Mortality in Mozambique

Results from a 2007–2008 Post-Census Mortality Survey

TECHNICAL REPORT

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Acknowledgements

The Mozambique Post-Census Mortality Survey (INCAM) would not have been possible without the hard work and collaboration of various government ministries, organizations, departments, and individuals. The Mozambique National Institute of Statistics conducted the survey, the Mozambique Ministry of Health assisted with critical input, the U.S. Census Bureau and MEASURE Evaluation provided technical assistance, and the U.S. Centers for Disease Control and Prevention (CDC) Mozambique office coordinated assistance. Additionally, INCAM would not have been possible without funding from the U.S. Agency for International Development (USAID), the U.S. President's Emergency Plan for AIDS Relief (PEPFAR), and the United Nations Children's Fund (UNICEF).

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This report draws upon the Portuguese report "Mortalidade em Mocambique—Inquerito Nacional sobre Causes de Mortalidade, 2007/8" and presents additional findings from the INCAM survey. Primary authors of this report are Renee Lewis, U.S. Census Bureau, and Stirling Cummings, MEASURE Evaluation. A number of individuals provided valuable comments and direction during the writing of this report, including Loraine West and Daniel Goodkind from the U.S. Census Bureau, Peter Young from the CDC office in Mozambique, and Robert Mswia from MEASURE Evaluation. We would like to thank Andrea Miles for her assistance in editing this report.

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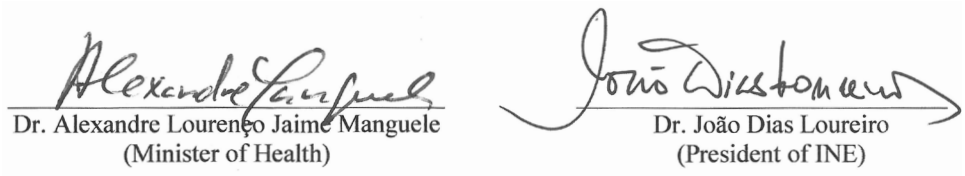
Preface

Data outlining causes of death are essential for measuring the health and welfare of the population. However, in most developing countries, reliable information on mortality is often unavailable. In Mozambique, most people do not die in health facilities and information outlining causes of death is generally not available. Population-level mortality rate information is also scarce and is generally limited to data gathered for children under age 5 from a Demographic Health Survey (DHS). In order to bridge this information gap, the Mozambique National Institute of Statistics (INE) in collaboration with the Mozambique Ministry of Health, decided to implement the National Inquiry into the Causes of Mortality (INCAM). Together, these agencies pioneered a new methodology for collecting cause-of-death information by using household-reported deaths from the 2007 National Population and Housing Census. Drawing a sample from the census provided a unique opportunity to study causes of death in Mozambique.

The implementation of INCAM has deepened the skills of local experts and provided the Ministry of Health with valuable mortality data. This information on who is dying and what they are dying from will allow the Ministry of Health to implement interventions, set goals, and monitor and evaluate the state of health care in Mozambique. In order to maximize the impact, the results of this study should be widely disseminated among the various administrative levels within the country and shared with researchers both in Mozambique and elsewhere.

We are aware that the issue of mortality is very sensitive, and we express our gratitude toward the men and women who agreed to provide information about the circumstances surrounding the death of a loved one. This information was instrumental in determining the leading causes of death in our country. Finally, we would like to thank all the institutions that contributed to the materialization of this study. We would like to acknowledge MEASURE Evaluation, the U.S. Centers for Disease Control and Prevention (CDC), and the U.S. Census Bureau for their technical assistance, as well as the U.S. President's Emergency Plan for AIDS Relief (PEPFAR), the U.S. Agency for International Development (USAID) and The United Nations Children's Fund (UNICEF) for their financial assistance.



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Executive Summary

As it entered the second millennium, Mozambique lacked comprehensive estimates of mortality as well as its causes. Although several potential sources of such information existed, each had limitations and weaknesses. Given the lack of comprehensive information, Mozambique was unable to determine levels of mortality, its causes, or the regions and demographic characteristics exhibiting the highest mortality. In response to this critical data gap, the government of Mozambique decided to implement a post-census mortality survey—the Inquérito Sobre Causas de Mortalidade (INCAM)—in conjunction with the 2007 population census. The National Institute of Statistics, in collaboration with the Ministry of Health, implemented INCAM between 2007 and 2008. The INCAM sample was designed to be representative at the national, provincial, as well as urban and rural levels and to yield cause-of-death estimates consistent with the international classification system (ICD-10) developed by the World Health Organization (WHO).

The frame for the INCAM survey was the 2007 Mozambique General Census of Population and Housing, which occurred August 1, 2007. In addition to collecting other household information, the census inquired about household deaths within the past year. A sample of clustered enumeration areas from the census were randomly selected, and then households reporting a death in the sample areas were identified so that more information about the deaths could be gathered through detailed verbal autopsy (VA) questionnaires. Two physicians independently reviewed each VA questionnaire and completed a death certificate according to ICD-10 procedures. If the death certificates differed, the two physicians jointly consulted to reach a consensus. Causes of death were certified and coded for 10,080 deaths in the period from August 1, 2006 to July 31, 2007.

This report presents key findings from INCAM regarding leading causes of death by basic demographic characteristics, including area of residence, age group, sex and other characteristics, such as the use of health services prior to death.

- Malaria and HIV/AIDS were the leading causes of death, followed by perinatal conditions, diarrheal diseases, pneumonia, accidents and external causes, diseases of the circulatory system, tuberculosis and malignant neoplasms. Malaria accounted for 29 percent of all deaths and HIV/AIDS for 27 percent.
- Although malaria and HIV/AIDS were the two leading causes of death, the age groups most affected by these diseases were very different. Whereas malaria was the leading cause of death in children under 5, HIV/AIDS was the leading cause of death in adults beginning around age 15 and continued to be the leading cause of death in adults until people reached their late 60s.
- Differences in mortality also existed across urban and rural locations. Malaria was the leading cause of death in rural areas and HIV/AIDS was the leading cause of death in urban areas. Deaths from accidents and external causes, circulatory diseases, and malignant neoplasms had higher death fractions in urban areas compared to rural areas.
- HIV/AIDS was a more prevalent cause of death in the southern provinces.

- Newborns and infant deaths in children under age 1 accounted for approximately one-quarter of all deaths. Deaths of children from 1 to 4 years comprised 19 percent of all deaths.

Major findings for deaths among children under age 15 include:

- Bacterial sepsis of newborn was the leading cause of death among neonates (under 28 days), accounting for 35 percent of neonatal deaths.
- Infant mortality was 9,993 per 100,000 children under age 1, which means about one in ten infants died before their first birthday. Malaria accounted for about 35 percent of such mortality.
- Among children age 28 days to four years, malaria was the leading cause of death, accounting for approximately half of all deaths (51 percent). HIV/AIDS was the second leading cause of death among this age group, accounting for 16 percent of deaths.
- Among children age 5–14 years, malaria was the leading cause of death, accounting for about half of all deaths, while HIV/AIDS was the second leading cause of death accounting for 14 percent of deaths. Other leading causes included accidents and external causes, diarrheal diseases, and pneumonia.

Major findings for deaths among adults age 15 and above include:

- HIV/AIDS was the leading cause of death, accounting for 40 percent of all adult deaths. The second leading cause of death was malaria, which was the source of 14 percent of adult deaths. Other leading causes included circulatory system diseases, accidents and external causes, and tuberculosis.
- HIV/AIDS was the leading cause of death for adults in all provinces, ranging from 32 percent of deaths in Nampula to 50 percent of deaths in Gaza. The percentage of deaths due to malaria varied from 7 percent in Maputo to 18 percent in Nampula. Maputo City had the highest percentage of deaths due to circulatory disease.
- HIV/AIDS death rate was 567 per 100,000 adults and the malaria death rate was 201 per 100,000 adults.

Major findings concerning treatment sought and place of death:

- Overall 69 percent of decedents sought treatment of some form from one or more sources. Clinical treatment was sought by 62 percent of decedents, 7 percent received care from community outreach health activists, and 27 percent visited a traditional healer.
- People living in urban areas (76 percent) were more likely to receive clinical treatment than those who resided in rural areas (56 percent).
- Treatment received varied by age. Adults age 25–49 were the age group with the highest percentage of people who sought clinical treatment. Children under one year of age had the lowest percentage of deaths to receive any treatment as well as clinical treatment specifically.
- People dying from HIV/AIDS, tuberculosis, and malignant neoplasms were the most likely to have received clinical treatment, while deaths from accidents and external causes and perinatal deaths were the least likely to have received such treatment.

- Approximately three-quarters of all deaths occurred at home. About 21 percent of deaths took place at health units, the second most common place of death.

Major findings on deaths due to malaria and HIV/AIDS:

- Children under fifteen years of age had the highest percentages of death from malaria. For children age 28 days to 14 years, malaria accounted for roughly half of all deaths.
- In the 15 to 24 years age group, HIV/AIDS overtook malaria, and in adults ages 25 to 49, HIV/AIDS was by far the leading cause of death.
- The southern provinces of Gaza, Maputo, and Maputo City had the lowest proportions of deaths due to malaria. Gaza and Maputo experienced the highest percentages of deaths due to HIV/AIDS.
- Thirty-three percent of people who died from an underlying cause of HIV/AIDS also died as a direct result of tuberculosis. Of HIV/AIDS deaths occurring in urban areas, 40 percent died as a direct result of tuberculosis compared to 30 percent in rural areas.

Major findings on maternal mortality:

- Fifty-five percent of maternal deaths were due to direct obstetric causes. Another 18 percent were HIV/AIDS-related, and the remaining 27 percent were due to indirect causes other than HIV/AIDS.
- Among all maternal deaths, 55 percent occurred during pregnancy or childbirth (including 14 percent due to abortion) and 45 percent occurred within 1–42 days after a birth (these shares are not significantly different).
- Maternal deaths accounted for 14 percent of all deaths in women age 15–49 or about one maternal death for every six non-maternal deaths.
- Among those giving birth, 51 percent of maternal deaths occurred to mothers who delivered at home and 43 percent delivered at a health unit.

INCAM provides Mozambique with a critical baseline tool for measuring mortality and its causes, as well as improving options for allocating health resources to best serve the needs of its citizens. The findings also provide critical comparative perspective on mortality trends elsewhere in the world.

Chapter 1 Overview and Objectives

As it entered the second millennium, Mozambique lacked comprehensive estimates of mortality as well as its causes. Although several potential sources of such information existed, each had limitations and weaknesses.

For example, the civil registration system was incomplete, with existing coverage limited mostly to urban areas. Demographic and Health Surveys (1997 and 2003) provided direct estimates of mortality only for children under age five, as well as indirect estimates of maternal mortality via the sisterhood method. The Demographic Surveillance System in Manhiça, established in 1996, produces cause-specific mortality statistics, but only for a population of about 84,000[1] which covers only about 0.4 percent of Mozambique's population. The site is located in a mostly rural district in southern Mozambique and cannot be considered as representative of the rest of the country. Although the Ministry of Health is taking steps to improve the quality of hospital-based death registration, the death certificates produced for those dying in Maputo Central Hospital are also not nationally representative.

Given the lack of comprehensive information, Mozambique was unable to determine levels of mortality, its causes, or the regions and demographic characteristics exhibiting the highest mortality. Deaths related to HIV/AIDS, for instance, had to be estimated based on comparative models rather than actual empirical data. This lack of basic information on mortality is common in the developing world.

In response to this critical data gap, the government of Mozambique decided to implement a post-census mortality survey—the Inquérito Sobre Causas de Mortalidade (INCAM)—in conjunction with the 2007 population census. The National Institute of Statistics, in collaboration with the Ministry of Health, implemented INCAM between 2007 and 2008. This survey received technical assistance from MEASURE Evaluation, the U.S. Census Bureau, and the U.S. Centers for Disease Control (Mozambique office) with funding from the U.S. Agency for International Development (USAID) and the United Nations Children's Fund (UNICEF). To our knowledge, this was the first time that a national mortality survey of this scope was linked to a census.

The goal of INCAM was to determine the leading causes of death by age and sex, to identify the regions where such mortality was highest, and to estimate cause-specific death rates. These results will help the government identify emerging health problems, monitor the progress of health initiatives, evaluate the effectiveness of health programs, and guide planning for health services.

[1] www.scienceagainstpoverty.es/Resources/.../Nuria_Casamitjana_ppt.pdf

Chapter 2 Methodology

2.1 SAMPLE DESIGN

The frame for the INCAM survey was the 2007 Mozambique General Census of Population and Housing, which occurred August 1, 2007. In addition to collecting other household information, the census inquired about household deaths within the past year. The INCAM sample was designed to be representative at the national, provincial, as well as urban and rural levels. To ensure that there would be a sufficient number of deaths to provide reliable rankings of the leading causes of mortality, the population for each of the stratums selected for INCAM was estimated for midyear 2007. Based on these estimates, and the assumption of a crude death rate of 12 per thousand in urban areas and 18 per thousand in rural areas, it was determined that approximately 16,000 deaths would be necessary to yield statistically significant mortality estimates.[2] The sample was selected with the intention of capturing this many deaths.

The INCAM sample was selected randomly in each province. The enumeration areas (EAs) in the 2007 census were divided into urban and rural strata in each of the 10 provinces (Maputo City only has urban EAs). A series of EAs were then randomly selected from the urban and rural lists for each province. For each selected EA, the corresponding census supervisory area for that EA and an adjoining census supervisory area were selected to form a segment. In total, 32 segments were selected for each of the following provinces: Niassa, Cabo Delgado, Tete, Manica, Sofala, Inhambane, Gaza, and Maputo. For the more populous provinces of Nampula and Zambezia, 48 segments were selected. Given the dense population concentration in Maputo City, and hence lower fieldwork costs, it was decided not to couple the census supervisory areas in the capital and instead to select 64 segments, each consisting of a single census supervisory area.

2.2 IDENTIFICATION OF INCAM DEATHS

As the completed census forms arrived in Maputo City from the field, the census forms for households located in INCAM sample areas were reviewed to see if any deaths from the previous 12 months were recorded on the census questionnaire. If a death was listed on the census form, the information from the mortality section (section H) was keyed into a database along with information regarding the household, such as its geographic location, number of household members, composition of building materials for the roof/walls/floors, family members' educational status, and household possessions reported on the census questionnaire. At this stage, each death was assigned a unique identifier so that it could later be linked to the information on completed verbal autopsy (VA) forms and death certificates. This step was critical because without these unique identifiers, there would have been no way to associate the death with its cause or VA.

[2] The crude death rate estimates were based on the national mortality estimate from the U.S. Census Bureau International Data Base, December 2006 version.

Upon completion, the database contained a list of 18,105 deaths (see Table 1) in the twelve months preceding the census reported by all households residing in areas selected in the INCAM sample. The teams that later went into the field to administer VAs were directed to households on this list. INCAM only covered those who were living in private households prior to death. Group quarters such as dormitories, prisons, military barracks, and health facilities, were not covered in the INCAM survey. However, results from the 2007 census showed that 99.9 percent of Mozambique's population resides in households; therefore, the exclusion of institutional or group-quarter populations should have a minimal effect on the representativeness of INCAM results.

2.3 INCAM VERBAL AUTOPSY QUESTIONNAIRES

INCAM used all three of the WHO-endorsed international standardized VA questionnaires for specific age groups (see WHO, 2007). One questionnaire was used for neonates under 28 days old, another for children 28 days to 14 years of age, and a third questionnaire was used for adults age 15 years and above. The questionnaires were adapted somewhat to fit the specific needs of Mozambique and its unique situation. For example, the list of facilities for receiving treatment was modified to reflect Mozambique's situation and scorpion was added to the list of animal/insect bites.

Each questionnaire gathered basic demographic information on the deceased, such as their sex and age, an account of the events that led to their death, what the respondent believed the cause of death to be, the place of death, any health services sought by the deceased during the illness that led to death, and most importantly, information on the symptoms and their durations suffered by the deceased during the terminal stage of the disease that led to death.

2.4 FIELD WORK AND DATA COLLECTION

The VA field team consisted of verbal autopsy interviewers, verbal autopsy supervisors, and drivers. In most communities the assistance of local guides—people known in their communities—was sought to help locate households and set up appointments for the VA interviewers.

Verbal autopsy supervisors coordinated the activities of the verbal autopsy interviewers and were responsible for making sure that the field operations ran smoothly and efficiently. Most of the verbal autopsy supervisors were provincial staff who had worked for the Mozambique Statistical Office (INE) during the census enumeration activities.

The training of field staff occurred in two phases. In the first phase, teams of supervisors were formed and training took place in Maputo province. The second phase of training was for drivers and the interviewers who would be administering the VAs. Interviewers received training on how to administer VAs and were supplied with an interviewer's manual specific to verbal autopsy that provided guidance on how to ask questions and fill in the questionnaires. Interviewers working in Maputo

City or Maputo province were trained in Maputo province, staff working in Gaza and Inhambane were trained in Gaza, staff working in Tete and Manica were trained in Tete, and staff working in Niassa, Cabo Delgado, Nampula, and Sofala were trained in each of those provinces, respectively. Training commenced in October of 2007 in Maputo City and was completed in the northern provinces by January of 2008.

Nationally, 45 field teams were formed. Maputo City was assigned three teams while the other provinces were allocated four teams, except for the provinces of Zambezia and Nampula which had five teams. Each team consisted of three interviewers and a driver, except in the provinces of Zambezia and Nampula where teams were made up of four interviewers and a driver. The field teams in each province were under the supervision of the provincial supervisor in coordination with the national team.

Data collection began immediately after the completion of training for the interviewers. Thus, Maputo City and Maputo province, whose teams were the first to be formed, began field work in October 2007. The other provinces started fieldwork after the end of their interviewer trainings, which meant the northern provinces of the country began collecting data in January 2008. Data collection ended in Tete in May 2008, the end of data collection nationally.

Once the VA interviewer arrived at a household on the INCAM list, an appropriate respondent who lived with or cared for the deceased was identified before proceeding with the interview. When an appropriate respondent was absent or not available at that time, another day was scheduled to conduct the interview. The VA interviewer made up to three attempts to visit the household to find an appropriate respondent. If by the third visit it was not possible to complete the interview, the interviewers were instructed to complete the questionnaire with as much information as was available, including the name of the deceased, their sex and approximate age at death, and their place of death. If possible, the qualitative information outlining the chain of events leading to death was also included.

Interviews were conducted in the former residence of the deceased. If an appropriate respondent was identified, the interviewer first asked the age of the deceased in order to determine which of the three VA questionnaires to complete. The interviewers were instructed to complete the questionnaires during the interview. In most cases, interviewers were able to complete the VA during the first visit.

VA fieldwork determined that a large number of deaths reported in the census were out of scope (Table 1; 6,353 deaths). The majority of out of scope deaths were deaths that actually occurred outside of the reference period from August 1, 2006 to July 31, 2007 (4,891deaths). Other out of scope deaths included decedents who were not residents within the INCAM geographic area, duplicate reporting of deaths, and stillbirths.

Some households could not be located for the VA, including households that had dissolved (Table 1). Deaths among these households potentially included some deaths that were outside of the reference period and thus out of scope. The coverage estimate in Table 1 assumes that all deaths in households that could not be located

were in scope. Therefore, if some of those deaths were out of scope, then the coverage estimate in Table 1 is biased downwards.

INCAM cooperation was quite high; only 62 households declined to participate in the VA. During fieldwork if VA interviewers discovered a death that had not been reported on the census, a VA was administered. A total of 185 additional deaths were found (Table 1). It should be noted that INCAM was not designed to identify all deaths missed in the census. Therefore, underreporting of deaths in the census is still a potential issue and would bias downwards death rates calculated from INCAM.

Table 1 **Deaths in Scope from the INCAM Survey: 2006–2007**

Province	Deaths identified in the census	Deaths in scope from the census		Deaths out of scope from the census	Valid deaths certified and coded	Coverage rate (percent)	Deaths found in the field that were not reported in the census	Total valid deaths certified and coded
		Household located	Household not located					
Total	18,105	10,190	1,562	6,353	9,895	84	185	10,080
Niassa	1,361	642	205	514	558	66	3	561
Cabo Delgado	1,617	1,054	84	479	1,035	91	5	1,040
Nampula	2,111	925	338	848	874	69	12	886
Zambezia	2,170	1,164	203	803	1,142	84	40	1,182
Tete	1,622	750	221	651	741	76	42	783
Manica	1,511	961	121	429	954	88	20	974
Sofala	1,565	1,144	124	297	1,133	89	20	1,153
Inhambane	1,296	686	77	533	663	87	2	665
Gaza	1,797	1,035	69	693	995	90	7	1,002
Maputo	1,441	810	74	557	790	89	11	801
Maputo City	1,614	1,019	46	549	1,010	95	23	1,033

Note: Coverage rate is equal to valid deaths certified and coded divided by deaths in scope from the census
Source: INCAM, 2006–2007

2.5 CERTIFYING AND CODING CAUSES OF DEATH

There are several methods available to assign the causes of death from verbal autopsy questionnaires, including physician review, expert algorithms, and data driven algorithms such as regression, neural networks, and Bayesian approaches. For INCAM, physician review was selected as the preferred method. A team of 22 physicians, representing all provinces of the country, were selected to attend training on death certification and coding in accordance with the standards set by the International Classification of Diseases 10th revision (ICD-10).[3]

[3] http://www.who.int/classifications/icd/en/

The medical certification of causes of death in INCAM was based on the second edition of the International Classification of Diseases 10th revision, Volumes 1, 2, and 3 as outlined in Sample Vital Registration Using Verbal Autopsy (SAVVY) manuals.[4]

Physicians were trained to use the international death certificate to assign the cause of death. The international death certificate is part of the ICD-10 procedures and is used to assign the underlying and direct causes of death, as well as to identify other significant conditions that contribute to death. The certificate is composed of two parts. Part I lists medical conditions in the order of their causal relationship and allows physicians to register up to four conditions that represented the chain of events leading to death. The order of these events is important because each condition gives rise to another in the line above it. The condition on the lowest line is the underlying cause and the condition on the top line lists the direct cause of death. Part II of the death certificate is used to acknowledge other significant conditions that contributed to death but were not related to the sequence of events listed in Part I. In Parts I and II, each line has a place for recording the time interval between the onset of each condition and death. Finally, in Part I, the ICD code for each listed condition is filled in. The ICD-10 manual, Volume 2, section 4.1.12, "Summary of linkages by code number," provided guidance for determining the final underlying cause of death and code, as did the Vital Statistics ICD-10 ACME Decision Tables for Classifying Underlying Causes of Death, 2006.

Two physicians independently reviewed each VA questionnaire and completed a death certificate. Both death certificates were keyed into a database and all ICD codes and their sequences were compared. In cases where there was disagreement, the questionnaires were returned to the two physicians and they were allowed to work together to produce a final, ratified death certificate, which was keyed into a database. The assignment of ICD-10 codes lasted 30 days and was conducted in Maputo City.

Most death certificates consisted of one or two causes of death. As the number of causes of death entered in the death certificates increased, the likelihood of disagreement also increased. Thus, it is understandable that in cases where physicians produced certificates with a single cause of death, agreement was more likely to occur (data not shown).

2.6 DATA PROCESSING

The data processing team was composed of a programmer, a supervisor, and nine data entry personnel. Census and Survey Processing System (CSPro) was used for data processing and editing.[5] Double key data entry was employed to increase accuracy. Data entry occurred in three phases.

[4] http://www.cpc.unc.edu/measure/tools/monitoring-evaluation-systems/savvy
[5] http://www.census.gov/ipc/www/cspro/

During the first phase, information from the census questionnaire for INCAM sample households reporting a death was entered into a database. That information included household identification, geographic and administrative classifications, head of household characteristics, housing characteristics, and all information regarding deaths in the household over the past year. Once data from the INCAM sample area census questionnaires were entered, two files were created. The first contained a list of deaths reported in each household and the second contained a list of deaths reported in each segment, form ing a control list used by supervisors. At this stage, each death was assigned a unique identification number (reference number) so that the deaths could later be linked to their completed VA forms and death certificates. This was a critical step in tying the three data processing stages together.

During the second phase of data entry, completed VA questionnaires that had returned from the field underwent a quality control review at INCAM headquarters. Once they were reviewed and any necessary changes were made on the form, they were entered into a separate database. After data entry at this stage was completed, VA questionnaires that had complete interviews were eligible to be assigned a cause of death. These forms were separated out and sent to the team of physicians for the certification and coding of cause of death. VA questionnaire data entry took place between March and August 2008.

The third phase of data entry was the most complex and involved entering the completed death certificates into a third database. Since each VA questionnaire was reviewed and coded separately by two different doctors, each questionnaire had two death certificates associated with it and each of these certificates needed to be entered twice using the double key data entry method. Once entered, the system compared the two death certificates against each other and checked for discrepancies. In cases where the causes of death codes or sequences did not match, the death certificates were returned to the physicians to discuss and come to an agreement on the cause of death, thus producing a new, third death certificate. These final death certificates were also entered using double keying.

Once the third phase of data entry was completed, the three databases (information from the census, VA, and death certificate) were merged together for each province. Cases were merged using the unique identifier assigned to each death during the creation of the list of INCAM deaths. The provincial files were then combined to form a national-level dataset, which is the source of most of the analyses reported in this INCAM report.

2.6.1 Tabulation

Upon merging the three databases into one, the data underwent a macro level cleaning. The data sets were then converted from CSPro to SPSS for the purposes of further cleaning, tabulation, and analysis. Tabulation was performed in order to provide detailed information about the causes of death by age group, sex, area of residence, use of health services, and place of death. Generally, only the underlying cause of death was tabulated for analysis. Even though there may be several causes that contribute to a death, the underlying cause of death is of particular interest to

health professionals because the most effective public health intervention would be to arrest the chain of morbid events leading directly to death as early as possible.

2.7 CALCULATION OF DEATH RATES

The death rates used in this report are official INE estimates based on demographic analysis of the 2007 census.[6] In constructing the death rate estimates, INE considered results from INCAM and adjusted census mortality results accordingly. INE produced population estimates and projections that begin in 2007 and end in 2040 for each of the 11 provinces at the urban and rural levels. These estimates and projections can then be aggregated to the province level, the national urban and rural levels, and to the national level. These estimates and projections are done on a cohort component basis, yielding death rates by sex and single years of age.

INE's death rate estimates were then apportioned by cause of death based on information obtained through INCAM. Cause-specific death rates were constructed by multiplying the overall death rate for a particular demographic group by the cause-specific fractions indicated by INCAM for that group. All cause-specific rates for any group thus sum to the overall death rate for that group. In this report infant death rates (m_0) as opposed to infant mortality rates (q_0) are used to achieve comparability across age groups.

2.8 STATISTICAL SIGNIFICANCE OF RESULTS

All tables in this report, with the exception of appendix tables, show results only if the number of unweighted (actual) cases is 20 or higher. If the table cell is based on fewer than 20 unweighted cases, an asterisk is shown in the table. Unless otherwise specified, results in the tables, figures, and text are based on the weighted results. All direct or implied comparisons in the text are significantly different at the 90 percent confidence level unless otherwise stated. This means the 90 percent confidence interval for the difference of the estimates being compared does not include zero. All confidence intervals were calculated using the Complex Samples module in SPSS and tested using Z-scores. It should be noted that this report does not make comparisons of individual leading causes of death with the category of "other" causes of death. The "other" category is comprised of all other causes of death that were not individually listed as leading causes.

2.9 LIMITATIONS OF THE DATA

Retrospective death histories gathered using verbal autopsy, such as those included in the 2007 INCAM survey, are susceptible to error. Estimates derived from a sample survey are affected by two types of errors: (1) non-sampling errors and (2) sampling errors. Sampling error occurs when the characteristics of a sample are measured instead of those of the entire population (as from a census). Note that sample-based estimates will vary depending on the particular sample selected from the population,

[6] It was not possible to construct mortality rates for the INCAM sample areas alone due to technical difficulties in matching the sampled areas with the compiled census data in those same areas.

but all estimates attempt to approximate the actual figures. Measures of the magnitude of sampling error reflect the variation in the estimates over all possible samples that could have been selected from the population using the same sampling, data collection, and processing methods. Standard errors are primarily measures of the magnitude of sampling error. For this report, the appendix contains estimates and standard errors for key variables.

In addition to sampling error, nonsampling errors may be introduced during any phase of data collection or processing. For example, operations such as editing, reviewing, or keying data from questionnaires may introduce error into the estimates. Non-sampling errors may also be the result of mistakes made in the field, such as failure to locate and interview the correct household, misunderstanding of the questions on the part of either the interviewer or the respondent, and errors made when filling out questionnaires.

Verbal autopsy data may be affected by recall bias. Some respondents may not have accurately recalled if the death of a loved one occurred within the specified timeframe of one year from the date of the census. Furthermore, the circumstances that led to death may not have been recollected accurately by the respondent. Physician review for assigning causes of death from data collected by verbal autopsy can be prone to misclassification; certain causes of death are easier to assign from a verbal autopsy than others (Marsh et al., 2003; Chandramohan et al., 1998; Kahn et al., 2000; Rodriguez et al., 1998; Mobley et al., 1996). For these reasons, readers of this report should use the study results with appropriate caution.

Finally, it should be noted that INCAM was not designed to identify all deaths missed in the census. Therefore, underreporting of deaths in the census is still a potential issue and would bias downwards death rates calculated from INCAM.

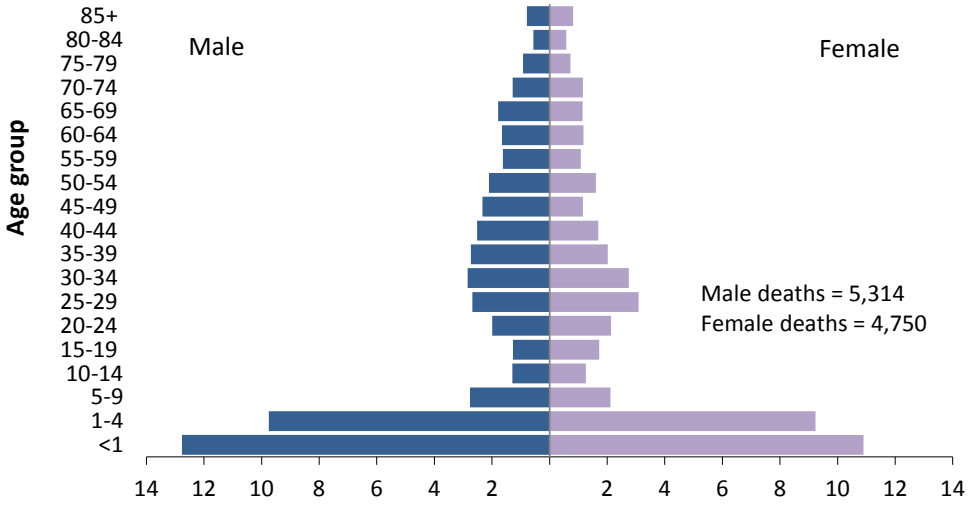
Chapter 3 General Results

This chapter outlines results from INCAM at the national level. Specifically, this chapter covers the age distribution of INCAM deaths, as well as the leading causes of death by basic demographic characteristics, including area of residence, age group, and sex. Global burden of disease classification and cause-specific death are discussed as well.

3.1 AGE DISTRIBUTION OF INCAM DEATHS

Figure 1 represents the age distribution of all enumerated INCAM deaths occurring in the twelve months prior to the 2007 census. Deaths for children less than one year of age accounted for the largest number of deaths, approximately one-quarter of all enumerated deaths were attributed to this age group. Males less than one year of age accounted for approximately 13 percent of all enumerated deaths and females less than one year of age accounted for about 11 percent. Deaths of children age 1–4 years comprised the next largest age group, accounting for 19 percent of all deaths. Cumulatively, children under 5 years of age accounted for 43 percent of all deaths and half of all deaths were in children under age fifteen. To put this in perspective, the WHO Global Burden of Disease 2004 Update reports that in developed countries, the percentage of deaths in children under age fifteen only accounted for 1 percent of deaths in those countries.[7]

Figure 1 Distribution of Deaths by Sex and Age Group in Percent: 2006–2007



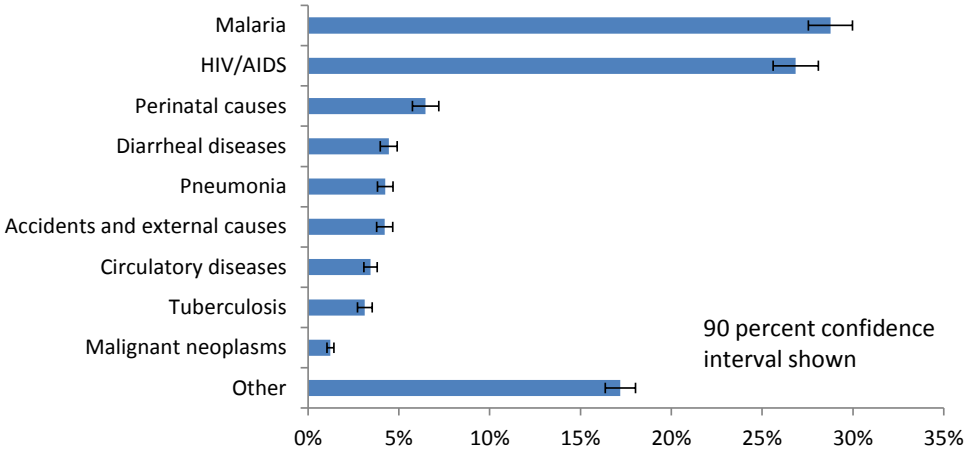
Source: INCAM, 2006-2007

[7] The WHO Global Burden of Disease 2004 Update did not report standard errors for their estimates. Therefore, it is not possible to perform statistical comparisons to INCAM findings.

3.2 LEADING CAUSES OF DEATH IN MOZAMBIQUE

Figure 2 shows the nine leading causes of death in Mozambique. Malaria and HIV/AIDS were the leading causes of death, accounting for 29 and 27 percent of deaths, respectively. Together they accounted for a little more than half of all deaths. The third leading cause of death was perinatal conditions, responsible for 6 percent of all deaths. Other leading causes of death included diarrheal diseases (4 percent), pneumonia (4 percent), accidents and external causes (4 percent), diseases of the circulatory system (3 percent), tuberculosis (3 percent) and malignant neoplasms (1 percent).[8] The remaining causes of death were grouped into the category of "Other" and accounted for 17 percent of total deaths. There were only 24 cases where the death was not assigned an ICD-10 code and the cause of death could not be determined. A complete listing of the cause of death sub-categories and their relation to the major categories can be found in Appendix Tables A-13 to A-16.

Figure 2 Distribution of Leading Causes of Death in Percent: 2006–2007



Source: INCAM, 2006-2007

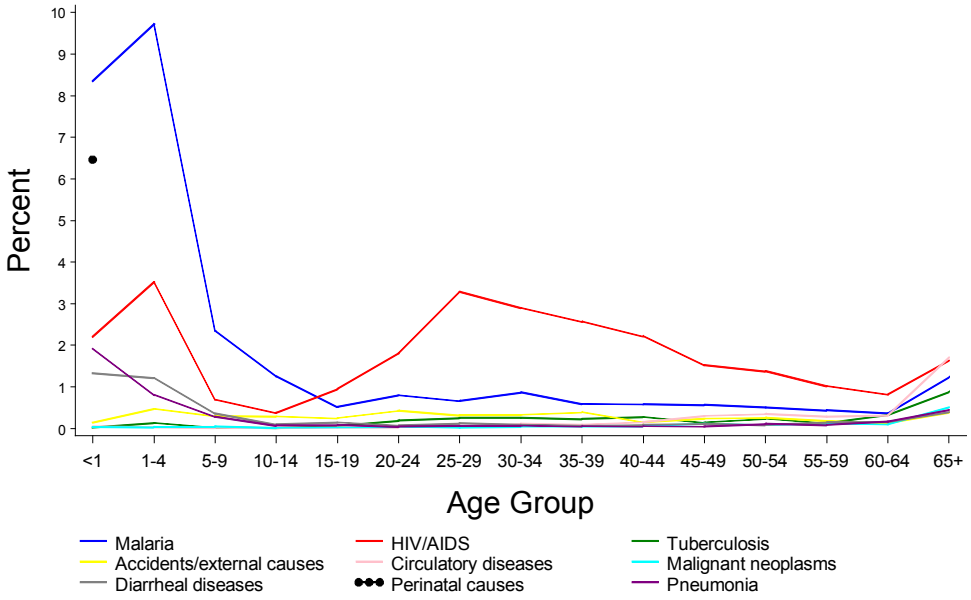
[8] There were no statistical differences between the percentages of deaths due to diarrheal diseases, pneumonia, and accidents and external causes or between the percentage of deaths due to diseases of the circulatory system and tuberculosis.

3.2.1 Leading Causes of Death by Age Group

Figure 3 shows the share of all enumerated INCAM deaths for an age group and leading causes of death. All of the points of the graph at each age group add up to 83 percent of all enumerated deaths and the remaining 17 percent of enumerated deaths comes from the "other" category, which is not shown on the graph. The high fraction of deaths observed in children under one year of age in Figure 3 is mainly due to malaria and perinatal conditions. Malaria was the leading cause of death in children aged 28 days to fourteen years of age. Deaths in children under age 1 due to malaria and perinatal conditions accounted for 8 and 6 percent, respectively, of total deaths across all ages.

Figure 3 indicates that mortality by age group for malaria and HIV/AIDS (the two leading causes of death) was very different. Malaria was the leading cause of death for children under age 1 up to the 10–14 year old age group. Specifically, malarial deaths in children under age five accounted for 18 percent of all enumerated deaths. Furthermore, malarial deaths in children under age 15 accounted for 22 percent of all enumerated deaths. However, for adults age 15 and above, HIV/AIDS overtook malaria as the leading cause of death. Deaths due to HIV/AIDS in adults age 15–30 accounted for 6 percent of total deaths across all ages. When that age range is expanded, deaths due to HIV/AIDS in adults age 15–49 accounted for 15 percent of all enumerated deaths. Furthermore, about one in five enumerated deaths was to an adult age 15 and above with HIV/AIDS as the cause of death.

Figure 3 Percentages of Leading Causes of Death by Age Group: 2006–2007

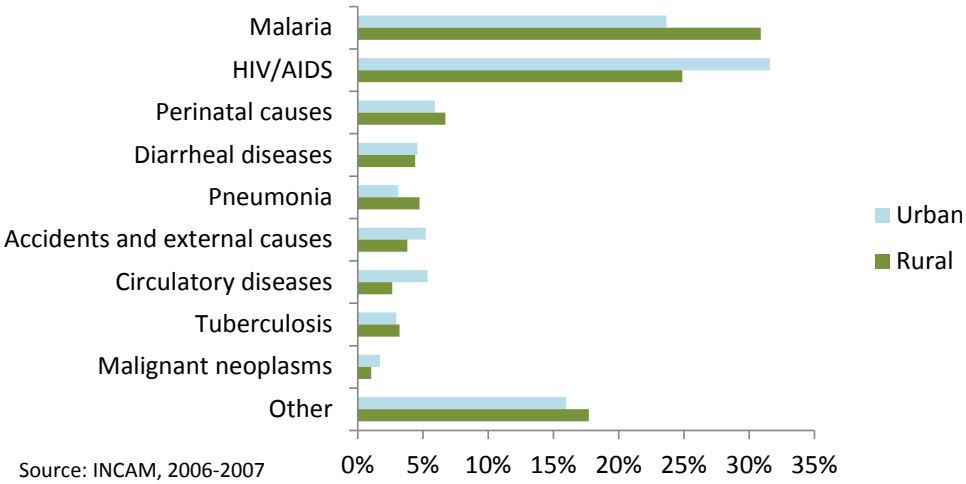


Source: INCAM, 2006-2007

3.2.2 Leading Causes of Death by Area of Residence

The leading causes of death by area of residence are shown in Figure 4. The most notable differences are for malaria and HIV/AIDS, where malaria was the leading cause of death in rural areas, accounting for 31 percent of deaths, and HIV/AIDS was the leading cause of death in urban areas, accounting for 32 percent of deaths.[9] These differences largely reflect differing disease incidence of these areas, which in turn are related to differing environment and social factors. People living in rural areas are more likely to be in proximity to mosquitoes, while the concentration of urban areas in the southern part of the country with differing social conditions and greater migration, renders urban areas more vulnerable to HIV. Deaths from pneumonia, accidents and external causes, circulatory diseases, and malignant neoplasms had higher death fractions in urban areas compared to rural areas.

Figure 4 Leading Causes of Death by Area of Residence in Percent: 2006–2007



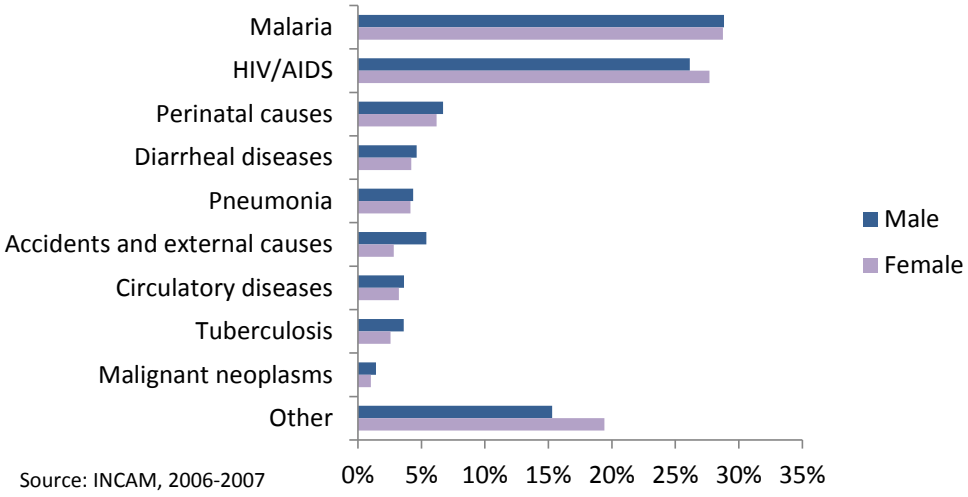
Source: INCAM, 2006-2007

[9] The percentage of deaths due to malaria in rural areas was not statistically different from the percentage of deaths due to HIV/AIDS in urban areas.

3.2.3 Leading Causes of Death by Sex

The leading causes of death by sex are shown in Figure 5. Malaria was the leading cause of death in males (29 percent), closely followed by HIV/AIDS (26 percent). Malaria and HIV/AIDS were also the leading causes of death in females.[10] Males had higher percentages of deaths than females from accidents and external causes, tuberculosis, and malignant neoplasms.

Figure 5 Leading Causes of Death by Sex in Percent: 2006–2007



Source: INCAM, 2006-2007

[10] There were no statistical differences in the percentages of deaths due to malaria between males and females or due to HIV/AIDS between males and females. Among females, there was no statistical difference between the percentage of deaths due to HIV/AIDS and malaria.

3.3 OVERVIEW OF DEATH RATES

3.3.1 Age-Specific Death Rates by Sex and Area of Residence

Age-specific death rates by sex and area of residence based on the 2007 census are shown in Table 2. In 2007, the crude death rate in Mozambique was 14.6 per 1,000 population. In general, death rates were higher among males than females for most age groups, and rates were highest at the youngest and oldest ages. About one in ten infants died before their first birthday. The overall death rate was higher in rural than in urban areas. However, when broken down by age, some key differences appear. For instance, urban areas show lower death rates for individuals under age 25, yet at ages 25–64, urban areas show higher death rates than rural areas. Excess adult mortality in urban areas might reflect the greater prevalence of HIV/AIDS, a greater tendency in rural areas to not re port adult deaths, or other factors.

Table 2 Age-Specific Death Rates by Sex and Area of Residence: 2007 (Per 1,000 Population)

	National			Urban			Rural		
Age group (years)	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All ages	14.6	15.8	13.5	12.1	13.0	11.2	15.8	17.1	14.5
< 1	99.9	104.2	95.8	82.9	88.1	77.9	105.5	109.5	101.6
1–4	15.1	15.8	14.4	10.2	11.3	9.1	16.9	17.4	16.3
0–4	33.4	34.9	32.1	25.4	27.3	23.5	36.2	37.5	35.0
5–9	3.9	4.1	3.7	2.8	2.9	2.6	4.3	4.5	4.1
10–14	3.0	3.0	3.0	1.9	2.0	1.9	3.5	3.5	3.6
15–19	4.5	4.3	4.7	3.3	3.1	3.6	5.1	4.9	5.2
20–24	6.4	6.0	6.7	5.7	5.1	6.3	6.8	6.6	6.9
25–29	9.0	9.0	8.9	9.2	8.8	9.5	8.8	9.1	8.6
30–34	10.9	11.8	10.1	12.2	12.9	11.6	10.2	11.2	9.4
35–39	12.9	15.1	11.1	14.5	16.4	12.7	12.2	14.3	10.4
40–44	13.4	15.9	11.0	15.3	17.8	12.7	12.5	14.9	10.2
45–49	15.6	18.5	12.8	17.6	20.5	14.4	14.7	17.6	12.1
50–54	19.1	23.8	15.0	21.4	26.4	16.3	18.2	22.7	14.6
55–59	22.1	26.2	18.6	23.5	27.7	19.3	21.6	25.6	18.3
60–64	28.7	33.1	24.9	30.0	34.7	25.6	28.3	32.6	24.7
65+	70.7	80.0	62.3	70.5	78.8	63.7	70.7	80.3	61.9

Source: Mozambique 2007 Population and Housing Census

3.3.2 Cause-Specific Death Rates by Sex and Area of Residence

Table 3 shows cause-specific death rates by sex and area of residence based on overall 2007 census death rates and INCAM cause-specific death fractions. By convention, cause-specific death rates are expressed as deaths per 100,000 population. Nationally, the cause-specific death rate for malaria and HIV/AIDS was 422 and 393 per 100,000 population, respectively. In urban areas, HIV/AIDS was the leading cause of death with a cause-specific death rate of 381 per 100,000 population. Malaria was the second leading cause of death with a cause-specific death rate of 286 per 100,000 population. The converse was true for rural areas where malaria was the leading cause of death followed by HIV/AIDS. The cause-specific death rate in rural areas was 488 per 100,000 population for malaria and 392 per 100,000 population for HIV/AIDS. While the malarial death rate was higher in rural areas than urban areas, there was no statistical difference between the urban and rural HIV/AIDS death rate. Death rates for perinatal causes, pneumonia, and tuberculosis were higher in rural areas than urban areas, while the death rate for circulatory diseases was higher in urban areas.[11]

Given that the overall 2007 census death rate was higher for males (1,584 per 100,000 males) than females (1,354 per 100,000 females), it is not surprising that males experienced higher death rates nationally than females for each of the nine leading causes of death.

Table 3 Cause-Specific Death Rates by Sex and Area of Residence: 2007 (Per 100,000 Population)

	National			Urban			Rural		
Cause of death	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All causes	1,464.5	1,583.5	1,354.1	1,206.3	1,298.2	1,117.6	1,577.2	1,711.8	1,454.5
Malaria	421.6	456.4	389.2	285.5	311.8	260.1	487.7	527.4	451.7
HIV/AIDS	393.3	414.0	374.7	381.2	403.5	359.7	392.3	412.6	374.8
Perinatal conditions	94.8	106.2	84.0	70.9	83.0	59.2	106.0	117.1	95.8
Diarrheal diseases	64.8	73.3	56.7	55.1	58.0	52.4	68.9	80.4	57.9
Pneumonia	62.3	69.0	56.0	37.2	37.4	37.0	74.8	85.0	65.2
Accidents and external causes	61.6	85.4	38.3	62.8	84.7	41.3	59.7	84.3	35.9
Circulatory diseases	50.3	57.4	43.6	64.7	68.5	61.0	41.6	50.4	33.1
Tuberculosis	45.8	57.3	34.8	35.6	44.5	26.8	50.6	63.2	38.4
Malignant neoplasms	18.1	22.4	13.9	20.8	25.8	15.9	16.3	20.2	12.5
All other causes	251.8	242.1	262.7	192.6	181.1	204.3	279.3	271.2	289.1

Note: Proportions used to calculate cause-specific death rates are based on 224,746 weighted INCAM deaths
Source: Mozambique 2007 Population and Housing Census; INCAM, 2006-2007

[11] There was no statistical difference between urban and rural area death rates for diarrheal diseases, accidents and external causes, and malignant neoplasms.

3.3.3 Age-Specific Death Rates by Sex and Province

Table 4 shows age-specific death rates from the 2007 census by sex in the provinces of Mozambique. Given the limited number of deaths per province, the table aggregates death rates across broader age categories than those shown in Table 4. Gaza, with a death rate of 20.7 per 1,000 population, stands out compared to other provinces because it had higher mortality at almost every age group. Cabo Delgado and Sofala also showed relatively high mortality. The lowest mortality rates were found in Maputo City and Maputo province, which are the capital and the most developed province, respectively.

Table 4 Age-Specific Death Rates by Province, and Sex: 2007 (Per 1,000 Population)

	National			Niassa			Cabo Delgado			Nampula		
Age group (years)	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All ages	14.6	15.8	13.5	14.5	15.7	13.2	16.5	18.1	15.0	13.4	14.3	12.6
< 1	99.9	104.2	95.8	126.4	131.6	121.3	93.3	96.1	90.6	105.1	107.7	102.6
1–4	15.1	15.8	14.4	17.8	19.2	16.5	12.7	13.3	12.2	15.6	16.4	14.9
0–4	33.4	34.9	32.1	41.5	43.6	39.5	30.3	31.4	29.4	35.0	36.2	33.9
5–14	3.5	3.6	3.4	3.3	3.6	3.1	6.3	6.5	6.1	4.7	4.8	4.6
15–24	5.4	5.1	5.6	4.4	4.6	4.3	7.6	7.4	7.7	5.3	5.1	5.5
25–39	10.7	11.6	9.9	7.0	7.6	6.5	11.9	12.5	11.3	6.6	6.7	6.5
40–49	14.4	17.0	11.8	11.7	13.4	9.8	17.3	19.8	14.8	9.0	9.8	8.2
50–64	22.5	27.0	18.7	19.4	23.2	15.9	26.5	31.8	21.9	17.5	19.3	15.6
65+	70.7	80.0	62.3	59.6	67.9	50.7	74.0	92.1	56.6	62.7	67.7	56.3

	Zambezia			Tete			Manica			Sofala		
Age group (years)	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All ages	14.5	15.9	13.2	14.0	15.1	12.9	15.5	16.9	14.2	16.4	17.7	15.1
< 1	108.9	112.0	105.8	87.7	92.6	82.9	107.2	114.2	100.4	103.2	109.7	96.6
1–4	17.8	18.9	16.7	11.4	12.4	10.4	15.1	16.8	13.4	14.4	16.0	12.9
0–4	37.8	39.3	36.3	28.1	29.8	26.3	35.0	37.8	32.3	33.2	35.9	30.6
5–14	4.0	4.1	4.0	2.6	2.8	2.5	2.7	2.9	2.5	3.3	3.4	3.2
15–24	6.3	6.1	6.4	4.6	4.1	5.0	4.8	4.3	5.2	7.0	6.1	7.8
25–39	9.3	10.0	8.7	11.8	12.6	11.2	12.1	12.8	11.5	16.3	16.8	15.8
40–49	11.1	13.3	8.9	16.7	20.1	13.5	17.1	20.8	13.8	20.7	25.1	16.3
50–64	18.0	22.2	14.1	25.0	29.8	20.9	26.9	32.8	21.9	26.3	31.7	21.2
65+	53.2	63.5	41.4	78.5	89.7	68.6	83.4	97.5	71.9	74.8	82.4	67.9

Table 4 *continued*

	Inhambane			Gaza			Maputo			Maputo City		
Age group (years)	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All ages	15.2	16.8	13.9	20.7	22.0	19.7	11.9	12.9	11.1	10.1	11.2	9.0
< 1	85.2	89.9	80.8	94.7	99.6	90.0	74.4	80.1	68.9	64.6	69.7	59.6
1–4	10.5	11.4	9.5	28.4	22.3	34.4	7.6	9.1	6.0	7.1	8.3	6.0
0–4	26.2	27.7	24.7	42.4	38.5	46.2	21.8	24.3	19.4	19.0	20.9	17.0
5–14	2.0	2.2	1.8	2.1	2.3	2.0	1.2	1.3	1.2	1.2	1.1	1.4
15–24	4.6	4.9	4.4	5.5	5.1	5.9	3.7	3.4	4.0	3.0	2.7	3.2
25–39	12.1	14.6	10.6	18.9	24.5	15.0	10.6	11.6	9.7	11.3	13.2	9.6
40–49	16.8	22.7	13.0	23.2	35.1	15.9	16.0	19.1	13.1	14.3	17.3	11.5
50–64	24.2	30.0	20.6	30.7	42.6	23.7	24.6	30.4	19.9	22.4	27.3	17.5
65+	74.3	84.5	67.0	94.8	120.2	82.1	73.4	84.4	66.6	63.1	68.3	59.3

Source: Mozambique 2007 Population and Housing Census

3.3.4 Cause-Specific Death Rates by Province

Table 5 shows cause-specific death rates by province based on overall 2007 census death rates and INCAM cause-specific death fractions. For malaria, the lowest death rates occurred in Maputo and Maputo City.[12] Gaza stands out for its very high death rate due to HIV/AIDS—842 per 100,000 population, more than double the national average (393 per 100,000 population). High mortality due to HIV/AIDS explains in part why the overall death rate in Gaza is so high (2,072 per 100,000 population). Nampula experienced the lowest HIV/AIDS death rate at 248 per 100,000 population.

Table 5 Cause-Specific Death Rates by Province: 2007 (Per 100,000 Population)

Cause of death	National	Niassa	Cabo Delgado	Nampula	Zambezia	Tete
All causes	1,464.5	1,446.3	1,651.7	1,341.8	1,451.2	1,396.2
Malaria	421.2	476.1	506.1	483.9	432.0	440.7
HIV/AIDS	393.2	359.9	341.7	247.6	382.9	317.4
Perinatal conditions	94.8	106.7	92.9	135.9	97.1	115.6
Diarrheal diseases	65.1	62.6	94.8	77.6	71.9	50.4
Pneumonia	62.3	*	80.4	56.3	68.4	68.2
Accidents and external causes	61.8	476.1	85.0	43.4	45.8	66.3
Circulatory diseases	50.5	359.9	44.3	29.0	37.6	47.9
Tuberculosis	45.8	*	64.4	31.0	36.1	51.3
Malignant neoplasms	18.1	*	37.5	*	*	*
All other causes	251.8	225.6	304.5	227.8	268.8	223.1

Cause of death	Manica	Sofala	Inhambane	Gaza	Maputo	Maputo City
All causes	1,546.9	1,636.7	1,520.1	2,072.1	1,191.5	1,010.3
Malaria	445.0	488.3	388.2	389.3	135.9	132.5
HIV/AIDS	473.5	509.3	465.2	842.3	463.8	336.2
Perinatal conditions	73.1	99.1	*	79.2	*	40.8
Diarrheal ciseases	64.3	58.8	44.7	70.6	32.8	*
Pneumonia	67.1	55.1	49.8	90.5	47.6	40.0
Accidents and external causes	80.4	83.2	75.1	78.5	67.1	58.4
Circulatory diseases	45.3	39.2	87.8	92.2	88.1	106.6
Tuberculosis	55.9	47.1	61.6	87.1	47.5	35.3
Malignant neoplasms	*	*	*	*	33.9	46.1
All other causes	238.7	230.3	296.2	316.5	247.4	197.8

** Unweighted sample of INCAM deaths was less than 20*
Note: Proportions used to calculate cause-specific death rates are based on 225,088 weighted INCAM deaths
Source: Mozambique 2007 Population and Housing Census; INCAM, 2006–2007

[12] There were no statistical differences between the malarial death rates for Maputo province and Maputo City.

3.4 GLOBAL BURDEN OF DISEASE CLASSIFICATION AND COMPARISON

In order to better aid health decision-making and compare disease burdens across differing populations, the WHO developed the Global Burden of Disease (GBD) classification. The GBD provides a consistent and comparative description of the burden of diseases and injuries and the risk factors that cause them. This allows policy makers to determine if one type of disease is afflicting certain areas of the world more than others. The GBD study uses three broad categories to classify disease. Group I consists of communicable, maternal, perinatal and nutritional conditions. These conditions tend to afflict poorer countries, such as Mozambique. Group II is made up of noncommunicable diseases and Group III consists of deaths due to injuries.

Table 6 outlines the distribution of deaths by the Global Burden of Disease Classification system by sex and area of residence. As seen in the table, communicable, maternal, perinatal, and nutritional conditions (Group I) accounted for the largest share (87 percent) of all defined deaths in Mozambique. A higher percentage of deaths attributable to this group occurred in females (89 percent) compared to males (85 percent). Conversely, a higher percentage of deaths due to noncommunicable conditions (Group II) were seen in men (9 percent) compared to women (8 percent). Males also experienced a larger percentage of deaths due to injuries (Group III) than females (9 percent compared to 8 percent). Rural areas had a higher percentage of deaths attributed to communicable, maternal, perinatal, and nutritional conditions (Group I) than did urban areas, while urban areas had a higher percentage of deaths attributed to noncommunicable conditions (Group II) and injuries (Group III) than did rural areas.

Table 6 Distribution of Deaths by Global Burden of Disease Classification by Sex and Area of Residence in Percent: 2006–2007

Cause of death	Total	Sex		Area of residence	
		Male	Female	Urban	Rural
All defined causes	100	100	100	100	100
Group I: Communicable, maternal, perinatal, and nutritional conditions	87	85	89	83	89
» Infectious and parasitic diseases	72	71	72	70	72
» Respiratory infections	5	5	5	3	5
» Maternal conditions	2	NA	4	2	2
» Perinatal conditions	7	7	7	6	7
» Nutritional deficiencies	2	2	2	1	2
Group II: Noncommunicable conditions	8	9	8	11	7
Group III: Injuries	5	6	3	6	4

Note: NA = not applicable
Source: INCAM, 2006–2007

The WHO Global Burden of Disease 2004 Update (WHO, 2008a) estimated that 68 percent of deaths in Africa were due to communicable, maternal, perinatal, and nutritional conditions (Group I).[13] A study examining hospital records from 1994 in Maputo City by Dgedge et al. (2001) found that a similar percent of deaths (66 percent) in their sample were due to these causes. More recently, using all civil registers based on death certificates from 2001, Cliff et al. (2003) found that 76 percent of deaths were due to these causes in Maputo City.[14] Additionally, a study by Sacarlal et al. (2009) of children under age 15 from 2006 to 2007 data from the Manhiça Demographic Surveillance Site (DSS) found that about 85 percent of deaths were due to infectious and parasitic diseases, perinatal disorders, respiratory infections, nutritional disorders, or other Group I conditions.[15] Findings from INCAM are fairly consistent with these studies, with approximately 87 percent of deaths in Mozambique due to Group I causes. Among children under age 15, 95 percent of deaths were due to Group I causes (data not shown). However, none of the studies mentioned are representative of the Mozambique population as a whole, so it is difficult to interpret comparisons of INCAM results to the results of these other reports.

Table 6 also shows that when Group I is broken down, infectious and parasitic diseases accounted for 72 percent of all deaths in Mozambique. Cliff et al. (2003) estimated that approximately 50 percent of deaths in Maputo City were due to infectious and parasitic diseases, however, their study occurred six years prior to INCAM and only covered registered deaths in four cities. The WHO Global Burden of Disease 2004 Update estimated that only 43 percent of African deaths were attributable to infectious and parasitic diseases. Sacarlal et al. (2009) determined 50 percent of deaths in children under age 15 were due to infectious and parasitic diseases. INCAM found 67 percent of deaths in children under age 15 were due to infectious and parasitic diseases (data not shown).

Estimates from the WHO Global Burden of Disease 2004 Update show 25 percent of deaths in Africa were due to noncommunicable conditions and diseases (Group II). Cliff et al. (2003) reported 18 percent of deaths in Maputo City were due to noncommunicable conditions and diseases. Sacarlal et al. (2009) found only 11 percent of deaths due to such causes, a finding similar to the results from INCAM, which found 8 percent of deaths due to noncommunicable conditions and diseases.

Estimates for the percentages of deaths due to injuries (Group III) did not vary widely across the four sources. The WHO Global Burden of Disease 2004 Update

[13] The WHO Global Burden of Disease 2004 Update did not report standard errors for their estimates. Therefore, it was not possible to perform statistical comparisons to INCAM findings.

[14] The Dgedge et al. and the Cliff et al. studies used data from death registries. Because it is not possible to derive standard errors from registry data, statistical comparisons to INCAM could not be done.

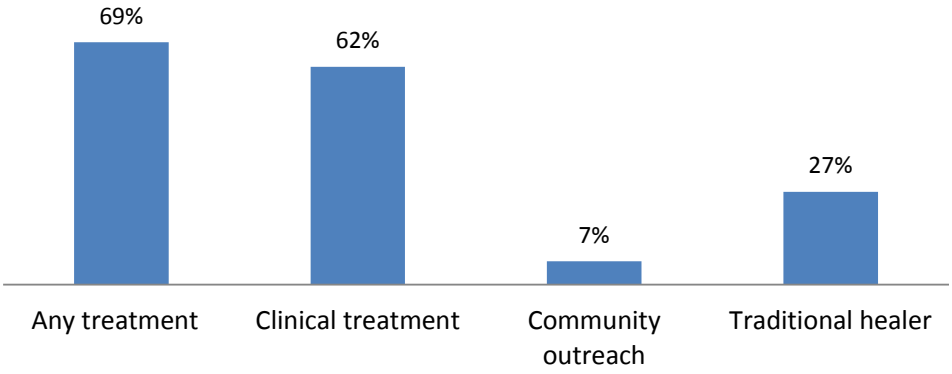
[15] The Sacarlal et al. (2009) study did not distribute causes of death by all definable deaths, but instead included two additional categories for "Undetermined and badly defined symptoms" and for deaths with "No consensus." Numbers reported here are re-calculated to exclude these categories, thus the distributions reported here are for all definable causes. About 13 percent of deaths were excluded in the redistribution. Manhiça DSS figures are based on a census of the site; therefore, it is not possible to derive standard errors and to make statistical comparisons to INCAM findings.

estimated 7 percent of deaths in the Africa region were due to such causes, while Cliff et al. (2003) reported 6 percent of deaths in Maputo City were attributable to injuries. Sacarlal et al. (2009) determined 5 percent of deaths in children under age 15 were due to injuries, a finding similar to INCAM's.

3.5 TREATMENT RECEIVED

Figure 6 delineates the percentage of people who received treatment for the illness that lead to death by treatment type. It is possible for the deceased to have received treatment from more than one source; therefore, the percent of people receiving different sources of treatment are not mutually exclusive from one another. Clinical treatment was defined as a visit to a state health center, state hospital, or private clinic. Care at home by health personnel, care at home by home-based care groups, and care from aid centers or community health groups were combined into one variable to represent treatment through community outreach by health activists. Care from a traditional healer was defined as non-clinical care from someone that practiced traditional medicine.

Figure 6 People Who Sought Treatment for the Illness that Led to Death by Provider in Percent: 2006–2007



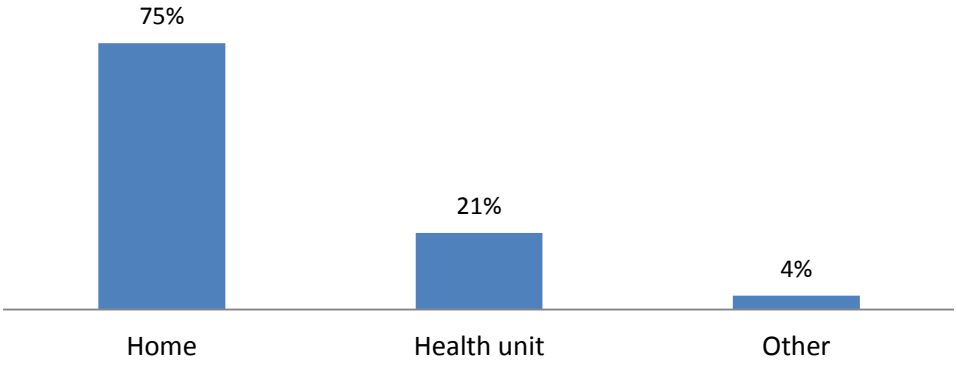
Source: INCAM, 2006-2007

Sixty-nine percent of decedents received some form of treatment for the illness that led to their death. Clinical treatment was the most frequent form of treatment sought; 62 percent of all decedents utilized clinical treatment prior to their death. Far fewer people received treatment through community outreach; at 7 percent this was the least utilized treatment type. Approximately 27 percent of people sought treatment from a traditional healer for the illness that led to death.

3.6 PLACE OF DEATH

Approximately three-quarters of all deaths occurred at home, as can be seen in Figure 7. Health units were the second most common place of death, accounting for 21 percent of deaths. Four percent of people died somewhere other than a health unit or home.

Figure 7 Place of Death: 2006–2007



Source: INCAM, 2006-2007

Chapter 4 Causes of Death Among Children

This chapter summarizes the causes of death for children 0–14 years of age by various demographic characteristics including sex, age group, and area of residence. Age categories were determined by examining age ranges with similar disease burdens and children were categorized into three distinctive age groups for analysis: neonates age 0–27 days, children age 28 days to four years, and children age 5–14 years. However, because neonatal death rates could not be calculated from the 2007 census, death rates for children under age 1 are shown instead.

4.1 OVERVIEW OF NEONATAL DEATHS

Children age 0–27 days old accounted for 8 percent of all enumerated deaths. Examination of these neonatal deaths determined that 20 percent were first born children and thus their births marked the first time their mothers had given birth. Ninety-five percent of all neonates who died were born through normal vaginal delivery. However, 28 percent of all neonatal deaths had pre-term deliveries. Neonates born as part of a multiple delivery (twins or triplets) accounted for 15 percent of all neonatal deaths.

Only 3 percent of all neonatal deaths had their births assisted by a doctor and an additional 37 percent were assisted by either a nurse or trained midwife. Thus, medically assisted delivery, consisting of delivery aided by a physician, nurse, or trained midwife, occurred in just 40 percent of neonatal deaths. For births that occurred without medically assisted delivery, a traditional midwife was in attendance for 21 percent of neonatal deaths, while relatives assisted 30 percent of births for neonates who died. Seven percent of births of deceased neonates occurred with mothers giving birth alone, and 3 percent of births were listed as being attended by "other" for type of assistance.[16]

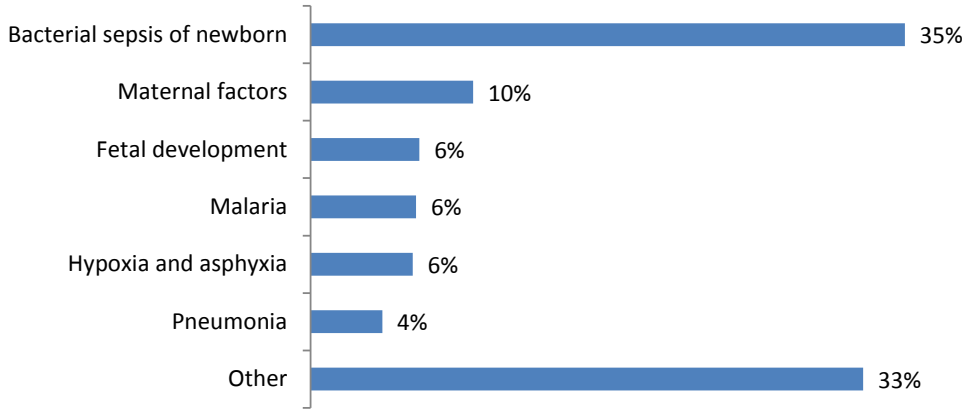
Ninety-three percent of deceased neonates who were born at home also died at home, suggesting they never received any medical attention. This, along with the fact that 60 percent of deceased neonates did not have their deliveries assisted by a trained medical professional, outlines the need for more trained health care workers and access to clinics for pregnant women and their newborns. This point is further supported when one considers that 1 percent of mothers of these neonates had also passed away by the time the VA was administered.

[16] There was no statistical difference in the percent of births in neonates who died who were attended by a doctor and by "other" type of assistance.

4.1.1 Leading Causes of Death in Neonates

Figure 8 shows the six leading causes of death for children age 0–27 days. Bacterial sepsis of newborn was the leading cause of death, which accounted for 35 percent of neonatal deaths in INCAM. Maternal factors (i.e., when the fetus and newborn were affected by maternal factors and by complications of pregnancy, labor and delivery) were responsible for the second highest share of neonatal deaths (10 percent). Other leading causes of death included fetal development (disorders relating to the length of gestation and fetal growth), malaria, intrauterine hypoxia and birth asphyxia, and pneumonia. It is important to note that malaria ranked as one of the leading causes of death in children under 28 days.[17]

Figure 8 Causes of Death for Neonates in Percent: 2006–2007



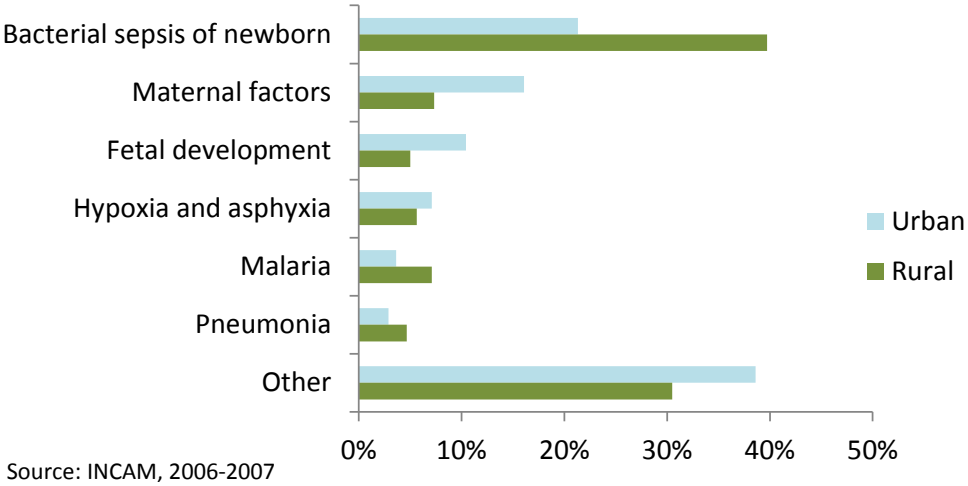
Source: INCAM, 2006-2007

[17] There were no statistical differences in the share of neonatal deaths caused by fetal development, malaria, intrauterine hypoxia and birth asphyxia, or pneumonia.

4.1.2 Leading Causes of Death by Area of Residence in Neonates

Figure 9 illustrates the leading causes of death in neonates by area of residence. For some of the leading causes of death in neonates, there were significant differences in the shares between urban and rural areas. Bacterial sepsis accounted for 21 percent of neonatal deaths in urban areas, whereas it was the cause of nearly double that amount (40 percent) in rural areas. Malaria also accounted for a higher share of neonatal deaths in rural areas than in urban areas. The converse was true of maternal complications. Maternal factors were the cause of 16 percent of deaths in urban neonates, whereas in rural neonates, they were responsible for about half that level (7 percent) of deaths. Fetal development also had higher shares in urban areas than in rural areas for neonatal deaths.[18]

Figure 9 Leading Causes of Death for Neonates by Area of Residence in Percent: 2006–2007



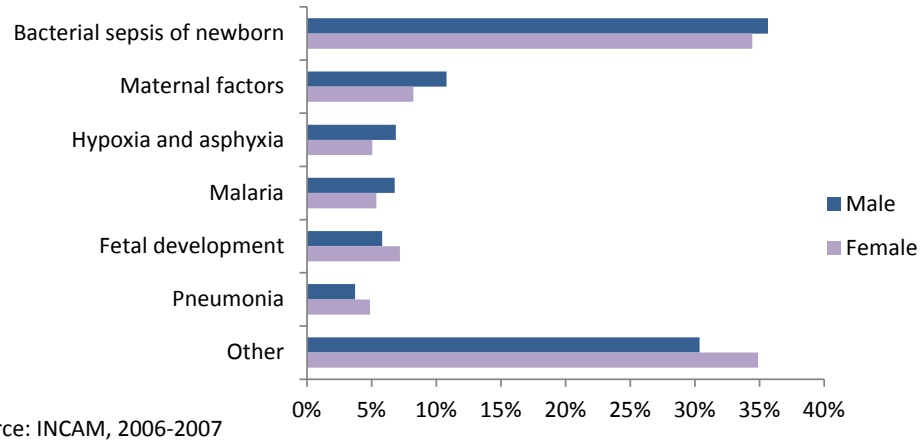
Source: INCAM, 2006-2007

[18] There were no statistical differences between the rural and urban shares of neonatal deaths for hypoxia and asphysxia and pneumonia.

4.1.3 Leading Causes of Death by Sex in Neonates

The leading causes of death in neonates, by sex, are outlined in Figure 10. Bacterial sepsis was the primary cause of death in both male and female neonates. However, there were no statistical differences in terms of one sex being more likely than the other to die from specific causes.

Figure 10 Leading Causes of Death for Neonates by Sex in Percent: 2006–2007



Source: INCAM, 2006-2007

4.1.4 Cause-Specific Death Rates for Children Under Age 1 by Sex and Area of Residence

The neonatal mortality rate for children under 28 days old from the 2007 census was 32.8 per 1,000 live births. Because information on the size of the neonatal population was not available, we were unable to calculate neonatal death rates.

Cause-specific death rates by sex and area of residence from the 2007 census for children under age 1 are shown in Table 7. The infant death rate was 9,993 per 100,000 children under age 1 (99.9 per 1,000 children under age 1), or about 10 percent. The corresponding 2007 INE official infant mortality rate was nearly the same at 93.6 per 1,000 live births. The 2007 census found the infant death rate was higher in rural compared to urban areas (10,555 and 8,294 per 100,000 children under age 1, respectively). The excess in the rural infant death rate was due to several infectious diseases such as malaria and bacterial sepsis of newborn. The cause-specific death rates for malaria and bacterial sepsis of newborn were higher in rural compared to urban areas. However, malaria was the leading cause of death in children under age 1, accounting for 35 percent of deaths. Malaria had the highest cause-specific death rate in both urban and rural areas for this age group.

Regardless of area of residence, as expected, the death rates from the 2007 census for male infants were higher than those for female infants.

Table 7 Cause-Specific Death Rates for Children Under Age 1 by Sex and Area of Residence: 2007 (Per 100,000 Children Under Age 1)

	National			Urban			Rural		
Cause of death	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All causes	9,993.0	10,417.9	9,576.0	8,294.2	8,805.3	7,789.0	10,554.9	10,953.7	10,164.3
Malaria	3,527.2	3,728.9	3,324.5	2,246.0	2,418.3	2,082.6	3,970.4	4,175.9	3,778.2
Bacterial sepsis of newborn	1,276.4	1,344.2	1,208.4	762.8	900.7	608.2	1,455.7	1,495.3	1,433.1
HIV/AIDS	923.0	993.2	851.3	1,020.5	1,003.6	1,038.0	887.7	987.1	764.9
Pneumonia	807.4	908.9	701.4	529.0	555.7	503.8	900.9	1,029.6	771.2
Diarrheal diseases	551.7	592.0	510.5	510.5	460.3	559.4	571.4	636.4	483.9
All other causes	2,907.3	2,850.7	2,980.0	3,225.4	3,466.5	2,997.0	2,768.7	2,629.4	2,933.0

Note: Proportions used to calculate cause-specific death rates are based on 53,152 weighted INCAM deaths.
Source: Mozambique 2007 Population and Housing Census; INCAM, 2006–2007

4.1.5 Cause-Specific Death Rates for Children Under Age 1 by Province

Table 8 shows cause-specific death rates for children under age 1 by province. The infant death rate from the 2007 census was highest in Niassa (12,637 per 100,000 children under age 1 or 126 per 1,000 children under age 1) and lowest in Maputo City (6,464 per 100,000 children under age 1 or 65 per 1,000 children under age 1). The two leading causes of death for infants at the national level were malaria (3,521 per 100,000 children under age 1) and bacterial sepsis of newborn (1,275 per 100,000 children under age 1). For several provinces the number of deaths among children under age 1 in INCAM was less than 20, thereby limiting statistical comparisons across provinces.

Table 8 Cause-Specific Death Rates for Children Under Age 1 by Province: 2007 (Per 100,000 Children Under Age 1)

Cause of death	National	Niassa	Cabo Delgado	Nampula	Zambezia	Tete
All causes	9,993.0	12,637.4	9,331.8	10,511.7	10,886.4	8,770.7
Malaria	3,521.3	4,959.9	3,067.2	3,542.7	3,839.9	3,361.6
Bacterial sepsis of newborn	1,274.6	2,099.0	1,824.7	2,400.2	1,022.3	764.9
All other causes	5,197.1	5,578.5	4,439.8	4,568.8	6,024.2	4,644.3

Cause of death	Manica	Sofala	Inhambane	Gaza	Maputo	Maputo City
All causes	10,716.9	10,316.4	8,520.3	9,468.5	7,443.3	6,463.8
Malaria	4,335.6	4,286.3	4,221.0	2,617.9	*	1,018.2
Bacterial sepsis of newborn	*	1,093.2	*	*	*	*
All other causes	5,721.3	4,936.9	4,042.6	6,448.8	5,749.6	5,313.7

** Unweighted sample of INCAM deaths was less than 20*

Note: Proportions used to calculate cause-specific death rates are based on 53,358 weighted INCAM deaths.

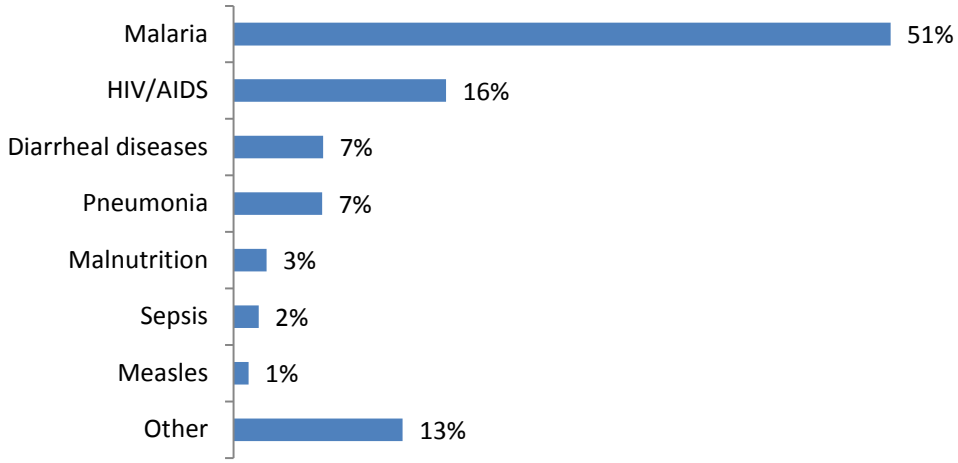
Source: Mozambique 2007 Population and Housing Census; INCAM, 2006–2007

4.2 OVERVIEW OF DEATHS IN CHILDREN AGE 28 DAYS TO FOUR YEARS

4.2.1 Leading Causes of Death for Children Age 28 Days to Four Years

Thirty-five percent of all enumerated deaths occurred to children age 28 days to four years. Figure 11 shows the seven leading causes of death for children in this age group. Malaria was the leading cause of death, accounting for approximately half of all deaths (51 percent). HIV/AIDS was the second leading cause of death, accounting for 16 percent of deaths. Other leading causes included diarrheal diseases, pneumonia, malnutrition and other nutritional deficiencies, sepsis, and measles.[19]

Figure 11 Leading Causes of Death for Children Age 28 Days to Four Years in Percent: 2006–2007



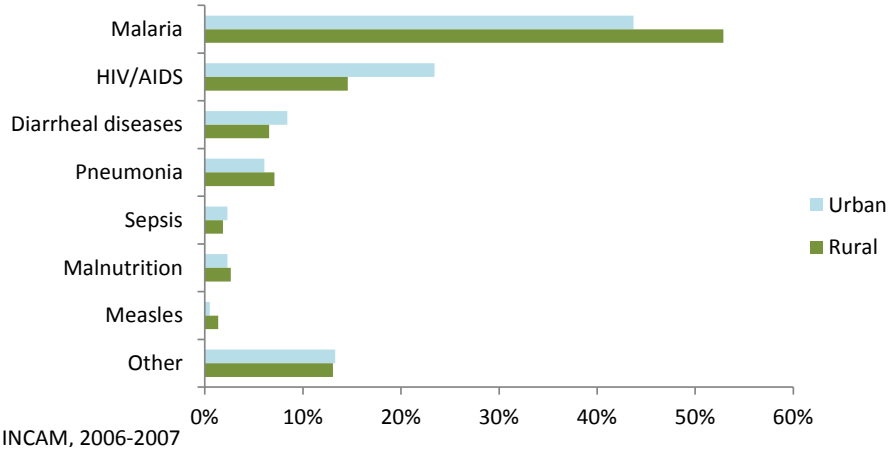
Source: INCAM, 2006-2007

[19] There were no statistical differences between the percentage of deaths due to pneumonia and diarrheal diseases or between the percentage of deaths due to sepsis and malnutrition in children age 28 days to four years.

4.2.2 Leading Causes of Death for Children Age 28 Days to Four Years by Area of Residence

Figure 12 illustrates the leading causes of death for children age 28 days to four years by area of residence. Malaria and HIV/AIDS were the first and second leading causes of death, respectively, for both urban and rural areas. However, malaria accounted for 44 percent of deaths in urban areas, whereas it was the cause of 53 percent of rural deaths. The opposite is true of HIV/AIDS; 23 percent of urban deaths in children age 28 days to 4 years were the result of HIV/AIDS whereas 15 percent of rural deaths were due to the disease.

Figure 12 Leading Causes of Death for Children Age 28 Days to Four Years by Area of Residence in Percent: 2006–2007

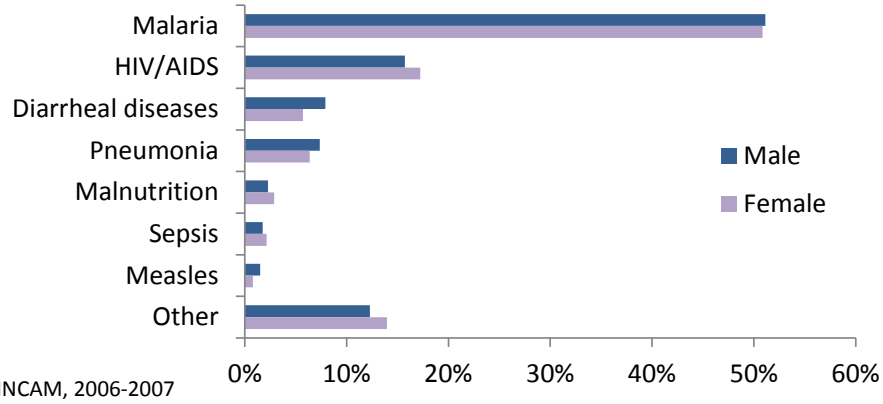


Source: INCAM, 2006-2007

4.2.3 Leading Causes of Death for Children Age 28 Days to Four Years by Sex

The leading causes of death in children age 28 days to four years by sex is outlined in Figure 13. Malaria was the leading cause of death for both males and females age 28 days to four years, accounting for about half of all deaths in this age group for each sex. HIV/AIDS was the second leading cause of death in both sexes. With the exception of diarrheal diseases, there were no statistical differences in terms of one sex having higher percentages of death than the other sex for any of the leading causes of death.

Figure 13 Leading Causes of Death for Children Age 28 Days to Four Years by Sex in Percent: 2006–2007



Source: INCAM, 2006-2007

4.2.4 Cause-Specific Death Rates for Children Age 1–4 by Sex and Area of Residence

Cause-specific death rates for children at ages 1–4 by sex and area of residence are shown in Table 9. Death rates from the 2007 census for children age 1–4 were 1,513 per 100,000 children. Malaria accounted for about half of all child mortality with a cause-specific death rate of 775 per 100,000 children age 1–4. HIV/AIDS was the second leading cause of death with a death rate of 281 per 100,000 children age 1–4. The 2007 census indicated that child mortality was higher in rural than urban areas (1,686 deaths compared to 1,019 deaths per 100,000 children age 1–4). Higher death rates in rural areas were largely due to malaria; the malarial death rate was almost twice as high in rural compared to urban areas (894 and 458 per 100,000 children age 1–4, respectively). Pneumonia also caused higher mortality in rural compared to urban areas. Nationally, there were no statistical differences for cause-specific death rates between males and females except in the case of diarrheal diseases where males experienced a higher rate than females (125 deaths compared to 69 deaths per 100,000 children age 1–4). Malarial death rates in urban areas were higher for males compared to females, but there was no statistical difference for the malarial death rate between males and females in rural areas. For both males and females, malarial death rates were higher in rural compared to urban areas.

Table 9 Cause-Specific Death Rates for Children Age 1–4 by Sex and Area of Residence: 2007 (Per 100,000 Children Age 1–4)

	National			Urban			Rural		
Cause of death	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All Causes	1,512.8	1,582.2	1,444.1	1,019.3	1,125.6	914.4	1,685.8	1,742.0	1,630.3
Malaria	775.3	806.1	744.7	457.6	511.8	404.8	893.9	914.8	873.0
HIV/AIDS	280.7	266.8	293.8	267.8	298.7	237.5	276.6	245.5	306.8
Diarrheal diseases	96.1	124.7	68.5	77.8	87.5	68.5	101.1	137.8	65.1
Pneumonia	64.6	61.9	67.1	41.3	*	*	73.0	66.7	79.1
Malnutrition	54.8	59.4	50.2	40.0	*	*	59.6	64.0	55.3
All other causes	241.3	263.3	219.8	134.7	134.8	133.4	281.7	313.2	250.9

** Unweighted sample of INCAM deaths was less than 20*

Note: Proportions used to calculate cause-specific death rates are based on 42,656 weighted INCAM deaths

Source: Mozambique 2007 Population and Housing Census; INCAM, 2006-2007

4.2.5 Cause-Specific Death Rates for Children Age 1–4 by Province

Cause-specific death rates for children at ages 1–4 by province are shown in Table 10. The 2007 census indicated that Gaza had the highest death rate in this age group, while Maputo City and Maputo province had the lowest. The provinces of Maputo and Maputo City had the lowest malarial death rates, while Gaza had the highest at 1,384 per 100,000 children age 1–4.[20]

Table 10 Cause-Specific Death Rates for Children Age 1–4 by Province: 2007 (Per 100,000 Children Age 1–4)

Cause of death	National	Niassa	Cabo Delgado	Nampula	Zambezia	Tete
All causes	1,512.8	1,784.1	1,272.3	1,563.3	1,780.8	1,137.8
Malaria	774.2	872.7	752.5	968.5	761.4	554.9
HIV/AIDS	280.4	353.8	127.4	181.3	398.0	224.8
All other causes	458.2	557.6	392.4	413.5	621.4	358.1

Cause of death	Manica	Sofala	Inhambane	Gaza	Maputo	Maputo City
All causes	1,507.6	1,442.6	1,046.8	2,839.7	758.0	711.8
Malaria	696.7	725.4	530.1	1,384.3	253.1	224.8
HIV/AIDS	367.9	404.0	*	688.8	216.3	212.2
All other causes	443.0	313.2	384.6	766.6	288.5	274.8

** Unweighted sample of INCAM deaths was less than 20*

Note: Proportions used to calculate cause-specific death rates are based on 42,715 weighted INCAM deaths.

Source: Mozambique 2007 Population and Housing Census; INCAM, 2006–2007

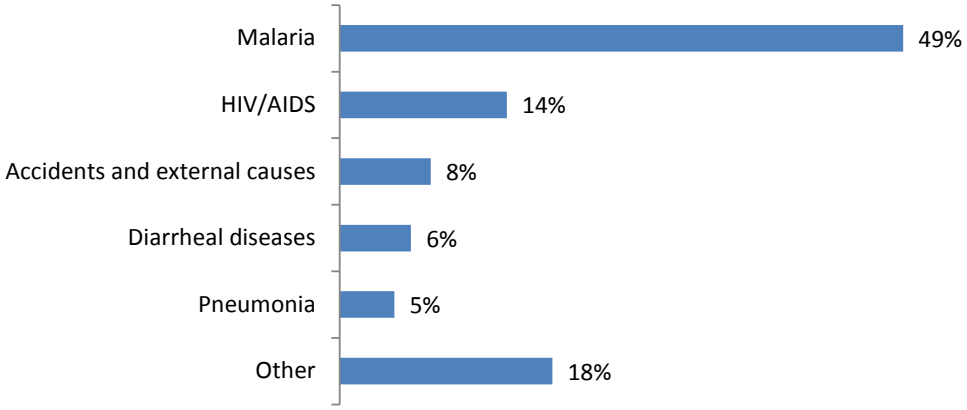
[20] The malarial death rates for Maputo province and Maputo City were not statistically different from one another.

4.3 OVERVIEW OF DEATHS IN CHILDREN AGE 5–14 YEARS

4.3.1 Leading Causes of Death for Children Age 5–14 Years

Deaths in children age 5–14 years accounted for 7 percent of all enumerated deaths. Figure 14 shows the five leading causes of death for children in this age group. Malaria was the leading cause of death, accounting for about half of all deaths, while HIV/AIDS was the second leading cause of death accounting for 14 percent of deaths. Other leading causes included accidents and external causes, diarrheal diseases, and pneumonia.[21]

Figure 14 Leading Causes of Death for Children Age 5–14 Years in Percent: 2006–2007



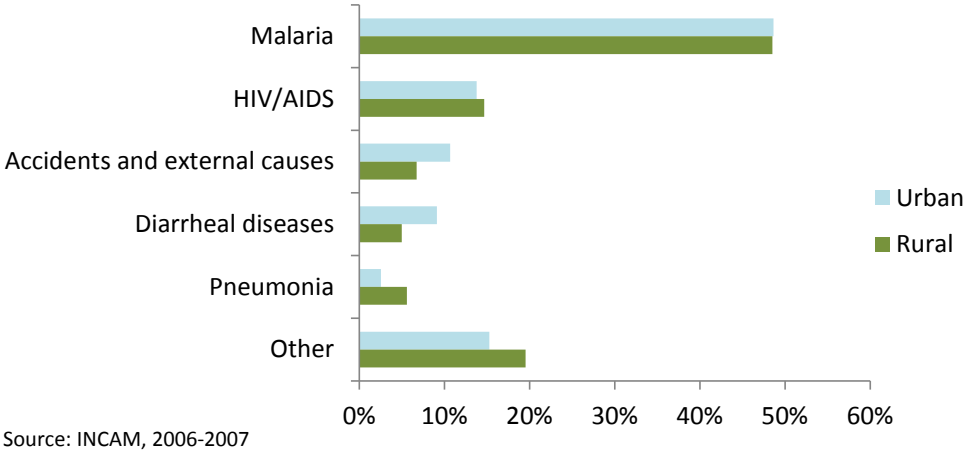
Source: INCAM, 2006-2007

[21] There were no statistical differences between the percentage of deaths due to accidents and external causes and diarrheal diseases or between the percentage of deaths due to diarrheal diseases and pneumonia in children age 5–14 years.

4.3.2 Leading Causes of Death for Children Age 5–14 Years by Area of Residence

Figure 15 illustrates the leading causes of death for children age 5–14 years by area of residence. Malaria was the leading cause of death in both urban and rural areas, accounting for about half of all deaths in these areas.[22] The share of deaths due to HIV/AIDS was not statistically different between urban and rural areas; the same was true for accidents and external causes.[23]

Figure 15 Leading Causes of Death for Children Age 5–14 Years by Area of Residence in Percent: 2006–2007



Source: INCAM, 2006-2007

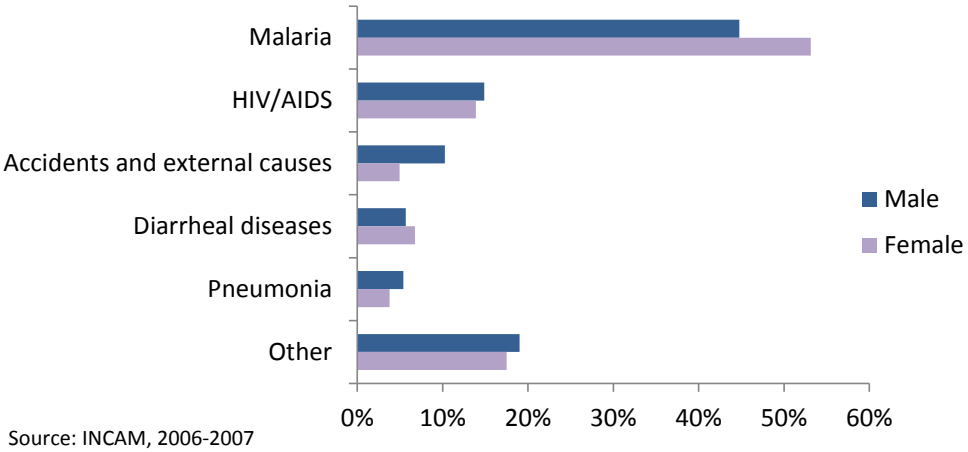
[22] There was no statistical difference between urban and rural areas in the share of malaria deaths among children age 5–14.

[23] Sample sizes for pneumonia and diarrheal diseases were too small to make comparisons by area of residence.

4.3.3 Leading Causes of Death for Children Age 5–14 Years by Sex

The leading causes of death for children age 5–14 years by sex are outlined in Figure 16. Malaria was the leading cause of death in both males and females, accounting for about half of all deaths in this age group.[24] HIV/AIDS was the second leading cause of death in females, while in males there was no statistical difference between HIV/AIDS and accidents and external causes for the second leading cause of death.[25]

Figure 16 Leading Causes of Death for Children Age 5–14 Years by Sex in Percent: 2006–2007



Source: INCAM, 2006-2007

[24] There was no statistical difference between males and females in the share of malaria deaths among children age 5–14.

[25] There was no statistical difference between the share of deaths from HIV/AIDS in females and the share of deaths in males from HIV/AIDS or accidents and external causes among children age 5–14.

4.3.4 Cause-Specific Death Rates for Children Age 5–14 by Sex and Area of Residence

Cause-specific death rates for children at ages 5–14 by sex and area of residence are shown in Table 11. Child mortality at ages 5–14 was 348 deaths per 100,000 children according to the 2007 census, which was one of the lowest rates for all age groups. Malaria accounted for roughly half of the child death rate (169 per 100,000 children age 5–14). As was the case at younger ages, this table shows that based on data from the 2007 census, mortality at ages 5–14 was higher in rural compared to urban areas (395 compared to 236 per 100,000 children age 5–14).

Table 11 Cause-Specific Death Rates for Children Age 5–14 by Sex and Area of Residence: 2007 (Per 100,000 Children Age 5–14)

	National			Urban			Rural		
Cause of death	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All causes	348.0	359.5	336.8	236.3	247.0	225.9	394.8	406.6	383.3
Malaria	169.0	161.0	179.0	115.2	129.7	102.3	191.5	171.7	218.4
HIV/AIDS	50.2	53.4	46.8	32.6	*	48.1	57.9	72.9	39.3
Accidents and external causes	27.3	36.9	*	25.2	40.8	*	26.6	33.4	*
All other causes	101.5	108.2	94.4	63.3	62.9	63.3	118.8	128.6	107.5

** Unweighted sample of INCAM deaths was less than 20*

Note: Proportions used to calculate cause-specific death rates are based on 16,692 weighted INCAM deaths.

Source: Mozambique 2007 Population and Housing Census; INCAM, 2006–2007

4.3.5 Cause-Specific Death Rates for Children Age 5–14 by Province

Table 12 shows cause-specific death rates by province for children at ages 5–14. The 2007 census found that Cabo Delgado had one of the highest death rates of children at ages 5–14 (633 per 100,000 children age 5–14). Gaza showed relatively low mortality for this age group, in contrast to its above-average mortality at most other age groups. Maputo City had one of the lowest death rates for this age group.

Table 12 Cause-Specific Death Rates for Children Age 5–14 by Province: 2007 (Per 100,000 Children Age 5–14)

Cause of death	National	Niassa	Cabo Delgado	Nampula	Zambezia	Tete
All causes	348.0	334.9	633.3	470.7	402.8	261.1
Malaria	168.9	141.0	273.3	257.7	227.6	110.8
All other causes	179.1	193.9	359.9	213.0	175.2	150.4

Cause of death	Manica	Sofala	Inhambane	Gaza	Maputo	Maputo City
All causes	269.8	328.2	203.3	213.9	*	122.6
Malaria	120.8	144.4	*	*	*	*
All other causes	149.0	183.8	112.8	154.4	*	69.3

** Unweighted sample of INCAM deaths was less than 20*

Note: Proportions used to calculate cause-specific death rates are based on 16,700 weighted INCAM deaths.

Source: Mozambique 2007 Population and Housing Census; INCAM, 2006–2007

Chapter 5 Causes of Death Among Adults

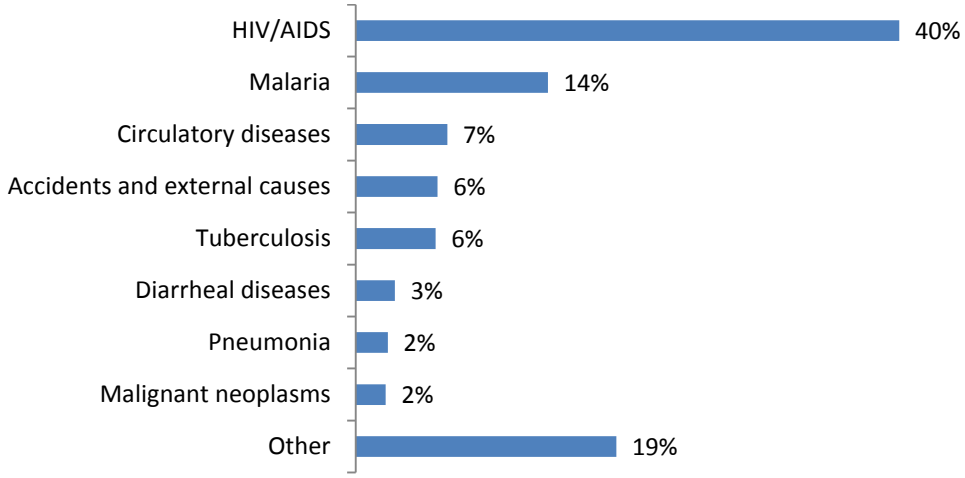
This chapter examines the causes of death in adults age 15 years and older by demographic characteristics including area of residence, sex, age, and province.

5.1 OVERVIEW OF DEATHS IN ADULTS AGE 15 AND OLDER

5.1.1 Leading Causes of Death for Adults Age 15 and Older

Fifty percent of all enumerated deaths occurred among adults age 15 and older. Figure 17 shows the eight leading causes of death for adults. HIV/AIDS was the leading cause of death, accounting for 40 percent of all adult deaths. The second leading cause of death was malaria, which was the source of 14 percent of adult deaths. Following malaria, leading causes of death were circulatory system diseases, accidents and external causes, and tuberculosis.[26] Altogether, the above-mentioned diseases were responsible for about three-quarters of adult deaths. The remaining leading causes of death were diarrheal diseases, pneumonia, and malignant neoplasms, each of which were responsible for less than five percent of adult deaths.[27]

Figure 17 Leading Causes of Death for Adults Age 15 and Older in Percent: 2006–2007



Source: INCAM, 2006-2007

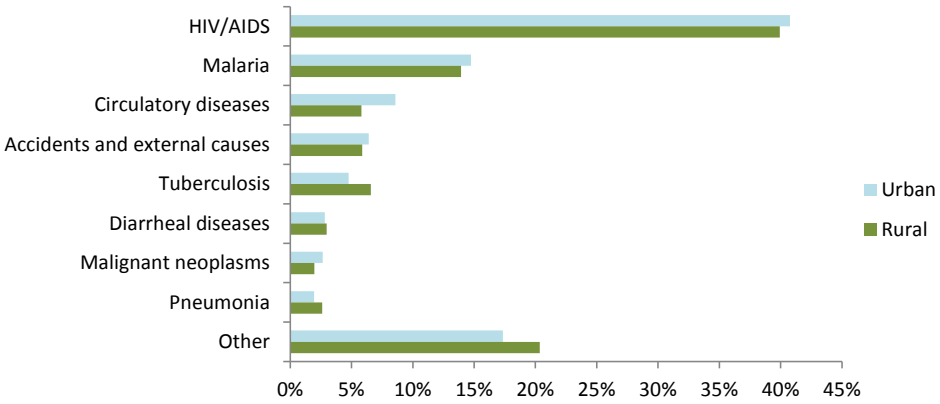
[26] There were no statistical differences between the percentages of deaths due to circulatory system diseases, accidents and external causes, and tuberculosis.

[27] There were no statistical differences between the percentages of deaths due to diarrheal diseases and pneumonia or between pneumonia and malignant neoplasms.

5.1.2 Leading Causes of Death for Adults Age 15 and Older by Area of Residence

Figure 18 shows leading causes of death by area of residence for adults. In both urban and rural areas, HIV/AIDS was the leading cause of death. It accounted for approximately 40 percent of adult deaths in each of urban and rural areas.[28] Malaria, the second leading cause of death, accounted for roughly 14 percent of adult deaths in each of urban and rural areas.[29] Circulatory system diseases were the third leading cause of death in urban areas, resulting in 9 percent of deaths in these areas. As might be expected, adults living in urban areas were more likely to die from circulatory diseases than adults in rural areas.

Figure 18 Leading Causes of Death for Adults Age 15 and Older by Area of Residence in Percent: 2006–2007



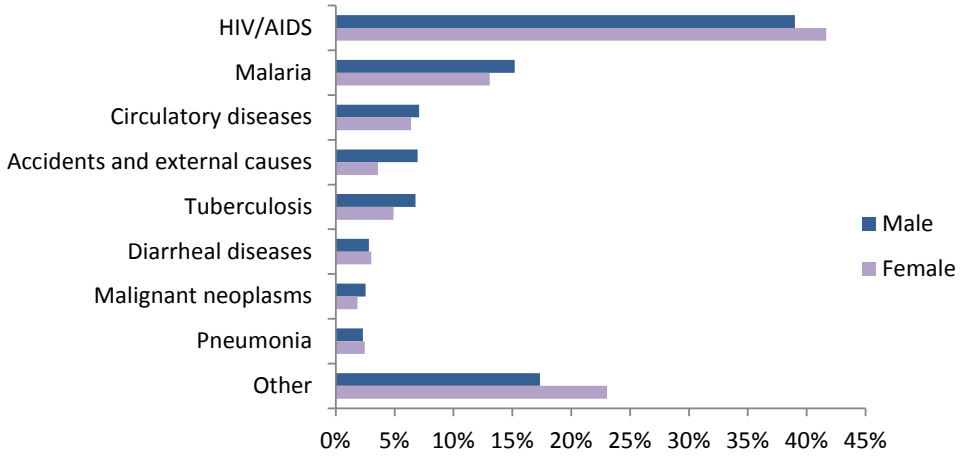
Source: INCAM, 2006-2007

[28] There was no statistical difference in the percent of deaths due to HIV/AIDS in urban compared to rural areas.
[29] There was no statistical difference in the percent of deaths due to malaria in urban compared to rural areas.

5.1.3 Leading Causes of Death for Adults Age 15 and Older by Sex

The leading causes of death for adults by sex are outlined in Figure 19. HIV/AIDS was the leading cause of death in both sexes, while malaria was the second leading cause of death. There was no statistical difference between men and women in the share of deaths due to HIV/AIDS. Malaria accounted for a higher share of deaths among adult men (15 percent) as compared to adult women (13 percent). However, men were about twice as likely to die from accidents and external causes as women (8 percent compared to 4 percent).

Figure 19 Leading Causes of Death for Adults Age 15 and Older by Sex in Percent: 2006–2007



Source: INCAM, 2006-2007

5.1.4 Leading Causes of Death for Adults Age 15 and Older by Province

Table 13 shows the leading causes of death for adults age 15 and older by province. HIV/AIDS was the leading cause of death for adults in all provinces, ranging from 32 percent of deaths in Nampula to 50 percent of deaths in Gaza. The percentage of deaths due to malaria varied from 7 percent in Maputo to 18 percent in Nampula.

Table 13 Leading Causes of Death for Adults Age 15 and Older by Province in Percent: 2006–2007

Cause of death	National	Niassa	Cabo Delgado	Nampula	Zambezia	Tete
Total	100	100	100	100	100	100
HIV/AIDS	40	40	34	32	42	36
Malaria	14	15	15	18	16	14
Circulatory diseases	7	9	5	5	6	9
Accidents and external causes	6	*	6	6	5	9
Tuberculosis	6	*	8	6	5	8
Malignant neoplasms	2	*	4	*	*	*
Other	25	23	29	32	25	22

Cause of death	Manica	Sofala	Inhambane	Gaza	Maputo	Maputo City
Total	100	100	100	100	100	100
HIV/AIDS	43	45	41	50	45	38
Malaria	15	16	13	10	7	9
Circulatory diseases	6	4	8	7	9	14
Accidents and external causes	8	7	6	4	6	7
Tuberculosis	6	5	6	6	5	5
Malignant neoplasms	*	*	*	*	4	6
Other	21	19	24	21	24	21

** Unweighted sample of INCAM deaths was less than 20*
Source: INCAM, 2006–2007

5.1.5 Cause-Specific Death Rates for Adults Age 15 and Older by Sex and Area of Residence

Table 14 shows cause-specific death rates by sex and area of residence for adults ages 15 and above. The death rate among adults from the census was 1,410 per 100,000 adults, not much different than the overall death rate for all ages of 1,464 per 100,000 population (see Table 5). HIV/AIDS, the leading cause of death among adults, had a death rate of 567 per 100,000 adults.

As one might expect, males had higher death rates than females for HIV/AIDS, malaria, circulatory diseases, accidents and external causes, tuberculosis, and malignant neoplasms. Death rates for accidents and external causes were about twice the rate in men as in women.[30]

Similar to death rates for children (Section 4), adult death rates from the census were higher in rural areas compared to urban areas (1,460 compared to 1,306 per 100,000 adults). The cause-specific death rates for HIV/AIDS and tuberculosis were higher in rural than urban areas for adults. On the other hand, the death rate for circulatory diseases was higher in urban compared to rural areas for adults.[31]

Table 14 Cause-Specific Death Rates for Adults Age 15 and Older by Sex and Area of Residence: 2007 (Per 100,000 Adults Age 15 and Older)

	National			Urban			Rural		
Cause of death	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All causes	1,410.3	1,571.3	1,267.4	1,305.8	1,406.6	1,209.4	1,460.3	1,654.9	1,293.8
HIV/AIDS	567.1	612.9	527.8	532.2	567.8	498.6	582.8	632.9	541.7
Malaria	200.7	238.8	165.9	192.5	215.3	170.2	203.7	250.5	162.4
Circulatory diseases	95.4	111.3	81.0	111.9	115.9	108.4	84.2	106.5	64.5
Accidents and external causes	85.6	122.3	51.1	83.6	113.6	53.1	85.9	126.1	49.6
Tuberculosis	83.5	106.5	62.2	62.1	75.8	48.3	95.9	125.1	69.9
Diarrheal diseases	41.0	44.1	38.4	36.8	43.7	29.8	43.2	43.7	43.2
Pneumonia	33.5	36.2	31.3	25.5	*	26.6	38.1	43.2	33.8
Malignant neoplasms	31.3	39.8	23.4	34.7	41.9	27.4	28.9	37.8	20.9
Other	272.1	259.4	286.4	226.5	208.0	247.0	297.5	289.1	307.8

** Unweighted sample of INCAM deaths was less than 20*
Note: Proportions used to calculate cause-specific death rates are based on 113,823 weighted INCAM deaths
Source: Mozambique 2007 Population and Housing Census; INCAM, 2006–2007

[30] There were no statistical differences between men and women for death rates due to diarrheal diseases and pneumonia.

[31] There were no statistical differences between rural and urban areas for adult death rates due to malaria, accidents and external causes, diarrheal diseases, pneumonia, and malignant neoplasms.

5.1.6 Cause-Specific Death Rates for Adults Age 15 and Older by Province

Table 15 shows cause-specific death rates by province for adults age 15 and over. The adult death rate due to HIV/AIDS was highest in Gaza (1,167 per 100,000 adults). Nampula (336 per 100,000 adults) had the lowest adult HIV/AIDS death rate.

Table 15 Cause-Specific Death Rates for Adults Age 15 and Older by Province: 2007 (Per 100,000 Adults Age 15 and Older)

Cause of death	National	Niassa	Cabo Delgado	Nampula	Zambezia	Tete
All causes	1,410.3	1,081.9	1,693.3	1,064.5	1,151.5	1,493.2
HIV/AIDS	567.3	432.8	567.9	335.7	481.8	537.6
Malaria	200.6	166.2	245.9	196.5	181.3	212.7
Circulatory diseases	95.8	93.4	90.8	57.7	66.7	129.0
Accidents and external causes	85.5	*	97.7	63.6	61.8	132.4
Tuberculosis	83.5	*	127.3	59.5	62.7	116.6
Malignant neoplasms	31.3	*	72.8	*	*	*
Other	346.4	243.5	491.0	338.8	282.5	335.2

Cause of death	Manica	Sofala	Inhambane	Gaza	Maputo	Maputo City
All causes	1,531.6	1,760.9	1,822.3	2,324.3	1,401.4	1,175.7
HIV/AIDS	665.7	793.1	745.6	1,166.5	624.4	451.9
Malaria	232.7	287.3	242.5	227.8	97.6	109.4
Circulatory diseases	87.4	78.2	152.0	159.8	130.2	163.8
Accidents and external causes	124.0	121.4	107.4	89.8	89.8	78.2
Tuberculosis	97.3	90.4	111.9	151.0	72.3	53.7
Malignant neoplasms	*	*	*	*	50.1	67.0
Other	317.2	337.3	442.3	484.5	337.0	251.6

** Unweighted sample of INCAM deaths was less than 20*

Note: Proportions used to calculate cause-specific death rates are based on 114,097 weighted INCAM deaths

Source: Mozambique 2007 Population and Housing Census; INCAM, 2006-2007

Chapter 6 Treatment Received and Place of Death

This chapter summarizes the care the deceased received for the illness that led to their death, as well as the place of their death. Treatment received and place of death are analyzed by different demographic characteristics including area of residence, sex, age, and province, as well as cause of death.

6.1 TREATMENT CATEGORIES AND DEFINITIONS

Interviewers asked verbal autopsy respondents whether the deceased had received any treatment for the illness that led to death. Respondents were encouraged to indicate as many treatment sources as applicable. The possible choices are listed below:

- Care at home by health personnel
- Care at home by home-based care groups
- Care at home by family members or others
- Care from an aid center or from community health groups
- Care from a traditional healer
- Care from a state health center
- Care from a state hospital
- Care from a private clinic
- Care from a pharmacy or shop

The respondent also had the option of responding with "other" and having the source of care written in, or indicating that they did not know what care was given.

6.1.1 Consolidation of Treatment Variables

Some categories of treatment were consolidated, with the result that there were four treatment-type variables used for the analysis. The consolidation process is explained below.

If the decedent only received care at home by family members, this was considered analogous to not receiving any treatment. There were very few cases of this occurring, but these cases were grouped into the "no treatment" category and are not discussed further in this report.

A variable for clinical treatment was created that includes the deceased visiting a state health center, state hospital, or private clinic. It should be noted that a wide range of quality of care can exist within this category. For example, a state hospital is defined by the Mozambique Ministry of Health as having an operating room, outpatient and emergency facilities, a laboratory, and a doctor on staff. A state health center or private clinic may not necessarily have comparable facilities.

Care at home by health personnel involves workers that were an extension of the health system but who were not clinical personnel. Home-based care groups, aid centers, and community health groups were also not considered to be staffed by

clinical personnel. For this reason, care at home by health personnel, care at home by home-based care groups, and care from aid centers or community health groups were combined into one category to represent community outreach by health activists.

Care from a traditional healer was defined as non-clinical care from someone that practiced traditional medicine. This variable stands alone and was left unaltered.

Finally, the depth of treatment from a pharmacy or shop is not well understood. Furthermore, less than one percent of respondents indicated that the deceased received treatment from a pharmacy or shop for the illness that led to death. Because of this, treatment from pharmacies and shops is not discussed on their own in this report, but it is included in the "received any treatment" variable.

In summary, this chapter focuses on whether the deceased received any form of treatment, clinical treatment, care from community outreach health activists, or visited a traditional healer.

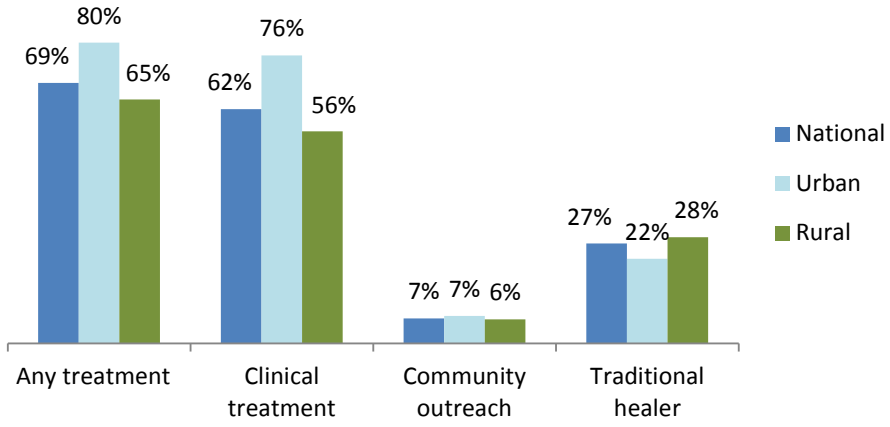
6.2 TREATMENT BY DEMOGRAPHIC CHARACTERISTICS

Overall 69 percent of decedents received treatment of some form, 62 percent received clinical treatment, 7 percent received care from community outreach health activists, and 27 percent visited a traditional healer (see Figure 6-1). The following section outlines treatment received by basic demographic characteristics such as area of residence, province, sex, and age group.

6.2.1 Treatment Received by Area of Residence and Type of Treatment

The percent of people who received treatment differed by area of residence of the deceased. Figure 20 shows that people living in urban areas were more likely to receive some form of treatment, as well as clinical treatment, than those who resided in rural areas. While only 56 percent of people in rural areas received clinical treatment, 76 percent of people in urban areas received clinical treatment. The percent of people accessing community outreach was low in both urban and rural areas, with usage rates ranging from 6 to 7 percent.[32] People living in rural areas were more likely to have received treatment from a traditional healer (28 percent) than their urban counterparts (22 percent).

Figure 20 Treatment Received by Area of Residence and Type of Treatment in Percent: 2006–2007



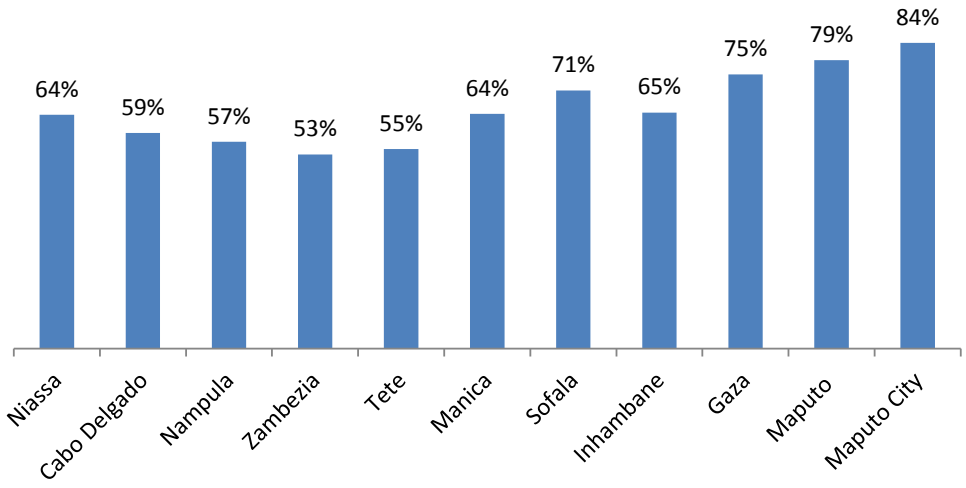
Source: INCAM, 2006-2007

[32] There was no statistical difference in the percent of people who sought community outreach in urban compared to rural areas.

6.2.2 Clinical Treatment Received by Province

Figure 21 shows the percent of people by province who received clinical treatment for the illness that led to their death.[33] People living in the southern provinces of Gaza, Maputo, and Maputo City were more likely to receive clinical treatment than residents in the northern and central provinces of Niassa, Cabo Delgado, Nampula, Zambezia, Tete, Manica, and Inhambane.[34] Unsurprisingly, residents of Maputo City were the most likely to receive clinical care of all the provinces (84 percent). This is to be expected as Maputo City and the southern provinces are more urban and developed and thus allow for greater access to clinical care. The lower proportions of decedents receiving clinical treatment in the northern provinces suggests the need for greater medical access for the population in those provinces.

Figure 21 Clinical Treatment Received by Province in Percent: 2006–2007



Source: INCAM, 2006-2007

6.2.3 Treatment Received by Sex

There was no statistical difference in any of the types of care sought between males and females. Clinical treatment was the most common form of treatment sought, and 62 percent of both males and females visited a health unit, hospital, or private clinic before death. (Figure not shown.)

[33] Due to small sample sizes in some of the provinces of people who sought clinical treatment, statistical comparisons cannot be made between the provinces. Percentages of people seeking treatment from a traditional healer were lowest in Maputo province (13 percent) and Maputo City (8 percent).

[34] There were no statistical differences between the percent of decedents who received clinical treatment in Gaza and Sofala or between Gaza and Maputo provinces.

6.2.4 Treatment Received by Type of Treatment and Age Group

Table 16 illustrates the percentage of people who received treatment for the illness that led to death by type of treatment and age group. As seen in this table, the age group age 25–49 had the highest percentage of people who sought clinical treatment. Children under one year of age had the lowest percentage of deaths to receive clinical treatment. Only about half of children under one year of age received clinical treatment, compared with 73 percent of adults age 25 to 49. Children under one year of age also were the least likely to have received treatment from a traditional healer, while adults age 25 to 49 had the highest percent of treatment sought from this category at 32 percent.[35]

Overall treatment sought was lowest for children under one year of age with only 56 percent of children receiving some form of treatment. This result is likely due to the often acute onset of illness and death among children and indicates the need for health programs targeted at infants.

Table 16 Treatment Received by Type of Treatment and Age Group in Percent: 2006-2007

Age group (years)	Treatment received	Clinical treatment	Community outreach	Traditional healer
< 1	56	49	4	19
1–4	71	64	6	28
5–14	67	60	4	25
15–24	70	62	8	29
25–49	78	73	8	32
50+	72	64	9	26

Source: INCAM, 2006–2007

[35] There was no statistical difference between the percent of people age 25-49 and 15-24 who sought treatment from a traditional healer.

6.2.5 Treatment Received by Type of Treatment and Cause of Death

Table 17 shows the type of treatment received by cause of death. Deaths from HIV/AIDS, malignant neoplasms, and tuberculosis were the most likely to have received clinical treatment,[36] while deaths from accidents and external causes and perinatal deaths were the least likely to have received such treatment.[37]

Care from a traditional healer was least common in deaths due to accidents and external causes and perinatal deaths.

Table 17 Treatment Received by Type of Treatment and Cause of Death in Percent: 2006–2007

Cause of death	Treatment received	Clinical treatment	Community outreach	Traditional healer
Malaria	70	62	6	24
HIV/AIDS	89	84	10	40
Perinatal causes	31	26	*	7
Diarrheal diseases	68	59	*	24
Pneumonia	67	60	*	27
Accidents and external causes	26	24	*	*
Circulatory diseases	68	59	*	20
Tuberculosis	81	73	*	34
Malignant neoplasms	86	78	*	37
Other	59	52	6	22

** Unweighted sample size was less than 20*
Source: INCAM, 2006–2007

[36] There were no statistical differences between the percent of people who received clinical treatment and died from HIV/AIDS and malignant neoplasms, or between the percent of people who received clinical treatment and died from malignant neoplasms and tuberculosis.

[37] There were no statistical differences between the percent of people who received clinical treatment and died from accidents and external causes and perinatal causes.

6.3 PLACE OF DEATH

Respondents were given four choices about where the deceased passed away: at home, in a health unit, in another location, or unknown. Figure 22 shows the percentage of deaths that occurred in each location where the location of death was known. Approximately three-quarters of deaths took place at home (75 percent), 21 percent occurred in a health unit, and 4 percent took place in another location.

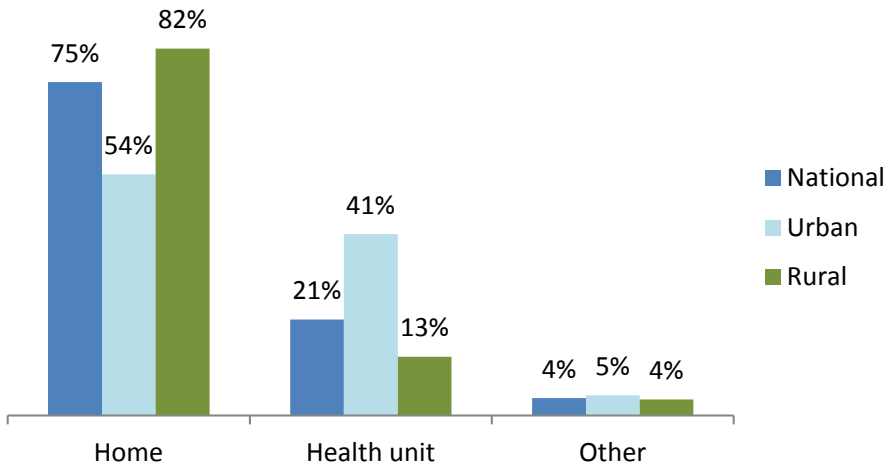
6.4 PLACE OF DEATH BY DEMOGRAPHIC CHARACTERISTICS

The following section outlines place of death by basic demographic characteristics such as area of residence, province, sex, and age group.

6.4.1 Place of Death by Area of Residence

Figure 22 breaks down the location of death by area of residence. Higher percentages of people living in rural areas died at home than people living in urban areas; 83 percent of rural deaths occurred at home whereas only 54 percent of urban deaths took place at home. The converse is true for deaths that occurred in a health unit. Forty-one percent of urban deaths occurred in a health unit, compared to just 13 percent of rural deaths. Percentages of deaths occurring in other locations were higher for urban (5 percent) compared to rural areas (4 percent).

Figure 22 Place of Death by Area of Residence in Percent: 2006–2007

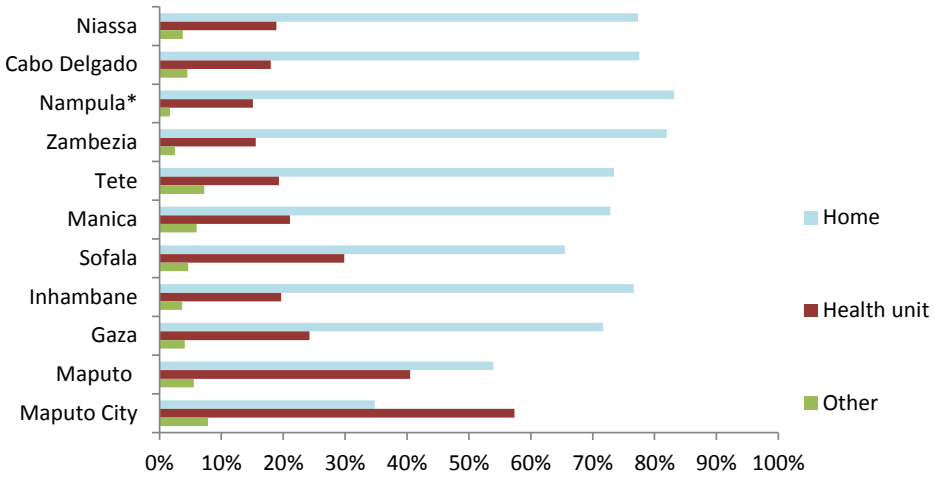


Source: INCAM, 2006-2007

6.4.2 Place of Death by Province

The place of death by province is shown in Figure 23. The more urban provinces of Maputo City and Maputo province had the highest percentages of deaths that took place in a health unit, and the lowest percentages of deaths that occurred at home. Maputo City was the only place to have had more deaths occur in a health unit than at home.

Figure 23 Place of Death by Province in Percent: 2006–2007



* Unweighted sample size was less than 20 for Other.

Source: INCAM, 2006-2007

6.4.3 Place of Death by Sex

There were no statistical differences in the number of deaths between males and females that occurred at home or in a health unit. Both males and females were more likely to die at home (74 percent). Males were more likely to die in other places than females (4 percent compared to 3 percent). (Figure not shown.)

6.4.4 Place of Death by Age Group

The place of death by age group is displayed in Table 18. Higher percentages of deaths in children under age 1 occurred at home compared to adults age 15–24 or age 25–49. The same was also true for children age 1–4. Adults over 50 years of age experienced higher percentages of deaths at home than adults age 15–24 or age 25–49.[38] On the other hand, higher percentages of adults age 25 to 49 died in a health unit than did adults age 50 and above, or children.

Table 18 Place of Death by Age Group in Percent: 2006–2007

Age group (years)	Home	Health unit	Other
< 1	78	18	2
1–4	76	18	4
5–14	71	21	6
15–24	70	24	6
25–49	66	28	4
50+	79	18	3

Source: INCAM, 2006–2007

[38] There were no statistical differences in the percent of deaths that occurred at home between children under age 1, children age 1–4 and adults age 50 and above.

6.4.5 Place of Death by Cause of Death

Table 19 shows place of death by leading causes of death. Deaths were most likely to occur at home for all leading causes of death. However, as might be expected, deaths from accidents and external causes experienced the lowest percentages of deaths at home and the highest percentages of deaths in locations other than the home or a health unit relative to other leading causes of death. Nationally, malaria and HIV/AIDS were the two leading causes of death, but people dying from these diseases did not experience similar distributions of deaths between the home and health unit. Higher percentages of deaths from HIV/AIDS occurred in a health unit than did deaths from malaria. Conversely, malarial deaths occurred at home in higher percentages than did deaths from HIV/AIDS. This probably relates back to the population afflicted by these diseases. Adults are more likely to die from HIV/AIDS and children are more affected by malaria. Table 18 confirms the differential place of death based on age group.

Table 19 Place of Death by Cause of Death in Percent: 2006–2007

Cause of death	Home	Health unit	Other
Malaria	79	19	3
HIV/AIDS	72	26	2
Tuberculosis	77	22	*
Accidents and external causes	50	15	34
Circulatory diseases	80	17	*
Malignant neoplasms	69	29	*
Diarrheal diseases	77	19	*
Perinatal causes	74	24	*
Pneumonia	81	18	*
Other	75	22	3

** Unweighted sample size was less than 20*
Source: INCAM, 2006–2007

Chapter 7 Deaths Due to Malaria and HIV/AIDS

This chapter covers mortality from malaria and HIV/AIDS based on various demographic characteristics, as well as treatment received and place of death for those who died from these diseases.

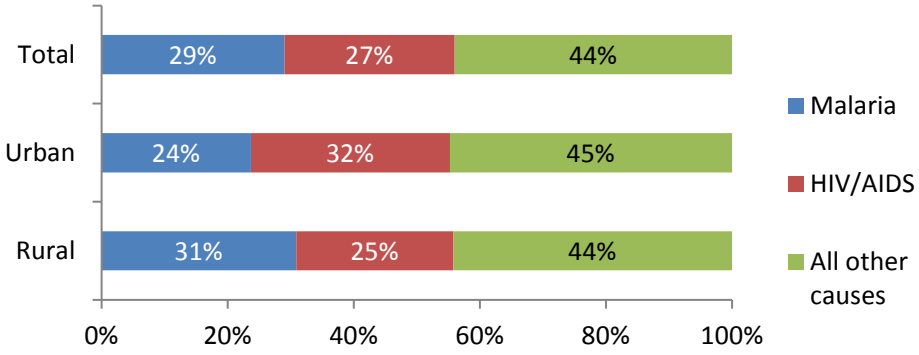
7.1 COMPARISON OF DEATHS DUE TO HIV/AIDS, MALARIA, AND ALL OTHER CAUSES

According to the INCAM survey data, malaria and HIV/AIDS were the leading causes of death in Mozambique, accounting for 56 percent of all deaths nationally. Figures 24 to 28 below show the distribution of deaths caused by HIV/AIDS, malaria, and all other causes of death by basic demographic characteristics.

7.1.1 Deaths Due to Malaria, HIV/AIDS, and All Other Causes by Area of Residence

Figure 24 shows deaths due to malaria, HIV/AIDS, and all other causes by area of residence. People living in rural areas experienced higher percentages of death from malaria than from HIV/AIDS while the converse was true of people living in urban areas.

Figure 24 Deaths Due to Malaria, HIV/AIDS, and All Other Causes by Area of Residence in Percent: 2006–2007



Source: INCAM, 2006-2007

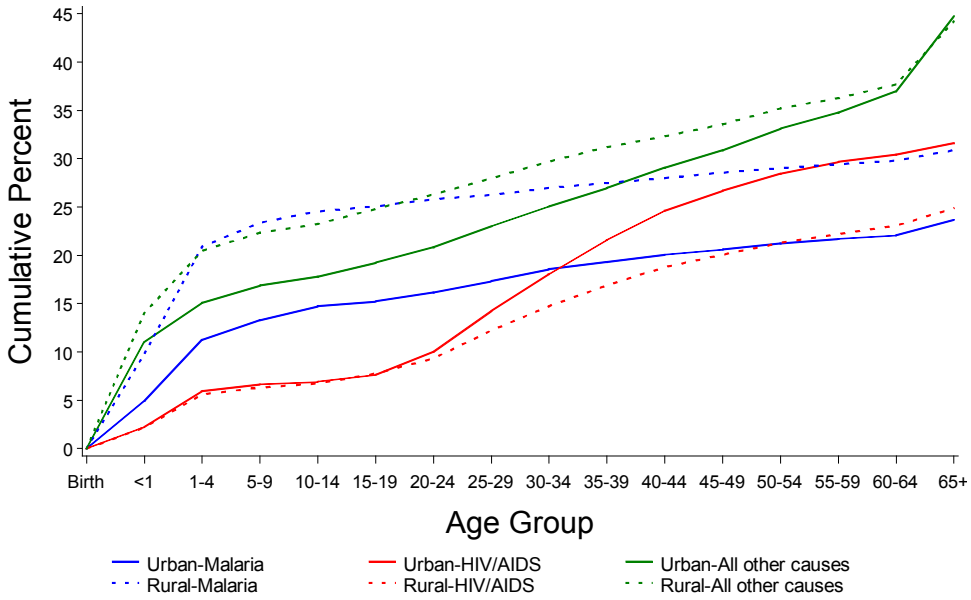
7.1.2 Deaths Due to Malaria, HIV/AIDS, and All Other Causes by Age Group and Area of Residence

Deaths due to malaria, HIV/AIDS, and all other causes by age group and area of residence are represented in Figure 25.

Malaria was responsible for approximately 21 percent of all rural deaths and 11 percent of all urban deaths before the age of 5 years. When all ages were included, malaria was the cause of death for 24 percent of urban deaths and 31 percent of rural deaths.

There was little difference between urban and rural HIV/AIDS mortality prior to 20 years of age. Cumulatively up to this age, HIV/AIDS accounted for 8 percent of all deaths in both urban and rural areas. This starts to change in the early 20s as the cumulative percent of deaths increases faster in the urban setting than in the rural setting. Ultimately, across all ages combined, 32 percent of deaths in urban areas and 25 percent in rural areas were attributed to HIV/AIDS.

Figure 25 Cumulative Causes of Death by Age Group and Area of Residence: 2006–2007

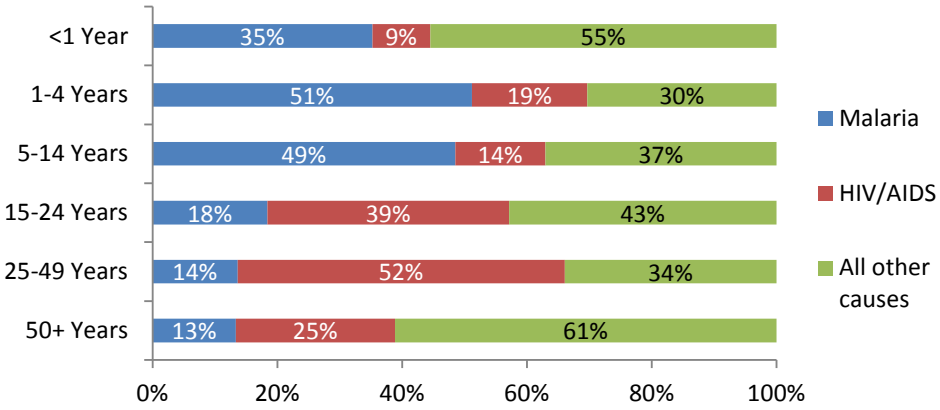


Source: INCAM, 2006-2007

7.1.3 Deaths Due to Malaria, HIV/AIDS, and All Other Causes by Age Group

Figure 26 shows deaths due to malaria, HIV/AIDS, and all other causes by age group. Children under fifteen years of age had the highest percentages of death from malaria. In the 15–24 years age group, HIV/AIDS overtook malaria and in adults ages 25–49, HIV/AIDS was by far the leading cause of death. Infants under one year of age were the least likely to die from HIV/AIDS among these age groups, while adults age 25–49 were the most likely to succumb to the disease. The role of HIV/AIDS as a cause of death persists at older ages, accounting for a quarter of all deaths among adults age 50 and older.

Figure 26 Deaths Due to Malaria, HIV/AIDS, and All Other Causes by Age Group in Percent: 2006–2007

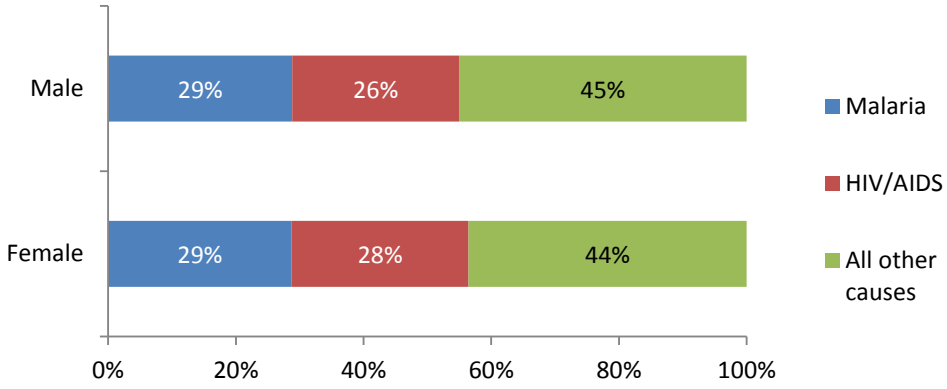


Source: INCAM, 2006-2007

7.1.4 Deaths Due to Malaria, HIV/AIDS, and All Other Causes by Sex

Deaths due to malaria, HIV/AIDS, and all other causes by sex are shown in Figure 27. Males experienced a higher percentage of deaths due to malaria than HIV/AIDS while there was no statistical difference in the percentage of females dying from malaria compared to HIV/AIDS. There was also no statistical difference between the sexes in terms of one sex being more likely than the other to die from malaria or HIV/AIDS.

Figure 27 Deaths Due to Malaria, HIV/AIDS, and All Other Causes by Sex in Percent: 2006–2007

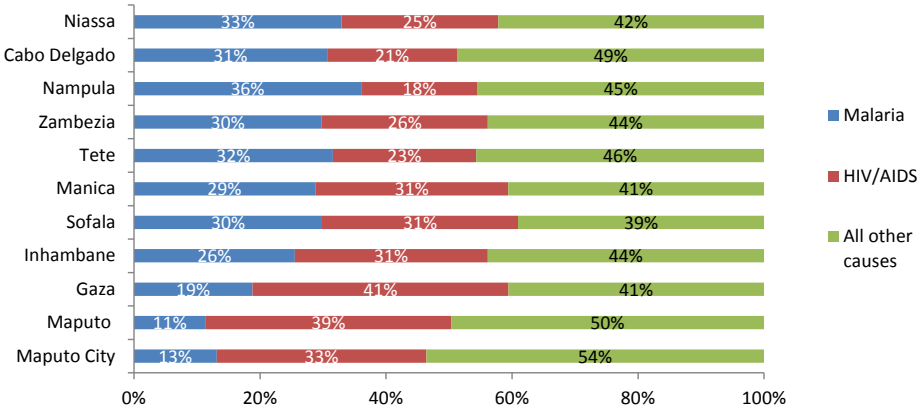


Source: INCAM, 2006-2007

7.1.5 Deaths Due to Malaria, HIV/AIDS, and All Other Causes by Province

Figure 28 shows deaths due to malaria, HIV/AIDS, and all other causes by province. The southern provinces of Gaza, Maputo, and Maputo City had the lowest proportions of deaths due to malaria.[39] Gaza and Maputo experienced the highest percentages of deaths due to HIV/AIDS.[40]

Figure 28 Deaths Due to Malaria, HIV/AIDS, and All Other Causes by Province in Percent: 2006–2007



Source: INCAM, 2006-2007

[39] There was no statistical difference between the percent of deaths due to malaria in Maputo province and Maputo City.

[40] There was no statistical difference between the percent of deaths due to HIV/AIDS in Maputo province and Gaza.

7.2 DEATHS DUE TO MALARIA

According to the Mozambique Ministry of Health (2006), malaria is the leading cause of morbidity registered at health units in Mozambique. Furthermore, the Malaria Indicator Survey (Mabunda et al., 2007) found 39 percent of children under age 5 were infected with the parasite causing malaria in 2007. Malaria accounted for about 40 percent of all outpatient visits (Mozambique Ministry of Health, 2006). The Mozambique Health Information System registered over 6,300,000 cases of malaria (confirmed and unconfirmed) and 3,366 deaths in health units in 2007 (WHO, 2008b).

7.2.1 Deaths Due to Malaria by Sex and Age Group

Table 20 breaks down the percentage of deaths due to malaria by age group and sex. Children in the age groups spanning 28 days to 14 years experienced the highest percentage of deaths due to malaria. In each of these age groups, for each sex, malaria accounted for roughly half of all deaths.

Table 20 Deaths Due to Malaria by Sex and Age Group in Percent: 2006–2007

Age group	Male	Female
Total	29	29
0–27 days	7	*
28–364 days	51	50
1–2 years	49	51
3–4 years	56	53
5–14 years	45	53
15–24 years	23	15
25–29 years	14	10
30–34 years	17	14
35–39 years	14	11
40–44 years	17	10
45–54 years	16	16
55–64 years	13	17
65–74 years	13	12
75+ years	10	15

** Unweighted sample size was less than 20*
Source: INCAM, 2006–2007

7.2.2 Treatment Type Received for Malarial Deaths by Area, Sex, Age Group, and Province

Table 21 illustrates the different types of treatment sought for people who died from malaria by basic demographic characteristics. Seventy percent of people who died from malaria sought some form of treatment before death. People who died of malaria in urban areas had higher rates of seeking some form of treatment than their rural counterparts. There were no statistical differences between the proportion of males and females who received any form of treatment or between the different age groups who received any form of treatment.

Sixty-one percent of people who died from malaria sought clinical treatment in the time before death. Those dying from malaria in urban areas were more likely to receive clinical treatment than those in rural areas. The percentages of males and females who sought such treatment were not statistically different, and there were no statistical differences in the use of clinical treatment among the different age groups.

There were marked differences across the provinces in the use of modern services for treating malaria. The receipt of clinical treatment ranged from 54 percent in Zambezia to 88 percent in the city of Maputo. Maputo City, Maputo province, and Gaza had a higher percentage receiving clinical treatment compared to their northern and central provincial counterparts of Niassa, Cabo Delgado, Nampula, Zambezia, Tete, Manica, Sofala, and Inhambane.[41] This difference likely is linked to access to modern health services, which are more widely available in the more urban, southernmost areas of the country.

The percentage of malarial deaths receiving treatment from community outreach programs was low across the board. Only six percent of malarial deaths received such treatment, this was similar for both urban and rural areas as well as for males and females.[42] When broken down by age or by provinces, sample sizes were too small to draw any definitive conclusions.

Twenty-four percent of people who died from malaria sought treatment from a traditional healer before death. Higher proportions of people living in rural areas (25 percent) sought treatment from a traditional healer than did people living in urban areas (20 percent). There were no statistical differences in the percentage of males and females accessing a traditional healer. In general, there were no statistical differences between age groups who sought treatment from a traditional healer. One exception was that larger percentages of children under 1 year of age and children age 1–4 sought treatment from a traditional healer than did children age 5–14. Sample sizes for the southern provinces were too small to make any comparisons to the other provinces.

[41] There were no statistical differences between the percent of malarial deaths who sought clinical treatment in Gaza and Sofala, between Gaza and Maputo, or between Maputo province and Maputo City.

[42] There were no statistical differences between the share seeking treatment from community outreach in urban compared to rural areas, or between males and females.

Table 21 Treatment Type Received for Malarial Deaths by Area, Sex, Age Group, and Province in Percent: 2006–2007

	Any treatment received	Clinical treatment	Community outreach	Traditional healer
Total	70	61	6	24
Area of residence				
Urban	83	79	5	20
Rural	65	56	6	25
Sex				
Male	69	61	6	25
Female	70	62	5	22
Age group (years)				
< 1	69	61	4	25
1–4	70	61	5	25
5–14	67	60	*	19
15–24	72	66	3	21
25–49	74	65	7	24
50+	70	60	12	23
Province				
Niassa	67	63	*	16
Cabo Delgado	66	58	5	17
Nampula	64	59	4	23
Zambezia	69	54	8	33
Tete	64	55	6	24
Manica	71	66	5	26
Sofala	78	71	4	36
Inhambane	72	62	11	17
Gaza	85	76	*	12
Maputo	86	84	*	*
Maputo City	90	88	*	*

** Unweighted sample size was less than 20*
Note: Categories are not mutually exclusive
Source: INCAM, 2006–2007

7.2.3 Place of Death for Malarial Deaths by Area, Sex, Age Group, and Province

Table 22 covers the location of death for people who died from malaria by basic demographic characteristics. Seventy-nine percent of malarial deaths occurred at home, 19 percent occurred in a health unit, and 3 percent occurred in other places. In both urban and rural areas the majority of malarial deaths occurred at home, with the share in rural areas exceeding that in urban areas. The likelihood of dying in a health unit in urban areas was 40 percent compared to only 12 percent in rural areas. Within each location of death there was no statistical difference between males and females. A little more than three-quarters of both males and females died at home. A lower percentage of deaths due to malaria occurred at home in adults age 25–49 than for any other age group. The southern, more urban provinces of Maputo City and Maputo province had the lowest percentage of malarial deaths that occurred in the home. Maputo City had the highest percentage of malarial deaths that occurred in a health unit (65 percent). Maputo province had the second highest percentage of malarial deaths occur in a health unit at 46 percent. In contrast Nampula only had about 10 percent of malarial deaths occur in a health unit.[43]

[43] The percent of deaths occurring in a health unit in Nampula was not statistically different from the percent in Niassa.

Table 22 Place of Death for Malarial Deaths by Area, Sex, Age Group, and Province in Percent: 2006–2007

	Home	Health unit	Other	Total
Total	79	19	3	100
Area of residence				
Urban	57	40	3	100
Rural	85	12	3	100
Sex				
Male	79	19	3	100
Female	78	18	3	100
Age groups (years)				
< 1	83	13	3	100
1–4	79	17	4	100
5–14	76	20	*	100
15–24	76	23	*	100
25–49	67	31	*	100
50+	80	19	*	100
Province				
Niassa	81	15	*	100
Cabo Delgado	76	21	*	100
Nampula	89	10	*	100
Zambezia	83	16	*	100
Tete	71	19	10	100
Manica	75	21	*	100
Sofala	71	25	*	100
Inhambane	78	18	*	100
Gaza	69	26	*	100
Maputo	52	46	*	100
Maputo City	29	65	*	100

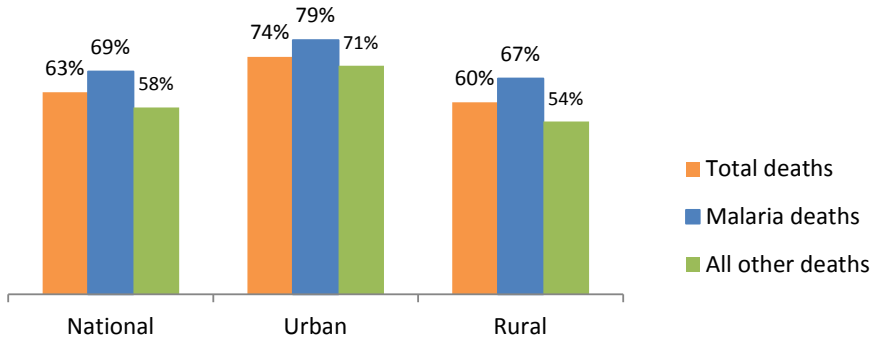
** Unweighted sample size is less than 20*
Source: INCAM, 2006–2007

7.2.4 Use of Health Services and Place of Death for Malarial Deaths in Children under Age Five

Even though deaths from malaria in children can be prevented through the distribution of bed nets, early diagnosis, and treatment with effective drugs, INCAM data show that 63 percent of deaths from malaria occurred in children under five years of age in Mozambique in 2007.

Figure 29 shows the percent of children under five years of age who received some form of treatment for the illness that led to death. Nationally, a higher percent of children who died from malaria received some form of treatment than did children who died from other causes. In both urban and rural areas, a higher percent of children dying from malaria sought treatment than did children who died from other causes. As one might expect, higher percentages of children dying from malaria in urban areas received treatment than did children dying from malaria in rural areas (79 percent and 67 percent, respectively).

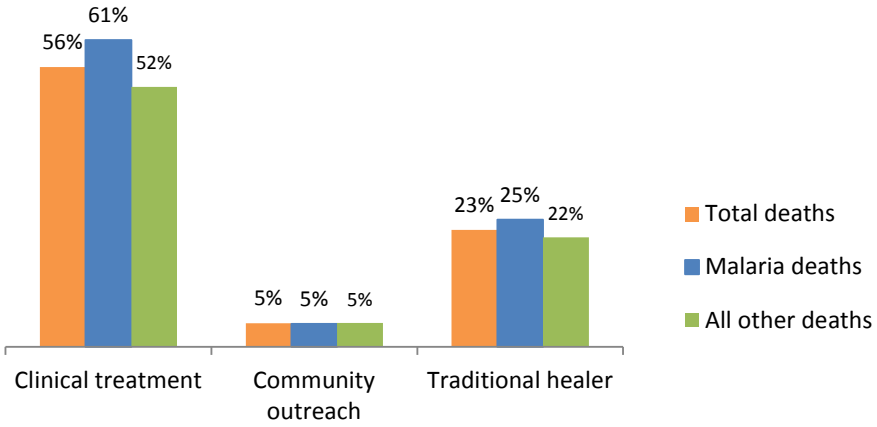
Figure 29 Deaths for Children Under Age Five Who Received Any Treatment by Cause of Death and Area of Residence in Percent: 2006–2007



Source: INCAM, 2006-2007

Figure 30 shows type of services used by children before death. The use of health services in a clinical setting was relatively more common in malaria deaths (61 percent) than in other causes of death (52 percent). There were no statistical differences between the percent of children receiving treatment from community outreach between malarial and non-malarial deaths. Malarial deaths had higher percentages of care sought from a traditional healer than did non-malarial deaths.

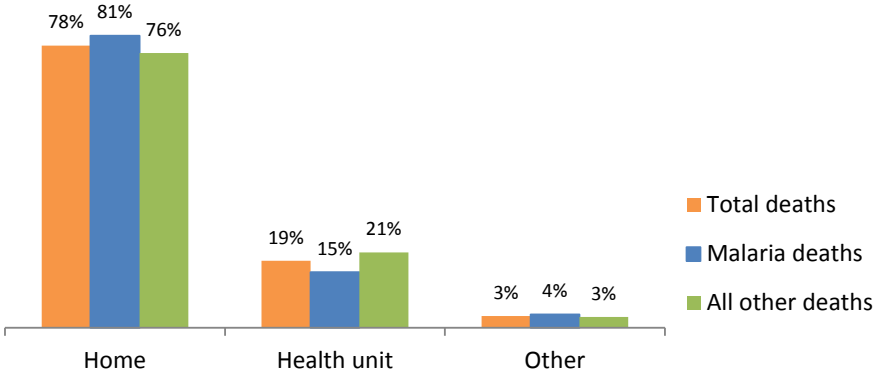
Figure 30 Deaths for Children Under Age Five by Type of Treatment and Cause of Death in Percent: 2006–2007



Source: INCAM, 2006-2007

Figure 31 compares the place of death by cause of death for children under age five. Malarial deaths were more likely to occur at home (81 percent) compared to in a health unit (15 percent). Compared to children who died from all other causes, children who died from malaria were both more likely to die at home and less likely to die in a health unit.

Figure 31 Place of Death for Children Under Age Five by Cause of Death in Percent: 2006–2007



Source: INCAM, 2006-2007

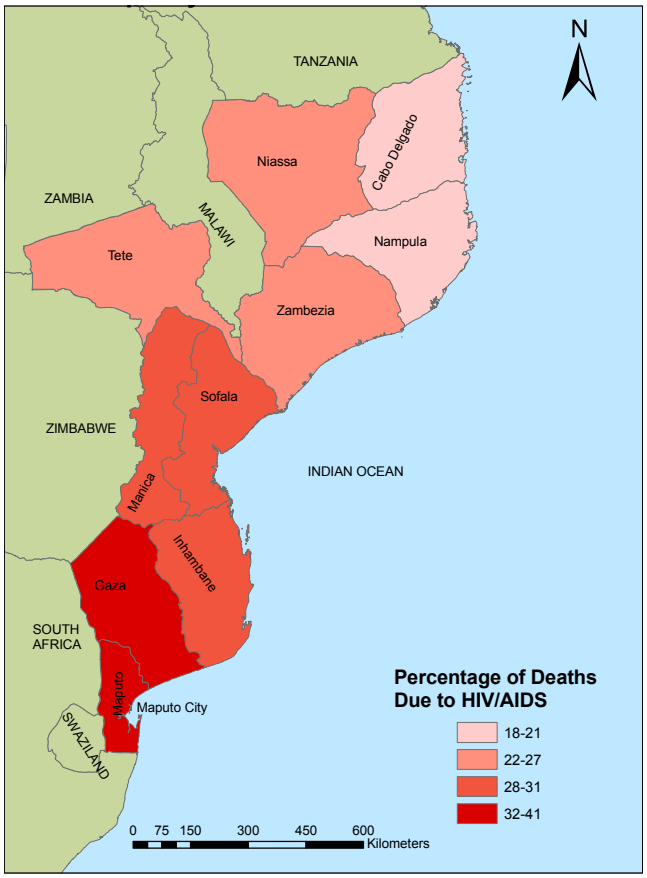
7.3 DEATHS DUE TO HIV/AIDS

According to the Mozambique Epidemiological Fact Sheet on HIV and AIDS (Joint United Nations Programme on HIV/AIDS, 2008), the adult HIV prevalence in Mozambique was 12.5 percent in 2007, and an estimated 81,000 deaths occurred due to HIV/AIDS.[44] INCAM found 60,439 weighted deaths during the 2006–2007 time frame. The high mortality caused by this disease has a devastating impact on the population.

7.3.1 Percentage of Deaths Due to HIV/AIDS by Region

Figure 24 shows that 27 percent of all deaths were due to HIV/AIDS and the percentage of deaths due to HIV/AIDS in urban areas was higher than in rural areas. Figure 32 shows the percentage of deaths in each province due to HIV/AIDS. Gaza and Maputo provinces experienced the highest percentages of deaths due to HIV/AIDS at 41 and 39 percent respectively.[45]

Figure 32 Percentage of Deaths Due to HIV/AIDS in Mozambique by Province: 2006–2007



Source: INCAM, 2006-2007

[44] Standard errors were not provided for the estimated number of deaths due to HIV/AIDS, therefore it was not possible to perform statistical comparisons to INCAM findings. However, low and high estimates of 67,000 and 98,000 deaths, respectively, were given.

[45] There was no statistical difference in the percent of deaths due to HIV/AIDS in Gaza compared to Maputo province.

7.3.2 Deaths Due to HIV/AIDS by Age Group and Sex

The percentages of deaths due to HIV/AIDS by age group and sex are shown in Table 23. In total and by individual age groups, there were no statistical differences in the percentage of deaths from HIV/AIDS by sex. However, there were differences across selected age groups. Among young adult males, the percentage of deaths due to HIV/AIDS rose from 36 percent at ages 15–24 to 55 percent at ages 25–29. The share then remained near that level until men reached the 45–54 year age group.[46] The highest percentages of death from HIV/AIDS for females were found among women in the age groups between 25 and 44 years of age.[47] If female HIV/AIDS deaths under 28 days are ignored due to the very small sample size, women age 75 and above were the least likely of all female age groups to die from the disease.

Table 23 Deaths Due to HIV/AIDS by Age Group and Sex in Percent: 2006–2007

Age group	Male	Female
Total	26	28
0–27 days	*	*
28–364 days	14	13
1–2 years	17	21
3–4 years	15	19
5–14 years	15	14
15–24 years	36	41
25–29 years	55	58
30–34 years	51	53
35–39 years	51	58
40–44 years	51	55
45–54 years	45	40
55–64 years	32	34
65–74 years	24	24
75+ years	10	7

** Unweighted sample size was less than 20*
Source: INCAM, 2006–2007

[46] The percent of deaths due to HIV/AIDS in males did not statistically differ between the 25–29, 30–34, 35–39 or 40–44 year age groups. Additionally, the percent of deaths due to HIV/AIDS in males did not statistically differ between the 30–34, 35–39, 40–44, or 45–54 year age groups.

[47] There were no statistical differences in the percent of deaths due to HIV/AIDS in women for the 25–29, 30–34, 35–39, or 40–44 year age groups.

7.3.3 HIV/AIDS Deaths with Tuberculosis as a Direct Cause of Death by Area of Residence, Sex, and Age Group

When coding the cause of death, it was possible for the physicians to determine if the direct cause of death differed from the underlying cause. In this way, they were able to ascertain the percentage of people whose underlying cause of death was HIV/AIDS, but whose death directly resulted from tuberculosis. This section covers this group of deaths in further detail.

Tuberculosis (TB) is the leading opportunistic infection among the HIV-positive population. Data from the National Program of Tuberculosis Control show 50 percent of patients with TB were also co-infected with HIV in 2007 (Mozambique Ministry of Health, 2007).

The distribution of deaths from HIV with or without TB as the direct cause of death according to basic demographic characteristics is illustrated in Table 24. This table shows that 33 percent of people who died from an underlying cause of HIV/AIDS also died as a direct result of tuberculosis. Of HIV/AIDS deaths occurring in urban areas, 40 percent died as a direct result of TB compared to 30 percent in rural areas. Percentages of HIV/AIDS deaths with a direct cause of death of tuberculosis were higher in males (35 percent) than females (31 percent). Higher levels of HIV/AIDS deaths due to tuberculosis were recorded in individuals 15 years and older and children under one year of age experienced the lowest levels.[48]

[48] There were no statistical differences in the percent of HIV/AIDS deaths due to tuberculosis between adults age 15–24 and adults age 50+ or between adults age 25–49 and age 50+.

Table 24 HIV/AIDS Deaths that were Co-infected with Tuberculosis by Area, Sex, Age Group, and Province in Percent: 2006–2007

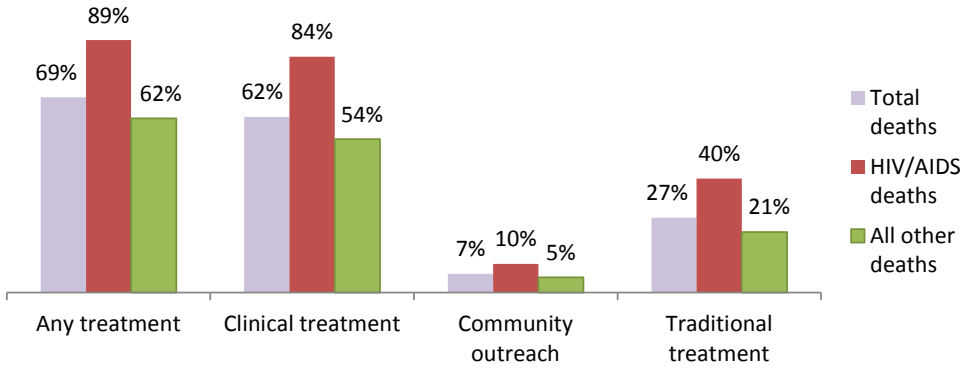
	Cause of death		Total
	HIV/AIDS without tuberculosis	HIV/AIDS with tuberculosis	
Total	67	33	100
Area of residence			
Urban	60	40	100
Rural	70	30	100
Sex			
Male	65	35	100
Female	69	31	100
Age group (years)			
< 1	96	*	100
1–4	91	9	100
5–14	84	*	100
15–24	66	34	100
25–49	57	43	100
50+	59	41	100
Province			
Niassa	72	28	100
Cabo Delgado	60	40	100
Nampula	80	20	100
Zambezia	73	27	100
Tete	74	26	100
Manica	62	38	100
Sofala	63	37	100
Inhambane	65	35	100
Gaza	56	44	100
Maputo	63	37	100
Maputo City	54	46	100

** Unweighted sample size was less than 20*
Source: INCAM, 2006–2007

7.3.4 Treatment Received for HIV/AIDS

Figure 33 shows the types of treatment received by different causes of death. People who died of HIV/AIDS were more likely to have received some type of treatment than people who died from other causes (89 percent compared to 62 percent). People who died from HIV/AIDS were also more likely to have received clinical treatment than people who died from other causes. Care sought for community outreach and from a traditional healer was more common in people who died from HIV/AIDS compared to people who died from other causes. This is not surprising, as HIV is a chronic disease that can take many years to go from infection to death of the host.

Figure 33 Type of Treatment Received by Cause of Death in Percent: 2006–2007



Source: INCAM, 2006-2007

Table 25 below shows the percent of people who died from HIV/AIDS and received various types of treatment before death, by demographic characteristics. Overall, 89 percent of the people who died from HIV/AIDS received some form of treatment before death. A very high 95 percent of HIV/AIDS deaths in urban areas received some form of treatment before death, while in rural areas the share was not as high (86 percent). Males were more likely (91 percent) to have sought some form of treatment than females who died from HIV/AIDS (88 percent).

Table 25 Treatment Type Received for HIV/AIDS Deaths by Area, Sex, Age Group, and Province in Percent: 2006–2007

	Any treatment received	Clinical treatment	Community outreach	Traditional healer
Total	89	84	10	40
Area of residence				
Urban	95	93	11	33
Rural	86	79	10	44
Sex				
Male	91	85	10	41
Female	88	82	10	39
Age group (years)				
< 1	82	78	*	33
1–4	91	86	7	43
5–14	87	82	*	46
15–24	89	79	13	41
25–49	92	87	11	42
50+	85	79	11	36
Province				
Niassa	88	82	*	35
Cabo Delgado	87	80	*	42
Nampula	84	80	14	44
Zambezia	86	78	11	53
Tete	86	78	*	42
Manica	89	82	9	38
Sofala	92	88	13	59
Inhambane	92	86	12	33
Gaza	96	89	10	27
Maputo	95	92	6	20
Maputo City	97	96	8	10

** Unweighted sample size was less than 20*
Source: INCAM, 2006–2007

Eighty-four percent of people who died from HIV/AIDS received clinical treatment, though this treatment may or may not have included antiretroviral medicines. People living in urban areas were more likely to seek out clinical treatment than those in rural areas. There was no statistical difference in the percent of males and females who received clinical treatment. Maputo City experienced the highest percentage of HIV/AIDS deaths receiving clinical treatment at 96 percent.

Even though community outreach was the least utilized type of treatment, higher percentages of HIV/AIDS deaths received treatment from community outreach programs than deaths from other types of diseases (Figure 33). Ten percent of HIV/AIDS deaths received this type of treatment (Table 25), compared to six percent of malarial deaths (Table 21). The percentage of people who accessed community outreach before dying of HIV/AIDS was not statistically different between urban and rural areas or between males and females. When broken down by age or to the provincial level, sample sizes were too small to make any comparisons.

Traditional healers were the second most common source of health care used by patients who died from HIV/AIDS. Forty percent of people sought treatment from a traditional healer, with deaths in rural areas being more likely to have received this treatment than urban deaths. Seeking care from a traditional healer did not statistically differ by sex. People living in Maputo City were the least likely to receive this form of treatment for HIV/AIDS.

7.3.5 Place of Death for HIV/AIDS Deaths by Area, Sex, Age Group, and Province

Table 26 shows the location of death by various demographic characteristics for people who died of HIV/AIDS. Nationally, only about one-quarter of deaths due to HIV/AIDS occurred in a health unit, while almost three-quarters occurred at home. However, there was a significant difference in the percentage of deaths that occurred at home in urban versus rural areas. More than twice as many HIV/AIDS deaths in urban areas took place in a health unit than did deaths in rural areas. People dying from HIV/AIDS in rural areas experienced higher percentages of death at home than those who lived in urban areas. There were no statistical differences in the percent of deaths that occurred in a health unit or at home between males and females. Adults age 25–49 years experienced a higher percentage of HIV/AIDS deaths occurring in a health unit than children under age 1, adults age 15–24 and adults age 50+. However, there were no other statistical differences among the different age groups for the percentage of HIV/AIDS deaths that occurred in a health unit. Adults age 25–49 had a lower percentage of HIV/AIDS deaths occurring at home than adults age 15–24 and adults age 50+, but no other statistical differences were seen between the other age groups. Maputo City experienced the highest percentage of HIV/AIDS deaths occurring in a health unit and the lowest percentage of these deaths at home.

Table 26 Place of Death for HIV/AIDS Deaths by Area, Sex, Age Group, and Province in Percent: 2006–2007

	Home	Health unit	Other	Total
Total	72	26	2	100
Area of residence				
Urban	54	44	2	100
Rural	82	16	2	100
Sex				
Male	72	26	2	100
Female	72	26	2	100
Age groups (years)				
< 1	74	23	*	100
1–4	74	25	*	100
5–14	73	24	*	100
15–24	76	23	*	100
25–49	69	29	2	100
50+	77	22	*	100
Province				
Niassa	78	21	*	100
Cabo Delgado	83	15	*	100
Nampula	77	23	*	100
Zambezia	81	18	*	100
Tete	69	27	*	100
Manica	72	24	*	100
Sofala	66	33	*	100
Inhambane	72	26	*	100
Gaza	72	26	*	100
Maputo	58	40	*	100
Maputo City	38	58	*	100

** Unweighted sample size was less than 20*
Source: INCAM, 2006–2007

Section 8 Maternal Mortality

Maternal mortality is an indicator of the level of development of medical and sanitary conditions in a given society. Developed countries are characterized by low maternal mortality while most developing countries, despite some advances in health care, tend to have high maternal mortality.

Concerns about maternal health and mortality underlie several national and international initiatives, such as the Millennium Development Goals (MDGs), which have established clear benchmarks to monitor and evaluate interventions. Assessing progress toward the goals of these initiatives has been a challenge due to weak and fragmented health information systems as well as a lack of reliable data.

A number of methodologies available to measure and monitor maternal mortality do not provide estimates that are based on nationally representative data. In fact, among maternal mortality estimates for sub-Saharan Africa provided in a recent summary report (Hemed et al., 2009), 44 percent of country estimates were not based on data at all, but rather statistical models. Moreover, even when maternal mortality data are more readily available, they typically do not indicate direct and indirect causes of mortality nor is the underlying cause of maternal death based on internationally comparable procedures. Even the most widely used methodologies for measuring maternal mortality, such as household-based surveys and hospital-based records, usually do not provide such information.

In Mozambique, maternal health is a government priority and significant investments have been made in this area of health in recent years. However, data are needed to understand the current situation and to assess the effectiveness of maternal health improvement programs in reducing maternal mortality ratios. Results from INCAM provide valuable information about maternal mortality and the state of maternal health in Mozambique.

8.1 DEFINITION OF MATERNAL MORTALITY USED IN INCAM

This chapter covers INCAM findings on maternal mortality. Maternal deaths were classified according to the WHO ICD-10 volumes 1-3-10 index, Chapter XV Pregnancy, childbirth and the puerperium (O00–O99)[49] which excludes human immunodeficiency virus [HIV/AIDS] disease (B20–B24), injury, poisoning and certain other consequences of external cause (S00–T98) and normal pregnancy (Z34). However, all maternal deaths with an underlying cause of HIV/AIDS were identified and included in the maternal mortality measures where appropriate. Thus, INCAM defined a maternal death as the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes.

[49] Ranges of codes from ICD-10 are indicated here in order to clarify which specific causes are included in each definition.

Direct obstetric deaths (O00-O97) were those maternal deaths resulting from obstetric complications of the pregnant state, from interventions, omissions, incorrect treatment, or from a chain of events resulting from a maternal cause of death. Likewise, indirect obstetric deaths (O98-O99) were those maternal deaths resulting from previous disease that developed prior to or during pregnancy and which were not due to direct obstetric causes but were aggravated by physiologic effects of pregnancy.

Deaths where the underlying cause of death was HIV/AIDS in women who were pregnant or who had given birth within 42 days of their death were classified as maternal deaths. There were ten unweighted cases where women had HIV/AIDS but died of direct obstetric causes; these deaths were included in the direct obstetric death category. Maternal deaths which were not otherwise classified as direct obstetric deaths, but where the underlying cause was HIV/AIDS infection, were included as indirect obstetric deaths regardless of whether HIV/AIDS was incidental to pregnancy or complicated the pregnancy.[50]

The timing of adult female deaths relative to pregnancy was determined from the adult verbal autopsy form that contains a question to identify all women who died and were pregnant at the time of death, pregnant within 42 days of death, or pregnant 43 days to 1 year before death (O96). This information allowed the calculation of pregnancy-related deaths.

[50] The inclusion or exclusion of HIV as a cause of maternal deaths has not been standardized until recently. The approach used in this report may differ slightly from that used by other reports. After the completion of INCAM's cause of death coding, an amendment was made in 2010 to the ICD-10 introducing code O98.7 to identify indirect maternal deaths due to HIV/AIDS. Code O98.7 does not include incidental HIV deaths in women who happened to be pregnant or who had recently delivered (WHO et al., 2010). Because of this, INCAM's method for coding HIV-related indirect maternal deaths may overestimate the number of these deaths compared to other methods following the O98.7 convention.

8.2 OVERVIEW OF MATERNAL MORTALITY IN MOZAMBIQUE

Table 27 presents the basic frequency distributions (numbers and percentages) of maternal deaths, both weighted and unweighted, recorded from INCAM. There were 213 unweighted cases of maternal death, including three women under fifteen years of age and one over 49 years of age. In addition to the maternal deaths just described, there were 8 deaths due to accidents or incidental to pregnancy—thus, there were 221 unweighted deaths that were pregnancy-related. The post-census survey also recorded 46 late maternal deaths (more than 42 days after the end of pregnancy). In the tables and figure that follow Table 27, unless otherwise indicated, these two latter categories are excluded, focusing instead on the maternal deaths.

Table 27 Distribution of Maternal Deaths Along With Number of Accidental and Late Maternal Deaths: 2006–2007

	Pregnancy-related deaths						
	Maternal deaths						
	Direct obstetric deaths[1]	Indirect obstetric deaths		Total maternal deaths	Accidental/ incidental	Total pregnancy-related deaths	Late maternal deaths
		Indirect causes	HIV[2]				
Unweighted							
Frequency	114	58	41	213	8	221	46
Percent maternal deaths	53.5%	27.2%	19.2%	100.0%			
Weighted							
Frequency	2,629	1,302	872	4,803	176	4,979	963
Percent maternal deaths	54.7%	27.1%	18.1%	100.0%			

[1] *Ten cases were HIV+ but the underlying cause of death was a direct obstetric death.*

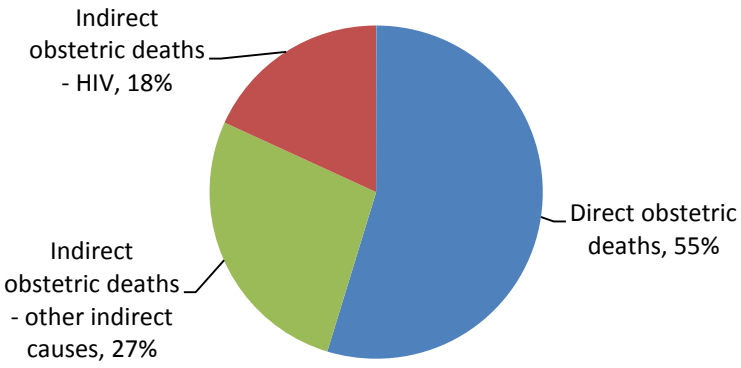
[2] *Although ICD-10 codes exclude HIV as either a direct or indirect cause of maternal deaths, it is classified here as an indirect cause*

Source: INCAM, 2006–2007

8.2.1 Classification of Maternal Death by Cause

Table 27 and Figure 34 show the distribution of maternal deaths based on whether they were due to direct obstetric causes or indirect causes. Although ICD-10 coding excluded HIV/AIDS as an underlying direct or indirect cause of maternal death at the time, it is assumed here that it is an indirect cause. Again, instances where mothers were HIV/AIDS positive yet died of direct obstetric causes were included in the direct obstetric category.

Figure 34 Distribution of Maternal Deaths: 2006–2007



Source: INCAM, 2006-2007

Fifty-five percent of maternal deaths were due to direct obstetric causes. About 18 percent were HIV/AIDS-related, and the remaining 27 percent were due to indirect causes other than HIV/AIDS. To our knowledge, this post-census mortality survey in Mozambique may be the most broad-based in a developing country to determine the share of maternal deaths due to direct vs. indirect obstetric causes, as well as the share due to HIV/AIDS—nearly one fifth.

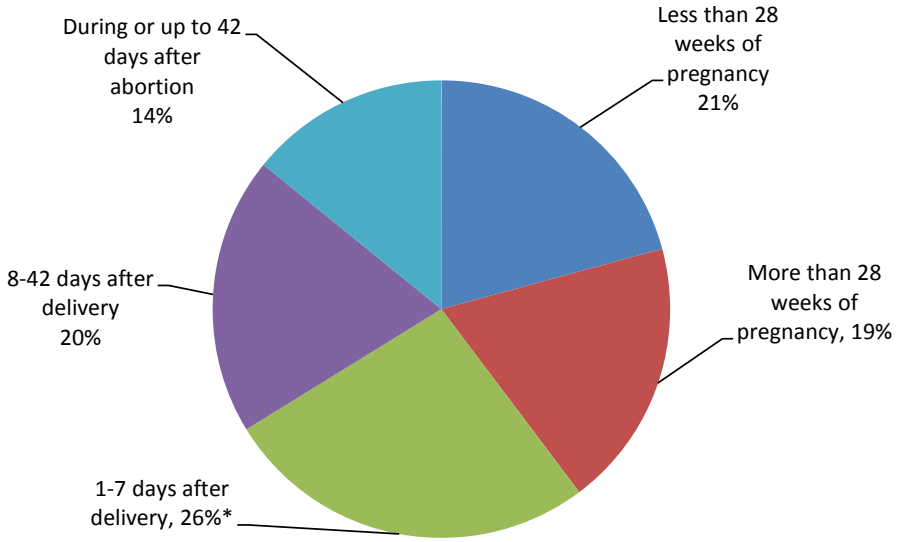
A study by Menendez et al. (2008) in Maputo Central Hospital performed autopsies on maternal deaths that occurred between October 2002 and December 2004. While this study was not nationally representative, it is one of the only other sources to shed light on maternal mortality in Mozambique. Menendez et al. (2008) found that 38 percent of deaths were due to direct obstetric causes. Menendez et al. (2008) also found 13 percent of maternal deaths were due to HIV/AIDS and 43 percent were due to indirect causes other than HIV/AIDS.[51]

[51] Menendez et al. did not report standard errors for their estimates. Therefore, it is not possible to perform statistical comparisons to INCAM findings.

8.2.2 Maternal Deaths by Duration of Pregnancy or Time Since Childbirth

Figure 35 shows the distribution of maternal deaths in relation to the duration of pregnancy or time since childbirth. Among all maternal deaths, 40 percent occurred during pregnancy but before delivery, 46 percent occurred within delivery or 1–42 days after a birth, and 14 percent were due to abortion.[52] There were no statistical differences in the percent of direct and indirect maternal deaths that occurred during pregnancy, after birth, or from an abortion (data not shown).

Figure 35 Distribution of Maternal Deaths by Duration of Pregnancy or Time Since Childbirth in Percent: 2006–2007



*Includes the 3 unweighted cases where death occurred during childbirth or during the first 24 hours after delivery

Source: INCAM, 2006-2007

8.2.3 Maternal Deaths by Type of Delivery

Deliveries by cesarean section are rare in Mozambique. The 2003 Mozambique Demographic and Health Survey (DHS) (Instituto Nacional de Estatistica, 2005) found that just under 2 percent of all births occurred by cesarean. INCAM found that 9 percent (10 unweighted cases) of maternal deaths occurred to women who delivered by cesarean section. In women who gave birth, the distribution by delivery type of the remaining maternal deaths was 88 percent with normal vaginal deliveries and 3 percent (2 unweighted cases) with abnormal vaginal deliveries which required the use of a vacuum (data not shown). Due to the very small sample sizes, statistical comparisons cannot be made between the share of maternal deaths by type of delivery.

[52] There was no significant difference between the percentage of maternal deaths that occurred during pregnancy and the percentage of maternal deaths that occurred during or after childbirth.

8.2.4 Age Distribution of Maternal Deaths and Percent Deaths in Women Age 15–49 Due to Maternal Causes

Table 28 shows the distribution of maternal deaths to women 15–49 years old reported in INCAM and the 2007 Census. INCAM results (first column) indicate that between 19 and 25 percent of maternal deaths occurred at each age group 15–19, 20–24, 25–29 and 30–34.[53] The average age of death for women who died of maternal causes was 27 years, while the median was 26 years (meaning that half of maternal deaths occurred before 26 years of age). It is worth highlighting that approximately 20 percent of maternal deaths occurred in girls who did not complete their twentieth year of age. Two out of three maternal deaths occurred among adolescents and young adults under 30 years of age. Cumulatively, 86 percent of maternal deaths occurred between the ages of 15 and 34. The distribution of maternal deaths from INCAM is similar to the full census except for women age 35–49 who comprised 14 percent of all maternal deaths in INCAM and 21 percent in the 2007 census. The lower proportion of maternal deaths at older childbearing ages may reflect several factors, including a lower proportion of women giving birth at older ages and a smaller number of women at these ages. An examination of the age-specific fertility rates sheds light on the first factor. The 2007 census results (Table 28, third column) show a typical pattern of lower fertility rates for both the younger and older ends of the childbearing age. Fertility peaks among women age 20–29 years with a slight decline among women 30–34 years old.

Table 28 Distribution of Maternal Deaths to Women 15–49 Years Old from INCAM and 2007 Census

Age group (years)	INCAM	2007 census	Age-specific fertility rates
Total (15–49)	100	100	
15–19	20	17	122.2
20–24	22	21	231.6
25–29	25	22	236.5
30–34	19	19	213.7
35–49	14	21	123.4

Source: Mozambique 2007 Population and Housing Census; INCAM, 2006–2007

[53] There were no significant differences between these age groups.

The INCAM sample shows that maternal deaths accounted for 14 percent of all deaths in women age 15–49 or about one maternal death for every six non-maternal deaths (Table 29, column 1). The proportion of all deaths among women age 15–49 that was due to maternal causes was higher in women age 15–34 than in women age 35–49. Results from the 2007 census were similar (Table 29, column 2). Results from the 2003 DHS show proportions of total deaths being attributable to maternal causes range from 12 percent in women age 20-24 to 52 percent in women age 35–49 (Table 29, column 3).[54]

Table 29 Maternal Deaths as a Share of Total Female Deaths by Age Group from INCAM, 2007 Census, and 2003 DHS in Percent

Age group (years)	INCAM	2007 census	2003 DHS
Total (15–49)	14	13	19
15–19	25	19	24
20–24	21	17	12
25–29	17	15	20
30–34	15	14	22
35–49	6	8	52

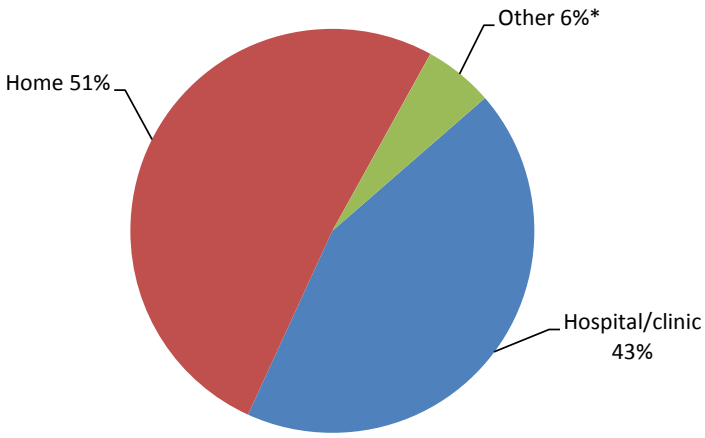
Source: INCAM, 2006–2007; Mozambique 2007 Population and Housing Census; Mozambique DHS, 2003

[54] The 2003 Mozambique DHS did not report standard errors for their maternal mortality estimates. Therefore, it is not possible to perform statistical comparisons to INCAM findings.

8.2.5 Place of Delivery

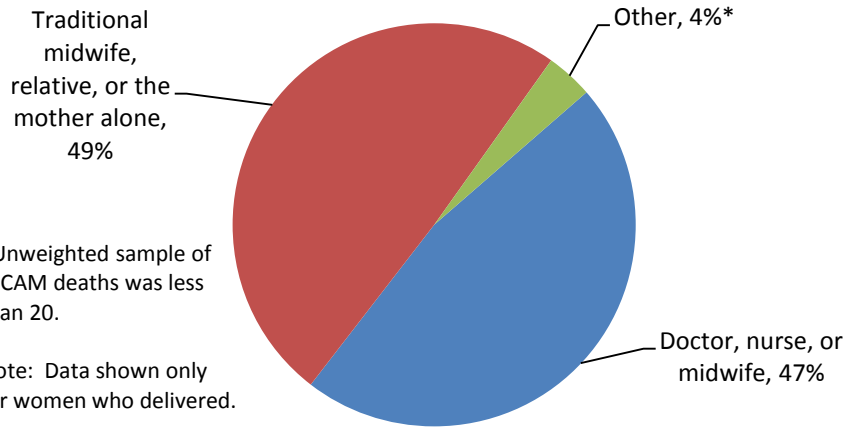
Figure 36 shows the distribution of maternal deaths by place of delivery. Among those giving birth, 51 percent of maternal deaths occurred to mothers who delivered at home and 43 percent to mothers who delivered at a health unit.[55] This latter finding is roughly comparable to findings in Figure 37, which shows the percent distribution of maternal deaths by the person assisting during delivery. Approximately half of all maternal deaths (47 percent) occurred when there was a trained professional (a doctor, nurse, or midwife) assisting with the birth. In the other half of maternal deaths (53 percent), the woman delivered without any trained medical assistant.[56]

Figure 36 Percent Distribution of Maternal Deaths by Place of Delivery: 2006–2007



*Unweighted sample of INCAM deaths was less than 20.
Source: INCAM, 2006-2007

Figure 37 Percent Distribution of Maternal Deaths by Who Assisted During Delivery: 2006–2007



*Unweighted sample of INCAM deaths was less than 20.

Note: Data shown only for women who delivered.

Source: INCAM, 2006-2007

[55] There was no significant difference between these two shares.

[56] There was no statistical difference in the percent of women who delivered with a trained medical assistant and those who delivered without one.

Despite the similar number of maternal deaths occurring at home and at medical facilities, one cannot conclude that the risk of maternal death is similar in both places. To determine appropriate death rates in each area, one would need to know the location where all births take place. Furthermore, even if such rates are calculated, there might still be questions about how to interpret the results, since women who are ill or who have pregnancy complications may choose to give birth in medical facilities rather than at home.

8.2.6 Treatment Prior to Death

Table 30 shows care seeking prior to death for maternal deaths compared to other women dying of non-maternal causes, and men in the same age group. This table indicates that 61 percent of maternal deaths were preceded by attempts at clinical treatment. However, higher percentages of women age 15–49 who died from non-maternal causes sought clinical treatment than women in that same age group dying from maternal causes (73 vs. 61 percent).

Table 30 Maternal Deaths By Treatment Sought, Compared to Non-Maternal Deaths in Percent: 2006–2007

Treatment	Any type of treatment	Clinical treatment	Community outreach	Traditional healer
All deaths	69	62	7	27
Women age 15–49, maternal causes	67	61	*	24
Women age 15–49, non-maternal deaths	79	73	9	31
Men age 15–49	76	69	8	33

** Unweighted sample of INCAM deaths was less than 20*
Source: INCAM, 2006–2007

8.2.7 Place of Death

The distribution of location of death is outlined in Table 31 for maternal deaths, non-maternal female deaths, and male deaths for individuals age 15–4 9. As might be expected given the nature and causes of death involved, a higher proportion of maternal deaths took place at a health unit (37 percent) than for women who died of non-maternal causes (28 percent) and men at ages 15–49 (26 percent).[57] However, 61 percent of maternal deaths still occurred at home, highlighting the need for expanded medical care for women both before and after pregnancy.

Table 31 Maternal Deaths Compared to Non-Maternal Deaths By Location of Death in Percent: 2006–2007

Population group	Health unit	Home	Other	Total
All deaths	21	75	4	100
Women age 15–49, maternal causes	37	61	2	100
Women age 15–49, non-maternal deaths	28	69	3	100
Men age 15–49	26	68	6	100

Source: INCAM, 2006–2007

8.3 MATERNAL MORTALITY RATIOS

The maternal mortality ratio as measured in the 2007 census was 500 deaths per 100,000 births for women age 12–49 (Table 32). The difference in maternal mortality between urban and rural areas was small. Maternal mortality ratios were highest for girls at ages 12–14 years (1,816 deaths per 100,000 births) and lowest for women at ages 20–24 years (377 deaths per 100,000 births). To achieve the Millennium Development target for 2015, maternal mortality will need to decline by half the 2007 level.

Table 32 Maternal Mortality Ratios by Age Group and Area of Residence: 2007 (Per 100,000 Births)

Age Group (Years)	National	Urban	Rural
12–49	500.1	490.0	504.0
15–49	489.3	484.2	491.0
12–14	1,815.9	1,268.3	1,962.7
15–19	589.4	491.8	630.1
20–24	376.7	340.7	391.1
25–29	465.2	525.6	445.5
30–34	539.9	557.6	534.8
35–39	511.7	576.9	494.8
40–44	631.8	675.2	620.8
45–49	649.0	867.5	605.0

Source: Mozambique 2007 Population and Housing Census

[57] There was no statistical difference in the percent of deaths that occurred at home between women age 15–49 who died of non-maternal causes and men age 15–49.

Maternal mortality ratios by cause of death and area of residence are shown in Table 33. Within urban areas, there was no statistical difference in the maternal mortality ratios for direct obstetric deaths and non-HIV related indirect obstetric deaths. The maternal mortality ratio was lowest in urban areas for HIV-related indirect obstetric deaths. In rural areas, direct obstetric deaths had the highest maternal mortality ratio. In rural areas, there was no statistical difference in the maternal mortality ratios for HIV-related indirect obstetric deaths and non-HIV related indirect obstetric deaths.

Maternal mortality ratios associated with direct causes were higher in rural areas compared to urban areas. However, there was no statistical difference between maternal mortality ratios for urban and rural areas for HIV-related indirect causes of maternal deaths. There was also no statistical difference for maternal mortality ratios for non-HIV related indirect causes between urban and rural areas.

Table 33 Maternal Mortality Ratios (Ages 12–49) by Direct and Indirect Causes and Area of Residence: 2007 (Per 100,000 Births)

Type of maternal death	National	Urban	Rural
Total	500	490	504
Direct	274	208	299
Indirect-non-HIV	136	175	120
Indirect-HIV-related	91	107	84

Source: Mozambique 2007 Population and Housing Census; INCAM, 2006–2007

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Appendix

Table A-1: Sampling Errors for the Distribution of Leading Causes of Death by Area of Residence and Sex: 2006–2007

Cause of death	Number of cases		Percent weighted	Standard error	Design effect	Relative error	90-percent confidence interval	
	Unweighted	Weighted					Lower limit	Upper limit
National	**10,080**	**225,088**	**100.00**	**X**	**X**	**X**	**X**	**X**
Malaria	2,592	64,740	28.80	0.74	2.81	0.03	27.54	29.98
HIV/AIDS	3,001	60,439	26.90	0.75	3.05	0.03	25.61	28.09
Perinatal causes	573	14,567	6.50	0.44	3.43	0.07	5.74	7.20
Diarrhea	397	10,007	4.40	0.28	2.00	0.06	3.98	4.91
Pneumonia	395	9,571	4.30	0.26	1.71	0.06	3.83	4.68
Accidents and external causes	475	9,493	3.90	0.27	1.92	0.07	3.77	4.66
Circulatory diseases	436	7,756	3.40	0.22	1.55	0.07	3.08	3.81
Tuberculosis	348	7,035	3.10	0.24	2.06	0.08	2.73	3.53
Malignant neoplasms	158	2,775	1.20	0.12	1.23	0.10	1.04	1.43
Other	1,705	38,705	17.50	0.51	1.91	0.03	16.36	18.03
Urban	**4,398**	**66,177**	**100.00**	**X**	**X**	**X**	**X**	**X**
Malaria	910	15,657	23.66	1.50	3.86	0.06	21.19	26.13
HIV/AIDS	1,496	20,902	31.58	1.68	4.06	0.05	28.81	34.36
Perinatal causes	215	3,905	5.90	0.66	2.40	0.11	4.82	6.98
Diarrhea	164	3,022	4.57	0.55	2.12	0.12	3.67	5.47
Pneumonia	137	2,048	3.09	0.37	1.39	0.12	2.49	3.70
Accidents and external causes	239	3,443	5.20	0.49	1.49	0.09	4.40	6.00
Circulatory diseases	271	3,547	5.36	0.43	1.13	0.08	4.65	6.07
Tuberculosis	156	1,950	2.95	0.31	1.07	0.11	2.43	3.46
Malignant neoplasms	96	1,139	1.72	0.22	0.93	0.13	1.35	2.09
Other	714	10,564	15.96	0.86	1.73	0.05	14.54	17.39
Rural	**5,682**	**158,911**	**100.00**	**X**	**X**	**X**	**X**	**X**
Malaria	1,682	49,083	30.9	0.88	2.73	0.03	29.43	32.35
HIV/AIDS	1,505	39,537	24.9	0.86	2.92	0.03	23.47	26.29
Perinatal causes	358	10,662	6.7	0.56	3.80	0.08	5.78	7.64
Diarrhea	233	6,985	4.4	0.33	1.94	0.08	3.85	4.94
Pneumonia	258	7,523	4.7	0.33	1.85	0.07	4.18	5.29
Accidents and external causes	236	6,050	3.8	0.33	2.22	0.09	3.26	4.35
Circulatory diseases	165	4,209	2.6	0.26	1.94	0.10	2.22	3.08
Tuberculosis	192	5,085	3.2	0.32	2.45	0.10	2.67	3.73
Malignant neoplasms	62	1,636	1.0	0.14	1.38	0.13	0.80	1.26
Other	991	28,141	17.7	0.62	1.96	0.03	16.69	18.73

X = not applicable

Table A-1 *continued*

Cause of death	Number of cases		Percent weighted	Standard error	Design effect	Relative error	90-percent confidence interval	
	Unweighted	Weighted					Lower limit	Upper limit
Male	**5,315**	**120,596**	**100.00**	**X**	**X**	**X**	**X**	**X**
Malaria	1,356	34,761	28.82	0.91	2.31	0.03	27.32	30.33
HIV/AIDS	1,577	31,531	26.15	0.87	2.20	0.03	24.72	27.58
Perinatal causes	311	8,089	6.71	0.58	3.06	0.09	5.75	7.67
Diarrhea	211	5,582	4.63	0.38	1.88	0.08	4.00	5.26
Pneumonia	199	5,252	4.36	0.39	2.02	0.09	3.72	4.99
Accidents and external causes	316	6,501	5.39	0.40	1.74	0.07	4.74	6.04
Circulatory diseases	229	4,372	3.63	0.30	1.49	0.08	3.13	4.12
Tuberculosis	228	4,360	3.62	0.32	1.69	0.09	3.08	4.15
Malignant neoplasms	88	1,707	1.42	0.18	1.26	0.12	1.13	1.71
Other	800	18,440	15.29	0.61	1.65	0.04	14.28	16.30
Female	**4,753**	**104,150**	**100.00**	**X**	**X**	**X**	**X**	**X**
Malaria	1,234	29,938	28.75	0.93	2.05	0.03	27.22	30.27
HIV/AIDS	1,422	28,822	27.67	0.94	2.18	0.03	26.12	29.23
Perinatal causes	261	6,462	6.20	0.52	2.27	0.08	5.35	7.06
Diarrhea	183	4,364	4.19	0.37	1.63	0.09	3.59	4.79
Pneumonia	195	4,310	4.14	0.35	1.51	0.08	3.56	4.72
Accidents and external causes	158	2,949	2.83	0.27	1.26	0.09	2.39	3.27
Circulatory diseases	206	3,354	3.22	0.28	1.26	0.09	2.75	3.69
Tuberculosis	120	2,675	2.57	0.31	1.82	0.12	2.07	3.07
Malignant neoplasms	70	1,067	1.02	0.15	1.14	0.15	0.77	1.28
Other	904	20,208	19.40	0.72	1.64	0.04	18.21	20.60

X = not applicable

Table A-2: Confidence Intervals for Cause-Specific Death Rates by Sex and Area of Residence: 2007 (Per 100,000 Population)

	Both sexes			Males			Females		
	Cause-specific death rate	90-percent confidence interval		Cause-specific death rate	90-percent confidence interval		Cause-specific death rate	90-percent confidence interval	
Cause of death		Lower limit	Upper limit		Lower limit	Upper limit		Lower limit	Upper limit
National	**1,464.50**	**X**	**X**	**1,583.50**	**X**	**X**	**1,354.08**	**X**	**X**
Malaria	421.59	403.75	439.44	456.43	432.56	480.30	389.24	368.54	409.93
HIV/AIDS	393.28	375.08	411.48	414.02	391.37	436.67	374.73	353.64	395.81
Perinatal causes	94.82	84.10	105.53	106.21	91.02	121.40	84.01	72.40	95.63
Diarrhea	64.81	58.00	71.63	73.30	63.30	83.30	56.74	48.57	64.91
Pneumonia	62.31	56.09	68.53	68.97	58.89	79.05	56.04	48.23	63.85
Accidents and external causes	61.58	55.10	68.06	85.37	75.03	95.71	38.34	32.38	44.29
Circulatory diseases	50.35	45.06	55.63	57.41	49.50	65.32	43.61	37.29	49.93
Tuberculosis	45.84	39.97	51.72	57.25	48.82	65.68	34.78	27.97	41.59
Malignant neoplasms	18.08	15.20	20.96	22.42	17.82	27.02	13.88	10.44	17.31
Other	251.84	239.55	264.13	242.13	226.09	258.16	262.73	246.57	278.88
Urban	**1,206.32**	**X**	**X**	**1,298.23**	**X**	**X**	**1,117.59**	**X**	**X**
Malaria	285.52	255.59	315.23	311.80	280.47	343.13	260.05	224.05	296.05
HIV/AIDS	381.16	347.57	414.46	403.47	364.29	442.64	359.75	324.66	394.83
Perinatal causes	70.91	58.15	84.24	82.96	60.02	105.90	59.16	44.38	73.94
Diarrhea	55.11	44.24	65.94	57.99	43.86	72.12	52.35	39.60	65.10
Pneumonia	37.19	30.03	44.64	37.39	27.47	47.32	37.05	28.41	45.68
Accidents and external causes	62.78	53.09	72.42	84.72	69.31	100.13	41.29	31.92	50.66
Circulatory diseases	64.68	56.09	73.22	68.52	55.95	81.08	60.99	50.93	71.05
Tuberculosis	35.56	29.29	41.80	44.48	34.61	54.36	26.83	19.58	34.08
Malignant neoplasms	20.77	16.29	25.23	25.79	18.16	33.42	15.86	10.66	21.05
Other	192.65	175.39	209.76	181.11	157.36	204.85	204.26	183.64	224.89
Rural	**1,577.20**	**X**	**X**	**1,711.76**	**X**	**X**	**1,454.50**	**X**	**X**
Malaria	487.71	464.14	510.16	527.41	494.81	560.02	451.66	425.58	477.74
HIV/AIDS	392.34	370.17	414.65	412.64	384.48	440.81	374.84	347.93	401.76
Perinatal causes	106.03	91.13	120.51	117.06	97.48	136.64	95.82	80.17	111.48
Diarrhea	68.86	60.73	77.93	80.38	67.15	93.62	57.92	47.66	68.18
Pneumonia	74.81	65.96	83.36	84.99	70.59	99.39	65.24	54.20	76.27
Accidents and external causes	59.74	51.46	68.63	84.25	70.75	97.75	35.89	28.37	43.42
Circulatory diseases	41.57	35.03	48.52	50.36	40.33	60.40	33.14	25.24	41.03
Tuberculosis	50.57	42.18	58.77	63.23	51.50	74.96	38.38	28.77	48.00
Malignant neoplasms	16.27	12.66	19.81	20.19	14.69	25.69	12.49	8.07	16.91
Other	279.29	263.20	295.39	271.23	250.48	291.97	289.11	267.26	310.95

X = not applicable

Note: Cause-specific death rates for the national and province levels come from the 2007 Mozambique census.

Table A-3: Confidence Intervals for Cause-Specific Death Rates for Children Under Age 1 by Province: 2007 (Per 100,000 Population)

Cause of death	Cause-specific death rate	90-percent confidence interval	
		Lower limit	Upper limit
National	**9,992.99**	**X**	**X**
Malaria	3,521.34	3,291.77	3,750.91
Bacterial sepsis of newborn	1,274.57	1,065.19	1,483.95
HIV/AIDS	928.28	773.86	1,082.71
Pneumonia	804.26	685.94	922.58
Diarrheal diseases	557.71	453.95	661.47
Septicaemia	182.68	118.09	247.28
Other	2,724.14	2,529.53	2,918.75
Niassa	**12,637.36**	**X**	**X**
Malaria	4,959.86	4,135.88	5,783.85
Bacterial sepsis of newborn	2,099.04	1,235.72	2,962.35
HIV/AIDS	1,293.56	757.06	1,830.05
Pneumonia	1,077.95	507.06	1,648.83
Diarrheal diseases	310.13	34.31	585.95
Septicaemia	0.00	0.00	0.00
Other	2,896.83	2,154.15	3,639.51
Cabo Delgado	**9,331.82**	**X**	**X**
Malaria	3,067.23	2,554.61	3,579.85
Bacterial sepsis of newborn	1,824.74	1,275.76	2,373.73
HIV/AIDS	264.73	90.34	439.12
Pneumonia	861.41	482.95	1,239.88
Diarrheal diseases	850.50	448.82	1,252.18
Septicaemia	223.27	40.95	405.60
Other	2,239.93	1,769.72	2,710.14
Nampula	**10,511.68**	**X**	**X**
Malaria	3,542.73	2,848.32	4,237.13
Bacterial sepsis of newborn	2,400.15	1,692.09	3,108.22
HIV/AIDS	796.19	371.75	1,220.63
Pneumonia	586.80	285.99	887.61
Diarrheal diseases	380.68	170.61	590.76
Septicaemia	113.88	0.00	253.19
Other	2,691.25	2,184.38	3,198.13

X=not applicable

Note: Cause-specific death rates for the national and province levels come from the 2007 Mozambique census.

Table A-3 *continued*

Cause of death	Cause-specific death rate	90-percent confidence interval	
		Lower limit	Upper limit
Zambezia	**10,886.37**	**X**	**X**
Malaria	3,839.95	3,332.27	4,347.63
Bacterial sepsis of newborn	1,022.26	661.21	1,383.31
HIV/AIDS	1,031.20	622.69	1,439.71
Pneumonia	979.86	709.36	1,250.36
Diarrheal diseases	663.82	386.43	941.20
Septicaemia	288.40	98.61	478.19
Other	3,060.89	2,554.60	3,567.18
Tete	**8,770.74**	**X**	**X**
Malaria	3,361.62	2,774.21	3,949.04
Bacterial sepsis of newborn	764.85	461.63	1,068.08
HIV/AIDS	610.97	324.85	897.08
Pneumonia	753.22	401.43	1,105.01
Diarrheal diseases	479.32	216.49	742.14
Septicaemia	30.70	0.00	81.95
Other	2,770.05	2,348.84	3,191.27
Manica	**10,716.94**	**X**	**X**
Malaria	4,335.58	3,803.77	4,867.39
Bacterial sepsis of newborn	660.11	330.43	989.79
HIV/AIDS	1,205.69	794.86	1,616.52
Pneumonia	641.52	407.89	875.15
Diarrheal diseases	997.35	554.46	1,440.25
Septicaemia	181.89	0.00	418.99
Other	2,694.80	1,999.88	3,389.72
Sofala	**10,316.43**	**X**	**X**
Malaria	4,286.32	3,615.34	4,957.31
Bacterial sepsis of newborn	1,093.22	671.95	1,514.50
HIV/AIDS	836.87	538.74	1,135.00
Pneumonia	648.23	355.32	941.13
Diarrheal diseases	517.36	269.99	764.73
Septicaemia	294.12	64.06	524.17
Other	2,640.31	2,165.47	3,115.15

X=not applicable

Note: Cause-specific death rates for the national and province levels come from the 2007 Mozambique census.

Table A-3 *continued*

Cause of death	Cause-specific death rate	90-percent confidence interval	
		Lower limit	Upper limit
Inhambane	**8,520.30**	**X**	**X**
Malaria	4,221.01	3,699.03	4,743.00
Bacterial sepsis of newborn	256.71	37.95	475.47
HIV/AIDS	753.82	216.75	1,290.89
Pneumonia	467.76	150.22	785.30
Diarrheal diseases	81.27	0.00	211.07
Septicaemia	90.24	0.00	240.76
Other	2,649.49	2,091.44	3,207.54
Gaza	**9,468.54**	**X**	**X**
Malaria	2,617.85	1,900.64	3,335.07
Bacterial sepsis of newborn	401.90	79.45	724.35
HIV/AIDS	1,915.28	1,395.06	2,435.50
Pneumonia	991.36	435.98	1,546.73
Diarrheal diseases	738.52	262.29	1,214.74
Septicaemia	292.99	89.29	496.69
Other	2,510.65	1,972.67	3,048.63
Maputo	**7,443.33**	**X**	**X**
Malaria	1,184.00	802.81	1,565.19
Bacterial sepsis of newborn	509.77	170.29	849.25
HIV/AIDS	1,330.34	738.54	1,922.13
Pneumonia	1,403.25	873.13	1,933.38
Diarrheal diseases	620.23	177.93	1,062.54
Septicaemia	210.80	12.69	408.90
Other	2,184.94	1,412.93	2,956.95
Maputo City	**6,463.84**	**X**	**X**
Malaria	1,018.21	660.44	1,375.97
Bacterial sepsis of newborn	131.92	4.51	259.32
HIV/AIDS	847.27	555.86	1,138.67
Pneumonia	1,026.12	712.79	1,339.44
Diarrheal diseases	301.24	140.38	462.10
Septicaemia	0.00	0.00	0.00
Other	3,139.09	2,658.57	3,619.61

X = not applicable

Note: Cause-specific death rates for the national and province levels come from the 2007 Mozambique census.

Table A-4: Confidence Intervals for Cause-Specific Death Rates for Children Age 1–4 by Province: 2007 (Per 100,000 Population)

Cause of death	Cause-specific death rate	90-percent confidence interval	
		Lower limit	Upper limit
National	**1,512.8**	**X**	**X**
Malaria	774.2	734.9	813.5
HIV/AIDS	280.4	251.7	309.0
Diarrheal diseases	96.6	78.9	114.3
Pneumonia	64.5	50.2	78.8
Malnutrition	54.7	42.3	67.2
Measles	26.2	16.2	36.2
Sepsis	12.8	6.9	18.7
Other	203.4	180.0	226.7
Niassa	**1,784.1**	**X**	**X**
Malaria	872.7	692.2	1,053.2
HIV/AIDS	353.8	228.9	478.6
Diarrheal diseases	119.8	64.0	175.5
Pneumonia	41.4	1.0	81.8
Malnutrition	50.0	5.8	94.2
Measles	49.4	0.8	98.0
Sepsis	0.0	0.0	0.0
Other	297.1	194.4	399.8
Cabo Delgado	**1,272.3**	**X**	**X**
Malaria	752.5	665.7	839.3
HIV/AIDS	127.4	83.0	171.9
Diarrheal diseases	79.5	26.9	132.1
Pneumonia	69.2	34.7	103.7
Malnutrition	7.9	0.0	16.5
Measles	27.2	7.1	47.4
Sepsis	16.9	1.2	32.6
Other	191.6	135.7	247.4
Nampula	**1,563.3**	**X**	**X**
Malaria	968.5	865.1	1072.0
HIV/AIDS	181.3	125.9	236.6
Diarrheal diseases	106.5	60.8	152.1
Pneumonia	60.9	21.7	100.1
Malnutrition	65.7	27.0	104.4
Measles	42.3	10.0	74.6
Sepsis	0.0	0.0	0.0
Other	138.2	87.4	188.9

X = not applicable

Note: Cause-specific death rates for the national and province levels come from the 2007 Mozambique census.

Table A-4 *continued*

Cause of death	Cause-specific death rate	90-percent confidence interval	
		Lower limit	Upper limit
Zambezia	**1,780.8**	**X**	**X**
Malaria	761.4	663.2	859.6
HIV/AIDS	398.0	308.0	488.0
Diarrheal diseases	145.7	93.6	197.8
Pneumonia	83.3	39.8	126.8
Malnutrition	46.6	18.9	74.3
Measles	39.5	11.5	67.4
Sepsis	29.1	5.8	52.4
Other	277.3	204.0	350.5
Tete	**1,137.8**	**X**	**X**
Malaria	554.9	473.3	636.6
HIV/AIDS	224.8	156.4	293.3
Diarrheal diseases	58.7	28.0	89.4
Pneumonia	47.7	20.1	75.3
Malnutrition	56.4	30.7	82.2
Measles	0.0	0.0	0.0
Sepsis	7.2	0.0	19.0
Other	188.1	140.2	235.9
Manica	**1,507.6**	**X**	**X**
Malaria	696.7	592.0	801.4
HIV/AIDS	367.9	260.7	475.0
Diarrheal diseases	53.0	22.6	83.3
Pneumonia	84.9	42.9	126.8
Malnutrition	100.1	39.0	161.3
Measles	10.5	0.0	27.4
Sepsis	20.7	0.0	53.5
Other	173.9	101.1	246.6
Sofala	**1,442.6**	**X**	**X**
Malaria	725.4	609.3	841.4
HIV/AIDS	404.0	308.1	500.0
Diarrheal diseases	79.5	38.8	120.2
Pneumonia	33.3	8.6	58.0
Malnutrition	36.6	8.9	64.3
Measles	6.0	0.0	16.2
Sepsis	10.0	0.0	26.6
Other	147.8	83.3	212.3

X = not applicable

Note: Cause-specific death rates for the national and province levels come from the 2007 Mozambique census.

Table A-4 *continued*

Cause of death	Cause-specific death rate	90-percent confidence interval	
		Lower limit	Upper limit
Inhambane	**1,046.8**	**X**	**X**
Malaria	530.1	454.6	605.5
HIV/AIDS	132.2	70.3	194.0
Diarrheal diseases	57.9	19.9	96.0
Pneumonia	48.4	15.4	81.4
Malnutrition	55.5	16.7	94.3
Measles	10.2	0.0	27.3
Sepsis	17.3	0.0	35.1
Other	195.2	131.2	259.2
Gaza	**2,839.7**	**X**	**X**
Malaria	1,384.3	1,169.9	1,598.7
HIV/AIDS	688.8	471.3	906.3
Diarrheal diseases	148.4	39.1	257.7
Pneumonia	97.7	20.8	174.5
Malnutrition	110.1	18.9	201.2
Measles	17.9	0.0	48.1
Sepsis	24.7	0.0	65.7
Other	367.9	229.4	506.4
Maputo	**758.0**	**X**	**X**
Malaria	253.1	178.0	328.2
HIV/AIDS	216.3	142.1	290.6
Diarrheal diseases	48.4	9.5	87.2
Pneumonia	39.8	2.7	76.9
Malnutrition	56.4	11.2	101.5
Measles	12.1	0.0	30.7
Sepsis	0.0	0.0	0.0
Other	131.9	80.5	183.4
Maputo City	**711.8**	**X**	**X**
Malaria	224.8	161.9	287.8
HIV/AIDS	212.2	151.9	272.6
Diarrheal diseases	30.1	4.8	55.5
Pneumonia	62.9	26.2	99.5
Malnutrition	74.8	37.0	112.6
Measles	0.0	0.0	0.0
Sepsis	7.1	0.0	18.6
Other	99.9	51.8	148.0

X = not applicable

Note: Cause-specific death rates for the national and province levels come from the 2007 Mozambique census.

Table A-5: Sampling Errors for the Distribution of Leading Causes of Death by Age Group: 2006–2007

Cause of death	Number of cases		Percent	Standard error	Design effect	Relative error	90-percent confidence interval	
	Unweighted	Weighted					Lower limit	Upper limit
Neonates (under 28 days)	**719**	**18,466**	**100.00**	**X**	**X**	**X**	**X**	**X**
Bacterial sepsis of newborn	216	6,467	35.02	2.65	2.31	0.08	30.64	39.40
Maternal factors and complications	91	1,767	9.57	1.27	1.38	0.13	7.48	11.66
Disorders relating to length of gestation and fetal growth	58	1,183	6.40	1.08	1.47	0.17	4.61	8.19
Malaria	39	1,147	6.21	1.08	1.49	0.17	4.43	7.99
Intrauterine hypoxia and birth asphyxia	51	1,110	6.01	1.09	1.58	0.18	4.21	7.81
Pneumonia	32	779	4.22	0.87	1.42	0.21	2.77	5.66
Other	232	6,013	32.56	2.26	1.73	0.07	28.84	36.29
Children age 28 days to four years	**3,142**	**77,608**	**100.00**	**X**	**X**	**X**	**X**	**X**
Malaria	1,520	39,516	50.92	1.30	2.22	0.03	48.77	53.07
HIV/AIDS	575	12,783	16.47	0.96	2.18	0.06	14.89	18.05
Diarrheal diseases	220	5,387	6.94	0.58	1.72	0.08	5.98	7.90
Pneumonia	223	5,336	6.88	0.52	1.37	0.08	6.02	7.73
Malnutrition	88	1,990	2.56	0.35	1.56	0.13	1.99	3.13
Sepsis	50	1,511	1.95	0.36	2.21	0.18	1.36	2.54
Measles	30	911	1.17	0.23	1.54	0.20	0.79	1.56
Other	436	10,173	13.11	0.66	1.25	0.05	12.02	14.20
Children age 5–14 years	**637**	**16,700**	**100.00**	**X**	**X**	**X**	**X**	**X**
Malaria	296	8,107	48.54	2.75	2.00	0.06	44.01	53.08
HIV/AIDS	93	2,407	14.41	1.69	1.52	0.12	11.63	17.20
Accidents and external causes	61	1,310	7.85	1.24	1.40	0.16	5.80	9.89
Diarrheal diseases	35	1,027	6.15	1.29	1.89	0.21	4.03	8.27
Pneumonia	30	789	4.72	1.05	1.63	0.22	2.99	6.46
Other	122	3,060	18.32	1.72	1.31	0.09	15.48	21.17
Adults age 15+ years	**5,578**	**112,274**	**100.00**	**X**	**X**	**X**	**X**	**X**
HIV/AIDS	2,330	45,159	40.22	0.99	2.41	0.02	38.58	41.86
Malaria	737	15,970	14.22	0.64	1.99	0.05	13.16	15.28
Circulatory diseases	426	7,623	6.79	0.41	1.53	0.06	6.12	7.46
Accidents and external causes	350	6,807	6.06	0.43	1.95	0.07	5.35	6.78
Tuberculosis	330	6,645	5.92	0.45	2.17	0.08	5.17	6.67
Diarrheal diseases	132	3,264	2.91	0.32	2.09	0.11	2.38	3.43
Pneumonia	110	2,667	2.38	0.29	2.17	0.12	1.89	2.86
Malignant neoplasms	147	2,490	2.22	0.23	1.39	0.10	1.84	2.59
Other	1,016	21,648	19.28	0.75	2.11	0.04	18.05	20.51

X = not applicable

Table A-6: Sampling Errors for the Percent of People Who Sought Treatment by Treatment Source: 2006–2007

Treatment sought	Number of cases		Percent	Standard error	Design effect	Relative error	90-percent confidence interval	
	Unweighted	Weighted					Lower limit	Upper limit
Total who sought treatment from any source	**7,359**	**155,729**	**69.19**	**0.91**	**4.08**	**0.01**	**67.69**	**70.68**
Clinical treatment	6,771	140,016	62.20	1.07	5.13	0.02	60.44	63.97
Community outreach	649	14,926	6.63	0.42	2.98	0.06	5.94	7.32
Traditional healer	2,397	59,683	26.52	0.94	4.83	0.04	24.96	28.07
Urban total who sought treatment from any source	**3,600**	**52,825**	**79.82**	**1.12**	**2.42**	**0.01**	**77.98**	**81.67**
Clinical treatment	3,466	50,616	76.49	1.18	2.41	0.02	74.54	78.43
Community outreach	302	4,807	7.26	0.62	1.74	0.08	6.25	8.28
Traditional healer	870	14,879	22.48	1.12	2.25	0.05	20.63	24.34
Rural total who sought treatment from any source	**3,759**	**102,903**	**64.76**	**1.19**	**4.63**	**0.02**	**62.79**	**66.72**
Clinical treatment	3,305	89,400	56.26	1.39	5.82	0.02	53.97	58.54
Community outreach	347	10,119	6.37	0.53	3.55	0.08	5.49	7.25
Traditional healer	1,527	44,804	28.19	1.24	5.69	0.04	26.14	30.24

Note: Treatment may have been sought from more than one source.

Table A-7: Sampling Errors for the Percent Deaths Due to Malaria by Sex and Age: 2006–2007

Sex and age group	Number of cases		Percent	Standard error	Design effect	Relative error	90-percent confidence interval	
	Unweighted	Weighted					Lower limit	Upper limit
Male total	**1,356**	**34,761**	**28.82**	**0.91**	**2.31**	**0.03**	**27.32**	**30.33**
0–27 days	24	678	6.77	1.37	1.38	0.20	4.52	9.03
28–364 days	355	9,585	51.36	2.28	1.81	0.04	47.60	55.11
1–2 years	313	7,980	49.21	2.61	2.06	0.05	44.91	53.52
3–4 years	112	3,183	55.88	3.74	1.51	0.07	49.70	62.05
5–14 years	143	4,082	44.77	3.82	2.51	0.09	38.48	51.07
15–24 years	65	1,668	22.77	3.29	2.10	0.14	17.35	28.19
25–29 years	33	817	13.54	2.65	1.69	0.20	9.17	17.91
30–34 years	46	1,102	17.22	2.46	1.26	0.14	13.17	21.27
35–39 years	45	834	13.59	2.30	1.29	0.17	9.79	17.38
40–44 years	50	936	16.56	2.63	1.32	0.16	12.22	20.90
45–54 years	35	841	16.04	3.36	2.05	0.21	10.50	21.57
55–64 years	35	923	12.56	2.13	1.42	0.17	9.05	16.07
65–74 years	40	920	13.33	2.51	1.76	0.19	9.18	17.47
75+ years	31	535	10.45	2.17	1.20	0.21	6.88	14.03
Female total	**1,234**	**29,938**	**28.75**	**0.93**	**2.05**	**0.03**	**27.22**	**30.27**
0–27 days	14	448	5.35	1.51	1.76	0.28	2.86	7.85
28–364 days	321	8,051	49.94	2.33	1.63	0.05	46.10	53.78
1–2 years	310	8,055	51.16	2.31	1.57	0.05	47.36	54.96
3–4 years	108	2,642	52.86	3.72	1.30	0.07	46.72	59.00
5–14 years	153	4,025	53.14	3.41	1.65	0.06	47.51	58.76
15–24 years	61	1,273	14.71	2.17	1.51	0.15	11.14	18.29
25–29 years	35	671	9.65	1.69	1.07	0.18	6.86	12.44
30–34 years	44	841	13.58	2.31	1.32	0.17	9.77	17.39
35–39 years	20	485	10.69	2.77	1.70	0.26	6.13	15.25
40–44 years	19	365	9.60	2.26	1.04	0.23	5.88	13.32
45–54 years	24	426	16.36	3.10	0.85	0.19	11.25	21.48
55–64 years	37	881	17.38	3.07	1.55	0.18	12.32	22.43
65–74 years	31	603	11.70	2.16	1.09	0.18	8.13	15.26
75+ years	40	716	15.06	2.67	1.24	0.18	10.66	19.46

Table A-8: Sampling Errors for the Percent Deaths Due to HIV/AIDS by Sex and Age: 2006–2007

Sex and age group	Number of cases		Percent	Standard error	Design effect	Relative error	90-percent confidence interval	
	Unweighted	Weighted					Lower limit	Upper limit
Male total	**1,577**	**31,531**	**26.15**	**0.87**	**2.20**	**0.03**	**24.72**	**27.58**
0–27 days	2	47	0.47	0.35	1.21	0.74	0.00	1.04
28–364 days	109	2,687	14.40	1.77	2.22	0.12	11.47	17.32
1–2 years	144	2,836	17.49	1.64	1.41	0.09	14.79	20.19
3–4 years	35	860	15.09	2.84	1.67	0.19	10.41	19.77
5–14 years	51	1,355	14.86	2.37	1.89	0.16	10.95	18.77
15–24 years	111	2,608	35.61	3.48	1.80	0.10	29.88	41.34
25–29 years	172	3,332	55.23	3.78	1.63	0.07	48.99	61.46
30–34 years	183	3,264	51.02	2.95	1.04	0.06	46.15	55.89
35–39 years	171	3,102	50.53	4.31	2.13	0.09	43.42	57.63
40–44 years	156	2,905	51.38	3.59	1.36	0.07	45.47	57.30
45–54 years	116	2,375	45.29	3.51	1.22	0.08	39.50	51.09
55–64 years	125	2,387	32.47	2.56	1.03	0.08	28.25	36.70
65–74 years	79	1,626	23.55	2.82	1.42	0.12	18.90	28.20
75+ years	23	487	9.52	2.48	1.70	0.26	5.43	13.60
Female total	**1,422**	**28,822**	**27.67**	**0.94**	**2.18**	**0.03**	**26.12**	**29.23**
0–27 days	1	43	0.52	0.52	2.05	1.00	0.00	1.38
28–364 days	105	2,133	13.23	1.49	1.46	0.11	10.77	15.69
1–2 years	143	3,284	20.86	1.88	1.58	0.09	17.76	23.96
3–4 years	38	936	18.73	3.18	1.55	0.17	13.49	23.97
5–14 years	42	1,052	13.89	2.07	1.27	0.15	10.48	17.30
15–24 years	178	3,586	41.45	2.62	1.14	0.06	37.13	45.77
25–29 years	204	4,052	58.28	3.52	1.66	0.06	52.48	64.09
30–34 years	177	3,255	52.56	3.47	1.40	0.07	46.84	58.28
35–39 years	129	2,637	58.10	3.54	1.09	0.06	52.26	63.93
40–44 years	111	2,075	54.66	4.44	1.41	0.08	47.34	61.98
45–54 years	70	1,046	40.23	4.18	0.88	0.10	33.33	47.12
55–64 years	79	1,737	34.25	3.22	1.09	0.09	28.94	39.56
65–74 years	52	1,237	23.98	3.54	1.66	0.15	18.14	29.82
75+ years	19	317	6.66	1.51	0.81	0.23	4.18	9.15

Table A-9: Sampling Errors for the Distribution of Maternal Deaths by Type of Death: 2006–2007

Type of maternal deaths	Number of cases		Percent	Standard error	Design effect	Relative error	90-percent confidence interval	
	Unweighted	Weighted					Lower limit	Upper limit
Direct obstetric deaths	114	2,629	54.74	4.25	1.68	0.08	47.73	61.76
Indirect obstetric deaths (non-HIV related)	58	1,302	27.11	3.77	1.65	0.14	20.90	33.32
Indirect obstetric deaths (HIV related)	41	872	18.15	3.29	1.68	0.18	12.71	23.58

Table A-10: Sampling Errors for Deaths Due to Maternal Mortality Causes by Time of Death Relative to Pregnancy: 2006–2007

Time of death relative to pregnancy	Number of cases		Percent	Standard error	Design effect	Relative error	90-percent confidence interval	
	Unweighted	Weighted					Lower limit	Upper limit
Less than 28 weeks of pregnancy	42	961	20.76	3.48	1.57	0.17	15.00	26.53
More than 28 weeks of pregnancy	32	877	18.95	3.34	1.55	0.18	13.43	24.48
During or within 24 hours of delivery	3	71	1.53	0.98	1.36	0.64	0.00	3.15
1–7 days after delivery	57	1,155	24.96	3.44	1.35	0.14	19.27	30.65
8–42 days after delivery	38	909	19.64	3.30	1.48	0.17	14.17	25.11
During or within 24 hours of abortion	7	164	3.55	1.49	1.38	0.42	1.09	6.02
Maternal death 1–7 days following abortion	9	206	4.45	1.66	1.38	0.37	1.71	7.20
Maternal death 8–42 days following abortion	16	285	6.15	1.85	1.27	0.30	3.09	9.21

Table A-11: Sampling Errors for Deaths Due to Maternal Mortality Causes by Who Assisted Delivery: 2006–2007

Delivery assistant	Number of cases		Percent	Standard error	Design effect	Relative error	90-percent confidence interval	
	Unweighted	Weighted					Lower limit	Upper limit
Doctor	10	152	7.44	2.38	0.77	0.32	3.51	11.38
Nurse/midwife	41	806	39.41	6.13	1.49	0.16	29.26	49.56
Traditional midwife	11	305	14.90	4.59	1.57	0.31	7.31	22.50
Relative	18	465	22.74	5.27	1.50	0.23	14.01	31.48
Mother alone	8	240	11.75	4.35	1.73	0.37	4.54	18.95
Other	5	77	3.76	1.87	0.92	0.50	0.65	6.86

Table A-12: Confidence Intervals for Maternal Mortality Rates by Type of Maternal Death: 2007

Cause of death	Maternal mortality death rates	90-percent confidence interval	
		Lower limit	Upper limit
All maternal deaths	**500.00**	**X**	**X**
Direct obstetric deaths	273.71	238.55	308.86
Indirect obstetric deaths (non-HIV related)	135.56	104.53	166.60
Indirect obstetric deaths (HIV related)	90.73	63.88	117.58
Urban maternal deaths	**490.00**	**X**	**X**
Direct obstetric deaths	208.19	164.87	251.52
Indirect obstetric deaths (non-HIV related)	174.79	133.54	216.04
Indirect obstetric deaths (HIV related)	107.02	74.42	139.62
Rural maternal deaths	**504.00**	**X**	**X**
Direct obstetric deaths	299.03	253.74	344.31
Indirect obstetric deaths (non-HIV related)	120.49	80.88	160.10
Indirect obstetric deaths (HIV related)	84.48	49.46	119.50

X = not applicable

Note: Maternal mortality rates at the national and urban/rural levels are from the 2007 Mozambique census

Table A-13: Causes of Death Found in INCAM

Cause of death	103 cause tabulation	3-digit ICD-10 codes
Malaria	(1-021) Malaria	B50–B54
HIV/AIDS	(1-020) Human immunodeficiency virus [HIV] disease	B20–B24
Tuberculosis	(1-005) Respiratory tuberculosis	A15–A16
	(1-006) Other tuberculosis	A17–A19
Accidents and external causes	(1-096) Transport accidents	V01–V99
	(1-097) Falls	W01–W19
	(1-098) Accidental drowning and submersion	W65–W74
	(1-099) Exposure to smoke, fire and flames	X00–X09
	(1-100) Accidental poisoning by and exposure to noxious substances	X40–X49
	(1-101) Intentional self-harm	X60–X84
	(1-102) Assault	X85–X99 Y00–Y09
	(1-103) All other external causes	W20–W64 W75–W99 X10–X39 X50–X59 Y10–Y98
Circulatory diseases	(1-066) Hypertensive diseases	I10–I14
	(1-067) Ischaemic heart diseases	I20–I25
	(1-068) Other heart diseases	I26–I51
	(1-069) Cerebrovascular diseases	I60–I69
Malignant neoplasms	(1-028) Malignant neoplasm of oesophagus	C15
	(1-029) Malignant neoplasm of stomach	C16
	(1-030) Malignant neoplasm of colon, rectum and anus	C18–C21
	(1-031) Malignant neoplasm of liver and intrahepatic bile ducts	C22
	(1-034) Malignant neoplasm of trachea, bronchus and lung	C33–C34
	(1-036) Malignant neoplasm of breast	C50
	(1-037) Malignant neoplasm of cervix uteri	C53
	(1-038) Malignant neoplasm of other and unspecified parts of uterus	C54–C55
	(1-040) Malignant neoplasm of prostate	C61
	(1-041) Malignant neoplasm of bladder	C67
	(1-042) Malignant neoplasm of meninges, brain and other parts of central nervous system	C70–C72
	(1-046) Remainder of malignant neoplasms	C17 C23–C24 C26–C31 C37–C41 C44–C49 C51–C52 C57–C60 C62–C66 C68–C69 C73–C81 C88 C96–C97

Table A-13 *continued*

Cause of death	103 cause tabulation	3-digit ICD-10 codes
Malignant neoplasms	(1-047) Remainder of neoplasms	D00–D48
Diarrheal diseases	(1-003) Diarrhoea and gastroenteritis of presumed infectious origin	A09
Perinatal causes	(1-092) Certain conditions originating in the perinatal period	P00–P96
Pneumonia	(1-074) Pneumonia	J12–J18
All other causes	(1-002) Cholera	A00
	(1-004) Other intestinal infectious diseases	A01–A08
	(1-008) Tetanus	A33–A35
	(1-012) Septicaemia	A40–A41
	(1-013) Infections with a predominantly sexual mode of transmission	A50–A64
	(1-015) Rabies	A82
	(1-018) Measles	B05
	(1-019) Viral hepatitis	B15–B19
	(1-022) Leishmaniasis	B55
	(1-024) Schistosomiasis	B65
	(1-025) Remainder of certain infectious and parasitic diseases	A21–A32 A38 A42–A49 A65–A79 A81 A83–A89 B00–B04 B06–B09 B25–B49 B58–B64 B66–B94 B99
	(1-049) Anaemias	D50–D64
	(1-050) Remainder of diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	D65–D89
	(1-052) Diabetes mellitus	E10–E14
	(1-053) Malnutrition	E40–E46
	(1-054) Remainder of endocrine, nutritional and metabolic diseases	E00–E07 E15–E34 E50–E88
	(1-056) Mental and behavioural disorders due to psychoactive substance use	F10–F19
	(1-057) Remainder of mental and behavioural disorders	F01–F09 F20–F99
	(1-059) Meningitis	G00 G03
	(1-061) Remainder of diseases of the nervous system	G31–G98 G4–G25
	(1-062) Diseases of the eye and adnexa	H00–H57
	(1-071) Remainder of diseases of the circulatory system	I71–I99

Table A-13 *continued*

Cause of death	103 cause tabulation	3-digit ICD-10 codes
All other causes	(1-075) Other acute lower respiratory infections	J20–J22
	(1-076) Chronic lower respiratory diseases	J40–J47
	(1-077) Remainder of diseases of the respiratory system	J00–J06 J30–J39 J60–J98
	(1-080) Diseases of the liver	K70–K76
	(1-081) Remainder of diseases of the digestive system	K00–K22 K28–K66 K80–K92
	(1-082) Diseases of the skin and subcutaneous tissue	L00–L99
	(1-083) Diseases of the musculoskeletal system and connective tissue	M00–M99
	(1-085) Glomerular and renal tubulo-interstitial diseases	N00–N15
	(1-086) Remainder of diseases of the genitourinary system	N17–N98
	(1-087) Pregnancy, childbirth and the puerperium	O08 O94
	(1-088) Pregnancy with abortive outcome	O00–O07
	(1-089) Other direct obstetric deaths	O10–O92
	(1-090) Indirect obstetric deaths	O98–O99
	(1-091) Remainder of pregnancy, childbirth and the puerperium	O95-O97
	(1-093) Congenital malformations, deformations and chromosomal abnormalities	Q00–Q99
	(1-094) Symptoms, signs and abnormal clinical and laboratory findings not elsewhere classified	R00–R99
	(X-XXX) Undetermined	

Table A-14: Leading Cause of Death Definitions for INCAM

Cause of death	Leading cause of death definitions
Malaria	(1-021) Malaria
HIV/AIDS	(1-020) Human immunodeficiency virus [HIV] disease
Tuberculosis	(1-005) Respiratory tuberculosis
	(1-006) Other tuberculosis
Accidents and External Causes	(1-096) Transport accidents
	(1-097) Falls
	(1-098) Accidental drowning and submersion
	(1-099) Exposure to smoke, fire and flames
	(1-100) Accidental poisoning by and exposure to noxious substances
	(1-101) Intentional self-harm
	(1-102) Assault
	(1-103) All other external causes
Circulatory Diseases	(1-066) Hypertensive diseases
	(1-067) Ischaemic heart diseases
	(1-068) Other heart diseases
	(1-069) Cerebrovascular diseases
Malignant Neoplasms	(1-028) Malignant neoplasm of oesophagus
	(1-029) Malignant neoplasm of stomach
	(1-030) Malignant neoplasm of colon, rectum and anus
	(1-031) Malignant neoplasm of liver and intrahepatic bile ducts
	(1-034) Malignant neoplasm of trachea, bronchus and lung
	(1-036) Malignant neoplasm of breast
	(1-037) Malignant neoplasm of cervix uteri
	(1-038) Malignant neoplasm of other and unspecified parts of uterus
	(1-040) Malignant neoplasm of prostate
	(1-041) Malignant neoplasm of bladder
	(1-042) Malignant neoplasm of meninges, brain and other parts of central nervous system
	(1-046) Remainder of malignant neoplasms
	(1-047) Remainder of neoplasms
Diarrheal Diseases	(1-003) Diarrhoea and gastroenteritis of presumed infectious origin
Perinatal Causes	(1-092) Certain conditions originating in the perinatal period
Pneumonia	(1-074) Pneumonia

Table A-15: Cause of Death Definitions for Children in INCAM

Cause of Death Definitions for Newborns Under 28 Days	
Malaria	(3-014) Malaria
Pneumonia	(3-032) Pneumonia
Bacterial Sepsis of Newborn	(3-045) Bacterial sepsis of newborn
Fetal Development	(3-039) Disorders relating to length of gestation and fetal growth
Hypoxia and Asphyxia	(3-041) Intrauterine hypoxia and birth asphyxia
Maternal Factors	(3-038) Fetus and newborn affected by maternal factors and by complications of pregnancy labour and delivery

Cause of Death Definitions for Children Age 28 Days–4 Years	
Malaria	(3-014) Malaria
Pneumonia	(3-032) Pneumonia
Diarrheal Diseases	(3-002) Diarrhoea and gastroenteritis of presumed infectious origin
HIV/AIDS	(3-012) Human immunodeficiency virus [HIV] disease
Measles	(3-011) Measles
Malnutrition	(3-024) Malnutrition and other nutritional deficiencies
Sepsis	(3-045) Bacterial sepsis of newborn
	(3-009) Septicaemia

Cause of Death Definitions for Children Age 5–14 Years	
Malaria	(3-014) Malaria
Pneumonia	(3-032) Pneumonia
Diarrheal Diseases	(3-002) Diarrhoea and gastroenteritis of presumed infectious origin
HIV/AIDS	(3-012) Human immunodeficiency virus [HIV] disease
External Causes and Accidents	(3-060) External causes of morbidity and mortality
	(3-061) Transport accidents
	(3-062) Accidental drowning and submersion
	(3-063) Other accidental threats to breathing
	(3-406) Exposure to smoke, fire and flames
	(3-065) Accidental poisoning by and exposure to noxious substances
	(3-066) Assault
	(3-067) All other external causes

Table A-16: Cause of Death Definitions for Adults Age 15 and Above in INCAM

Cause of Death Definitions for Adults Age 15 and Above	
Malaria	(1-021) Malaria
HIV/AIDS	(1-020) Human immunodeficiency virus [HIV] disease
Tuberculosis	(1-005) Respiratory tuberculosis
	(1-006) Other tuberculosis
Accidents and External Causes	(1-096) Transport accidents
	(1-097) Falls
	(1-098) Accidental drowning and submersion
	(1-099) Exposure to smoke, fire and flames
	(1-100) Accidental poisoning by and exposure to noxious substances
	(1-101) Intentional self-harm
	(1-102) Assault
	(1-103) All other external causes
Circulatory Diseases	(1-066) Hypertensive diseases
	(1-067) Ischaemic heart diseases
	(1-068) Other heart diseases
	(1-069) Cerebrovascular diseases
Malignant Neoplasms	(1-028) Malignant neoplasm of oesophagus
	(1-029) Malignant neoplasm of stomach
	(1-030) Malignant neoplasm of colon, rectum and anus
	(1-031) Malignant neoplasm of liver and intrahepatic bile ducts
	(1-034) Malignant neoplasm of trachea, bronchus and lung
	(1-036) Malignant neoplasm of breast
	(1-037) Malignant neoplasm of cervix uteri
	(1-038) Malignant neoplasm of other and unspecified parts of uterus
	(1-040) Malignant neoplasm of prostate
	(1-041) Malignant neoplasm of bladder
	(1-042) Malignant neoplasm of meninges, brain and other parts of central nervous system
	(1-046) Remainder of malignant neoplasms
	(1-047) Remainder of neoplasms
Diarrheal Diseases	(1-003) Diarrhoea and gastroenteritis of presumed infectious origin
Pneumonia	(1-074) Pneumonia

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