the health-related status of an emergency-affected population, such as internally displaced persons or refugees.

The objectives of the guide are:
- To explain the focus of a rapid health assessment
- To provide adequate methods for correctly carrying out rapid health assessments
- To provide practical tools that can facilitate rapid health assessments
- To provide support in the analysis and interpretation of the results of a rapid health assessment

For this guide to remain operational, and adapted to the reality of the field, we invite its users to send any comments or remarks to:

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CHAPTER 1

Framework of rapid health assessments: top priorities in emergencies

Emergencies and population displacement

The objective and place of rapid health assessments

Framework of rapid health assessments: top priorities in emergencies

1.1. Emergencies and population displacement

There are presently over 40 million internally displaced persons (IDP) and refugees[3] in the world [1,2].

Massive population displacements are often associated with high mortality, particularly in vulnerable groups such as children under 5 years of age [3]. The principal causes of death are measles, diarrhoeal diseases, acute respiratory infections, malaria and/or malnutrition [4]. In Angola, in 2002, among the displaced former UNITA members, these diseases had caused 68% of all deaths recorded, 37% of which had occurred in children under the age of 5 years [5].

The objective during the acute phase of an emergency is to reduce as rapidly as possible excess mortality and to stabilise the population's health situation [6]. Considering the elements determining a person's health, as well as the "main killer diseases", the following operational priorities have been defined (commonly referred to as the "top priorities") [7]:

- Rapid assessment of the health status of a population
- Mass vaccination against measles
- Water supply and implementation of sanitary measures
- Food supply and implementation of specialised nutritional rehabilitation programmes
- Shelter, site planning and non-food items
- Curative care based on the use of standardised therapeutic protocols, using essential drugs
- Control and prevention of communicable diseases and potential epidemics
- Surveillance and alert
- Assessment of human resources, training and supervision of community health workers
- Coordination of different operational partners

To the abovementioned list, we add the security situation of the displaced population.

These top priorities are the basis of any assessment, and ideally, the subsequent interventions are multisectoral, covering each of these priorities [8].

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3 **Internally displaced persons** (**IDP**) are persons who were forced to leave their homes, but without crossing international borders. They are estimated to be 25.3 million in the world (UNHCR, 2004).
Refugees are persons who fled their homes and crossed an international border to take refuge in another country (UNHCR, 1967). They are estimated to be 17.1 million.
For the purpose of this guide, we will refer to both groups as "**displaced persons**".

1.2. The objective and place of rapid health assessments

The objectives of a rapid health assessment are to evaluate the magnitude of an ongoing emergency, and to determine the major health and nutrition related needs of the displaced population. Interpretation is done according to each specific context, and the assessment results in concrete recommendations for field operations. Information may also be used for "temoignage and advocacy".

Health assessments are generally carried out at the start of an intervention, together with the first operational activities (water supply, measles vaccination, etc.). They rapidly provide information on the size of the affected population, on its health priorities and vital needs. The immediate implementation of a basic surveillance system provides a mechanism to further monitor the ongoing situation as well as the impact of the interventions (Appendices 2 and 3).

Rapid health assessments are different from, and generally preceded by, exploratory missions, during which different information is collected (history of the crisis, socio-political context, etc.). Both activities also differ in the methods used, and in the time and resources needed.

CHAPTER 2

The focus of rapid health assessments

Demographic information

Mortality and morbidity

Nutritional status

Vital needs: food, water, hygiene and sanitation

Shelter and non-food items

Security

The focus of rapid health assessments

The focus of rapid health assessments is based on the top priorities. The information collected is used to calculate indicators, which are compared to internationally accepted standards (Appendix 1) [9, 10].

2.1. Demographic information

The total number of the displaced population indicates the magnitude of a natural or manmade disaster.
Total population and average household size are useful for the planning of an intervention, when calculating needed quantities of food, water, etc. Population figures provide the denominator for the indicators to be calculated (e.g. mortality rates).
Because programmes can target specific groups (children under 5 years of age, elderly, pregnant and lactating women, etc.), it is useful to know the age and sex distribution of the population as well.

2.2. Mortality and morbidity

2.2.1. Mortality

In an emergency, mortality is the best indicator for the gravity of a population's health situation. This indicator is expressed as a rate that may be compared to reference values[4]. The prospective follow-up of the mortality rate illustrates the evolution of the population's situation, and allows for an assessment of the results of an intervention. This should be set up from the beginning of the intervention (Appendix 2).

2.2.2. Morbidity

The set-up of health programmes is determined by the diseases that occur most frequently, or that present an epidemic risk, and for which actions can be taken. In most complex emergencies, the main causes of morbidity are diarrhoeal diseases, acute respiratory infections, malaria, and measles [11]. Prevalence surveys are rarely done. Data from the regional health structures, or from the first emergency consultations for the displaced, can be used to calculate main disease incidence.
From the start of the intervention, a systematic and prospective surveillance system should be implemented, covering the most frequent pathologies, as well as potential epidemic diseases (measles, cholera, etc.) (Appendix 3).

2.3. Nutritional status

Malnutrition is present in many emergency situations and is often associated with high mortality. The nutritional status of a population can be measured through a cross-sectional survey[5], estimating the prevalence of global and severe acute malnutrition.

4 Explanation of basic epidemiologic terms (such as "rate") can be found on the CDrom: Introduction to applied epidemiology
5 A cross-sectional study corresponds to taking a snapshot of the population at a certain point in time

The interpretation of malnutrition prevalence figures cannot be done without a thorough context analysis, considering mortality, local coping mechanisms, expected harvest, etc. [12]. The decision on the type of nutritional programme to implement, depends on all these elements together.
Once the programmes are started, malnutrition prevalence figures provide the baseline data for estimating the influence of an intervention.

2.4. Vital needs

Food and water are essential for survival; hygiene and sanitation measures have a major impact on health. All of these issues are therefore included in a rapid health assessment.

2.4.1. Food

The objective is to determine if the affected population has access to food in sufficient quantity (calories) and quality (nutrient or micronutrient content). Vulnerable groups who may have less access to food (female heads of family, elderly, ethnic minorities, etc.) need to be identified.

2.4.2. Water

Like for food, the objective is to know if water is available in sufficient quantity and is of acceptable quality. In the early stages of an emergency, sufficient quantities of water are more important and have the priority over the water quality. In addition, access to water needs to be considered.

2.4.3. Hygiene and sanitation

The objective is to assess existing measures and facilities for excreta disposal and waste management. A more in-depth assessment, including medical infrastructure as well as household waste management, is the role of sanitation experts, and is not discussed in this guide [26].
The availability of soap can also be evaluated.

2.5. Shelter and non-food items

With a direct and/or indirect impact on health, the quality of shelters and the availability of non-food items need to be assessed.

2.5.1. Shelter

The objective is to assess whether the displaced population has a habitat, which protects against the local weather conditions, and provides a minimum of privacy. Needs to be covered are estimated by measuring the number of families who do not have protective shelter.

2.5.2. Non-food items

Essential for decent living conditions are items like blankets, water containers, cooking pots, sources of energy (wood, fuel, etc.), etc. Absence of these items increases the population's vulnerability.

2.6. Security

The assessment of the security situation of the displaced population includes evaluating the risk for robbery, violent attacks, rape, beatings, etc. The security environment gives indication on the need for specifically targeted interventions, such as mental health or sexual violence programmes. Lack of security may also influence access to food, water or firewood, and therefore general health.

CHAPTER 3

Presentation of methods

Sample survey

Data collection at distribution points

Demographic assessment methods

Other methods

Presentation of methods

For the information collected during a rapid health assessment to be reliable and representative, adequate data collection methods should be used. The commonly used methods are presented below.

3.1. Sample survey

For a sample survey, a limited number (or sample) of households is selected to collect the data. A correctly selected sample is representative of the target population from which the sample is drawn. The results of a sample survey are presented with 95% confidence intervals[6].

Most of the data needed to assess the population health status can be gathered through one single survey (cf. example of questionnaire in Appendix 6). The size of the sample depends on the information looked for, and the desired precision, as well as on logistics and time constraints.

Some data are collected from the household as a whole (like mortality or household composition), other information is obtained from specific population groups within the household (like children, for nutritional and vaccination status).

Different methods to select a sample can be used:

3.1.1. Simple random sampling

If households are numbered or a population listing exists, all households to be visited can be drawn by chance. However, such lists or numberings are rarely available in emergency situations and it is exceptional that a simple random survey can be done.

3.1.2. Systematic sampling

Systematic sampling can be done if households are organized in ordered rows: tents or houses that are aligned or in a clear order. The total number of houses is divided by the required sample size, which gives the sampling interval to be used (Example N° 1).

[6] A confidence interval (CI) is a range of values that is normally used to describe the uncertainty around a point estimate, such as a mortality rate. When presenting the 95% CI, there is 95% probability that the true value is covered by this range. The 95% confidence interval of a proportion is calculated with the following formula:

$$\pm 1.96\sqrt{\frac{p(1-p)}{n}}$$

Example of spatial organisation of shelters in a refugee camp

Example N° 1
Systematic sampling

After evaluating the sample size and the sampling interval, the first habitat (or household) to visit is selected by randomly choosing a number between 1 and the sampling interval. The sampling interval is added to that number, and so on. The condition for systematic sampling is that houses are ordered or aligned.

1. Total number of habitats = 4000
2. Required sample size = 450 habitats[7]
3. Sampling interval = 4000/450 = 9
4. Random number between 1 and 9 = 6

According to this example, the first household to be visited is the one living in habitat n° 6. The second household to be visited lives in habitat n° 15 (6 + 9), the third household lives in habitat n° 24 (15 + 9), etc. So starting from the first, randomly chosen habitat, every ninth habitat is visited, until a total of 450 households are interviewed.

3.1.3. Cluster sampling

In cluster sampling, several clusters of households (i.e. households grouped together) are selected for data collection. Generally, a sample of 30 clusters of 30 families is taken, representing approximately 4000 to 5000 persons, 900 of whom are children between 6 and 59 months (Example N° 2). However, the adapted sample size should be calculated for every survey.
When possible, systematic sampling is preferred, since it is easier to carry out, and more rapid. The precision obtained is equivalent to cluster sampling[8], but with a smaller sample size.

7 The appropriate sample size should be calculated for every survey.
8 Using 2-stage cluster sampling (sample size = 900 children, design effect of 2), with an expected prevalence of malnutrition of 10%, the limits of the 95% confidence interval are [7.5% - 13.2%].

The above methods are explained in more detail in the MSF *Nutrition guidelines* [13].

Example N° 2
Two-stage cluster sampling

For nutrition surveys, 30 clusters, each of 30 children, are enough to obtain results with sufficient precision. These figures are used for the calculations in the example below.
Before starting a cluster survey, the total population of the target area, as well as the population per section (or village), is known. In the example below, the target area is divided in 7 sections.

Selection of clusters
1. Calculate the cumulative total population = 24755
2. Calculate the sampling interval = 24755/30 = 825
3. Determine the first cluster at random ex. 200
4. The following clusters are determined by adding each time the sampling interval (200 + 825 = 1025, etc.). When the resulting population figure is bigger than the population from the first section, the next cluster is drawn from the next section.

Section	Population per section (or village)	Cumulative population	Corresponding population figure	N° of clusters per section (or village)
1	4000	4000	200, 1025, 1850, 2675, 3500	5
2	3000	7000	4325, 5150, 5975, 6800	4
3	1755	8755	7625, 8450	2
4	6000	14755	9275, 10100, 10925, 11750, 12575, 13400, 14225	7
5	5000	19755	15050, 15875, 16700, 17525, 18350,19175	6
6	4000	23755	20000, 20825, 21650, 22475, 23300	5
7	1000	24755	24 125	1

Selection of individuals
In each section (or village) where one or more clusters are drawn, a random direction is selected at the centre of the section. While walking in this direction, from the centre to the limit of the section, the total number of habitats is counted.
Once the total is obtained, a random number is taken between 1 and the total number of habitats counted. This number corresponds to the initial household that is the departure point for the selection of the habitats in the cluster. The following household is then the next nearest habitat, and so forth, until the required cluster size is obtained.
If several clusters are drawn in one section (or village), the same procedure, starting from the centre of the section, is repeated for each cluster.

The two-stage cluster sampling method is described in more detail in the MSF *Nutrition guidelines* [13].

3.2. Data collection at distribution points

Important information can be obtained from other agencies or NGOs present, such as the quantities planned for distribution. This information allows for a calculation of the *theoretical* quantities of water or food per person for a given time period (day, week or month). However, this does not provide any information on the proportion of the target population that does not have access to a certain service (e.g. families who do not have distribution cards). Such information can be obtained through appropriate questionnaires during surveys.

In order to know the *real* quantities (e.g. food) distributed, a survey can be done through systematic sampling of the families present at the distribution points. The average quantity of food per person is evaluated, as well as the proportion of beneficiaries who receive less than the accepted minimum (cf. Chapter 4: *4.6.1.3.2 food basket monitoring*, page 39).

3.3. Demographic assessment methods

The size of the target population can be estimated through different methods:

3.3.1. Census and/or registration

- During a census, every person is counted and registered individually.
  This is the "ideal" method. However, a census takes a long time, and requires a lot of human resources - both of these often lack in emergencies. A census is done during the time of the day when most persons are "at home".
- Systematic registration of new persons can be done upon arrival at the site. This may be coupled to other aid activities, such as distribution of food cards, detection of malnutrition, measles vaccination, etc.

3.3.2. Exhaustive counting of habitats (or households)

Habitats in the target area are counted one by one. This is often only feasible in small sites (small surface areas).

The average number of persons per household is obtained from a sample of households, selected at random or through systematic sampling.

The total population is then obtained by multiplying the total number of habitats by the average number of persons per household.

An exhaustive habitat count can be done while walking, or while driving in a car, and sometimes by aerial photography. This assumes good quality and sufficient detail of the pictures taken when flying over the target area.

3.3.3. Vaccination coverage or programme activity data

This method uses the results of a vaccination coverage survey or the number of vaccines administered during a mass vaccination campaign, for a specific age group (e.g. 6 to 59 months). Using the reference age group distribution, the total population can be deduced (Example N° 3) [14].

Example N° 3
Population estimate from vaccination coverage data

Assume that measles vaccination coverage among children between 6 and 59 months, was 80% (or 0.80) and that 10000 measles vaccines were administered in that age group.

With this information, the total number of children between 6 and 59 months can be estimated: 10000/0.80 = 12500.

Knowing that children of this age group generally represent around 16 to 20% of the total population[9], the total population is estimated to be 12500/0.16 or 0.20 = 78125 or 62500 persons.

3.3.4. Area sampling

Using area sampling, first the surface area is estimated. Then, the total population is calculated from counting the number of persons in a randomly selected sample of habitats (Example N° 4, Appendix 4).

Example N° 4
Area sampling

Area sampling provides an estimate of the surface of the target area (site), as well as the total number of persons living in that area. Population density can be calculated.

1. Delineate the perimeter of the target area: a walk (or drive) along the borders of the target area is done, indicating several landmarks. The distance between each of these landmarks is recorded (in meters), as well as the positioning references of each landmark (the degrees of the angle to the North when using a compass, or latitude/longitude of the landmark when using a GPS - Global Positioning System). The perimeter of the target area should include only the area where there are habitats.
2. With this information, a map is drawn, and the total surface of the area is calculated.
3. Next, a grid is drawn on the map, using squares of 25m x 25m (according to the scale of the map).
4. Randomly select a number of squares (or GPS points from which the squares are drawn) distributed throughout the area.
5. The number of persons in each habitat within the square is to be counted. A 100m rope can be used to delineate the 25m x 25m square. In order to be representative, 15 fully inhabited squares are required.
6. The population is calculated by extrapolating the average number of persons per square, to the total number of squares counted for the full area surface.

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[9] The proportion of children under 5 years may vary according to the context [14].

The use of the software E-pop allows automatic calculation of the site/camp area surface, total population and population density[10].

Area sampling can also be used to estimate the structure of a population (proportion of individuals according to age and sex); however, sample surveys are most often used for this purpose.

3.4. Other methods

Qualitative methods (e.g. focus groups, in-depth interviews, etc.) represent a more participatory approach and complementary information for better understanding of specific problems can be collected. Some reference documents or useful website links can be found on the CDrom.

10 E-pop: software developed by Epicentre for mapping (and area sampling), and available on the CDrom with this guide.

CHAPTER 4

Areas of assessment and indicators

Demography

Mortality

Morbidity

Measles vaccination coverage

Nutritional status

Vital needs: food, water, hygiene and sanitation

Shelter and non-food items

Security

Areas of assessment and indicators

4.1. Demography

Knowing the size of the target population is important for planning and enables the calculation of indicators. Big changes in population figures, due to massive in- or efflux of persons or families, need to be integrated and taken into account in the operations.

4.1.1. Objectives

- Determine the size of a population
- Assess the population structure
- Determine the size of vulnerable groups

4.1.2. Indicators

- Total population: total number of persons per site. If indicated, a difference can be made between displaced and resident population.
- Population structure:
  - male/female sex ratio
  - average household size
  - proportion (%) of children under 5 years (or other)
  - proportion (%) of pregnant and/or lactating women, unaccompanied minors, elderly, etc.
  - age pyramid

4.1.3. Methods

4.1.3.1. Methods to determine the population size

Methods to determine the population size are described in the previous chapter. The choice of method, depends on the local situation.

1. Census/registration
2. Counting habitats
3. Using programme activities
4. The method of area sampling allows some additional calculations, apart from estimating the total population:
   - the total surface area of a site, expressed in square metres (m^2)
   - the surface area of separate sections of a site
   - the population density, expressed in numbers of m^2/person

Emergency standards
A minimum shelter (habitat) area of 3.5 m^2/person
For the entire site, a minimum of 30 m^2/person

4.1.3.2. Methods to determine the population structure

To determine the population structure - in its most basic form this means the age and sex distribution of the population - either data from a census or a sample survey are used.

The reference age group proportions generally used for developing countries are presented in Table 1 and 2. In general, the male/female sex ratio (number of men/ number of women) is around 1, and the same for all age groups.

At a minimum, the sex ratio is calculated for the total population and for children under five years of age (0 to 59 months). If more detailed information is available, this can be represented by an age pyramid (Example N° 5).

Specific demographic indicators can be calculated for programme planning, such as the number of pregnant women expected for prenatal consultations, the number of women at child-bearing age for tetanus vaccination, etc.

Note that population displacement often leads to a change in the composition of traditional families. Therefore, it is also useful to know the importance of specific vulnerable groups, like single women with children (female heads of households), unaccompanied minors, isolated elderly persons, etc.

Table 1
Standard age distribution of populations in developing countries[11]

Age group	Proportion of total population
0 – 4 years	16%
5 – 14 years	27%
15 – 29 years	27%
30 – 44 years	16%
≥ 45 years	14%
Total	100%

Table 2
Standard age group distribution for the 0 – 4 years

Age group	Proportion of total population
0 – 11 months	4%
12 – 23 months	3%
24 – 35 months	3%
36 – 47 months	3%
48 – 59 months	3%

4.1.3.2.1. Estimation of number of pregnant women

In order to estimate the number of pregnant women, the total population should be known.

11 The proportion of children under 5 years may vary according to the context [14].

Total pregnant women = total population x 0.50 x 0.47 x 0.18

0.50 = 50% = proportion of women in a population
0.47 = 47% = proportion of women at child-bearing age (15 to 49 years) [14]
0.18 = 18% = average fertility rate per woman [14]

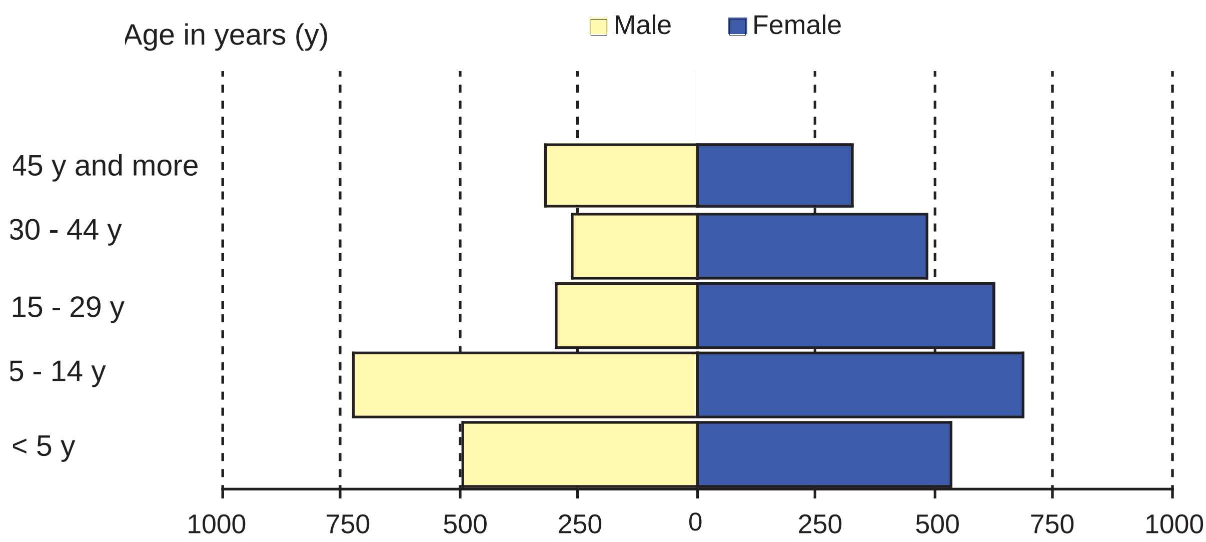
For a total population of 30000 people, there are an estimated 1269 pregnant women (30000 x 0.50 x 0.47 x 0.18).

4.1.3.2.2. Age pyramid

An age pyramid presents the age group distribution of a population, distinguishing men and women. The youngest age group is put at the base.
An asymmetric age pyramid needs to be explained according to the local context.

Example N°5 shows the age pyramid from Murnei, a village in West-Darfur, Sudan (2004), where about 80000 displaced persons had gathered. The asymmetry for the 15-29y and 30-44y age groups was most likely linked to the high level of violence in the months previous to the survey, during which many men were killed, and others had fled [15].

Example N° 5
Age and sex distribution for the population in Murnei, Darfur, Sudan, May 2004
(n = 4754)



4.2. Mortality

Mortality is the priority indicator to be followed in an emergency: it gives a good indication of the health-related situation of the displaced population. Mortality needs to be monitored over time, in order to follow its evolution (to measure the result of a relief intervention).

Mortality is often high during the first weeks or months following mass population displacement. The main objective of humanitarian assistance in emergencies is the rapid reduction of excess mortality. With an effective humanitarian response, mortality is expected to normalize after a few weeks or months [16].

4.2.1. Objectives

- Measure the crude mortality rate in the displaced population
- Measure the mortality rate in the children under 5 years
- Determine the principal causes of death and their respective burden (proportional mortality)

4.2.2. Indicators

- **Crude Mortality Rate** (**CMR**): total number of deaths, per 10000 persons per day. Once the situation is more stable (post-emergency), the CMR can be expressed as number of deaths, per 1000 persons per month.
- **Under-5 Mortality Rate** (**U5MR**): number of deaths in children under 5, per 10000 persons per day.
- **Proportion (%) of the population deceased during a given time period**.
- **Proportional mortality**: number of deaths attributed to each priority disease. E.g. % of deaths due to measles, due to acute respiratory infections, etc.
- **Specific mortality rate**: number of deaths due to a given disease. E.g. number of deaths due to measles/10000/day.

4.2.3. Methods

During an initial assessment, mortality is measured *retrospectively*, i.e. the amount of deaths during a certain time period, previous to the moment of the assessment. This may be done by a sample survey, or by counting the number of graves in the cemetery.

Retrospective mortality provides information on the gravity of a situation that has already passed, which may be different from tendencies at the time of the assessment.

A *prospective* follow-up of mortality is part of a surveillance system that should be implemented during the assessment. Methods for prospective mortality surveillance are presented in Appendix 2.

4.2.3.1. Retrospective mortality survey

In absence of all available mortality data, a sample survey is carried out among the affected population (cf. Chapter 3).

Since the "event of death" is a relatively rare event, the sample size to measure mortality should be large enough in order to obtain sufficient precision. For cluster sampling, 30 clusters of 30 households, which approximately corresponds to 4000 to 5000 individuals, is an appropriate sample size (depending on the recall period used).

4.2.3.1.1. Recall period

The head of each family surveyed is questionned on the occurrence (or not) of any deaths within the household, during a specific period of time (called the "recall period"). In order to define the recall period, a balance needs to be made between 2 elements:

- To limit mistakes related to memory (called "recall bias"), and to limit difficulties in interpreting results, the recall period should not be too long.

- At the same time, the recall period should be long enough to cover a sufficient number of "death events", for the precision of statistical calculations.

When a situation is extremely serious and the number of deaths is evidently very high (e.g. IDP in Somalia in 1992 [17], Rwandan refugees in Goma in 1994 [18], the famine in southern Sudan in 1998 [19]), the retrospective period covered by a survey is only a few weeks. A longer recall period will yield more precise results, and therefore smaller confidence intervals. The final decision on the length of the recall period will depend on the context, the objective of the survey, and the period of interest.

It is important to clearly identify the limiting date that defines the recall period, through a major event from a "local calendar", i.e. the date corresponds to a reference known by everybody, like the beginning or the end of Ramadan, national holiday, day of severe attacks, etc. Doubts on the dates should be excluded, both for the interviewers and the persons interviewed.

4.2.3.1.2. Calculation of mortality rate

The mortality rate is obtained as follows (Example N° 6 and N° 7):
- Numerator: the total number of deaths that occurred in the surveyed sample during the investigated recall period.
- Denominator: the total number of individuals recorded at the time of the survey, plus half of the total number of deaths. This is based on the assumption that the occurrence of deaths was evenly spread over time.
- Rate: to calculate the rate, the result is multiplied by 10000 and divided by the number of days in the recall period.

In this way, the results will be expressed as number of deaths/10000/day, and presented with their 95% confidence interval[12]. Comparison over time, or with other settings is now possible.

This is the usual and simplest way to estimate the mortality rate. In order to be more accurate, the number of births during the recall period, family members who are absent or have disappeared, new persons who have arrived, etc. should also be taken into account. However, the benefit of results with higher precision often does not justify the increased complexity of the questionnaire, with consequences for training of the survey team, understanding of questions, more time consuming interviews, increased risk for mistakes, etc.

Example N° 6
Calculation of mortality rate from survey data

The results of a survey of 5500 individuals showed that 48 deaths had occurred in the 4 previous weeks (28 days):

- Numerator: 48
- Denominator: 5500 + 48/2 = 5524
- Crude mortality rate (CMR): $\frac{48}{5524}$ x 10000/28 days = 3.1 deaths/10000/day
- 95% CI [2.2 – 4.0]

[12] The 95% confidence interval of a proportion is calculated with the following formula:

$$\pm 1.96\sqrt{\frac{p(1-p)}{n}}$$

Example N° 7
Calculation of mortality rate from survey data

In Kass, South Darfur, Sudan, a retrospective mortality survey was done in a context of high level of violence, which had caused people to look for refuge in the displaced camps [20]. A total of 5776 persons were included, and 217 deaths were reported to have occurred during the 121 days of recall period.

This corresponded to a CMR of $\frac{217}{5885}$ x 10000/121 days = 3.1 deaths/10000/day

The 95% CI was [2.5 - 3.7]

Examples N° 6 and N° 7 show that for the same result, the precision in the second example is higher (i.e. smaller confidence interval) because of the longer recall period.

4.2.3.2. Mortality data obtained from counting graves

In certain situations it is possible to count the number of new graves dug since the arrival of refugees (Example N° 8). This method is approximate, but precious when it is the only source of information, before the set up of a simple prospective mortality surveillance system (Appendix 2).
The results can later be compared with the data obtained from a retrospective mortality survey.

Example N° 8
Mortality from grave counting

Six months after the massive arrival of displaced persons at Hoddur, Somalia, 5900 graves were counted for a population of 25000 (MSF, Epicentre, 1993). This means that during these 6 months, 19% of the initial population (25000 + 5900) had died, which corresponded to:

a CMR of $\frac{5900}{27950}$ x 10000/183 days = 11.5 deaths/10000/day

4.2.3.3. Determining the main causes of death

For each death recorded during the retrospective mortality survey, the cause of death reported by the head of household is noted. The use of simple case definitions, or of a local term (often the case for measles) can facilitate the identification of the cause of death. A true "verbal autopsy" (i.e. a long questionnaire to determine the cause of death) is rarely used in emergencies, as it takes more time and may be more complex.

The most common causes of death in low-income countries are malaria, measles, diarrhoea, acute respiratory infections, and malnutrition.

4.2.4. Interpretation of results

The mortality data obtained by a retrospective survey express an average for the time period investigated. As soon as possible, a prospective mortality surveillance system should be set up, which allows to follow the evolution of the health situation in a population (Appendix 2).

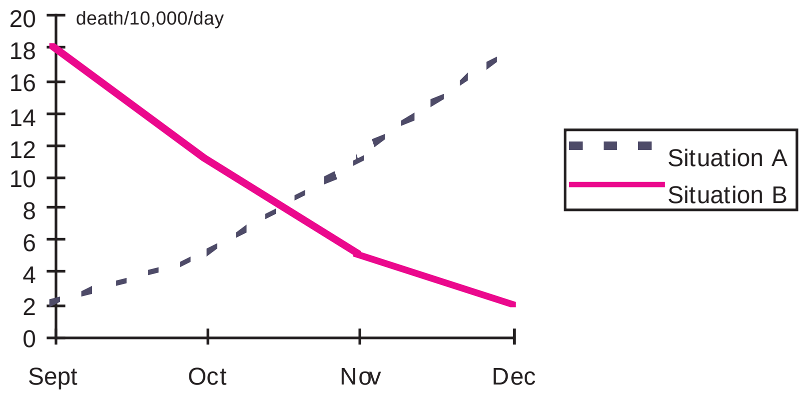
The crude and under-5 mortality rates are the most useful indicators to evaluate and monitor the health situation of a population. In low-income countries, outside "crisis situations", mortality rates usually vary around 0.5 to 0.6 deaths per 10000 persons per day (or 18 to 22 deaths/1000/year). In general, mortality rates are compared to the emergency standards below. Some authors have proposed the doubling of the baseline mortality as an indication for an emergency, in particular for higher income countries [11].

Emergency threshold[13]
CMR ≥ 1 death/10000/day
U5MR ≥ 2 deaths/10000/day

4.2.4.1. Caution when interpreting mortality data !

It is important to remember that the mortality rate obtained by a retrospective survey is an estimate. It represents an average for the whole recall period. If the recall period is long, the average mortality rate might not represent what is actually happening at the time of the survey. This could lead to inappropriate decisions (Example N° 9).

Example N° 9
Interpretation of mortality rate from survey data



Retrospective mortality surveys conducted at the end of December with a 4 month recall period will give the same result in situation A and in situation B (8 deaths/10000/day). Neither result is representative of what is actually happening at the end of December.

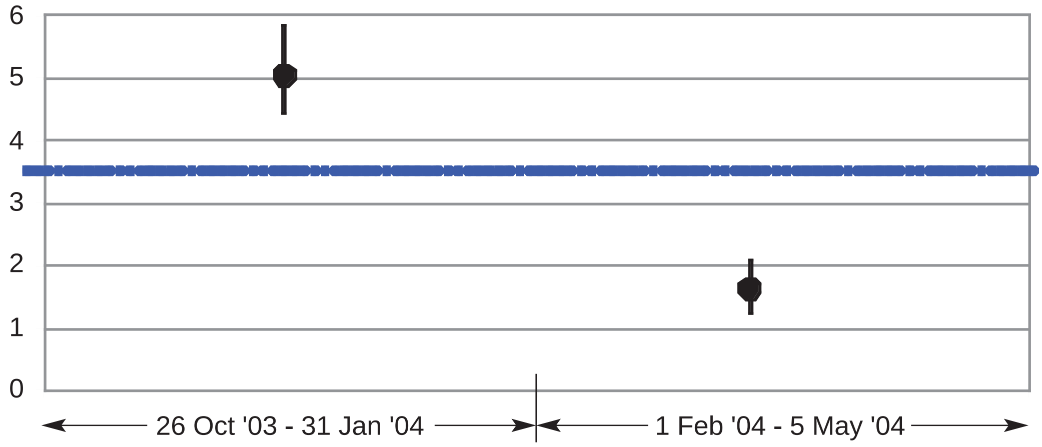
On the other hand, if the recall period is short, there is a risk of measuring a very specific event that might not be representative of the overall situation. Also, less death events will be recorded, leading to a reduction of the precision of the estimate (i.e. a wider confidence interval).

To avoid misinterpretation as described above, the total (longer) recall period can be divided in 2 by a second event. When inquiring about the time of death, it is asked whether the person died before or after this second event (Example N° 10).

13 More detailed emergency thresholds have been proposed by UNHCR, and thresholds according to world regions have been proposed by SPHERE [9, 10].

Example N° 10
Splitting up of the recall period

In Darfur (May 2004), the question on mortality was first asked for the total recall period of 193 days (26 Oct. '03 to 5 May '04) [15]. Subsequently, it was asked whether the reported death occurred before or after a certain event (corresponding to the 1st of February), which split up the original recall period in 2 parts.



The crude mortality rate for the total recall period of 193 days was 3.4 deaths per 10000 population per day. However, different results were found when looking at the 2 different periods: for the first period, a CMR of 5.1 deaths per 10000 per day was found (95% CI: 4.5 - 5.8) versus a CMR of 1.7 (95% CI: 1.3-2.1) for the second period.

The higher mortality in the first half of the recall period would not have been identified if only one figure was available for the complete recall period.

Since mortality data only represent the situation during the recall period of the survey, some caution is needed when used for planning purposes, especially when figures are abnormally high. Peaks of mortality documented during communicable disease outbreaks or nutrition emergencies often reflect what is happening in the most vulnerable groups of the population. It needs to be considered that in the period after high excess mortality in the vulnerable groups, mortality may return to "normal" since the vulnerable groups have disappeared.

4.3. Morbidity

4.3.1. Objectives

- Identify the most frequent pathologies and determine their relative importance
- Identify the pathologies with high epidemic potential

4.3.2. Indicators

- **Incidence**: the number of new cases of a disease that occur during a specified time period, in a population at risk for developing the disease.

For acute diseases, or during an emergency or epidemic, incidence will most often be expressed per 1000 per week. For more chronic diseases, or for longer term programmes, incidence can be expressed per 1000 per month. As the time period can vary (week versus month), so can the population reference (per 100, per 1000, per 10000, etc.).

- **Prevalence**: the number of persons who have the disease at a specific time (or "existing cases" during a specific time period) in a population. As for incidence, the time and population reference can vary with the situation.

4.3.3. Methods

4.3.3.1. Incidence

Information on the occurrence of new cases of a certain pathology during a certain period in time, can be collected from the registers in the existing health structures. A prospective disease surveillance system should be set up as soon as possible with the field team, at the start of an intervention (Appendix 3).

4.3.3.2. Prevalence

In the absence of any epidemiological data, the prevalence of a given pathology can be estimated through a retrospective sample survey and using a well-defined case definition. Heads of family are questionned on the occurrence of a particular disease in the household during a defined period of time. However, a "prevalence survey" to assess morbidity has limited value because it usually does not provide any information on trends in occurrence of the disease; it is therefore rarely done.

4.3.4. Interpretation of results

While disease prevalence gives some information on current health problems, disease incidence is much more useful to monitor during emergencies. Data on disease incidence allow for the follow-up of trends of principal pathologies and they can point out the start or show the evolution of an epidemic. Thresholds to identify epidemics can be expressed as incidence rates, e.g. meningitis [21].

The set-up of a prospective morbidity surveillance system is therefore a priority during a major emergency. The initial system should be simple, and focus on the most important causes of mortality, as well as the diseases with high epidemic potential (Appendix 3).

4.4. Measles vaccination coverage

Measles is an infectious disease with high epidemic potential and excess mortality, in particular in areas with high population density. Measles vaccination coverage gives an indication of the risk for an epidemic.

4.4.1. Objective

Measure the proportion of children aged from 6 months to 15 years vaccinated against measles in a certain area.

4.4.2. Indicators

- Proportion (%) of children who are *confirmed* to have been vaccinated against measles. For each child, the vaccination card is verified.

- Proportion (%) of children who are *supposed* to have been vaccinated against measles. This is based on the information given by the mother.

If based on a sample survey, the results are presented with their 95% confidence intervals.

4.4.3. Methods

The assessment of measles vaccination coverage focuses on children aged from 6 months to 15 years, which is the age group at highest risk [7].

The assessment of measles vaccination coverage can be integrated during a sample survey in the affected population (cf. Chapter 3). The inclusion of 210 children (i.e. 7 children per cluster) provides results with a precision of ± 10% in a cluster sample survey. In case a simple or systematic random sampling survey was done, half of this number (105 children) would be sufficient, but this is rarely done.

4.4.4. Interpretation of results

The measles vaccination coverage gives information on the need to carry out a measles vaccination campaign, and allows for an assessment of the effectiveness of the campaign after it is finished. In order to avoid an epidemic, measles vaccination coverage should be no less than 95%. [22]

Emergency standards
Measles vaccination coverage of minimum 95% to prevent an outbreak

In order to allow correct interpretation, it should be noted if vaccination coverage was calculated from data collected from vaccination cards or from statements of the mothers. Coverage based on vaccination cards is generally more reliable and it is the recommended norm.

4.5. Nutritional status

Acute malnutrition and micronutrient deficiencies are an important cause of mortality in complex emergencies [4, 12]. Since children between 6 and 59 months represent the most vulnerable age group for malnutrition, the assessment of their nutritional status is one of the priorities of a rapid health assessment. Micronutrient deficiencies occur when the food available is not sufficiently diversified, and can lead to specific deficiency outbreaks.

4.5.1. Objectives

- Determine the severity of a nutritional situation
- Estimate the potential number of malnourished children
- Determine the needs for a nutritional intervention

4.5.2. Indicators

- Prevalence of global acute malnutrition
- Prevalence of severe acute malnutrition

Acute malnutrition in a child is well measured through the Weight for Height (W-H) index, and/or the presence of bilateral oedema of the feet. Prevalence of acute malnutrition in a population is expressed in the % of the median and in Z-scores. Results are presented with their 95% confidence intervals (Example N° 11).

4.5.3. Methods

Prevalence of acute malnutrition in a site or camp can best be measured through a representative sample survey (cf. Chapter 3), during which anthropometric measures are taken: weight, height, presence of bilateral oedema, and MUAC (Mid-Upper Arm Circumference). The importance of accuracy of the anthropometric measures should be stressed during the training of the survey team, in order to limit errors [23].

The target population of a nutrition survey usually comprises children aged between 6 and 59 months included. If carried out in a context where the age of children is often not known or imprecise, the inclusion criterion is based on the height of the children, i.e. children between 65 cm and 110 cm (≥ 65 cm and < 110 cm). Children between 65 cm and 84.9 cm are measured while lying down (length). Those of 85 cm and above are measured standing (height).

In case of serious time constraints, rapid assessments using MUAC only can be done (screening). However, the results should be interpreted cautiously, and need to be validated by a sample survey based on weight and height measures as soon as possible.

4.5.3.1. Anthropometric indices

- **Weight for height index** (**W-H**): W-H expresses acute malnutrition, and is most often used for rapid nutritional surveys in emergency situations. Prevalence of acute malnutrition is usually expressed in Z-scores (or standard deviation, a statistical reference), and/or in percentages of the median, as compared to a reference population[14]. Z-score is more accurate, because it is a statistical expression and takes into account natural variations in weight.

  Definition of acute malnutrition according to W-H:
  Prevalence of *global acute malnutrition* is defined by the proportion of children
  – with a W-H index below -2 Z-scores, and/or bilateral oedema, *OR*
  – with a W-H index below 80% of the median, and/or bilateral oedema
  Prevalence of *severe acute malnutrition* is defined by the proportion of children
  – with a W-H index below -3 Z-scores, and/or bilateral oedema, *OR*
  – with a W-H index below 70% of the median, and/or bilateral oedema

  In general, both ways of expressing the results are presented: the results in Z-score are more statistically correct (less age-dependent), while the % of the median results are usually used as entry and discharge criteria for the selective feeding programmes, and therefore allow better comparison.

Example N° 11
Expression of malnutrition prevalence

Table 3: Prevalence of acute malnutrition among children from 6 to 59 months of age, expressed in Z-score (n = 951). Maradi, Niger, May 2005.

	n	%	95% CI
Global acute malnutrition			
< -2 Z and/or oedema	184	19.3	15.6 - 23.6
Severe acute malnutrition			
< -3 Z and/or oedema	23	2.4	1.2 - 4.6

14 Reference norms recommended by the WHO are those from the National Center for Health Statistics (1977), Centers for Disease Control and Prevention, Atlanta, USA.

Table 4: Prevalence of acute malnutrition among children from 6 to 59 months of age, expressed in Z-score (n = 951). Maradi, Niger, May 2005.

	n	%	95% CI
Global acute malnutrition			
< 80% and/or oedema	133	14.0	11.0 - 17.6
Severe acute malnutrition			
< 70% and/or oedema	15	1.6	0.7 - 3.3

- **Bilateral oedema**: oedema can be a symptom of severe acute malnutrition (kwashiorkor). It is investigated by applying moderate pressure with the thumbs for 3 seconds on the dorsum of both feet of the child. If a pit remains after removal of the thumbs, the person has oedema.
- **Mid-Upper Arm Circumference** (**MUAC**): the MUAC (< 110 mm) is a reliable indicator to identify children with a high risk of dying. It is measured for children between 65 and < 110 cm of height, on the left arm in a relaxed position. The exact measurement is noted and marked in millimetres.

Table 5: Prevalence of acute malnutrition according to MUAC

Acute malnutrition	MUAC (mm)
Severe	< 110
Moderate	≥ 110 to < 125
Global	< 125
At risk for malnutrition	≥ 125 to < 135

MUAC results are usually presented separately from the W-H index results.

4.5.4. Interpretation of results

The results of a nutritional survey cannot be interpreted without a thorough context analysis: the season and rain fall or drought, the previous or expected harvest, results of previous surveys or intervention reports, etc. [12] Considering all relevant factors, a decision on the strategy to use can be taken (opening of 24h or ambulatory therapeutic and/or supplementary feeding centres, blanket food distribution, etc.) [13].
The proportion of children with malnutrition oedema needs special attention, since they have a higher risk for severe infection and death [24].

4.6. Vital needs

4.6.1. Food resources

4.6.1.1. Objectives

- Assess the food availability in a population
- Assess the access to food distributions
- Estimate the quantity (calories) of individual rations
- Estimate the quality (nutrients and micronutrients) of individual rations

4.6.1.2. Indicators

- Proportion (percentage) of families having a food distribution card
- Proportion of families receiving an adequate ration
- Average number of kilocalories/person/day

4.6.1.3. Methods

Regardless of the assessment method used, the excel tool "componut" (cf. CDrom) was developed to facilitate the calculation of the food ration in terms of quantity and quality.

4.6.1.3.1. Theoretical rations

The quantity of the different food items that are planned to be distributed, as well as the frequency of distributions and target population, can be obtained from the organisations in charge of distribution (World Food Programme (WFP) or an implementing partner). Important to realize that theoretical rations do not always correspond to the real quantities distributed.
Information on the available stock of food, food in the pipeline, etc. gives an indication on the capacity of response to the emergency.

4.6.1.3.2. Food basket monitoring

The objective of food basket monitoring is to assess the average food ration actually received by the beneficiaries as well as to estimate the equity of distribution between families. The assessment is carried out at the distribution site, or at the household level the same day of the distribution. If there is more time between the distribution and measurement, part of the ration might be eaten, sold or exchanged.

A representative sample is selected (cf. Chapter 3). At the distribution site, systematic sampling is most often used. In emergencies, complete food ration measurements done for 30 to 35 heads of family already provide a good estimate.

For each household included, all food received is weighed, and the number of persons in the household is recorded. If in addition the approximate date for the next distribution is known, the number of kilocalories per individual and per day can be calculated, as well as the nutrient and micronutrient composition.

These measurements are repeated with the same methodology during each distribution in order to follow up tendencies in food availability. Important to note that by sampling from the households who received a food ration, families who did not have access to the distribution are not taken into account.

4.6.1.3.3. Community sample survey

During a nutritional or retrospective mortality survey, the quantity of available food can be assessed. However, this is time consuming, rather delicate, and there is an important bias due to the time lapse between the distribution and measurement.
It is therefore more interesting to assess certain factors indirectly linked to the food distribution and rations, e.g. presence of a food distribution card, whether or not food was received at the last distribution, etc. (Example N° 12)

Example N° 12
Food distribution access

During the survey in Murnei (West-Darfur, Sudan), 21 of the 912 families interviewed reported not having a registration card for WFP food distributions. This corresponds to 2.3%, with a 95% confidence interval of [1.2 - 4.3]. Nine families (2.1% - 95% CI [1.0-4.0]) stated to have never received any general food distribution at all since their arrival in Murnei camp.

4.6.1.4. Interpretation of results

Food rations should correspond to a minimum of 2100 kcal/person/day, where proteins provide 10 to 12% of the total energy, and fat at least 17% (these proportions are given when using "componut" - cf. CDrom). However, this can change according to the environmental temperature, the population's health and nutritional status, demographic characteristics and physical activity level [25].

The proportion of families having a food distribution card gives an indication of food accessibility.

The proportion of families receiving an "adequate ration" versus those receiving less is a good indicator of the equity of distribution. The same is true for the variance between the individual rations distributed. The greater the variance, the less equitable will be distribution among families. A possible relation with the family size needs to be investigated: experience has shown that larger families often received proportionally less than other families.

Emergency standards
Minimum 2100 kcal/person/day, with 10 to 12% proteins, and a minimum of 17% fat

Table 6: Daily requirements of vitamins and minerals for a population needing emergency food aid [25]

Vitamin/Mineral	Recommended Daily Intake	Vitamin/Mineral	Recommended Daily Intake
Vitamin A	500 μg retinol equivalents	Vitamin C	28 mg
Thiamine (B1)	0.9 mg	Vitamin D	3.8 μg
Riboflavine (B2)	1.4 mg	Iron	22 mg
Niacin	12.0 mg	Iodine	150 μg
Folic acid	160 μg		

4.6.2. Water resources

The availability of sufficient and clean water is a key determinant of a person's health. Water-related diseases represent a major burden on morbidity and mortality in low-income countries.

Different water sources are identified:
1. Surface water, e.g. rivers
2. Rain water, which is collected at the household level
3. Ground water, from natural sources, from wells or from boreholes

4.6.2.1. Objective

Measure the access and availability to water in the displaced population

4.6.2.2. Indicators

- Average number of litres of potable water available per person per day
- Number of faecal coliforms per 100 ml water, as an indicator of health risk

- Proportion (percentage) of families having sufficient and adequate water transportation and storage means
- Average number of users per waterpoint per day, as an indicator of access

4.6.2.3. Methods

4.6.2.3.1. Water quantity

a) Assessment at water distribution points
   - **Hand pump**: the average water flow of a hand pump corresponds to 1 m^3/ hour. If it is known how many hours per day the pump functions, as well as the target population, the quantity of available water per person per day can be deduced. This assumes that all persons have equal access.
   - **Water tanks**: water availability can be estimated from the tank capacity and the number of times they are filled per day or per week.
   - **Water trucking**: persons in charge of implementing water distribution systems know the total quantities of distributed water. The average quantity of water available per person per day can be estimated from these figures.

b) Community sample survey
   The number of water containers present in the household at the time of the survey, gives a good indication on the storage and collecting capacity of the household.
   During a community sample survey, the number and capacity of containers used by each family can be counted. By using the number of litres collected each day with the available containers and the size of families, the quantity of water available per person per day may be estimated. This is rather time consuming.

4.6.2.3.2. Water quality

Water quality can be measured at the tap, where the water is fetched, or in the house, where the water is stored. The distinction is important to make since clean water from the tap can become contaminated if it is stored in a "dirty" container (= post-collection contamination).

The quality of water is verified with specific bacteriological testing kits, preferably using E. coli as an indicator for presence of bacteria. Follow up on the presence of free residual chlorine per litre is a priority, because it is an indicator of disinfected water, and in addition provides post-collection protection. Water turbidity is another indicator of water quality. More details can be found in the MSF water and sanitation guideline [26].

4.6.2.3.3. Water access

The easiest way to assess the use of water, is through structured observation at a water collection point, where the observer marks the number of persons collecting water during one day. It is important to note that the level of occupation of the waterpoint may vary during the day.

4.6.2.4. Interpretation of results

4.6.2.4.1. Water quantity

In an emergency, the provision of sufficient quantities of water is of higher priority than the water quality. However, as soon as possible, water should be of an acceptable quality as well.
The average quantity of water needed for drinking, cooking and personal hygiene is estimated to be a minimum of 15 to 20 litres per person per day. Anything less should be considered as an absolute emergency. People should not have to wait longer than 15 minutes in line before being able to fill their containers.

4.6.2.4.2. Water quality

Water quality is considered acceptable when there are less than 10 faecal coliforms per 100 ml of water - which corresponds to a low health risk - although 0 faecal coliforms per 100 ml should be the objective. More than 10 faecal coliforms correspond to an intermediate, and more than 100 to a high health risk.

In case the water is chlorinated, free residual chlorine should be between 0.3 and 0.8 mg/litre, depending on the pH.

At the start of an emergency, turbidity below 20 NTU (Nephelometric Turbidity Units, a measure of turbidity) can be accepted, but should be below 5 NTU as soon as possible. Water with turbidity above 20 NTU cannot be chlorinated.

4.6.2.4.3. Water access

The number of users per waterpoint per day needs to be compared to the total population and number of waterpoints.

Emergency standards
Minimum quantity of potable water of 15 to 20 litres/person/day[15]
Minimum of 2 water containers of 20 litres per household

4.6.3. Hygiene and sanitation

Hygiene and sanitation cover a wide range of activities, including vector control, management of waste and wastewater, etc. What follows is limited to the immediate priorities in the early phase of an emergency. Further assessment will have to be done by experts.

4.6.3.1. Objective

Assess the basic hygiene conditions in the displaced population

4.6.3.2. Indicators

- Excreta disposal: E.g. number of persons per latrine
- Hygiene: Grams of soap available per person, per month

Other relevant indicators can be found in the literature [26, 27].

4.6.3.3. Methods

Basic information on hygiene and sanitation is collected from existing programme activities, or through community sample surveys. The presence of a latrine can be assessed per family, as well as the presence or not of soap in the household (Example N° 13).

Additional information can be obtained through other methods, like observational health walks or focus groups. However, more expert input will be needed.

Example N° 13

Data from a certain organization show that 300 latrines have been built in a camp of 6000 persons.
This corresponds to 6000/300 = 20 persons/latrine. This result is an average, and does not give information on the particular situation of each family.

15 In situations of extreme emergency, a minimum of 5 litres per person per day may be acceptable during the first few days following displacement.

4.6.3.4. Interpretation of results

A minimum of 1 latrine for 20 persons should be available, and ideally within 50 metres of the houses. In emergencies, before the digging of individual/family latrines, collective latrines may be opted for, like trench latrines, defaecation fields, etc.
A minimum of 250 grams of soap per person per month is considered necessary for good personal hygiene.

Emergency standards
1 latrine should be used by no more than 20 persons (separate men and women)

4.7. Shelter and non-food items

4.7.1. Objectives

To assess the material conditions that influence survival

4.7.2. Indicators

- Living area available (m^2) per person
- Proportion of households with protective shelter
- Proportion of households with blankets, cooking pots, firewood, etc.

4.7.3. Methods

4.7.3.1. Area sampling

As explained in Chapter 3 and Appendix 4, the area sampling method provides an estimate of the total area surface of the site or camp. Using this information, together with the total population estimate, the living area per person can be calculated.

4.7.3.2. Community sample survey

During a community sample survey the type of shelter for each household included can be assessed, e.g. whether it is protective against the local weather conditions (wind, rain, freezing, sun), type of roof, etc.
At the same time, a certain amount of essential non-food items can be assessed for each household, e.g. the number of blankets or mosquito nets present in the house, presence of cooking pots, soap, firewood, jerry cans, etc.

4.7.4. Interpretation of results

The minimum shelter area required is 3.5 m^2 per person. However, when planning a new site to host a displaced population, a minimum of 30 m^2 per person needs to be calculated. This takes into account the living space around the shelter, as well as the space needed for health centres, waste management, etc.

The need for adequate shelter or non-food items should not be underestimated. Lack of protection against the rain during the rainy season, lack of blankets when temperatures at night are low, is to be considered as a priority health issue, because these items play a role in people's health and livelihood.

Emergency standards
Protection from wind, rain, freezing temperatures and direct sunlight Minimum shelter area of 3.5 m^2/person Minimal total site area of 30 m^2/person

4.8. Security

4.8.1. Objectives

Assess the exposure to risk factors that represent a threat to the safety and health of the affected population.

4.8.2. Indicators

- Number of reports of violent events such as rape, beatings, robbery, violent attacks, gunshots, etc.
- Proportion of consultations due to violent events
- Vulnerable sub-groups, according to age, sex, ethnic group, etc.

4.8.3. Methods

In case health programmes exists, the number of consultations for violent events can be checked from the register. In some sites, violent events are reported in a separate registration book.

During the assessment of retrospective mortality, violence can be one of the causes of death to be recorded. These results give an important indication of the presence of violence in the population. When the objective is to document the different aspects as well as the magnitude of violence in a certain community, a more detailed assessment of the occurrence, as well as of the nature of any violent event, can be done.

The use of qualitative methods, through interviews with key informants, women's focus groups, etc. is an equally important and complementary tool to assess the importance of violence.

4.8.4. Interpretation of results

The presence of violence has a great impact on the health and daily functioning of a population: fear for attacks may prevent people from searching food, water or firewood.
On the other hand, in case of shortages, people may be forced to actually leave safe areas to search for these items.

While eliminating the cause of insecurity is often out of our hands, specific targeted programmes can try to alleviate the damage: mental health assistance to prevent possible stress disorders, management of cases of sexual violence, surgical programmes for gunshot wounds, etc.

CHAPTER 5

Some practical tips for the implementation of a rapid health assessment

Clearly define the objectives of the assessment

Planning and timetable

Method to choose

Material

Questionnaire

Human resources and training of survey teams

Testing of questionnaire

Data collection and entry

Preliminary report

Some practical tips for the implementation of a rapid health assessment

5.1. Clearly define the objectives of the assessment

As a reminder, the overall objective of a rapid health assessment is to collect, in a very short time, reliable information to assess the health status of a population, in order to plan the intervention strategy.

The general and specific objectives for every new assessment need to be clearly defined beforehand (Example N° 14). It is useful to write them down and include them in the final report.

Example N° 14

The specific objectives of the rapid health assessment during the emergency in Darfur, Sudan (2004) were the following:

1. To assess the current socio-demographic situation (age-sex pyramid)
2. To assess retrospective mortality, with the major causes of death
3. To estimate prevalence of global and severe acute malnutrition among children between 6 and 59 months of age
4. To assess measles vaccination coverage (with and without card)
5. To assess access to food, shelter and non-food items

5.2. Planning and timetable

A rapid health assessment is done in an emergency context, and should be carried out in a minimum of time. The planning of the emergency intervention and the health status of refugees may depend on it. However, clear terms of reference need to be prepared beforehand, including the objectives of the assessment, method to be used, and estimated time needed.

An indication of time needed:

- Preparation and departure from headquarters: ....2 to 3 days
- Meeting field teams, authorities, visit of target area, review existing documents:..1 to 2 days
- Preparation of survey: finalise questionnaire, training survey team, field testing of questionnaire and measurements, logistics: ....2 to 3 days
- Data collection, according to number of survey teams, available logistics, distances, duration of interviews: ....4 to 6 days
- First analysis and preliminary report in the field: ....1 day

Total =..10 to 15 days

In some contexts, it will take more time to actually reach the field, which should be taken into account in the planning. Further and more in-depth analysis of the collected data (after the preliminary analysis), as well as the writing of the final report will take another 5 to 8 days.

Make sure to have obtained all necessary authorizations to carry out the assessment before starting. By discussing with local key informants, some practical aspects of data collection can be better prepared, e.g. market days or distribution days when few people can be found in their house.

5.3. Method to choose

A community sample survey allows to obtain most of the information and indicators looked for in a rapid health assessment, as discussed in this guideline: the structure of a population, retrospective mortality, nutritional status, vaccination coverage, coverage of vital needs, etc.
Nonetheless, it is important to realize that one survey cannot answer all questions, and that different methods might be better adapted for certain issues, e.g. assessment of water and food resources, security, etc.
All variables need to be clearly identified before the starting of the assessment, and possible sources of confusion need to be anticipated, e.g. bias related to the recall period or the selection of the households, double recording of one death event which is related to the precise definition of a household, differences between resident and displaced population, etc.

5.4. Material

As soon as possible, a list with all material necessary for the survey should be sent to the field teams, for everything to be ready upon arrival (cf. Appendix 5).
Better also to be as independent as possible, and leave with all necessary administrative material, a computer with the necessary software (cf. below), portable printer, international plug, paper, clicker, GPS, compass, etc.

5.5. Questionnaire

Before starting a survey, use the information obtained from the teams already in the field, as well as from discussions with key informants (local leaders, staff, heads of family, etc.) and existing programmes. This will help to define the questions for the community survey.
Questions to investigate should be limited to those with a possible operational impact (cf. Appendix 6). Long questionnaires often are confusing and time consuming, for the survey team as well as for the people to be interviewed.

5.6. Human resources and training of survey teams

When doing a community sample survey, the number of survey teams will determine the time needed for data collection. A team generally consists of a local supervisor, and one or two assistants. A translator might be needed. A minimum of 4 to 5 teams is needed to carry out a large survey (30 clusters of 30 families) within a reasonable delay (4 to 6 days).

Needs in local and expatriate human resources need to be anticipated before leaving headquarters, and communicated to the team in the field to start preparing. If necessary, sufficient time for recruitment and training is to be planned. Enough time for training will determine the quality of the data collection, and therefore ensure the validity of the survey results. An interviewers guideline should be prepared to facilitate training and the carrying out of the interviews (CDrom).

It is good for the field team to participate in the survey, since it allows them to get to know the area of intervention and the population they are working with. However, the high workload of the operational team should be taken into account, and availability to participate should be checked with the field coordinator.

5.7. Testing of questionnaire

A survey should not be started without having tested the household selection process, or the interviews including the introduction of the survey team, stressing confidentiality, etc. During the test phase, the understanding and formulation of the questions (with translation) is checked, both for the persons interviewed as for the interviewers themselves. An indication on the average time needed per family interview is obtained. A minimum of 5 questionnaires per team should be tested, under close supervision.

5.8. Data collection and entry

Rigorous data collection for the whole duration of the survey is essential to ensure good quality and exploitable data. Questions should be asked in the same manner from the start until the end. Anthropometric measurements need to be precise. Weighing scales should be verified at the start of every (anthropometric) survey day, with the same reference weight. Close and/or regular supervision of each survey team is required.

At the end of each day, the survey supervisor verifies with each team whether the questionnaires are filled in correctly. Data entry is preferably done on a daily basis to monitor quality of the data collection. Relatively easy to use software includes: Microsoft Excel, EpiInfo (data entry and analysis, including EpiNut for nutrition - CDC Atlanta/WHO Geneva), EpiData (EpiData Association - Denmark), or WinCosas (vaccination - Epiconcept, France). The latter two can be found on the CDrom (internet link).

5.9. Preliminary report

The preliminary report should be short (2 to 3 pages): it should include the method used, the preliminary survey results, a brief interpretation of key indicators (comparison with reference values) and the main recommendations directly useful for operations. An example is presented in Appendix 7.
Preliminary results should be communicated to the field team before leaving, as well as to the coordination and headquarters team.

Conclusion

Conclusion

Rapid health assessments are an essential part of a humanitarian emergency response: they provide within a short time, solid baseline data on the health-related status of a population, and ensure an intervention that corresponds to the true needs of the affected population.

As much as possible, the field team should be actively involved in the assessment. It allows them to see more than the health centre or hospital they are working in, and to know better and understand the population they are working with and for.

The methods used during a rapid health assessment should be rapid, rigorous and precise, and should provide reliable and representative information. A short preliminary report, with the first main results and operational recommendations, should be given as soon as possible to the field and coordination teams. Any feedback can be included in the final report.

The results of an adequate and valid rapid health assessment have an important impact on operational orientation. Therefore, results should be presented in a clear and understandable (standard) manner.

Appendices

1. Reference norms for main indicators used in emergencies
2. Simple prospective mortality surveillance
3. Morbidity surveillance
4. Area sampling
5. Material needed for rapid health assessments
6. Example of rapid health assessment questionnaire
7. Example of rapid health assessment preliminary report

Reference norms for main indicators used in emergencies [7,9,10]

Mortality

CMR ≥ 1 death/10000/day
U5MR ≥ 2 deaths/10000/day

Measles vaccination coverage

Minimum 95% of the children between 9 months and 15 years should be vaccinated.

Food rations

Minimum 2100 kcal/person/day, with 10 to 12% proteins, and a minimum of 17% fat.

Water

Minimum quantity of clean water of 15 to 20 litres/person/day
Minimum 2 water containers of 20 litres per household

Hygiene and sanitation

1 latrine to be used by maximum 20 persons (men and women separated)

Shelter and non-food items

Protection from wind, rain, freezing temperatures and direct sunlight
Minimum shelter area of 3.5 m^2 per person
Minimal total site area of 30.0 m^2 per person

Simple prospective mortality surveillance

1. Rationale

Mortality is the most useful indicator of a population's health situation. Prospective surveillance of weekly mortality is an *absolute priority* in an emergency [28].

At the start of an intervention, retrospective mortality will be measured, to evaluate the severity of the situation over the *past* few weeks or months (cf. Chapters 3 and 4). However, at the same time, a prospective surveillance system should be set up, in order to monitor from week to week the *current* health situation of the displaced population.

2. Methods

The principle of prospective mortality surveillance is to know every day (or week) how many persons exactly have died in the target population. Several methods are proposed [29]:

2.1. Grave watchers

A 24h presence at the existing graveyards is ensured, in order not to miss any death. For each death, a few data are recorded, including age and sex of the deceased, as well as the reported cause of death. In addition, information on the living area, main symptoms or whether the person died at home or at a health structure, etc. can be noted.
The persons doing this job need to be closely supervised, to ensure reliable data collection.

This system can work well in case of a closed camp situation, where the graveyard(s) are clearly identified. However, in more open settings, it might be more complicated to ensure all graveyards are included in the surveillance system.

2.2. Home visitors (recommended)

A network of home visitors (HVs) is trained to ensure the active mortality surveillance. Every HV is assigned a sector or area to cover, with clearly defined boundaries to avoid overlap (and therefore double counting of deaths). Ideally, the HVs live and work in the same area. The recommendation is to have 1 HV for a population of 1000 persons.
The HVs visit all houses in their sector to ask about any deaths that occurred in the household since their last visit. It is recommended they do their tour every day around the same time.
For each death, a certain amount of information is collected, similar to the grave watchers. However, it is better to keep this to a minimum and as simple as possible, especially during the first few weeks, to avoid mistakes and misinformation (Example N° 15). Later in the emergency, more information can be collected, or additional tasks can be covered.

The HVs should be closely supervised (through daily meetings, joining them regularly, etc.), in order to ensure rigorous data collection. Close supervision also ensures a presence among the displaced population, to observe, discuss, and communicate, and to know better the population to be assisted.

An important advantage of working with a network of HVs is that they can provide valuable information on what is going on in the community, e.g. alerts about sick persons who cannot come to the health centre, elderly living alone who do not receive any food, etc.

Example N° 15
Weekly home visitors report. Murnei, Darfur, Sudan, 2004.

Site: ______________________________

Week: ________ from Monday (__________) to Saturday (____________)

Reported by: ____________________________

DEATHS	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	TOTAL
< 5 years	|||	|					
≥ 5 years	|	||					

3. Calculation of mortality rate

With the information collected on a daily basis, and knowing the target population, the crude and under-5 mortality rate can be calculated. During an emergency, this should be done on a weekly basis. An excel sheet to facilitate calculation can be found on the CDrom.

Once the emergency is under control, and mortality goes down, it is enough to calculate mortality rates on a monthly basis.

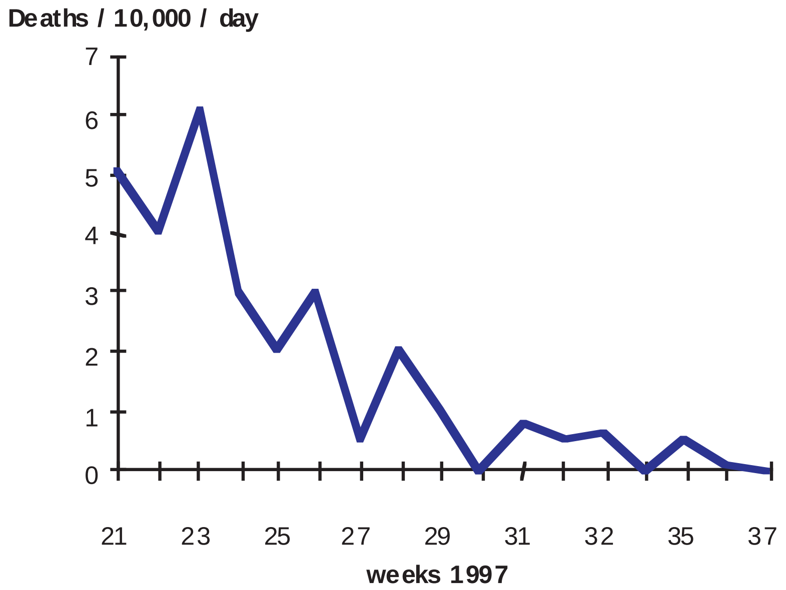
4. Interpretation of results

The main objective of prospective mortality surveillance is to follow trends: several factors may affect the weekly reporting of deaths, such as under- or over reporting, delays in reporting, etc. In addition, there are often uncertainties about the denominator. Therefore, the trend of the mortality rates from week to week is more informative than the absolute mortality figures each week (Example N° 16 and N° 17).

As a reminder, a CMR of ≥ 1/10000/day, or an U5MR ≥ 2/10000/day is considered an emergency.

Example N° 16
Interpretation of prospective mortality data

The figure below shows the reported weekly mortality rate among Rwandese refugees in Loukoulela, Congo, between May and September, 1997. This rate was very unstable from week to week, and taken separately cannot be relied upon. However, there was an obvious downward trend, which informed the relief team that the situation was progressively improving and returned to normal after 3 months.



Example N° 17
Importance of the denominator in the calculation of the mortality rate

During the week from August 3 to 10, 1998, in Acumcum, southern Sudan, 71 deaths were recorded among the children under 5. While the total population of Acumcum was estimated at 10000 persons, the under five population was not known.
In this situation, two denominators could be used to calculate the U5MR:

a) Use the fact that children under five represent 16% of the population, which is the generally used figure for developing countries. This means there are an estimated 1600 children under 5 in Acumcum.

   Therefore, the U5MR is $\frac{71}{1635} \times 10000 \div 7 = 62/10000/\text{day}$

b) Use the fact that children under five represent 40% of the population, which corresponds to what was found in several surveys conducted in the displaced populations of Bhar El Ghazal. This means there are an estimated 4000 children under 5 in Acumcum.

   Therefore, the U5MR is $\frac{71}{4035} \times 10000 \div 7 = 25/10000/\text{day}$

This example shows how uncertainties about a denominator can affect mortality rates.

Morbidity surveillance

1. Rationale

Active morbidity surveillance informs on the main pathologies present in the displaced population - important for programme planning - and may identify potential epidemics. An adapted surveillance system should be implemented from the start of the intervention.

2. Methods

No complicated methods or material are needed to have a good surveillance system: pen and paper are enough!

During the early phase of an emergency, the surveillance should be focused, short and simple. Only those diseases that are an important cause of mortality, and/or have an epidemic potential should be included. The distinction between 2 age groups only - under 5 years and ≥ 5 years old - is sufficient (Example N° 18).
Later on, once the emergency and response are more under control, other diseases can be added, as well as an extra age group if required.

For each disease included in the surveillance system, there is a corresponding clear and simple case definition. All health personnel filling in the weekly statistics should know the case definitions.

Example N° 18
Outpatient morbidity surveillance. Darfur, Sudan, 2004.

	Week 23		
Diagnosis	< 5	≥ 5	TOTAL
Non bloody diarrhoea			
Bloody diarrhoea			
Malaria			
ARTI			
Violence			
STI			
Skin / Eye infection			
Measles			
Other			
TOTAL			
% under 5			

3. Calculation of incidence rates

Based on the number of patients, and the total target population, incidence rates per disease can be calculated. Most often incidence is expressed as the number of persons diagnosed with a certain disease per 1000 population per week (Example N° 19).

Example N° 19
Calculation of incidence rates

For epidemiologic week 23, a total of 120 patients were diagnosed with watery diarrhoea at the outpatient consultations. Considering a target population of 10000 persons, watery diarrhoea incidence for week 23 was 12 per 1000.

As for mortality, morbidity surveillance with a weekly follow-up of the main incidence rates, provides more information about the tendency of the disease frequency. The isolated weekly figures are much less interesting. In addition, incidence rates allow comparison, e.g. to those from other health centres at the same site.

An example surveillance tool can be found on the CDrom.

Area sampling

1. Rationale

In order to plan an emergency intervention, a rapid population assessment is done to estimate the magnitude of the population displacement. The population figure also provides a denominator for epidemiologic and programme indicators.

Area sampling provides an estimate of the surface of the target area (site or camp), as well as the total number of persons living in that area. Population density can be calculated.

Rapid population assessments through area sampling can be done in displaced camps, or in more stable settings where slum-like living conditions exist.

2. Methods

2.1. First stage: drawing the map

The drawing of the map is done using either a standard compass, or a Global Positioning System (GPS). The perimeter of the target area is delineated, walking (or driving) along the borders of the target area, while indicating and recording several landmarks. The walk (or drive) goes around the external limits of the camp, finishing at the starting point.

For each landmark, 2 measures need to be recorded:

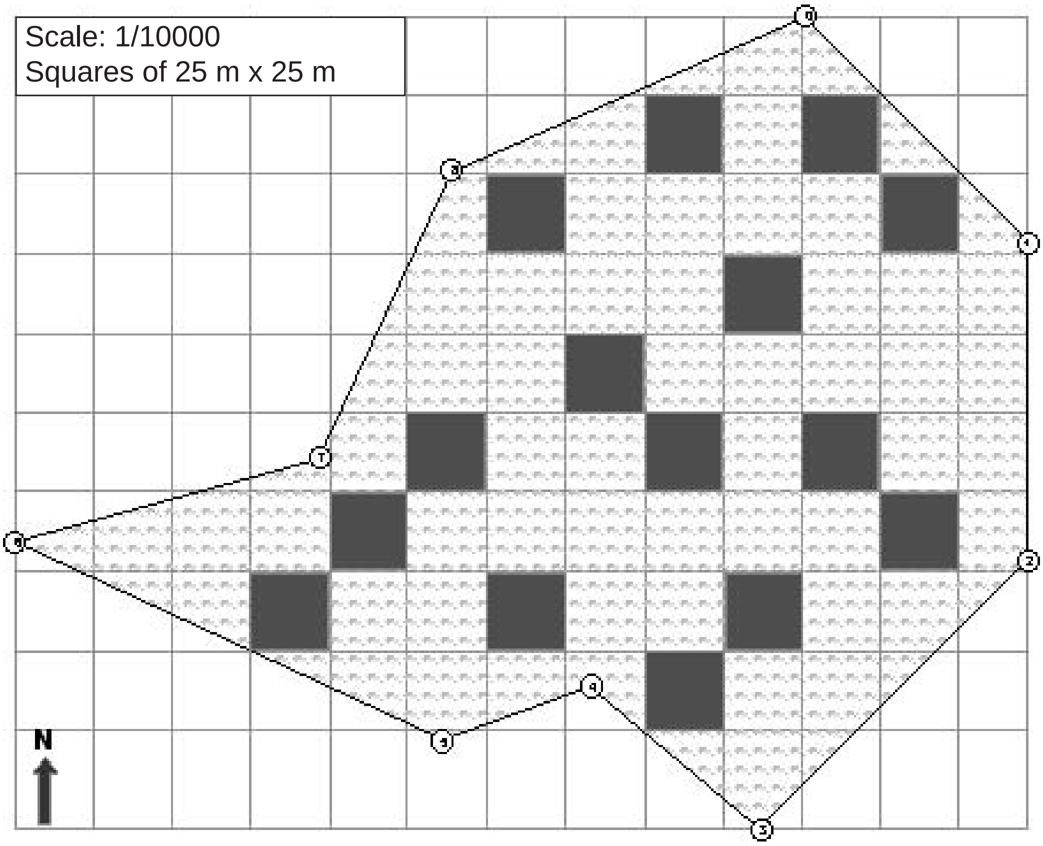
1) the distance to the next landmark (in meters)
   While several tools exist to count the meters while walking, no equipment is needed when using footsteps as a measure. A person can estimate his footstep length by counting the number of steps needed to walk a fixed distance (e.g. 50 m). Using a hand clicker facilitates the counting of steps.
2) the position of the landmark, using the compass or GPS
   - When using a **compass**, at the landmark, the angle between 2 sequential camp sides is measured. When standing at one landmark, the arrow of the compass is pointed in the direction of the next landmark, and the degrees of the angle are noted (Table 7).
   - When using a **GPS**, point measures for each landmark are expressed in latitude and longitude. If using a handhold GPS, verify beforehand the unit is set to decimal degrees (e.g. 39.4567 with 4 decimal place precision). Each time the direction changes, and a new landmark is identified, the measures are recorded.

Table 7: Area sampling coordinates using a compass, Area A

Point N°	Degrees	Meters
1	135°	100
2	180°	100
3	225°	120
4	310°	70
5	250°	50
6	295°	150
7	75°	100
8	25°	100

Using this information a map of the area can be drawn, as is shown below in figure 1.

Figure 1
Map of Area A, using the coordinates of table 7



Once a sketch of the map is made, a grid is drawn on the map, using squares of 25 m x 25 m (according to the scale of the map) (Figure 1). By counting the number of squares within the perimeter, an estimation of the total surface area is obtained.

2.2. Second stage: calculate the total area population

Through systematic sampling, a number of squares (or GPS points from which the squares are drawn) are selected. This can be accomplished using E-Pop software (cf. CDrom) or on a gridded paper map. Each point is to be considered to be the lower left corner of the quadrat, with the left side of every square oriented to the North. Going back to the field, the number of habitats and persons in each habitat within each square is counted. A 100 m rope can be used to delineate the 25 m x 25 m square.

In order to be representative, 15 inhabitated squares are required. Only habitats for which at least half of the surface falls within the selected square should be included in the persons count. Per household, the number of persons who spent the previous night is noted. Additional information on the age, sex, etc. of household members can be collected.

Using the total number of persons counted in all selected squares, the average number of persons per square is obtained. From this, knowing the total number of squares counted within the sampled area, the total population is extrapolated.

Population density (number of m^2 per person) is obtained by dividing the total camp surface by the total number of persons estimated for the whole area.

The use of the software E-pop allows automatic calculation of the area surface, total population and population density. It can be found on the CDrom with this guide.

Material needed for rapid health assessments

Description of material	Number
Needs for anthropometric measurements (5 survey teams)	
MUAC bracelets	25
Salter scale (25 kg)	5
Trousers with scale	5
Reference weight (+/- 10 kg)	1
Height board	5
Rope (1 m)	5
Wooden stick 1 m 50 (with mark at 110 cm)	5
Stationary (5 survey teams)	
Backpacks	5
Clip board	5
Plastic maps	10
Pencils	15
Erasers	5
Pencil sharpener	5
Notebook/paper	1
Calculator	1
Stapler (+ staples)	1
Flashlight (+ batteries)	1
Area sampling	
Hand counter ("clicker")	1
Compass or GPS	1
(batteries for GPS)	(24)
Rope (100 m)	1

Example of a rapid health assessment questionnaire, using a community sample survey*

(on nutritional and vaccination status, and retrospective mortality)

1. Date of survey (day/month/year)	.... /....... /.......
2. Number of child or family	n°.......................
3. Site of interview	....
Family composition	
4. Total number in the family	……
5. Family members under 5 years	… M – … F
6. Family members of 5 years or above	… M – … F
General food distribution	
7. Food distribution card	Yes – No
Non-food items and shelter	
8. Number of blankets in the house	……
9. Number of jerry cans in the house	……
10. House protects against the rain	Yes – No
Nutrition (only for children from 6 to 59 months)	
11. Sex of child	Male – Female
12. Age	……
13. Presence of bilateral oedema	Yes – No
14. MUAC (exact measurement, in mm)	…… mm
15. Weight - in kg (to 100 g precise)	……,… kg
16. Height - in cm	……,… cm
17. Admitted in the therapeutic feeding centre	Yes – No
18. Admitted in the supplementary feeding centre	Yes – No
Measles vaccination coverage	
19. Vaccinated against measles according to card	Yes – No
20. Vaccinated against measles according to history	Yes – No
21. Date of measles vaccination (card)	.... /....... /......
Retrospective mortality	
22. Total number of deaths in household since beginning of Ramadan	……

1st death*:	Age: …	Sex: …	Month: …	Period: …	Location: …	Cause: …
2nd death*:	Age: …	Sex: …	Month: …	Period: …	Location: …	Cause: …
3rd death*:	Age: …	Sex: …	Month: …	Period: …	Location: …	Cause: …

** Codes*:

Period: *1 = Between Ramadan and Eid Kabir; 2 = After Eid Kabir*

Location: *1 = In the village or on the way; 2 = In the displaced camp; 3 = Other*

Cause: *1 = Violence; 2 = Respiratory tract infection; 3 = Diarrhoea; 4 = Other*

* Another example questionnaire can be found on the CDrom.

Example of a rapid health assessment preliminary report

Place: ....
Dates: ....
Done by: ....

Methods
1) Area sampling
2) Cluster sampling survey - 30 clusters of 30 households

Results

Indicators/information	Observed	Theoretical
Demography		
Total number of displaced	80000	–
Total number included in survey	4754	–
% of children under 5 (or age pyramid)	21.6%	16%
Sex ratio, men/women	0.79	1.03
Malnutrition		
% of children 6-59 months with W/H index < -2 Z-score	20.5% 95% CI [17.3-24.1]	–
% of children 6-59 months with W/H index < -3 Z-score	3.2% 95% CI [2.2-4.5]	–
% of children 6-59 months with MUAC < 125 mm	12.4% 95% CI [9.6-15.9]	–
Retrospective mortality: from 26 Oct. '03 to 5 May '04 (193 days)		
Number of deaths per 10000 per day	3.4 95% CI [3.1-3.8]	< 1/10000
Distribution of causes of death		
Measles	35%	–
Diarrhoea	25%	–
Vaccination coverage against measles among children (6m - 59m)		
According to card	73.8%	100%
According to card + history	85.6%	100%
Vital needs		
Daily calorie rations available	1,500	2,100
Shelter and non-food items		
% of persons without protective habitat	95.3%	0%
% of families without water containers	24.9%	0%

Recommendations (dependent on the context)
- Reinforce prospective mortality surveillance
- Ensure nutritional treatment programmes
- Increase quantity of food rations
- Catch-up measles vaccination campaign
- Mass distribution of plastic sheeting and jerry cans

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