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# Continuation of Emergency Medical and Nutritional support in the Eastern and Western Regions in Sierra Leone

## OFDA FINAL REPORT

**March 2002**

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# I. EXECUTIVE SUMMARY

Final Report

| | |
|---|---|
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| | |
|---|---|
| Programme Title: | Continuation of Emergency Medical and Nutritional support in the Eastern and Western Regions in Sierra Leone |
| Country: | Sierra Leone |
| Disaster/Hazard: | Civil Conflict |
| Time period covered by Report: 01 April 2001 to 30 November 2001 | |

**Summary of activities undertaken and progress made in reporting period:**

**Provision of:**

- Essential medical supplies and equipment to 14 Community Health Clinics (CHC)/ Community Health Posts (CHP)[1], 1 Mother Child Health (MCH) clinic and 10 MCH posts and 4 emergency clinics to a level of basic health care support (Kenema District)
- Essential medical supplies to 50-bed emergency paediatric clinic and 10-bed emergency in-patient service (Macauley Street Clinic) and support of PHC services (Macauley Street Satellite Clinic) in Freetown
- Technical/Health support to 20-bed Newton clinic, outside Freetown
- Essential equipment, food, Health Education Materials and non-medical supplies to nutrition program
- Secure storage and distribution of medical and barrier nursing supplies for the Lassa Fever ward
- 14658 Impregnated ITNs, through the village development committees (VDCs), to vulnerable groups on a cost recovery (and revolving fund) basis.
- One full cholera kit each to Kenema and Freetown MoHS

MoHS-generated IEC materials to all Merlin clinics

**Establishment of:**

- Partial Cost Recovery[2] system in the Peripheral Health Units
- Full MoHS staffing levels according to MoHS guidelines in all supported clinics except Newton clinic at which 5 vacancies exist. Lobbying of MoHS to provide staff is ongoing.
- Liaison with MoHS/UNICEF to ensure maintenance and supply of cold chain/vaccines

[1] See Annex 5 PHU reports. For a month by month outline of supported clinics.

[2] Currently full cost recovery itself has not been launched. Activities required under the Bamako iniative, of which cost recovery is a component, have been initiated: functioning and active VDCs, standardised and community approved fees- for- service, active bank accounts. Thus the infrastructure is in place. However, approval from the Ministry of Health to launch the next step, cost recovery on drugs, has not been forthcoming. Merlin has been in discussions with the MoHS at central level on gaining approval but will also require donor lobbying.

- Strict Lassa fever (LF) care protocols and case definitions
- Community training strategies in response to KAP Lassa Fever survey results
- Satellite CHV teams based in strategic villages to identify/respond to public health risks.

**Conduct of:**

- Joint MoHS/Merlin medical supervision in clinics. Each clinic was visited once per month for 4-6 hours each time.
- 2 nutrition surveys (see Annex 1)
- Public Health education campaigns on the following: basic hygiene messages, malaria prevention, feeding practices, immunisation promotion and the importance of early effective health-seeking behaviour.
- Three monthly audit of community bank accounts to ensure VDC accountability of funds
- Micro-virology diagnosis and mammology/epidemiology assessment visit March 2001 (see Annex 2)
- A Knowledge Attitude and Practice (KAP) survey related to Lassa Fever (see Annex 3)
- WHO-Roll Back Malaria (RBM) recommended malaria prevention and control activities in identified communities/vulnerable populations[3] as part of a longer-term malaria strategy
- IEC on malaria prevention and control campaigns in response to new influxes
- Survey of Insecticide Treated Nets (ITN) usage and retention three months and six months after distribution
- Environmental impact assessment of residual spraying by malaria control team
- Follow-up KAP survey regarding malaria (with full analysis and documentation) (see Annex 4)

**Training of:**

- All CHC personnel in new and established MoHS/WHO/MSF guidelines and protocols
- Community Health Officer (CHO) and MCH aides in food security and malnutrition early warning
- All MCH staff in Safe Motherhood Initiatives (SMI) and Integrated Management of Childhood Illness (ICMI)
- 100 CHVs in WHO vector-borne and communicable disease community-based case definitions
- 140 Lassa Fever CHVs in strategic villages based on strategies designed in response to KAP survey results
- Core Technical staff in new national strategy for IMCI
- 3 Merlin staff and 1 MoHS staff member in management techniques for establishment of Cost Recovery system
- 14 Vaccinators in Expanded Programme of Immunisation (EPI) service provision using MoHS/WHO/MSF guidelines
- National Lassa Fever professional counterpart (Dr. Konteh)
- All Lassa Fever Ward staff in clinical and barrier-nursing techniques/ protocols as per August 2000 WHO/ CDC report (D Bausch)
- All clinic staff in identification, assessment, diagnosis and emergency Lassa Fever treatment prior to referral
- 200 Community health volunteers (CHVs) in the impregnation of ITN for villages located in CHC catchment areas
- All clinic staff in malaria diagnosis / case management MoHS /WHO protocols
- 7 outreach workers in public health prevention strategies contact tracing referral and Information Education Campaigns (IEC) within Kenema District and newly affected areas and communities with particular regard to malnutrition, malaria and Lassa Fever.

[3] Pregnant and lactating women, children under five and returnees from non-endemic areas.

**Strengthening of:**

- Health Information System with distribution and collection of appropriate MoHS standard reporting formats to all supported clinics in collaboration with other INGOs operating in Eastern region. Due to the cessation of births and deaths registration, accurate mortality data is difficult to obtain. A recent nutritional survey undertaken in 2001 found an infant mortality rate of 2.91/1000. The survey was not designed to obtain specific disease mortality rates. Goal also undertook a survey, the results showing 2.9/1000. IRC conducted a survey in Jan 2001, the results were considerably higher at 8.145/1000 and this may be due to unrealistic sample size. The IRC survey did highlight that key causes for < 5 mortality were fever (malaria), diarrhoea and ARI.
- District referral system to minimum agreed MoHS/Sphere standards by increasing awareness of facilities available and the costs involved.
- Under-5 surveillance for children attending Merlin health facilities using MoHS/UNICEF growth monitoring formats
- VDC capacity and encouragement of financial control by ongoing meetings and dialogue

**Reactivation of:**

- EHO cadre to identify environmental and public health risks

**Integration of:**

- Therapeutic Feeding Centre in Kenema General Hospital paediatric ward as per national health nutritional policy

**Mitigation of:**

- Nutritional crises through preventative interventions by CHC staff and awareness raising of secondary malnutrition through disease
- Malarial outbreak risk through targeting the populations of 2 new IDP camps and 2 PHU catchment areas for malarial prevention and control activities.
- Disease outbreak through targeting key health education messages to the communities (e.g. prompt presentation of fever)
- Disease outbreak through maintenance of drug supplies, EPI supplies, equipment and logistical contingency for diarrhoea/dysentery, malaria and Lassa Fever, measles.
- Disease outbreak through dissemination, planning and training in emergency preparedness, and case management at all levels

**OBJECTIVE 1:** Health status of resident, displaced and returned populations in Merlin operational areas improved through provision of Primary Health Care (PHC), Public Health (PH), and nutritional programs.

***Sub-Objective 1.1:*** *Health status of resident, displaced and returned populations in Merlin operational areas improved through Primary Health Care and Public Health Activities.*
***Sub-Objective 1.2:*** *Health status of resident, displaced and returned populations in Merlin operational areas improved through Nutritional Support.*

**Key indicators** illustrated a deteriorating situation requiring major inputs and collaboration between the various ministerial sectors, United Nation (UN) agencies and NGOs.

1. Over 2 million displaced internally since the start of the war
2. Illiteracy estimated at 80%
3. Access to primary health care services estimated at 30 % nation-wide and < 10% in some areas
4. EPI coverage declined from 75% in 1990 to 40% in 1999[4] with some areas not having received coverage for 3 years
5. Maternal Mortality Rate (MMR) 1,800/100,000 live births ( the highest in the world)
6. Infant Mortality Rate (IMR) 182 /1,000 live births and an under-five mortality of 316/1,000 live births (amongst the highest in the world).[5]
7. The crude mortality in Kenema District was found by International Rescue Committee (January 2001) to be 3.7/1000/month (44/1000/yr.) and the infant mortality in Kenema District was found to be 303 deaths / 1000 live births.

**Indicators and Current Measure:**

- All supported CHCs providing EPI coverage as per MoHS/UNICEF guidelines

Data collation and analysis per agreed Ministry of Health standards for PHUs/CHCs, of:

  - Morbidity & mortality, age/gender specific
  - 98% of pregnant women attending receiving Tetanus Toxoid (TT) 1 and 2
  - 100% of pregnant women attending receiving malaria prophylaxis.
  - 88% of births where trained attendant present.
  - 0.5 Health consultations per person per year

- No Diarrhoea outbreaks were identified
- Total ANC attendance in 2001 was 24,714 showing an increase in antenatal attendance in Kenema Town and District (KTD)
- 17 % of under 5s fully immunised
- 20% of women of women of childbearing age received TT1 and 2
- Mortality, recovery, re-admission, defaulter rates & average monthly weight gain for beneficiaries in the TFC as per Sphere standards (see annex 5)

Budget for Objective #1: $ 141,396
Cumulative Expenditure to date: $136,575
Balance: $4,821

[4] Items 1-4, Unitied Nations Consolidated Interagency Appeal for Sierra Leone; 1999, November; United Nations

[5] Item 5-6, State of the Worlds Children; 1999, UNICEF

**OBJECTIVE 2:**
Ministry of Health and Sanitation's capacity to provide Disease Prevention and Control in Merlin operational areas increased.

***Sub-Objective 2.1:*** *Ministry of Health and Sanitation's capacity to provide Lassa Fever Prevention, Treatment and Control in Kenema Town & District and Eastern Region is increased.*

***Sub-Objective 2.2:*** *Ministry of Health and Sanitation's capacity to provide Malaria Prevention and Control in Merlin Operational Areas is increased.*

***Sub-Objective 2.3:*** *Ministry of Health and Sanitation's capacity to provide Disaster Mitigation, Preparedness and Emergency Response is increased*

**Indicator and Current Measure:**
*Lassa*
Case Fatality Rate within the Lassa Fever Unit was around 20% or less throughout the reporting period. See Lassa statistics (Annex 6)
*Malaria*
Merlin's experience in malaria control programmes in complex emergencies suggests that it is difficult, if not impossible, to state quantifiable morbidity and mortality targets resulting from malaria interventions. Factors such as lack of quality baseline data, accurate population statistics (due to e.g. unexpected population movements and influxes), politics, seasonal and climatic changes, all contribute towards the difficulty in defining the percentage malaria reduction during a programme period.
It is however possible to use well defined, previously tested proxy indicators in a meaningful way to try and demonstrate some reduction in malaria, as has been done successfully, for example, in East Democratic Republic of Congo:

- Reduction by 10-15% in numbers of severe malaria patients admitted to Merlin supported in-patient facilities. It was noticed that in May 2001 at the beginning of the rains in Eastern Sierra Leone malaria incidence figures rose sharply, becoming 80% of all diseases. This is a seasonal peak due to the rains and does not imply poor security/access, staffing or drug shortages. The overall incidence declined over the year to 40%. This could be a result of distribution of ITNs in some operational areas; training of CHVs; and the dissemination of key messages on disease prevention by the Public health outreach team and encouragement of environmental control measures.
- Monthly percentage of patients with confirmed malaria appropriately treated. Prescriptions written in the CHC were examined retrospectively on a systematic basis. 80% showed appropriate treatment of malaria.
- 100% of distributed nets were impregnated with pyrethroids insecticides according to the recommended dilutions and International safety guidelines. 8011 ITNs were distributed to Blama PHU catchment area. 2931 ITNs in the Levuma area and in Newton 3406 nets were distributed with a further 310 distributed in this area in collaboration with Oxfam.
- 70% ITNs re-impregnated by end 9 months. Unfortunately the ITNS distributed were not re-impregnated due to the lack of appropriate insecticide. There was ICON available but the MoHS would not allow the use of this. However, after lengthy discussions they changed their opinion but by this time the ICON had expired.
- >80% of vulnerable groups identified paid a community agreed cost to receive an ITN
- A survey of Insecticide Treated Nets (ITN) usage and retention three months and six months after distribution showed 77% retention after three months and 75%retention after 6 months. The main reason for non-retention was the owners moving away from the area and therefore not available for questioning. The target had been 90% after 3 months.
- No booths in the IDP camps were sprayed due to lack of MoHS approved pyrethroids

insecticide

- Data from KAP survey reports (see annex 4) A malaria KAP survey was conducted amongst the staff and guardians in the Paediatric Ward at KGH. In KGH, 93% of staff and 65% of patients' guardian knew that mosquitoes transmit malaria. 74% and 50% of the two groups knew that mosquitoes breed in stagnant water. 89% and 66% gave fever as one of the symptoms of malaria. Regarding prevention, 80% of staff and 47% of patients' guardians named bed nets.
- >95% of homes in identified communities are sprayed with pyrethroids insecticide. An Environmental Impact Assessment conducted in Blama and Levuma after spraying showed a high level of satisfaction amongst the community. 64% of respondents rated the spraying exercise as good, and 25% as excellent. There was a high effect on other insects, notably cockroaches, bedbugs and houseflies with minimal side effects such as skin irritation and headaches reported.

Budget for Objective #2:$120,735
Cumulative Expenditure to date: $85,836
Balance: $34,899

## II. PROGRAM OVERVIEW

### A. *GOALS AND OBJECTIVES*

*GOAL*

**Reduced mortality and morbidity among vulnerable resident, displaced and returning populations of Sierra Leone in Freetown and Kenema district.**

**OBJECTIVE 1:** Health status of resident, displaced and returned populations in Merlin operational areas improved through provision of Primary Health Care (PHC), Public Health (PH), and nutritional programs.

***Sub-Objective 1.1:*** *Health status of resident, displaced and returned populations in Merlin operational areas improved through Primary Health Care and Public Health Activities.*
***Sub-Objective 1.2:*** *Health status of resident, displaced and returned populations in Merlin operational areas improved through Nutritional Support.*

**OBJECTIVE 2: Ministry of Health and Sanitation's capacity to provide Disease Prevention and Control in Merlin operational areas increased**

***Sub-Objective 2.1:*** *Ministry of Health and Sanitation's capacity to provide Lassa Fever Prevention, Treatment and Control in Kenema Town & District and Eastern Region is increased*
***Sub-Objective 2.2:*** *Ministry of Health and Sanitation's capacity to provide Malaria Prevention and Control in Merlin Operational Areas is increased.*
***Sub-Objective 2.3:*** *Ministry of Health and Sanitation's capacity to provide Disaster Mitigation, Preparedness and Emergency Response is increased*

## B. *PROFILE OF TARGETED POPULATIONS AND NEEDS IDENTIFIED*

| Site | Estimated Total Populations |
|---|---|
| Kenema Town | 102,000 |
| **Kenema Camps:** | |
| Nyandeyama[6] | 10, 357 |
| Lebanese | 12,208 |
| Gofer | 1, 016 |
| Niawama | 4,500 |
| **Blama Town** | 20, 640 |
| Blama Camp | 12,249 |
| Kenema District | 327, 004 |

Total original target population 489, 974

**Total number of beneficiaries in Kenema district is 475, 117**(excluding Nyandeyama and Niawama)

| Site | Estimated Population |
|---|---|
| **Freetown,** Newton: Resident<br>Newton Displaced | 17,925<br>1,000 Total 18, 925 |
| Songo | 30, 788 |
| Koya Rural | 39, 039 |
| | **Total:** 88, 752 |
| **Grand TOTAL number of beneficiaries** | **578, 726 (estimated)** |

**Note:** the actual numbers that Merlin is supporting in Kenema through MoHS is 475, 117. The beneficiaries are the vulnerable resident, displaced and returning populations with a particular emphasis on women and children.

## C. *GEOGRAPHICAL LOCATIONS OF MAJOR PROGRAM ACTIVITIES*

Date: *November 2000*

Country: Sierra Leone

Total Target Population: **578, 726 (estimated)**

| Admin 1 | Admin 2 | Place | Lat/ Long | Sector/ Activity | Start | End | Target Pop |
|---|---|---|---|---|---|---|---|
| Sierra Leone | Kenema District | Kenema District | 7° 52'N 11° 10'W | Health/ nutrition | Whole program period | Whole program period | Recently displaced/ Resident vulnerable population in Kenema district |
| Sierra Leone | Freetown | Freetown | 8° 29'N 13° 14'W | Health | Whole program period | Whole program period | Displaced/ vulnerable resident population in Freetown |

[6] Nyandeama and Niawama camp have only been impacted by Merlin interventions and support in that we undertook the insecticide spraying in January 2001. These camp beneficiaries should not be mentioned as being Merlin-supported for the purposes of this report.

# III. PROGRAMME PERFORMANCE

## A. *PROGRAM PERFORMANCE VIS-À-VIS OBJECTIVES*

**OBJECTIVE # 1:**
Health status of resident, displaced and returned populations in Merlin operational areas improved through provision of Primary Health Care (PHC), Public Health (PH), and nutritional programs.

***Sub-Objective 1.1:*** *Health status of resident, displaced and returned populations in Merlin operational areas improved through Primary Health Care and Public Health Activities.*

***Sub-Objective 1.2:*** *Health status of resident, displaced and returned populations in Merlin operational areas improved through Nutritional Support.*

**Illustrative Activities:**

**Provision of:**
- Essential medical supplies and equipment to 14 Community Health Clinics (CHC)/ Community Health Posts (CHP), 1 Mother Child Health (MCH) clinic and 10 MCH posts and 4 emergency clinics to a level of basic health care support (Kenema District)[7]
- Essential medical supplies to 50-bed emergency paediatric clinic and 10-bed emergency in-patient service (Macauley Street Clinic) and support of PHC services (Macauley Street Satellite Clinic) in Freetown
- Technical/Health support to 20-bed Newton clinic, outside Freetown
- Essential equipment, food, Health Education Materials and non-medical supplies to nutrition program

**Establishment of:**
- Partial Cost Recovery system in the CHCs and dependent MCHCs and CHPs
- Full MoHS staffing levels according to MoHS guidelines in all supported clinics except Newton clinic at which 5 vacancies exist. Lobbying of MoHS to provide staff is ongoing.
- Liaison with MoHS/UNICEF to ensure maintenance and supply of cold chain/vaccines

**Conduct of:**
- Joint MoHS/Merlin medical supervision in clinics. Each clinic was visited once per month for 4-6 hours each time.
- 2 nutrition surveys (see Annex 1)
- Three monthly audit of community bank accounts to ensure VDC accountability of funds

**Training of:**
- All CHC personnel in new and established MoHS/WHO/MSF guidelines and protocols
- Community Health Officer (CHO) and MCH aides in food security and malnutrition early warning
- All MCH staff in Safe Motherhood Initiatives (SMI) and Integrated Management of Childhood Illness (ICMI)
- Core Technical staff in new national strategy for IMCI

[7] 11 CHC/CHPs are functional, 1 suspended and 2 assesssed but inaccessible due to security situation until September 2001

- 3 Merlin staff and 1 MoHS staff member in management techniques for establishment of Cost Recovery system

14 Vaccinators in Expanded Programme of Immunisation (EPI) service provision using MoHS/WHO/MSF guidelines

**Strengthening of:**

- Health Information System with distribution and collection of appropriate MoHS standard reporting formats to all supported clinics in collaboration with other INGOs operating in Eastern region
- District referral system to minimum agreed MoHS/Sphere standards by increasing awareness of facilities available and the costs involved.
- Under-5 surveillance for children attending Merlin health facilities using MoHS/UNICEF growth monitoring formats
- VDC capacity and encouragement of financial control by ongoing meetings and dialogue

**Integration of:**

- Therapeutic Feeding Centre in Kenema General Hospital paediatric ward as per national health nutritional policy

**Mitigation of:**

- Nutritional crises through preventative interventions by CHC staff and awareness raising of secondary malnutrition through disease

**Indicators:**

- All CHCs providing EPI coverage as per MoHS/UNICEF guidelines
- Data collation and analysis per agreed Ministry of Health standards for PHUs/CHCs, of:
    - morbidity & mortality, age/gender specific (see annex 5)
    - 98% of pregnant women attending received Tetanus Toxoid (TT) 1 and 2
    - 100% of pregnant women attending received malaria prophylaxis.
    - 88% of births were attended by a trained birth attendant
    - 0.5 Health consultations per person per year
- No Diarrhoea outbreaks were identified
- Total ANC attendance in 2001 was 24,714 showing an increase in antenatal attendance in Kenema Town and District (KTD)
- 17 % of under 5s fully immunised
- 20% of women of women of childbearing age received TT1 and 2
- Mortality, recovery, re-admission, defaulter rates & average monthly weight gain for beneficiaries in the TFC as per Sphere standards (see annex 5)

**Targets:**

- All CHCs providing EPI coverage as per MoHS/UNICEF guidelines
- Data collation and analysis per agreed Ministry of Health standards for PHUs/CHCs, of:
    - morbidity & mortality, age/gender specific (see annex 5)
    - 100% of pregnant women attending receiving Tetanus Toxoid (TT) 1 and 2
    - 100% of pregnant women attending receiving malaria prophylaxis.
    - 88% of births where trained attendant present.
    - Health consultations per person per year
- Diarrhoea outbreaks identified and responded to appropriately

- 20%Total ANC attendance in 2001 Kenema Town and District (KTD)
- 70 % of under 5s fully immunised
- Mortality, recovery, re-admission, defaulter rates & average monthly weight gain for beneficiaries in the TFC as per Sphere standards see annexe 5

## 1. Actual Accomplishments and Comparison of Actual and Proposed Accomplishments

In Merlin supported Primary Health units the overall number of consultations for the year 2001 was 143, 660. During the project period there was an increase in the **utilisation rates**[8] (see annex 7) due to improved security but this was not consistent across all facilities. Overall, access was improved through targeted health education messages and fairer cost recovery systems implemented with community participation. The average overall utilisation rate was **1.66.** The "norm" is 1.0 suggesting a greater use of facilities by those with access reflecting an underlying increased need for health services. Increased utilisation rates indicate a greater demand for services and improved access that is likely, though not inevitably, to result in improved health status.

The utilisation rates range widely from 6.53 consultations in Gofer IDP camp some 10 miles from Kenema town to 0.07 in Tongo, a much more remote CHC serving an incoming young, predominately male, population working in the diamond fields. Clinic statistics also indicate that some clinics, notably those in close proximity to large numbers of IDP populations, experience higher utilisation rates.

Differences in quality of health care were assessed by systematic supervision of each clinic to ascertain whether this was a factor in differences in utilisation rates. Each clinic was visited once per month for 4-6 hours each time. 1 in 20 prescriptions were retrospectively checked to check accuracy of prescribing with regard to diagnosis. These were found to be 80% accurate overall. There were no differences found between the clinics suggesting that quality of care was similar.

The internationally accepted average **number of diagnoses per patient** should not exceed more than two diagnoses per patient. However in Merlin-supported health facilities this average number is 2.75 per patient. The reason for this has been identified primarily as an inadequate standard of diagnostic skills. Misappropriation of drugs is, to a minor extent, also a factor. It is hoped that with ongoing training and supervision these problems can be overcome.

There was a reduction of staff incentives and improved co-operation with the government in the payment of salaries to MoHS staff. These steps were taken with a view to handing over the responsibility of the facilities to the MoHS.

All of the following indicators were **achieved**:

- All registered pregnant mothers received malaria prophylaxis as documented in daily clinic records
- All supported clinics had requisite MoHS staffing levels
- All facilities received regular supply of standard essential drugs with no reported stock ruptures
- Drug use was frequently monitored and stock checks undertaken systematically
- All facilities received regular supply of vaccines and have functioning cold chain system in place

[8] Utilisation Rates is the number of consultations per person per year.

- CHOs were trained in appropriate prescribing practices in dedicated workshops and also during monthly supervisory visits
- 1 Vaccinator per CHC received training (i.e. total 14 vaccinators)
- 9 CHCs have achieved secure income to their VDC managed bank accounts
- CHCs provided comprehensive mortality and morbidity data on a monthly basis using standard MoHS formats
- All pregnant women presenting to the clinics received regular malaria prophylaxis
- Over 80% of high risk pregnancies identified were referred to CHCs
- 98% of pregnant women attending the clinics received TT1,2,3
- Attended births: 59% were attended by a trained TBA, 0.44% were attended by a midwife or doctor at home; 2% Of births were unattended at home; 27% of births took place at a CHC (attended by MCH Aide) and 1% took place in a MCHP (attended by MCH Aide). 10% of births were attended by an untrained TBA.

The following indicators resulted in disappointing figures:
20% of women of child bearing age received TT 1,2,3
17% of Under-5s fully immunised with 52% of under-1s fully immunised.
(See annex 5) for Merlin annual morbidity data

The Merlin TFC provided satisfactory results in accordance with internationally accepted norms and Sphere standards. (See data annex 5)

- All moderately & severely malnourished children under-5 years, pregnant & lactating women were appropriately referred between KGH/TFC/SFP/satellite SFPs and CHC.
- Nutrition services were incorporated into KGH paediatric ward by end of project period as agreed with all MoHS staff undergoing re-registration.
- MoHS national standards were set and nutrition protocols agreed and utilised.
- The centre provided 79% coverage of estimated malnourished children with a cure rate of 85% and a mortality rate of 5%. The defaulter rate was 7% and on average the beneficiaries had a mean weight gain of 12g/kg.
- Nutritional and medical care was provided to the severely malnourished according to recognised WHO and MSF guidelines. Children were discharged as "cured" according to non-anthropometric indices such as; good appetite, no diarrhoea, no fever, no parasitic infection or other untreated illnesses; and no micronutrient deficiencies.
- The health care to patient ratio was equal to or greater than 1:10 at all times.
- Merlin attended Regional & National Nutrition co-ordination meetings and was a member of the Sierra Leone National Nutrition taskforce.

The objective to immunise all pregnant women on full TT 1, 2, 3 has not achieved levels to Merlin's satisfaction. The main area of constraint in achieving fuller coverage has been identified as difficulty in accessing isolated areas. Unreliable supply of vaccines and equipment to these areas by UNICEF and MoHS has also been a factor. UNICEF "cannot supply all facilities" due to logistic and other constraints. Not all facilities have cold chain equipment; particularly the MCHPs. Lack of access due to insecurity has been cited as an ongoing constraint.

Immunisation services are an integral and fundamental part of the primary health care support to the MoHS. The Merlin/National target for full immunisation coverage is for children under 5 is 70 % but only an average 17% coverage was actually achieved. Reasons for this include poorly motivated MoHS staff receiving poor salaries.

Maintenance of essential immunisation services is of prime importance and rests with the MoHS to ensure consistent and viable salaries as well as constant routine and disease outbreak supplies.

The challenge remains with the health education outreach teams in collaboration with the VDCs to continue delivering key health messages. Merlin has much anecdotal experience that the success of uptake of six-antigen immunisation is in direct proportion to appropriate and innovative health promotion. Additional specific and consistent key health messages have been designed in collaboration with the MoHS for weaning practices, nutrition and prevention of water borne and related diseases.

**OBJECTIVE # 2:**
**Ministry of Health and Sanitation's capacity to provide Disease Prevention and Control in Merlin operational areas increased**

***Sub-Objective 2.1:*** *Ministry of Health and Sanitation's capacity to provide Lassa Fever Prevention, Treatment and Control in Kenema Town & District and Eastern Region is increased*

***Sub-Objective 2.2:*** *Ministry of Health and Sanitation's capacity to provide Malaria Prevention and Control in Merlin Operational Areas is increased.*

***Sub-Objective 2.3:*** *Ministry of Health and Sanitation's capacity to provide Disaster Mitigation, Preparedness and Emergency Response is increased*

**Illustrative Activities:**

**Provision of:**
- Safe/secure storage and distribution of medical and barrier nursing supplies for the Lassa Fever ward
- 14658 Impregnated ITNs, through the village development committees (VDCs), to vulnerable groups on a cost recovery (and revolving fund) basis.
- One full cholera kit each to Kenema and Freetown MoHS
- MoHS-generated IEC materials to all Merlin clinics

**Establishment of:**
- Strict Lassa fever (LF) care protocols and case definitions
- Community training strategies in response to KAP Lassa Fever survey results
- Satellite CHV teams based in strategic villages to identify/respond to public health risks.

**Conduct of:**
- Public Health education campaigns on the following: basic hygiene messages, malaria prevention, feeding practices, immunisation promotion and the importance of early effective health-seeking behaviour.
- Micro-virology diagnosis and mammology/epidemiology assessment visit March 2001 (see Annex 2)
- A Knowledge Attitude and Practice (KAP) survey related to Lassa Fever (see Annex 3)
- WHO-Roll Back Malaria (RBM) recommended malaria prevention and control activities in identified communities/vulnerable populations as part of a longer-term malaria strategy
- IEC on malaria prevention and control campaigns in response to new influxes
- Survey of Insecticide Treated Nets (ITN) usage and retention three months and six months after distribution
- Residual spraying of booths within IDP camps following MoHS counterpart training
- Follow-up KAP survey regarding malaria (with full analysis and documentation) (see Annex 4)

**Training of:**

- 100 CHVs in WHO vector-borne and communicable disease community-based case definitions
- 140 Lassa Fever CHVs in strategic villages based on strategies designed in response to KAP survey results
- National Lassa Fever professional counterpart (Dr. Konteh)
- All Lassa Fever Ward staff in clinical and barrier-nursing techniques/ protocols as per August 2000 WHO/ CDC report (D Bausch)
- All clinic staff in identification, assessment, diagnosis and emergency Lassa Fever treatment prior to referral
- 200 Community health volunteers (CHVs) in the impregnation of ITN for villages located in CHC catchment areas
- All clinic staff in malaria diagnosis / case management MoHS /WHO protocols
- All existing outreach workers in public health prevention strategies contact tracing referral and Information Education Campaigns (IEC) within Kenema District and newly affected areas and communities with particular regard to malnutrition, malaria and Lassa Fever.

**Strengthening of:**

- District referral system to minimum agreed MoHS/Sphere standards by increasing awareness of facilities available and the costs involved.

**Reactivation of:**

EHO cadre to identify environmental and public health risks

**Mitigation of:**

- Malarial outbreak risk through targeting the populations of 2 new IDP camps and 2 PHU catchment areas for malarial prevention and control activities.
- Disease outbreak through targeting key health education messages to the communities (e.g. prompt presentation of fever)
- Disease outbreak through maintenance of drug supplies, EPI supplies, equipment and logistical contingency for diarrhoea/dysentery, malaria and Lassa Fever, measles.
- Disease outbreak through dissemination, planning and training in emergency preparedness, and case management at all levels

**Indicators and Targets:**

Case Fatality Rate within the Lassa Fever Unit was around 20%. Or less throughout the reporting period

**Malaria**

- Reduction by 10-15% in numbers of severe malaria patients admitted to Merlin supported in-patient facilities.
- Monthly percentage of patients with confirmed malaria appropriately treated. Target is 80%.
- 100% of distributed nets impregnated with pyrethroids insecticides according to the recommended dilutions and International safety guidelines.
- 70% ITNs re-impregnated by end 9 months.
- >80% of vulnerable groups identified pay a community agreed cost to receive an ITN
- A survey of Insecticide Treated Nets (ITN) usage and retention three months and six months after distribution should 90% retention after three months
- 100%of booths in the IDP camps sprayed with approved pyrethroids insecticide
- Data from Malaria KAP survey reports (see annex 4)
- >95% of homes in identified communities are sprayed with pyrethroids insecticide.

## 1. Actual Accomplishments and Comparison of Actual and Proposed Accomplishments

Case Fatality Rate within the Lassa Fever Unit was around 20%. or less throughout the reporting period. There is a MoU signed with the DHMT for the use of the Lassa ambulance.

***Malaria***

- It was noticed that in May 2001 at the beginning of the rains in Eastern Sierra Leone malaria incidence figures rose sharply, becoming 80% of all diseases. This is a seasonal peak due to the rains and does not imply poor security/access, staffing or drug shortages. The overall incidence declined over the year to 40%. This could be a result of distribution of ITNs in some operational areas; training of CHVs; and the dissemination of disseminated key messages on disease prevention by the Public health outreach team and encouragement of environmental control measures.
- Prescriptions written in the CHC were examined retrospectively on a systematic basis. 80% showed appropriate treatment of malaria.
- 100% of distributed nets were impregnated with pyrethroids insecticides according to the recommended dilutions and International safety guidelines. 8011 ITNs were distributed to Blama PHU catchment area. 2931 ITNs in the Levuma area and in Newton 3406 nets were distributed with a further 310 distributed in this area in collaboration with Oxfam.
- 70% ITNs re-impregnated by end 9 months. Unfortunately the ITNS distributed were not re-impregnated due to the lack of appropriate insecticide. There was ICON available but the MoHS would not allow the use of this. However, after lengthy discussions they changed their opinion but by this time the ICON had expired.
- >80% of vulnerable groups identified paid a community agreed cost to receive an ITN
- A survey of Insecticide Treated Nets (ITN) usage and retention three months and six months after distribution showed 77% retention after three months and 75% retention after 6 months. The main reason for non-retention was the owners moving away from the area and therefore not available for questioning. The target had been 90% after 3 months.
- No booths in the IDP camps were sprayed due to lack of MoHS approved pyrethroids insecticide
- Data from KAP survey reports (see annex 4). A malaria KAP survey was conducted amongst the staff and guardians in the Paediatric Ward at KGH. In KGH, 93% of staff and 65% of patients' guardian knew that mosquitoes transmit malaria. 74% and 50% of the two groups knew that mosquitoes breed in stagnant water. 89% and 66% gave fever as one of the symptoms of malaria. Regarding prevention, 80% of staff and 47% of patients' guardians named bed nets.
- >95% of homes in identified communities are sprayed with pyrethroids insecticide. An Environmental Impact Assessment conducted in Blama and Levuma after spraying showed a high level of satisfaction amongst the community. 64% of respondents rated the spraying exercise as good, and 255 as excellent. There was a high effect on other insects, notably cockroaches, bedbugs and houseflies with minimal side effects such as skin irritation and headaches reported.

## *B. POSITIVE EFFECTS OF PROGRAM ON TARGET POPULATIONS*

As outlined the health and nutrition status of the target population improved. Importantly there is an ongoing increase in the MoHS capacity to take back responsibility for peripheral level clinics and to ensure ongoing delivery of quality health care with improved accessibility.

**Capacity Building**
Capacity building and training at all levels of health care delivery has taken place including training of village level volunteers, clinic health staff and MoHS staff at DHMT level. Training modules included technical health protocols, promotional health care, community mapping, cost recovery management and project cycle management.

**VDC Bank accounts**
Over 60% of Merlin supported facilities in the district have established bank accounts with significant funding levels which will go toward helping to sustain the facilities when Merlin exits.

**Sustained emergency preparedness**
Health care was provided to influxes of refugees in a speedy and appropriate manner. There are contingency plans in place with reserve stocks of drugs and consumables.

**Support to District Health Management team (DHMT)**
Merlin has offered sustained support to the MOHS whose capacity to deliver National Immunization Days etc has clearly been boosted. This reflects Merlin's commitment to supporting district health management team in difficult circumstances/with their on-going constraints.

**The Malaria Control Programme** has achieved a decrease in the morbidity from Malaria.

**The Lassa Ward** has succeeded in offering good quality care resulting in a case fatality rate of less than 20%.

### *C. EFFECT ON OVERALL PROGRAM PERFORMACE OF UNFORESEEN CIRCUMSTANCES*

Throughout the full reporting period, essential care was provided to beneficiaries even though there have been vastly increased numbers of patients presenting at the health facilities (see Annex 5). This has created significant constraints:

- Human resource constraints
- Material resource constraints
- Standard of qualitative reporting and analysis of quantitative data
- Continuing stringent task oriented supervision

Specific challenges for the health sector include:
- Finding modalities to enable the MoHS to maintain service at all peripheral facilities
- Ensuring uninterrupted drug supply by the MoHS
- Continuing to enjoy community participation with less external assistance than has been the case over the past 5-6 years.

Security and road conditions allowed unrestricted access and an adequate supply of drugs and equipment reached the project sites but this varied throughout the project period due to unpredictable security incidents.
The MoHS provided adequate suitably qualified staff at the health facilities but it became clear that clinical skills were not optimal due to breaks in service. Ongoing training and supervision addressed this.
UNICEF/MoHS did not provide uninterrupted supply of vaccines & maintain cold chain equipment.
The MoHS staff has continued to use the SMI guidelines but this will need ongoing training and supervision.

There was apathy towards implementing a cohesive policy of de-centralisation of services from Freetown to District level. No coherent fully developed national policies (e.g. on IMCI, TB control, cost recovery etc) exist. There are ongoing difficulties in defining health priorities in collaboration with the MoHS during this critical transitional period. Modalities of enabling the MoHS to maintain service at all peripheral units after humanitarian assistance is completed have to be designed in collaboration with the MoHS. Partial cost recovery has been seen as a way forward to maintain local ownership and continuity but no national policy exists
Efforts by Merlin to launch cost recovery by facilitating two workshops by a WHO health economist have failed to bring forward the issue.
There are many problems surrounding implementation of cost recovery. The most important is that there is no clear knowledge of what wealth people has, what they can afford and what they will pay for. There is no clear idea of an affordable baseline charge from which to design a feasible cost recovery system. VDCs and MoHS District Health Management team (DHMT) set user fees set at a proportion of the real cost. The rates set take into account affordable levels for those in the very poor category. The funds raised contribute to the running costs of each health centre. Health worker salaries are heavily reliant upon community contributions. In the current very serious economic context user fees requested from the target populations are a token of the realistic cost. A rudimentary exemption scheme has commenced in order to ensure those defined as indigent by each community receive free treatment at health centres. Initially the system appeared to be working quite well in the peripheral health facilities; however, latterly quantitative trends relating to access identified weaknesses in this system. Difficulties for the very poor to access facilities continue to exist and require further in-depth exploration in the future.

There is pressing need for a household economic investigation to be carried out. Initial programme planning did not optimise the potential input from MoHS and stakeholders. Future programmes must facilitate ownership by all parties at conception to maximise productivity. There is a continuing need for Merlin to dialogue with senior leaders and hospital decision-makers to support and encourage their move to cost-recovery. There is an on going dependence upon agencies such as Merlin. In conclusion there is no clear political will to achieve cost recovery.

During the next funding cycle specific peripheral clinics will be compared like with like in order to 'diagnose' precisely what factors have the greatest influence on attendance. There will also be emphasis on training of CHVs on case definitions, disease surveillance and defaulter tracing. Analysis of the data also indicates that referral must be encouraged particularly from remote communities to facilities which can provide quality health care.

There was lack of MoHS participation in the continual supervision of health facility quality assurance. Future plans will incorporate detailed task-orientated supervision with set objectives and targets for MoHS/DHMT staff.

The average **drug cost/per patient**[9] was US$0.45. The range varies from US$1.22 to US$0.20 Again this is most likely due to inappropriate diagnosis and over prescribing of drugs. These findings require three activities in the next funding cycle

- Specific investigation and review of diagnostic skills
- Continuing training of clinic staff in the diagnosis and management of the major morbidities
- Monitoring of drug usage including appropriate recorded data

Sierra Leone has a long tradition of informal drug peddlers selling imported drugs without prescription. These people have no formal health qualification and sell drugs purely on the

[9] Drugs purchased under grants by ECHO and Buza.

ability to pay. With improved security in certain areas this informal market increased markedly particularly during the last two months of the reporting period. People buy these drugs for many reasons-lack of confidence in the MoHS structures preference of injectable drugs and capsules over standardised tablets and cultural beliefs and health seeking behaviour. Patients often present late to formal health structures following self-medication leading with more severe symptoms than they would have had had they presented early. This is a huge challenge for the MoHS. The MoHS is currently investigating the extent of the problems and looking at ways of enforcing the laws surrounding the illegal sale of drugs.

The war has impacted hugely on civil society redevelopment. DDR is now formally complete; however, many areas in Kenema district are now in the process of rebuilding infrastructure. This needs continual funding and support.
There has been a steady influx of Liberian refugees throughout the reporting period. Merlin has responded to the health needs of these populations using existing health structures particularly in Blama. Fortunately, this has had no adverse effect on the delivery of planned care.

A planned entomological evaluation in Kenema District was not carried out. This study can only be conducted during the wet season to allow optimum and statistically significant results. This objective was unmet due to lack of staff resources during the reporting period.

Planned Chloroquine efficacy and insecticide-resistance studies were not carried out as another INGO (MSF) carried out these studies during the reporting period. It was learned after the reporting period that WHO and MoHS have not accepted this study due to methodological inaccuracies.

In Koya Rural redipping of nets was not undertaken due to delays by the VDCs in submitting member names of the management committee in a timely manner. The MoHS had responsibility for ensuring the timeliness whilst Merlin was in charge of supervising the redipping. Lobbying continues to encourage the MoHS to fulfil their promised role. Failures to redip the nets will likely result in an increase in the incidence of malaria, although this will not be seen statistically for a few months.

There have been difficulties in recruiting and retaining quality international staff. One international staff member was evacuated to Europe with suspected Lassa Fever. A second terminated their contract due to bereavement.
A high turnover of senior Merlin expatriate staff has disrupted programme continuity in some areas. However it has afforded increased objectivity toward the programme and allowed opportunity for the generation and implementation of new ideas.

## IV. RESOURCE USE / EXPENDITURES

### *A. SUMMARIZATION OF RESOURCES COMMITTED*

Please see appended financial report.

### *B. BREAKDOWN OF EXPENDITURE BY OBJECTIVES*

Please see appended financial report.

## V. ANNEXED DOCUMENTS

Annex 1 Two nutritional survey reports
Annex 2 Micro-virology diagnosis and mammology/epidemiology assessment visit report
Annex 3 Lassa fever KAP survey report
Annex 4 Malaria KAP survey
Annex 5 Health and morbidity data
Annex 6 Lassa fever statistics
Annex 7 Utilisation rates

# ANNEXES

| | |
|---|---|
| **Annex 1** | Two joint nutritional surveys |
| **Annex 2** | Micro-virology diagnosis and mammology/epidemiology assessment report |
| **Annex 3** | Lassa Fever KAP survey report |
| **Annex 4** | Malaria KAP survey report |
| **Annex 5** | Merlin's monthly health and morbidity data |
| **Annex 6** | Lassa Fever statistics |
| **Annex 7** | Utilisation rates |

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# NUTRITION SURVEY

## Kenema town and IDP Camps (Lebanese, Nyandeyama, Gofer)

## Blama town and IDP Camp

17-22 January 2001

**Mary Atkinson**

**Nutritionist**

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**20th February 2001**

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## 1.0 INTRODUCTION

### *1.1 BACKGROUND*

Kenema District is one of three districts in the Eastern Province of Sierra Leone, the other two being Kono and Kailahun. Although there is currently access to all but two chiefdoms (Lower Bambara and Malegohun) in Kenema District, Kono and Kailahun districts remain largely inaccessible due to the activity of the Revolutionary United Front (RUF). Movement between pro-government and rebel-held areas in Kenema and Kailahun districts remains limited to commercial and non-humanitarian traffic. Currently, there is no major fighting in the Eastern Region, but this may occur if attempts are made to seize the diamond producing areas in these districts from the RUF.

Kenema District has been severely impacted by ten years of civil war between pro-government forces and the RUF. Kenema town is Sierra Leone's third largest town and the main administrative town in the District. Having housed a pre-war population of 20,000, the population of Kenema town is now estimated at 102,408 (MERLIN Jan 01). The town additionally supports approximately 25,000 internally displaced within three camps (Lebanese, Nyandeyama, and Gofer). Blama town which is located 12 miles from Kenema on the Kenema Bo highway, has a population of 5,600 (MERLIN Nov 2000). In 1998, 9,000 IDPs were forcibly moved from Kenema RTI camp to Blama town. Since there were no services in place for this influx, many initially moved in with residents of Blama Town. An IDP camp was subsequently established which now supports a population of approximately 15,000.

The agricultural cycle for potential returning IDPs was disrupted due to a deterioration in the security situation in May 2000. With no opportunity to return home in time for this year's agricultural cycle, the IDP population in the Kenema area will continue to depend on humanitarian assistance. WFP and CRS continue to distribute monthly General Food Distribution (GFD) to all households in the IDP camps in Kenema and Blama.

### *1.2 MERLIN NUTRITION PROGRAMME IN KENEMA DISTRICT*

MERLIN took over emergency nutritional activities in Kenema District from MSF Holland in April 1996. The original programme which included therapeutic and supplementary feeding has since expanded to include support of the Paediatric ward, Lassa Fever ward and Under Five's clinic at Kenema District Hospital. Within Kenema District, MERLIN supports fourteen Peripheral Health Units (PHUs) through the District Health Team. In addition, Merlin supports clinics at Lebanese camp and Blama camp and there are plans to open a clinic at Gofer camp. MERLIN activities in the district, town and IDP camps also have a large outreach component including screening, EPI, active case finding, health education, lassa fever sensitisation and malaria control. Other health agencies working in Kenema district include MSF, GOAL, KDHCO, Africare, IRC, and ICRC.

Merlin's decentralised Supplementary Feeding Programme (SFP) programme in Kenema District and Blama town were handed over to GOAL in November 1999 and April 2000 respectively. GOAL now support 14 SFP sites in Kenema district. MERLIN continues to support a Therapeutic Feeding Centre (TFC) and SFP from Kenema District hospital, although there are plans to hand over the SFP to GOAL in March 2001. In January 2001 the total number of admissions to the Merlin TFC which serves Kenema District was 83, with the total number of inpatients at the end of the month being 107. The SFP was operating once a week with 355 new admissions and a total of 490 registered.

### *1.3 PREVIOUS NUTRITIONS IN KENEMA AND BLAMA*

#### 1.3.1 KENEMA TOWN AND IDP CAMPS

*Table 1.1: Comparison of prevalence of Global and Severe Acute Malnutrition, Kenema town and IDP camps, since 1995*

| *Survey* | Kenema Town | | Kenema IDP camps | |
|---|---|---|---|---|
| | Global | Severe | Global | Severe |
| Merlin, July 2000 | 3.7% | 0.4% | 2.2% | 0.0% |
| Merlin, December 1999 | 2.7% | 0.0% | 1.5% | 0.0% |
| Merlin, July 1999 | 10.2% | 2.6% | 13.6% | 5.7% |
| Merlin, June 1998 | 10.9% | 2.5% | 13.6% | 5.7% |
| Merlin, November 1996 | 5.5% | 0.3% | 6.6% | 0.5% |
| Merlin, June 1996 | 8.6% | 1.1% | 8.9% | 0.8% |
| MSF, February 1996 | 6.3% | 1.0% | 8.6% | 0.2% |
| MSF, November 1995 | 6.8% | 0.5% | 5.3% | 0.9% |
| MSF, August 1995 | 22.6% | 7.7% | 37% | 11.5% |

The nutrition programme was first established in Kenema town by MSF Holland in 1995 following a nutritional emergency in which global and severe malnutrition were extremely high both in the town (22.6% global, 7.7% severe) and the RTI camp (37% global, 11.5% severe). The nutrition status then stabilised (5% -10% global) during 1996. A nutrition survey scheduled for June 1997 was interrupted by a military coup in May 1997. A second survey scheduled for January 1998 was again delayed due to insecurity and subsequent fighting. Following political upheavals in February 1998 there was a rapid increase in severe malnutrition that led to the opening of a second TFC in Kenema town in May 1998 which had exceeded its capacity by June. A nutrition survey in June 1998 revealed a high level of malnutrition both in the town (10.9% global, 2.5% severe) and in the RTI camp (13.6% global, 5.7% severe). An attack on Kenema town in January 1999 coinciding with the RUF occupation of Freetown, led to further disruption. A nutrition survey in July 1999 subsequently found rates of malnutrition still high and at a similar level to those found in June 1998. Since 1999, the nutritional status of under fives in Kenema has improved, with global malnutrition staying below 4% and severe malnutrition below 1%, both in the town and the camps. The most recent nutrition survey in July 2000 found slightly less malnutrition in the camps (2.2% global, 0% severe) than in the townships (3.7% global, 0.4% severe).

### 1.3.2 BLAMA TOWN AND IDP CAMPS

Table 1.2: Comparison of prevalence of Global and Severe Acute Malnutrition since 1999, Blama town & IDP camp.

| *Survey* | **Blama town** | | **Blama IDP camps** | |
|---|---|---|---|---|
| | **Global** | **Severe** | **Global** | **Severe** |
| Merlin, July 2000 | 3.0% | 0.3% | 2.0% | 0.8% |
| Merlin, December 1999 | 4.3% | 0.4% | 1.3% | 0.2% |
| Merlin, July 1999 | 7.8% | 1.4% | - | - |

The first MERLIN nutrition survey in Blama town took place in July 1999 soon after the transportation of 9,000 IDPs from the RTI camp in Kenema to Blama in December 1998. Global malnutrition in Blama town was initially high at 7.8% as a result of this sudden influx but had fallen to less than half this figure (3.0%) by July 2000. Global malnutrition in Blama IDP camp has remained significantly lower than in the town since December 1999.

## 2.0 METHODOLOGY

### *2.1 OBJECTIVES*

**Main objective**

- To estimate the nutritional status of children aged 6 to 59 months

*Secondary objectives*

- To estimate EPI and measles coverage of children aged 6-59 months
- To estimate retrospective mortality of children under five years
- To determine the demographic composition and resident status of households
- To evaluate the coverage of feeding programmes in the population surveyed

### *2.2 SAMPLING METHODOLOGY*

A separate survey was conducted at each of the following locations:

1. Kenema town
2. Kenema IDP camps (Lebanese, Nyandeyama, Gofer)
3. Blama town
4. Blama IDP camp

Sample sizes were calculated to provide at least 3% precision.

*Table 2.1: Sampling methodology for nutrition surveys, January 2001*

| | Total population | Sample size | Sampling method |
|---|---|---|---|
| Kenema town | 102,408 | 768 | Cluster |
| Kenema IDP camps | 22,984 | 384 | Systematic (1 in 12) |
| *Lebanese* | *11,611* | | |
| *Nyandeyama* | *10,357* | | |
| *Gofer* | *1,016* | | |
| Blama town | 5,637 | 268 | Systematic (1 in 3) |
| Blama IDP camp | 14,628 | 384 | Systematic (1 in 7) |
| **Total** | **174,179** | **1,804** | |

### 2.2.1 KENEMA TOWN

*A Merlin population mapping exercise in January 2001 estimated a total population of 102,408 in Kenema town. The mapping exercise involved counting every house in Kenema and the number of people living in every 10th house in each of 16 zones in the town.*
*The cluster sampling method was used to select children for measurement in Kenema town. In the first stage of cluster sampling the town was divided into 16 zones from which 30 clusters were selected according standard procedures (see Appendix I) In the second stage, geographical central locations were identified for each cluster site and a random direction chosen by spinning a bottle. All houses in a straight line in the direction of the bottle to the boundary of the area were counted. A random number between 1 and this number of houses was chosen and used as the first house for measurement. Subsequent houses were chosen by locating the nearest house to the right of the main entrance of each house.*

### 2.2.2 BLAMA TOWN

*A population of 5,637 for Blama town was obtained from a full census undertaken by Merlin in November 2000.*
*The systematic sampling method was used to select households and children in the sample. Since Blama town has a small population, a reduced sample size of 268 was used. One in every three houses in the town were visited.*

### 2.2.3 KENEMA AND BLAMA IDP CAMPS

*The population statistics for the Kenema IDP camps were obtained from a MERLIN census at the end of December 2000 and double checked against recent verifications from the food pipeline agencies (WFP, CRS) operating in these camps.*
*Systematic sampling was used to select booths in all IDP camps. A sample size of 384 children was calculated for both the Kenema and Blama IDP camp surveys. 1 in 7 booths in Blama camp and 1 in 12 booths in Kenema IDP camps (Lebanese, Nyandeyama and Gofer) were visited.*

## *2.3 DATA COLLECTION*

*All households living at each selected house/booth, were included in the survey. A household was defined as "all those eating from the same pot".*
*All children living in the household aged 6-59 months with heights between 65cm and 110cm were measured.*
*The following information was collected on two questionnaires from each house/booth:*

*From the head of every household:*

- **Gender of head of household**
- **Household composition** (number of 0-5 months, 6-59 months, 60 months and above)
- **Resident status of household** (resident or displaced)
- **Date at which displaced households arrived at current address**
- **Location from which displaced households arrived** (country, district, chiefdom)
- **Under fives mortality in last 12 months** (numbers, date of death)
- **Number of meals eaten by household on previous day**

For every child aged 6-59 months:
***Anthropometry***

- **Age** (calculated using date on child's health card, or local events calendar. Where age was not available, selection was based on height excluding all children below 65cm and above 110cm)

- **Sex**
- **Weight** (using a Salter Scale, precision 0.1 Kg. Children weighed without clothes)
- **Height** (using a measuring board, precision of 0.1cm. Children less than 85 cm measured lying down. Children greater than or equal to 85 cm measured standing up)
- **Bilateral oedema** (assessed by applying thumb pressure to both feet/shins for three seconds)

*Every 6-59 month child was additionally assessed for the following:*
***Immunisation status***

- **EPI status** (assessed by recording the vaccination dates for Polio, DPT, and BCG) from the child's health card. The presence of a BCG mark scar was recorded if there was no vaccination date for BCG.
- **Measles vaccination** was assessed by vaccination date on the health card. If no date was available, measles vaccine by mother's history was recorded.

***Feeding Centre Coverage***
*Current attendance of supplementary or therapeutic feeding programme*
*Where an eligible child was absent from a household, an absence form was completed and arrangements made to return. Where an eligible child was currently admitted in the TFC or attending the SFC/clinic, the team located the child at the feeding centre to obtain their measurements. During the survey, a register of children who were severely malnourished or who required immediate medical attention was maintained. The registers were submitted daily and followed for formal assessment and admission to the nutrition programme as appropriate.*
The "Feeding Centre Coverage" is defined as the percentage of malnourished children frequenting SFP or TFP, divided by the percentage of malnourished children.

$$\text{Coverage} = \frac{\text{Number of malnourished children attending SFP or TFC in sample}}{\text{Total number of malnourished children in sample}} \times 100$$

### 2.3.1 ACUTE MALNUTRITION

*Acute malnutrition was determined using weight for height (W/H) index values.*
*Both z-scores and percentage of the median were used to express severe and global malnutrition in the sample population.*
*Only z-scores have true statistical meaning and so only these will be used to look at malnutrition according to the different sub-categories.*

**Guidelines for results expressed by z-score**

- **Severe acute malnutrition** is defined by W/H < -3 SD and/or oedema
- **Global acute malnutrition** is defined by W/H < -2 SD and/or oedema

**Guidelines for the results expressed as % of the reference median for Weight/Height**

- **Severe acute malnutrition** is defined by W/H < 70% and/or oedema
- **Global acute malnutrition** is defined by W/H <80% and/or oedema

## *2.4 TEAM COMPOSITION AND TRAINING*

Each of the six survey teams was composed of a Team Supervisor and three additional team members. All team members had experience in the methodologies used in nutritional surveys. Twenty survey team members were employed as Merlin's Outreach Team in Kenema. The remaining four were EPI volunteers from the Ministry of Health.

Prior to the survey, all team members attended a MERLIN two day training workshop to explain the basics of the survey methodology and anthropometric data collection. This workshop included rigorous training in measuring weight, height, identification of oedema and how to complete the questionnaires. Teams were sent out into the field to practice the selection and measurement of children on the day before the survey. Teams were managed in the field by two supervisors.

The survey took place between 17-22 January 2001.

## RESULTS

Data processing and analysis were carried out using EPI-INFO 5.0.
The calculation and analysis of the anthropometric indicators were carried out using EPINUT.

## 3.0 KENEMA TOWN

***HOUSEHOLD INFORMATION***

A total of 190 houses and 463 households were selected by cluster sampling in Kenema Town.
All households at each selected address were included in the survey.

### *3.1 COMPOSITION OF HOUSE/ADDRESS*

The average number of people living in each house/address was 24.
The mean number of households living in each house/address ranged from 1 to a maximum of 10. The average number of households occupying a house was 2.44.

Table 3.1: Age group composition of households, Kenema Town, January 2001

| Age group | n | mean | range | % |
|---|---|---|---|---|
| Number 0-5 months | 109 | 0.24 | 0-2 | 2.4 |
| Number 6-59 months | 804 | 1.74 | 1-16 | 17.6 |
| Number 60 months & above | 3644 | 7.87 | 1-33 | 79.9 |
| **Total per household** | **4557** | **9.84** | **2-36** | **100.0** |

The total number of people living in a household ranged from 2 to 36, with a mean of 9.82.
20.0% of household members were under five years.

### *3.2 HEAD OF HOUSEHOLD*

Table 3.2: Gender of head of household, Kenema Town, January 2001

| | N | % |
|---|---|---|
| Male | 325 | 70.2 |
| Female | 138 | 29.8 |
| **Total** | **463** | **100** |

Nearly one third (29.8%) of households were headed by a female.

### *3.3RESIDENT STATUS OF HOUSEHOLDS*

Households were classified according to whether they were Resident (currently living in home location) or Displaced (currently living away from home location).

Table 3.3: Resident status of households, Kenema town, January 2001

| | N | % |
|---|---|---|
| Resident | 209 | 45.2 |
| Displaced | 253 | 54.8 |
| **Total** | **462** | **100** |

Displaced families accounted for 54.8% of all households in the survey.
Based on the figures above and on an average town population of 102,408, the estimated displaced population of Kenema town is 55,812.

### *3.4 ARRIVAL DATES OF DISPLACED HOUSEHOLDS*

Figure 3.1: Date of arrival of Displaced in Kenema Town, January 2001

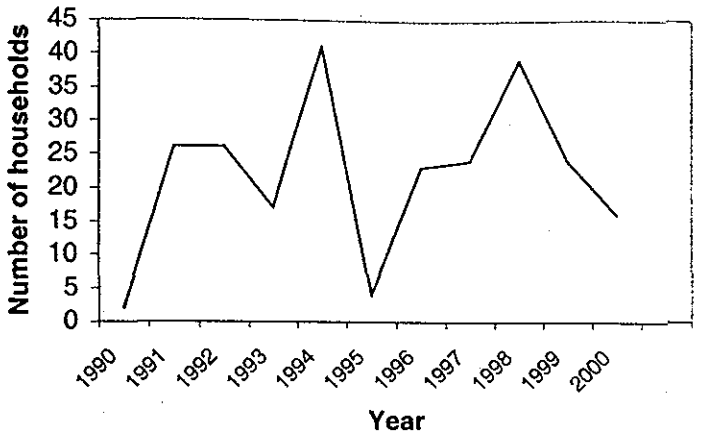


Figure 3.1 shows how the trend of the influx of displaced into Kenema town over the last 10 years.
Displaced families were further classified according to whether they had lived in Kenema town for more or less than one year. 7.3% (18) of all households had arrived in the last 12 months.

### *3.5 AREA OF ORIGIN*

Displaced households were asked for details about their home location/area of origin.
Eight (3.2%) households had arrived from Guinea, and 4 (1.6%) from Liberia.
Households displaced from within Sierra Leone were asked for the name of their home district.

Table 3.4: District from which Displaced, Kenema Town, January 2001

| District | Total Displaced | | Displaced <=12 months | | Displaced > 12 months | |
|---|---|---|---|---|---|---|
| | N | % | n | % | N | % |
| Kenema | 108 | 45.2 | 8 | 47.1 | 99 | 45.6 |
| Kailahun | 95 | 39.7 | 3 | 17.6 | 89 | 41.0 |
| Pujehun | 11 | 4.6 | - | - | - | - |
| Kono | 9 | 3.8 | - | - | 9 | 4.1 |
| Tonkolili | 6 | 2.5 | 3 | 17.6 | 3 | 1.4 |
| Bo | 4 | 1.7 | - | - | 4 | 1.8 |
| Bombali | 3 | 1.3 | 2 | 11.8 | 1 | 0.5 |
| Kambia | 1 | 0.4 | - | - | - | - |
| Freetown | 1 | 0.4 | 1 | 5.9 | - | - |
| Moyamba | 1 | 0.4 | - | - | 1 | 0.5 |
| **Total** | **239** | **100** | **17** | **100** | **217** | **100** |

Table 3.6 shows that the majority of displaced had arrived from either Kenema district (45.2%) or Kailahun district (39.7%).
A smaller proportion of the newly arrived households came from Kailahun district (17.6%) compared to those living in Kenema for more than 12 months (41%).
If households had been displaced from within Kenema District they were additionally asked for the name of their home Chiefdom.

Table 3.5: Chiefdom from which Displaced, Kenema Town, January 2001

| Kenema District Chiefdoms | Total Displaced | | Displaced <=12 months | | Displaced >12 months | |
|---|---|---|---|---|---|---|
| | n | % | n | % | n | % |
| Lower Bambara | 47 | 44.8 | 4 | 50.0 | 43 | 44.3 |
| Nongowa | 11 | 10.5 | 2 | 25.0 | 9 | 9.3 |
| Gaura | 10 | 9.5 | 1 | 12.5 | 9 | 9.3 |
| Malegohun | 9 | 8.6 | - | - | 9 | 9.3 |
| Tunkia | 7 | 6.7 | - | - | 7 | 7.2 |
| Lower Mbabala | 6 | 5.7 | - | - | 6 | 6.2 |
| Dama | 4 | 3.8 | - | - | 4 | 4.1 |
| Dodo | 3 | 2.9 | - | - | 3 | 3.1 |
| Gorama Mende | 2 | 1.9 | 1 | 12.5 | 1 | 1.0 |
| Kaindu Leppiama | 2 | 1.9 | - | - | 2 | 2.1 |
| Koya | 2 | 1.9 | - | - | 2 | 2.1 |
| Nomo | 2 | 1.9 | - | - | 2 | 2.1 |
| **Total** | **105** | **100** | **8** | **100** | **97** | **100** |

Nearly half (44.8%) of households displaced from within Kenema District arrived from Lower Bambara chiefdom. This proportion was similar for both the newly displaced and those living in Kenema for more than 12 months.

### *3.6 RETROSPECTIVE UNDER FIVES MORTALITY*

A total of 0.86% (4) households reported at least one under five's mortality in the last full calendar month (December) and 35 (7%) in the past year. One household reported two under fives deaths in the same month. Retrospective under fives crude mortality was calculated as 1.4 per 10,000 per day using mortality figures from the last complete month, and 1.03 when calculated as an average for the last year.

Figure 3.2: Date of death, Under five's mortality, Kenema Town, 2001

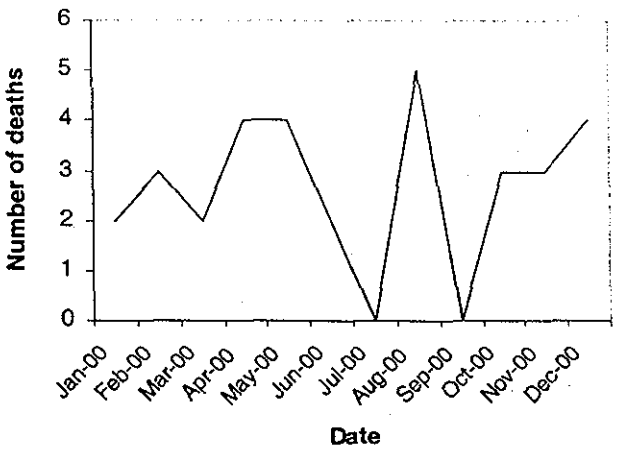


Figure 3.2 shows the distribution of under fives deaths in Kenema town over the last 12 months.

### *3.7 UNDER FIVES MORTALITY BY RESIDENT STATUS*

Table 3.6: Under five's mortality in last 12 months by resident status, Kenema town, January2001

| Resident status | Total number of deaths | % of households |
|---|---|---|
| Resident (n=209) | 9 | 4.3 |
| Total Displaced (n=253) | 26 | 10.3 |
| **Total (n=462)** | **35** | **7.5** |

Displaced households were 2.39 times more likely to have an under 5s mortality than non displaced households *(Relative Risk = 2.39, 95% Confidence limit 1.14<RR<4.98)*. The Yates Corrected Chi Square statistical test found this higher risk of death to be statistically significant *(p=0.025)*.
Newly displaced families were no more likely to experience an under fives death than those displaced for more than 12 months.

### *3.8 NUMBER OF MEALS EATEN ON PREVIOUS DAY*

***Table 3.7: Number of meals, eaten on previous day, Kenema Town, January 2001***

| Number of meals | n | % |
|---|---|---|
| 1 | 105 | 22.7 |
| 2 | 270 | 58.4 |
| 3 | 84 | 18.2 |
| 4 | 3 | 0.6 |
| **Total** | **462** | **99.9** |

The average number of meals consumed by a household was 1.97 (*SD 0.66*).
Over three quarters (77%) of Kenema households reported eating two or more meals on the previous day. This compares favourably with the two previous surveys in Kenema town.

### *NUTRITION ANTHROPOMETRY*

A total of 810 children qualified for data entry and analysis. The measurements of 2 children were "flagged" due to extreme weight and/or height measurements.

### *3.9 DISTRIBUTION BY AGE AND SEX*

Table 3.8: Distribution of children aged 6-59 months by age and sex, Kenema town, January 2001

| Age | Boys | | Girls | | Total | | Sex ratio |
|---|---|---|---|---|---|---|---|
| (months) | N | % | N | % | n | % | |
| 6-17 | 111 | 54.7 | 92 | 45.3 | 203 | 25.1 | 1.2 |
| 18-29 | 82 | 40.8 | 119 | 59.2 | 201 | 24.8 | 0.6 |
| 30-41 | 102 | 51.8 | 95 | 48.2 | 1977 | 24.4 | 1.0 |
| 42-53 | 60 | 44.4 | 75 | 55.6 | 135 | 16.7 | 0.8 |
| 54-59 | 42 | 57.5 | 31 | 42.5 | 73 | 9.0 | 1.3 |
| **Total** | **397** | **49.1** | **412** | **50.9** | **809** | **100** | **0.9** |

The sex ratio distribution shows an approximately equal representation of boys and girls in the sample, thus implying that no selection bias has occurred.

### *3.10 PREVELANCE OF ACUTE MALNUTRITION*

Table 3.9: Prevalence of severe and global malnutrition, z-score, % median, Kenema town, January 2001

| | Severe malnutrition | Global malnutrition |
|---|---|---|
| **z-score (95% CI)** | 0.4% (0.0% - 1.8%) | 3.8% (2.2% - 6.4%) |
| **% of median (95% CI)** | 0.5% (0.0% - 3.2%) | 2.0% (0.9% - 4.0%) |

Table 3.9 shows the distribution of global malnutrition and severe malnutrition by z-score and % median in the sample population.
Global acute malnutrition expressed in z-scores was 3.8% *(95% Confidence Interval 2.2%-6.4%)* including 0.4% of severe malnutrition *(CI: 0.0% - 1.8%)*.Expressed as a percentage of the median, the overall global malnutrition rate was 2.0% *(CI: 0.9% - 4.0%)*, including 0.5% *(CI: 0.0% - 3.2%)* of severe malnutrition.
2 cases of oedema (Kwashiorkor) were found during the survey.

### *3.11 PREVALENCE OF OEDEMA*

Table 3.10: Distribution of Marasmus (wasting), Kwashiorkor, and combined Marasmus/Kwashiorkor, Kenema town, Z-scores, January 2001

| | Wasting (< -2 Z scores) | No Wasting (≥ - 2 Z scores) |
|---|---|---|
| **Oedema** | ***Marasmus/Kwashiorkor***<br>0 (0.0%) | ***Kwashiorkor***<br>2 (0.2%) |
| **No oedema** | ***Marasmus***<br>29 (3.6%) | ***Normal***<br>778 (96.2%) |



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Table 3.10 shows the distribution of pure marasmus (wasting), pure kwashiorkor and combined marasmus/kwashiorkor. Two cases of oedema were found in the sample.

### *3.12 ACUTE MALNUTRITION BY AGE*

Table 3.11: Distribution of malnutrition by age, Z-scores, Kenema town, January 2001

| | | Acute malnutrition | | Moderate malnutrition | | No malnutrition | | Oedema | |
|---|---|---|---|---|---|---|---|---|---|
| AGE | | < - 3 Z scores | | ≥-3 to <-2 Z scores | | ≥-2 Z scores | | | |
| (months) | N | N | % | N | % | N | % | n | % |
| 6-17 | 203 | 0 | 0 | 9 | 4.4 | 193 | 95.1 | 1 | 0.5 |
| 18-29 | 201 | 0 | 0 | 12 | 6.0 | 188 | 93.5 | 1 | 0.5 |
| 30-41 | 197 | 1 | 0.5 | 3 | 1.5 | 193 | 98.0 | 0 | 0.0 |
| 42-53 | 135 | 0 | 0.0 | 4 | 3.0 | 131 | 97.0 | 0 | 0.0 |
| 54-59 | 73 | 0 | 0.0 | 0 | 0.0 | 73 | 100 | 0 | 0.0 |
| **Total** | **809** | **1** | **0.1** | **28** | **3.5** | **778** | **96.2** | **2** | **0.2** |

Table 3.12: Acute malnutrition by age group, Z-scores, Kenema town, January 2001

| Age groups | Severe acute/oedema | | Global acute | |
|---|---|---|---|---|
| | N | % | n | % |
| 6-29 months (n=404) | 2 | 0.5 | 23 | 5.7 |
| (CI) | | (-0.1-3.2) | | (3.0-10.2) |
| 6-59 months (n=809) | 3 | 0.4 | 31 | 3.8 |
| (CI) | | (0.0-1.8) | | (2.2-6.4) |

Tables 3.11 and 3.12 demonstrate a higher level of global acute malnutrition in the younger 6-29 month age groups. Such a difference is common, since this age group represents the weaning period of young children.

Statistical tests revealed that the 6-29 month age group had a higher risk of malnutrition (5.7% global) compared to the 30-59 month age group (1.0%), *Yates Corrected Chi Square = 6.61, p=0.01*. The relative risk (RR) is 2.88 *(95% CI: 1.30<RR<6.37)*. This means that children in the 6-29 age group have a risk multiplied by 2.55 to be malnourished, compared to children of 30-59 months.

### *3.13 ACUTE MALNUTRTION BY GENDER*

Table 3.13: Acute malnutrition by gender, Kenema town, January 2001

| Gender | Severe Acute | | Moderate acute | | Oedema | |
|---|---|---|---|---|---|---|
| | n | % | N | % | N | % |
| Males (n=397) | 1 | 0.25 | 19 | 4.8 | 0 | 0.0 |
| Females (n=412) | 0 | 0.0 | 9 | 2.2 | 2 | 0.5 |
| **Total (n=809)** | **1** | **0.12** | **28** | **3.1** | **2** | **0.25** |

The table shows that a larger proportion of boys were malnourished compared to girls. This difference was not found to be statistically significant.

### *3.14 ACUTE MALNUTRITION BY RESIDENT STATUS*

Table 3.14: Acute malnutrition by resident status, Kenema town, January 2001

| Resident status | Severe Acute | | Moderate Acute | | Oedema | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| Resident (n=362) | 1 | 2.8 | 13 | 4.4 | 1 | 2.8 |
| Total Displaced (n=442) | 0 | 0.0 | 15 | 3.6 | 1 | 0.2 |
| **Total (n=804)** | **1** | **0.12** | **28** | **3.1** | **2** | **0.25** |

Table 3.14 shows that the proportion of severe and moderate malnutrition was approximately the same for resident and displaced households.

### *3.14 ACUTE MALNUTRITION BY GENDER OF HEAD OF HOUSEHOLD*

Table 3.15: Acute malnutrition by gender of head of household, Kenema town, January 2001

| Gender of head of household | Severe Acute | | Moderate acute | | Oedema | |
|---|---|---|---|---|---|---|
| | N | % | N | % | n | % |
| Male (n=547) | 1 | 0.1 | 22 | 4.0 | 1 | 0.1 |
| Female (n=261) | 0 | 0.0 | 6 | 2.3 | 1 | 3.8 |
| **Total (n=808)** | **1** | **0.12** | **28** | **3.1** | **2** | **0.25** |

Global malnutrition was higher in male headed households. The latter was not found to be statistically significant.

### *3.15 ACUTE MALNUTRITION BY NUMBER OF MEALS EATEN*

Table 3.16: Acute malnutrition by number of meals eaten, Kenema town, January 2001

| Number of meals | Severe Acute | | Moderate acute | | Oedema | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| 1 (n=207) | 0 | 0.0 | 9 | 4.3 | 1 | 0.4 |
| 2 (n=454) | 1 | 0.2 | 14 | 3.1 | 0 | 0.0 |
| 3 (n=142) | 0 | 0.0 | 5 | 0.4 | 1 | 0.7 |
| 4 (n=4) | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| **Total (n=808)** | **1** | **0.12** | **32** | **3.1** | **2** | **0.25** |

There was slightly more global malnutrition in households consuming one meal (4.3%) compared to those consuming more than one meal (3.7%) but this difference was not found to be statistically significant.

### VACCINATION STATUS

Immunisation was assessed by the presence of a dated complete record for BCG, DPT, Polio and Measles on the child's health card. If a measles record was absent, immunisation was assessed by a history given by the parent/guardian. If a BCG record was absent, BCG immunisation was assessed by the presence of a BCG scar.

48% (395) children did not have a health card.

Table 3.17: EPI coverage, Kenema Town, January 2001

| Vaccination | N | % |
|---|---|---|
| Complete Polio on card | 314 | 38.8 |
| Complete DPT on card | 312 | 38.5 |
| BCG on card | 388 | 47.9 |
| BCG on card or scar | 750 | 92.6 |
| Measles on card | 275 | 34.0 |
| Measles on card or history | 601 | 74.2 |
| **Complete immunisation** | **237** | **29.2** |

The vast majority (92.6%) of children in the sample were fully immunised for BCG by having either a date of vaccination on their health card or a BCG scar. Only 38% had dated records for all three immunisations required for Polio and DPT and only 34% had a dated record of vaccination against measles.

Less than one third (29.2%) of all children included in the survey were fully immunised for Polio (3 dates), Polio (2 dates), BCG (date or scar), and Measles (date only) according to their health card. There was no difference in immunisation status according to resident status.

Of those children who had health cards, 57% were fully immunised for Polio, DPT, BCG and Measles according to the criteria stated above.

### ATTENDANCE OF SFP AND TFP

All children included in the survey were asked whether they currently attend a Supplementary Feeding Programme (SFP) or Therapeutic Feeding Programme (TFP).

Table 3.18: Attendance of SFP and TFP, Kenema town, January 2001

| | No attending feeding programme | No malnourished children | % attendance |
|---|---|---|---|
| Currently attending SFP | 8 | 29 (moderate) | 27.6 |
| Currently attending TFP | 0 | 3 (severe) | 0.0 |
| **Total** | **8** | **32** | **25.0** |

The Feeding Centre Coverage for Kenema town was calculated as 25.0%.

## 4.0 KENEMA IDP CAMPS (Lebanese, Nyandeyama, Gofer)

### *4.1 NUMBER OF BOOTHS AND CHILDREN VERSUS*

Table 4.1 Number of booths/children surveyed vs expected, Kenema IDP camps, January 2001

| IDP Camp | Obtained | | | Expected | | |
|---|---|---|---|---|---|---|
| | No of Booths | No of child 6-59 mnths | Mean 6-59 mnths child per booth | No of Booths | No of child 6-59 mnths | Mean 6-59 mnths child per booth |
| Lebanese | 79 | 118 | 1.49 | 79 | 203 | 2.57 |
| Nyandeyama | 70 | 109 | 1.56 | 66 | 170 | 2.57 |
| Gofer | 11 | 20 | 1.81 | 10 | 27 | 2.7 |
| **Total** | **160** | **247** | **1.54** | **155** | **400** | **2.58** |

Table 3.18 shows the actual number of booths and children obtained from systematic sampling 1 in every 12 booths compared to the numbers estimated using figures obtains from a population census in December 2000.

Although the number of booths surveyed was very close to the number predicted, the much lower than expected mean number of 6-59 month children in each booth meant that only 247 children were included in the survey compared to an expected 400. 70 (28.6%) of the booths visited by the survey teams had no children in the 6-59 month age group.

Sample size was deliberately overestimated to allow for such inconsistencies in population data and so the number of children included in survey still allowed for analysis with 3% precision and 6% malnutrition.

**HOUSEHOLD INFORMATION**

All households living at each selected booth were included in the survey.
A total of 160 booths and 245 households were interviewed in Kenema IDP camps.

### *4.2 COMPOSITION OF HOUSE/ADDRESS*

The average number of people living in a booth was 11.8.
The mean number of households living in each booth ranged from 1 to 3, with an average of 1.53.

### *4.3 COMPOSITION OF HOUSEHOLDS*

Table 4.2: Age group composition of households, Kenema IDP camps, January 2001

| Age group | Total | | | *Lebanese Camp* | | | Nyandeyama | | | Gofer Camp | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | Mean | % | N | mean | % | N | mean | % | n | Mean | % |
| Number 0-5 months | 70 | 0.29 | 3.7 | 41 | 0.28 | 3.4 | 26 | 0.32 | 4.4 | 3 | 1.17 | 3.0 |
| Number 6-59 months | 248 | 1.10 | 13.1 | 148 | 1.02 | 12.4 | 80 | 0.98 | 13.5 | 20 | 1.11 | 19.8 |
| Number 60 months & above | 1568 | 6.4 | 83.1 | 1003 | 6.92 | 84.1 | 487 | 5.94 | 82.1 | 78 | 4.33 | 77.2 |
| **Total per household** | 1886 | 7.07 | 100 | 1192 | 8.23 | 1 | 593 | 7.23 | 100 | 101 | 5.61 | 100 |

The total number of people in a household ranged from 2 to 26, with a mean of 7.07.
Gofer camp had a smaller household size with a lower proportion of adults to children compared to the other camps.
On average, 16.9% of the population surveyed in the camps was under five years of age.

### *4.4 HEAD OF HOUSEHOLD*

Table 4.3: Gender of head of household, Kenema IDP camps, January 2001

| Head of household | Total | | Lebanese Camp | | Nyandeyama | | Gofer Camp | |
|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | N | % | N | % |
| Male | 157 | 64.1 | 89 | 61.4 | 53 | 64.6 | 15 | 83.3 |
| Female | 88 | 35.9 | 56 | 38.6 | 29 | 35.4 | 3 | 16.7 |
| **Total** | **245** | **100** | **145** | **100** | **82** | **100** | **18** | **100** |

Approximately one third (35.9%) of households were headed by a female.
Gofer camp had substantially less female headed households (16.7%).

### *4.5 ARRIVAL DATE OF HOUSEHOLDS AT IDP CAMPS*

Households were asked for the date at which they had arrived at their respective camp. They were then further classified according to whether they had been living in their camp for more or less than one year.

Table 4.4: Date of arrival, Kenema IDP camps, January 2001

| | Total | | Lebanese Camp | | Nyandeyama | | Gofer Camp | |
|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | N | % | N | % |
| Less than 12 months | 16 | 6.6 | 8 | 5.5 | 1 | 1.25 | 7 | 38.9 |
| More than 12 months | 227 | 93.4 | 137 | 94.5 | 79 | 98.75 | 11 | 61.1 |
| **Total** | **243** | **100** | **145** | **100** | **80** | **100** | **18** | **100** |

The vast majority of households at Nyandeyama camp (98.75%) and Lebanese camp (94.5%) had been living there for more than 12 months. Over one third (38.9%) of households at Gofer camp had arrived in the last year.

### *4.6 AREA OF ORIGIN*

One household had arrived from Guinea.

Households displaced from within Sierra Leone were asked for the name of their home district.

Table 4.5: District from which Displaced, Kenema IDP camps, January 2001

| | Total | | Lebanese Camp | | Nyandeyama | | Gofer Camp | |
|---|---|---|---|---|---|---|---|---|
| District | n | % | n | % | n | % | n | % |
| Kailahun | 193 | 79.1 | 119 | 82.6 | 59 | 72.0 | 15 | 83.3 |
| Kenema | 35 | 14.3 | 17 | 11.8 | 15 | 18.3 | 3 | 16.7 |
| Kono | 15 | 6.1 | 8 | 5.6 | 7 | 8.3 | - | - |
| Pujehun | 1 | 0.4 | - | - | 1 | 1.2 | - | - |
| **Total** | **244** | | **144** | | **82** | | **18** | |

Table 3.22 shows that the majority of IDPs (79.1%) in all three camps had been displaced from Kailahun District. 14.3% had been displaced from within Kenema district. This pattern was similar for the both the newly displaced and those who had been living in the camps for more than one year.

Households displaced from within Kenema District were additionally asked for the name of their home chiefdom.

Table 4.6: Chiefdom from which Displaced, Kenema IDP camps, January 2001

| Kenema District Chiefdoms | Total | | Lebanese Camp | | Nyandeyama | | Gofer camp | |
|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | N | % | N | % |
| Nongowa | 9 | 25.7 | 3 | 17.6 | 5 | 33.3 | 1 | 33.3 |
| Malegohun | 9 | 25.7 | 6 | 35.3 | 3 | 2.0 | - | - |
| Lower Bambara | 6 | 17.1 | 1 | 5.9 | 5 | 33.3 | - | - |
| Gaura | 6 | 17.1 | 4 | 235 | - | - | 2 | 66.7 |
| Lower Mbabala | 3 | 8.6 | 3 | 17.6 | - | - | - | - |
| Kaindu Leppiama | 2 | 5.7 | - | - | 2 | 13.3 | - | - |
| **Total** | **35** | | **17** | | **15** | | **3** | |

Table 3.23 shows that Nongowa, Malegohun and Lower Bambara were the main chiefdoms from which those displaced from within Kenema District originated from.

### *4.7 Retrospective Under Five's Mortality*

A total of 0.82% (3) households reported at least one under five's death in the preceding month and 8.6% (21) in the past year.

9.6% (14) of families in Lebanese camp, 4.9% (4) in Nyandeyama and 16.7% (3) in Gofer camp reported at least one under fives in the last 12 months.

Retrospective under fives mortality was calculated as 2.01 per 10,000 per day using mortality figures for the last month and 1.76 when calculated as an average for the last year.

The CMR calculated as an average over the last 12 months was 1.9 in Lebanese camp, 0.99 in Nyandeyama camp and 3.7 in Gofer camp. The mortality rate in Gofer camp is particularly alarming.

Figure 4.1 Date of under fives death, Kenema IDP camps, January 2001

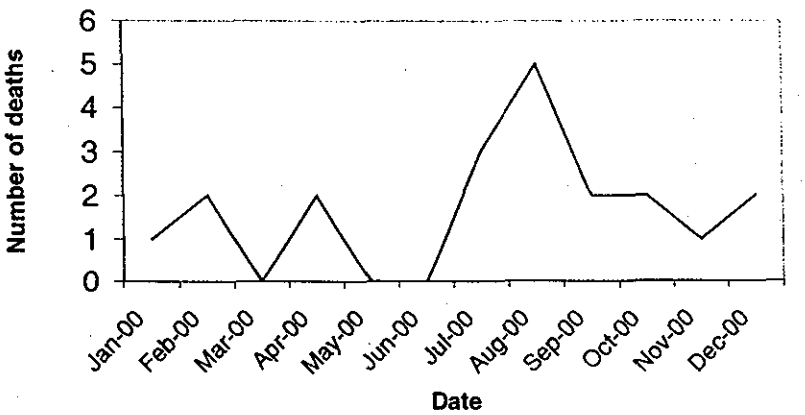


Figure 3.3 shows that the under fives death rate was at its highest between July and October 2000, reaching a peak in August 2000. This period of time coincides with the Hungry Season.

Only one household arriving in the last 12 months had an under fives death.



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### *4.8 Number of meals eaten on previous day, Kenema IDP camps, January 2001*

Table 4.8: Number of meals, eaten on previous day, Kenema IDP camps, January 2001

| Number of meals | Total N | Total % | Lebanese Camp N | Lebanese Camp % | Nyandeyama N | Nyandeyama % | Gofer Camp N | Gofer Camp % |
|---|---|---|---|---|---|---|---|---|
| 1 | 80 | 32.7 | 40 | 27.6 | 33 | 40.2 | 7 | 38.9 |
| 2 | 141 | 57.6 | 98 | 67.6 | 37 | 45.1 | 6 | 33.3 |
| 3 | 24 | 9.8 | 7 | 4.8 | 12 | 14.6 | 5 | 27.8 |
| 4 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| **Total** | **245** | **100.0** | **145** | **100.0** | **82** | **100.0** | **18** | **100.0** |

The average number of meals consumed on the previous day was 1.77 *(SD 0.61)*.
The vast majority (90%) of households consumed more than one meal on the previous day.
Nyandeyama camp had the highest proportion of households consuming only one meal (40.2%). Lebanese had the lowest proportion (27.6%)

## NUTRITION ANTHROPOMETRY

A total of 247 children qualified for data entry and analysis. No children were "flagged" due to extreme weight and/or height measurements.

### 4.9 Distribution by age and sex

Table 4.9: Distribution of children aged 6-59 months by age and sex, Kenema IDP camps, January 2001

| Age | Boys | | Girls | | Total | | Sex ratio |
|---|---|---|---|---|---|---|---|
| (months) | N | % | N | % | n | % | |
| 6-17 | 21 | 55.3 | 17 | 44.7 | 38 | 15.4 | 1.2 |
| 18-29 | 31 | 50.8 | 29 | 47.5 | 61 | 24.8 | 1.0 |
| 30-41 | 37 | 55.2 | 30 | 44.8 | 67 | 27.2 | 1.2 |
| 42-53 | 26 | 55.3 | 21 | 44.7 | 47 | 19.1 | 1.2 |
| 54-59 | 19 | 57.6 | 14 | 42.4 | 33 | 13.4 | 1.3 |
| **Total** | **134** | **54.5** | **111** | **45.1** | **246** | **100.0** | **1.2** |

The sex ratio distribution shows slightly more boys selected in each age group. There is no reason to suspect that there was any bias in the selection of boys in the sample.

### *4.10 PREVALENCE OF ACUTE MALNUTRITION*

Table 4.10: Prevalence of severe and global malnutrition, z-score, % median, Kenema IDP camps, January 2001

| | % Severe malnutrition | % Global malnutrition |
|---|---|---|
| **z-score (95% CI)** | 0.8 (0.1 – 3.2) | 1.2 (0.3 – 3.8) |
| **% of median (95% CI)** | 0.4 (-0.1 – 2.6) | 1.6 (0.5 – 4.4) |

Table 3.26 shows the distribution of global malnutrition and severe malnutrition by z-score and % median in the sample population.

Global acute malnutrition expressed in z-scores was 1.2% *(95% Confidence Interval 0.3% -3.8%)* including 0.8 % of severe malnutrition *(CI: 0.1% – 3.2%)*.

Expressed as a percentage of the median, the overall global malnutrition rate was 1.6 % *(CI: 0.5% - 4.4%)*, including 0.4 % *(CI: -0.1% - 2.6%)* of severe malnutrition.
1 case of oedema (Kwashiorkor) was found during the survey.

### *4.11 PREVALENCE OF OEDEMA*

Table 4.11: Distribution of Marasmus (wasting), Kwashiorkor, and combined Marasmus/Kwashiorkor, Z-scores, Kenema IDP camps , January 2001

| | Wasting (< -2 Z scores) | No Wasting (≥ - 2 Z scores) |
|---|---|---|
| Oedema | *Marasmus/Kwashiorkor* 0 (0.0%) | *Kwashiorkor* 1 (0.4%) |
| No oedema | *Marasmus* 2 (0.8%) | *Normal* 243 (98.8%) |

Table 4.11 shows the distribution of pure marasmus (wasting), pure kwashiorkor and combined marasmus/kwashiorkor. One case of oedema was found in the sample.

### *4.12 ACUTE MALNUTRION BY AGE*

***Table 4.12: Distribution of malnutrition by age, Z-scores, Kenema IDP camps, January 2001***

| | | Acute malnutrition | | Moderate malnutrition | | No malnutrition | | Oedema | |
|---|---|---|---|---|---|---|---|---|---|
| **AGE** | **N** | **< - 3 Z scores** | | **≥-3 to <-2 Z scores** | | **≥-2 Z scores** | | | |
| **(months)** | | **n** | **%** | **N** | **%** | **N** | **%** | **n** | **%** |
| 6-17 | 38 | 0 | 0.0 | 0 | 0.0 | 38 | 100.0 | 0 | 0.0 |
| 18-29 | 61 | 1 | 1.6 | 1 | 1.6 | 59 | 96.7 | 0 | 0.0 |
| 30-41 | 67 | 0 | 0.0 | 0 | 0.0 | 67 | 100.0 | 0 | 0.0 |
| 42-53 | 47 | 0 | 0.0 | 0 | 0.0 | 47 | 100.0 | 0 | 0.0 |
| 54-59 | 33 | 0 | 0.0 | 0 | 0.0 | 32 | 97.0 | 1 | 3.0 |
| **Total** | **246** | **1** | **0.4** | **1** | **0.4** | **243** | **98.8** | **1** | **0.4** |

Table 4.13: Acute malnutrition by age group, Z-scores, Kenema IDP camp, January 2001

| **Age groups** | **Severe acute** | | **Global acute** | |
|---|---|---|---|---|
| | **N** | **%** | **N** | **%** |
| 6-29 months (n=99) | 1 | 1.0 | 2 | 2.0 |
| (CI) | | (-0.1 – 6.3) | | (0.2 – 7.8) |
| 6-59 months (n=246) | 1 | 0.8 | 1 | 1.2 |
| (CI) | | (0.1 – 3.2) | | (0.3 – 3.8) |

Tables 4.12 and 4.13 demonstrate a higher level of severe acute and global acute malnutrition in the younger 6-29 month age groups. Such a difference is common, since this age group represents the weaning period of young children.

Statistical tests revealed that the 6-29 month age group did not have a higher risk of global acute malnutrition compared to the 30-59 month age group.

### *4.13 ACUTE MALNUTRION BY GENDER*

Table 4.14: Acute malnutrition by gender, Z-scores, Kenema IDP camps, January 2001

| **Gender** | **Severe Acute** | | **Moderate acute** | | **Oedema** | |
|---|---|---|---|---|---|---|
| | **n** | **%** | **N** | **%** | **n** | **%** |
| Males (n=135) | 1 | 0.74 | 1 | 0.74 | 1 | 0.74 |
| Females (n=111) | 0 | 0.0 | 0 | 0.0 | 0 | 0 |
| **Total (n= 246)** | **1** | **0.4** | **1** | **0.4** | **1** | **0.4** |

All cases of malnutrition in the sample were found in boys. This higher level of malnutrition in boys was not found to be statistically significant.

### 4.14 Acute malnutrition by IDP camp

Table 4.15: Acute malnutrition by IDP camp, Z-Scores, Kenema IDP camps, January 2001

| **IDP camp** | ***Severe Acute*** | | ***Moderate acute*** | | ***Oedema*** | |
|---|---|---|---|---|---|---|
| | **N** | **%** | **N** | **%** | **n** | **%** |
| Lebanese (n= 118) | 1 | 0.8 | 0 | 0.0 | 1 | 0.8 |
| Nyandeyama (n= 109) | 0 | 0.0 | 1 | 0.9 | 0 | 0.0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Gofer (n = 20) | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| **Total (n=247)** | **1** | **0.4** | **1** | **0.4** | **1** | **0.4** |

The three cases of acute malnutrition in the sample were distributed between the 3 camps.

### 4.15 Acute malnutrition by date of arrival

All malnourished children in the sample came from households that had arrived in the camps more than 12 months previously.

## VACCINATION STATUS

Immunisation status was assessed by the presence of a dated complete record for BCG, DPT, Polio and Measles on the child's health card. If a measles record was absent, immunisation was assessed by a history given by the parent/guardian. If a BCG record was absent, BCG immunisation was assessed by the presence of a BCG scar.

138 (56%) of children did not have a health card.

Table 4.16: Possession of health card, Kenema IDP camps, January 2001

| IDP camp | Health card | | No health card | |
|---|---|---|---|---|
| | n | % | N | % |
| Lebanese (n=118) | 54 | 45.8 | 64 | 54.2 |
| Nyandeyama (n=109) | 51 | 46.8 | 58 | 53.2 |
| Gofer (n=20) | 4 | 20.0 | 16 | 80.0 |
| **Total (n=247)** | **109** | **44.1** | **138** | **55.9** |

More than half the children in Lebanese camp (54.2%) and Nyandeyama camp (53.2%) did not have a health card. Only 20% of the children surveyed in Gofer camp were in possession of a health card.

Table 4.17 EPI coverage, Kenema IDP Camps, January 2001

| | Total | | Lebanese | | Nyandeyama | | Gofer | |
|---|---|---|---|---|---|---|---|---|
| Vaccination | N | % | n | % | n | % | n | % |
| Complete Polio on card | 74 | 30.0 | 39 | 33.0 | 33 | 30.3 | 2 | 10.0 |
| Complete DPT on card | 74 | 30.0 | 39 | 33.0 | 33 | 30.3 | 2 | 10.0 |
| BCG on card | 91 | 36.9 | 45 | 38.0 | 43 | 39.4 | 3 | 15.0 |
| BCG on card or scar | 226 | 91.5 | 107 | 90.7 | 99 | 90.1 | 20 | 100.0 |
| Measles on card | 90 | 36.4 | 44 | 37.3 | 44 | 40.4 | 2 | 10.0 |
| Measles on card or history | 225 | 91.1 | 106 | 99.1 | 102 | 93.6 | 17 | 85.0 |
| **Complete immunisation** | **69** | **27.9** | **36** | **30.5** | **31** | **28.4** | **2** | **10.0** |

The vast majority (91.5%) of children in the sample were fully immunised for BCG by having either a date of vaccination on their health card or a BCG scar. Only 30% had dated records for all three immunisations required for Polio and DPT and only 44% had a dated record of vaccination against measles.

Less than one third (27.9%) of all children included in the survey were fully immunised for Polio (3 dates), Polio (2 dates), BCG (date or scar), and Measles (date only) according to their health card. There was no difference in immunisation status according to resident status.

There was no difference in immunisation status according to whether the child's household had arrived in last 12 months or not.

Immunisation coverage rates were substantially lower in Gofer camp although numbers of children surveyed were small. Only 10% of children questioned in Gofer were fully immunised for Polio, DPT, Measles and BCG according to the criteria stated above. Dated immunisation for Polio, DPT, BCG and Measles were all very low (10%-15%) but all the children in the camp surveyed were covered for BCG by either having a date of immunisation on their health card or a scar.

### Attendance of SFP and TFP

All children included in the survey were asked whether they currently attend a Supplementary Feeding Programme

(SFP) or Therapeutic Feeding Programme (TFP).

Table4.18: Attendance of SFP and TFP, Kenema IDP camps, January 2001

| | No attending feeding programme | No malnourished children | % attendance |
|---|---|---|---|
| Currently attending SFP | 0 | 1 (severe) | 0.0 |
| Currently attending TFP | 1 | 2 (moderate) | 50.0 |
| **Total** | **1** | **3** | **33.3%** |

The Feeding Centre Coverage for Kenema IDP Camps was calculated as 33.3%.

## 5.0 BLAMA TOWN

### *5.1 NUMBER OF HOUSES/ADDRESSES SURVEYED VERSUS EXPECTED*

Table5.1: Number of houses/children surveyed vs number expected, Blama town, January 2001

| | Expected | Obtained | Difference |
|---|---|---|---|
| Number of houses | 152 | 184 | +32 |
| No 6-59 month children measured | 296 | 290 | -6 |
| Mean number children 6-59 month/house | 1.95 | 1.58 | -0.37 |

Table 5.1 shows the actual number of houses and children obtained from a systematic sampling of one in every three houses in the survey, compared to the numbers estimated using figures from a population census in Blama town in November 2000.

The number of houses and children obtained in the survey were very close to those calculated. The mean number of children in the 6-59 month age group living in each house was slightly lower (1.58) than that predicted (1.95) 10.4% (23) households visited by the survey teams had no children in the 6-59 month age group.

### HOUSEHOLD INFORMATION

All households living at each selected booth were included in the survey.

A total of 184 houses and 220 households were interviewed in Blama Town.

The average number of people living in a house/address was 10.3.

The mean number of households living in each house/address ranged from 1 to 6 with an average of 1.2.

### *5.3 COMPOSITION OF HOUSEHOLDS*

Table 5.2 Compostion of households, Blama Town, January 2001

| Age group | n | Mean | Range | % |
|---|---|---|---|---|
| Number 0-5 months | 60 | 0.27 | 0-2 | 3.2 |
| Number 6-59 months | 298 | 1.36 | 0-5 | 15.8 |
| Number 60 months & above | 1535 | 7.01 | 1-20 | 81.1 |
| **Total per household** | **1893** | **8.60** | **1-25** | **100.0** |

The total number of people living in a household ranged from 1 to 20, with a mean of 8.6.

18.9% of the population surveyed were under five years.

### *5.4 HEAD OF HOUSEDHOLD*

Table 5.3: Gender of head of household, Blama Town, January 2001

| | N | % |
|---|---|---|
| Male | 151 | 68.6 |
| Female | 69 | 31.4 |
| **Total** | **220** | **100.0** |

Nearly one third (31.4%) of households were headed by a female.

### *5.4 RESIDENT STATUS OF HOUSEHOLDS*

Households were classified according to whether they were Resident (currently living in home location) or Displaced (currently living away from home location).

Table 5.4: Resident status of households, Blama town, January 2001

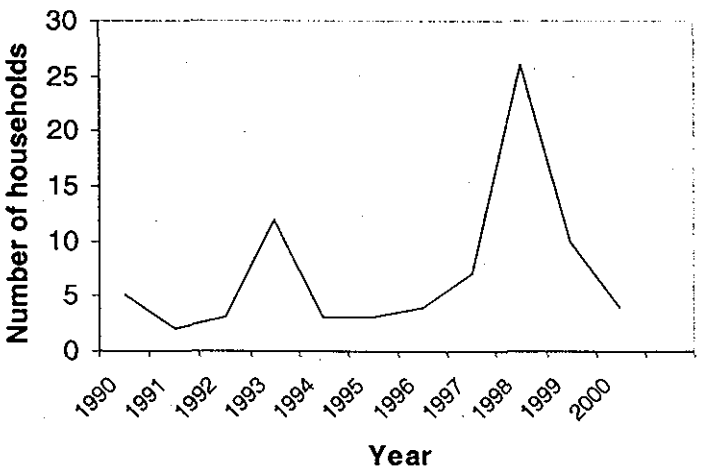
| | N | % |
|---|---|---|
| Resident | 138 | 63.3 |
| Displaced | 80 | 36.7 |
| **Total** | **218** | **100.0** |

Displaced households accounted for 36.7% of all households included in the survey.
Based on the figures above and an average town population of 5637, the estimated displaced population of Blama town is 2,069.

### 5.5 ARRIVAL DATES OF DISPLACED

Displaced families were asked for the date at which they had arrived in Blama town.
The majority (33%) of households arrived in 1998 when the all the occupants of RTI camp, Kenema were moved to Blama.
Nine (11.4%) of the displaced households had arrived in the last 12 months.

Figure 5.1: Arrival date of displaced in Blama town, January 2001




### *5.6 AREA OF ORIGIN*

Two displaced households had arrived from Guinea.
Households displaced from within Sierra Leone were asked for the name of their home district.

Table 5.5: District from which Displaced, Blama Town, January 2001

| District | Total Displaced | | Displaced <=12 months | | Displaced > 12 months | |
|---|---|---|---|---|---|---|
| | N | % | n | % | N | % |
| Kenema | 31 | 41.3 | 0 | 0.0 | 31 | 44.9 |
| Kailahun | 29 | 38.7 | 0 | 0.0 | 28 | 40.6 |
| Pujehun | 5 | 6.7 | 1 | 20.0 | 4 | 5.8 |
| Bo | 3 | 4.0 | 1 | 20.0 | 2 | 2.9 |
| Bombali | 2 | 2.7 | 1 | 20.0 | 1 | 1.4 |
| Freetown | 2 | 2.7 | 1 | 20.0 | 1 | 1.4 |
| Kono | 2 | 2.7 | 0 | 0.0 | 2 | 2.9 |
| Tonkolili | 1 | 1.3 | 1 | 20.0 | 0 | 0.0 |
| **Total** | **75** | **100.0** | **5** | **100.0** | **69** | **100.0** |

Table 5.5 shows that the majority (80%) of displaced households came from either Kenema or Kailahun districts.

If households had been displaced from Kenema District they were additionally asked for the name of their home Chiefdom.



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Table 5.6: Chiefdom from which Displaced, Blama Town, January 2001

| Kenema District Chiefdoms | Total Displaced | |
|---|---|---|
| | N | % |
| Lower Bambara | 12 | 38.7 |
| Nongowa | 7 | 22.6 |
| Niawa | 6 | 19.4 |
| Simbaru | 1 | 3.2 |
| Langrama | 1 | 3.2 |
| Koya | 1 | 3.2 |
| Tunkia | 1 | 3.2 |
| Lower Mbabala | 1 | 3.2 |
| Malegohun | 1 | 3.2 |
| **Total** | **31** | **100.0** |

Most of those displaced within Kenema District came from Lower Bambara (38.7%), Nongowa (22.6%) and Niawa (19.4%) chiefdoms.

### *5.7 RETROSPECTIVE MORTALITY UNDER FIVES*

A total of 0.9% (2) households reported at least one under five's mortality in the preceding month and 8.6% (19) in the past year. One household reported 2 deaths in the last 12 months.

Retrospective Under fives mortality was calculated as 1.79 per 10,000 per day using mortality data from the last month, and 1.45 when calculated as an average over the last year.

### *5.8 UNDER FIVES MORTALITY BY RESIDENT STATUS*

Table 5.7: Under five's mortality last 12 months by resident status, Blama town, January2001

| Resident status | Number of deaths | % of households |
|---|---|---|
| Resident (n=138) | 12 | 8.7 |
| Total Displaced (n=80) | 8 | 10.0 |
| *Displaced less than 1 year (n=9)* | *2* | *22.2* |
| *Displaced more than 1 year (n=70)* | *6* | *8.6* |
| **Total (n= 218)** | **20** | **9.2** |

Households displaced for less than one year experienced more under fives mortality (22.2%) compared to those who had been living in Blama town for more than one year. This difference in mortality was not found to be significant using statistical tests.

### *5.9 NUMBER OF MEALS EATEN ON PREVIOUS DAY*

Table 5.8: Number of meals, eaten on previous day, Blama Town, January 2001

| | Total households | | Resident households | | Displaced households | |
|---|---|---|---|---|---|---|
| Number of meals | N | % | n | % | N | % |
| 1 | 57 | 26.0 | 37 | 27.0 | 20 | 25.0 |
| 2 | 135 | 61.6 | 86 | 62.8 | 47 | 58.7 |
| 3 | 27 | 12.3 | 14 | 10.2 | 13 | 16.2 |
| 4 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| **Total** | **219** | **100.0** | **137** | **100.0** | **80** | **100.0** |

The average number of meals consumed by a household was 1.86 *(SD 0.66)*.
Approximately three quarters (74.0%) of Blama town households reported eating two or more meals on the previous day.
Displaced households who had arrived in last 12 months had similar pattern of meals to those who had been living in Blama town for more than one year.

### NUTRITION ANTHROPOMETRY

A total of 290 children qualified for data entry and analysis. The measurements of 2 children were "flagged" due to extreme weight and/or height measurements.

### *5.10 DISTRIBUTION BY AGE AND SEX*

Table 5.9: Distribution of children aged 6-59 months by age and sex, Blama Town, January 2001

| Age | Boys | | Girls | | Total | | Sex ratio |
|---|---|---|---|---|---|---|---|
| (months) | N | % | N | % | n | % | |
| 6-17 | 27 | 50.9 | 26 | 49.1 | 53 | 18.5 | 1.04 |
| 18-29 | 35 | 53.0 | 31 | 47.0 | 66 | 23.0 | 1.13 |
| 30-41 | 48 | 63.2 | 28 | 36.8 | 76 | 26.5 | 1.71 |
| 42-53 | 22 | 42.3 | 30 | 57.7 | 52 | 18.1 | 0.73 |
| 54-59 | 13 | 32.5 | 27 | 67.5 | 40 | 13.9 | 0.48 |
| **Total** | **145** | **50.5** | **142** | **49.5** | **287** | **100.0** | **1.02** |

The sex ratio distribution shows an under representation of girls in the 30-41 age group. There is no reason to suspect a selection bias during the household survey.

### *5.11 PREVALENCE OF MALNUTRITION*

Table 5.10: Prevalence of severe and global malnutrition, z-score, % median, Blama Town, January 2001

| | Severe malnutrition | Global malnutrition |
|---|---|---|
| **z-score (95% CI)** | 0.0 (-0.1 – 1.6) | 2.1 (0.8 – 4.8) |
| **% of median (95% CI)** | 0.0 (-0.0 – 1.6) | 1.4 (0.4 – 5.5) |

Table 5.10 shows the distribution of global malnutrition and severe malnutrition by z-score and % median in the sample population.

Global acute malnutrition expressed in z-scores was 2.1% *(95% Confidence Interval 0.8% - 4.8%).* No severe malnutrition was found in the sample population.

Expressed as a percentage of the median, the overall global malnutrition rate was 1.4% *(CI: 0.4 – 5.5)* with no severe malnutrition.
No cases of oedema (Kwashiorkor) were found during the survey.

### *5.12 PREVELENCE OF OEDEMA*

Table 5.11: Distribution of Marasmus (wasting), Kwashiorkor, and combined Marasmus/Kwashiorkor, Z-scores, Blama Town, January 2001

| | Wasting (< -2 Z scores) | No Wasting (≥ - 2 Z scores) |
|---|---|---|
| **Oedema** | ***Marasmus/Kwashiorkor***<br>0 (0.0%) | ***Kwashiorkor***<br>0 (0.0%) |
| **No oedema** | ***Marasmus***<br>6 (2.1%) | ***Normal***<br>281 (97.9%) |

Table 5.11 shows the distribution of pure marasmus (wasting), pure kwashiorkor and combined marasmus/kwashiorkor. No cases of oedema were found in the sample.

### *5.13 ACUTE MALNUTRITION BY AGE*

Table 5.12: Distribution of malnutrition by age, Z-scores, Blama Town, January 2001

| AGE | | Acute malnutrition | | Moderate malnutrition | | No malnutrition | | Oedema | |
|---|---|---|---|---|---|---|---|---|---|
| | | < - 3 Z scores | | ≥-3 to <-2 Z scores | | ≥-2 Z scores | | | |
| **Months** | **N** | **n** | **%** | **N** | **%** | **N** | **%** | **n** | **%** |
| 6-17 | 53 | 0 | 0.0 | 3 | 5.7 | 50 | 94.3 | 0 | 0.0 |
| 18-20 | 66 | 0 | 0.0 | 2 | 3.0 | 64 | 97.0 | 0 | 0.0 |
| 30-41 | 76 | 0 | 0.0 | 1 | 1.3 | 75 | 98.7 | 0 | 0.0 |
| 42-53 | 52 | 0 | 0.0 | 0 | 0.0 | 52 | 100.0 | 0 | 0.0 |
| 54-59 | 40 | 0 | 0.0 | 0 | 0.0 | 40 | 100.0 | 0 | 0.0 |
| **Total** | **287** | **0** | **0.0** | **6** | **2.1** | **281** | **97.9** | **0** | **0.0** |

Table 5.13: Acute malnutrition by age group, Z-scores, Blama Town, January 2001

| Age groups | Severe acute | | Global acute | |
|---|---|---|---|---|
| | n | % | N | % |
| 6-29 months (n=119) | 0 | 0.0 | 5 | 4.2 |
| (CI) | | (-0.2 – 3.8) | | (1.5 – 10.1) |
| 6-59 months (n=287) | 0 | 0.0 | 6 | 2.1 |
| (CI) | | (-0.1 – 1.6) | | (0.8 – 4.8) |

Tables 5.12 and 5.13 demonstrate a higher level of global acute malnutrition in the younger 6-29 month age groups. Such a difference is common, since this age group represents the weaning period of young children. Statistical tests did not reveal a significant difference ($p<0.05$) in global acute malnutrition between the 6-29 month and 30-59 month age group.

### *5.14 ACUTE MALNUTRITION BY GENDER*

Table 5.14: Acute malnutrition by gender, Blama Town, January 2001

| Gender | Severe Acute | | Moderate acute | | Oedema | |
|---|---|---|---|---|---|---|
| | n | % | N | % | n | % |
| Males (n=145) | 0 | 0.0 | 5 | 3.4 | 0 | 0.0 |
| Females (n=135) | 0 | 0.0 | 1 | 0.74 | 0 | 0.0 |
| **Total (n=280)** | **0** | **0.0** | **6** | **2.1** | **0** | **0.0** |

The table shows that a larger proportion of boys were malnourished compared to girls but this difference was not found to be statistically significant.

### *5.15 ACUTE MALNUTRITION BY GENDER OF HEAD OF HOUSEHOLD*

Table 5.15: Acute malnutrition by gender of Head of Household, Z-scores, Blama Town, January 2001

| Gender of head hhold | Severe Acute | | Moderate acute | | Oedema | |
|---|---|---|---|---|---|---|
| | n | % | N | % | n | % |
| Male (n=188) | 0 | 0.0 | 3 | 1.6 | 0 | 0.0 |
| Female (n=95) | 0 | 0.0 | 3 | 3.1 | 0 | 0.0 |
| **Total (n=283)** | **0** | | **6** | | **0** | **0.0** |

A higher proportion of female headed households (3.1%) contained malnourished children compared to male headed households (1.6%) but this was not found to be significant using statistical tests.

### *5.16 ACUTE MALNUTRTION BY NUMBER OF MEALS EATEN*

Table 5.16: Acute malnutrition by number of meals, Blama Town, January 2001

| Number of meals | Severe Acute | | Moderate acute | | Oedema | |
|---|---|---|---|---|---|---|
| | n | % | N | % | n | % |
| 1 (n=76) | 0 | 0.0 | 2 | 2.6 | 0 | 0.0 |
| 2 (n=174) | 0 | 0.0 | 3 | 1.7 | 0 | 0.0 |
| 3 (n=30) | 0 | 0.0 | 1 | 3.3 | 0 | 0.0 |
| 4 (n=0) | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| **Total (n=280)** | **0** | **0.0** | **6** | **2.1** | **0** | **0.0** |

There was no clear relationship between number of meals consumed and numbers of malnourished children.

### VACCINATION STATUS

Immunisation was assessed by the presence of a dated complete record for BCG, DPT, Polio and Measles on the

child's health card. If a measles record was absent, immunisation was assessed by a history given by the parent/guardian. If a BCG record was absent, BCG immunisation was assessed by the presence of a BCG scar. 65.5% (189) children did not have a health card.

Table 5.17: EPI coverage, Blama Town, January 2001

| Vaccination | Total n | % |
|---|---|---|
| Complete Polio on card | 76 | 26.4 |
| Complete DPT on card | 75 | 26.0 |
| BCG on card | 94 | 32.6 |
| BCG on card or scar | 252 | 87.5 |
| Measles on card | 78 | 27.1 |
| Measles on card or history | 238 | 82.6 |
| **Complete immunisation** | **62** | **21.4** |

The majority (87.5%) of children in the sample were fully immunised for BCG by having either a date of vaccination on their health card or a BCG scar. Only 26% had dated records of the complete 3 immunisations required for immunisation against Polio and DPT and 27.1% a dated record of vaccination against measles.

Less than one quarter (29.2%) of all children included in the survey were fully immunised for Polio (3 dates), Polio (2 dates), BCG (date or scar), and Measles (date only) according to their health card.

There was no difference in immunisation status according to resident status.

### Attendance of SFP and TFP

All children included in the survey were asked whether they currently attend a Supplementary Feeding Programme (SFP) or Therapeutic Feeding Programme (TFP).

Table 5.18: Attendance of SFP and TFP, Kenema town, January 2001

| | No attending feeding programme | No malnourished children | % attendance |
|---|---|---|---|
| Currently attending SFP | 2 | 6 (moderate) | 33.3 |
| Currently attending TFP | 0 | 0 (severe) | 0.0 |
| **Total** | **2** | **6** | **33.3** |

The Feeding Centre Coverage for Blama town was calculated as 33.3%.

## 6.0 BLAMA IDP CAMP

### *6.1 NUMBER OF BOOTHS/ADDRESSES SURVEYED VERSUS EXPECTED*

Table 6.1Number of booths/children surveyed vs numbers expected, Blama IDP camp, January 2001

| | Expected | Obtained | Difference |
|---|---|---|---|
| Number of booths | 201 | 203 | +2 |
| No 6-59 month children measured | 413 | 283 | -130 |
| Mean number children 6-59 month/booth | 2.057 | 1.38 | -0.68 |

Table 6.1shows the actual number of booths and children obtained from systematic sampling 1 in every 7 booths in the survey, compared to the numbers estimated using figures from a population census in Blama Camp in December 2000.

Although the number of booths obtained was very close to the number predicted, the much lower than expected mean number of 6-59 month children in each booth meant that only 283 children were included in the survey compared to an expected 413. 83 (30.7%) of the booths visited by the survey teams had no children in the 6-59 month age group.

Sample size was deliberately overestimated to allow for such inconsistencies in population data and so the number of children included in survey still allowed for analysis with 3% precision and 6% malnutrition.

**HOUSEHOLD INFORMATION**

All households living at each selected booth were included in the survey.
A total of 230 booths and 272 households were interviewed in Blama IDP camp.

### *6.2 COMPOSITON OF HOUSEHOLD/ADDRESSESS*

The average total number of people living in a booth was 10.
The mean number of households living in each booth was between 1 and 2, with and average of 1.34.

Table 6.2: Composition of households, Blama IDP Camp, January 2001

| Age group | n | mean | Range | % |
|---|---|---|---|---|
| Number 0-5 months | 71 | 0.26 | 0-2 | 3.5 |
| Number 6-59 months | 281 | 1.04 | 0-5 | 13.8 |
| Number 60 months & above | 1678 | 6.19 | 1-16 | 82.7 |
| **Total per household** | **2030** | **7.49** | **1-18** | **100.0** |

The total number of people living in a household ranged from 1 to 18, with a mean of 7.49.
17.3% of the population surveyed was under five years old.

### *6.3 HEAD OF HOUSEHOLD*

Table 6.3: Gender of head of household, Blama IDP Camp, January 2001

| | N | % |
|---|---|---|
| Male | 197 | 72.4 |
| Female | 75 | 27.6 |
| **Total** | **272** | **100.0** |

More than one quarter (27.5%) of households were headed by a female.

### *6.4 ARRIVAL DATE OF HOUSEHOLDS AT BLAMA CAMP*

Households were asked for the date at which they had arrived at Blama IDP Camp.
The vast majority (85%) arrived when the RTI camp, Kenema was moved to Blama at the end of 1998.
Seven households (2.6%) had arrived at Blama camp in the last 12 months.

### *6.5 AREA OF ORIGIN*

All households surveyed had been displaced from within Sierra Leone.
Each households was asked for the name of their home district.

Table 6.4: District from which Displaced, Blama IDP Camp, January 2001

| District | N | % |
|---|---|---|
| Kenema | 97 | 35.8 |
| Kailahun | 151 | 55.7 |
| Kono | 22 | 8.1 |
| Tonkolili | 1 | 0.4 |
| **Total** | **271** | **100.0** |

The vast majority of households (91.5%) had arrived from either Kenema or Kailahun district.

If households had been displaced from Kenema District they were additionally asked for the name of their home Chiefdom

Table 6.5: Chiefdom from which Displaced, Blama IDP Camp, January 2001

| Kenema District Chiefdoms | N | % |
|---|---|---|
| Lower Bambara | 57 | 58.8 |
| Nongowa | 26 | 26.8 |
| Gaura | 3 | 3.1 |
| Kaindu Leppiama | 1 | 1.0 |
| Dama | 1 | 1.0 |
| Tunkia | 1 | 1.0 |
| **Total** | **89** | **8.2** |

Over half (58.8%) of those who had been displaced from outside Kenema District originated from Lower Bambara Chiefdom. Approximately one quarter (26.8%) came from the Nongowa chiefdom.
All those arriving from within Kenema District in the last 12 months came from Lower Bambara Chiefdom.

### *6.6 RETROSPECTIVE UNDER FIVES MORTALITY*

A total of 0.37% (1) households reported at least one under five's mortality in the preceding month and 7.0% (19) in the past year. Two households reported two deaths each in the last 12 months.

Retrospective Under Fives Mortality was calculated as 0.91 per 10,000 per day using figures obtained from the last month, and 1.8 as an average over the last year.

**Figure 6.1: Date of under fives deaths, Blama IDP camp, January 2001**

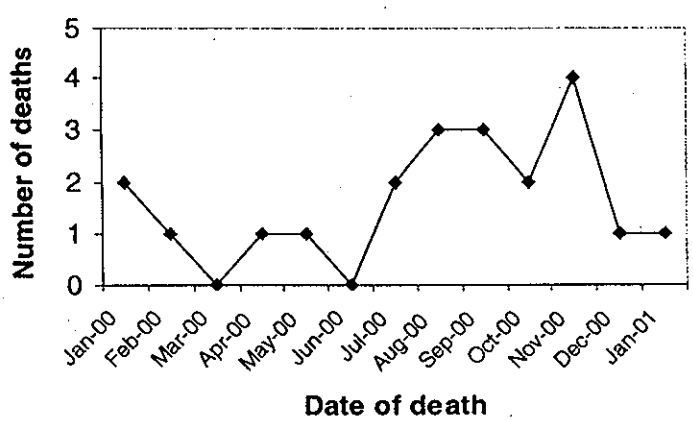


Figure 3.6 shows that the under fives death rate was at its highest between August and November October 2000 reaching a peak in November 2000.

### 6.7 NUMBER OF MEALS EATEN ON PREVIOUS DAY

Table 6.6: Number of meals, eaten on previous day, Blama IDP Camp, January 2001

| Number of meals | N | % |
|---|---|---|
| 1 | 57 | 21.0 |
| 2 | 186 | 68.4 |



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| | | |
|---|---|---|
| 3 | 29 | 10.7 |
| 4 | 0 | 0.0 |
| **Total** | 272 | **100** |

The average number of meals consumed by households was 1.9 *(SD 0.55)*.
The vast majority (79%) of Blama camp households reported eating two or more meals on the previous day.
Those who had arrived in last 12 months had similar pattern of meals to those who had lived in the camp for longer.

## NUTRITION ANTHROPOMETRY

A total of 283 children qualified for data entry and analysis. No measurements of children were "flagged" due to extreme weight and/or height measurements.

### *6.8 DISTRIBUTION BY AGE AND SEX*

Table 6.7: Distribution of children aged 6-59 months by age and sex, Blama IDP Camp, January 2001

| Age | Boys | | Girls | | Total | | Sex ratio |
|---|---|---|---|---|---|---|---|
| (months) | N | % | N | % | n | % | |
| 6-17 | 35 | 52.2 | 32 | 47.8 | 67 | 23.7 | 1.0 |
| 18-29 | 33 | 57.9 | 24 | 42.1 | 57 | 20.1 | 1.3 |
| 30-41 | 42 | 53.2 | 37 | 46.8 | 79 | 27.9 | 1.1 |
| 42-53 | 23 | 48.9 | 24 | 51.1 | 47 | 10.6 | 0.9 |
| 54-59 | 15 | 45.5 | 18 | 54.5 | 33 | 11.7 | 0.8 |
| **Total** | **148** | **52.3** | **135** | **47.7** | **283** | **100** | **1.1** |

The sex ratio distribution shows an approximately equal representation of boys and girls in the sample, thus implying that no selection bias has occurred.

### *6.9 PREVALENCE OF ACUTE MALNUTRION*

Table 6.8: Prevalence of severe and global malnutrition, z-score, % median, Blama IDP Camp, January 2001

| | Severe malnutrition | Global malnutrition |
|---|---|---|
| **z-score (95% CI)** | 0.4 (0.0 – 2.3) | 1.8 (0.6 – 4.3) |
| **% of median (95% CI)** | 0.4 (0.0 – 2.3) | 1.1 (0.2 – 3.3) |

Table 6.8 shows the distribution of global malnutrition and severe malnutrition by z-score and % median in the sample population.

Global acute malnutrition expressed in z-scores was 1.8 *(95% Confidence Interval 0.6% - 4.3%)* including 0.4% of severe malnutrition *(CI: -0.0 – 2.3)*.

Expressed as a percentage of the median, the overall global malnutrition rate was 1.1% *(CI: 0.2 – 3.3)*, including 0.4% *(CI: 0.0 – 2.3)* of severe malnutrition.
One case of oedema (Kwashiorkor) was found during the survey.

### 6.10 PREVALENCE OF OEDEMA

Table 6.9: Distribution of Marasmus (wasting), Kwashiorkor, and combined Marasmus/Kwashiorkor, Z-scores, Blama IDP Camp, January 2001

| | Wasting (< -2 Z scores) | No Wasting (> - 2 Z scores) |
|---|---|---|
| **Oedema** | ***Marasmus/Kwashiorkor*** 0 (0.0%) | ***Kwashiorkor*** 1 (0.4%) |



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| | | |
|---|---|---|
| No oedema | *Marasmus* 4 (1.4%) | *Normal* 278 (98.2%) |

Table 6.9 shows the distribution of pure marasmus (wasting), pure kwashiorkor and combined marasmus/kwashiorkor. One case of oedema was found in the sample.

### *6.11 ACUTE MALNUTRION BY AGE*

TABLE 6.10: DISTRIBUTION OF MALNUTRITION BY AGE, BLAMA IDP CAMP, JANUARY 2001

| AGE | | Acute malnutrition | | Moderate malnutrition | | No malnutrition | | Oedema | |
|---|---|---|---|---|---|---|---|---|---|
| | | < - 3 Z scores | | ≥-3 to <-2 Z scores | | ≥-2 Z scores | | | |
| Months | N | n | % | N | % | N | % | n | % |
| 6-17 | 67 | 0 | 0.0 | 0 | 0.0 | 67 | 100.0 | 0 | 0.0 |
| 18-20 | 57 | 0 | 0.0 | 3 | 5.3 | 53 | 93.0 | 1 | 1.8 |
| 30-41 | 79 | 0 | 0.0 | 1 | 1.3 | 78 | 98.7 | 0 | 0.0 |
| 42-53 | 47 | 0 | 0.0 | 0 | 0.0 | 47 | 100.0 | 0 | 0.0 |
| 54-59 | 33 | 0 | 0.0 | 0 | 0.0 | 33 | 100.0 | 0 | 0.0 |
| **Total** | **283** | **0** | **0.0** | **4** | **1.4** | **278** | **98.2** | **1** | **0.4** |

Table 6.11: Acute malnutrition by age group, Blama IDP Camp, January 2001

| Age groups | Severe acute | | Global acute | |
|---|---|---|---|---|
| | N | % | N | % |
| 6-29 months (n=124) | 1 | 0.8 | 4 | 3.2 |
| (CI) | | (-0.1 – 5.1) | | (0.9 – 8.6) |
| 6-59 months (n=159) | 1 | 0.4 | 1 | 1.8 |
| (CI) | | (-0.0 – 2.3) | | (0.6 – 4.3) |

Tables 6.10 and 6.11 demonstrate a higher level of severe acute and global acute malnutrition in the younger 6-29 month age groups. Such a difference is common, since this age group represents the weaning period of young children. Statistical tests revealed that there was not a significant difference ($p<0.05$) in global acute malnutrition between the 6-29 month and 30-59 month age group.

### *6.12 ACUTE MALNUTRION BY GENDER*

Table 6.12: Acute malnutrition by gender, Blama IDP Camp, January 2001

| Gender | Severe Acute | | Moderate acute | | Oedema | |
|---|---|---|---|---|---|---|
| | N | % | N | % | n | % |
| Males (n=145) | 0 | 0.0 | 1 | 0.7 | 0 | 0.0 |
| Females (n=135) | 0 | 0.0 | 3 | 2.2 | 1 | 0.7 |
| **Total (n=280)** | **0** | **0.0** | **4** | **1.4** | **1** | **0.35** |

The table shows that a larger proportion of girls were malnourished compared to boys. This difference was not found to be statistically significant.

### *6.13 ACUTE MALNUTRION BY DATE OF ARRIVAL AT BLAMA IDP CAMP*

All cases of global malnutrition occurred in households that had been living in Blama IDP camps for more than 12 months.

### *6.14 ACUTE MALNUTRTION BY HEAD OF HOUSEHOLD*

Table 6.13: Acute malnutrition by gender of Head of Household, Blama IDP Camp, January 2001

| Gender of head hhold | Severe Acute | | Moderate acute | | Oedema | |
|---|---|---|---|---|---|---|
| | n | % | N | % | n | % |
| Male (n=188) | 0 | 0.0 | 3 | 1.6 | 0 | 0.0 |
| Female (n=95) | 0 | 0.0 | 1 | 1.0 | 1 | 1.0 |
| **Total (n=283)** | **0** | **0.0** | **4** | **1.4** | **1** | **0.35** |

More male headed than female headed households had malnourished children. This difference was not found to be statistically significant.

### 6.15 ACUTE MALNUTRION BY NUMBER OF MEALS EATEN

Table 6.14: Acute malnutrition by number of meals, Blama IDP Camp, January 2001

| Number of meals | Severe Acute | | Moderate acute | | Oedema | |
|---|---|---|---|---|---|---|
| | n | % | N | % | n | % |
| 1 (n=76) | 0 | 0.0 | 2 | 2.6 | 0 | 0.0 |
| 2 (n=174) | 0 | 0.0 | 2 | 2.6 | 1 | 0.5 |
| 3 (n=30) | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 4 (n=0) | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| **Total (n=280)** | **0** | **0.0** | **4** | **1.4** | **1** | **0.36** |

There was no clear pattern between prevalence of malnutrition and number of meals consumed.

### VACCINATION STATUS

Immunisation status was assessed by the presence of a dated complete record for BCG, DPT, Polio and Measles on the child's health card. If a measles record was absent, immunisation was assessed by a history given by the parent/guardian. If a BCG record was absent, BCG immunisation was assessed by the presence of a BCG scar.

54.8% (155) children did not have a health card.

Table 6.16: EPI coverage, Blama IDP camp, January 2001

| Vaccination | N | % of sample population | % of children having health card |
|---|---|---|---|
| Complete Polio on card | 90 | 31.8 | 70.3 |
| Complete DPT on card | 90 | 31.8 | 70.3 |
| BCG on card | 101 | 35.7 | 78.9 |
| BCG on card or scar | 273 | 96.5 | 97.7 |
| Measles on card | 107 | 37.8 | 83.6 |
| Measles on card or history | 255 | 90.1 | 85.1 |
| **Complete immunisation** | **283** | **27.6** | **60.9** |

The vast majority (96.5%) of children in the sample were fully immunised for BCG by having either a date of vaccination on their health card or a BCG scar. Only 31.8% had dated records of all three immunisations required for Polio and DPT and 37.8% had a dated record of vaccination against measles.

Less than one third (27.6%) of all children included in the survey were fully immunised for Polio (3 dates), Polio (2 dates), BCG (date or scar), and Measles (date only) according to their health card.

Only 16.6% (2) of children that had arrived at Blama IDP Camp in the last 12 months were fully immunised as compared to 27.4% (75) of those who had lived in the camp for more than one year.

**Attendance of SFP and TFP**

All children included in the survey were asked whether they currently attend a Supplementary Feeding Programme (SFP) or Therapeutic Feeding Programme (TFP).

Table 6.16: Attendance of SFP and TFP, Blama IDP camp, January 2001

| | No attending feeding programme | No malnourished children | % attendance |
|---|---|---|---|
| Currently attending SFP | 1 | 4 (moderate) | 25.5 |
| Currently attending TFP | 0 | 1 (severe) | 0.0 |
| **Total** | **1** | **5** | **25.5** |

The Feeding Centre Coverage for Blama IDP camp was calculated as 25.5%.

## 7. 0 DISCUSSION

### 7.1 House/Household composition

Figure 7.1: Comparison of house/household composition, January 2001

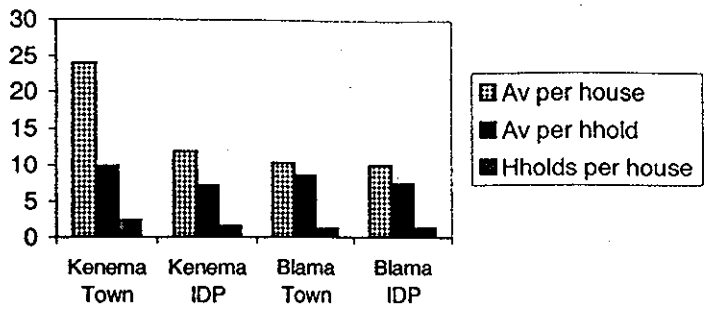


Figure 7.1 shows the difference in average house and household composition in the four survey locations. It illustrates how Kenema town is particularly densely populated with an average of 25 people and 2.4 households (range 1 to 10) to each house. This is significantly higher than Blama town that has an average of 10.3 people and 1.2 households living in each house.

Kenema town is more densely populated as a result of a particularly large influx of displaced in the town over the last ten years. The survey found that 54.8% of households in Kenema were displaced compared to 36.7% in Blama town.

Kenema town also had the highest proportion of under fives (20%) compared to the other locations surveyed (17-19%).

Although no correlation was found between house/household size and malnutrition, the overcrowding of houses in Kenema town undoubtedly has public health implications for the population living there.

### 7.2 Prevalence of Malnutrition

Table 7.1: Summary of prevalence of global and acute malnutrition since July 1999

| Site | Global Acute Malnutrition | | | | Severe Acute Malnutrition | | | |
|---|---|---|---|---|---|---|---|---|
| | Jan 2001 | July 2000 | Dec 1999 | July 1999 | Jan 2001 | July 2000 | Dec 1999 | July 1999 |
| Kenema Town | 3.8 | 3.7 | 2.7 | 10.2 | 0.4 | 0.4 | 0.0 | 2.6 |
| Kenema Camp | 1.2 | 2.2 | 1.5 | 13.6 | 0.8 | 0.0 | 0.0 | 5.7 |
| Blama Town | 2.1 | 3.0 | 4.3 | 7.8 | 0.0 | 0.3 | 0.4 | .4 |
| Blama Camp | 1.8 | 2.0 | 1.3 | - | 0.4 | 0.8 | 0.2 | - |

Table 7.1 shows how the nutritional status of the under fives population in the four locations surveyed has been relatively stable since December 1999, with global and severe acute malnutrition remaining below 4% and 1% respectively. The level of global malnutrition (3.8%) in Kenema town in January 2001 was very similar to that found in the previous survey (3.7%), whilst global malnutrition in the IDP camps and Blama town was slightly reduced. The previous survey took place in July 2000 during the Hungry Season and so the slight reduction in global malnutrition in this survey corresponds to the expected seasonal trend.

The prevalence of malnutrition in the IDP camps has been lower than that found in the respective towns since December 1999. In this survey, prevalence of malnutrition was particularly low in Nyandeyama camp (0.9% global, 0.0% severe) and no cases of malnutrition were found in the children measured at Gofer camp. The strict maintenance of regular monthly General Food Distributions (GFD) since July 1999 has undoubtedly had a great impact in reducing levels of malnutrition in the IDP camps as well as maintaining them at their current low level.

#### 7.2.1 Malnutrition and number of meals eaten

No relationship was found between number of meals eaten and malnutrition. The mean number of meals consumed by households varied from 1.7 – 1.8. On average 25% of all households questioned consumed only one meal on the previous day.

Table 7.2: Comparison of number of meals consumed since Dec 1999

| | % consuming one meal/day | | | % consuming two or more meals/day | | |
|---|---|---|---|---|---|---|
| | Jan 2001 | Jan 2001 | July 2000 | Jan 2001 | Jan 2001 | July 2000 |
| Kenema Town | 22.7 | 22.7 | 45.7 | 77.2 | 54.0 | 41.2 |
| Kenema Camp | 32.7 | 32.7 | 37.9 | 67.4 | 60.9 | 60.0 |
| Blama Town | 26.0 | 26.0 | 31.0 | 73.9 | 68.0 | 57.8 |
| Blama Camp | 21.0 | 21.0 | 28.5 | 79.1 | 71.4 | 80.0 |



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Table 7.2 shows how, the proportion of households consuming more than one meal a day in each survey location has steadily and significantly increased since monthly General Food Distributions (GFD) were strictly maintained in December 1999. This again illustrates the positive impact that the introduction of GFD has had on household food security.

### 7.2.2 Malnutrition and resident status

There was no difference between proportions of malnourished children found in resident and displaced households. In the IDP camps there was no correlation between malnutrition and how long a household had been living in the camp. The latter, together with the fact that nutritional status was better in the camps than in the townships, indicates that children from displaced households are no more vulnerable to malnutrition than those who are resident.

### 7.2.3. Malnutrition and age group

Children in the younger 6-29 month age group had a higher risk of malnutrition compared to those in the older 30-59 month age group and this was proved to be statistically significant for children living in Kenema town. The 6-29 month age group represents the period of supplementary feeding (weaning) when children are most vulnerable to developing malnutrition. In Sierra Leone, there are a number of inappropriate weaning practises that can contribute to malnutrition including, early introduction of food and water, unhygienic food preparation & feeding practises, inappropriate food consistency, infrequent meals, and low protein and fat concentration of supplementary foods. There is a clear need for effective community based nutrition education to help improve current weaning practises and so reduce risk of malnutrition.

### 7.2.4 Feeding Centre Coverage

The Feeding Centre Coverage was between 25% - 33.3% for the four locations surveyed. Although these coverage rates may not be fully representative due to the small numbers of malnourished found, they do indicate that there is room for improved nutrition surveillance, screening and social mobilisation in Kenema and Blama.

### 7.2.5 Merlin Feeding Programme

Attendance of Merlin Supplementary Feeding Programme (SFP) and Therapeutic Feeding Centre (TFC) in Kenema town has fallen steadily since July 2000. This is in line with the expected seasonal trend and the reduction of malnourished children found in the respective surveys.

As well as serving the population in Kenema and Blama town, the MERLIN TFC based at Kenema District Hospital provides treatment for the malnourished living in Kenema and Kailahun Districts. In January 2001 for example, 36% of new admissions into the MERLIN TFC arrived from outside Kenema town. At the time writing GOAL are conducting a nutrition survey in Kenema District. Levels of malnutrition are expected to be higher in the District than those in the townships.

**Although the amount of malnutrition remains relatively low in the populations surveyed, the current numbers of admissions into the supplementary and therapeutic feeding programmes from Kenema town and the surrounding districts justify a continued need for the Kenema based SFP and TFC programmes.**

**Nutrition surveillance, nutrition screening and referral at PHU level needs to be strengthened and well co-ordinated between agencies to improve overall coverage, particularly in newly accessible areas.**

**Since prevalence of malnutrition is now relatively low, the population would benefit from greater emphasis on prevention strategies. Improved feeding practises should be encouraged through the provision of nutrition training of health staff and thorough appropriate community based nutrition education programmes.**

## 7.3 Retrospective Under Fives Crude Mortality Rate (CMR)

Table 7.2: Comparison of under fives crude infant mortality, January 2001

| | Under Five's Mortality rate DEATHS/10,000 PER DAY | |
|---|---|---|
| | Average/Dec 2000 | Average/2000 |





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| | | |
|---|---|---|
| Kenema Town | 1.4 | 1.03 |
| Kenema IDP Camps (total) | 2.01 | 1.76 |
| *Lebanese Camp* | | *1.9* |
| *Nyandeyama Camp* | | *0.99* |
| *Gofer Camp* | | *3.7* |
| Blama Town | 1.79 | 1.45 |
| Blama IDP camp | 0.91 | 1.8 |

The Retrospective Under Five's Crude Mortality Rate (CMR) calculated as an average for both the last full calendar month (December 2000) and the previous 12 months (January to December 2000) was found to be between 1 and 2 per 10,000 per day in each of survey locations. The fact that the CMR was found to be above 1 raises some cause for concern. Although an Under Fives CMR above 1 does not indicate an emergency or crisis situation, particularly when looked at in conjunction with the low prevalence of malnutrition, it does indicate that the health situation is not acceptable (Revised MSF Nutrition Guidelines, Draft, 2000).

The CMR was found to be particularly high (2.01) in Kenema IDP camps. This figure was the result of a high death rate when calculated as an average over the last year both in Lebanese camp (1.9) and in particular Gofer camp (3.7). Three out of the 18 households questioned in Gofer camp experienced at least one under fives death in the last 12 months, and one of these experienced two deaths. This high mortality rate at Gofer Camp suggests an urgent need for improved health care facilities for residents of the camp. The nearest Ministry of Health clinic to Gofer camp is located three miles away in Geima, although KDHCO provide a mobile clinic at Gofer village. MERLIN plans to open a health clinic at Gofer camp in the immediate future.

Displaced households in Kenema town had 2.39 times more under fives mortality compared to resident households and this difference was found to be statistically significant. Newly displaced families in Kenema town were however, no more likely to experience an under fives death than those displaced for more than 12 months. Displaced households in Blama town, particularly those displaced for less than one year, experienced a higher under fives mortality, although this was not found to be statistically significant.

It is important to note that collection of data on retrospective mortality without any independent verification is frequently unreliable and so the results obtained should be interpreted with some degree of caution.

A recent retrospective mortality survey for the year 2000, conducted by IRC in Kenema District in January 2001 revealed a high crude mortality rate of 3.6 per 1,000/month (1.16 per 10,000 per day) for the whole population in Kenema district. Unfortunately a breakdown of figures for Under Fives Crude Mortality Rate is not yet available for comparison with the results of this survey.

No verbal autopsy on cause of death was collected during the survey. The low level of malnutrition found in the survey however, does suggest that malnutrition was not a major cause of death. Routine information collected from PHUs in Kenema District and the IRC survey indicate that the major causes of childhood mortality are malaria, followed by diarrhoea and acute respiratory disease. **The latter implies the need for improved first line treatments and preventative strategies for diarrhoea, malaria and respiratory infections, particularly at Gofer camp.**

### 7.4 Immunisation Status

Table 7.3: Summary of EPI coverage from December 1999

| Site | Complete Polio | | | Measles (history or card) | | | BCG (by card or scar) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Jan 01 | July 00 | Dec 99 | Jan 01 | July 00 | Dec 99 | Jan 01 | July 00 | Dec 99 |
| Kenema town | 38.8 | 40.9 | 30.0 | 74.2 | 68.9 | 82.0 | 92.6 | 96.7 | 95.0 |
| Kenema camp | 30.0 | 40.7 | 25.0 | 91.1 | 74.6 | 83.0 | 91.5 | 96.1 | 91.0 |
| Blama town | 26.4 | 40.7 | 17.0 | 82.6 | 74.6 | 78.0 | 87.5 | 96.0 | 91.0 |
| Blama camp | 31.8 | 45.8 | 24.0 | 90.1 | 95.5 | 90.0 | 96.5 | 92.8 | 95.0 |

Table 7.3 shows that EPI coverage for Polio and BCG in all four survey locations was lower than that found in July 2000. Measles immunisation (history or card) however, had improved at all locations except for Blama camp.

**Table 7.4: Comparison of vaccination coverage, January 2001**

| | Full EPI % | Full Polio % | Full DPT % | BCG date/scar % | Measles date % | No card % |
|---|---|---|---|---|---|---|
| Kenema Town | 29.2 | 38.8 | 38.5 | 92.6 | 34.0 | 48.0 |
| Kenema IDP Camps | 27.9 | 30.0 | 30.0 | 91.5 | 36.4 | 55.9 |
| *Lebanese Camp* | *30.5* | *33.0* | *33.0* | *90.7* | *37.3* | *54.2* |
| *Nyandeyama Camp* | *28.4* | *30.2* | *30.3* | *90.1* | *40.4* | *53.2* |
| *Gofer Camp* | *10.0* | *10.0* | *10.0* | *100.0* | *10.0* | *80.0* |
| Blama Town | 21.4 | 26.4 | 26.0 | 87.5 | 27.1 | 65.5 |
| Blama IDP camp | 27.6 | 31.8 | 31.8 | 96.5 | 37.8 | 54.8 |

Table 7.4 shows that only 21% to 29% of children questioned in the survey were fully immunised for Polio (3 dates), DPT (3 dates), BCG (date or scar) and Measles (date only) according to their health card. The immunisation status of children living in Blama town was particularly low due to the low proportion of children having a health card (34.5%).

Between 87% to 97% of children were fully immunised for BCG by either having a dated record on their health card or the presence of a scar. Full polio and DPT immunisation was particularly low (26% - 39%).

No significant difference was found in immunisation coverage or ownership of a health card according to resident status.

There were major barriers to assessing true immunisation status of children in this survey. One of the main barriers was the frequent loss, or withholding of health cards that contain records of immunisation dates. In Blama town 65% of children were not able to present a health card. In the other three surveys between 48% and 56% of children claimed not to have a health card.

Other obstacles included the fact that some children have more than one card and only presented one of them during the survey, and that the record of immunisation on the card may be incorrect or incomplete, (e.g. only recording the date of the final Polio/DPT vaccination or recording a tick instead of a date on the card). In this survey, only complete dated records were considered valid.

Another problem is that the health cards do not show records of immunisations received during emergency vaccination campaigns. In the last year, there has been an emergency measles campaign, NIDS Polio campaign, and a multiple antigen campaign for BCG, Measles, DPT and Polio in Kenema and Blama towns and IDP camps.

The above obstacles in assessing immunisation status mean that the true immunisation coverage of children should be higher than the figures obtained in the survey.

**Greater emphasis needs to be placed on the importance of maintaining accurate and complete immunisations records on children's' health cards. The importance of keeping a health card for each child should be emphasised to mothers/carers, particularly in Blama town and Gofer camp.**

**Routine immunisations at health clinics should be encouraged and strengthened, especially at Gofer camp.**

## 8.0 RECOMMENDATIONS

1. Continue to support the Therapeutic Feeding Centre (TFC) and Supplementary Feeding Programme (SFP) in Kenema District hospital (the MERLIN SFP will be handed over to GOAL in April 2001).
2. Improve coverage of the feeding programmes by strengthening nutrition surveillance, nutrition screening and referral at PHU level, particularly in newly accessible areas.
3. Place greater emphasis on prevention strategies through the provision of nutrition training to health staff and community based nutrition education programmes, especially with regard to weaning practises.

4. Improve first line treatment and preventative strategies for diarrhoea, malaria and respiratory infections (particularly at Gofer camp).
5. Encourage greater emphasis to be placed on the importance of maintaining accurate and complete records of immunisations on health cards (particularly at Gofer camp and Blama town).
6. Encourage and strengthen routine immunisations at health clinics (particularly at Gofer camp).
7. Continue to monitor the nutritional and food security situation in Kenema town and district, and organise another anthropometric/immunisation survey in 12 months time, unless the situation deteriorates before this time.

# APPENDIX

## I Cluster Sampling

# Appendix I

## Cluster Selection – Kenema Town

| Section | Population | Cumulative Total | Clusters | No of clusters |
|---|---|---|---|---|
| 1B | 5892 | 5892 | 520, 3934, | 2 |
| 2 | 3969 | 9861 | 7348 | 1 |
| 3 | 10668 | 20529 | 10762, 14176, 17590 | 3 |
| 4A | 9011 | 29540 | 21004, 24418, 27832, | 3 |
| 4B | 6787 | 36327 | 31246, 34660, | 2 |
| 4C | 5922 | 42249 | 38074, 41488 | 2 |
| 4D | 3839 | 46088 | 44902 | 1 |
| 5A | 5696 | 51784 | 48316, 51730 | 2 |
| 5B | 7615 | 59399 | 55144, 58558, | 2 |
| 5C | 2304 | 61703 | - | 0 |
| 5D | 5415 | 67118 | 61972, 65386 | 2 |
| 6A | 3333 | 70451 | 68800 | 1 |
| 6B | 10145 | 80596 | 72214, 75628, 79042, | 3 |
| 6C | 6729 | 87325 | 82456, 85870 | 2 |
| 7A | 9612 | 96937 | 89284, 92698, 96112, | 3 |
| 7B | 5470 | 102407 | 99526 | 1 |
| Total | 102407 | | | 30 |

$\frac{102,407}{30}$ = 3414 (Sampling interval)

Random number – between 0 and 3414 = 520

Annex 1

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# NUTRITION SURVEY REPORT KENEMA DISTRICT

**SEPTEMBER 2001**

# 1.0 INTRODUCTION

## *1.1 BACKGROUND*

Kenema District is one of three districts in the Eastern Province of Sierra Leone, the other two being Kono and Kailahun. Although there is currently access to all but two chiefdoms (Lower Bambara and Malegohun) in Kenema District and increasing accessibility in Kono, Kailahun districts remain largely inaccessible due to the activity of the Revolutionary United Front (RUF). Movement between pro-government and rebel-held areas in Kenema and Kailahun districts remains limited to commercial and non-humanitarian traffic. Currently, there is no major fighting in the Eastern Region, but this may occur if attempts are made to seize the diamond producing areas in these districts from the RUF.

Kenema District has been severely impacted by ten years of civil war between pro-government forces and the RUF. Kenema town is Sierra Leone's third largest town and the main administrative town in the District. Having housed a pre-war population of 20,000, the population of Kenema town is now estimated at 102,408 (MERLIN Jan 01). The town additionally supports approximately 25,000 internally displaced within three camps (Lebanese, Nyandeyama, and Gofer). Blama town, which is located 12 miles from Kenema on the Kenema Bo highway, has a population of 5,600 (MERLIN Nov 2000). In 1998, 9,000 IDPs were forcibly moved from Kenema RTI camp to Blama town. Since there were no services in place for this influx, many initially moved in with residents of Blama Town. An IDP camp was subsequently established which now supports a population of approximately 15,000.

## *1.2 MERLIN NUTRITION PROGRAMME IN KENEMA DISTRICT*

Merlin took over emergency nutritional activities in Kenema District from MSF Holland in April 1996. The original programme which included therapeutic and supplementary feeding has since expanded to include support of the Paediatric ward, Lassa Fever ward and Under Five's clinic at Kenema District Hospital. Within Kenema District, MERLIN supports fourteen Peripheral Health Units (PHUs) through the District Health Team. In addition, Merlin supports clinics at Lebanese camp and Blama camp and a clinic at Gofer camp. MERLIN activities in the district, town and IDP camps also have a large outreach component including screening, EPI, active case finding, health education, Lassa fever sensitisation and malaria control. Other health agencies working in Kenema district include MSF, GOAL, KDHCO, AfriCare, IRC, and ICRC.

Merlin's decentralised Supplementary Feeding Programme (SFP) programme in Kenema District and Blama town were handed over to GOAL in November 1999 and April 2000 respectively. GOAL now supports 14 SFP sites in Kenema district and 1 SFP in Kenema Town. MERLIN continues to support a Therapeutic Feeding Centre (TFC).

## *1.3 PREVIOUS NUTRITION SURVEYS IN KENEMA AND BLAMA*

### *1.3.1 Kenema town and IDP camps*

***Table 1.1: Comparison of prevalence of Global and Severe Acute Malnutrition, Kenema town and IDP camps, since 1995***

| *Survey* | Kenema Town | | Kenema IDP camps | |
|---|---|---|---|---|
| | Global | Severe | Global | Severe |
| Merlin, January 2001 | 3.8% | 0.4% | 1.2% | 0.8% |
| Merlin, July 2000 | 3.7% | 0.4% | 2.2% | 0.0% |
| Merlin, December 1999 | 2.7% | 0.0% | 1.5% | 0.0% |
| Merlin, July 1999 | 10.2% | 2.6% | 13.6% | 5.7% |
| Merlin, June 1998 | 10.9% | 2.5% | 13.6% | 5.7% |
| Merlin, November 1996 | 5.5% | 0.3% | 6.6% | 0.5% |
| Merlin, June 1996 | 8.6% | 1.1% | 8.9% | 0.8% |
| MSF, February 1996 | 6.3% | 1.0% | 8.6% | 0.2% |
| MSF, November 1995 | 6.8% | 0.5% | 5.3% | 0.9% |
| MSF, August 1995 | 22.6% | 7.7% | 37% | 11.5% |

The nutrition programme was first established in Kenema town by MSF Holland in 1995 following a nutritional emergency in which global and severe malnutrition were extremely high both in the town (22.6% global, 7.7% severe) and the RTI camp (37% global, 11.5% severe). The nutrition status then stabilised (5% -10% global) during 1996. A nutrition survey scheduled for June 1997 was interrupted by a military coup in May 1997. A second survey scheduled for January 1998 was again delayed due to insecurity and subsequent fighting. Following political upheavals in February 1998 there was a rapid increase in severe malnutrition that led to the opening of a second TFC in Kenema town in May 1998 which had exceeded its capacity by June. A nutrition survey in June 1998 revealed a high level of malnutrition both in the town (10.9% global, 2.5% severe) and in the RTI camp (13.6% global, 5.7% severe). An attack on Kenema town in January 1999 coinciding with the RUF occupation of Freetown, led to further disruption. A nutrition survey in July 1999 subsequently found rates of malnutrition still high and at a similar level to those found in June 1998. Since 1999, the nutritional status of under-fives in Kenema has improved, with global malnutrition staying below 4% and severe malnutrition below 1%, both in the town and the camps.

### *1.3.2 Blama town and IDP camps*

***Table 1.2: Comparison of prevalence of Global and Severe Acute Malnutrition since 1999, Blama town & IDP camp***

| *Survey* | Blama town | | Blama IDP camps | |
|---|---|---|---|---|
| | Global | Severe | Global | Severe |
| Merlin, January 2001 | | | | |
| Merlin, July 2000 | 3.0% | 0.3% | 2.0% | 0.8% |
| Merlin, December 1999 | 4.3% | 0.4% | 1.3% | 0.2% |
| Merlin, July 1999 | 7.8% | 1.4% | - | - |

The first Merlin nutrition survey in Blama town took place in July 1999 soon after the transportation of 9,000 IDPs from the RTI camp in Kenema to Blama in December 1998. Global malnutrition in Blama town was initially high at 7.8% as a result of this sudden influx but had fallen to less than half this figure (3.0%) by July 2000. Global malnutrition in Blama IDP camp has remained significantly lower than in the town since December 1999.

# 2.0 METHODOLOGY

## *2.1 OBJECTIVES*

**Main objective**

- To estimate the nutritional status of children aged 6 to 59 months

**Secondary objectives**

- To estimate EPI and measles coverage of children aged 6-59 months
- To estimate retrospective mortality of children under five years
- To determine the demographic composition and resident status of households
- To evaluate the coverage of feeding programmes in the population surveyed

## *2.2 SAMPLING METHODOLOGY*

A separate survey was conducted at each of the following locations:

1. Kenema town
2. Kenema IDP camps (Lebanese, Nyandeyama, Gofer)
3. Blama town
4. Blama IDP camp

Sample sizes were calculated to provide at least 3% precision.

***Table 2.1: Sampling methodology for nutrition surveys, January 2001***

| | Total population | Sample size | Sampling method |
|---|---|---|---|
| Kenema town | *102,408* | *940* | *Cluster* |
| Kenema IDP camps | *22,984* | *691* | *Systematic (1 in 12)* |
| *Lebanese* | *11,611* | | |
| *Nyandeyama* | *10,357* | | |
| *Gofer* | *1,016* | | |
| Blama town | *5,637* | *182* | *Systematic (1 in 3)* |
| Blama IDP camp | *14,628* | *240* | *Systematic (1 in 7)* |
| **Total** | | *2053* | |

### 2.2.1 Kenema town

A Merlin population mapping exercise in September 2001 estimated a total population of 102,408 in Kenema town. The mapping exercise involved counting every house in Kenema and the number of people living in every 10$^{th}$ house in each of 16 zones in the town.

The cluster sampling method was used to select children for measurement in Kenema town. In the first stage of cluster sampling the town was divided into 16 zones from which 30 clusters were selected according standard procedures *(see Appendix I)*. In the second stage, geographical central locations were identified for each cluster site and a random direction chosen by spinning a bottle. All houses in a straight line in the direction of the bottle to the boundary of the area were counted. A random number between 1 and this number of houses was chosen and used as the first house for measurement. Subsequent houses were chosen by locating the nearest house to the right of the main entrance of each house.

### 2.2.2 Blama town

A population of 5,637 for Blama town was obtained from a full census undertaken by Merlin in November 2000.

The systematic sampling method was used to select households and children in the sample. Since Blama town has a small population, a reduced sample size of 296 was used. One in every three houses in the town was visited.

### 2.2.3 Kenema and Blama IDP camps

The population statistics for the Kenema IDP camps were obtained from a MERLIN census at the end of December 2000 and double checked against recent verifications from the food pipeline agencies (WFP, CRS) operating in these camps.

Systematic sampling was used to select booths in all IDP camps. A sample size of 413 children was calculated for both the Kenema and Blama IDP camp surveys. 1 in 7 booths in Blama camp and 1 in 12 booths in Kenema IDP camps (Lebanese, Nyandeyama and Gofer) were visited.

### *2.3 DATA COLLECTION*

All households living at each selected house/booth were included in the survey. A household was defined as "all those eating from the same pot".
All children living in the household aged 6-59 months with heights between 65cm and 110cm were measured.
The following information was collected on two questionnaires *(see Appendix II)* from each house/booth:

*From the head of every household:*

- **Gender of head of household**
- **Household composition** (number of 0-5 months, 6-59 months, 60 months and above)
- **Resident status of household** (resident or displaced)
- **Date at which displaced households arrived at current address**
- **Location from which displaced households arrived** (country, district, chiefdom)
- **Under fives mortality in last 12 months** (numbers, date of death)
- **Number of meals eaten by household on previous day**

*For every child aged 6-59 months:*

- **Anthropometry**
- **Age** (calculated using date on child's health card, or local events calendar. Where age was not available, selection was based on height excluding all children below 65cm and above 110cm)
- **Sex**
- **Weight** (using a Salter Scale, precision 0.1 Kg. Children weighed without clothes)
- **Height** (using a measuring board, precision of 0.1cm. Children less than 85 cm measured lying down. Children greater than or equal to 85 cm measured standing up)
- **Bilateral oedema** (assessed by applying thumb pressure to both feet/shins for three seconds)

*Every 6-59 month child was additionally assessed for the following:*

- **Immunisation status**
- **EPI status** (assessed by recording the vaccination dates for Polio, DPT, and BCG) from the child's health card. The presence of a BCG mark scar was recorded if there was no vaccination date for BCG.
- **Measles vaccination** was assessed by vaccination date on the health card. If no date was available, measles vaccine by mother's history was recorded.

### *2.4 FEEDING CENTRE COVERAGE*

Current attendance of supplementary or therapeutic feeding programme
Where an eligible child was absent from a household, an absence form was completed and arrangements made to return. Where an eligible child was currently admitted in the TFC or attending the SFC/clinic, the team located the child at the feeding centre to obtain their measurements. During the survey, a register of children who were severely malnourished or who required immediate medical attention was maintained. The registers were submitted daily and followed for formal assessment and admission to the nutrition programme as appropriate.

The "Feeding Centre Coverage" is defined as the percentage of malnourished children frequenting SFP or TFP, divided by the percentage of malnourished children.

$$\text{Coverage} = \frac{\text{Number of malnourished children attending SFP or TFC in sample}}{} \times 100$$

**Total number of malnourished children in sample**

### *2.5 INDICATORS*

#### 2.5.1 Acute malnutrition

- Acute malnutrition was determined using weight for height (W/H) index values.
- Both z-scores and percentage of the median were used to express severe and global malnutrition in the sample population.
- Only z-scores have true statistical meaning and so only these will be used to look at malnutrition according to the different sub-categories.

**Guidelines for results expressed by z-score**

- **Severe acute malnutrition** is defined by W/H < -3 SD and/or oedema
- **Global acute malnutrition** is defined by W/H < -2 SD and/or oedema

**Guidelines for the results expressed as % of the reference median for Weight/Height**

- **Severe acute malnutrition** is defined by W/H < 70% and/or oedema
- **Global acute malnutrition** is defined by W/H <80% and/or oedema

### *2.6 TEAM COMPOSITION AND TRAINING*

Each of the six survey teams was composed of a Team Supervisor and three additional team members. All team members had experience in the methodologies used in nutritional surveys. Twenty survey team members were employed as Merlin's Outreach Team in Kenema. The remaining four were EPI volunteers from the Ministry of Health.

Prior to the survey, all team members attended a MERLIN two-day training workshop to explain the basics of the survey methodology and anthropometric data collection. This workshop included rigorous training in measuring weight, height, identification of oedema and how to complete the questionnaires. Teams were sent out into the field to practice the selection and measurement of children on the day before the survey. Teams were managed in the field by two supervisors.

The survey took place in September 2001.

## 3.0 RESULTS

Data processing and analysis were carried out using EPI-INFO 5.0.

The calculation and analysis of the anthropometric indicators were carried out using EPINUT.

## I – KENEMA TOWN

### A - HOUSEHOLD INFORMATION

A total of 175 houses and 379 households were selected by cluster sampling in Kenema Town.

All households at each selected address were included in the survey.

### *3.1 COMPOSITION OF HOUSE/ADDRESS*

The average number of people living in each house/address was 22.

The mean number of households living in each house/address ranged from 1 to a maximum of 7. The average number of households occupying a house was 1.97.

### *3.2 COMPOSITION OF HOUSEHOLDS*

***Table 3.1: Age group composition of households, Kenema Town, September 2001***

| Age group | n | mean | range | % |
|---|---|---|---|---|
| Number 0-5 months | 112 | 0.3 | 0-4 | 2.7 |
| Number 6-59 months | 828 | 2.18 | 0-9 | 19.7 |
| Number 60 months & above | 3263 | 8.63 | 1-35 | 77.6 |
| **Total per household** | **4203** | **11.1** | **2-44** | **100.0** |

The total number of people living in a household ranged from 2 to 44, with a mean of 11.1.
22.4% of household members were under five years.

### *3.3 HEAD OF HOUSEHOLD*

***Table 3.2: Gender of head of household, Kenema Town, September 2001***

| | N | % |
|---|---|---|
| Male | 214 | 56.5 |
| Female | 165 | 43.5 |
| **Total** | **379** | **100** |

The number of households headed by a female is approaching half (43.5%).

### *3.4 RESIDENT STATUS OF HOUSEHOLD*

Households were classified according to whether they were Resident (currently living in home location) or Displaced (currently living away from home location).

***Table 3.3: Resident status of households, Kenema town, September 2001***

| | N | % |
|---|---|---|
| Resident | 232 | 61.4 |
| Displaced | 146 | 38.6 |
| **Total** | **378** | **100** |

Displaced families accounted for 38.6% of all households in the survey.

***Based on the figures above and on an average town population of 102,408, the estimated displaced population of Kenema town is 55,812.***

### 3.5 ARRIVAL DATES OF DISPLACED HOUSEHOLDS

***Figure 3.1: Date of arrival of Displaced in Kenema Town, September 2001***

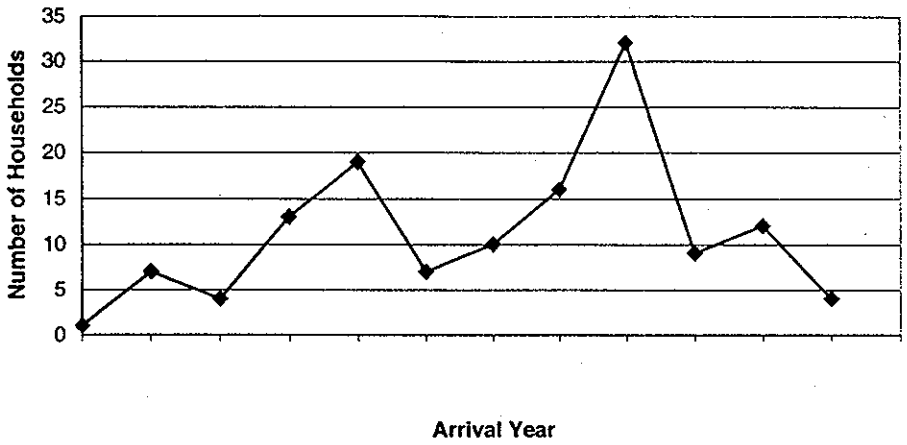



Figure 3.1 shows how the trend of the influx of displaced into Kenema town over the last 10 years.

Displaced families were further classified according to whether they had lived in Kenema town for more or less than one year. 5.2% (7) of all households had arrived in the last 12 months.

### 3.6 AREA OF ORIGIN

Displaced households were asked for details about their home location/area of origin.
Eight (3.2%) households had arrived from Guinea, and 4 (1.6%) from Liberia.
Households displaced from within Sierra Leone were asked for the name of their home district.

Table 3.4: District from which Displaced, Kenema Town, September 2001

| *District* | *Total Displaced* | | *Displaced <=12 months* | | *Displaced > 12 months* | |
|---|---|---|---|---|---|---|
| | *N* | *%* | *n* | *%* | *N* | *%* |
| ***Kenema*** | *108* | *45.2* | *8* | *47.1* | *99* | *45.6* |
| ***Kailahun*** | *95* | *39.7* | *3* | *17.6* | *89* | *41.0* |
| ***Pujehun*** | *11* | *4.6* | *-* | *-* | *-* | *-* |
| ***Kono*** | *9* | *3.8* | *-* | *-* | *9* | *4.1* |
| ***Tonkolili*** | *6* | *2.5* | *3* | *17.6* | *3* | *1.4* |
| ***Bo*** | *4* | *1.7* | *-* | *-* | *4* | *1.8* |
| ***Bombali*** | *3* | *1.3* | *2* | *11.8* | *1* | *0.5* |
| ***Kambia*** | *1* | *0.4* | *-* | *-* | *-* | *-* |
| ***Freetown*** | *1* | *0.4* | *1* | *5.9* | *-* | *-* |
| ***Moyamba*** | *1* | *0.4* | *-* | *-* | *1* | *0.5* |
| ***Total*** | *239* | *100* | *17* | *100* | *217* | *100* |

***Table 3.6 shows that the majority of displaced had arrived from either Kenema district (45.2%) or Kailahun district (39.7%).***

A smaller proportion of the newly arrived households came from Kailahun district (17.6%) compared to those living in Kenema for more than 12 months (41%).
If households had been displaced from within Kenema District they were additionally asked for the name of their home Chiefdom.

Table 3.5: Chiefdom from which Displaced, Kenema Town, September 2001

| Kenema District Chiefdoms | Total Displaced | | Displaced <=12 months | | Displaced >12 months | |
|---|---|---|---|---|---|---|
| | n | % | n | % | n | % |
| Lower Bambara | 47 | 44.8 | 4 | 50.0 | 43 | 44.3 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Nongowa | 11 | 10.5 | 2 | 25.0 | 9 | 9.3 |
| Gaura | 10 | 9.5 | 1 | 12.5 | 9 | 9.3 |
| Malegohun | 9 | 8.6 | - | - | 9 | 9.3 |
| Tunkia | 7 | 6.7 | - | - | 7 | 7.2 |
| Lower Mbabala | 6 | 5.7 | - | - | 6 | 6.2 |
| Dama | 4 | 3.8 | - | - | 4 | 4.1 |
| Dodo | 3 | 2.9 | - | - | 3 | 3.1 |
| Gorama Mende | 2 | 1.9 | 1 | 12.5 | 1 | 1.0 |
| Kaindu Leppiama | 2 | 1.9 | - | - | 2 | 2.1 |
| Koya | 2 | 1.9 | - | - | 2 | 2.1 |
| Nomo | 2 | 1.9 | - | - | 2 | 2.1 |
| Total | 105 | 100 | 8 | 100 | 97 | 100 |

Nearly half (44.8%) of households displaced from within Kenema District arrived from Lower Bambara chiefdom. This proportion was similar for both the newly displaced and those living in Kenema for more than 12 months.

### *3.7 RETROSPECTIVE UNDER-5s MORTALITY*

A total of 1.3% (5) households reported at least one under five's mortality in the last full calendar month (August) and 49 (13%) in the past year. There were three under fives deaths in the last year within one household surveyed. Retrospective under fives crude mortality was calculated as 1.72 per 10,000 per day using mortality figures from the last complete month, and 1.60 when calculated as an average for the last year.

***Figure 3.2: Date of death, Under five's mortality, Kenema Town, 2001***

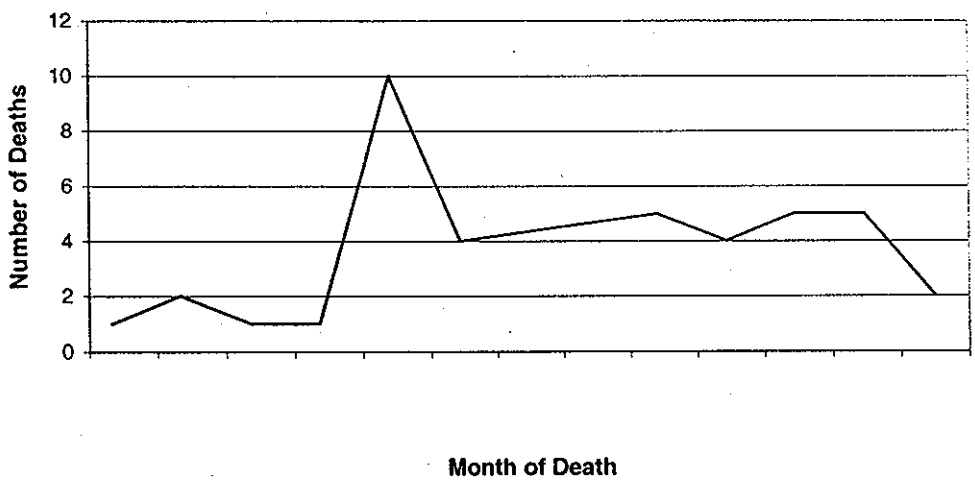



Figure 3.2 shows the distribution of under fives deaths in Kenema town over the last 12 months.

### *3.8 UNDER FIVES MORTALITY BY RESIDENT STATUS*

***Table 3.6: Under five's mortality in last 12 months by resident status, Kenema town, September 2001***

| Resident status | Total number of deaths | % of households |
|---|---|---|
| Resident (n=232) | 19 | 8.2 |
| Total Displaced (n=146) | 30 | 20.5 |
| **Total (n=378)** | **49** | **13.0** |

Displaced households were 2.39 times more likely to have an under 5s mortality than non displaced households (Relative Risk = 2.39, 95% Confidence limit 1.14<RR<4.98). The Yates Corrected Chi Square statistical test found this higher risk of death to be statistically significant (p=0.025).

Newly displaced families were no more likely to experience an under fives death than those displaced for more than 12 months.

### *3.9 NUMBER OF MEALS EATEN ON PREVIOUS DAY*

***Table 3.7: Number of meals, eaten on previous day, Kenema Town, January 2001***

| Number of meals | n | % |
|---|---|---|
| 1 | 136 | 36.1 |
| 2 | 182 | 48.3 |
| 3 | 58 | 15.4 |
| 4 | 1 | 0.3 |
| **Total** | **377** | **100.1** |

The average number of meals consumed by a household was 1.80 (*SD 0.70*).
Over one third (36.1%) of Kenema households reported eating only one meal on the previous day. This compares favourably with the two previous surveys in Kenema town.

## B - NUTRITION ANTHROPOMETRY

A total of 830 children qualified for data entry and analysis. The measurements of 7 children were "flagged" due to extreme weight and/or height measurements.

### *3.10 DISTRIBUTION BY AGE AND SEX*

***Table 3.8: Distribution of children aged 6-59 months by age and sex, Kenema town, September 2001***

| Age | Boys | | Girls | | Total | | Sex ratio |
|---|---|---|---|---|---|---|---|
| (months) | N | % | N | % | n | % | M:F |
| 6-17 | 114 | 50.4 | 112 | 49.6 | 226 | 27.2 | 1.0 |
| 18-29 | 93 | 44.3 | 117 | 55.8 | 210 | 25.3 | 0.8 |
| 30-41 | 85 | 44.3 | 107 | 55.8 | 192 | 23.1 | 0.8 |
| 42-53 | 70 | 51.9 | 65 | 48.1 | 135 | 16.3 | 1.1 |
| 54-59 | 32 | 47.8 | 35 | 52.2 | 67 | 8.1 | 0.9 |
| **Total** | **394** | **47.5** | **436** | **52.5** | **830** | **100** | **0.9** |

The sex ratio distribution shows an approximately equal representation of boys and girls in the sample, thus implying that no selection bias has occurred.

### *3.11 PREVALENCE OF ACUTE MALNUTRITION*

***Table 3.9: Prevalence of severe and global malnutrition, z-score, % median, Kenema town, September 2001***

| | Severe malnutrition | Global malnutrition |
|---|---|---|
| **z-score (95% CI)** | 2.68% (1.12% - 4.24%) | 6.33% (3.97% - 8.68%) |
| **% of median (95% CI)** | 1.82% (0.53% - 3.12%) | 6.08% (3.77% - 8.39%) |

Table 3.9 shows the distribution of global malnutrition and severe malnutrition by z-score and % median in the sample population inclusive of cases of oedema.

Global acute malnutrition expressed in z-scores was 6.33% *(95% Confidence Interval 3.97%-8.68%)* including 2.68% of severe malnutrition *(CI: 1.12% - 4.24%).*

Expressed as a percentage of the median, the overall global malnutrition rate was 6.08% *(CI: 3.77% - 8.39%)*, including 1.82% *(CI: 0.53% - 3.12%)* of severe malnutrition.

12 cases of oedema (Kwashiorkor) were found during the survey.

## 3.13 PREVALENCE OF OEDEMA

*Table 3.10: Distribution of Marasmus (wasting), Kwashiorkor, and combined Marasmus/Kwashiorkor, Kenema town, Z scores, September 2001*

| | Wasting (< -2 Z scores) | No Wasting (> - 2 Z scores) |
|---|---|---|
| Oedema | *Marasmus/Kwashiorkor* 0 (0.0%) | *Kwashiorkor* 12 (1.5%) |
| No oedema | *Marasmus* 40 (4.9%) | *Normal* 770 (93.7%) |

Table 3.10 shows the distribution of pure marasmus (wasting), pure kwashiorkor and combined marasmus/kwashiorkor with 12 cases of oedema found in the sample.

## 3.14 ACUTE MALNUTRITION BY AGE

*Table 3.11: Distribution of malnutrition by age, Z-scores, Kenema town, September 2001*

| Age (months) | N | Acute malnutrition < - 3 Z scores N | % | Moderate malnutrition >-3 to <-2 Z scores N | % | No malnutrition >-2 Z scores N | % | Oedema n | % |
|---|---|---|---|---|---|---|---|---|---|
| 6-11 | 226 | 5 | 2.21 | 12 | 5.31 | 204 | 90.27 | 5 | 2.21 |
| 12-23 | 209 | 5 | 2.39 | 8 | 3.83 | 191 | 91.39 | 5 | 2.39 |
| 24-35 | 186 | 0 | 0.00 | 8 | 4.30 | 177 | 95.16 | 1 | 0.54 |
| 36-47 | 134 | 0 | 0.00 | 0 | 0.00 | 133 | 99.25 | 1 | 0.75 |
| 48-59 | 67 | 0 | 0.00 | 2 | 2.99 | 65 | 97.01 | 0 | 0.00 |
| **Total** | **822** | **10** | **1.22** | **30** | **3.65** | **778** | **96.2** | **12** | **1.46** |

*Table 3.12: Acute malnutrition by age group, Z-scores, Kenema town, September 2001*

| Age groups | Severe acute/oedema N | % | Global acute n | % |
|---|---|---|---|---|
| 6-29 months (n=435) (CI) | 20 | 4.60 (1.81-7.38) | 40 | 9.20 (5.36-13.04) |
| 6-59 months (n=822) (CI) | 22 | 2.68 (1.12-4.24) | 52 | 6.33 (3.97-8.68) |

Tables 3.11 and 3.12 demonstrate a higher level of global acute malnutrition in the younger 6-29 month age groups. Such a difference is common, since this age group represents the weaning period of young children.
Statistical tests revealed that the 6-29 month age group had a higher risk of malnutrition (5.7% global) compared to the 30-59 month age group (1.0%), Yates Corrected Chi Square = 6.61, p=0.01. The relative risk (RR) is 2.88 (95% CI: 1.30<RR<6.37). This means that children in the 6-29 age group have a risk multiplied by 2.55 to be malnourished, compared to children of 30-59 months.

## 3.14 ACUTE MALNUTRITION BY GENDER

*Table 3.13: Acute malnutrition by gender, Kenema town, September 2001*

| Gender | Severe Acute n | % | Moderate acute N | % | Oedema N | % |
|---|---|---|---|---|---|---|
| Males (n=388) | 5 | 1.29 | 16 | 4.12 | 6 | 1.55 |
| Females (n=434) | 5 | 1.15 | 14 | 3.23 | 6 | 1.38 |
| Total (n=822) | **10** | **1.22** | **30** | **3.65** | **12** | **1.46** |

*The table shows that a larger proportion of boys were malnourished compared to girls. This difference was not found to be statistically significant.*

### 3.15 ACUTE MALNUTRITION BY RESIDENT STATUS

*Table 3.14: Acute malnutrition by resident status, Kenema town, September 2001*

| Resident status | Severe Acute | | Moderate Acute | | Oedema | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| Resident (n=514) | 9 | 1.8 | 17 | 3.3 | 11 | 2.1 |
| Total Displaced (n=300) | 1 | 0.3 | 13 | 4.3 | 1 | 0.3 |
| Total (n=814) | **10** | **1.2** | **30** | **3.7** | **12** | **1.5** |

***Table 3.14 shows that the proportion of severe and moderate malnutrition was approximately the same for resident and displaced households.***

### 3.16 ACUTE MALNUTRITION BY GENDER OF HEAD OF HOUSEHOLD

*Table 3.15: Acute malnutrition by gender of head of household, Kenema town, September 2001*

| Gender of head of hhold | Severe Acute | | Moderate acute | | Oedema | |
|---|---|---|---|---|---|---|
| | N | % | N | % | n | % |
| Male (n=473) | 3 | 0.6 | 17 | 3.6 | 4 | 0.8 |
| Female (n=346) | 7 | 2.0 | 13 | 3.8 | 8 | 2.3 |
| Total (n=819) | **10** | **1.2** | **30** | **3.7** | **12** | **3.5** |

***Global malnutrition was higher in male headed households. The latter was not found to be statistically significant.***

### 3.17 ACUTE MALNUTRITION BY NUMBER OF MEALS EATEN

*Table 3.16: Acute malnutrition by number of meals eaten, Kenema town, September 2001*

| Number of meals | Severe Acute | | Moderate acute | | Oedema | |
|---|---|---|---|---|---|---|
| | N | % | N | % | N | % |
| 1 (n=310) | 3 | 1.0 | 11 | 3.5 | 5 | 1.6 |
| 2 (n=371) | 6 | 1.6 | 17 | 4.6 | 4 | 1.1 |
| 3 (n=131) | 1 | 0.8 | 2 | 1.5 | 3 | 2.3 |
| 4 (n=1) | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| Total (n=813) | **10** | **1.2** | **30** | **3.7** | **12** | **1.5** |

***There was slightly more global malnutrition in households consuming one meal (4.3%) compared to those consuming more than one meal (3.7%) but this difference was not found to be statistically significant.***

### C VACCINATION STATUS

Immunisation was assessed by the presence of a dated complete record for BCG, DPT, Polio and Measles on the child's health card. If a measles record was absent, immunisation was assessed by a history given by the parent/guardian. If a BCG record was absent, BCG immunisation was assessed by the presence of a BCG scar.

57.1% (473) children did not have a health card.

*Table 3.17: EPI coverage, Kenema Town, September 2001*

| Vaccination | N | % |
|---|---|---|
| Complete Polio on card | 266 | 32.1 |
| Complete DPT on card | 264 | 31.9 |
| BCG on card | 332 | 40.1 |
| BCG on card or scar | 742 | 89.6 |
| Measles on card | 223 | 27.0 |
| Measles on card or history | 534 | 64.6 |

merlin



BEST AVAILABLE

| | | |
|---|---|---|
| Measles on card or history | 534 | 64.6 |
| **Complete immunisation** | **229** | **27.7** |

The large majority (89.6%) of children in the sample were fully immunised for BCG by having either a date of vaccination on their health card or a BCG scar. Not quite a third (32.1% and 31.9% respectively) had dated records for all three immunisations required for Polio and DPT and only 27% had a dated record of vaccination against measles.

Less than one third (27.7%) of all children included in the survey were fully immunised for Polio (3 dates), Polio (2 dates), BCG (date or scar), and Measles (date only) according to their health card. ***There was no difference in immunisation status according to resident status.***

Of those children who had health cards, 57% were fully immunised for Polio, DPT, BCG and Measles according to the criteria stated above.

**D - Attendance of SFP and TFP**

All children included in the survey were asked whether they currently attend a Supplementary Feeding Programme (SFP) or Therapeutic Feeding Programme (TFP).

***Table 3.18: Attendance of SFP and TFP, Kenema town, September 2001***

| | No attending feeding programme | No malnourished children | % attendance |
|---|---|---|---|
| Currently attending SFP | 3 | 30 (moderate) | 10.0 |
| Currently attending TFP | 32 | 22 (severe) | 145.5 |
| **Total** | **35** | **52** | **67.3** |

The Feeding Centre Coverage for Kenema town was calculated as 67.3%, although there is a large difference in coverage based on type of programme.

## II - KENEMA IDP CAMPS (Lebanese, Nyandeyama, Gofer)

### *3.18 NUMBER OF BOOTHS AND CHILDREN SURVERY VERSUS EXPECTED*

***Table 3.18: Number of booths/children surveyed vs expected, Kenema IDP camps, September 2001***

| IDP Camp | Obtained | | | Expected | | |
|---|---|---|---|---|---|---|
| | No of Booths | No of child 6-59 mnths | Mean 6-59 mnths child per booth | No of Booths | No of child 6-59 mnths | Mean 6-59 mnths child per booth |
| Lebanese | 127 | 254 | 2.00 | 79 | 203 | 2.57 |
| Nyandeyama | 209 | 238 | 1.14 | 66 | 170 | 2.57 |
| Gofer | 229 | 199 | 0.87 | 10 | 27 | 2.7 |
| **Total** | **483** | **691** | **1.43** | **155** | **400** | **2.58** |

### *3.19 COMPOSITIONS OF HOUSEHOLD*

**Table 3.19: Age group composition of households, Kenema IDP camps, January 2001**

| Age group | Total | | | *Lebanese Camp* | | | Nyandeyama | | | Gofer Camp | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | Mean | % | N | mea n | % | N | mea n | % | n | Mea n | % |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number 0-5 months | 125 | 0.19 | 2.7 | 36 | 0.21 | 2.7 | 23 | 0.11 | 1.5 | 66 | 0.24 | 3.9 |
| Number 6-59 months | 691 | 1.06 | 15.2 | 254 | 1.49 | 18.7 | 238 | 1.14 | 15.7 | 199 | 0.73 | 11.8 |
| Number 60 months & above | 3738 | 5.72 | 82.1 | 1066 | 6.23 | 78.6 | 1257 | 6.01 | 82.8 | 1415 | 5.18 | 84.2 |
| **Total per household** | 4554 | 6.97 | 100 | 1356 | 8.23 | 1 | 1518 | 7.23 | 100 | 1680 | 5.61 | 100 |

### *3.20 HEAD OF HOUSEHOLD*

***Table 3.20: Gender of head of household, Kenema IDP camps, January 2001***

| | Total | | Lebanese Camp | | Nyandeyama | | Gofer Camp | |
|---|---|---|---|---|---|---|---|---|
| **Head of household** | n | % | n | % | N | % | N | % |
| Male | 326 | 49.9 | 73 | 42.7 | 115 | 55.0 | 138 | 50.5 |
| Female | 327 | 50.1 | 98 | 57.3 | 94 | 45.0 | 135 | 49.5 |
| **Total** | **653** | **100** | **171** | **100** | **209** | **100** | **273** | **100** |

Approximately half (50.1%) of households were headed by a female.

Lebanese Camp had more female headed households (57.3%) than Gofer or Nyandeyama Camps.

### *3.21 ARRIVAL DATE OF HOUSEHOLDS AT IDP CAMPS*

Households were asked for the date at which they had arrived at their respective camp. They were then further classified according to whether they had been living in their camp for more or less than one year.

***Table 3.21: Date of arrival, Kenema IDP camps, September 2001***

| | Total | | Lebanese Camp | | Nyandeyama | | Gofer Camp | |
|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | N | % | N | % |
| Less than 12 months | 78 | 12.1 | 2 | 1.2 | 3 | 1.4 | 73 | 27.0 |
| More than 12 months | 567 | 87.9 | 164 | 98.8 | 206 | 98.6 | 197 | 73.0 |
| **Total** | **645** | **100** | **166** | **100** | **209** | **100** | **270** | **100** |

The vast majority of households at Nyandeyama camp (98.6%) and Lebanese camp (98.8%) had been living there for more than 12 months. Over one quarter (27.0%) of households at Gofer camp had arrived in the last year.

### *3.22 AREA OF ORIGIN*

One household had arrived from Guinea.
Households displaced from within Sierra Leone were asked for the name of their home district.

***Table 3.22: District from which Displaced, Kenema IDP camps, January 2001***

| | Total | | Lebanese Camp | | Nyandeyama | | Gofer Camp | |
|---|---|---|---|---|---|---|---|---|
| **District** | n | % | n | % | n | % | n | % |
| Kailahun | 193 | 79.1 | 119 | 82.6 | 59 | 72.0 | 15 | 83.3 |
| Kenema | 35 | 14.3 | 17 | 11.8 | 15 | 18.3 | 3 | 16.7 |
| Kono | 15 | 6.1 | 8 | 5.6 | 7 | 8.3 | - | - |
| Pujehun | 1 | 0.4 | - | - | 1 | 1.2 | - | - |
| **Total** | **244** | | **144** | | **82** | | **18** | |

***Table 3.22 shows that the majority of IDPs (79.1%) in all three camps had been displaced from Kailahun District. 14.3% had been displaced from within Kenema district. This pattern was similar for the both the newly displaced and those who had been living in the camps for more than one year.***

***Households displaced from within Kenema District were additionally asked for the name of their home chiefdom.***

***Table 3.23: Chiefdom from which Displaced, Kenema IDP camps, January 2001***

| Kenema District Chiefdoms | Total | | Lebanese Camp | | Nyandeyama | | Gofer camp | |
|---|---|---|---|---|---|---|---|---|
| | n | % | n | % | N | % | N | % |
| Nongowa | 9 | 25.7 | 3 | 17.6 | 5 | 33.3 | 1 | 33.3 |
| Malegohun | 9 | 25.7 | 6 | 35.3 | 3 | 2.0 | - | - |
| Lower Bambara | 6 | 17.1 | 1 | 5.9 | 5 | 33.3 | - | - |
| Gaura | 6 | 17.1 | 4 | 235 | - | - | 2 | 66.7 |
| Lower Mbabala | 3 | 8.6 | 3 | 17.6 | - | - | - | - |
| Kaindu Leppiama | 2 | 5.7 | - | - | 2 | 13.3 | - | - |
| **Total** | **35** | | **17** | | **15** | | **3** | |

***Figure 3.3: Date of under fives death, Kenema IDP camps, September 2001***

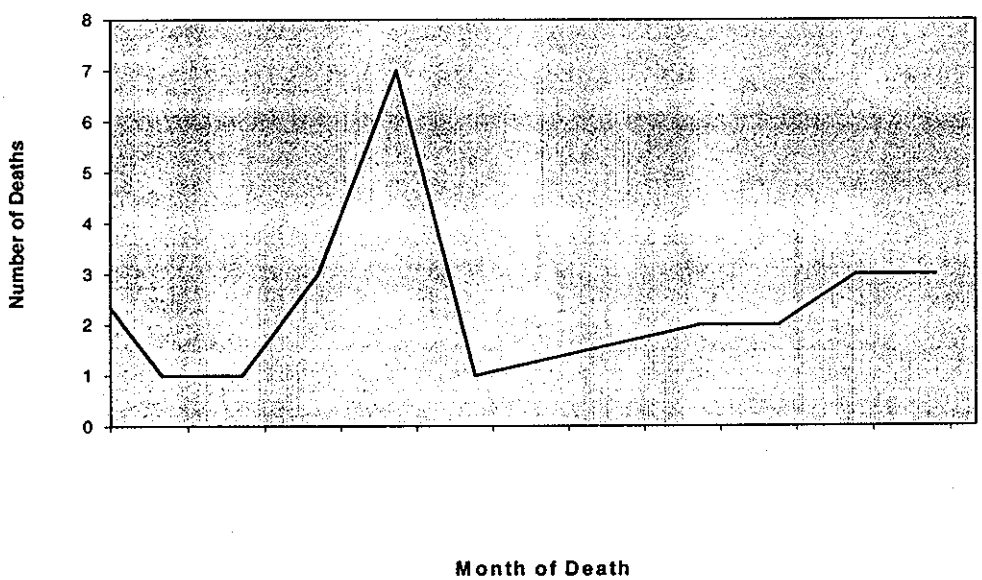



Figure 3.3 shows that the under fives death rate was at its highest between December 2000 and January 2001.

### *3.24 NUMBER OF MEALS EATEN ON PREVIOUS DAY, KENEMA IDP CAMPS*

***Table 3.24: Number of meals, eaten on previous day, Kenema IDP camps, September 2001***

| Number of meals | Total | | Lebanese Camp | | Nyandeyama | | Gofer Camp | |
|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % |
| 1 | 303 | 47.1 | 83 | 48.8 | 114 | 54.8 | 106 | 40.0 |
| 2 | 318 | 49.5 | 82 | 48.2 | 84 | 40.4 | 152 | 57.4 |
| 3 | 22 | 3.4 | 5 | 2.9 | 10 | 4.8 | 7 | 2.6 |
| 4 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| **Total** | **643** | **100.0** | **170** | **100.0** | **265** | **100.0** | **208** | **100.0** |

### *3.25 DISTRIBUTION BY AGE AND SEX*

***Table 3.25: Distribution of children aged 6-59 months by age and sex, Kenema IDP camps, September 2001***

| Age | Boys | | Girls | | Total | | Sex ratio |
|---|---|---|---|---|---|---|---|
| (months) | N | % | N | % | n | % | M:F |
| 6-17 | 98 | 48.0 | 104 | 51.0 | 204 | 29.4 | 0.94 |
| 18-29 | 85 | 49.4 | 87 | 50.6 | 172 | 24.8 | 0.98 |
| 30-41 | 69 | 47.9 | 75 | 52.1 | 144 | 20.8 | 0.92 |
| 42-53 | 76 | 57.6 | 56 | 42.4 | 132 | 19 | 1.36 |
| 54-59 | 23 | 56.1 | 18 | 43.9 | 41 | 5.9 | 1.28 |
| **Total** | **351** | **50.8** | **340** | **49.2** | **693** | **100.0** | **1.0** |

### *3.26 PREVALENCE OF ACUTE MALNUTRITION*

***Table 3.26: Prevalence of severe and global malnutrition, z-score, % median, Kenema IDP camps, September 2001***

| | % Severe malnutrition | % Global malnutrition |
|---|---|---|
| z-score (95% CI) | 1.74 (0.36 – 3.11) | 4.2 (2.08 – 6.31) |
| % of median (95% CI) | 1.30 (0.11 – 2.5) | 3.62(1.65 – 5.59) |

### *3.27 PREVALENCE OF OEDEMA*

***Table 3.27: Distribution of Marasmus (wasting), Kwashiorkor, and combined Marasmus/Kwashiorkor, Z-scores, Kenema IDP camps , September 2001***

| | Wasting (< -2 Z scores) | No Wasting (> - 2 Z scores) |
|---|---|---|
| **Oedema** | *Marasmus/Kwashiorkor* 2 (0.29%) | *Kwashiorkor* 5 (0.72%) |
| **No oedema** | *Marasmus* 24 (3.47%) | *Normal* 660 (95.51%) |

Table 3.27 shows the distribution of pure marasmus (wasting), pure kwashiorkor and combined marasmus/kwashiorkor. Seven cases of oedema were found in the sample, two of which also were marasmic.

### *3.28 ACUTE MALNUTRITION BY AGE*

***Table 3.28: Distribution of malnutrition by age, Z-scores, Kenema IDP camps, January 2001***

| AGE | N | Acute malnutrition < - 3 Z scores | | Moderate malnutrition ≥-3 to <-2 Z scores | | No malnutrition ≥-2 Z scores | | Oedema | |
|---|---|---|---|---|---|---|---|---|---|
| (months) | | n | % | N | % | N | % | n | % |
| 6-17 | 204 | 3 | 4.0 | 8 | 3.9 | 190 | 93.1 | 3 | 1.5 |
| 18-29 | 172 | 2 | 1.2 | 5 | 2.9 | 162 | 94.2 | 3 | 1.7 |
| 30-41 | 143 | 2 | 1.4 | 1 | 0.7 | 139 | 97.2 | 1 | 0.7 |
| 42-53 | 131 | 0 | 0.0 | 1 | 0.8 | 130 | 99.2 | 0 | 0.0 |
| 54-59 | 41 | 0 | 0.0 | 0 | 0.0 | 41 | 100.0 | 0 | 0.0 |
| **Total** | **691** | **7** | **1.0** | **15** | **2.2** | **662** | **95.8** | **7** | **1.0** |

***Table 3.29: Acute malnutrition by age group, Z-scores, Kenema IDP camp, September 2001***

| Age groups | Severe acute | | Global acute | |
|---|---|---|---|---|
| | N | % | N | % |
| 6-29 months (n=376) | 11 | 2.9 | 24 | 6.4 |
| (CI) | | (0.5 – 5.3) | | (2.9– 9.9) |

| | | | | |
|---|---|---|---|---|
| 6-59 months (n=691) | 14 | 2.0 | 29 | 4.2 |
| (CI) | | (0.5 – 3.5) | | (2.1 – 6.3) |

### *3.30 ACUTE MALNUTRITION BY GENDER*

***Table 3.30: Acute malnutrition by gender, Z-scores, Kenema IDP camps, September 2001***

| Gender | Severe Acute | | Moderate acute | | Oedema | |
|---|---|---|---|---|---|---|
| | n | % | N | % | n | % |
| Males (n=349) | 3 | 0.9 | 10 | 2.9 | 2 | 0.6 |
| Females (n=340) | 4 | 1.2 | 5 | 1.5 | 5 | 1.5 |
| **Total (n= 689)** | **7** | **1.0** | **15** | **2.2** | **7** | **1.0** |

***All cases of malnutrition in the sample were found in boys. This higher level of malnutrition in boys was not found to be statistically significant.***

### *3.31 ACUTE MALNUTRITION BY IDP CAMP*

***Table 3.31: Acute malnutrition by IDP camp, Z-Scores, Kenema IDP camps, September 2001***

| IDP camp | *Severe Acute* | | *Moderate acute* | | *Oedema* | |
|---|---|---|---|---|---|---|
| | N | % | N | % | n | % |
| Lebanese (n= 254) | 2 | 0.8 | 5 | 2.0 | 2 | 0.8 |
| Nyandeyama (n= 238) | 2 | 0.8 | 5 | 2.1 | 0 | 0.0 |
| Gofor (n = 200) | 3 | 1.5 | 5 | 2.5 | 5 | 2.5 |
| **Total (n=693)** | **7** | **1.0** | **15** | **2.17** | **7** | **1.0** |

Gofor Camp is the worst off in terms of acute malnutrition throughout the 3 camps. *Checking if this is significant.*

***Table 3.32: Possession of health card, Kenema IDP camps, September 2001***

| IDP camp | Health card | | No health card | |
|---|---|---|---|---|
| | n | % | N | % |
| Lebanese (n=255) | 148 | 58.0 | 107 | 42.0 |
| Nyandeyama (n=238) | 120 | 50.4 | 118 | 49.6 |
| Gofor (n=200) | 69 | 34.5 | 131 | 65.5 |
| **Total (n=693)** | **337** | **48.6** | **356** | **51.4** |

More than half the children in Lebanese camp (58.0%) and Nyandeyama camp (50.4%) did have a health card. Only approximately a third (34.5%) of the children surveyed in Gofer camp were in possession of a health card.

***Table 3.33. EPI coverage, Kenema IDP Camps, September 2001***

| | Total | | Lebanese | | Nyandeyama | | Gofor | |
|---|---|---|---|---|---|---|---|---|
| Vaccination | N | % | n | % | n | % | n | % |
| Complete Polio on card | 244 | 35.2 | 103 | 40.4 | 92 | 38.7 | 49 | 24.5 |
| Complete DPT on card | 246 | 35.5 | 105 | 41.2 | 92 | 38.7 | 49 | 24.5 |
| BCG on card | 286 | 41.3 | 118 | 46.3 | 107 | 45.0 | 61 | 30.5 |
| BCG on card or scar | 648 | 93.5 | 245 | 96.1 | 211 | 88.7 | 192 | 96.0 |
| Measles on card | 217 | 31.4 | 88 | 34.5 | 88 | 37.0 | 41 | 20.6 |
| Measles on card or history | 499 | 72.1 | 201 | 78.8 | 143 | 60.1 | 155 | 77.9 |
| **Complete immunisation** | **208** | **30.0** | **90** | **35.3** | **75** | **31.5** | **43** | **21.5** |

**Attendance of SFP and TFP**

All children included in the survey were asked whether they currently attend a Supplementary Feeding Programme (SFP) or Therapeutic Feeding Programme (TFP).

***Table 3.34: Attendance of SFP and TFP, Kenema IDP camps, September 2001***

| | No attending feeding programme | No malnourished children | % attendance |
|---|---|---|---|
| Currently attending SFP | 5 | 15 (moderate) | 33.3 |
| Currently attending TFP | 19 | 14 (severe) | 135.7 |
| **Total** | **24** | **29** | **82.8%** |

The Feeding Centre Coverage for Kenema IDP Camps was calculated as 82.8%. However, there appears to be much greater coverage by Therapeutic Feeding Programmes (135.7%) than by Supplementary Feeding Programmes (33.3%).

# II – BLAMA TOWN

## *3.33 NUMBER OF HOUSES/CHILDREN SURVEYED VERSUS NUMBER EXPECTED*

***Table 3.35: Number of houses/children surveyed vs number expected, Blama town, September 2001***

| | Expected | Obtained | Difference |
|---|---|---|---|
| Number of houses | 152 | 114 | -38 |
| No 6-59 month children measured | 296 | 182 | -114 |
| Mean number children 6-59 month/house | 1.95 | 1.60 | -0.05 |

## *3.35 COMPOSITION OF HOUSEHOLDS*

***Table 3.36: Composition of households, Blama Town, September 2001***

| Age group | n | Mean | Range | % |
|---|---|---|---|---|
| Number 0-5 months | 21 | 0.16 | 0-1 | 1.6 |
| Number 6-59 months | 182 | 1.36 | 0-4 | 14.0 |
| Number 60 months & above | 1099 | 8.2 | 3-19 | 84.4 |
| **Total per household** | **1302** | **9.72** | **3-20** | **100.0** |

The total number of people living in a household ranged from 3 to 20, with a mean of 9.72.

15.6% of the population surveyed were under five years.

## *3.36 HEAD OF HOUSEHOLD*

***Table 3.37: Gender of head of household, Blama Town, September 2001***

| | N | % |
|---|---|---|
| Male | 62 | 46.3 |
| Female | 72 | 53.7 |
| **Total** | **134** | **100.0** |

More than one half (53.7%) of households were headed by a female.

## *3.37 RESIDENT STATUS OF HOUSEHOLD*

Households were classified according to whether they were Resident (currently living in home location) or Displaced (currently living away from home location).

***Table 3.38: Resident status of households, BlamaTown, September 2001***

| | N | % |
|---|---|---|
| Resident | 119 | 88.8 |
| Displaced | 15 | 11.2 |
| **Total** | **134** | **100.0** |

Displaced households accounted for 11.2% of all households included in the survey.

***Based on the figures above and an average town population of 5637, the estimated displaced population of Blama town is 2,069.***

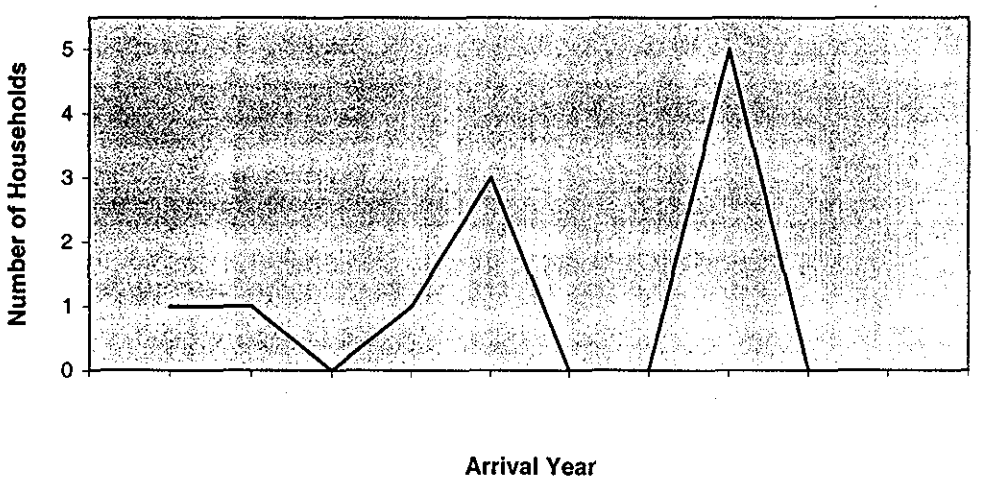
### *3.38 ARRIVAL DATES OF DISPLACED*

Displaced families were asked for the date at which they had arrived in Blama town.

The majority (45%) of households arrived in 1998 when the all the occupants of RTI camp, Kenema were moved to Blama.

None (0.0%) of the displaced households had arrived in the last 12 months.

***Figure 3.4: Arrival date of displaced in Blama town, September 2001***




### *3.39 AREA OF ORIGIN*

Two displaced households had arrived from Guinea.

Households displaced from within Sierra Leone were asked for the name of their home district.

***Table 3.39: District from which Displaced, Blama Town, January 2001***

| District | Total Displaced | | Displaced <=12 months | | Displaced > 12 months | |
|---|---|---|---|---|---|---|
| | N | % | n | % | N | % |
| Kenema | 31 | 41.3 | 0 | 0.0 | 31 | 44.9 |
| Kailahun | 29 | 38.7 | 0 | 0.0 | 28 | 40.6 |
| Pujehun | 5 | 6.7 | 1 | 20.0 | 4 | 5.8 |
| Bo | 3 | 4.0 | 1 | 20.0 | 2 | 2.9 |
| Bombali | 2 | 2.7 | 1 | 20.0 | 1 | 1.4 |
| Freetown | 2 | 2.7 | 1 | 20.0 | 1 | 1.4 |
| Kono | 2 | 2.7 | 0 | 0.0 | 2 | 2.9 |
| Tonkolili | 1 | 1.3 | 1 | 20.0 | 0 | 0.0 |
| **Total** | **75** | **100.0** | **5** | **100.0** | **69** | **100.0** |

Table 3.39 shows that the majority (80%) of displaced households came from either Kenema or Kailahun districts.

If households had been displaced from Kenema District they were additionally asked for the name of their home Chiefdom.

***Table 3.40: Chiefdom from which Displaced, Blama Town, January 2001***

| Kenema District Chiefdoms | Total Displaced | |
|---|---|---|
| | N | % |

| | | |
|---|---|---|
| Lower Bambara | 12 | 38.7 |
| Nongowa | 7 | 22.6 |
| Niawa | 6 | 19.4 |
| Simbaru | 1 | 3.2 |
| Langrama | 1 | 3.2 |
| Koya | 1 | 3.2 |
| Tunkia | 1 | 3.2 |
| Lower Mbabala | 1 | 3.2 |
| Malegohun | 1 | 3.2 |
| **Total** | **31** | **100.0** |

Most of those displaced within Kenema District came from Lower Bambara (38.7%), Nongowa (22.6%) and Niawa (19.4%) chiefdoms.

***Table 3.41: Under five's mortality last 12 months by resident status, Blama town, September 2001***

| Resident status | Number of deaths | % of households |
|---|---|---|
| Resident (n=119) | 1 | 0.8 |
| Total Displaced (n=15) | 0 | 0.0 |
| **Total (n= 134)** | **1** | **0.7** |

Households displaced for less than one year experienced more under fives mortality (22.2%) compared to those who had been living in Blama town for more than one year. This difference in mortality was not found to be significant using statistical tests.

### *3.42 NUMBER OF MEALS EATEN ON PREVIOUS DAY*

***Table 3.42: Number of meals, eaten on previous day, Blama Town, September 2001***

| | Total households | | Resident households | | Displaced households | |
|---|---|---|---|---|---|---|
| Number of meals | N | % | n | % | N | % |
| 1 | 36 | 26.9 | 27 | 22.7 | 9 | 60.0 |
| 2 | 97 | 72.4 | 91 | 76.5 | 6 | 40.0 |
| 3 | 1 | 0.7 | 1 | 0.8 | 0 | 0.0 |
| 4 | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| **Total** | **134** | **100.0** | **137** | **100.0** | **80** | **100.0** |

### *3.43 DISTRIBUTION BY AGE AND SEX*

***Table 3.43: Distribution of children aged 6-59 months by age and sex, Blama Town, September 2001***

| Age | Boys | | Girls | | Total | | Sex ratio |
|---|---|---|---|---|---|---|---|
| (months) | N | % | N | % | n | % | M:F |
| 6-17 | 24 | 42.9 | 32 | 57.1 | 56 | 31.8 | 0.75 |
| 18-29 | 20 | 34.5 | 38 | 65.5 | 58 | 33.0 | 0.53 |
| 30-41 | 11 | 36.7 | 19 | 63.3 | 30 | 17.0 | 0.58 |
| 42-53 | 19 | 73.1 | 7 | 26.9 | 26 | 14.8 | 2.71 |
| 54-59 | 4 | 66.7 | 2 | 33.3 | 6 | 3.4 | 2.00 |
| **Total** | **78** | **44.3** | **98** | **55.7** | **176** | **100.0** | **0.80** |

The sex ratio distribution shows an under representation of girls in the 42-53 age group. This follows similarly to results from the survey in January for the 30-41 month group. There is no reason to suspect a selection bias during the household survey.

### *3.44 PREVALENCE OF ACUTE MALNUTRITION*

***Table 3.44: Prevalence of severe and global malnutrition, z-score, % median, Blama Town, September 2001***

| | Severe malnutrition | Global malnutrition |
|---|---|---|

| | | |
|---|---|---|
| **z-score (95% CI)** | 7.95 (2.30 – 13.61) | 7.95 (2.30 – 13.61) |
| **% of median (95% CI)** | 7.39 (1.92 – 12.85) | 7.95 (2.30 – 13.61) |

Table 3.44 shows the distribution of global malnutrition and severe malnutrition (both inclusive of oedema cases) by z-score and % median in the sample population.

Global acute malnutrition expressed in z-scores or % median was 7.95% *(95% Confidence Interval 2.3% - 13.6%).* By z-score, there was no moderate malnutrition in the sample.

Twelve cases of oedema (Kwashiorkor) were found during the survey.

### *3.45 PREVALENCE OF OEDEMA*

***Table 3.45: Distribution of Marasmus (wasting), Kwashiorkor, and combined Marasmus/Kwashiorkor, Z-scores, Blama Town, September 2001***

| | **Wasting (< -2 Z scores)** | **No Wasting (≥ - 2 Z scores)** |
|---|---|---|
| **Oedema** | ***Marasmus/Kwashiorkor*** 0 (0.0%) | ***Kwashiorkor*** 12 (6.82%) |
| **No oedema** | ***Marasmus*** 2 (1.14%) | ***Normal*** 162 (92.05%) |

Table 3.45 shows the distribution of pure marasmus (wasting), pure kwashiorkor and combined marasmus/kwashiorkor. There were many cases of oedema (12) found in the sample.

### *3.46 ACUTE MALNUTRITION BY AGE*

***Table 3.46: Distribution of malnutrition by age, Z-scores, Blama Town, September 2001***

| **AGE** | | **Acute malnutrition** < - 3 Z scores | | **Moderate malnutrition** ≥-3 to <-2 Z scores | | **No malnutrition** ≥-2 Z scores | | **Oedema** | |
|---|---|---|---|---|---|---|---|---|---|
| **Months** | **N** | **n** | **%** | **N** | **%** | **N** | **%** | **n** | **%** |
| 6-17 | 56 | 1 | 1.8 | 0 | 0.0 | 48 | 85.7 | 7 | 12.5 |
| 18-20 | 58 | 1 | 1.7 | 0 | 0.0 | 53 | 91.4 | 4 | 6.9 |
| 30-41 | 30 | 0 | 0.0 | 0 | 0.0 | 29 | 96.7 | 1 | 3.3 |
| 42-53 | 26 | 0 | 0.0 | 0 | 0.0 | 26 | 100.0 | 0 | 0.0 |
| 54-59 | 6 | 0 | 0.0 | 0 | 0.0 | 6 | 100.0 | 0 | 0.0 |
| **Total** | **176** | **2** | **1.1** | **0** | **0.0** | **162** | **92.1** | **12** | **6.82** |

***Table 3.47: Acute malnutrition by age group, Z-scores, Blama Town, September 2001***

| **Age groups** | **Severe acute** | | **Global acute** | |
|---|---|---|---|---|
| | **n** | **%** | **N** | **%** |
| 6-29 months (n=119) | 13 | 11.40 | 13 | 11.40 |
| (CI) | | (3.15 – 19.66) | | (3.15 – 19.66) |
| 6-59 months (n=176) | 14 | 7.95 | 14 | 7.95 |
| (CI) | | (2.3 – 13.6) | | (2.3 – 13.6) |

Tables 3.46 and 3.47 demonstrate a higher level of global acute malnutrition in the younger 6-29 month age groups. Such a difference is common, since this age group represents the weaning period of young children.

***Statistical tests did not reveal a significant difference (p<0.05) in global acute malnutrition between the 6-29 month and 30-59 month age group.***

### *3.47 ACUTE MALNUTRITION BY GENDER*

***Table 3.48: Acute malnutrition by gender, Blama Town, September 2001***

| Gender | Severe Acute | | Moderate acute | | Oedema | |
|---|---|---|---|---|---|---|
| | n | % | N | % | n | % |
| Males (n=78) | 0 | 0.00 | 0 | 0.00 | 3 | 3.85 |
| Females (n=98) | 2 | 2.04 | 0 | 0.00 | 9 | 9.18 |
| **Total (n=176)** | **2** | **1.14** | **0** | **0.00** | **12** | **6.82** |

The table shows that a larger proportion of girls was malnourished compared to boys ***but this difference was not found to be statistically significant.***

### *3.48 ACUTE MALNUTRITION BY GENDER OF HEAD OF HOUSEHOLD*

***Table 3.49: Acute malnutrition by gender of Head of Household, Z-scores, Blama Town, September 2001***

| Gender of head hhold | Severe Acute | | Moderate acute | | Oedema | |
|---|---|---|---|---|---|---|
| | n | % | N | % | n | % |
| Male (n=74) | 0 | 0.0 | 0 | 0.0 | 5 | 6.8 |
| Female (n=101) | 2 | 2.0 | 0 | 0.0 | 7 | 6.9 |
| **Total (n=175)** | **2** | **1.1** | **0** | **0.0** | **12** | **6.9** |

***A higher proportion of female-headed households (3.1%) contained malnourished children compared to male-headed households (1.6%) but this was not found to be significant using statistical tests.***

### *3.49 ACUTE MALNUTRITION BY NUMBER OF MEALS EATEN*

***Table 3.50: Acute malnutrition by number of meals, Blama Town, September 2001***

| Number of meals | Severe Acute | | Moderate acute | | Oedema | |
|---|---|---|---|---|---|---|
| | n | % | N | % | n | % |
| 1 (n=43) | 0 | 0.0 | 0 | 0.0 | 4 | 9.3 |
| 2 (n=132) | 2 | 1.5 | 0 | 0.0 | 8 | 6.1 |
| 3 (n=0) | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| 4 (n=0) | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| **Total (n=175)** | **2** | **1.1** | **0** | **0.0** | **12** | **6.9** |

There was no clear relationship between number of meals consumed and numbers of malnourished children.

***Table 3.51: EPI coverage, Blama Town, September 2001***

| | Total | |
|---|---|---|
| **Vaccination** | **n** | **%** |
| Complete Polio on card | 55 | 31.3 |
| Complete DPT on card | 55 | 31.3 |
| BCG on card | 68 | 38.6 |
| BCG on card or scar | 167 | 94.9 |
| Measles on card | 45 | 25.6 |
| Measles on card or history | 131 | 74.4 |
| **Complete immunisation** | **48** | **27.3** |

A little more than a quarter (27.3) of children were completely immunised. Health cards were shown by 45.5% of those surveyed.

***Table 3.52: Attendance of SFP and TFP, Blama Town, September 2001***

| | No attending feeding programme | No malnourished children | % attendance |
|---|---|---|---|
| Currently attending SFP | 0 | 0 (moderate) | - |

| | | | |
|---|---|---|---|
| Currently attending TFP | 1 | 14 (severe) | 7.1 |
| **Total** | **1** | **14** | **7.1** |

Feeding centre coverage in Blama Town has been found to be reaching 7.1% of the malnourished children.

# IV - BLAMA IDP CAMP

### *3.50 NUMBER OF BOOTHS/ADDRESSES SURVEYED VERSUS EXPECTED*

***Table 3.53: Number of booths/children surveyed vs numbers expected, Blama IDP camp, September 2001***

| | Expected | Obtained | Difference |
|---|---|---|---|
| Number of booths | 201 | 153 | -48 |
| No 6-59 month children measured | 413 | 240 | -173 |
| Mean number children 6-59 month/booth | 2.057 | 1.57 | -0.487 |

### *3.52 COMPOSITION OF HOUSEHOLDS*

***Table 3.54: Composition of households, Blama IDP Camp, September 2001***

| Age group | n | mean | Range | % |
|---|---|---|---|---|
| Number 0-5 months | 43 | 0.18 | 0-1 | 2.5 |
| Number 6-59 months | 240 | 1.02 | 0-4 | 13.8 |
| Number 60 months & above | 1462 | 6.25 | 1-18 | 83.8 |
| **Total per household** | **1745** | **7.45** | **2-19** | **100.0** |

The total number of people living in a household ranged from 2 to 19, with a mean of 7.45.

16.3% of the population surveyed was under five years old.

### *3.53 HEAD OF HOUSEHOLD*

***Table 3.55: Gender of head of household, Blama IDP Camp, September 2001***

| | N | % |
|---|---|---|
| Male | 151 | 64.3 |
| Female | 84 | 35.7 |
| **Total** | **235** | **100.0** |

More than one third (35.7%) of households were headed by a female.

***Table 3.56: District from which Displaced, Blama IDP Camp, January 2001***

| District | N | % |
|---|---|---|
| Kenema | 97 | 35.8 |
| Kailahun | 151 | 55.7 |
| Kono | 22 | 8.1 |
| Tonkolili | 1 | 0.4 |
| **Total** | **271** | **100.0** |

***The vast majority of households (91.5%) had arrived from either Kenema or Kailahun district.***

***If households had been displaced from Kenema District they were additionally asked for the name of their home Chiefdom***

***Table 3.57: Chiefdom from which Displaced, Blama IDP Camp, January 2001***

| Kenema District Chiefdoms | N | % |
|---|---|---|

| | | |
|---|---|---|
| Lower Bambara | 57 | 58.8 |
| Nongowa | 26 | 26.8 |
| Gaura | 3 | 3.1 |
| Kaindu Leppiama | 1 | 1.0 |
| Dama | 1 | 1.0 |
| Tunkia | 1 | 1.0 |
| **Total** | **89** | **8.2** |

***Figure 3.5: Date of under fives deaths, Blama IDP camp, September 2001***

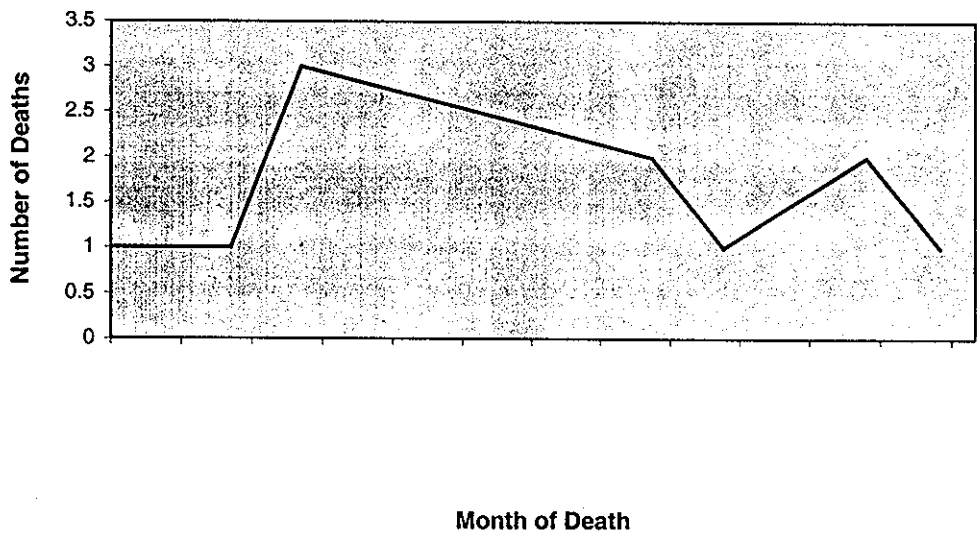



Figure 3.6 shows that the under fives death rate reached a peak in November 2000.

### *3.57 NUMBER OF MEALS EATEN THE PREVIOUS DAY*

***Table 3.58: Number of meals, eaten on previous day, Blama IDP Camp, September 2001***

| Number of meals | N | % |
|---|---|---|
| 1 | 118 | 50.6 |
| 2 | 97 | 41.6 |
| 3 | 18 | 7.7 |
| 4 | 0 | 0.0 |
| **Total** | **233** | **100** |

### *3.58 DISTRIBUTION BY AGE AND SEX*

***Table 3.59: Distribution of children aged 6-59 months by age and sex, Blama IDP Camp, September 2001***

| Age | Boys | | Girls | | Total | | Sex ratio |
|---|---|---|---|---|---|---|---|
| (months) | N | % | N | % | n | % | M:F |
| 6-17 | 27 | 38.6 | 43 | 61.4 | 70 | 29.2 | 0.63 |
| 18-29 | 31 | 51.7 | 29 | 48.3 | 60 | 25.0 | 1.07 |
| 30-41 | 21 | 35.0 | 39 | 65.0 | 60 | 25.0 | 0.54 |
| 42-53 | 19 | 46.3 | 22 | 53.7 | 41 | 17.1 | 0.86 |
| 54-59 | 4 | 44.4 | 5 | 55.5 | 9 | 3.8 | 0.80 |
| **Total** | **102** | **42.5** | **138** | **57.5** | **240** | **100** | **0.74** |

***The sex ratio distribution shows an approximately equal representation of boys and girls in the sample, thus implying that no selection bias has occurred.***

### *3.59 PREVALENCE OF ACUTE MALNUTRITION*

***Table 3.60: Prevalence of severe and global malnutrition, z-score, % median, Blama IDP Camp, September 2001***

| | Severe malnutrition | Global malnutrition |
|---|---|---|
| **z-score (95% CI)** | 1.25 (-0.74 – 3.24) | 4.17 (0.59 – 7.74) |
| **% of median (95% CI)** | 0.42 (-0.74 – 1.57) | 3.75 (0.35 – 7.15) |

### *3.60 PREVALENCE OF OEDEMA*

***Table 3.61: Distribution of Marasmus (wasting), Kwashiorkor, and combined Marasmus/Kwashiorkor, Z-scores, Blama IDP Camp, September 2001***

| | Wasting (< -2 Z scores) | No Wasting (≥ - 2 Z scores) |
|---|---|---|
| **Oedema** | *Marasmus/Kwashiorkor* *0 (0.0%)* | *Kwashiorkor* 0 (0.00%) |
| **No oedema** | *Marasmus* 9 (3.75%) | *Normal* 231 (96.25%) |

Table 3.61 shows the distribution of pure marasmus (wasting), pure kwashiorkor and combined marasmus/kwashiorkor. No cases of oedema were found in the sample.

### *3.61 ACUTE MALNUTRITION BY AGE*

***Table 3.62: Distribution of malnutrition by age, Blama IDP Camp, September 2001***

| AGE | | Acute malnutrition | | Moderate malnutrition | | No malnutrition | | Oedema | |
|---|---|---|---|---|---|---|---|---|---|
| | | < - 3 Z scores | | ≥-3 to <-2 Z scores | | ≥-2 Z scores | | | |
| **Months** | **N** | **n** | **%** | **N** | **%** | **N** | **%** | **n** | **%** |
| 6-17 | 70 | 1 | 1.4 | 1 | 1.4 | 68 | 97.1 | 0 | 0.0 |
| 18-20 | 60 | 2 | 3.3 | 3 | 5.0 | 55 | 91.7 | 0 | 0.0 |
| 30-41 | 60 | 0 | 0.0 | 1 | 1.7 | 59 | 98.3 | 0 | 0.0 |
| 42-53 | 41 | 0 | 0.0 | 1 | 2.4 | 40 | 97.6 | 0 | 0.0 |
| 54-59 | 9 | 0 | 0.0 | 0 | 0.0 | 9 | 100.0 | 0 | 0.0 |
| **Total** | **240** | **3** | **1.25** | **6** | **2.50** | **231** | **96.25** | **0** | **0.0** |

***Table 3.63: Acute malnutrition by age group, Blama IDP Camp, September 2001***

| Age groups | Severe acute | | Global acute | |
|---|---|---|---|---|
| | N | % | N | % |
| 6-29 months (n=130) | 3 | 2.31 | 7 | 5.38 |
| (CI) | | (-1.34 – 5.96) | | (-0.10 – 10.87) |
| 6-59 months (n=240) | 3 | 1.25 | 9 | 3.75 |
| (CI) | | (-0.74 – 3.24) | | (0.35 – 7.15) |

Tables 3.62 and 3.63 demonstrate a higher level of severe acute and global acute malnutrition in the younger 6-29 month age groups. Such a difference is common, since this age group represents the weaning period of young children.

***Statistical tests revealed that there was not a significant difference (p<0.05) in global acute malnutrition between the 6-29 month and 30-59 month age group.***

### *3.62 ACUTE MALNUTRITION BY GENDER*

***Table 3.64: Acute malnutrition by gender, Blama IDP Camp, September 2001***

| Gender | Severe Acute | | Moderate acute | | Oedema | |
|---|---|---|---|---|---|---|
| | N | % | N | % | n | % |
| Males (n=102) | 1 | 1.0 | 3 | 2.9 | 0 | 0.0 |
| Females (n=138) | 2 | 1.5 | 3 | 2.2 | 0 | 0.0 |
| **Total (n=240)** | **3** | **1.25** | **6** | **2.50** | **0** | **0.00** |

***The table shows that a larger proportion of girls were malnourished compared to boys. This difference was not found to be statistically significant.***

### *3.63 ACUTE MALNUTRITION BY DATE OF ARRIVAL AT BLAMA CAMP*

***All cases of global malnutrition occurred in households that had been living in Blama IDP camps for more than 12 months.***

### 3.64 Acute malnutrition by gender of head of household

***Table 3.65: Acute malnutrition by gender of Head of Household, Blama IDP Camp, September 2001***

| Gender of head hhold | Severe Acute | | Moderate acute | | Oedema | |
|---|---|---|---|---|---|---|
| | n | % | N | % | n | % |
| Male (n=156) | 3 | 1.9 | 5 | 3.2 | 0 | 0.0 |
| Female (n=84) | 0 | 0.0 | 1 | 1.2 | 0 | 0.0 |
| **Total (n=240)** | **3** | **1.3** | **6** | **2.5** | **0** | **0.0** |

More male headed than female headed households had malnourished children. ***This difference was not found to be statistically significant.***

### *3.65 ACUTE MALNUTRTION BY NUMBER OF MEALS EATEN*

***Table 3.66: Acute malnutrition by number of meals, Blama IDP Camp, September 2001***

| Number of meals | Severe Acute | | Moderate acute | | Oedema | |
|---|---|---|---|---|---|---|
| | n | % | N | % | n | % |
| 1 (n=125) | 1 | 0.8 | 4 | 3.2 | 0 | 0.0 |
| 2 (n=94) | 2 | 2.1 | 1 | 1.1 | 0 | 0.0 |
| 3 (n=20) | 0 | 0.0 | 1 | 5.0 | 0 | 0.0 |
| 4 (n=0) | 0 | 0.0 | 0 | 0.0 | 0 | 0.0 |
| **Total (n=239)** | **3** | **1.3** | **6** | **2.5** | **0** | **0.0** |

***There was no clear pattern between prevalence of malnutrition and number of meals consumed.***

***Table 3.67: EPI coverage, Blama IDP camp, September 2001***

| Vaccination | N | % of sample population |
|---|---|---|
| Complete Polio on card | 68 | 28.3 |
| Complete DPT on card | 68 | 28.3 |
| BCG on card | 90 | 37.5 |
| BCG on card or scar | 210 | 87.5 |
| Measles on card | 67 | 28.8 |
| Measles on card or history | 136 | 56.7 |
| **Complete immunisation** | **57** | **23.8** |

More than half (56.3%) of the children surveyed did not have health cards.

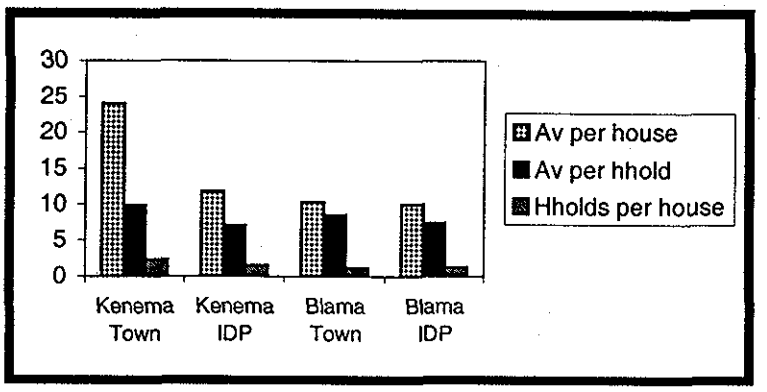
*Table 3.68: Attendance of SFP and TFP, Blama IDP camp, September 2001*

| | No attending feeding programme | No malnourished children | % attendance |
|---|---|---|---|
| Currently attending SFP | 0 | 6 (moderate) | 0.0 |
| Currently attending TFP | 3 | 3 (severe) | 100.0 |
| **Total** | **3** | **9** | **33.3** |

# 4.0 SUMMARY

## *4.1 HOUSE/HOUSEHOLD COMPOSITION*

*Figure 4.1: Comparison of house/household composition*




## *4.2 PREVALENCE OF MALNUTRITION*

*Table 4.1: Summary of prevalence of global and acute malnutrition since July 1999*

| Site | Global Acute Malnutrition | | | | Severe Acute Malnutrition | | | |
|---|---|---|---|---|---|---|---|---|
| | Jan 2001 | July 2000 | Dec 1999 | July 1999 | Jan 2001 | July 2000 | Dec 1999 | July 1999 |
| Kenema Town | 3.8 | 3.7 | 2.7 | 10.2 | 0.4 | 0.4 | 0.0 | 2.6 |
| Kenema Camp | 1.2 | 2.2 | 1.5 | 13.6 | 0.8 | 0.0 | 0.0 | 5.7 |
| Blama Town | 2.1 | 3.0 | 4.3 | 7.8 | 0.0 | 0.3 | 0.4 | .4 |
| Blama Camp | 1.8 | 2.0 | 1.3 | - | 0.4 | 0.8 | 0.2 | - |

*Table 4.2: Comparison of number of meals consumed since Dec 1999*

| | % consuming one meal/day | | | % consuming two or more meals/day | | |
|---|---|---|---|---|---|---|
| | Jan 2001 | Jan 2001 | July 2000 | Jan 2001 | Jan 2001 | July 2000 |
| Kenema Town | 22.7 | 22.7 | 45.7 | 77.2 | 54.0 | 41.2 |
| Kenema Camp | 32.7 | 32.7 | 37.9 | 67.4 | 60.9 | 60.0 |
| Blama Town | 26.0 | 26.0 | 31.0 | 73.9 | 68.0 | 57.8 |
| Blama Camp | 21.0 | 21.0 | 28.5 | 79.1 | 71.4 | 80.0 |

## *4.3 RETRSPECTIVE UNDER FIVES CRUDE MORTALITY RATE*

*Table 4.2: Comparison of under fives crude infant mortality, January 2001*

| | Under Five's Mortality rate DEATHS/10,000 PER DAY | |
|---|---|---|
| | Average/Dec 2000 | Average/2000 |
| Kenema Town | 1.4 | 1.03 |
| Kenema IDP Camps (total) | 2.01 | 1.76 |

| | | |
|---|---|---|
| *Lebanese Camp* | | *1.9* |
| *Nyandeyama Camp* | | *0.99* |
| **Gofer Camp** | | *3.7* |
| Blama Town | 1.79 | 1.45 |
| Blama IDP camp | 0.91 | 1.8 |

### *4.4 IMMUNISATION STATUS*

***Table 4.3: Summary of EPI coverage from December 1999***

| Site | Complete Polio | | | Measles (history or card) | | | BCG (by card or scar) | | |
|---|---|---|---|---|---|---|---|---|---|
| | Jan 01 | July 00 | Dec 99 | Jan 01 | July 00 | Dec 99 | Jan 01 | July 00 | Dec 99 |
| Kenema town | 38.8 | 40.9 | 30.0 | 74.2 | 68.9 | 82.0 | 92.6 | 96.7 | 95.0 |
| Kenema camp | 30.0 | 40.7 | 25.0 | 91.1 | 74.6 | 83.0 | 91.5 | 96.1 | 91.0 |
| Blama town | 26.4 | 40.7 | 17.0 | 82.6 | 74.6 | 78.0 | 87.5 | 96.0 | 91.0 |
| Blama camp | 31.8 | 45.8 | 24.0 | 90.1 | 95.5 | 90.0 | 96.5 | 92.8 | 95.0 |

***Table 4.3 shows that EPI coverage for Polio and BCG in all four survey locations was lower than that found in July 2000. Measles immunisation (history or card) however, had improved at all locations except for Blama camp.***

***Table 4.4: Comparison of vaccination coverage, January 2001***

| | Full EPI % | Full Polio % | Full DPT % | BCG date/scar % | Measles date % | No card % |
|---|---|---|---|---|---|---|
| Kenema Town | 29.2 | 38.8 | 38.5 | 92.6 | 34.0 | 48.0 |
| Kenema IDP Camps | 27.9 | 30.0 | 30.0 | 91.5 | 36.4 | 55.9 |
| *Lebanese Camp* | *30.5* | *33.0* | *33.0* | *90.7* | *37.3* | *54.2* |
| *Nyandeyama Camp* | *28.4* | *30.2* | *30.3* | *90.1* | *40.4* | *53.2* |
| **Gofer Camp** | *10.0* | *10.0* | *10.0* | *100.0* | *10.0* | *80.0* |
| Blama Town | 21.4 | 26.4 | 26.0 | 87.5 | 27.1 | 65.5 |
| Blama IDP camp | 27.6 | 31.8 | 31.8 | 96.5 | 37.8 | 54.8 |

## 5. RECOMMENDATIONS

**Note.** All recommendations should be undertaken in collaboration of the National Nutrition Programme Task Force.

5.1 *GENERAL*

5.1.2 The general overview of the findings from the Nutrition survey indicates that the nutrition status is stable. However there is urgent need for education in the areas of weaning practices. In addition to this in Kenema

town, (as opposed to camps), this must **not** be neglected. Host populations are slightly worse off in terms of nutrition status findings than the camps. (See 4 below). This emphasises the fact that local infrastructure urgently needs to be reinforced

5.1.3 Full completion of the integration of TFC in to the paediatric ward is now achieved. The nutrition situation and macro status of the displaced and resident community is to be monitored by co-ordinated surveillance via regular PHC services that will enable collaborated with MoHS and other agencies.

5.1.4 Do not continue nutrition surveys. The trends of Goal, IRC and Merlin nutrition surveys over the past three years demonstrate that there is a need for collaboration for the implementation of the national nutrition guidelines

### *5.2 SPECIFIC RECOMMENDATIONS*

5.2.1 **The prime activity of focus needs surrounds weaning practices.** Current practice needs to be strengthened in all aspects - educating mothers, strengthening health workers' quality and content of advice to mothers/carers and primary health care policy. Guidelines should be specific/key messages, implemented and evaluated.

5.2.2 It is not recommended that a further Merlin Nutrition survey be carried out.

5.2.3 The Sierra Leone national nutrition programme (Miss Scott, National Director based in Freetown) has been proactive in forming a nutrition task force. This will include all relevant stakeholders and agencies who are concerned with nutrition and food security

5.2.4 In Kenema town it is imperative that EPI coverage and immunisation of all antigens is strengthened. This is especially important for Gofer camps and more specifically for new arrivals. It appears that measles is especially important and that more accurate recording on patients/children cards is needed especially in measles.

### *5.3 NATIONAL NUTRITION PROGRAMME/HEALTH AND NUTRITION AGENCY RECOMMENDATIONS INCLUDE*

- Nutrition Education outreach team should visit villages that demonstrate high numbers of malnourished children.
- Children who have been in the TFC for more than a month should be checked for causes of illness i.e. TB, HIV/AIDS etc
- Health workers should abide strictly to the national nutrition guidelines.
- Whilst TFC activities are being integrated and scaled down strict adherence to flexibility and early warning must be maintained. There is constant threat of incursion and movements of people from Liberia and Guinea imposing on an already unstable demographic situation in Kenema district.
- NGOs with nutritional programmes should discuss the possibility of a national community based nutrition programme i.e. a fully developed document which involves the MoHS in all stages of its process based on surveys, national knowledge food security, WFP statistics etc.
- Concentrate efforts of outreach workers and key messages upon mothers where there are 6 - 29 month old children. Explore Hearth method.
- A Nutrition outreach team should be developed. Clear evidence-based messages relating closely to the findings of Merlin and Goal surveys as the basis of their work. A Masters student or nutrition supervisor should head up that team and work on the national programme.
- The hand over to MoHS of a national nutrition programme should be designed according to the context and realistic capacity.
- Improve collaboration and advocacy of all agency staff with MoHS so that information flow is streamlined.

- Focus nutrition education in Kenema town upon male- headed households.
- Facilitate Child to Child and School health action groups (C to C is the interface between the education and the health sector). Encourage children's ownership of health and nutrition at community level.

## 6.0 CONCLUSION

External funding will inevitably be decreased. Intensive therapeutic care is not an option in the hospital based or centre however there are opportunities to explore alternative innovative community interventions (e.g. Hearth Method)
Other approaches are essential if we are to achieve community 'ownership' for 'good' nutrition status.

Notes: The Hearth method

**1.2.1 Hearth [1] method. Researchers have shown that home based care of the severely malnourished person is successful and cost effective.** Home - based nutrition education and therapeutic care - decisions by the community, for their own members who are or are at risk of, severe acute malnutrition forms the basis of the Hearth Method.

By the nature of its complexity nutrition involves economics, psychological, anthropological and sociological elements. A new concept of community based therapeutic approach may be one intervention to be considered by the Nutrition programme recommendations for Kenema.
The Hearth method has been tested and adopted in Afghanistan and involves the concept of positive deviation. The principle shows that the women are impressed and affected by a mother who has shows good nutrition in her family. Other mothers are able to learn and take a leaf out of her book.

**1.2.2 Creative and innovative activities - The Hearth Method.**
Treat people with severe acute malnutrition their homes.
- The importance of nutrition team outreach workers
- Empower and build confidence within local health structures
- Empower communities and promote dissemination of people to more economically sustainable farming/rural areas
- Enable mothers/siblings to look after all her children in the same location
- Offers the potential for community mothers to educate other mothers and treat children at home. Positive deviance.
- It is possibly cheaper and demands less external input.
- Mothers who perform well can be used as a focus to promote behavioural change.
- Adopt one pilot area in a village with high levels of malnutrition and positive deviance mothers

**Principles underpin the approach**
- Community collaboration, motivation and recognition
- Child to Child activities
- Development approach
- Establishment of community structure to address their own problems with local knowledge and locally manufactured food
- Work with already established supplementary feeding principles and practice (Goal)
- The family remain in one place and together taking joint responsibility

**Constraints**
Community may resist change from established patterns of feeding centres
Initial significant amount of facilitation

[1] Hearth home - based nutrition education rehabilitation in development

Hearth groups must be motivated to pass on skills to subsequent emergencies.
Donor negativity – Initially higher case mortality rates as all deaths are reported and are transparent rather than hidden and unreported

Goal undertook a survey in the district in which their key findings were :
August 2001 – Goal.

- Due to the continued movement of refugees, returnees and IDPs, and to the still largely unresolved political issues between the Government and RUF, the nutritional status of the population in both newly opening and currently serviced areas should continue to be screened.

- Due to the level of malnutrition remaining below 10%, and showing very little fluctuation between the post-harvest baseline survey and the current pre-harvest survey, the current feeding centres should be phased out. When the number of under-five beneficiaries is <30 the SFP site should be closed.

- The Ministry of Health should take over the targeting of malnourished children and other vulnerable groups in areas where GOAL phase out the feeding centres. Children remaining malnourished when phase out occurs will be referred to the nearest Ministry of Health clinic.

- Additional supplementary feeding sites should be open for a limited, three-month period as and when necessary in the newly accessible area.

- The Ministry of Health should carry out growth monitoring at clinics and MCH posts in order to promote a better understanding around child physical and mental development and child care practices.

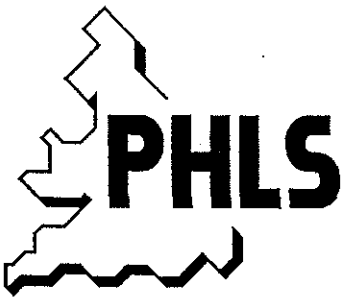
- A programme of health promotion focusing on childcare practices, basic hygiene and the aetiology and treatment of malnutrition at the community level should be implemented.

- The major morbidity was fever. Information about malaria prevention and aetiology should be disseminated, in addition to the distribution of bed-nets and community clearing of bush and stagnant water.

- A strong programme of health promotion, water and sanitation should be implemented in the project area.

- Follow up information should be sought in order that current breastfeeding, weaning and childcare practices are identified and their origin and importance understood. END

*Annex 2*



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# Report on an assessment visit to Sierra Leone. April 12th – 30th 2001

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merlin

## SUMMARY

This report details the outcome of an assessment visit to Sierra Leone made in April 2001. The objectives of the assessment were to:

- Assess the requirements for the diagnosis of parasitic, bacterial and virological infections in Sierra Leone and specifically in Kenema hospital.
- Evaluate the extent of rehabilitation and re-equipment required for the laboratory at Kenema hospital to achieve diagnostic microbiological services appropriate to the needs of the hospital and the population that it serves at present (and is likely to serve in the future), and to advise Merlin and the local and national medical services as to how this objective can be achieved.
- Facilitate advances in research into the microbiology, epidemiology and treatment of Lassa fever by the provision of facilities for the diagnosis of the disease, by the provision of specimens for appropriate research at laboratories outside Sierra Leone and by providing data to the MoH and other stakeholders.
- Assess reports on the spread of Lassa fever to the south of the Kenema area.
- Advise Merlin on rodent control measures needed in the Kenema area.

The assessment took place over the period April 12th – 30th 2001. It involved both meetings with relevant stakeholders and detailed examination of the situation on the ground. The recommendations produced from the survey are:

- Seek funding for the proposed development of a new laboratory facility at Kenema hospital and to assist training of staff.
- Establish a collaborative programme with the Central Public Health Laboratory, London to provide reference laboratory confirmation of the clinical diagnosis of Lassa fever on a regular basis for the immediate support of the Merlin Lassa Fever isolation ward.
- Continue education on Lassa fever and rodent control activities in the IDP camps.
- As the country opens up and the general security situation improves a detailed study of the biology of Lassa fever should be undertaken (especially as the techniques needed have improved greatly since studies of this sort were last undertaken). This should include:
  - Detailed studies of the taxonomy, genetics and distribution of *Mastomys* spp.
  - Studies of the carriage of Lassa fever virus by different populations of *Mastomys* spp.
  - A study of whether Lassa fever is spreading to new areas in Sierra Leone and why.




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## INTRODUCTION

Sierra Leone is one of the poorest countries in the world. It had a population of about 5.2 million before the war but large numbers of people have now fled the country and so the current size of the population is unknown. Of those remaining many thousands have been internally displaced or have fled the country but wish to return.

The internationally recognised government of the country controls about one third of the land area although this area includes about 50% of the population. Much of the potential wealth of the country (the diamond fields in the north-east) is in the hands of the rebel movement (the RUF).

Much of the infrastructure of the country has been ruined by years of war and the health service is in disarray. The activities of Non-Governmental Organisations (NGOs) such as Merlin are welcomed by the Ministry of Health, which is well aware of its inability to provide adequate levels of health care. During this assessment visit, discussions were held with the Deputy Minister of Health and the health official responsible for planning, both of whom welcomed the idea of improving diagnostic services in the Kenema region.

The activities of many parts of the Sierra Leonean health service are governed by protocols established over the years and this is also true of the diagnostic services. However, many parts of the service lack effective operation and control procedures.

Merlin has been operational in Sierra Leone for six years. It operates around Freetown and in and around Kenema in the Eastern province. At present activities in the eastern part of the country include substantial support to the Lassa fever ward, the paediatric ward and the therapeutic feeding centre in Kenema hospital, Peripheral Health Units (PHUs) in the Kenema area, together with outreach work on various aspects of Lassa fever control and general health education.

*Kenema town*

Kenema is the capital of the Eastern region of Sierra Leone. It lies about 50km from the border with Liberia on the main road from Freetown and on an important strategic crossroads linking the western and eastern parts of Sierra Leone. It has a resident population of about 130,000 persons but this is heavily swollen at present due an influx of about 42,000 people displaced by the war and a further 40 – 50,000 IDPs and refugees living in four camps in or near the town. It is a key market town and an important centre of the illegal trade in diamonds.

*Kenema hospital.*

Kenema hospital is the provincial hospital for Kenema, Kono and Kailahun. The hospital is the nearest functioning district general hospital to the Lassa fever endemic region.

The hospital, which is on the southern side of the town, has beds for 300 patients. But there are many more inpatients than this. Much of the hospital is in a poor state of repair but it has received considerable help from International NGOs and other international aid agencies in recent years. The International Committee of the Red Cross (ICRC) has rehabilitated the surgical facilities (including provision of an operating theatre suite and a surgical ward) and has provided a new water system. A large generator has also been installed. Merlin runs a therapeutic feeding centre and supports the paediatric services. It also supports the Lassa fever ward.

The Lassa fever ward, which has bed spaces for 20 patients, is run by Dr Conteh, a physician with very extensive experience of the diagnosis, treatment and public health aspects of Lassa fever.

*This assessment*
The terms of reference:

1. Lassa fever, especially with regard to diagnosis and to the investigation of the possible spread of Lassa Fever to new areas of eastern Sierra Leone.
2. Rodent control.
3. Laboratory services and particularly the development of new laboratory services at Kenema hospital

## 1. LASSA FEVER IN THE EASTERN REGION OF SIERRA LEONE

Lassa Fever, a zoonotic viral haemorrhagic fever caused by an arenavirus, is endemic in Sierra Leone, Liberia, Guinea and some parts of Nigeria (the "Lassa belt"). The natural hosts for the virus are Multimammate rats (*Mastomys spp*). Rats of this genus are widely distributed throughout West and Central Africa and are probably the most common rodents in tropical Africa. The taxonomy of this genus is not clear and we have a very fragmentary understanding about the epizootiology of Lassa in the rodent host. What is known is that certain members of the genus (*"M.natalensis"*) are persistently infected and shed the virus in their excreta. Humans are infected by contact with rat excreta, often in contaminated food. In Sierra Leone the main focus of infection is in the east of the country and is centred on the region immediately to the north of Kenema in and around the diamond mining towns of Segbwema, Panguma and Tongo.

The Lassa fever isolation ward in Kenema hospital, which is supported by Merlin, is the only specialist Lassa fever treatment centre in Sierra Leone. In the last 12 months over 500 individuals with suspected Lassa fever have been admitted to this ward. The overall case fatality rate amongst these patients was ca.20%.

This by no means represents the true number of Lassa cases in the region. Most of the hyper-endemic region is under the control of the rebel RUF. Although, there is much anecdotal evidence of high levels of Lassa infection in the region, movement of the population in this region is restricted by various military and paramilitary groups and therefore, in the main, these patients are not seen at the Kenema Lassa ward. At present this political instability also places this population beyond the safe operational region of the Lassa outreach teams.

*Merlin and Lassa Fever*
Merlin is the leading NGO involved in the treatment and control of Lassa Fever infection in the region. In addition to funding the Lassa fever ward it has been involved with public education programmes. These comprise passive education via billboards and an active population based education programme run by its Lassa outreach teams. The teams visit communities and IDP camps to teach people what they should do to reduce the risk of catching Lassa fever, how to recognise the disease and of the need for prompt treatment. By the criteria of general population awareness, this programme is highly effective. One of the key public health messages of the outreach programme is discussed in the section on rodent control below.

*The spread of Lassa to "new" areas*
There have been reports of cases of Lassa fever occurring in areas from which it has not previously been reported. A small number of cases have been reported from towns and villages to the south of Kenema over a period of several months. Discussions with the staff in the Lassa ward and with Merlin outreach teams suggested that some of these were individuals who had travelled to the south from the Tongo fields area but not all of the cases could be accounted for by such an explanation.

The unstable security situation in the Kenema area precluded a visit to these villages and towns and prevented further investigation.

## 2. RODENT CONTROL

A key method in the control of Lassa Fever virus is to control exposure to the vector, the *Mastomys* rats. However, control of rodents in tropical situations is complex and difficult. Ideally control can be achieved by a combination of:

a) Intensive poisoning/trapping programmes to reduce numbers
b) Measures to prevent breeding (denial of food and cover) and to protect food stores, houses etc. to prevent rodent access
c) The use of trapping programmes and/or cats to maintain numbers of rodents in houses at a low level.
d) Public education on the risks of contact with rodents and on practical measures to control rodent populations.

However, these steps may pose specific difficulties

a) Poisoning and trapping are labour intensive and the former is expensive. Poisoning also carries risks to humans. Operators need to be trained to undertake both activities. In Sierra Leone, most villages, camps etc. are close to farmland or forest, which can act as a reservoir of rodents, so such campaigns, need to be undertaken regularly (continuously in some situations) and supported by the other means listed above.
b) Both poisoning and trapping are non-specific in their action, targeting all species of rodent. There is evidence that *Mastomys* spp. may be excluded from some areas by the presence and activities of other rodent species such as black rats (*Rattus rattus*). If this is so then trapping or poisoning programmes must be undertaken regularly. Occasional programmes may be counter productive if they reduce the numbers of an effective competitor and allow *Mastomys*, with its exceptional ability to breed rapidly, to dominate the rodent fauna.
c) Denial of food and cover implies preventing access by rodents to food and other stores and to houses, good warehouse practice and high standards of cleanliness both in and outside buildings. These measures are very difficult to achieve in countries where most people are very poor and especially in camps for IDPs and refugees such as in the current conditions in Sierra Leone.
d) Predators such as cats are effective in keeping numbers of rodents low in houses or stores provided that other rodent control measures (such as reduced cover, access to food etc) are also in place. The ability of rodents to breed extremely fast will rapidly overwhelm the ability of predators to control them if food and cover are present *ad libitum*. Cats are not ideal in all situations (such as camps) as they may get eaten, may kill domestic stock such as chickens, or may act as vectors of diseases such as rabies, toxoplasmosis or cat scratch fever. In well-managed domestic dwellings or stores they are effective. Cats should not be introduced into areas where they are not normally found or have not been found in the recent past.

Rodent control throughout Sierra Leone is constrained by all these problems. In particular, in the IDP camps visited (see below) it is hampered by overcrowding, poor building construction and poor waste management. Merlin has undertaken a number of rodent control measures in the past and is actively involved with public education programmes on rodent control. Advice on how to trap rodents, how to handle carcasses safely, not to eat rodents and how to reduce access to food and cover will help reduce rodent numbers and, equally importantly, will reduce the risk of exposure to infection.

Any rodent control must be an integrated programme and involve all relevant agencies, the camp and/or local authorities if it is to be effective. Operators need training and protective clothing must be supplied to shield them from the risks of rodent borne disease (not only Lassa Fever but also Weil's disease, plague etc.).

## 3. LABORATORY SERVICES IN SIERRA LEONE

The main health services laboratory in Sierra Leone is in the Connaught Hospital in Freetown. There are sixteen laboratories serving the country. These include a Provincial laboratory serving each of the four provinces and a number of District laboratories.

District laboratories are supposed to be able to offer the following tests:

1. Malaria smears
2. Skin snips for onchocerciasis
3. Stool tests for ova, cysts and parasites
4. Urinalysis (dipstick tests)
5. HIV rapid tests
6. Blood group and cross match

The laboratories in Provincial hospitals (such as that at Kenema) should offer the above tests and also:

1. Bacterial culture (aerobic),
2. Smear microscopy for TB
3. Basic biochemistry
4. Basic haematology
5. Public Health microbiology (food and water).

The Connaught laboratory is both a diagnostic and a referral laboratory. It offers the above tests and in addition:

1. Mycology
2. Biochemistry (quite extensive)
3. Histology
4. Haematology
5. Radio immuno assay
6. Thyroid function tests
7. Pap smears

The Connaught laboratory has a staff of 20 including three doctors, two histopathologists, one haematologist, one biochemist and four MLSOs. The remaining staff are technicians, assistants and cleaners. Each speciality in this laboratory handles about 20 specimens per day. With improved supplies of reagents etc. it could handle more.

The Connaught laboratory has a number of up to date pieces of equipment but some of these do not work (for example the ELISA reader is broken although the other parts of the system, microplate washer and shaker, work). There is a Category II safety cabinet in the bacteriology laboratory. The state of the filters and of the UV sterilisation system in this cabinet is unknown. Generally, there is no equipment performance monitoring.

National laboratory staff are supposed to be trained in the Connaught laboratory and a few still are but most, especially those in laboratories remote from Freetown, mainly receive on the job training at local level. There used to be a laboratory school but this closed approximately ten years ago.

There is no national quality control system governing practice in the national laboratories.

The laboratory service is seriously under funded. Government funds meet only about 60% of needs. We were informed that cost recovery schemes are being tried in various parts of the country with varying success.

*The laboratories at Kenema hospital.*
The main hospital laboratory offers a diagnostic service for malaria (thick film - Field's stain), intestinal parasites, TB, basic haematology, basic urinalysis and some basic biochemistry. Gram's staining can be performed. The blood bank is in part of the laboratory and blood is grouped and tested for HIV using rapid tests.

The laboratory suite comprises a series of four small rooms (varying from 2x3 metres up to 3x3 metres), in which all diagnostic microbiology, haematology and phlebotomy occur. This suite also contains the blood bank fridge, a piece of equipment in poor condition (the door can only be closed provided considerable care and force is exercised). HIV test kits are also kept in this fridge.

All of the rooms have doors on one side and windows on the opposite side. This allows the prevailing wind to pass through the laboratory. Patients and passers-by, who sit in a veranda area outside the unit, can easily enter the laboratory space when they require laboratory services, or to indulge casual curiosity.

The laboratory is in very poor condition. It has little equipment and what there is is old and does not work well. There is a shortage of stains and reagents and of glassware.

Slide preparation for TB and malaria staining, the bulk of the laboratory workload, occurs in any available space as far as could be determined, usually towards the front (door) side of the unit. Typically, the microscopes are placed towards the rear of the laboratory, close to windows to provide a light source. The lack of a reliable electricity supply means that the staff have to rely on natural light for microscopy. There is only one sink in the laboratory with a running water supply. This is therefore used both for washing up and for hand washing. There is one other sink but the tap does not work and when we saw it the sink was full of dirty glassware and discarded glass bottles.

There are eight laboratory staff whose morale is very poor due to an awareness of their situation. They have mostly received their training on the job and one of the main things that they asked for was access to proper training. They were particularly worried that if we provided new equipment they might be expected to work it without proper training.

The accuracy of most if not all of the tests performed is questionable as there is no quality control. Results from a local private laboratory that is sometimes used by the medical staff ("Blue Shield") often differ widely from those produced by the hospital laboratory. However this private facility is expensive and the accuracy of its results is also questionable as there is no quality control.

In effect the Kenema medical services lack reliable laboratory support.

*Lassa Fever Unit Laboratory*
The Lassa Fever isolation ward has a small amount of equipment remaining from the previous CDC programme. This comprises a haematocrit centrifuge and two low speed centrifuges. These have never been serviced. There is a fridge/freezer in the unit but it has long since ceased working. There is a water purifier/deioniser of a similar vintage, but the quality of the output of this machine could not be assessed.

In terms of laboratory support for the ward, blood samples are taken from the patients in the Lassa ward, serum separated and haematocrit determined. Since there is limited serological testing in Kenema and no local refrigeration for serum storage, serum separation is currently of little value. Haematocrit determination contributes only little to patient management.

All work is done on a table in a room approximately three metres square. The equipment is placed on a table below a window that houses an air conditioning unit. This unit does not work properly. It does move air around but has little if any cooling effect. There is no conventional laboratory benching in this room and no services other than intermittent electricity. Staff members working in the unit wear gowns, gloves and masks, as for clinical staff elsewhere on the ward. There is no running water in the unit and no facilities for hand washing.

*The future for the Kenema hospital laboratory*

At present there is some hope of an improvement in the output of the main hospital laboratory. A new chief of the laboratory, Mr James Massally, has recently been appointed and is making a real effort to improve matters. He is a man of experience, trained at the central laboratory in Connaught Hospital, Freetown who has also worked as a laboratory specialist with the UN in East Timor. He has experience of work on Lassa as he worked with the CDC team in Kenema for a number of years (with Drs McCormick, Fisher-Hoch and Bennett), as did several of the other members of staff of the laboratory. Mr Massally is making a laudable attempt to improve standards of working, record keeping etc and has recently been to Freetown to obtain some additional equipment (a colorimeter for biochemical work and a better microscope). He is fighting against years of neglect and a serious lack of almost everything needed to run a laboratory but we have hopes of an improvement within the limitations of the available materials.

In the short term therefore the supply of some basic items (such as slides, some glassware, stains and reagents) would aid this improvement, as would assistance to the staff to obtain training in Freetown and the provision of some basic textbooks and other training aids. However there is no prospect of real improvement without the provision of a purpose built and properly equipped laboratory facility. Proposals for this are given in Annex 4.

All the staff will need extensive training even for basic laboratory work and will require much more extensive support when Lassa work begins. Whilst the Kenema laboratory Head, Mr James Massally, and some of the Kenema staff have experience in working on previous CDC Lassa projects, principally using immunofluorescent diagnostics, this work ceased a decade previously.

Mr Sidiki the technician in the Lassa isolation ward, whilst an enthusiastic and hard working team member, has no formal laboratory training or qualification, let alone the specific expertise required for Lassa fever diagnostic work. The same is true of the majority of the other Kenema laboratory staff with 'on the job' training being the norm, as discussed previously

*IDP camps*

There are four IDP camps in and near Kenema holding about 40,000 individuals. We visited two, Blama camp about ten miles west of Kenema, and the "Lebanese" camp on the western edge of the town.

The camps are all grossly overcrowded but attempts to move some of the inhabitants to another site have so far failed, partly because the site chosen is further away from Kenema than any of the existing camps.

The management of the camps leaves much to be desired.

*Blama camp.*
Blama camp holds about 15,000 individuals housed in ca. 1400 small dwellings.

Although the camp is reasonably clean there is rubbish and spilt grain on the ground throughout the camp and middens at the edge of the camp area. The soakaways do not work effectively and the latrines are inadequate. The inhabitants of the camp speak of heavy infestations of rodents (there are said to be at least 10 rodents in each hut). The inhabitants are encouraged to trap rodents using locally made traps but this has so far failed to reduce the problem significantly. The control problems are complicated by the fact that the camp is next to fields, swamps and wooded areas which act as reservoirs of rodents.

Despite the large number of rodents in the camp there are few cases of Lassa fever, two last year and one so far this year. (During this visit, we saw the corpse of one young *Mastomys* next to the hut in which this last case lived). The MoH and Merlin have run health education programmes to persuade people to handle carcasses of rats safely, not to eat rats and on general rodent control measures.

*The Lebanese camp*
A camp holding about 16,600 individuals which is named after a former Lebanese school around which it is built. It is much less well run than Blama camp. The drains and soakaways are badly designed and sited so that dirty water collects in many places. There is rubbish evident around the camp. The latrines are inadequate and not all the inhabitants use them – piles of faeces were seen on the ground near the latrine area. The water supply is intermittent. Oxfam is attempting to address these problems and is installing a second water tank in the camp. There is no possibility of improving the wells that currently serve the camp. Water tankers are not used to supply the camp.

The health problems in this camp are similar to those in Blama. Rodents are a major problem (for example camp staff informed us that 2,700 were killed in the camp in August 2000) but Lassa is not very prevalent with two cases so far this year.

Attempts to control the numbers of people in the camp have been frustrated partly by a reluctance on the part of the inhabitants to move, and partly because the land surrounding the camp is privately owned and it is not possible to control its use for housing additional persons.

Discussions were held with the Country Manager from Oxfam to determine whether Merlin could help with the problem in the Lebanese camp. She stated that she would welcome support from the health agencies in lobbying for further attempts to reduce the numbers in the camp. In addition she would welcome any input from Merlin for an attempt to assess why the inhabitants remain reluctant to use the latrines.

## 4. SUPORT FOR LOCAL LASSA FEVER VIRUS INFECTION DIAGNOSIS

There is a high level of will to establish reliable robust Lassa fever diagnosis in Eastern Sierra Leone to complement the obvious clinical expertise of the Lassa ward staff and the high level of public education and anxiety about this disease. This political will was enthusiastically expressed by Mr Fillie-Faboe the Minister of State for the Eastern Region, during a meeting at his residence in Kenema, and by Mr Sidikie Brima, the deputy Minister of Health of Sierra Leone. Similar support was given by Dr Williams, Head of the Government Laboratory Services, based at Connaught Hospital, Freetown, and locally in Kenema by Dr Sandi, the Medical director of Kenema Hospital and Dr Stevens the District Medical Officer for the Kenema region. However, one thing that was abundantly clear from these meetings was that Government priorities for the limited finances they have available lay elsewhere. This

together with a lack of local expertise in laboratory design and construction mean there is little prospect that a substantial laboratory devlopment will be realised without extensive external support.

RECOMMENDATIONS

**i) Seek funding for the proposed development of a new laboratory facility at Kenema hospital and to help train staff.**

- Improvement of general diagnostics at Kenema hospital requires the provision of a new laboratory facility. Details of the proposed facility are given in Annex 4.
- Staff will require extra training to use the new equipment and facilities proposed. They also require training to bring them up to proper standards for routine diagnostic activities using the present facility.

**ii) Interim support to the laboratory**

- Merlin should urgently seek a small grant to provide some basic reagents, glassware etc. to support the Kenema hospital laboratory whilst new facilities are planned and built and to provide training material to support laboratory staff in the interim.

**iii) Implementation of Lassa diagnostics in Kenema General Hospital**

- Under the current conditions in both the general diagnostic laboratory and the Lassa isolation laboratory there is no prospect of implementation of sustainable Lassa diagnostics in Kenema.
- Moreover, in the general diagnostic microbiology laboratory there is considerable concern as to the safety of staff working with pathogenic clinical samples containing pathogens such as TB, malaria, Lassa, HIV and Hepatitis B.
- Overall, under the conditions in either the general laboratory or the Lassa fever unit laboratory, there can no reasonable expectation of establishing either fluorescent microscopy or ELISA based Lassa fever based diagnostics. Currently there is
- No laboratory space appropriate to house such 'high technology' equipment,
- Insufficient staff training/expertise to support such diagnostics,
- No infrastructure to maintain and sustain such diagnostic services.

**iv) Proposal for laboratory support of diagnostics**

*Long term*

Establishment of Lassa fever diagnostics in Kenema must be integrated into the overall programme of development of diagnostic microbiological services. As outlined above this will be achieved in several stages:

- Building of a purpose designed laboratory
- Training of staff in current microbiological methods including use of standard operating procedures (including safety).
- Establishment of quality control procedures for all aspects of work including maintenance/ service of laboratory infrastructure.

*Short term*

It is proposed that for the immediate support of the Merlin Lassa Fever isolation ward a collaborative programme is established with CPHL, London, and with other partners who may wish to contribute. It would be intended to provide reference laboratory confirmation of the clinical diagnosis of Lassa fever on a regular basis.

This proposal would require

From CPHL

- All tubes/plastic ware to obtain serum samples from Lassa fever patients



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- A bench centrifuge for serum separation
- A fridge/freezer and backup electricity generator for the storage of sera/blood
- IATA standard containers for the shipment of samples, including freezer packs
- Arranging transport of samples from Freetown to CPHL, London

From Merlin
- Transport of serum samples from Kenema to Freetown.

Samples would be shipped to London every two months. The results of diagnostic testing would be returned to Kenema one month after receipt of the samples.

Discussions with logisticians from a range of NGOs including Merlin and ICRC have established that there is currently no source of dry ice in Sierra Leone. It is also doubtful if carbon dioxide gas for dry ice generation could be supplied regularly. The sera for transportation to reference laboratories will have to be transported packed with 'cold-blocks'. These would be added for the journey from Kenema to Freetown and replaced for the journey from Freetown to London. Whilst not ideal for the transport of virological samples, the method should be suitable for material to be used for molecular and serological diagnosis.

In addition to diagnostic confirmation of Lassa infection the samples sent to London would be used by CPHL (and others) to develop/evaluate new (rapid) diagnostic tests for Lassa fever to be locally validated by the collaborators in Kenema, when the proposed new laboratory is established.

v) **Continue rodent control activities in the IDP camps.**

vi) **As the country opens up and the general security situation improves a detailed study of the biology of Lassa fever should be undertaken (especially as the techniques needed have improved greatly since studies of this sort were last undertaken). This should include:**
- Detailed studies of the taxonomy, genetics and distribution of *Mastomys* spp.
- Studies of the carriage of Lassa fever virus by different populations of *Mastomys* spp.
- A study of whether Lassa fever is spreading to new areas in Sierra Leone and why.

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# MALARIA KAP SURVEY AT KENEMA GOVERNMENT HOSPITAL

**OCTOBER 2001**

## 1. BACKGROUND

The work of the malaria control programme (MCP) at Merlin is concentrated in three IDP camps and two PHU areas. Most of the in-patients at Kenema Government Hospital (KGH) are not from areas where the MCP is currently working. In order to help disseminate knowledge further afield education sessions on the Merlin supported wards are planned. With this in mind, it was decided to conduct a knowledge, attitude and practice (KAP) survey at the paediatric ward and therapeutic feeding centre (TFC) at KGH, to assess the base line knowledge, as a prelude to malaria education sessions.

Prior to interviewing the parents or guardians of the child patients, the staff were interviewed. The medical staff in particular can use their contact with patients to disseminate health education messages and advice.
Medical and non-medical staff were interviewed, and the questionnaire adapted to include their job title and malaria treatment expected or given at a hospital. [Questionnaire in appendix 1].

## 2. KAP SURVEY

Malaria field officers conducted the individual interviews on the wards, mostly in Krio or Mende. All patients' guardians and most staff were interviewed.

A total of 54 staff were interviewed from paediatric ward (PW), paediatric ward extension (PW ext), TFC and under fives. Nurses (including state enrolled community health Nurses (SECHN), auxiliary nurses and staff nurses have all received formal medical training. Carers, vaccinators and registrars have no formal medical training but receive training on the job. The pharmacist is a trained SECHN.

Among patients' guardians in PW, PW extension and TFC, 71, 77 and 51 interviews were conducted respectively. With a few exceptions, the interviewees were mothers of the patients. The exceptions were always other family members, such as grandmothers or aunts. All except one, a father in TFC, were female.
The majority of interviewees were of the Mende tribe, 87.0% of staff and 82.9% of patients' guardians.
The most commonly given local or tribal names for malaria were 'kolevule' and 'gbelui'. Several other tribes were also represented, some of which had alternative names for malaria. The survey also included people from Temne and Sherbro tribes, although no local names were known.

## 3. RESULTS – STAFF SURVEY

### *3.1 TRANSMISSION*

A high proportion of staff, both medical and non-medical, demonstrated considerable knowledge about malaria, transmission, treatment and prevention. 92.6% (50 respondents) knew that mosquitoes transmit malaria. Three medical staff specified Anopheline mosquitoes. When asked where mosquitoes come from, 80% (40) of these people correctly identified stagnant water, ponds or swamps. Toilets and dirty places were also commonly listed as sites for mosquitoes. One SECHN thought that flies transmitted malaria, although they did know that mosquitoes breed in stagnant water. Other sources of malaria, given by 2 cooks and 2 cleaners, were 'gbelui' (a Mende name for malaria), cold, fever, bed bugs, poor handling food, fleas, unsanitary conditions and sexual intercourse. One nurse stated stagnant water itself as a source of malaria.

When asked how a mosquito gives malaria to a human, 81.5% (44) knew that the mosquito infects a human through biting. 35.2% (19) of the staff knew that a mosquito had to acquire the infection before transmitting it to another, healthy person, and one SECHN knew that the infection is carried in the salivary glands of the mosquito. 24.1% (13) knew the mosquito itself was infected, and said it injected



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blood into the healthy human. One thought the mosquito acquired malaria from drinking infected urine, and two that it acquired infection from dirt in toilets before transmitting it to humans.

### *3.2 SYMPTOMS AND TREATMENT*

When asked the symptoms attributed to malaria, every respondent knew one or more. Fever was the most commonly cited, 88.9% (48) of respondents including it amongst other signs. Weakness or excessive sleep, headache and joint pain and loss of appetite were also commonly identified as signs of malaria.

96.3% (52) of respondents would treat malaria at home. One said they would rush the patient to hospital, and one would wash with cold water. 81.5% (44) said they would use chloroquine. Only 3.7% (2) stated herbs, a cook and a cleaner. More people treat or would expect to be treated with fansidar in a hospital (46.6%, 23) than at home (24.1%, 13). Of the five people who would treat with quinine at home, 2 were aid nurses, and 3 non-medical staff. Other drugs used at home included oral re-hydration solution (ORS), aspirin, folic acid, B-complex vitamins, chloramphenicol and penicillin injection.

One member of medical staff, an aid nurse, did not know that malaria can cause convulsions in children. Of all respondents, 83.3% (45) knew that malaria can cause convulsions. The expected treatment for convulsions was given as diazepam by 27.8% (10 medical staff, and 5 non-medical staff) or Panadol (a brand name for paracetamol), 18.5% (10). Other treatments were chloroquine, quinine, folic acid, promethazine and phenobarbitone each quoted once. Tepid sponging was listed by 37.0% (20) interviewees as a treatment for convulsions. A further 4 stated exposing the body to cool air. Both are methods of reducing fever.

Traditional medicine was listed by 9.3% (5) staff (all non-medical) as a treatment for convulsions. One specified the use of a T-bush. Another respondent stated use of church consecrated water as a treatment.

### *3.3 PREVENTION*

The interviewees were asked what they can do to prevent malaria. Bed nets were listed by 79.6% (43) as a preventive measure and 37.0% (20) owned a net at home. Use of insecticides such as 'Shelltox' (a commercially available aerosol containing pyrethroids) and mosquito coils is also popular, listed by 75.9% (41). Half of the respondents knew destroying breeding sites by removing stagnant water or pouring oil into pit latrines was an effective measure.

### *3.4 RECENT FEVER AND TREATMENT*

Thirty-one interviewees (57.4%) described having a fever in the previous 7 days. All had taken treatment, 74.2% (23) took chloroquine. In 13 cases, the chloroquine and Panadol were given together. Chloroquine alone was given in 7 cases, and the combination of chloroquine, fansidar and panadol given in 2 instances. Only three of those with fever did not attend a health facility for the treatment. One SECHN took self-prescribed chloroquine and panadol, and two (1 SECHN and 1 cook) took fansidar obtained from a pharmacy. It is unclear whether this was the hospital pharmacy or one of the many found in town.

There was no relationship between those who owned nets and those who had had fever.

## 4. RESULTS – WARD SURVEY

### *4.1 TRANSMISSION*

The knowledge amongst the guardians of patients in the wards was markedly lower than amongst the staff. Taking all wards together, 65.3% (130) of guardians knew that mosquitoes transmit malaria, compared to 92.6% (50) of staff. The staff also knew that mosquitoes specifically come from stagnant



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water. Amongst guardians, 50.3% (100) knew mosquitoes come from stagnant water, but many said toilets (35.2%, 70) and the bush (37.2%, 74) as well.

A total of 104 interviewees (52.3%) knew mosquitoes transmit malaria through their bite, and of these, 21 (10.6% of total) understood the concept of transmission from an infected to a healthy person via a mosquito.

### 4.2 SYMPTOMS AND TREATMENT

Of all respondents, 96.0% (291) in the wards were able to describe some symptoms which they would attribute to malaria, and only 65.8% (131) gave fever as a symptom. A few stated symptoms which are not due to malaria, such as yellow nails (1), heart palpitations (1), bad dreams (1) and a swollen face (1). This suggests some confusion between the diseases leading to fever, such as malaria, yellow fever and Lassa fever. 4.0% (8) people did not know any signs of malaria.

A considerably higher percentage of guardians (27.6%, 55) than staff (3.7%, 2) would treat malaria at home with herbs. Like the staff, most would still use chloroquine or panadol.

Similarly, many more guardians (34.7%, 69) than staff (9.3%, 5) would treat convulsions at home with traditional methods. These included keeping the child in a goat pen, and using tiger balm or native onion.

Although 65.3% (130) stated fever as a cause of convulsions, 4.5% (9) stated witches or evil spirits, and 9.5% (19) other causes such as a new moon, thunder and lightening, or if a pregnant woman is hungry for a day.

Only 59.3% (118) knew that malaria can cause convulsions in children, and 28.6% (57) stated it did not.

### 4.3 PREVENTION

When asked how they could prevent malaria, the most common answer was the use of bed nets, given by 47.2% (94). Only 23.1% (46) owned a bed net, of which 28.3% (13) were treated with insecticide. In 51.0% of cases, children slept under these nets, with or without the respondent.

Use of traditional herbs or medicine as a preventive measure was stated by 8.5% and other local methods included tying a native rope around the waist, burning lemon grass or rubbing on native ointment.

### 4.4 RECENT FEVER AND TREATMENT

Of the 76.4% (152) respondents who said they had experienced fever in the previous seven days, 57.9% (88) had taken treatment at home. As would be expected from earlier results, many had used herbs, particularly in TFC.

In line with the high proportion of herbal treatments amongst people interviewed in PW and TFC, more treatment was self-prescribed by the interviewees in these wards, unlike interviewees in PW extension, most of who went to a pharmacy for treatment.

## 5. DISCUSSION AND CONCLUSION

Although many of the interviewees knew that mosquitoes transmit malaria, knowledge about the ecology and behaviour of the vector is less consistent. Three of the staff knew that only Anopheles mosquitoes transmit malaria.

Among guardians and most staff there is no recognition of Anopheline and Culicine (including Culex and Aedes) mosquitoes, and therefore no distinction made between the different habits and behaviour. One important difference is that Anopheline mosquitoes require unpolluted water for breeding, whereas Culex

can tolerate high levels of pollution, and hence often breed in pit latrines. Aedes prefer to breed in small vessels, such as tree holes or artificial containers. Among the wards, many people stated latrines as a source of mosquitoes. This shows knowledge of the breeding requirements of mosquitoes, but not specifically Anopheline species, and the malaria vector. In terms of disease control, this distinction is not crucial in a community. Both Anopheline and Culicine mosquitoes are nuisance biters and Culicine mosquitoes can transmit lymphatic filariasis and yellow fever.
Measures to reduce the population of all mosquitoes are therefore beneficial.

The signs and symptoms of malaria can be diverse, especially in an endemic area such as Sierra Leone, where the population will have acquired some level of immunity. Only a few people could not identify any signs of malaria. Due to its diverse symptoms, malaria can also easily be confused with many other infections which cause fever. A few people stated symptoms which would be more indicative of yellow fever (yellow nails) or Lassa fever (swollen face), but which also present with a high fever.

The first line treatment for malaria in Sierra Leone is chloroquine. It is also well recognised and cheap. In keeping with this, the majority of interviewees would take this at home for a fever, or expect to receive it at a health facility. Panadol (paracetamol) is an analgesic and anti-pyretic, and is often given in conjunction with chloroquine. Both are readily available at a street pharmacy or drug peddler.

It is very common for people to treat malaria at home, before or in place of consulting a health facility. For many, the health facility may be too far away, or they do not have the money to pay for a consultation, or not be able to visit during opening hours. Hospital admissions demonstrate that attendance at health facilities decreases during planting and harvesting times, when people have to spend more time on their farms.

Figures for attendance at a health facility may be skewed among Merlin staff, because they receive free treatment at the Merlin supported wards.

Knowledge about the causes of convulsions in children is less widespread than the cause of malaria. Although some know that malaria can lead to convulsions, nearly a third of interviewees in the wards stated that malaria could not lead to convulsions. Some thought that although mosquitoes can cause malaria, cultural beliefs are more widely held with regard to convulsions, which are thought to be caused by non-medical causes such as evil spirits, witch craft, thunder and lightening. In keeping with this, more traditional medicine is used in the treatment of convulsions, such as keeping the child in a goat pen, for example. A similar number would refer to a health facility, sometimes after the use of traditional medicine.
Few people knew methods of fever management such as tepid sponging, which can be used prior to medical treatment.

In all groups interviewed, the use of bed nets was the most often quoted measure for the prevention of malaria. Amongst the staff use of insecticides or repellents such as 'Shelltox' or mosquito coils were also popular, followed by cleaning of the immediate environment or compound.
These proportions were reversed among the interviewees in the wards, and this may reflect better knowledge or increased earning status in the staff.
In malaria control in an endemic area and consequently malaria education in communities, two aspects should be highlighted: reduction of the mosquito population (by reducing breeding sites or residual spraying) and individual protection from mosquito bites (by the use of bed nets or repellents).
Cleaning of the local environment will only have an effect if breeding sites are removed, by filling in potholes or destroying old tins or pans. It can, however, help to reduce the incidence of diseases common in unsanitary conditions.



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Where treatment was taken for a fever in the week prior to the survey, the majority took chloroquine and/or panadol. However, several still take herbal medicine, which can be harmful rather than beneficial, as evidenced by hospital admissions and deaths due to herbal intoxication.

In the light of these findings, there is great scope for improvement in the basic knowledge of malaria transmission, symptoms, treatment and prevention among the patients and their guardians in the KGH. Most of these people do not come from areas in which the malaria control programme is currently active, and providing education to these people will not only benefit the individual but also help to disseminate the knowledge further afield. This education could be provided periodically in the form of small group sessions in the wards at quiet times of the day. The medical staff, who have constant contact with the patients, are also in an ideal position to educate on malaria transmission and offer advice on malaria prevention and treatment.



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Appendix 1

## LASSA FEVER
## KNOWLEDGE, ATTITUDE & PRACTICE SURVEY

Date_____ Name of interviewer_____

Age: _____ Sex: M/F Place of residence: _____

1. Have you heard of Lassa fever before? Yes / No. If Yes, from whom?
a) Merlin/MOHS Lassa Outreach Team, b) radio discussion, c) colleagues, d) family members
b) others specify_____

2. How many people do you know who have suffered from Lassa fever in the last year? (Ramadan last year to date)

3. What things do you notice about their health state? _____

4. Have you ever lived in the same house or town with a person suffering from Lassa Fever in the last year? (Ramadan) Yes / No. If yes what was the outcome? a) Died, b) Recovered, c) Developed disability.

5. How many other villages/towns other than your own village/town have you heard of where people have suffered from Lassa Fever?

6. Do you know what spreads Lassa Fever? Yes/No
If yes, please state _____

7. Do you have rats in your household? Yes/No

8. Do you know what attract rats into a household? Yes/No
If yes name them _____

9a. Do you do anything to keep rats out of your household? Yes / No. If yes what do you do?

9b. Which of these actions do you consider the most effective?_____

9c. What normally do you do when you catch or kill a rat in your household? A) Eat it, b) throw it away, c) bury it. Others_____

10. Are you aware that Lassa Fever could also be spread from person to person directly?
Yes / No. If yes, how? A) Eating together, a) Sleeping together, c) Body contact d) urine/ stool, e) Body fluids, sex, others Specify _____

11. Which groups of people are normally affected with Lassa fever? a) Children, b) Men, c) Women, d) Refugees, e) Pregnant women f) Poor people, g) Every body. Circle the right answer.

12. Do you or the communities know how to assist in the prevention of Lassa fever? Yes/No. If yes State_____

13. What should you or the community do if Lassa fever is suspected in someone? A) Treat at home, b) refer to health facility, c) buy drugs from pharmacy, d) don't know.

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14. Do you have a cat in your household? Yes / No. If no, would you keep a cat if you could get one? Yes / No. If yes, Why?_____ _____ if no why_____

**Thank you for your help!**

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# LASSA FEVER KAP SURVEY REPORT

**2001**

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## 1.0 BACKGROUND INFORMATION

Lassa Fever, a zoonotic viral haemorrhagic fever caused by an arenavirus, is endemic in Sierra Leone, Liberia, Guinea and some parts of Nigeria (the "Lassa belt"). The natural hosts for the virus are Multimammate rats (*Mastomys spp*). Rats of this genus are widely distributed throughout West and Central Africa and are probably the most common rodents in tropical Africa. The taxonomy of this genus is not clear and we have a very fragmentary understanding about the epizootiology of Lassa in the rodent host. What is known is that certain members of the genus (*"M.natalensis"*) are persistently infected and shed the virus in their excreta. Humans are infected by contact with rat excreta, often in contaminated food. In Sierra Leone the main focus of infection is in the east of the country and is centred on the region immediately to the north of Kenema in and around the diamond mining towns of Segbwema, Panguma and Tongo.

A Lassa fever isolation ward in Kenema hospital, which is supported by Merlin, is the only specialist Lassa fever treatment unit in Sierra Leone. In the last 12 months over 500 individuals with suspected Lassa fever have been admitted to this ward. The overall case fatality rate amongst these patients was ca.20%.

### *Merlin and Lassa Fever*

Merlin is the leading NGO involved in the treatment and control of Lassa fever infection in the region. In addition to funding the Lassa fever ward it has been involved with public education programmes. These comprise passive education via billboards and an active population based education programme run by its Lassa outreach teams. The teams visit communities and IDP camps to teach people what they should do to reduce the risk of catching Lassa fever, how to recognise the disease and of the need for prompt treatment.

A key method in the control of Lassa Fever virus is to control exposure to the vector, the *Mastomys* rats. However, control of rodents in tropical situations is complex and difficult. Ideally control can be achieved by a combination of:

a) Intensive poisoning/trapping programmes to reduce numbers
b) Measures to prevent breeding (denial of food and cover) and to protect food stores, houses etc. to prevent rodent access
c) The use of trapping programmes and/or cats to maintain numbers of rodents in houses at a low level.
d) Public education on the risks of contact with rodents and on practical measures to control rodent populations.

However, these steps may pose specific difficulties

a) Poisoning and trapping are labour intensive and the former is expensive. Poisoning also carries risks to humans. Operators need to be trained to undertake both activities. In Sierra Leone, most villages, camps etc. are close to farmland or forest, which can act as a reservoir of rodents, so such campaigns, need to be undertaken regularly (continuously in some situations) and supported by the other means listed above.
b) Both poisoning and trapping are non-specific in their action, targeting all species of rodent. There is evidence that *Mastomys* spp. may be excluded from some areas by the presence and activities of other rodent species such as black rats (*Rattus rattus*). If this is so then trapping or poisoning programmes must be undertaken regularly. Occasional programmes may be counter productive if they reduce the numbers of an effective competitor and allow *Mastomys*, with its exceptional ability to breed rapidly, to dominate the rodent fauna.
c) Denial of food and cover implies preventing access by rodents to food and other stores and to houses, good warehouse practice and high standards of cleanliness both in and outside buildings. These measures are very difficult to achieve in countries where most people are very poor and especially in camps for IDPs and refugees such as in the current conditions in Sierra Leone.
d) Predators such as cats are effective in keeping numbers of rodents low in houses or stores provided that other rodent control measures (such as reduced cover, access to food etc) are also in place. The ability of rodents to breed extremely fast will rapidly overwhelm the ability of predators to control them if food and cover are present *ad libitum*. Cats are not ideal in all situations (such as camps) as they may get eaten, may kill domestic stock such as chickens, or may act as vectors of diseases such as rabies, toxoplasmosis or cat scratch fever. In well-managed domestic dwellings or stores they are effective. Cats should not be introduced into areas where they are not normally found or have not been found in the recent past.

Rodent control throughout Sierra Leone is constrained by all these problems. In particular, in the IDP camps it is hampered by overcrowding, poor building construction and poor waste management. Merlin has undertaken a

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number of rodent control measures in the past and is actively involved with public education programmes on rodent control. Advice on how to trap rodents, how to handle carcasses safely, not to eat rodents and how to reduce access to food and cover will help reduce rodent numbers and, equally importantly, will reduce the risk of exposure to infection.

This KAP survey is an attempt to evaluate the extent to which health education/community sensitisation programme has been effective in raising awareness of the disease and rodent control and to use the result to refocus the preventive & control measures during the next programme cycle.

## 2.0 METHODOLOGY

Using 2 stage cluster sampling (30 clusters x 7 respondents), multiple clustering method was used to conduct the Lassa fever KAP survey. Assuming that 10% of the population in all Merlin operational areas in the district should be knowledgeable about Lassa fever, and using 95% confidence intervals we used 120 clusters doubling it to 240 clusters x 7 respondents/cluster giving the total of **1680** respondents.

The survey covered four IDPs camps (Lebanese, Nyandeyama, Blama and Gofor) with 12, 11, 15, and 2 clusters respectively. Kenema Township is separated into seven zones, these were all covered with 101 clusters. Eight PHUs were selected with 48 catchment villages randomly selected from a total of around 200 giving a total of 336 clusters.

Random sampling method was used throughout the survey exercise

1. **Kenema Town –** 101 clusters were chosen in the 7 zones and each zone was allocated a number of clusters proportional to the population of the zone. In each cluster seven households were selected and interviewed. "A household" is a group of persons sharing meals and residence. The sampling units (households) in each cluster was randomly chosen.
The team went to the centre of the zone and randomly selected the first cluster (in this case a street) by spinning a bottle and choosing the direction of the neck of the bottle. Also randomly selected the first house on the street by again spinning the bottle at the centre of the chosen street and interviewed one member only of the chosen household. The team then moved to the nearest house until the seven interviews of the cluster were completed. This procedure was repeated until the required clusters were completed in each zone.
2. **Camps –** Here each camp is divided into sections and every section is allocated a number of respondents. Therefore booths were selected at random and a household/booth interviewed. The team went to the centre of the section of the camp and randomly selected the first booth and then every 5th booth until the required number of interviews for the section was completed.

3. **PHUs catchment areas –** The teams visited randomly selected villages. In each selected village the team then randomly selected a house and in the selected house a household was also selected at random and one member of that household was interviewed. Where more than one respondent was required the team moved to the nearest house and procedure repeated until the required number of respondents was interviewed in the village.

## 3.0 RESULTS

### PART 1 AWARENESS

#### 3.1 Knowledge of Lassa Fever

Table 1: have heard about Lassa fever

| Sex | Yes | No | Total |
|---|---|---|---|
| Male | 774 | 39 | 813 |
| Female | 817 | 50 | 867 |
| Total | 1591 | 89 | 1680 |
| % | 95 | 5 | 100 |

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3.2 Source of information on Lassa Fever

From the different sources of hearing about Lassa fever like family members, outreach team/radio discussions, and colleagues, the overwhelming proportion was via the outreach team and radio discussions.

Table 2

| Source of information | Number | % of total |
|---|---|---|
| Lassa outreach team | 734 | 38.1 |
| Radio discussion | 865 | 44.9 |
| Colleagues | 465 | 24.2 |
| Family members | 260 | 13.5 |
| Others | 0 | 0.0 |

3.3 Respondents who have known of Lassa Fever cases

Table 3 Respondents who have known cases of Lassa fever

| 0 | 1-5 | 5-10 | >10 |
|---|---|---|---|
| 576 | 339 | 348 | 410 |

3.4 Knowledge of symptoms of Lassa Fever

Table 4 Signs/symptoms attributed to Lassa fever.

| Signs/symptoms | Number | % of total |
|---|---|---|
| Fever | 609 | 23% |
| Mental confusion | 50 | 2% |
| Body pains | 720 | 27% |
| Sore throat | 450 | 17% |
| Convulsions | 45 | 1.6% |
| Vomiting | 475 | 18% |
| Red eyes | 120 | 4.4% |
| Others | 230 | 9% |

3.5 People identified as normally affected with Lassa fever

Table 5

| Group of people normally affected with Lassa fever | # each group | % of total |
|---|---|---|
| Children | 72 | 3.9 |
| Men | 34 | 1.8 |
| Women | 63 | 3.4 |
| Pregnant women | 45 | 2.4 |
| Refugees | 30 | 1.6 |
| Poor people | 60 | 3.2 |
| Everybody | 1550 | 83.6 |

3.6 Community Attitude to Lassa Fever

Table 6

| Community attitude to a suspected case of Lassa fever in the community | # respondents | % Total |
|---|---|---|
| Buy drugs from pharmacy | 78 | 4.6 |
| Treat at home | 12 | 0.7 |
| Refer to health facility | 1575 | 93.8 |
| Don't know | 15 | 0.9 |

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## PART 2 MODE OF TRANSMISSION

### 3.7 Knowledge of transmission

Eight hundred and thirty seven respondents (50%) reported that they were aware of between 0-5 villages where people have suffered from Lassa fever, 320 (19%) between 5-10 villages and 520 (31%) reported of over 10 villages.

Table 7 Mode of spread of Lassa fever as reported by respondents:

| Mode of transmission | Number | % of total |
|---|---|---|
| [illegible] | 645 | 38.3 |
| [illegible] | 3 | 0.1 |
| [illegible] | 0 | 0 |
| [illegible] | 946 | 57.2 |
| Dirty environment | 40 | 2.4 |

During the interview 93% of the respondents said that Lassa fever could be spread from man to man in the following ways:

Table 8

| Ways in which Lassa is spread from man to man | # respondents | %of total |
|---|---|---|
| Eating together | 950 | 56.5 |
| Sleeping together | 35 | 2.1 |
| Body contact | 210 | 12.5 |
| Urine/stool | 140 | 8.3 |
| Body fluids | 344 | 20.5 |
| Others | 1 | 0.1 |

## PART 3 RODENT RISK AND CONTROL

### 3.8 Rat infestation

Figure 1

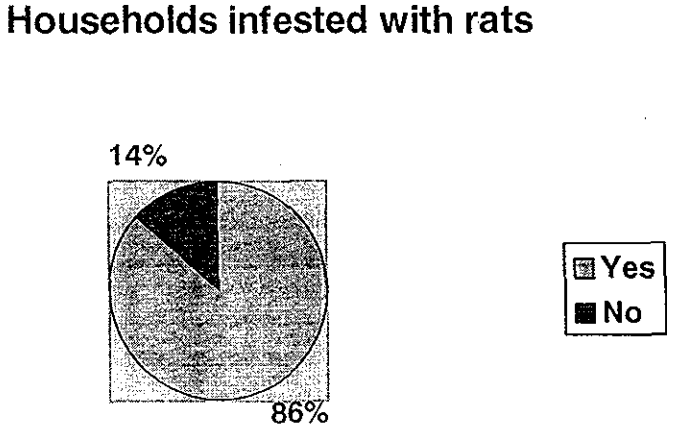


Table 9: Things that attract rats into household

| Conditions that attract rats in H/H | Number | % of total |
|---|---|---|
| Food | 833 | 49.6 |
| Dirt | 142 | 8.5 |
| Congested home | 421 | 25.0 |
| Insects | 0 | 0.0 |
| Grass | 35 | 2.1 |
| Overcrowding | 249 | 14.8 |

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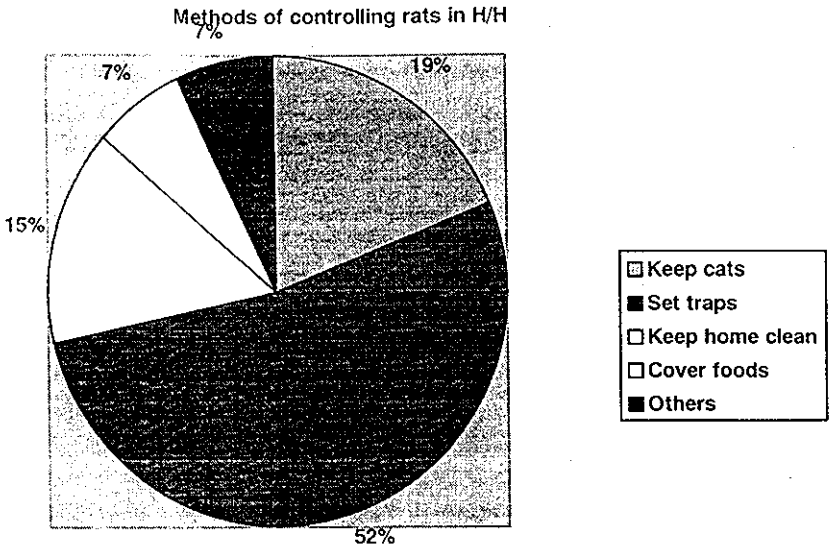
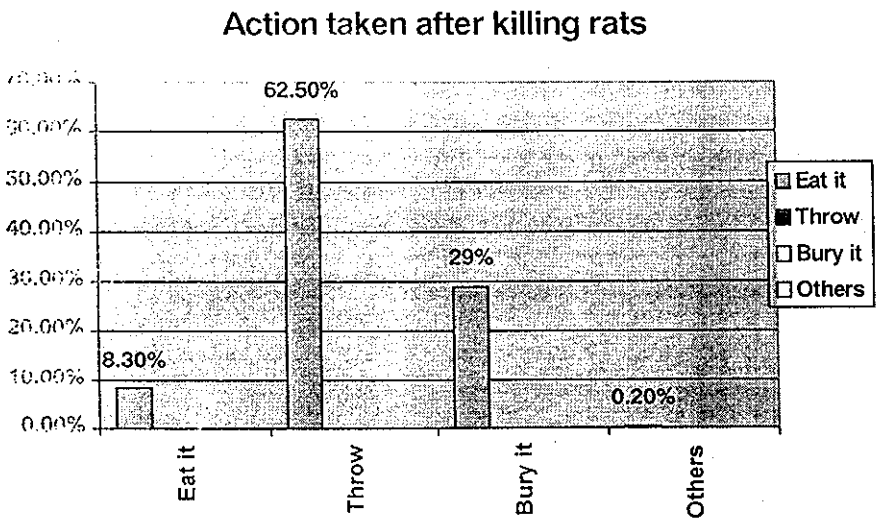
3.8 Method of controlling rats

Figure 2

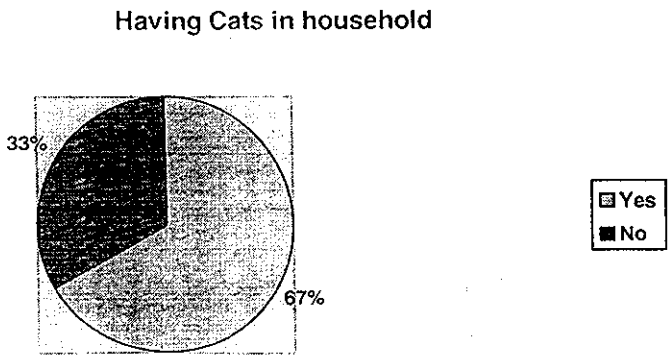



3.9 Action taken after killing rats

Figure 3




3.10 Percentage of households with cats

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## 4.0 ANALYSIS

### AWARENESS

Following five years of Lassa Outreach activities (health education, community sensitisation & radio discussions) in the Kenema district 95% of respondents have heard about the disease. Fifty percent of respondents had heard of more than 5 villages where Lassa had been reported, 31% had heard of more than ten. This could be an indication that knowledge about Lassa is widespread and that news of Lassa fever cases is considered notable enough to be spread village to village.

Fifty six percent of respondents identified fever, 43% identified body pains and 27% identified sore throat as major symptoms of Lassa fever. These results are fairly low considering the general awareness about the disease. It is quite surprising that only 36% identified fever as a symptom of Lassa 'Fever'. There is a need to improve the awareness of symptoms of possible Lassa fever through further education.

Only four percent of respondents said they would refer a suspected case of Lassa to a health facility. This is very reassuring though there is still room for improvement.

### MODE OF TRANSMISSION

Fifty six percent identified rats as a main transmission route for Lassa fever whilst 38% identified human to human transmission. Therefore 94 % correctly identified one of the two main routes of transmission. Of those who knew that man was a route of transmission only 28.8% could state correctly the means through which Lassa is spread from person to person. Eighty four percent of respondents correctly stated that everybody is at risk of contracting Lassa fever.

Generally awareness of mode of transmission is very good. There is a knowledge gap in exactly how the virus can be spread from person to person therefore more emphasis should be put on mode of spread during the health education programme during the next programme cycle.

### RODENT RISKS AND CONTROL

Eighty six percent of respondents were aware of rat infestation in their dwellings. Ninety eight percent of respondents take some measures to control rats in their dwellings. Sixty seven percent of respondents have a cat in their compound. Of those who did not have a cat 97% said they would keep a cat if they could get one.

Twenty nine percent were able to identify risk factors that may encourage rats to enter the house. This shows an awareness of the importance of rodent control and a good knowledge of what attracts rats. The current outreach education teaches people to bury any rats that they catch. Only 29% of respondents said that they would bury a rat. Sixty three percent said that they would throw a rat away. A worrying 8 % of respondents said they would eat any rats that they caught. Although people are aware that rats spread Lassa fever and other diseases the risk from dead rodents are not fully understood and need to be reinforced in the training.

## 5.0 SUMMARY

Generally the results of the survey reveal a good knowledge of Lassa fever, it's mode of transmission, control measures and the seriousness of the disease. Baseline data of this sort is not available so the degree to which this knowledge is attributable to the work of the Merlin Lassa Outreach team is hard to gauge. There remain some worrying gaps in peoples understanding of the disease that needs to be addressed through further education and training

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## Kenema Therapeutic Feeding Program (Jan-Dec 2001)

| Nutritional Center | Jan | Feb | March | April | May | June | July | August | September | October | November | December | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Admissions* | 184 | 113 | 174 | 221 | 416 | 345 | 369 | 169 | 140 | 85 | 88 | 41 | 2345 |
| Re-admissions | 1 | 1 | 6 | 0 | 2 | 3 | 4 | 1 | 1 | 0 | 0 | 2 | 21 |
| Deaths | 7 | 8 | 8 | 7 | 11 | 8 | 11 | 19 | 11 | 12 | 7 | 7 | 116 |
| Deaths within 48 hours | 4 | 3 | 5 | 3 | 6 | 3 | 6 | 8 | 4 | 2 | 0 | 0 | 44 |
| Defaulters | 5 | 2 | 13 | 8 | 32 | 60 | 10 | 5 | 15 | 14 | 10 | 5 | 179 |
| Transfers | 8 | 6 | 5 | 5 | 8 | 8 | 15 | 16 | 0 | 0 | 1 | 0 | 72 |
| *Cured* | 143 | 120 | 128 | 144 | 315 | 269 | 318 | 180 | 169 | 138 | 56 | 67 | 2047 |
| Total Exits | 163 | 136 | 154 | 164 | 366 | 345 | 354 | 220 | 195 | 164 | 74 | 79 | 2414 |
| Mean Weight Gain [MWG] (kg) | 10.9 | 11 | 12.3 | 14.4 | 12.2 | 9 | 11.3 | 11.4 | 11.8 | 10.1 | 11 | 12.6 | 12 |
| Average Length of Stay (days) | 23 | 19 | 22 | 11 | 13.5 | 18.6 | 23 | 18 | 26 | 15 | 20 | 17 | 18.84 |

| Project | Coverage | Cure Rate | Mortality Rate | Default Rate | MWG (kg) | Av. Length of stay (days) | Staff ratio / 100 |
|---|---|---|---|---|---|---|---|
| **Merlin-Kenema** | 79% | 85% | 5% | 7% | 12 | 18.84 | 0.725 |

**Number of staff**

17

| | Total | <5 | <15 |
|---|---|---|---|
| **Population of Kenema District** | **461644** | **78479** | **184658** |
| **Population of Kenema Town** | **102408** | **17409** | **40963** |

**Global Acute Malnutrition Rate**

3.8%

| Hospital: | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total/Average | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of Beds | 168 | 166 | 159 | 166 | 166 | 163 | 163 | 159 | 159 | 143 | 102 | 100 | 152 | Average |
| Admissions | 636 | 571 | 641 | 734 | 1172 | 683 | 868 | 696 | 635 | 814 | 444 | 345 | **687** | Average |
| Exits | 727 | 613 | 624 | 705 | 1228 | 700 | 862 | 696 | 573 | 835 | 512 | 414 | **8489** | Total |
| Transfers | 7 | 11 | 8 | 5 | 13 | 10 | 12 | 7 | 3 | 2 | 4 | 2 | **84** | Total |
| Defaulters | 2 | 11 | 6 | 4 | 9 | 6 | 6 | 7 | 6 | 2 | 9 | 10 | **78** | Total |
| Discharges | 695 | 567 | 590 | 673 | 1175 | 660 | 809 | 648 | 530 | 797 | 464 | 369 | **7977** | Total |
| Discharge rate (%) | 96 | 93 | 95 | 96 | 96 | 94 | 94 | 93 | 92 | 95 | 91 | 89 | **94** | Average |
| Deaths | 23 | 24 | 20 | 23 | 31 | 24 | 35 | 34 | 87 | 36 | 35 | 33 | **405** | Total |
| Deaths within 48 hours | 11 | 12 | 11 | 12 | 19 | 10 | 22 | 16 | 11 | 12 | 15 | 18 | **169** | Total |
| Mortality Rate (%) | 3.1 | 3.9 | 3.2 | 3.3 | 2.5 | 3.4 | [illegible] | 5 | 6 | 4.3 | 6.9 | 8 | 4 | Average |
| Average Length of Stay (days) | 5 | [illegible] | 5 | 6 | 6 | 6 | 7 | 7 | 6 | 6 | 6 | 5 | **6.1** | Average |
| Bed Occupancy Rate (%) | 104 | 110 | 97 | 98 | 150 | 103 | 82 | 94 | 102 | 126 | 62 | 59 | **99** | Average |

| [redacted] | Population | Total New Admissions | Av. # New Admissions/ month | Attendance Rate (based on dist. <15 pop.) | Attendance Rate (based on dist. <5 pop.) | Attendance Rate (based on town <15 pop.) | Attendance Rate (based on town <5 pop.) | Bed Capacity | Av. Length of Stay (days) | Bed Occupancy rate (%) | Av. Cost/New Admission (Euro) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Pediatric Service - KGH** | [illegible] | **8240** | **687** | **0.04** | **0.10** | **0.20** | **0.47** | **152** | **6.1** | **99** | **11.5** |

| | Total | <5 | <15 |
|---|---|---|---|
| **Population of Kenema District** | **461644** | **78479** | **184658** |
| **Population of Kenema Town** | **102408** | **17409** | **40963** |

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**Annex 5** Morbidity and health data

**PHU Reports Kenema District (Jan-Dec 2001) New Cases Only**

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total PHC | Average/Month |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Baama CHC | 369 | 701 | 240 | 328 | 473 | 303 | 457 | 249 | 191 | 296 | 540 | 389 | 4536 | 378 |
| Blama Camp | 589 | 828 | 965 | 857 | 1114 | 819 | 1112 | 625 | 1163 | 654 | 982 | 933 | 10641 | 887 |
| Blama CHC | 852 | 812 | 918 | 996 | 1199 | 876 | 888 | 1147 | 870 | 878 | 944 | 855 | 11235 | 936 |
| Doujou CHP | 398 | 383 | 352 | 327 | 508 | 401 | 383 | 524 | 385 | 407 | 401 | 279 | 4748 | 396 |
| Falla CHP | 365 | 275 | 320 | 261 | 226 | 309 | 246 | 156 | 139 | 133 | 155 | 144 | 2729 | 227 |
| Foindu CHC | 452 | 290 | 376 | 367 | 403 | 271 | 258 | 272 | 239 | 207 | 245 | 209 | 3589 | 299 |
| Goala MCHP | | | | | | | | | | 190 | 169 | 119 | 478 | 159 |
| Gofor Camp | | | | | 432 | 477 | 296 | 547 | 304 | 362 | 306 | 414 | 3138 | 392 |
| Komende MCHP | | | | | | | | | | 90 | 70 | 61 | 221 | 74 |
| Kundorma CHP | 449 | 489 | 450 | 476 | 453 | 345 | 506 | 472 | 431 | 437 | 547 | 305 | 5360 | 447 |
| Largo CHC | 510 | 621 | 752 | 376 | 650 | 677 | 657 | 692 | 447 | 508 | 457 | 380 | 6727 | 561 |
| Lebanese Camp | 2173 | 1633 | 1893 | 1595 | 1949 | 1650 | 1478 | 1454 | 1432 | 917 | 1638 | 1364 | 19176 | 1598 |
| Levuma CHC | 1167 | 619 | 934 | 1258 | 1148 | 856 | 1065 | 980 | 867 | 680 | 936 | 573 | 11083 | 924 |
| Lowoma CHC | | | | | | | | | 78 | 159 | 167 | 83 | 487 | 122 |
| Mondema CHC | 378 | 308 | 321 | 405 | 412 | 356 | 416 | 303 | 383 | 296 | 626 | 748 | 4952 | 413 |
| Nekabo CHP | 639 | 297 | 420 | 503 | 477 | 203 | 344 | 299 | 391 | 336 | 341 | 281 | 4531 | 378 |
| Ngalehun MCHP | | | | | | | | | | 65 | 109 | 103 | 277 | 92 |
| Tongo CHC | | | | | | | | | 106 | 261 | 286 | 210 | 863 | 216 |
| Tungie CHC | 449 | 339 | 493 | 490 | 750 | 438 | 400 | 366 | 341 | 469 | 87 | 101 | 4723 | 394 |
| Weima CHC | 267 | | | | | | | | 267 | 322 | 457 | 131 | 1444 | 294 |
| Under 5 clinic Kenema | 2969 | 2374 | 2483 | 1377 | 3314 | 2866 | 3479 | 1940 | 3708 | 2432 | 2500 | 2213 | 31655 | 2638 |
| **Total District** | 12026 | 9969 | 10917 | 9616 | 13508 | 10847 | 11985 | 10026 | 11742 | 10099 | 11963 | 9895 | 164248 | 11049 |

**Annex 5** Morbidity and health data

| | Pop | Att. Rate | New Cases | Revisits | All Cases | Cost/Patient (Drugs only) (€) | # staff | staff/100 |
|---|---|---|---|---|---|---|---|---|
| Baama CHC | 11051 | 1.82 | 4536 | 4763 | 9299 | 0.54 | 3 | 0.07 |
| Blama Camp | 14988 | 1.80 | 10641 | 9809 | 20450 | 0.33 | 3 | 0.03 |
| Blama CHC | 20640 | 1.69 | 11235 | 10502 | 21737 | 0.30 | 4 | 0.04 |
| Doujou CHP | 4131 | 2.88 | 4748 | 8218 | 12966 | 0.47 | 3 | 0.06 |
| Falla CHP | 5381 | 0.99 | 2729 | 2904 | 5633 | 1.11 | 3 | 0.11 |
| Foindu CHC | 10250 | 1.13 | 3589 | 3052 | 6641 | 1.41 | 3 | 0.08 |
| Goala MCHP | 3857 | 0.36 | 478 | 355 | 833 | 0.10 | 1 | 0.21 |
| Gofor Camp | 1018 | 6.53 | 3138 | 2720 | 5858 | 0.37 | 2 | 0.06 |
| Komende MCHP | 5000 | 0.12 | 221 | 456 | 677 | 0.36 | 1 | 0.45 |
| Kundorma CHP | 6756 | 1.77 | 5360 | 6931 | 12291 | 0.52 | 3 | 0.06 |
| Largo CHC | 12151 | 1.97 | 6727 | 5685 | 12412 | 0.44 | 4 | 0.06 |
| Lebanese Camp | 17000 | 2.32 | 19176 | 10501 | 29677 | 0.19 | 4 | 0.02 |
| Levuma CHC | 15582 | 2.95 | 11083 | 6497 | 17580 | 0.22 | 4 | 0.04 |
| Lowoma CHC | 9000 | 0.18 | 487 | 633 | 1120 | 0.47 | 3 | 0.62 |
| Mondema CHC | 7051 | 1.86 | 4204 | 4211 | 8415 | 0.67 | 3 | 0.07 |
| Nekabo CHP | 10126 | 0.98 | 4531 | 4107 | 8638 | 0.77 | 3 | 0.07 |
| Ngalehun MCHP | 6000 | 0.12 | 277 | 257 | 534 | 0.24 | 1 | 0.36 |
| Tongo CHC | 35000 | 0.07 | 863 | 905 | 1768 | 0.55 | 4 | 0.46 |
| Tungie CHC | 6922 | 2.40 | 4622 | 3638 | 8260 | 0.46 | 3 | 0.06 |
| Weima CHC | 7000 | 0.49 | 1444 | 1040 | 2484 | 0.47 | 3 | 0.21 |
| Under 5 clinic Kenema | 17340 | 2.36 | 31655 | 9308 | 40963 | 0.90 | 5 | 0.02 |
| **Total District** | 226244 | 1.66 | 164248 | 96492 | 260740 | 0.52 | 63 | 0.04 |

*Annex 6 Lassa Statistics*

| 2001 Data | January | | | | | | | | | February | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Male | | | Female | | | Total | | | Male | | | Female | | | |
| Age Group | Cases | Deaths | CFR | Cases | Deaths | CFR | Cases | Deaths | CFR | Cases | Deaths | CFR | Cases | Deaths | CFR | Cases |
| <5 yrs | 1 | 0 | 0% | 4 | 0 | 0% | 5 | 0 | 0% | 0 | 0 | #DIV/0! | 2 | 0 | 0% | 2 |
| 5 -14 yrs | 4 | 0 | 0% | 2 | 0 | 0% | 6 | 0 | 0% | 3 | 2 | 67% | 3 | 1 | 33% | 6 |
| 15 - 29 yrs | 10 | 1 | 10% | 5 | 1 | 20% | 15 | 2 | 13% | 7 | 1 | 14% | 6 | 0 | 0% | 13 |
| 30 - 45 yrs | 1 | 0 | 0% | 3 | 0 | 0% | 4 | 0 | 0% | 3 | 0 | 0% | 0 | 0 | #DIV/0! | 3 |
| >45 yrs | 1 | 0 | 0% | 0 | 0 | #DIV/0! | 1 | 0 | 0% | 3 | 1 | 33% | 1 | 0 | 0% | 4 |
| All Cases | 17 | 1 | 6% | 14 | 1 | 7% | 31 | 2 | 6% | 16 | 4 | 25% | 12 | 1 | 8% | 28 |
| Patient Sources | Male | % of cases | | Female | % of cases | | All | % of cases | | Male | % of cases | | Female | % of cases | | All |
| Segbwema | 0 | 0% | | 1 | 7% | | 1 | 3% | | 0 | 0% | | 0 | 0% | | 0 |
| Tongo | 1 | 6% | | 0 | 0% | | 1 | 3% | | 0 | 0% | | 0 | 0% | | 0 |
| Panguma | 0 | 0% | | 2 | 14% | | 2 | 6% | | 2 | 12% | | 1 | 7% | | 3 |
| Kenema | 11 | 65% | | 7 | 50% | | 18 | 58% | | 8 | 47% | | 4 | 29% | | 12 |
| Hangha | 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 |
| Boajibu | 0 | 0% | | 1 | 7% | | 1 | 3% | | 0 | 0% | | 0 | 0% | | 0 |
| Bo | 1 | 6% | | 1 | 7% | | 2 | 6% | | 0 | 0% | | 0 | 0% | | 0 |
| Others | 4 | 24% | | 2 | 14% | | 6 | 19% | | 6 | 35% | | 7 | 50% | | 13 |
| | 17 | | | 14 | | | 31 | | | 16 | | | 12 | | | 28 |

*Annex 6 Lassa Statistics*

| | | March | | | | | | | | | 1st Quarter | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total | | Male | | | Female | | | Total | | | Male | | | Female | | | Total | | |
| Deaths | CFR | Cases | Deaths | CFR | Cases | Deaths | CFR | Cases | Deaths | CFR | Cases | Deaths | CFR | Cases | Deaths | CFR | Cases | Deaths | CFR |
| 0 | 0% | 4 | 0 | 0% | 2 | 0 | 0% | 6 | 0 | 0% | 5 | 0 | 0% | 3 | 0 | 0% | 13 | 0 | 0% |
| 3 | 50% | 3 | 0 | 0% | 0 | 0 | #DIV/0! | 3 | 0 | 0% | 10 | 2 | 20% | 5 | 1 | 20% | 15 | 3 | 20% |
| 1 | 8% | 2 | 0 | 0% | 5 | 1 | 20% | 7 | 1 | 14% | 18 | 2 | 11% | 16 | 2 | 13% | 35 | 4 | 11% |
| 0 | 0% | 5 | 1 | 20% | 2 | 0 | 0% | 7 | 1 | 14% | 8 | 1 | 11% | 5 | 0 | 0% | 14 | 1 | 7% |
| 1 | 25% | 2 | 0 | 0% | 2 | 0 | 0% | 4 | 0 | 0% | 6 | 1 | 17% | 3 | 0 | 0% | 9 | 1 | 11% |
| 5 | 18% | 16 | 1 | 6% | 11 | 1 | 9% | 27 | 2 | 7% | 49 | 6 | 12% | 37 | 3 | 8% | 86 | 9 | 10% |
| % of cases | | Male | % of cases | | Female | % of cases | | All | % of cases | | | % of cases | | | % of cases | | | % of cases | |
| 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | | 1 | 3% | | 1 | 1% | |
| 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | | 1 | 2% | | 0 | 0% | | 1 | 1% | |
| 10% | | 1 | 6% | | 1 | 7% | | 2 | 6% | | 3 | 6% | | 4 | 11% | | 7 | 8% | |
| 39% | | 9 | 53% | | 10 | 71% | | 19 | 61% | | 28 | 57% | | 21 | 57% | | 49 | 57% | |
| 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | |
| 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | | 1 | 3% | | 1 | 1% | |
| 0% | | 1 | 6% | | 0 | 0% | | 1 | 3% | | 2 | 4% | | 1 | 3% | | 3 | 3% | |
| 42% | | 5 | 29% | | 0 | 0% | | 5 | 16% | | 15 | 31% | | 8 | 24% | | 24 | 28% | |
| | | 16 | | | 11 | | | 27 | | | 49 | | | 37 | | | 86 | | |

*Annex 6 Lassa Statistics*

| April | | | | | | | | | May | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Male | | | Female | | | Total | | | Male | | | Female | | | Total | | |
| Cases | Deaths | CFR | Cases | Deaths | CFR | Cases | Deaths | CFR | Cases | Deaths | CFR | Cases | Deaths | CFR | Cases | Deaths | CFR |
| 4 | 3 | 75% | 3 | 2 | 67% | 7 | 5 | 71% | 4 | 1 | 25% | 4 | 1 | 25% | 8 | 2 | 25% |
| 2 | 1 | 50% | 2 | 2 | 100% | 4 | 3 | 75% | 1 | 0 | 0% | 4 | 2 | 50% | 5 | 2 | 40% |
| 4 | 2 | 50% | 4 | 0 | 0% | 8 | 2 | 25% | 1 | 0 | 0% | 6 | 0 | 0% | 7 | 0 | 0% |
| 2 | 0 | 0% | 4 | 2 | 50% | 6 | 2 | 33% | 7 | 0 | 0% | 4 | 0 | 0% | 11 | 0 | 0% |
| 0 | 0 | #DIV/0! | 0 | 0 | #DIV/0! | 0 | 0 | #DIV/0! | 0 | 0 | #DIV/0! | 1 | 0 | 0% | 1 | 0 | 0% |
| 12 | 6 | 50% | 13 | 6 | 46% | 25 | 12 | 48% | 13 | 1 | 8% | 19 | 3 | 16% | 32 | 4 | 13% |
| Male | % of cases | | Female | % of cases | | All | % of cases | | Male | % of cases | | Female | % of cases | | All | % of cases | |
| 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | |
| 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | |
| 0 | 0% | | 0 | 0% | | 0 | 0% | | 1 | 6% | | 1 | 7% | | 2 | 6% | |
| 6 | 35% | | 7 | 50% | | 13 | 42% | | 6 | 35% | | 9 | 64% | | 15 | 48% | |
| 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | |
| 0 | 0% | | 0 | 0% | | 0 | 0% | | 1 | 6% | | 0 | 0% | | 1 | 3% | |
| 1 | 6% | | 0 | 0% | | 1 | 3% | | 0 | 0% | | 1 | 7% | | 1 | 3% | |
| 5 | 29% | | 6 | 43% | | 11 | 35% | | 5 | 29% | | 8 | 57% | | 13 | 42% | |
| 12 | | | 13 | | | 25 | | | 13 | | | 19 | | | 32 | | |

*Annex 6 Lassa Statistics*

| June | | | | | | | | | 2nd Quarter | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Male | | | Female | | | Total | | | Male | | | Female | | | Total | | | -5 | | |
| Cases | Deaths | CFR | Cases | Deaths | CFR | Cases | Deaths | CFR | Cases | Deaths | CFR | Cases | Deaths | CFR | Cases | Deaths | CFR | cases | Deaths | CFR |
| 3 | 1 | 33% | 2 | 0 | 0% | 5 | 1 | 20% | 11 | 5 | 45% | 8 | 3 | 82% | 20 | 8 | 133% | 16 | 5 | 0.3125 |
| 5 | 1 | 20% | 2 | 1 | 50% | 7 | 2 | 29% | 8 | 2 | 25% | 8 | 5 | 63% | 16 | 7 | 44% | 18 | 4 | 22% |
| 2 | 1 | 50% | 2 | 1 | 50% | 4 | 2 | 50% | 7 | 3 | 43% | 12 | 1 | 8% | 19 | 4 | 21% | 26 | 5 | 19% |
| 3 | 0 | 0% | 1 | 0 | 0% | 4 | 0 | 0% | 12 | 0 | 0% | 9 | 2 | 22% | 21 | 2 | 10% | 21 | 1 | 5% |
| 0 | 0 | #DIV/0! | 0 | 0 | #DIV/0! | 0 | 0 | #DIV/0! | 0 | 0 | #DIV/0! | 1 | 0 | 0% | 1 | 0 | 0% | 6 | 1 | 17% |
| 13 | 3 | 23% | 7 | 2 | 29% | 20 | 5 | 25% | 38 | 10 | 26% | 39 | 11 | 28% | 77 | 21 | 27% | 87 | 16 | 18% |
| Male | % of cases | | Female | % of cases | | All | % of cases | | | % of cases | | | % of cases | | | % of cases | | | % of cases | |
| 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | |
| 2 | 12% | | 0 | 0% | | 2 | 6% | | 2 | 4% | | 0 | 0% | | 2 | 2% | | 3 | 3% | |
| 0 | 0% | | 0 | 0% | | 0 | 0% | | 1 | 2% | | 1 | 3% | | 2 | 2% | | 4 | 5% | |
| 4 | 24% | | 4 | 29% | | 8 | 26% | | 16 | 33% | | 20 | 54% | | 36 | 42% | | 44 | 51% | |
| 1 | 6% | | 0 | 0% | | 1 | 3% | | 1 | 2% | | 0 | 0% | | 1 | 1% | | 1 | 1% | |
| 0 | 0% | | 0 | 0% | | 0 | 0% | | 1 | 2% | | 0 | 0% | | 1 | 1% | | 1 | 1% | |
| 0 | 0% | | 0 | 0% | | 0 | 0% | | 1 | 2% | | 1 | 3% | | 2 | 2% | | 3 | 3% | |
| 6 | 35% | | 3 | 21% | | 9 | 29% | | 16 | 33% | | 17 | 46% | | 33 | 38% | | 31 | 36% | |
| 13 | | | 7 | | | 20 | | | 38 | | | 39 | | | 77 | | | 87 | | |

*Annex 6 Lassa Statistics*

| Half Year | | | | | | July | | | | | | | | | August | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| >5 | | | Total | | | Male | | | Female | | | Total | | | Male | | | Female | |
| cases | Deaths | CFR | cases | Deaths | CFR | Cases | Deaths | CFR | Cases | Deaths | CFR | Cases | Deaths | CFR | Cases | Deaths | CFR | Cases | Deaths |
| 17 | 3 | 0.176471 | 33 | 8 | 0.242424 | 0 | 0 | #DIV/0! | 0 | 0 | #DIV/0! | 0 | 0 | #DIV/0! | 0 | 0 | #DIV/0! | 2 | 0 |
| 13 | 6 | 46% | 31 | 10 | 32% | 3 | 1 | 33% | 0 | 0 | #DIV/0! | 3 | 1 | 33% | 1 | 0 | 0% | 1 | 1 |
| 28 | 3 | 11% | 54 | 8 | 15% | 3 | 1 | 33% | 3 | 1 | 33% | 6 | 2 | 33% | 3 | 2 | 67% | 1 | 1 |
| 14 | 2 | 14% | 35 | 3 | 9% | 2 | 0 | 0% | 1 | 0 | 0% | 3 | 0 | 0% | 3 | 0 | 0% | 2 | 1 |
| 4 | 0 | 0% | 10 | 1 | 10% | 2 | 0 | 0% | 1 | 0 | 0% | 3 | 0 | 0% | 2 | 0 | 0% | 0 | 0 |
| 76 | 14 | 18% | 163 | 30 | 18% | 10 | 2 | 20% | 5 | 1 | 20% | 15 | 3 | 20% | 9 | 2 | 22% | 6 | 3 |
| % of cases | | | % of cases | | | Male | % of cases | | Female | % of cases | | All | % of cases | | Male | % of cases | | Female | % of |
| 1 | | 1% | 1 | | 1% | 0 | | 0% | 0 | | 0% | 0 | | 0% | 0 | | 0% | 0 | |
| 6 | | 8% | 3 | | 2% | 0 | | 0% | 0 | | 0% | 0 | | 0% | 1 | | 6% | 2 | |
| 5 | | 7% | 8 | | 5% | 0 | | 0% | 0 | | 0% | 0 | | 0% | 0 | | 0% | 1 | |
| 41 | | 54% | 95 | | 58% | 5 | | 29% | 1 | | 7% | 6 | | 19% | 1 | | 6% | 2 | |
| 8 | | 9% | 1 | | 1% | 0 | | 0% | 0 | | 0% | 0 | | 0% | 0 | | 0% | 0 | |
| 1 | | 1% | 2 | | 1% | 0 | | 0% | 0 | | 0% | 0 | | 0% | 0 | | 0% | 0 | |
| 2 | | 3% | 5 | | 3% | 0 | | 0% | 0 | | 0% | 0 | | 0% | 0 | | 0% | 0 | |
| 28 | | 34% | 57 | | 35% | 5 | | 29% | 4 | | 29% | 9 | | 29% | 7 | | 41% | 1 | |
| 76 | | | 163 | | | 10 | | | 5 | | | 15 | | | 9 | | | 6 | |

*Annex 6 Lassa Statistics*

| | | | | September | | | | | | | | | 3rd Quarter | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Total | | | Male | | | Female | | | Total | | | Male | | | Female | | | |
| CFR | Cases | Deaths | CFR | Cases | Deaths | CFR | Cases | Deaths | CFR | Cases | Deaths | CFR | Cases | Deaths | CFR | Cases | Deaths | CFR | Cases |
| 0% | 2 | 0 | 0% | 1 | 0 | 0% | 0 | 0 | #DIV/0! | 1 | 0 | 0% | 1 | 0 | 0% | 2 | 0 | #DIV/0! | 3 |
| 100% | 2 | 1 | 50% | 2 | 0 | 0% | 0 | 0 | #DIV/0! | 2 | 0 | 0% | 6 | 1 | 17% | 1 | 1 | 100% | 7 |
| 100% | 4 | 3 | 75% | 2 | 1 | 50% | 2 | 0 | 0% | 4 | 1 | 25% | 8 | 4 | 50% | 6 | 2 | 33% | 14 |
| 50% | 5 | 1 | 20% | 4 | 1 | 25% | 3 | 0 | 0% | 7 | 1 | 14% | 8 | 1 | 11% | 6 | 1 | 17% | 15 |
| #DIV/0! | 2 | 0 | 0% | 1 | 0 | 0% | 0 | 0 | #DIV/0! | 1 | 0 | 0% | 5 | 0 | 0% | 1 | 0 | 0% | 6 |
| 50% | 15 | 5 | 33% | 10 | 2 | 20% | 5 | 0 | 0% | 15 | 2 | 13% | 29 | 6 | 21% | 16 | 4 | 25% | 45 |
| cases | All | % of cases | | Male | % of cases | | Female | % of cases | | All | % of cases | | | % of cases | | | % of cases | | |
| 0% | 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 |
| 14% | 3 | 10% | | 1 | 6% | | 0 | 0% | | 1 | 3% | | 2 | 4% | | 2 | 5% | | 4 |
| 7% | 1 | 3% | | 1 | 6% | | 2 | 14% | | 3 | 10% | | 1 | 2% | | 3 | 8% | | 4 |
| 14% | 3 | 10% | | 2 | 12% | | 1 | 7% | | 3 | 10% | | 8 | 16% | | 4 | 11% | | 12 |
| 0% | 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 |
| 0% | 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 |
| 0% | 0 | 0% | | 0 | 0% | | 1 | 7% | | 1 | 3% | | 0 | 0% | | 1 | 3% | | 1 |
| 7% | 8 | 26% | | 6 | 35% | | 1 | 7% | | 7 | 23% | | 18 | 37% | | 8 | 16% | | 24 |
| | 15 | | | 10 | | | 5 | | | 15 | | | 29 | | | 16 | | | 45 |

*Annex 6 Lassa Statistics*

| | | October | | | | | | | | | November | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total | | Male | | | Female | | | Total | | | Male | | | Female | | | Total | |
| Deaths | CFR | Cases | Deaths | CFR | Cases | Deaths | CFR | Cases | Deaths | CFR | Cases | Deaths | CFR | Cases | Deaths | CFR | Cases | Deaths |
| 0 | #DIV/0! | 0 | 0 | #DIV/0! | 0 | 0 | #DIV/0! | 0 | 0 | #DIV/0! | 3 | 1 | 33% | 3 | 1 | 33% | 6 | 2 |
| 2 | 20% | 2 | 0 | 0% | 1 | 0 | 0% | 3 | 0 | 0% | 0 | 0 | #DIV/0! | 1 | 0 | 0% | 1 | 0 |
| 9 | 43% | 4 | 1 | 25% | 3 | 0 | 0% | 7 | 1 | 14% | 0 | 0 | #DIV/0! | 3 | 0 | 0% | 3 | 0 |
| 2 | 18% | 7 | 1 | 14% | 4 | 1 | 25% | 11 | 2 | 18% | 2 | 0 | 0% | 6 | 2 | 33% | 8 | 2 |
| 0 | 0% | 0 | 0 | #DIV/0! | 0 | 0 | #DIV/0! | 0 | 0 | #DIV/0! | 2 | 0 | 0% | 2 | 0 | 0% | 4 | 0 |
| 13 | 22% | 13 | 2 | 15% | 8 | 1 | 13% | 21 | 3 | 14% | 7 | 1 | 14% | 15 | 3 | 20% | 22 | 4 |
| % of cases | | Male | % of cases | | Female | % of cases | | All | % of cases | | Male | % of cases | | Female | % of cases | | All | % of |
| 0% | | 0 | 0% | | 1 | 7% | | 1 | 3% | | 0 | 0% | | 1 | 7% | | 1 | |
| 5% | | 4 | 24% | | 2 | 14% | | 6 | 19% | | 2 | 12% | | 3 | 21% | | 5 | |
| 5% | | 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | | 1 | 7% | | 1 | |
| 14% | | 2 | 12% | | 5 | 36% | | 7 | 23% | | 1 | 6% | | 6 | 43% | | 7 | |
| 0% | | 1 | 6% | | 0 | 0% | | 1 | 3% | | 0 | 0% | | 0 | 0% | | 0 | |
| 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 | |
| 1% | | 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 | 0% | | 0 | |
| 20% | | 6 | 35% | | 0 | 0% | | 6 | 19% | | 4 | 24% | | 4 | 29% | | 8 | |
| | | 13 | | | 8 | | | 21 | | | 7 | | | 15 | | | 22 | |

*Annex 6 Lassa Statistics*

| | December | | | | | | | | | 4th Quarter | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Male | | | Female | | | Total | | | Male | | | Female | | | Total | | | |
| CFR | Cases | Deaths | CFR | Cases | Deaths | CFR | Cases | Deaths | CFR | Cases | Deaths | CFR | Cases | Deaths | CFR | Cases | Deaths | CFR | cases |
| 33% | 0 | 0 | #DIV/0! | 1 | 0 | 0% | 1 | 0 | 0% | 3 | 1 | 33% | 4 | 1 | #DIV/0! | 7 | 2 | #DIV/0! | 20 |
| 0% | 1 | 0 | 0% | 0 | 0 | #DIV/0! | 1 | 0 | 0% | 3 | 0 | 0% | 2 | 0 | 0% | 5 | 0 | 0% | 27 |
| 0% | 2 | 0 | 0% | 3 | 1 | 33% | 5 | 1 | 20% | 6 | 1 | 17% | 9 | 1 | 11% | 15 | 2 | 13% | 40 |
| 25% | 1 | 0 | 0% | 1 | 0 | 0% | 2 | 0 | 0% | 10 | 1 | 10% | 11 | 3 | 27% | 21 | 4 | 19% | 40 |
| 0% | 1 | 0 | 0% | 0 | 0 | #DIV/0! | 1 | 0 | 0% | 3 | 0 | 0% | 2 | 0 | 0% | 5 | 0 | 0% | 14 |
| 18% | 5 | 0 | 0% | 5 | 1 | 20% | 10 | 1 | 10% | 25 | 3 | 12% | 28 | 5 | 18% | 53 | 8 | 15% | 141 |
| cases | | % of cases | | Female | % of cases | | All | % of cases | | | % of cases | | | % of cases | | | % of cases | | |
| 3% | 0 | | 0% | 0 | | 0% | 0 | | 0% | 0 | | 0% | 2 | | 5% | 2 | | 2% | 0 |
| 16% | 2 | | 12% | 2 | | 14% | 4 | | 13% | 8 | | 16% | 7 | | 19% | 15 | | 17% | 13 |
| 3% | 0 | | 0% | 0 | | 0% | 0 | | 0% | 0 | | 0% | 1 | | 3% | 1 | | 1% | 5 |
| 23% | 0 | | 0% | 3 | | 21% | 3 | | 10% | 3 | | 6% | 14 | | 38% | 17 | | 28% | 55 |
| 0% | 0 | | 0% | 0 | | 0% | 0 | | 0% | 1 | | 2% | 0 | | 0% | 1 | | 1% | 2 |
| 0% | 0 | | 0% | 0 | | 0% | 0 | | 0% | 0 | | 0% | 0 | | 0% | 0 | | 0% | 1 |
| 0% | 0 | | 0% | 0 | | 0% | 0 | | 0% | 0 | | 0% | 0 | | 0% | 0 | | 0% | 3 |
| 26% | 3 | | 18% | 0 | | 0% | 3 | | 10% | 13 | | 27% | 4 | | 11% | 17 | | 28% | 62 |
| | 5 | | | 5 | | | 10 | | | 25 | | | 28 | | | 53 | | | 141 |

*Annex 6 Lassa Statistics*

| Annual Figures | | | | | | | | | 3rd Quarter Cumulative | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Male | | Female | | | Total | | | | Male | | | Female | | | Total | | |
| Deaths | CFR | cases | Deaths | CFR | cases | Deaths | CFR | | cases | Deaths | CFR | cases | Deaths | CFR | cases | Deaths | CFR |
| 6 | 0.78788 | 23 | 4 | #DIV/0! | 43 | 10 | #DIV/0! | | 17 | 5 | 0.45455 | 18 | 3 | #DIV/0! | 30 | 8 | #DIV/0! |
| 5 | 16% | 16 | 7 | 44% | 43 | 12 | 28% | | 24 | 5 | 21% | 14 | 7 | 50% | 38 | 12 | 32% |
| 10 | 25% | 43 | 6 | 14% | 83 | 16 | 19% | | 34 | 9 | 26% | 34 | 5 | 15% | 68 | 14 | 21% |
| 3 | 8% | 31 | 6 | 19% | 71 | 9 | 13% | | 30 | 2 | 7% | 20 | 3 | 15% | 50 | 5 | 10% |
| 1 | 7% | 7 | 0 | 0% | 21 | 1 | 5% | | 11 | 1 | 9% | 5 | 0 | 0% | 16 | 1 | 6% |
| 25 | 19% | 120 | 23 | 19% | 261 | 48 | 18% | | 116 | 22 | 19% | 92 | 18 | 20% | 208 | 40 | 19% |
| % of cases | | | % of cases | | | % of cases | | | | % of cases | | | % of cases | | | % of cases | |
| | 0% | 3 | | 3% | 3 | | 1% | | 0 | | 0% | 1 | | 1% | 1 | | 0% |
| | 8% | 9 | | 8% | 22 | | 8% | | 5 | | 4% | 2 | | 2% | 7 | | 3% |
| | 4% | 9 | | 8% | 14 | | 5% | | 5 | | 4% | 8 | | 9% | 13 | | 6% |
| | 38% | 58 | | 48% | 114 | | 44% | | 52 | | 45% | 45 | | 49% | 97 | | 47% |
| | 1% | 6 | | 0% | 2 | | 1% | | 1 | | 1% | 0 | | 0% | 1 | | 0% |
| | 1% | 1 | | 1% | 2 | | 1% | | 1 | | 1% | 1 | | 1% | 2 | | 1% |
| | 2% | 3 | | 3% | 6 | | 2% | | 3 | | 3% | 3 | | 3% | 6 | | 3% |
| | 44% | 36 | | 30% | 86 | | 33% | | 48 | | 42% | 32 | | 35% | 81 | | 39% |
| | | 120 | | | 261 | | | | 116 | | | 92 | | | 208 | | |

**Admission Data - Pediatric Service - Kenema General Hospital (KGH) Jan-Dec 2001**

| Hospital: | Jan | Feb | mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total/Average | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of Beds | 168 | 166 | 169 | 166 | 166 | 163 | 163 | 159 | 159 | 143 | 102 | 100 | **152** | Average |
| Admissions | 636 | 571 | 641 | 734 | 1172 | 683 | 868 | 696 | 636 | 814 | 444 | 345 | **687** | Average |
| Exits | 727 | 613 | 624 | 705 | 1228 | 700 | 862 | 696 | 573 | 835 | 512 | 414 | **8489** | Total |
| Transfers | 7 | 11 | 8 | 5 | 13 | 10 | 12 | 7 | 3 | 2 | 4 | 2 | **84** | Total |
| Defaulters | 2 | 11 | 6 | 4 | 9 | 6 | 6 | 7 | 6 | 2 | 9 | 10 | **78** | Total |
| Discharges | 695 | 567 | 590 | 673 | 1175 | 660 | 809 | 648 | 530 | 797 | 464 | 369 | **7977** | Total |
| Discharge rate (%) | 96 | 93 | 95 | 96 | 96 | 94 | 94 | 93 | 92 | 95 | 91 | 89 | **94** | Average |
| Deaths | 23 | 24 | 20 | 23 | 31 | 24 | 35 | 34 | 87 | 36 | 35 | 33 | **405** | Total |
| Deaths within 48 hours | 11 | 12 | 11 | 12 | 19 | 10 | 22 | 16 | 11 | 12 | 15 | 18 | **169** | Total |
| Mortality Rate (%) | 3.1 | 3.9 | 3.2 | 3.3 | 2.5 | 3.4 | 4 | 5 | 6 | 4.3 | 6.9 | 8 | **4** | Average |
| Average Length of Stay (days) | 6 | 6 | 6 | 6 | 6 | 6 | 7 | 7 | 6 | 6 | 6 | 5 | **6.1** | Average |
| *Bed Occupancy Rate (%)* | 104 | 110 | 97 | 98 | 150 | 103 | 82 | 94 | 102 | 126 | 62 | 59 | **99** | Average |

| | Population | Total New Admissions | Av. # New Admissions/ month | Attendance Rate (based on dist. <15 pop.) | Attendance Rate (based on dist. <5 pop.) | Attendance Rate (based on town <15 pop.) | Attendance Rate (based on town <5 pop.) | Bed Capacity | Av. Length of Stay (days) | Bed Occupancy rate (%) | Av. Cost/New Admission (Euro) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Pediatric Service - KGH** | | **8240** | **687** | **0.04** | **0.10** | **0.20** | **0.47** | **152** | **6.1** | **99** | **11.5** |

| | Total | <5 | <15 |
|---|---|---|---|
| **Population of Kenema District** | **461644** | **78479** | **184658** |
| **Population of Kenema Town** | **102408** | **17409** | **40963** |

**Summary of drug consumption figures, drug costs and levels of stock purchased from the previous ECHO project.**

On drug usage, we enclose our analysis of the consumption by activity, PHU and paediatrics, from the enclosed report for the previous twelve months.

Drug cost for 2002 has been calculated using the following data:

**PHUs**

| | |
|---|---|
| Cost per patient: | 0.52 EUR |
| Population served: | 220,997 (Merlin PHC data) |
| Predicted total visits: | 113.3% of population served |
| Predicted total visits: | 250,390 |
| Total cost for 2002: | 130,203 EUR |

**PAEDIATRIC WARD**

| | |
|---|---|
| Cost per patient: | 11.5 EUR |
| Population served: | 471,000 (Merlin/Goal Nutrition Surveys 2001) |
| Attendance rate 2001: | 8,240 |

(For the paed ward last year's figures are being used as base line for 2002 projection).

| | |
|---|---|
| Total cost 2002: | 94,760 EUR |

Therefore, total net predicted drug costs for 2002 = 94,760 + 130,302 = **225,062**

As stated, this is a net figure. It takes no account of variations in usage due to epidemics, etc. Nor is the practice of assessing drug stock only by value wholly reliable, as some stocks may be over the required level where others may be under. For these variations we would add a figure of 15%, but this will be covered by general stock held.

2. Drug stock figures are contained in the previously submitted stock sheets. These include the adjustment of overstocks caused by large donations, inconsistencies because of drugs used in the emergency phase but no longer considered essential and not therefore being provided to MoHS in Kenema, and because some drugs have been funded by other donors (Buza, Chinese Government, etc.) The following figures are from that data : -

1. Predicted value of drugs for 2002 from above = €225,062
2. Value of drugs issued from Kenema during period of previous project = €248,229
3. To check this – value of O + R – C in whole project for duration = €241,862
4. (Discrepancy of less than 3% on real vs. stock card values is acceptable)
5. Value of drugs in previous project extrapolated from ECHO reporting = €230,316
6. Value of drugs bought for previous project = €315,602
7. Therefore residual value of ECHO drugs from previous project = 315,603 – 248,229 = 67,374
8. Value of drugs issued from Kenema less value from ECHO report = 248,229 – 230,316 = 17,913
9. Therefore assume value in Kenema (Lassa ward) due from another donor = €17,913
   Projected value of drugs for ECHO proposal in 2002 equals: -
   **1 less 7 less 9 = 225,062 – 67,374 – 17,913 = €139,775**

To summarise, in recognition of ECHO drugs held in stock in Sierra Leone at 01/01/2002 (€67,374) and as an allowance against ECHO stock held at 31/03/2001 (€39,775), the projected usage of drugs in the 2002 project has taken into account a total carried forward value of €107,149. In addition, ECHO drugs to the value of €17,913 will be reimbursed to the 2002 project from other donor's supplies (Buza).