



Rapid assessment of retrospective mortality and morbidity in Xa-Muteba municipality

**Lunda Norte
Angola**

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LIST OF CONTENTS

LIST OF FIGURES	3
LIST OF TABLES	4
SUMMARY	5
ACKNOWLEDGMENTS	6
ABBREVIATIONS.....	7
1. INTRODUCTION	8
1.1. Context of the survey.....	8
1.2. Justification of survey	9
2. OBJECTIVES	10
3. METHODS.....	10
3.1. Study area and study population	10
3.2. Sample size and study design	10
3.3. Data collection	13
3.4. Data entry and analysis	14
3.5. Ethical considerations.....	15
4. RESULTS	16
4.1. Demographics: description of the population being surveyed.....	16
4.2. Measles vaccine coverage	19
4.3. Retrospective mortality	19
4.3.1. Mortality rates.....	19
4.3.2. Age and sex distribution of the deceased.....	19
4.3.3. Place and date of death	20
4.3.4. Reported causes of death	21
4.4. Retrospective morbidity	22
4.4.1. General morbidity	22
4.4.2. Frequency of self-reported diseases	23
4.4.3. Health-seeking behaviour.....	27
5. DISCUSSION	29
5.1. Mortality rates	29
5.2. Morbidity.....	30
5.3. Other results	30
5.4. Validity and possible limitations	31
6. CONCLUSION.....	32
7. RECOMMENDATIONS	33
7.1. Recommendations for MSF	33
7.2. Further recommendations.....	34
8. APPENDICES	35
8.1. Household questionnaire.....	35
8.2. Survey guidelines for the interviewers	37

LIST OF FIGURES

Figure 1	
Xa-Muteba municipality, Lunda Norte province, Angola, Africa, May 2006	9
Figure 2	
Map of the survey area, indicating the villages where clusters were assigned, Xa-Muteba municipality, Lunda Norte province, Angola, April - May, 2006	12
Figure 3	
Age pyramid of the survey population in Xa-Muteba municipality, Lunda Norte province, Angola, 26 April – 1 May, 2006 (n=3819, 130 missing data for age)	18
Figure 4	
Age and sex distribution of deaths in the survey population in Xa-Muteba municipality, Lunda Norte province, Angola, between 1 January and 25 April 2006 (n=47, 1 missing data*)	20
Figure 5	
Month of death of the survey population in Xa-Muteba municipality, Lunda Norte province, Angola, between 1 January and 25 April 2006 (n=47, 1 missing data)	21

LIST OF TABLES

Table 1	Population estimates prior to survey and number of clusters assigned to villages, Xa-Muteba municipality, Lunda Norte province, Angola, April - May, 2006	11
Table 2	Description of the survey population in Xa-Muteba municipality, Lunda Norte province, Angola, 26 April – 1 May, 2006	17
Table 3	Mortality by age group in the survey population of Xa-Muteba municipality, Lunda Norte province, Angola, between 1 January and 25 April 2006 (n=48)	19
Table 4	Place of death of the survey population in Xa-Muteba municipality, Lunda Norte province, Angola, between 1 January and 25 April 2006 (n=48)	20
Table 5	Reported causes of death in the study population in Xa-Muteba municipality, Lunda Norte province, Angola, 1 January – 25 April, 2006 (n=48)	22
Table 6	Household members reported to be sick in the last 14 days prior to the study in the study population in Xa-Muteba municipality, Lunda Norte province, Angola, 11 April - 25 April, 2006	23
Table 7	Self-reported diseases in the whole study population in Xa-Muteba municipality, Lunda Norte province, Angola, 11 April - 25 April, 2006 (n=1983, 1 missing value)....	24
Table 8	Reported diseases in the study population aged under 5 years in Xa-Muteba municipality, Lunda Norte province, Angola, 11 April - 25 April, 2006 (n=525).....	25
Table 9	Five main self-reported diseases per age group in the study population in Xa-Muteba municipality, Lunda Norte province, Angola, 11 April - 25 April, 2006.....	26
Table 10	Reasons for not going to a health centre in the whole study population and under 5 years of age in Xa-Muteba municipality, Lunda Norte province, Angola, 11 April - 25 April, 2006	27
Table 11	Reasons for not going to a health centre for four major health problems (malaria, diarrhoea, respiratory infections, pregnancy related problems) in the whole study population in Xa-Muteba municipality, Lunda Norte province, Angola, 11 April - 25 April, 2006	28

SUMMARY

Introduction

As part of an effort to advocate the needs of the population in the municipality of Xa-Muteba and in a more general context in rural areas of Angola, Médecins Sans Frontières-Holland asked Epicentre to conduct a retrospective morbidity and mortality survey of the population living in this area. The mortality survey covered the period 1 January – 25 April 2006.

Methods

The survey covered all accessible villages (n=21) in Xa-Muteba municipality with an estimated population of 45,682. Two-stage cluster sampling with 30 clusters of 30 households (900 families, 3,949 individuals) was carried out between 26 April and 1 May 2006. Data collection was by standardized questionnaire.

Results

The CMR between 1 January and 25 April 2006 was 1.1/10,000/day (95%CI 0.8-1.4). The U5MR was 2.8/10,000/day (95%CI 1.8-3.7), of whom 10 deaths occurred during the neonatal period. These levels are around the thresholds defining an emergency (1/10,000/day for general population or 2/10,000/day for under 5 populations). Most of the deceased died at home.

Of the 3,949 people present in the survey population, 1,984 (50.2%, 95%CI 46-54.4) reported to be ill or have been ill in the 14 days prior to the study (11 - 25 April 2006). Of these, 525 were in the age group under 5 years (55.2%).

The most frequently self-reported health problems in the whole study population were (1) malaria/fever, (2) respiratory infections, (3) stomach ache, (4) diarrhoea, and (5) back pain. All together these 5 self-reported diseases represented 68.2% of all mentioned diseases. In those under 5 years of age, the four first mentioned health problems (1-4) represented 79% of all mentioned diseases.

Of the 1,984 self-reported disease cases, 59.7% (1185/1984, 95%CI 49.9-68.8) did not go to any health centre. According to the head of household the four main reasons for not attending any health centre in the whole study population were that (1) drugs were bought in a pharmacy, (2) the person was not sick enough, (3) the health centre was too far away, and (4) traditional medicine was used. These reasons counted for 87.8% of all those mentioned.

Conclusions and Recommendations

The results for the study show that, even 4 years after the end of the civil war, the population is still in a crisis situation. Both crude and under-five mortality rates during the past 3.5 months were above the emergency thresholds. Self-reported health problems (malaria, respiratory infections, diarrhoea) show the typical pattern of a remote Sub-Saharan region with a high incidence of preventable infectious disease. The population (especially children under 5 years of age) in the municipality of Xa-Muteba remains at high risk.

Reinforced monitoring of the morbidity, mortality and access to health care within this population is recommended, with strong focus on sensitising the population to malaria and obstetric health problems. Lobbying of the still precarious situation is vital at all levels throughout the country.

ACKNOWLEDGMENTS

I would like to thank the teams of interviewers for their enthusiasm and diligence when carrying out the survey. I am very grateful to all authorities who allowed us to conduct this work.

To Camila Gianella, I could not have completed this survey without your constant and generous help. To Karen Copsey, project coordinator, and Vittorio Varisco, Log/Admin, many thanks for your patience and help in Xa-Muteba.

To Erna van Goor, MSF-H head of mission and Sophie van der Wardt, medical coordinator, many thanks for your welcome and support in Luanda and for providing me with the necessary background information. A big thank-you to all members and staff of MSF-Holland in Luanda and Malanja, too numerous to mention, who made my stay in these places so memorable.

Finally, this survey would not have been possible without the co-operation and generosity of the people of the municipality of Xa-Muteba!

ABBREVIATIONS

CDC	Centres for disease control & prevention
CHW	Community health workers
CI	Confidence interval
CMR	Crude mortality rate
EPI	Expanded programme on immunization
HC	Health centre
HH	Household
IDP	Internally displaced person
MoH	Ministry of Health
MSF	Médecins sans Frontières
MSF-B	Médecins sans Frontières- Belgian section
MSF-H	Médecins sans Frontières- Dutch section
PPS	Proportional to population size
U5MR	Under-5 mortality rate
UNHCR	United Nations High Commissioner for Refugees
UNITA	União Nacional para a Independência Total de Angola
WHO	World Health Organisation

1. INTRODUCTION

1.1. Context of the survey

On April 4th, 2002, a ceasefire agreement was signed between the Government of Angola and the rebel UNITA (União Nacional para a Independência Total de Angola) movement, bringing 27 years of civil war to an end. Since that time, there has been a great potential for development in the country, as Angola has large resources of oil and diamonds. However, the current level of corruption, non-transparency and low level of interest in developing services for the general population is limiting improvements. Furthermore, during the civil war the investment for educational purposes was progressively diminished, leaving Angola with a huge number of low skilled and less qualified people. In addition, large parts of the country are still inaccessible, due to landmines and poor infrastructure.

According to official strategy papers by the Ministry of Health (MoH) in 2005, only 30% of the population has access to health care. The organizational and technical capacities of the MoH remains fairly low, with a tendency to neglect rural more than urban areas. Angola is still faced with high under-five and infant mortality rates¹. Nevertheless, international support to reconstruct the health care sector is barely given. Global Fund will be the major contributor in the coming years, however limiting its money to fight against malaria, TB and HIV/AIDS.

Xa-Muteba (13,000 km²) is one of the 8 municipalities of the Lunda Norte province situated on the North-East part of the country bordering the Democratic Republic of Congo (Figure 1). Xa-Muteba suffered heavily during the war and a big part of the current population comprises returnees. Population figures vary from 45,000² (the target population of MSF, as parts of the municipality are not accessible due to landmines) to 60,000 persons³.

Xa-Muteba lies on the Western edge of the province and has a high occurrence of natural resources, mainly diamonds. However, social services, such as health care and education, are minimal for those who are not directly involved in the diamond digging business. In addition, it is far from the provincial capital Dundo (700 km, 2 days' drive by car) and a functional second-line hospital (Malanje, 186 km, 6-8 hours' drive by car).

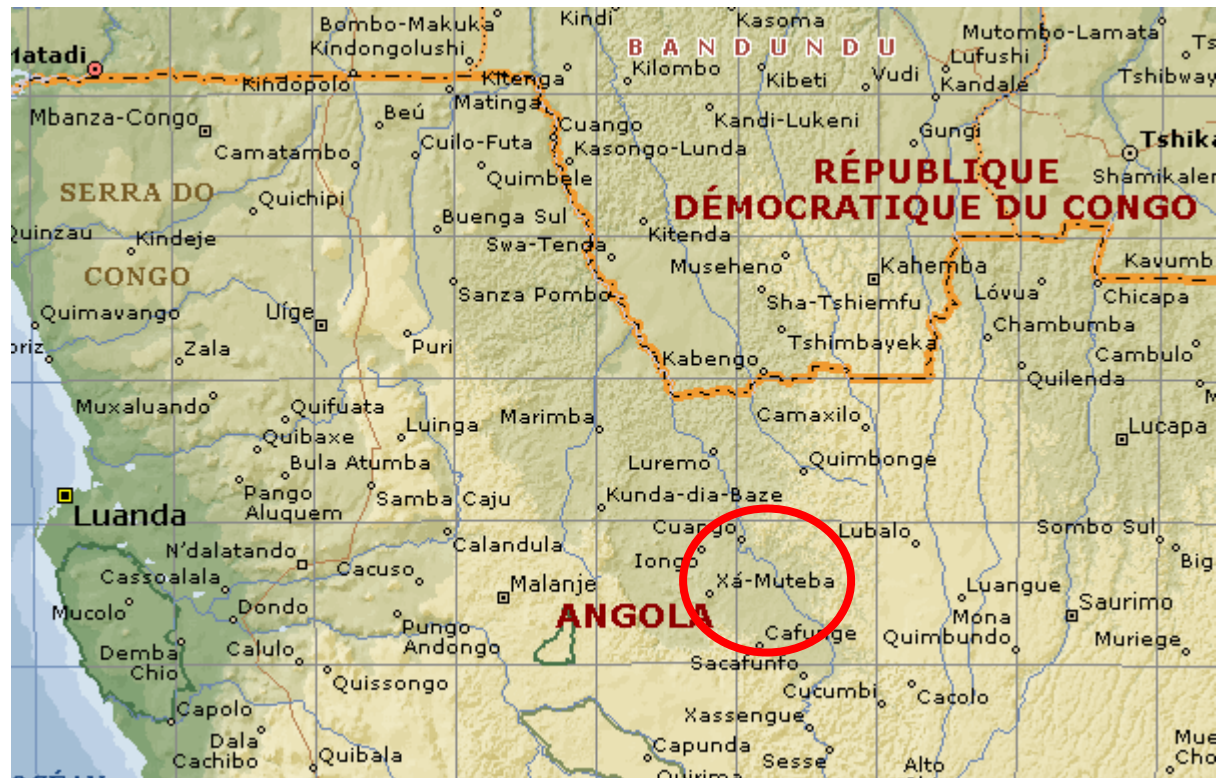
At the moment, MSF-H provides direct health care in the only health centre in Xa-Muteba town. In addition, its activities in the municipality include the support of two health posts in Domingo Vaz and Samba (Figure 2).

¹ Under-five mortality rate (U5MR) 262/1.000 live births; infant mortality rate 153/1.000 live births (source: World Health Organization, World Health report, 2002)

² MSF estimation during a mass measles vaccination campaign, October 2005

³ Figure come from Xa-Muteba municipality administration, 2005

Figure 1 Xa-Muteba municipality, Lunda Norte province, Angola, Africa, May 2006



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1.2. Justification of survey

As part of an effort to advocate the needs of the population in the municipality of Xa-Muteba and in a more general context in rural areas of Angola, Médecins Sans Frontières Holland (MSF-H) asked EPICENTRE to conduct a retrospective morbidity and mortality survey of the population living in this area. Results may lead in a shift in program priorities in the municipality towards those that are the most vulnerable.

2. OBJECTIVES

General objectives

- To estimate retrospectively the crude mortality rate for the total population and for children under 5 years of age
- To estimate retrospectively the reported morbidity for the total population and for children under 5 years of age

Specific objectives

- To describe the population surveyed by sex and age
- To obtain an indication on the major causes of death, as well as on the place of death (home, health facility) and the age and sex distribution of the deceased
- To obtain an indication on the major self-reported diseases in the population
- To gain more knowledge on health-seeking behaviour and access to health care in the population
- To make recommendations for the further operational strategy in Xa-Muteba

3. METHODS

3.1. Study area and study population

Xa-Muteba municipality consists of 21 villages accessible by car at the time of the survey. These were all situated on the three main roads leaving Xa-Muteba town to either Malanje, Cuango or Samba. Villages situated on the road to longo and Calucala were not accessible by car. Due to landmines, the road clearance was still not given and therefore these villages could not be included in the study area (Figure 2).

The total accessible population estimate for Xa-Muteba municipality of 45,682 was taken from the results of the MSF-H mass measles vaccination campaign in October 2005. The estimation of the population of children under 5 years of age (6,898, 15% of the total population) was taken from the same source.

3.2. Sample size and study design

With a sample size of 30 clusters of 30 households, corresponding to 900 households, it would be possible to detect a mortality rate of 1.0 deaths/10,000/day over a recall period of 115 days. This sample size provides lower and upper 95% confidence limits of 0.6 and 1.4 respectively (design effect 2, alpha risk=0.05, beta risk=0.4).

A two-stage cluster sampling methodology was chosen according to the standardized method recommended by the World Health Organization (WHO)⁴.

In the first stage, 30 clusters were selected from a list of the 21 accessible villages in Xa-Muteba municipality provided by MSF-H (Table 1). Cluster allocation was by systematic sampling with probability of allocation proportional to the respective population size of each village (PPS / Figure 2).

Table 1 Population estimates prior to survey and number of clusters assigned to villages*, Xa-Muteba municipality, Lunda Norte province, Angola, April - May, 2006

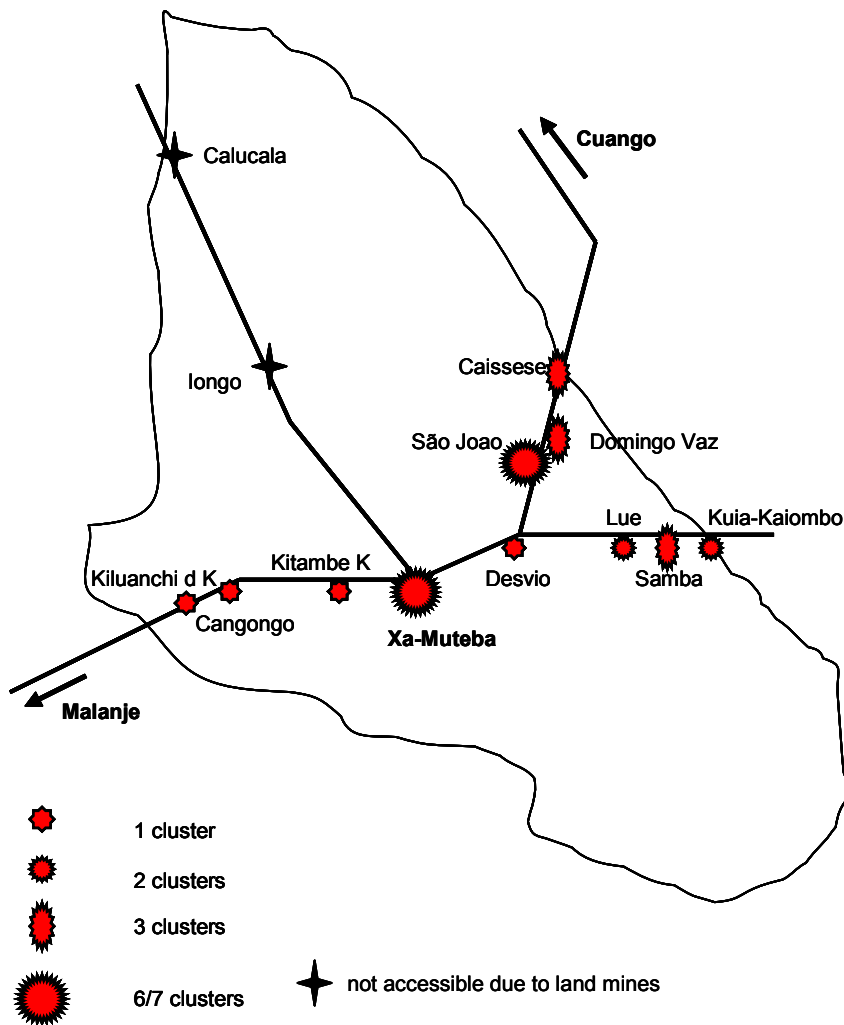
Village	Road towards	Driving distance from Xa-Muteba [h]	Population	No. clusters / village
Xamuteba town			8,298	6
Kiluanchi de Kassange	Malanje		159	0
Chico Mateus	Malanje	01:30	351	1
Muhende	Malanje		132	0
Cucala	Malanje		66	0
Camassa	Malanje		219	0
Desvio	Domingo Vaz / Samba	00:30	1,305	1
Cumbulo	Malanje		93	0
Cangongo	Malanje	01:00	576	1
Muatchingomde	Malanje		26	0
Mamugina	Malanje		146	0
Kitambe Kiaketa	Malanje	00:15	1,060	1
Cavunda	Malanje		589	0
São Joao	Cuango	02:00	10,616	7
Domingo Vaz	Cuango	02:00	4,536	3
Manuel Ngola	Cuango		1,424	0
Caissese	Cuango	02:20	4,715	3
Mussasa	Samba		497	0
Lue	Samba	01:20	1,987	2
Kuia-Kaiombo	Samba	02:00	3,238	2
Samba	Samba	01:40	5,649	3
Total			45,682	30

* The calculated sampling interval for selecting clusters was 1,522; the random number selected between one and the sampling interval was 66.

⁴ Henderson RH, Sundaresan T. Cluster sampling to assess immunisation coverage: A review of experience with simplified sampling methodology. Bulletin of the World Health Organization 1982(60):253-60

In the second stage, the standard WHO/EPI methodology⁴ was used to select 30 households within a cluster: accordingly, a pen was thrown on the ground in the central point of the cluster, and a line drawn in its direction towards the edge of the cluster. Households along this line were counted, and one of these was selected using a random number table as the first to be interviewed in the cluster. The next household followed in order of physical proximity was then interviewed until the desired cluster of 30 households was completed.

Figure 2 Map of the survey area, indicating the villages where clusters were assigned, Xa-Muteba municipality, Lunda Norte province, Angola, April - May, 2006



For survey purposes, a household was defined as a group of people eating and sleeping in the same house and under the responsibility of one person or head of household for at least the previous two weeks. All households both with and without children were included. Empty households were replaced with the next closest, unless the head of the household

could be located within a reasonable time. Houses where safe access was not entirely sure (danger of landmines) were also replaced with the next closest.

In the selected houses, the head of the household, or another member of the household able to speak on behalf of the head was interviewed.

3.3. Data collection

Five teams, each comprising two persons, conducted the interviews at the site of the household, either in Portuguese or, where necessary, in one of the local languages (i. e. Chokwe, Nkangala). The survey was carried out over 6 days from 26 April to 1 May 2006. Every day, each team collected information for one cluster of 30 households. Two days of training was performed on-site, including half a day to pilot the questionnaire, by the Epicentre coordinator prior to initiating the survey.

A standardized, piloted questionnaire was used, consisting of two pages which represented one household. One line in each questionnaire represented one household member within the interviewed household. The questionnaire was translated into Portuguese (Appendix 8.1.). Information was elicited on the following variables:

(1) Demographics

- Sex and age of each household member present at the end of the recall period
- Date of arrival in the municipality of Xa-Muteba
- Measles vaccination status for household members younger than 5 years of age

(2) Retrospective morbidity

- Self-reported symptoms of household members who had been sick in the two weeks prior to the study
- Access to health care and health-seeking behaviour for these household members

(3) Retrospective mortality

- Sex and age of household members not present at the end of the recall period, and reasons for not being present: death, disappearance, or absence (the disappeared and absent were distinguished according to whether the respondents knew that the person in question was still alive and his/her whereabouts)
- Date of death, disappearance, or absence
- Place and cause of death as reported by the respondents
- Health-seeking behaviour before dying as reported by the respondents

The recall period for assessing morbidity was two weeks prior to the study (from 11 April to the survey date). The recall period for assessing mortality was from 1 January 2006 to the survey date. The starting date of 1 January 2006 was chosen because the celebration of New Year is an important event in Angola and therefore well remembered in the population. The exact date of death was recorded (day/month/year). In the case that the exact date was unknown, it was recorded as 1/month/year. To ascertain all deaths were mentioned the teams asked directly for any person who died in 2006 at the end of each questionnaire, before leaving the household.

The survey was anonymous. Interviewers were instructed to respect the order of the questionnaire, as during piloting this was found to be the most logical. However, questions in the interviewer guidelines were only meant as guidance and were not read out in a systematic fashion in their exact wording. See Appendix 8.2. for the guidelines which were translated into Portuguese.

3.4. Data entry and analysis

Data were daily entered by the Epicentre epidemiologist into EpiData 3.0 software (The EpiData Association, Odense, Denmark). Data cleaning was done to check for inconsistencies in data entry and responses. Data analysis was done using Epi-Info 6.04 (Centres for disease control & prevention (CDC), Atlanta, USA and WHO, Geneva, Switzerland) and Stata 8.0 (Stata Corporation, College Station, Texas, USA).

The crude mortality rate indicates the number of persons in the sample population who died from New Year (1 January 2006). The recall period corresponded to 115 days. Mortality rates were expressed in number of deaths per 10,000 per day and presented with 95% confidence interval (CI) adapted for design (cluster) effect. A crude mortality rate (CMR) of $\geq 1/10,000/\text{day}$ was used as the threshold for emergency intervention, and of $\geq 2/10,000/\text{day}$ as the emergency threshold for the under-5 mortality rate (U5MR).

The denominator for mortality rates corresponded to the mid-period population size (see below), assumed to be the total of persons at the time of the survey plus half of the deaths that had occurred during the period.

$$\text{Mortality rate} = \frac{\# \text{ deaths in period}}{\text{population at the end of the period} + 0.5 \# \text{ deaths}} \times \frac{10,000}{\# \text{ days during period}}$$

All other indicators (sex and age of the survey population, vaccination coverage, access to health care) were calculated as proportions with 95% confidence intervals (95%CI) and with estimates of actual design (cluster) effect for each variable.

3.5. Ethical considerations

Approval was given from the national authorities to carry out the survey.

Households were only interviewed after giving verbal consent. In the case of refusal to participate in the survey, the household was replaced with the next closest without further consequences.

If the survey team was faced with a household member who was ill during the interview, they were treated or referred to the MSF clinic for free diagnosis and treatment.

4. RESULTS

4.1. Demographics: description of the population being surveyed

Between 26 April and 1 May 2006, 900 households were interviewed, giving a total population of 3,949. The M/F ratio was 1.0 (1934/2015). The total population under 5 years old was 951 (24.1%) with a M/F ratio of 1.0 (479/475).

The median age of the study population at the time of the survey was 14 years (mean: 19.1, Q_{25} – Q_{75} : 5-30). On average 4.4 persons lived in a household (minimum: 1, maximum: 15 / Table 2).

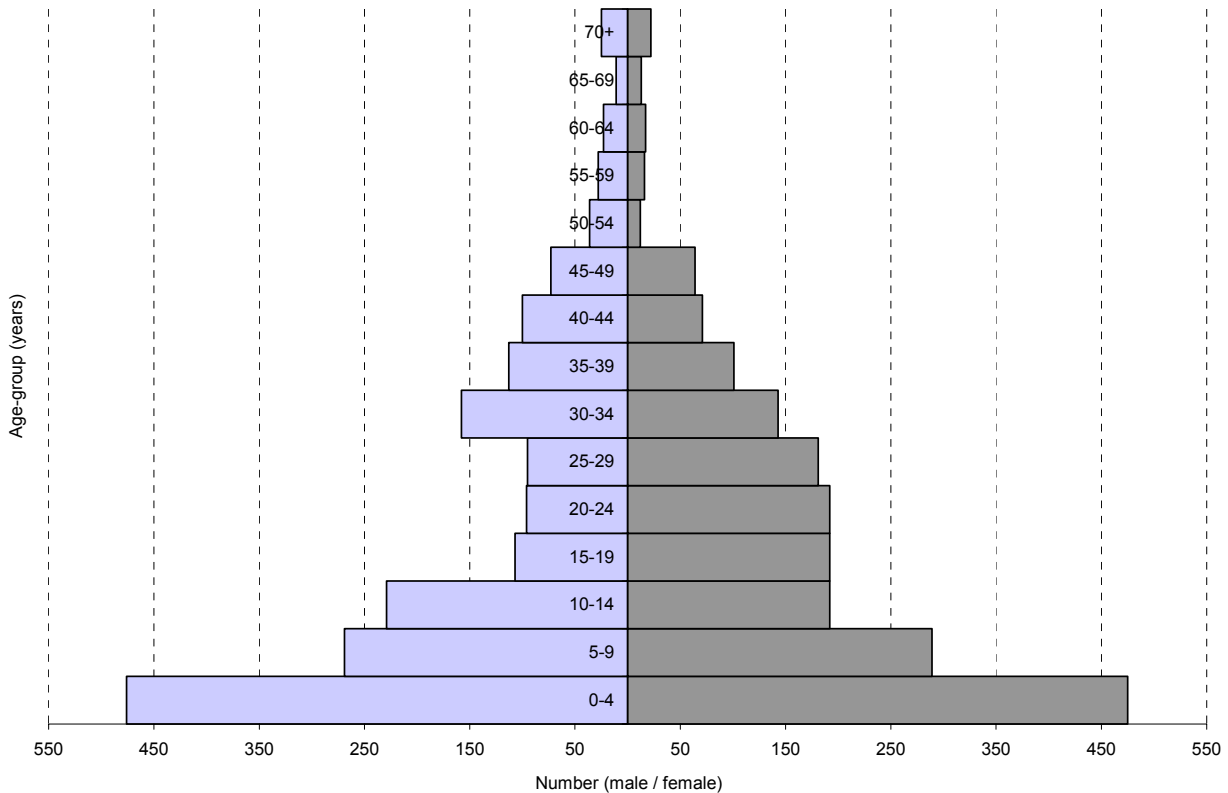
Table 2 Description of the survey population in Xa-Muteba municipality, Lunda Norte province, Angola, 26 April – 1 May, 2006

No. study population	3949	
No. households interviewed	900	
Mean age (years)	19.1	
Median age (years)	14	
Male	13	
Female	15	
Age classes	N	[%]
< 5 years	951	24.1
5 - 14 years	979	24.8
15 – 29 years	863	21.8
30 – 44 years	686	17.4
≥ 45 years	340	8.6
Missing values*	130	3.3
Sex ratio (male / female)	N	Ratio
Total population	1934/2015	1.0
< 5 years	479/475	1.0
5 - 14 years	498/481	1.0
15 – 29 years	298/565	0.5
30 – 44 years	371/315	1.2
≥ 45 years	196/144	1.4
Household	N	[%]
Number of household members:		
1 person	46	5.1
2 – 4 persons	469	52.1
5 – 7 persons	326	36.2
8 – 10 persons	44	4.9
> 10 persons	15	1.7
Total	900	100.0
Mean household size	4.4	

* Many elderly people did not know their age. In addition, women rarely knew the age of their husbands.

The age pyramid shows a significant lack of males aged 15-29 years compared with females, as more than twice as many females than males were in this age-group ($p < 0.001$). Males accounted for 34.5% of all persons in the age group 15–29 years (Figure 3).

Figure 3 Age pyramid of the survey population in Xa-Muteba municipality, Lunda Norte province, Angola, 26 April – 1 May, 2006 (n=3819, 130 missing data for age)



Eighty-four percent of the study population (3309/3949) arrived during or before 1990 in Xa-Muteba municipality or were already born there. The years of peak influx for those who arrived later were 2000 (13.4%, 86/640), 2003 (13.8%, 88/640) and 2005 (12.5%, 80/640).

Out of the total population 99 were absent at the day of the study (2.5%, 99/3949). The majority were men working on fields which were further away from their houses (82.8%, 82/99).

None of the households mentioned a person who had disappeared during the recall period.

4.2. Measles vaccine coverage

The target population for the measles vaccine were all those aged 6 months to 4 years (N=777, 58 missing data). The total number vaccinated according to presence of a measles vaccine card was 224 (28.8%, 95%CI 22.9-34.7). The number vaccinated according to recall or history was, as expected, higher at 332 (42.7%, 95%CI 34.6-50.8).

4.3. Retrospective mortality

4.3.1. Mortality rates

The recall period during the retrospective mortality survey was 115 days (from 1 January to 25 April 2006). Crude mortality rate (**CMR**) for the entire recall period was **1.1/10,000/day** (95%CI 0.8-1.4). Deaths in children under 5 years accounted for 64.6% (31/48) of all deaths, corresponding to an under-five mortality rate (**U5MR**) of **2.8/10,000/day** (95%CI 1.8-3.7 / Table 3).

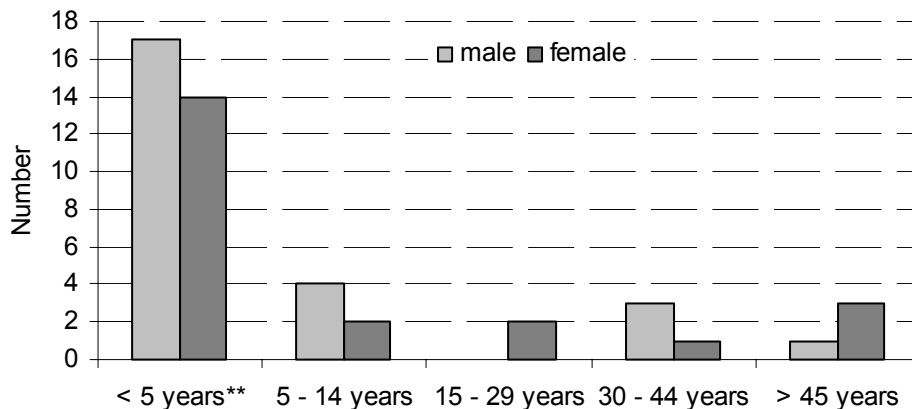
Table 3 Mortality by age group in the survey population of Xa-Muteba municipality, Lunda Norte province, Angola, between 1 January and 25 April 2006 (n=48)

Age groups	N deaths	Mid-term population	Deaths / 10,000 / day	95% CI	Design effect
< = 1 month	10	51	17.1	6.0-28.1	1.2
2 month – 4 years	21	918	2.0	1.1-2.9	1.1
0 – 4 years (U5MR)	31	967	2.8	1.8-3.7	0.9
Total (CMR)	48	3,973	1.1	0.8-1.4	0.9

4.3.2. Age and sex distribution of the deceased

The median age of the deceased was 1 year (mean: 10, Q₂₅–Q₇₅: 0 – 8, min 0, max 65). Most of the deaths (64.6%, 31/48) were in those aged 4 years and younger. Out of those deaths 10 occurred in the first month after being born (32.3%, 10/31). No males who died during the recall period were aged between 15 and 29 years (Figure 4).

Figure 4 Age and sex distribution of deaths in the survey population in Xa-Muteba municipality, Lunda Norte province, Angola, between 1 January and 25 April 2006 (n=47, 1 missing data*)



* One wife did not know the age of her husband who deceased 2006

** Ten deaths occurred in the first month after being born

4.3.3. Place and date of death

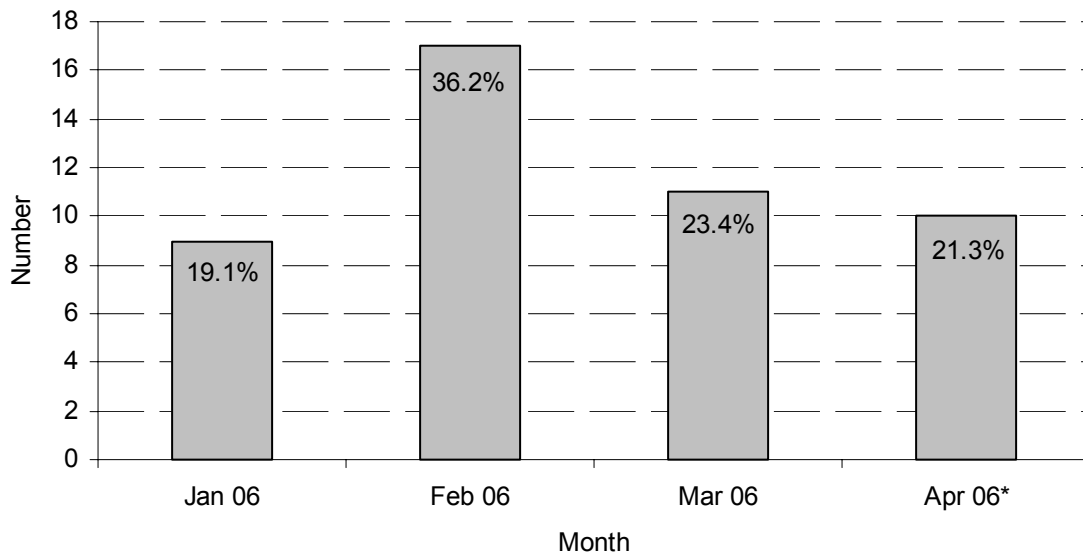
At 85.4% (41/48, 95%CI 75.8-95), most of the deceased during the survey died at home (Table 4).

Table 4 Place of death of the survey population in Xa-Muteba municipality, Lunda Norte province, Angola, between 1 January and 25 April 2006 (n=48)

Place of death	N	[%]
At home	41	85.4
Health structure supported by MSF	3	6.3
Other health structure	3	6.3
Unknown	1	2.0
Total	48	100.0

Most of the deaths occurred in February 2006 (36.2%, 17/48). The months of January (19.1%, 9/48), March (23.4%, 11/48) and April (21.3%, 10/48) had an almost an equal distribution of deaths (Figure 5).

Figure 5 Month of death of the survey population in Xa-Muteba municipality, Lunda Norte province, Angola, between 1 January and 25 April 2006 (n=47, 1 missing data)



* April 06 only had 25 days (study started at 26 April 2006)

4.3.4. Reported causes of death

Malaria/fever was reported as the leading cause of death in the survey population (37.5%, 18/48). It was followed by respiratory infections (18.7%), diarrhoea (8.3%) and anaemia (8.3% / Table 5).

When analyzing by age, with 51.6% malaria/fever also remained the leading cause of death in the under 5 years age group (16/31). In the age group 5 years and over, the main cause of death was related to respiratory infections (35.3%, 6/17). No differences could be seen in the frequency of reported causes of death when stratifying by gender.

Table 5 Reported causes of death in the study population in Xa-Muteba municipality, Lunda Norte province, Angola, 1 January – 25 April, 2006 (n=48)

Reported causes of death	Total		< 5 years		5 years and over	
	N	[%]	N	[%]	N	[%]
Malaria / fever	18	37.5	16	51.6	2	11.8
Respiratory infections	9	18.7	3	9.7	6	35.3
Diarrhoea	4	8.3	3	9.7	1	5.9
Anaemia	4	8.3	2	6.4	2	11.8
During birth	3*	6.3	2	6.4	1	5.9
Unknown	3	6.3	1	3.2	2	11.8
Stomach ache	2	4.2	2	6.5	0	0.0
Other causes	5**	10.4	2	6.5	3	17.5
Total	48	100.0	31	100.0	17	100.0

* Two children (male and female) died immediately after being born; one woman (unknown age) died during labour at home

** Other causes of deaths were only mentioned once (haemorrhages, hepatitis, lower abdominal pain, trauma/accident, tumour)

Visit to a health structure before death

Out of the 48 people who died, 32 (66.7%) had been to any kind of health structure before, including a basic health post in a village. The remaining 16 did not seek care in a health structure for following reasons: bought drugs in a private pharmacy (n=4), health centre too far away (n=3), used traditional medicine (n=3), consultation too expensive, no confidence in the health structure, spontaneous death (each mentioned 1) and unknown reason (n=2).

4.4. Retrospective morbidity

4.4.1. General morbidity

Of the 3,949 people present in the survey population, 1,984 (50.2%, 95%CI 46-54.4) reported to be ill or have been ill in the 14 days prior to the study (11 April - 25 April 2006). Of these, 525 were in the age group of children under 5 years, so the proportion being ill in this group was 55.2% (525/951, 95%CI 51.5-58.9 / Table 6).

Table 6 Household members reported to be sick in the last 14 days prior to the study in the study population in Xa-Muteba municipality, Lunda Norte province, Angola, 11 April - 25 April, 2006

Age groups	n / N	[%]	95% CI
Total population	1984/3949	50.2	46-54.4
< 5 years	525/951	55.2	51.5-58.9
5 - 14 years	365/979	37.3	31.3-43.3
15 - 29 years	387/863	44.8	39-50.7
30 – 44 years	400/686	58.3	51.7-64.9
≥ 45 years	258/340	75.9	69.4-82.4

4.4.2. Frequency of self-reported diseases

The most frequently self-reported health problem in the whole study population was malaria/fever with 31.3% (616/1983). The second most frequently self-reported health problem was respiratory infections with 11.6% (230/1983) followed by stomach ache (10%, 198/1983), diarrhoea (7.5%, 155/1983) and back pain (7.7%, 153/1983 / Table 7). All together these 5 self-reported diseases represented 68.2% of all mentioned diseases (1352/1983, 95%CI 64.6-71.7).

Table 7 Self-reported diseases in the whole study population in Xa-Muteba municipality, Lunda Norte province, Angola, 11 April - 25 April, 2006 (n=1983, 1 missing value)

Self-reported diseases	N	[%]
Malaria / fever	616	31.1
Respiratory infections	230	11.6
Stomach ache	198	10.0
Diarrhoea	155	7.8
Back pain	153	7.7
Headache	79	4.0
Leg pain	50	2.5
Pregnancy related problems	48	2.4
Lower abdominal pain	41	2.1
Trauma/accident	40	2.0
Eye problems	37	1.9
Skin infections	20	1.1
Unknown symptoms	19	0.9
Ear problems	19	0.9
Spleen ache	18	0.9
Tumour	17	0.8
Body pain	16	0.8
Joint pain	16	0.8
Tooth ache	16	0.8
Urinary problems	12	0.6
Scabies	11	0.6
Other*	172	8.7
Total	1983	100.0

* All other self-reported diseases were reported equal or less than ten times, i.e. chest pain, constipation, hypertension, hunch back, neck pain

The most frequently reported health problem in the study population aged under 5 years was as well malaria/fever with 42.3% (222/525). The second most frequently reported health problem was diarrhoea with 17.5% (92/525) followed by stomach ache (11.2%, 59/525), and respiratory infections (8%, 42/525 / Table 8). All together these 4 reported diseases represented 79% of all mentioned diseases (415/525, 95%CI 75.5-82.6).

Table 8 Reported diseases in the study population aged under 5 years in Xa-Muteba municipality, Lunda Norte province, Angola, 11 April - 25 April, 2006 (n=525)

Self-reported diseases	N	[%]
Malaria / fever	222	42.3
Diarrhoea	92	17.5
Stomach ache	59	11.2
Respiratory infections	42	8.0
Skin infections	14	2.7
Spleen ache	13	2.5
Eye problems	8	1.5
Ear problems	8	1.5
Leg pain	7	1.3
Unknown symptoms	5	1.0
Body pain	5	1.0
Scabies	5	1.0
Trauma / accident	4	0.8
Lower abdominal pain	3	0.6
Headache	3	0.6
Tumour	3	0.6
Tooth ache	1	0.2
Urinary problems	1	0.2
Other*	30	5.7
Total	525	100.0

* Other self-reported diseases were constipation and stomach parasites (each n=4), anaemia, colic, haemorrhages and tongue problems (each n=3), unwell (n=3) and abscess, conjunctivitis, hepatitis, infection, measles, mouth pain and neck pain (each n=1)

In all 5 age groups malaria/fever, respiratory infections and stomach ache were among the 5 main self-reported health problems. Differences could be seen in the age class from 15 to 29 years, where pregnancy related problems become the third main self-reported health problem (8.5%, 33/386). Regarding women in this age-group exclusively, pregnancy related problems increase to 11.5% (n=33/288) and become the second main self-reported health problem.

In the two age groups equal and over 30 years diarrhoea was replaced by back pain being one of the 5 main self-reported diseases. In the age group of equal and over 45 years pack pain was the first mentioned health problem (18.2%, 47/258 / Table 9).

Table 9 Five main self-reported diseases per age group in the study population in Xa-Muteba municipality, Lunda Norte province, Angola, 11 April - 25 April, 2006

Age groups (n)	Self-reported diseases	N	[%]
< 5 years (n=525)	Malaria / fever	222	42.3
	Diarrhoea	92	17.5
	Stomach ache	59	11.2
	Respiratory infections	42	8.0
	Other ¹	30	5.7
5 - 14 years (n=365)	Malaria / fever	132	36.2
	Stomach ache	52	14.2
	Respiratory infections	40	11.0
	Other ¹	39	10.7
	Diarrhoea	26	7.1
15 - 29 years (n=386 ²)	Malaria / fever	130	33.6
	Respiratory infections	34	8.8
	Pregnancy related problems	33	8.5 ³
	Stomach ache	33	8.5
	Back pain	33	8.5
30 – 44 years (n=400)	Malaria / fever	90	22.5
	Respiratory infections	63	15.8
	Back pain	59	14.8
	Other ¹	39	9.8
	Stomach ache	27	6.8
≥ 45 years (n=258)	Back pain	47	18.2
	Respiratory infections	46	17.8
	Malaria / fever	36	14.0
	Other ¹	31	12.0
	Stomach ache	23	8.9

¹ All other self-reported diseases were mentioned less than 5 times

² 1 missing value

³ Excluding men from this age group, pregnancy related problems increase to 11.5% (n=33/288) and become the second main self-reported health problem

4.4.3. Health-seeking behaviour

Of the 1984 self-reported disease cases, 39.3% (779/1984, 95%CI 30-49.1) sought care in a health centre. However, 59.7% (1185/1984, 95%CI 49.9-68.8) did not go to any health centre. No data were available for 20 persons.

In the age group of under 5 years with 45.7% slightly more patient attended a health centre (240/525, 95%CI 36.5-55.2, 12 missing data).

According to the head of household the four main reasons for not attending any health centre in the whole study population were that (1) drugs were bought in a pharmacy (459/1185, 38.8%), (2) the person was not sick enough (261/1185, 22%), (3) the health centre was too far (169/1185, 14.3%), and (4) traditional medicine was used (150/1185, 12.7%). These reasons counted for 87.8% of all mentioned ones (Table 10).

In the age group of under 5 years the two main reasons for not attending any health centre were the same as for the whole study population. The main reason was that drugs were bought in a pharmacy (128/273, 46.9%) and the second main reason that the child was not sick enough (64/273, 23.5%). Different to the whole study population the third reason was that traditional medicine was used (27/273, 9.9%). These 3 reasons counted for 80.3% of all mentioned ones (Table 10).

Table 10 Reasons for not going to a health centre in the whole study population and under 5 years of age in Xa-Muteba municipality, Lunda Norte province, Angola, 11 April - 25 April, 2006

Reasons for not going to a health centre	Total		< 5 years	
	N	[%]	N	[%]
Bought drugs in pharmacy	459	38.8	128	46.9
Not sick enough	261	22.0	64	23.5
Health centre too far	169	14.3	24	8.8
Traditional medicine	150	12.7	27	9.9
No confidence	68	5.7	10	3.7
Consultation too expensive	50	4.2	14	5.1
Unknown reasons	13	1.1	2	0.7
No time to go to health centre	5	0.4	2	0.7
Missing data	10	0.8	2	0.7
Total	1185	100.0	273	100.0

When analyzing the health-seeking behaviour in the study population by four major health problems, 52.6% (324/616, 95%CI 41.6-65) did not attend a health facility when feeling sick with malaria/fever, 52.9% (82/155, 95%CI 41.1-64.7) did not seek care having diarrhoea, 58.7% (135/230, 95%CI 45.6-74.1) having a respiratory infection and 47.9% (23/48, 95%CI 22.4-73.5) with pregnancy related problems.

For malaria, diarrhoea and respiratory infections the three main reasons were the same, people did not attend a health centre because they (1) bought drugs in a pharmacy, (2) did not feel sick enough or (3) the health centre was too far. However, for pregnancy related problems the main reason why women did not seek care was the distance to the health facility (Table 11).

Table 11 Reasons for not going to a health centre for four major health problems (malaria, diarrhoea, respiratory infections, pregnancy related problems) in the whole study population in Xa-Muteba municipality, Lunda Norte province, Angola, 11 April - 25 April, 2006

Reasons for not going to a health centre	Malaria		Diarrhoea		RI ¹		Preg. rel. prob. ²	
	N	[%]	N	[%]	N	[%]	N	[%]
Bought drugs in pharmacy	141	43.6	33	40.2	43	31.8	1	4.3
Not sick enough	93	28.7	19	23.2	32	23.6	6	26.1
Health centre too far	39	12.0	17	20.7	22	16.3	8	34.9
Traditional medicine	26	8.0	4	4.9	16	11.9	4	17.4
No confidence	8	2.5	4	4.9	16	11.9	1	4.3
Consultation too expensive	15	4.6	4	4.9	4	3.0	3	13.0
Unknown reasons	1	0.3	0	0.0	2	1.5	0	0.0
No time to go to health	1	0.3	1	1.2	0	0.0	0	0.0
Total	324	100.0	82	100.0	135	100.0	23	100.0

¹ RI: Respiratory infections

² Preg. rel. prob.: Pregnancy related problems

5. DISCUSSION

5.1. Mortality rates

During the study period, both CMR and U5MR were above the respective emergency thresholds.

The CMR was 1.1/10,000/day, describing a crisis situation in which the surveyed population experience CMRs slightly above the threshold of gravity in emergency situations (1.0/10,000/day⁵) and twice the level considered normal for developing countries (0.5/10,000/day⁵). The majority of all deaths occurred at home.

At 2.8/10,000/day⁵ the U5MR was above the emergency threshold of 2.0/10,000/day⁵ and almost three times higher than the U5MR for Africa outside “crisis situations” (1.0/10,000/day⁵). Two-thirds of the reported deaths occurred in children under 5 years old and out of these, one-third died during the neonatal period.

The mortality rates in this study were lower than those found in a survey conducted by MSF-B among internally displaced persons (IDPs) in a camp in Camacupa (Bié province, Angola) immediately after the ceasefire agreement in 2002, which yielded a CMR as high as 1.5/10,000/day and U5MR of 3.3/10,000/day (MSF-B, 2002⁶). However, they were higher than those observed in a study carried out in Lankien area of Upper Nile State at the end of 2005, which showed a CMR of 0.5/10,000/day and an U5MR of 0.9/10,000/day. That study area is comparable to our study, as it reflects as well a post-war situation in a very remote, rural region where a population living in different villages was interviewed. Nevertheless, in the study of Upper Nile State, the mortality rates were the average for Sub-Saharan African countries in non-crisis situations (MSF-H, 2005⁷). The mortality rates of our study were also slightly higher than the results of a study carried out in villages in Korma area in North Darfur (Sudan) in December 2005, a region where one of the worst crises is going on since 2003. Yet, CMR there was 0.8/10,000/day and U5MR 2.2/10,000/day (MSF-B, 2005⁸).

With half of the people dying from malaria/fever, respiratory infections or diarrhoea the causes of death reflect the usual pattern in Sub-Saharan Africa and correspond with data available on disease frequency in this region⁹. None of the deaths were related to violence, implying a relatively stable and safe context for the area.

⁵ Epicentre. Rapid health assessment of refugee or displaced populations. Médecins sans Frontières, Paris, France, 1999 ; UNHCR. Handbook for emergencies. 2nd edition, UNHCR, Geneva, Switzerland, 2000

⁶ Grein T, Checchi F. Mortality among Internally Displaced Persons in Camacupa Municipality, Bié Province, Angola. Epicentre, MSF-Belgium, August 2002

⁷ Van den Broek I. Rapid assessment of retrospective mortality and morbidity in the Nuer population, Lankien, Bieh State, South Sudan. Epicentre, MSF-Holland, December 2005

⁸ Beckhoven D. Rapid health assessment, Korma area, North Darfur, Sudan. Epicentre, MSF-Belgium, December 2005.

⁹ WHO. World health report 2004. WHO, Geneva, Switzerland, 2004

5.2. Morbidity

Half of the study population reported to be ill or have been ill in the 14 days prior to the study. In the age group of under 5 years of age the number was slightly higher with 55%. The most frequently mentioned self-reported diseases were malaria/fever, respiratory infections, stomach ache, diarrhoea and back pain. Same as for the causes for death also the self-reported diseases reflect the typical picture in a Sub-Saharan community⁹.

Almost two out of three persons who reported to be ill or have been ill recently did not seek care in a health centre. The main reason for not attending a health centre was that patients instead bought drugs from a pharmacy (present in every village). This reason can be linked with the third most frequently mentioned, that the health centre was too far away. Public transport does not exist and the only way to reach a health facility is either on foot or, the more expensive solution, on top of one of the trucks that regularly pass through the villages. Respondents often considered one hour's walk to reach a health centre as too far. Regarding the two MSF-supported health posts in Domingo Vaz and Samba: overcrowding and long waiting time were reported several times by the interviewees as an additional reason to choose another alternative. A further barrier to access to health could also be the strong belief in traditional medicine: 1 out of 10 patients preferred to take traditional medicine to visiting a health centre.

Among women with a pregnancy-related problem, distance to the health centre played an important part in not visiting one, as this was mentioned by one-third of pregnant women.

5.3. Other results

The current population is quite young, with a mean age of 19 years and almost 25% being children under 5 years of age. More striking is the lack of males of working age (15-29 years) reaching a sex ratio of 0.5 in this age group. One interpretation for fewer males of working age could be that many have still died during the years of fighting before the cease agreement in 2002. This may be confirmed by the observation, that many young women (less than 20 years of age) are married to older men (over 40 years). However, it is also possible that many men in this age group were absent for a long time because of their current work, for example in diamond mines, in the capital or in foreign countries. Those who had been absent longer than the recall period would not have been registered in the questionnaire.

People had been living in this municipality for a long time, with the majority of families staying in Xa-Muteba municipality for over 15 years. Their living situation seemed to be relatively stable.

Measles vaccination coverage was, as expected, higher by history than by card. However, even if we assume that the presence of a measles vaccination history accurately

represented coverage, the figures were unacceptably low. Vaccination coverage of more than 80% is required in order to prevent measles outbreaks¹⁰.

In October 2005 MSF, in collaboration with the MoH, launched a mass measles vaccination campaign for children between 6 months and 4 years in the municipality of Xa-Muteba. Around 7,000 children were vaccinated against measles (15% of the total population in the municipality). In our study, however, we found this age-group to be 21% of the whole study population. This could be part of the explanation as to why we found such low coverage (i.e. the initial population estimate for this targeted age-group was too low).

5.4. Validity and possible limitations

Sampling

A two-stage cluster design was used to get information on the population living in the municipality of Xa-Muteba. The villages in this municipality are all situated along four main roads. However, at the time of the study, there was no road clearance given for the street going towards Calucala, due to the high number of still-active landmines (Figure 2). Therefore, the villages situated along this road were not included in the study. However, it is very likely, given the fact that the road is inaccessible, that the population of these villages might have even greater mortality and morbidity, and less access to healthcare, than the population included in the survey.

Cause of deaths and diseases

All causes of death were reported by family members and no attempts were made to conduct verbal autopsies. As almost all deaths occurred outside health facilities (in the home), accuracy of information of cause of death depends largely on how the death was perceived by family members. Bearing in mind the good participation of the study population, combined with the high quality of the interviewers, we believe that cause of deaths was accurately ascertained during the survey.

Cause of disease was also self-reported and, as they occurred in the 14 days prior to the study, we had to rely on information given by the head of the family. As the supervisor was always with the teams in the different villages to immediately discuss and classify reported signs and symptoms, we believe that these self-reported diseases are reliable for that population.

¹⁰ World Health Organization. WHO, United Nation Children's Fund. Measles mortality reduction and regional elimination strategic plan 2001 - 2005. Geneva, Switzerland: World Health Organization; 2001. Available at: <http://www.who.int/vaccines-documents/docspdf01/www573.pdf> (accessed May 29, 2006)

6. CONCLUSION

The survey provided retrospective mortality and morbidity information in a post-war situation of a population living in a remote area of Angola. The findings suggest that, even 4 years after the end of the civil war, the population still lives in a crisis situation. Both crude and under-five mortality rates during the past 3.5 months were above the emergency thresholds of 1/10,000/day for the entire population, and 2/10,000/day for children under five years. Among those under 5 years who died, one-third occurred within the neonatal period.

Both causes of death and self-reported health problems (malaria, respiratory infections, diarrhoea) show the typical pattern of a remote Sub-Saharan region with a high incidence of preventable infectious disease. In addition, a high number of pregnancy-related problems was reported.

The population, especially children under 5 years of age, in the municipality of Xa-Muteba remains at high risk of fatal disease. Reinforced monitoring of the morbidity, mortality and access to health care within this population is recommended, with strong focus on sensitising the population to malaria and obstetric health problems.

7. RECOMMENDATIONS

In light of the current situation in Xa-Muteba municipality, the following recommendations can be made.

7.1. Recommendations for MSF

- Identify and train community health workers (CHW) in order to monitor all accessible villages in the municipality (1 CHW per 1,000 to 2,500 people is needed) by focusing on the main diseases such as malaria and obstetric health problems
 - Reinforce malaria prevention by the usual tools (distribution of mosquito nets, in-house spraying)
 - Use this study's data as a baseline for monitoring
 - Assign an MSF team member to be responsible for the CHWs and ensure that the monitoring remains reliable in spite of staff turnover
- Conduct health sensitization
 - For early consultation targeting mainly pregnant women and children under 5 years of age
 - Encourage pregnant women to participate in prenatal consultations
 - Encourage parents to immunize their children
- Reinforce program activities
 - Get a better idea of which villages have less access to health care by identifying the different catchment areas for each MSF supported health facility
 - Maintain existing activities in the municipality and increase consultation capacities, especially in out-posts such as Domingo Vaz and Samba
 - Add supplementary consultations to help decrease waiting times and encourage the population to consult more frequently
 - Reinforce consultation related to obstetric health problems
- **Repeat this kind of study** in Xa-Muteba municipality at the end of 2006 or beginning of 2007; focusing on neonatal and infant mortality rates
- **Take the results of this study/these studies as a basis for further decisions concerning the continuation/adaptation of the project**

7.2. Further recommendations

- Assure that malaria treatment is available throughout the whole country (urban and rural areas) according to the national protocol to fight against malaria
- Measles vaccination
 - Negotiate with other international organisations a measles vaccination catch-up campaign in order to reach a coverage of at least 80%
 - Maintain routine measles vaccination through 'Expanded programme on immunization' (EPI) activities in increasing the age range to up to 5 years
 - Conduct a measles vaccination coverage study in order to assess the quality of the vaccination campaign
- Use the results from this study to communicate a continuing borderline emergency health care situation for rural areas in Angola
- Lobby the government, UN related international organisations and other non-governmental organisations for widespread interventions in rural areas in Angola
- Use this study's data as a baseline for future mortality and morbidity studies

8. APPENDICES

8.1. Household questionnaire

Was translated in Portuguese

Questionnaire: Demographic, morbidity and mortality survey, Xa-Muteba (Angola) 2006

Date (dd/mm/yyyy)/...../2006 Team N° Verbal consent received yes / no Refusal yes / no
 Village Cluster N° (1-30) Household N° (1-30)

No	Sex		Age		Date of arrival day/month/year	Measles vaccination (<5years)		Sick in the last 2 weeks Y/N	If no: continue at page 2 If yes: main symptom of disease 1=diarrhea; 2=respiratory infection; 3=malaria/fever; 4=trauma/accident; 5=pregnancy related; 6=unknown; 7=other (specify)	Went to health centre Y/N	If yes: place 1=MSF dispensary; 2=other health structure; 3=unknown; 4=other (specify)	if not: why 1=not sick enough; 2=health centre too far; 3=drugs on market/pharmacy; 4=traditional medicine; 5=consultation too expensive; 6=no confidence; 7=other reason (specify)
	M / F	years	months	Card Y/N		History Y/N						
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												

Cluster N° (1-30) Household N° (1-30)

No	Present at 1.1.2006?	Present today?	If NOT present today, reason	Date of death, absence, or disappearance	Place of death	Cause of death	Before death been at a health centre	if not: why
	Y / N	Y / N	1=died; 2=absent (place of stay known); 3=disappeared (stay unknown)	day/month/year	1=home; 2=MSF dispensary; 3=other health structure; 4=unknown; 5=other (specify)	1=diarrhea; 2=respiratory infection; 3=malaria/fever; 4=trauma/accident; 5=during pregnancy; 6=giving birth; 7=violence; 8=unknown; 9=other (specify)	Y/N	1=not sick enough; 2=health centre too far; 3=drugs on market/pharmacy; 4=traditional medicine; 5=consultation too expensive; 6=no confidence; 7=other reason (specify)
1								
2								
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14								
15								

8.2. Survey guidelines for the interviewers

were translated in Portuguese

Demographic, morbidity and mortality survey - Xa-Muteba, Angola - 2006 Guidelines for interviewers

1. Basic information on the survey

Objectives	We want to assess the health status in the population and gain a better knowledge on its mortality rate including related causes.
Type of survey	Retrospective morbidity and mortality survey
Method	30 by 30 cluster
Duration	Training 2 days Survey 6 days
Planned period	April 24, - May 01, 2006
Location	Xa-Muteba
Total population	45.700
Recall period	January 1 - April 25, 2006 – 115 days
Teams	5 teams will work fulltime to carry out the survey. One team consists of 2 trained interviewers. Each team will finish 1 cluster per day. Each team reports daily the results of its work to the survey supervisor.

2. Needed material per team

Please check every morning before you leave for your cluster that you have following items:

- 1 clipboard
- 2 pencils
- 1 rubber
- 1 sharpener
- MSF identification: 2 plastic badges or MSF T-Shirts
- Plastic folder (protection of questionnaires)
- 1 backpack
- Questionnaires
- Random number table

3. Method

- Ensure that people understand that this survey is entirely anonymous.
- There will be no incentives given for participating.
- Interviews should be conducted with the head of household, or another adult member of the family in his/her absence.

- After arrival in a household, before starting with the questionnaires, introduce yourself and the purpose of the study. Ask the respondent for verbal informed consent and note this on the questionnaire.
- If the whole household or certain members **refuse to participate, never insist** on their participation. Note it on the questionnaire (Refusal yes/no) and continue with the next household.

Definition of a household

A group of people eating and sleeping in the same compound and under the responsibility of 1 person or head of household for at least the previous two weeks.

We include therefore the whole household, no matter the age of the household members.

Selection of clusters

A total of 30 clusters will be randomly chosen and assigned to each team; within each cluster, 30 households will be included.

How to select the households within 1 cluster:

1. Go to the centre of the cluster
2. Randomly select a direction (with a pen)
3. Follow this direction to go to the periphery of the cluster area, numbering the houses you pass
4. Upon arrival at the periphery, select a random number between 1 and the number of houses counted
5. Go to the house corresponding to that random number
6. After having investigated this first house, continue to investigate every next house (closest front door)

Particular cases

- If the house is empty, ask the neighbours when the household will return. If they will come back the same day, then you should revisit this household. Note date and time of the revisit. Only revisit once! If there is still nobody present at the second visit write ABSENT on the questionnaire for this household.
- If more than 1 household (more than 1 family head) lives within 1 compound, randomly select 1 household (random number table), and continue the interview for that household only. The other household(s) within the same compound will not be included and you can continue to the next compound.
- If 1 man has several women, all women and their children should be considered as part of the same household.

4. Order and structure of questions

Structure of the questionnaire

- The questionnaire consists of 2 pages (morbidity related questions and mortality related questions)
- This 2-page-questionnaire represents one household
- One line in each questionnaire represents one household member within this household
- In each cluster you should fill-in 30 questionnaires = 30 households

You should respect the order of the questions to allow for a smooth interview. Questions below are meant as guidance. They will not be read out in a systematic fashion in their exact wording.

Description of the questions

1) How many people have lived in your household between 1.1.2006 and today, including yourself? This includes births, deaths and people residing in your household for a short period.

- Now you have to fill-in a separate line for all reported household members with the required information

2) For all household members list now:

- Sex: M=Male, F=Female
- Age: Record age in full years (if more than 1 year of age)
For children under 1 year of age, record age in months (1 to 11 months)

3) When did this household member arrive in the village?

- Complete date of arrival (day/month/year) in village for each household member

4) If this household member is younger than 5 years of age, ask if he/she is vaccinated against measles. A measles vaccine is usually described as an injection received in the upper left arm.

- If the interviewed person shows you a measles vaccination card, answer 'Y' at the column "card: Y=yes, N=no" If you don't see a measles vaccination card answer 'N'.
- If the interviewed person reports you that a measles vaccination was done, answer 'Y' at the column "history: Y=yes, N=no". If no measles vaccination was done, answer 'N'.

5) Ask if the household member has been sick in the 2 weeks prior to the study.

- If no, go to page 2 of the questionnaire and continue with question "Present at 1.1.2006?"
- If yes, ask for the observed symptoms of the disease, tick on the questionnaire the number of the self-reported symptom which is closest to the given description

6) Ask if the sick household member went to a health centre during his/her sickness

- If yes, ask for the place of the health centre and fill in the number which is related to this place
- If no, ask the main reason why he / she didn't seek for care in a health centre and tick on the questionnaire the number of this main reason which corresponds to the given answer

7) Ask if the household member lived in this household on 1.1.2006?

- Tick either Y=yes or N=no

8) Ask if the household member lives in this household today?

- Tick either Y=yes or N=no

9) What happened to this household member who lived in your household at 1.1.2006 but is now no longer living in this household?

- classify this household member who is no longer living in the household as
 - 1=died if died since 1.1.2006
 - 2=absent, used to live in this family at 1.1.2006, but left since; it is know that person is alive and where person lives
 - 3=disappeared used to live in this family at 1.1.2006, but left since; it is not known if person still alive or dead, or where person lives, if still alive

10) Ask for the date of death, absence, or disappearance

- Record dates as day/month/year. If only the month and the year are known, record as 1/month/year.
- Make use of a local calendar if needed.

11) If the household member died since 1.1.2006 note:

- the place of death
- the cause of death

- Did the household member seek care at a health centre before he/she died?
 - If yes, questions are finished for this household member
 - If no, ask the main reason why he / she didn't seek for care in a health centre and tick on the questionnaire the number of this main reason which corresponds to the given answer

5. End of interview

End of line in questionnaire

When you finished with filling-in all the required information for this household member continue with the next household member and fill-in the next line of the questionnaire.

End of questionnaire

When you filled-in for each household member the questionnaire ask the interviewed person (usually the head of household) directly if any household members died, left or disappeared between 1.1.2006 and today. If yes, add this household member to the questionnaire and fill-in required information.

Before you leave the household verify if you received all the needed information.

GOOD LUCK!