Mortality Study in Guinea

Investigating the Causes of Death in Children Under 5

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BASICS II

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Abstract

Save the Children, BASICS I, and the Guinea MOH conducted a study of mortality among children less than 5 years old in Mandiana, Guinea, from October 1998 through September 1999. This report describes the results of a verbal and social autopsy that was used to investigate the deaths of 330 children under 5. The objectives of the study were to determine (1) causes and trends in mortality, (2) the relative importance of each step in the Pathway to Survival, and (3) the most appropriate interventions to reduce child mortality in Mandiana and other similar settings. The methodology for the study built upon tools and methods developed by BASICS and Johns Hopkins University.

Credit

Photo credit: Save the Children.

Save the Children

Save the Children is an international nonprofit child-assistance organization working in more than 45 countries worldwide, including the United States. Founded in 1932, its mission is to make lasting, positive change in the lives of children in need. Save the Children is a member of the international Save the Children Alliance, a worldwide network of 26 independent Save the Children organizations working in more than 100 countries to ensure the well-being and protect the rights of children everywhere. Save the Children aims to champion "finishing the unfinished child survival agenda" through advocacy and recognized leadership in child survival.

Table of Contents

Acronyms

ARI	Acute respiratory infection
BASICS	Basic Support for Institutionalizing Child Survival
BCG	Bacille Calmette-Guérin
COGES	*Comité de Gestion de Santé* (Community Health Management Group)
CVS	*Comité Villageois de Santé* (Village Health Committee)
DHS	Demographic and Health Survey
DPE	*Direction Préfectorale de l'Education* (District Education Office)
DPS	*Directeur Prefectoral de la Santé* (District Health Office Director)
DPT	Diphtheria, pertussis, and tetanus
HFA	Health facility assessment
HIS	Health information system
HIV	Human immunodeficiency virus
IMCI	Integrated Management of Childhood Illness
IMR	Infant mortality rate
IRS	*Inspecteur Régional de la Santé* (Regional Health Office Director)
IV/IM	Intravenous/intramuscular
JHU	Johns Hopkins University, School of Hygiene and Public Health
KPC	Knowledge, practices, and coverage
MNT	Maternal and neonatal tetanus
MOH	Ministry of Health
OPV	Oral polio vaccine
ORS	Oral rehydration salts
ORT	Oral rehydration therapy
PEV/SSP/ME	*Programme Elargi de Vaccination, Soins de Santé Primaires et Médicaments Essentiels* (The Expanded Program for Immunization, Primary Health Care and Essential Medicines)
SC/US	Save the Children Federation Inc.
SOWC	State of the World's Children
STD	Sexually transmitted disease
TBA	Traditional birth attendant
TH	Traditional healer
U5MR	Under-5 mortality rate
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USAID/BHR/PVC	Office of Private and Voluntary Cooperation, Bureau for Humanitarian Response, U.S. Agency for International Development
WHO	World Health Organization

Acknowledgments

We hope that this research will improve the health programs in Mandiana and help alleviate the suffering caused by the death of young children not only in Mandiana but also in other areas of West Africa that are confronted with similar problems. We wish to acknowledge the work of numerous people and organizations that contributed to the success of this study.

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Executive Summary

The infant and under-5 mortality rates in Guinea are among the highest in the world: 98/1,000 and 177/1,000 respectively in 1999. Child mortality figures for the rural and remote Mandiana prefecture, while unknown, are expected to be higher than these national averages. In Mandiana, death statistics are derived mainly from hospital cases. Most child deaths, however, take place in the home,

and little is known about mortality trends and the causes of mortality in this setting. In addition, care-giving inside the home and care-seeking outside the home, often referred to as the Pathway to Survival, are poorly understood. Save the Children is working with the communities and the Ministry of Health (MOH) to implement a child survival project in Mandiana prefecture. With local partners and the Basic Support for Institutionalizing Child Survival (BASICS) Project, Save the Children conducted a mortality investigation to determine mortality trends and causes, to estimate the relative importance of each step in the Pathway to Survival, and to identify appropriate interventions to reduce child mortality in Mandiana.

Mandiana is a large prefecture in northeastern Guinea, consisting of 73 large villages that had a total population of 180,584 in 1998. While mortality surveillance took place in all 73 villages, research was conducted into all deaths of children under 5 in 30 randomly selected villages. Following formative research, study questionnaires were adapted and translated into the local language, Malinké. Computer data-entry programs were developed for the questionnaires, and study personnel were trained. Village health committees and the health centers in the 30 clusters gathered mortality and birth statistics. The interview team was informed about mortality cases, and they traveled to the communities to interview the caretakers of the deceased children. Most of the interviews were

conducted 1–2 months after the reported death. An expert panel consisting of representatives from the Ministry of Health, the University of Kankan's department of social science, and other members of the Mandiana hospital and health community met on a monthly basis to monitor and review the data. The expert panel made recommendations on the questions, determined significant variables and how they should be analyzed, and reviewed the verbal autopsies and medical records to determine the possible cause or causes of death.

A total of 330 cases were investigated during the 12-month study period. The age-specific mortality trends in the study area compare favorably with the rates for both rural and upper Guinea and more closely approximate national-level statistics. The under-5 mortality is 171/1,000, the infant mortality is 97/1,000, the post-neonatal mortality is 47/1,000, and the neonatal mortality is 50/1,000. The five most common causes of under-5 deaths are malaria (32%), acute respiratory infections (25%), diarrhea (15%), neonatal tetanus (9%), and birth asphyxia (7%). Other causes of death are malnutrition (6%), neonatal infections (4%), meningitis/sepsis (4%), and measles (2%). The age distribution of deaths is similar to that in other studies. Early neonatal mortality is about one-half of neonatal mortality, neonatal mortality is about one-half of infant mortality, and infant mortality accounts for one-half of the total under-5 mortality.

There are five major findings and recommendations that both affirm the choice of the current programmatic interventions of the MOH and SC/US in Mandiana and suggest the need to develop several new strategies:

■ Almost one-third of the under-5 deaths were in neonates, and the largest number of these deaths were due to neonatal tetanus. Improving tetanus toxoid immunization and continuing to promote clean deliveries by training of traditional birth attendants (TBAs) should address this issue.

■ The largest cause (almost one-third) of under-5 death was malaria, which should be effectively addressed by new and larger scale strategies to improve insecticide-treated bednet use and appropriate treatment at the community level.

■ The treatment outcomes of over one-third of the children who came to facilities but received only "average" or even "poor" treatment should be addressed by mechanisms to improve the quality of care, such as facility-based IMCI (Integrated Management of Childhood Illness) training.

■ For the children in the study who never visited a health facility before their deaths (61%), improving care-seeking could have had the greatest impact. An approach of behavior change communications to improve caretaker recognition and labeling of "danger" signs could address this step in the Pathway to Survival.

■ The resorting-to-care component of care-seeking is also a critical step. Delays in appropriate care-seeking because of the preferred use of traditional healers and the lack of money to access treatment should be addressed by strategies to improve the training of traditional healers and to expand the use of the obstetrical emergency transport funds for severe child illness.

Although this study provides specific information for Mandiana prefecture, the results are potentially applicable to many other parts of Guinea and West Africa.

Introduction

Save the Children Program in Guinea

Save the Children Federation (SC/US) began working in Mandiana in March 1997. The fundamental mission of SC/US in Guinea, as in all countries where it works, is to help make positive and lasting change in the lives of children and women in particular and in the community in general. SC/US is currently implementing two projects in Mandiana: a community health project (the Child Survival Project, supported by the Office of Private and Voluntary Cooperation, Bureau for Humanitarian Response, U.S. Agency for International Development [USAID/BHR/PVC]) and an education project (the Community Schools Project).

The goal of the Child Survival Project is to improve maternal and child health in Mandiana prefecture. Its activities include malaria/hygiene, nutrition, child/maternal health care, vaccination, and family planning information and services. The project covers the entire prefecture; its activities are conducted in all 12 subprefectures, including the urban commune of Mandiana.

In 1997 and 1998, SC/US completed five baseline studies that provided a wealth of information to guide program design and implementation. These studies were as follows:

1) Organizational Life, which examined how the communities organize themselves and their health perceptions;
2) Health Facility, which evaluated the level of the health infrastructures and the training needs of the health agents;
3) Emphasis Behaviors, which observed the behaviors of caretakers and looked at the health care that was taking place at the home and community levels;
4) Knowledge, Practices, and Coverage Survey and Food Frequency Assessment; and
5) Survey of local non-governmental organizations and community-based organizations, which determined the health activities other local organizations are performing.

As a basis for its community work, SC/US created and trained village health committees (CVS). Seventy-three CVSs have been created in the 12 subprefectures, including the urban commune of Mandiana. Based on the results of the baseline studies, the project trained CVS members in nutrition, child/maternal health, vaccination, malaria-hygiene-environment, family planning (including HIV/STD prevention), training techniques, and their roles and tasks as members of the CVS. SC/US, in collaboration with the Ministry of Health, developed other activities in accordance with the objectives aimed at improving maternal and child health. In 1998 SC/US decided that the project could benefit from developing a mortality investigation to provide information on causes of mortality and steps in the Pathway to Survival not found in the first five studies. This information would permit SC/US and the

Figure 2.1 Map of Guinea
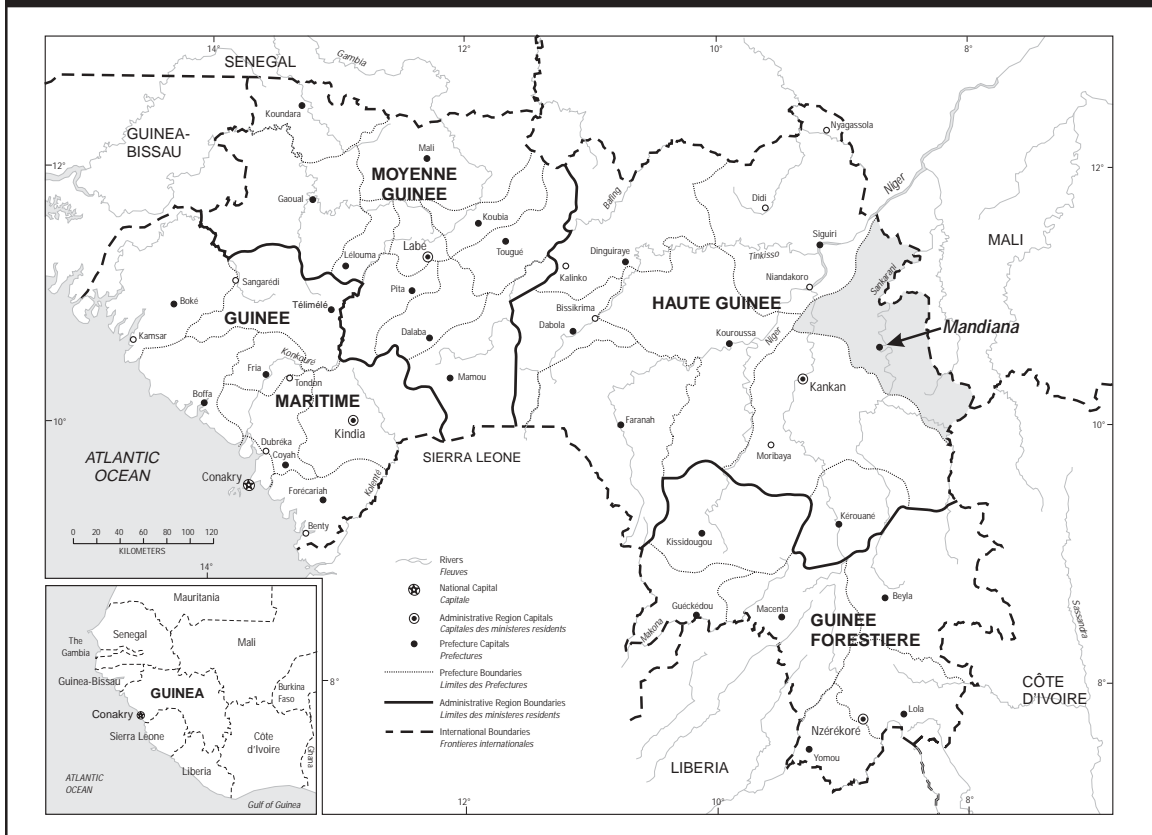
MOH to more selectively target interventions and limited resources to address the most important causes of death and the most critical steps in the pathway.

Mandiana and the Ministry of Health in Mandiana

The prefecture of Mandiana is situated on the eastern edge of the Republic of Guinea within the region of Upper Guinea. The prefecture is bordered on the west by the prefecture of Kankan, on the east by Mali, and on the southeast by Côte d'Ivoire (Figure 2.1). Mandiana Prefecture, with a 1998 population of 180,584, is divided into 12 subprefectures.[1] The subprefectures are made up of districts (large villages of approximately 2,400 inhabitants) and sectors (small villages or hamlets). Mandiana prefecture has 73 villages. The administrative seat, Mandiana, has a population of about 6,000. The prefecture is one of the more inaccessible areas of Guinea; travel between Kankan and Mandiana (86 km) is very difficult between June and November when the annual rains turn the roads to mud. Most inhabitants are Malinké, although there are small populations of Peulhs, Sousous, and Forest region ethnic groups. The dominant religion is Islam. The local economy is based on agriculture, traditional mining of gold, and small-scale commerce. Principal agricultural products include peanuts, corn, fonio, cotton, cassava, yam, and rice. Each year from July to September, this region experiences a period of low food availability caused by the

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1. *Recensement General de la Population et de l'Habitat.* Dec. 1996. Conakry, Guinea: Bureau National de Recensement.

depletion of the previous year's harvest before the current year's crop is ready.

The population is composed of patrilineal, extended kinship units in which polygynous unions are common. Few women in the region have opportunities to enroll in formal schooling. In Upper Guinea, 87.3% of the women have no schooling, only 9.4% have a primary education, and 1.9% have a high school education or higher.[2] Women have key roles as caretakers of children and managers of food resources within the family. In most family settings, mothers are responsible for the daily care of children under 5 years old. While there are co-wives, mothers-in-law, and other elder female relatives in many of the large Malinké households, the birth mother of each young child is responsible for his or her daily dietary needs and care-giving.

Mandiana prefecture represents a health district in Guinea. The prefectural director of health (DPS), who is a medical doctor employed by the government and represents the Ministry of Health, manages the district's health. Mandiana prefecture includes a prefectural hospital in the urban commune of Mandiana and 11 health centers, one in each of the other 11 subprefectures, all integrated into the country's Expanded Program for Immunization, Primary Health Care and Essential Medicines (PEV/SSP/ME). There are also 15 health posts in rural areas.

Qualified health agents—including doctors, health aides, technical health aides, pharmacists, lab technicians, and pharmacist assistants—run these health structures. A hospital director, who serves under the prefectural health director, manages the prefectural hospital. The hospital provides general medicine, pediatrics, surgery, and gynecology through medical doctors and provides pharmacy-laboratory services through a pharmacist, an assistant pharmacist, and two laboratory technicians. The health agents and the Community Health

Management Groups (COGES), which represent the community, actively participate in management and decision making for the health centers.

Health Situation in Guinea and Mandiana

The most recent (1999) *Demographic and Health Survey* (DHS) study reports a national infant mortality rate (IMR) of 98/1,000 live births and an under-5 mortality rate (U5MR) of 177/1,000 live births (Table 2.1). The 2001 *State of the World's Children* (SOWC) ranks the U5MR in Guinea as the 17th highest in the world. Upper Guinea has the second highest rate in the country (128.5 IMR and 221.9 U5MR) (UNICEF 2001). Child mortality figures for Mandiana prefecture, while unknown, are expected to be higher than the national average.

Although economic conditions in Guinea are slowly improving, a study of poverty in Guinea conducted in 1994–95 by the Ministry of Planning and Cooperation showed that 53% of the rural population lived at or below the poverty level, defined as an annual income per person of approximately US $226. The prevalence of poverty in Upper Guinea, at 62%, was the highest in the country. Nationwide, although access to health services at the local level improved considerably since the adoption of the Bamako Initiative, the formal health care system suffers a marked deficiency of facilities, equipment, and personnel. The nation's ability to improve its health status has been hampered by the lack of access to modern services and by low utilization rates. In rural areas of Guinea, only 49.7% of the population lives within 5 km of a health facility that provides prenatal care services.[3]

Death statistics in Mandiana are derived mainly from hospital cases, although most deaths occur at home. In 1997, among 147

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2. 1999 DHS.

3. 1999 DHS.

children less than 5 years old hospitalized at the Mandiana Prefectural Hospital, there were 15 deaths (10.2%), and among 143 births at the hospital, there were 19 deaths (13.3%) of infants under 7 days old.

The known causes of illness in Mandiana also come from hospital data. The dominant illnesses of children less than 5 years old are acute respiratory infections (ARIs), malnutrition, diarrhea, and malaria. Other pathologies such as infections (oto-rhino-laryngologic), parasites, and anemia also hold an important place in addition to seasonal epidemics (e.g., meningitis, measles, etc.). Many other factors contribute to the risk of becoming ill: customs, habits, food taboos, lack of knowledge, poverty, crowded housing, and insufficient hygiene.

Survey Objectives

The purpose of the child mortality investigation was to assist the local community and the DPS in determining the most important causes of and contributors to the high rates of mortality in Mandiana. The Pathway to Survival was used by the study to help examine the process of care-giving and care-seeking for children with severe illnesses. This model was developed by the BASICS Project and the U.S. Centers for Disease Control and Prevention. The tools and methods for undertaking a mortality study were developed by BASICS and Johns Hopkins University (JHU) (Gray, Smith, and Barss 1990). This model was adapted to study the mortality situation in Mandiana and gather the information needed to develop effective interventions (Figure 2.2).

Table 2.1 General Information and Main Health Indicators for Guinea	
Characteristics	*Indicator*
General characteristics of the population	
Total population of Guinea (1998)	7,337,000[1]
Proportion of the population between 0 and 14 years	51.5%[1]
Socioeconomic indicators	
Total adult literacy rate	50% male, 22% female*
Primary school enrollment ratio	63% male, 34% female*
% of population with access to safe water	46%*
Child health indicators	
Neonatal mortality rate	48.4/1,000 live births**
All Guinea infant mortality rate	98/1,000 live births**
All Guinea under-5 mortality rate	177/1,000 live births**
Upper Guinea infant mortality rate	129/1,000 live births**
Upper Guinea under-5 mortality rate	222/1,000 live births**
Other health information	
% of population with access to health services	21%***
Maternal mortality rate	666/100,000 live births**
Crude birth rate	42 births/1,000 population*
Crude death rate	17 deaths/1,000 population*
Total fertility rate	5.5 children born/woman*

* UNICEF *State of the World's Children 2000*
** 1999 DHS estimates
*** UNICEF *State of the World's Children 1997*

Figure 2.2 The Modified Pathway to Survival
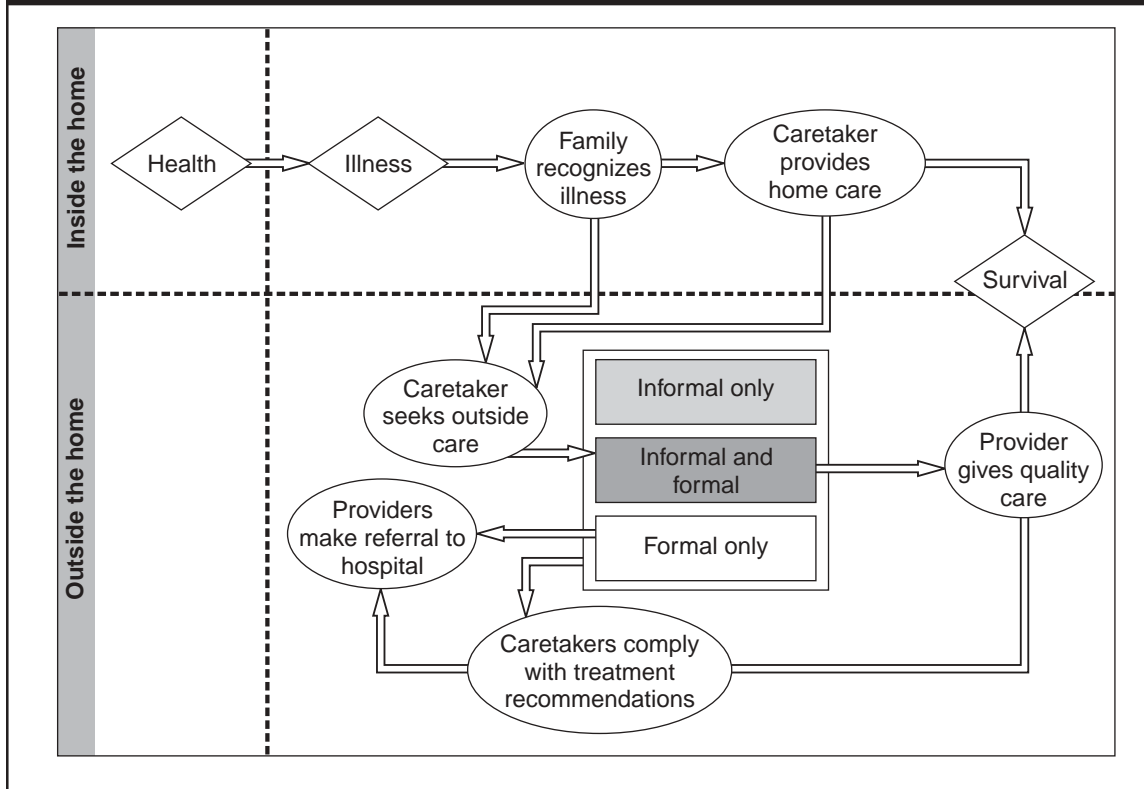
Inside the home

Health → Illness → Family recognizes illness → Caretaker provides home care → Survival

Outside the home

Caretaker seeks outside care → Informal only / Informal and formal / Formal only

Providers make referral to hospital

Provider gives quality care

Caretakers comply with treatment recommendations

Note: Informal health providers include traditional healers and family elders; formal health services include public health centers, health posts, hospitals, and private clinics.

Methodology

In July 1998 and with the support of USAID/Conakry, Dr. Henry Kalter, Dr. Renata Schumacher, and Ms. Melisse Murray oriented SC/US and the MOH in Kankan to the mortality study. They then collaborated to design a study protocol and plan for implementation. The team selected a surveillance model for two reasons: it was less costly than a survey model, and it supported the SC/US approach of

working with village health committees that were involved in the ongoing detection and reporting of deaths in the community.

The deaths that occurred over one year (October 1998–September 1999) were examined in order to reduce the impact of seasonality on the study findings. Cluster sampling, in which each cluster was an entire village, was used. The main advantage of using cluster sampling with a longitudinal design was that the study efforts could be concentrated on those selected clusters. This would allow efforts to ensure the quality of the death-reporting networks so that the results would be more accurate. The project participants examined the Pathway to Survival and identified key indicators and their expected associated denominators to determine the required sample size of deaths for the study. This resulted in a sample size of 300 child deaths, which approximates the total number of deaths of children under 5 years old expected to occur in the study clusters.

SC/US established and coordinated several groups in the community. A leadership/coordination committee guided the project and included a representative from the DPS of Mandiana, a representative from SC/US–Mandiana, and the project coordinator. The expert panel included the doctor from the Regional Health Office (IRS) in Kankan, the doctor from the DPS' office in Mandiana, a doctor from the prefectural hospital in Mandiana, a representative from the Micro-

Realisation office of Mandiana, a sociologist from the University of Kankan, and a nurse and a doctor from SC/US–Mandiana. The expert panel's activities included identifying health objectives and indicators, determining appropriate care criteria, judging the quality of the care given to children by health agents, determining the causes of death for each case, reviewing the mothers' narratives, helping with the interpretation of the results, and proposing interventions. The study protocol was developed and finalized in collaboration with the expert panel and the *Secrétaire Général* of the Ministry of Health, Dr. Mohamed Sylla.

Formative Research, Adaptation and Field Testing of Questionnaires, and Training

Standardized questionnaires were developed in English from the BASICS/JHU mortality investigation manual. The verbal autopsy questionnaire (Annex A) examines the biological cause(s) of death, and the social autopsy questionnaire (Annex B) examines the actions taken during the course of the illness. These two questionnaires were completed during interviews of the caretakers of the deceased children. The treatment and records questionnaire (Annex C) records information from health cards in the household, and the medical records abstraction questionnaire (Annex D) records key information from the health facility records. These were translated into French and then adapted to the local

cultural setting and language (Malinké) by conducting formative research over a period of two months. Ms. Melisse Murray and an assistant from the University of Kankan sociology department led the formative research with SC/US and the local MOH staff. Research activities included in-depth interviews, free-listing techniques, and group discussions (focus, formal, and natural) with mothers of children under 5 years old, mothers who had suffered a child death in the previous six months, village health committee members, traditional healers, government health workers, drug vendors, and local authorities. Selection of the sites for formative research activities was based on a number of considerations including the differences in the Malinké language spoken in the north and south of the prefecture, the practices of caretakers in mining zones, and the range of care-seeking behaviors in areas with and without the different types of formal government health infrastructure. Case studies, developed with the input of SC/US nurses and the head of the Saladou Health Center, were useful for soliciting local terms used for child illnesses. In many cases, interviews and discussion sessions were tape-recorded and subsequently reviewed for further clarification.

Dr. Kalter, Dr. Claudine Jurkovitz, and Mr. Eric Swedberg from SC/US/Westport returned to Guinea in October 1998 to train the SC/US animators, supervisors (to establish the death-reporting system and train the CVS members), interviewers, medical records abstractors, and expert panel members. Mr. Massé Camara, an assistant researcher for the Ministry of Health, prepared the data input screens in Epi Info for the analysis. The local research coordinator, Mr. Damou Rahim Keita, participated in all phases of the activity.

The study instrument was pretested in several villages in different areas of Mandiana to ensure that the phrases included in the questionnaires and their corresponding Malinké terms were accurate, comprehensible, and acceptable to local caretakers of children. The adapted and translated questionnaires were then translated back into French and English to ensure that they accurately reflected the intent of the original questionnaires. To ensure that the questionnaires were easily understood and usable by both the caretakers and the interviewers, they were field-tested in non-study areas with caretakers whose children had recently died.

Selection of Study Clusters and Identification of Deaths

The study population included the 70 largest villages of Mandiana prefecture served by SC/US. The 30 villages (clusters) were selected by stratified random sampling proportionate to population figures from the 1996 census conducted by the National Census Bureau of the Ministry of Planning and Cooperation. The selection of the cluster sample was conducted during the expert panel training. A network of pregnancy monitoring and child death reporting was developed in each of the 30 cluster villages. This village network included the local CVS members, health posts and centers, village and religious leaders, traditional birth attendants (TBAs), and other traditional health care providers. The clan leaders and "elder" women who are most knowledgeable about pregnancies, births, and deaths were also incorporated into the data collection network. Pregnancies and deaths of children younger than 5 years old were reported by members of this network to the CVS in each village, who then transmitted this information to the SC/US animators' "death reporters" serving that particular village.

In this part of Guinea, child deaths do not seem to be hidden or taboo to discuss. Children are baptized during infancy (usually around 7 days of age), and the death of a child is mourned publicly. Therefore, the researchers assume that nearly all child deaths were reported by the child death reporting system and thus captured in the study.

Data Collection

The 30 clusters were divided into two zones, and each was allocated a team of two interviewers. One supervisor supported the work of two teams composed of two interviewers per team and one supervisor. The project staff investigated all deaths reported in the 30 villages. Interviewers were given information on the location of the households by the pregnancy monitoring and death-reporting network. Interviewers approached the households at the appropriate time, depending on the work schedule of the household, and identified the most appropriate respondent for each interview (the child's primary caretaker during his or her fatal illness). In some cases, when two or more people cared for the child, it was appropriate to include more than one respondent. If the most appropriate respondent was not available on the first visit, interviewers made appointments to return when they could speak with the primary caretaker. An informed consent statement and form appropriate to local customs and norms was read to the respondent before the interview. The statement described the purpose, benefits, and risks of the study to the respondent and requested the respondent's participation. The statement made it clear that participation was completely voluntary and that there would be no adverse consequences for not participating. When consent was obtained, the participant signed the statement to indicate his or her willingness to be part of the study.

During the study, all interviews were conducted in Malinké and at a time and place convenient to the respondent. This was usually in the respondent's household or nearby. Interviews were conducted with great sensitivity to the painful situation of the respondent. Condolences were offered before the interview and, if the caretaker found it too difficult to respond to the questions, the interview was interrupted and completed at a later time. At the completion of the interview, the interviewer offered the respondent information regarding available health care and other services.

To complete the analysis, the medical records abstraction form was filled out from the medical records of children seen at a health facility. This questionnaire collected information on several aspects of the consultation, such as general information about the child, reasons mentioned by the caretaker for bringing the child to the health facility, signs and symptoms observed by the medical provider, the established diagnosis, and the treatment prescribed. Once all information was gathered, the expert panel held several meetings to analyze this questionnaire with the verbal and social autopsies to establish the possible cause of death; the panel also used pre-established quality criteria to determine the overall quality of care given at the health facility.

Data Analysis and Interpretation

Epi Info 6.02 and SPSS were used to develop data input files for the four questionnaires. Dr. Oury Diallo entered the data. The expert panel was responsible for determining the probable biological causes of death for each child, reviewing the process of care-giving and care-seeking, and assessing the quality of medical care according to medical records. Epi Info 6.02 was used to conduct data analysis.

Results

Description of the Study Population

T he study identified 353 deaths of children under the age of 5 years in the sample population over the 1-year study period. Interviews were conducted with the caretakers of 330 of these children. It was not possible to interview the caretakers of 23 of the children because of (1) prolonged absence of the child's caretakers from the home; (2) displacement or relocation of the family to another part of Guinea; or (3) funding constraints that prevented the team from conducting interviews after October 1999.

The population in Mandiana is quite stable; 79% has been living there for more than 10 years (range: 10–90 years). Twenty-two percent of the population has moved to Mandiana within the last 10 years, and 11.2% has been living there for less than 4 years.

The number of deaths identified per subprefecture is roughly proportional to the total population of each one (Table 4.1). For example, the largest number of deaths (22%) is reported from Dialakoro, which has the largest population.

Description of Household Characteristics

Housing and Water

Eighty-nine percent of houses where the deceased children lived have roofs made out of straw, and only 11% have roofs of tin. The floors are mainly earthen (89%) with wood or cement in only 11% of the houses.

Water sources for washing and especially for drinking are an important determinant for child illness. Only 9% of the study population obtains drinking water from unprotected sources. This compares favorably to most of rural Guinea in which 43% of the population uses water from unprotected sources such as rivers, streams, and ponds. The public pump and private or public wells are the most common sources (approximately 30% each). The same sources of water are used for washing and drinking.

The number of people living in one house (including the deceased child) gives an idea about the extent of crowding and is also a risk factor for child illness. Even though 88% of all households have only one room, interviewers reported that some of the households have up to 12 rooms. This is because most families in Mandiana are organized in "compounds," which consist of a number of houses arranged in a circle, each usually with one room. Thus, it is possible that in some cases the interviewers wrote down the total number of rooms in the compound.

The number of people living in a household and the number of rooms used for sleeping can be used indirectly to visualize the socioeconomic situation of these families. Generally, most of the "other" people who live in the household (i.e., other than the father, mother, and deceased child) are other children and, to a lesser extent, other family members. In 66% of the cases, more than three people share a one-bedroom house, and in 60%, five or more people were living in the house at the time the child died, with 86% of the inhabitants sharing just one room.

Table 4.1 Characteristics of the Population Under Surveillance

Subprefecture	Population under surveillance #	%	Total number of deaths identified #	%	Number of deaths included in the study	Neonatal deaths (<1 month)	Post-neonatal (1-11 months)	Child deaths (12-59 months)
Balandougouba	5,888	6	31	9	30	7	7	16
Dialakoro	26,401	29	77	22	72	28	20	24
Faralako	2,885	3	15	4	14	4	6	4
Kantoumanina	3,945	4	23	7	23	5	9	9
Kinieran	9,811	11	32	9	30	7	9	14
Koundian	7,182	8	34	10	28	6	6	16
Koundianakoro	4,145	5	21	6	21	4	4	13
Mandiana	5,997	7	36	10	35	14	14	7
Morodou	9,066	10	30	8	29	8	7	14
Nyantanina	5,886	6	14	4	11	2	2	8
Saladou	2,620	3	8	2	8	1	3	4
Sansando	7,980	9	32	9	29	11	5	13
Total	91,806	–	353	–	330	97	92	142
Calculated mortality rates			171/1,000 live births			50/1,000 live births	47/1,000 live births	74/1,000 live births

To calculate the age-specific mortality rate, the total number of recorded live births during the 1-year period and the total number of identified deceased children less than 5 years old at the time of death were taken. The calculations are based on a total of 353 children (add to the above number 6 neonates, 6 children from 1-11 months, and 11 children from 12 to 59 months). Even though the study includes only the deaths occurring in 1 year, the under-5 mortality rate was calculated as an estimate.

Characteristics of the Mother and Father

The majority of the respondents are the mothers of the deceased child (88%), followed by fathers (6%) and grandmothers (3%). One percent of the mothers died before the interview was conducted, but it could not be determined from the questionnaire whether their deaths were related to the deceased children's births.

The mothers of the deceased children are much younger than the fathers. Sixty-three percent of the mothers are between 15 and 29 years old, and 22% are more than 34 years old; both of these age ranges are considered a risk factor for perinatal and early neonatal mortality (WHO 1996). Most of the men are more than 25 years old, and 67% are more than 35 years old.

Literacy

The mothers' and fathers' educational levels are similar, with 94.8% and 89.4% respectively having no education, 4.2% and 5.2% respectively having completed at least primary school, and 0.6% of the mothers and 4.8% of the fathers having completed secondary education or higher. (The level of education was not known for 0.4% of mothers and 0.6% of fathers).

Occupation

The most common occupation for mothers and fathers is farming (95% and 91% respectively). Most women combine farming with housework. Almost all farming takes place in their own fields, while cooperative farms are mentioned in only 0.5% of the cases. For women, the second most common

occupation is mining (23%); evidently, because no men mention it, this is primarily a female occupation. Other occupations mentioned for the women are housekeepers (0.4%) and sellers (0.01%), and for the men, sellers (3%), technicians (2%), and woodcutters (0.9%) were mentioned. Thirty-six percent of the mothers belong to a community organization.

The population in the study is very homogenous in terms of house construction, availability and use of water sources, and educational level. Thus, a socioeconomic indicator for further comparisons between other variables was not constructed.

Maternal Obstetric History

Most mothers become pregnant for the first time between the ages of 15 and 19. Maternal age less than 18 years is a risk factor for perinatal and neonatal mortality. The number of children born increases proportionally to maternal age, with most women between 20

and 24 years old having two to five children. Almost all of the women (97%) between 25 and 29 years old have three or more children. There were no women over the age of 35 who have had fewer than two live births, with most having had six or more live births. The average number of children born to women in the study group is 4.55, and the average number of children surviving is 2.46.

Wellness Behaviors

Of the 330 caretakers interviewed for this study, only 106 (32%) could show the deceased child's immunization card. The following results are based on the information recorded on these health cards.

Immunization

Twenty-two percent of the children with health cards had no vaccinations recorded (Table 4.2). There are no gender differences in full vaccination coverage at the age of 3 months and older and 9 months and older.

Growth Monitoring

The information on weight for age recorded on the health cards showed that 26% of the children had very low weight for age, 31% had low weight for age, and 43% had adequate weight for age (Figure 4.1). The children most often affected by malnutrition ranged from 12 to 23 months old, and 53% of these were noted to have very low weight for age.

Of the 12 neonates in the study for whom a health card was available, only one health card records very low weight for age, and one records low weight for age (both of them presumably had low birth weight). The nutritional status of the children in the post-neonatal group is dramatically different: 21% with very low weight, 41% with low weight, and only 38% with adequate weight for age.

Breastfeeding

According to the caretakers, 91% of the children in this study were breastfed. However, exclusive breastfeeding is much

Table 4.2 Immunization Status of Children with Health Cards (n=106)	
	Total
Vaccine	*No. (%)*
No immunization (n=106)	23 (22%)
BCG (n=106)	82 (77%)
OPV birth (n=106)	72 (68%)
OPV 1 (n=95)	66 (69%)
OPV 2 (n=92)	60 (65%)
OPV 3 (n=88)	51 (58%)
Children older than 3 months with OPV 1–3 (n= 88)	51 (58%)
DPT 1 (n=95)	67 (71%)
DPT 2 (n=92)	60 (65%)
DPT 3 (n=88)	51 (58%)
Children older than 3 months with DPT 1–3 (n= 88)	51 (58%)
Measles (n=70)	37 (53%)
Children older than 9 months at the time of death and with all vaccines (n=70)	32 (46%)

Figure 4.1 Weight for Age Classification (n=72)

Percent

Age group	Adequate weight for age (above –2 z-score)	Low weight for age (below –2 z-score)	Very low weight for age (below –3 z-score)
Less than 1 month	83	8.5	8.5
1–11 months	38	41	21
12–23 months	16	31	53
24–59 months	72	14	14

- ■ Adequate weight for age (above –2 z-score)
- □ Low weight for age (below –2 z-score)
- ▨ Very low weight for age (below –3 z-score)
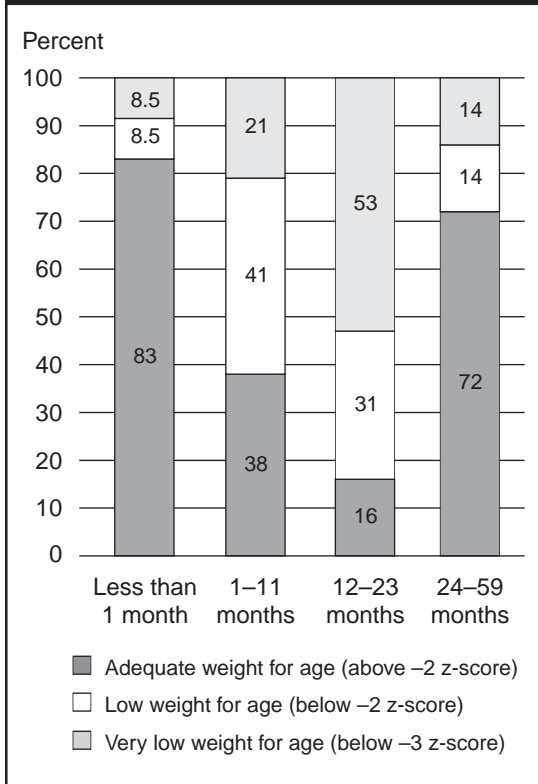
less commonly reported. When asked how many months did their child drink only breast milk, 86% responded "0 months", and only 4% reported exclusively breastfeeding the child from ages 1 to 6 months.

There is a large variation in the duration of breastfeeding, with a range of 0 to 48 months. The mean duration of breastfeeding is 13 months, but the median is only 4 months. It is important to note that all of these children died, and most of them were still breastfeeding at the time of death.

Demographic Characteristics of Sample

Of the 330 children who died, 178 (54%) were male. There were more deaths of male children in all age groups, except the 1–11 months age group (Figure 4.2).

Fifty-seven percent of the deaths occurred in children less than one year old,

with 28% during the post-neonatal period and 29% during the neonatal period (Figure 4.3). Early neonatal mortality was about one-half of neonatal mortality, and neonatal mortality was about one-half of infant mortality. The mortality in the under-5 group was concentrated in the group of children under 2 years of age (78%). Children 24 to 59 months old accounted for only 22% of all cases.

Place of Birth and Death

Eighty-four percent of the study subjects were delivered at home (Figure 4.4). Health workers attended 38% of the births, and trained midwives attended another 25%. The proportion of births assisted by a traditional birth attendant was 44% (some births were attended by more than one provider).

Eighty-four percent of all births and 91% of all deaths occurred at home, and only 15% of births and 6% of deaths occurred in a health facility. This is directly related to care-seeking behavior. Only 39% of the children were taken to a health center or health post, and only 4% were taken to a hospital at least

Figure 4.2 Mortality of Children Under 5 Years, by Gender

No. of deaths

- □ Male
- ▨ Female
- ■ Total

Age group

$\chi^2 - 4.4$; p-value = 0.11
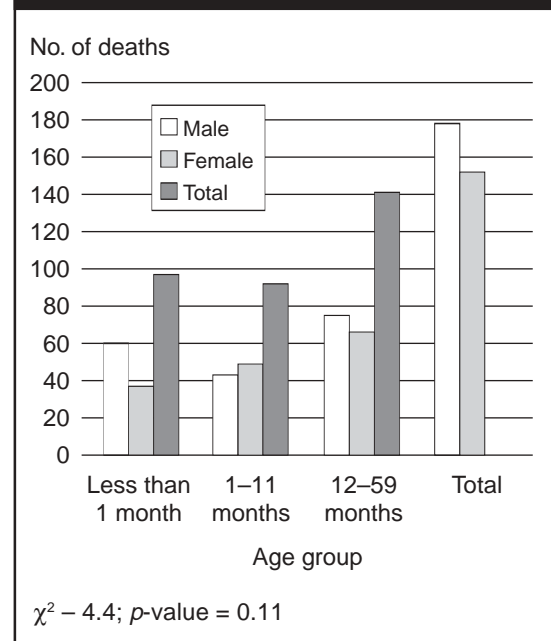
Figure 4.3 Age Distribution of Deaths

Neonate (< 1 month) 29%

Post-neonate (1–11 months) 28%

Child (12–59 months) 43%
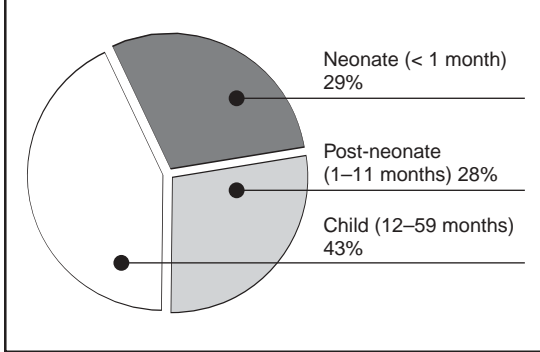
once during the illness leading to death. The mean duration of illness before the first medical consultation was 3.5 days (range from 0 to 60 days), with a median of 2 days. There was no difference in the number of deaths that occurred outside health care facilities disaggregated by sex.

Geographical and Seasonal Distribution of Deaths

Mandiana prefecture is located in a predominantly savanna zone characterized by higher temperatures and a long dry season. The area has a uni-modal rainy season that occurs between April and October each year. Communities are generally isolated and may be completely deprived of outside contact, including health services, for long periods during the rainy season.

Most of the deaths occurred during October–November 1998 and July–September 1999 (63%). A similar pattern can be observed for the most common infectious diseases. Malaria presents a seasonal pattern, with most deaths from malaria occurring in July and August 1999. Deaths from ARI, while not showing as clear a seasonal pattern as malaria, present several peaks throughout the year (October 1998, February 1999, and August 1999). Most deaths due to neonatal tetanus occurred in July 1999, while most diarrhea/dysentery deaths occurred in December 1998. Severe infections (including meningitis, septicemia,

and neonatal infections) do not show a defined pattern throughout the year, presenting only small variations.

Important differences in the distribution of diagnoses of death by the different subprefectures may be attributed to the variation in the coverage of preventive and curative health services. Table 4.3 presents the geographic distribution of the diagnoses of death.

Causes of Death

As seen in Figure 4.5, the most common cause of death overall was malaria, which accounted for a total of 104 deaths (32%). This was followed by ARI (83 deaths; 25%) and diarrhea (50 deaths; 15%). Other causes of death included neonatal tetanus, birth asphyxia, and other severe infections. Malnutrition was the proximate cause in 21 deaths (6%). It is not known what the nutritional status of the remaining children was prior to their demise; however, in a subset of the study population for whom health cards were reviewed (n=106), 57% were low weight for age or very low weight for age.

There is a clear difference in the cause of death of neonates and children ages 1 month to under 5 years. During the neonatal period, neonatal tetanus accounted for 32% of the

Figure 4.4 Place of Birth and Death

Study cases

Note: 1 case is missing in the place of birth data, and 8 cases died "on the way" to the health facility.
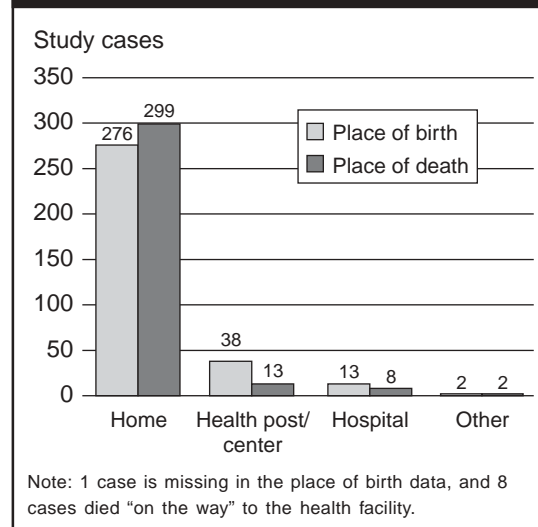
Table 4.3 Diagnosis Grouped by Subprefecture

Diagnosis	Subprefecture												Total
	Kinieran	Koundian	Sansando	Koundianakoro	Balandougouba	Dialakoro	Mandiana	Faralako	Saladou	Kantoumanina	Morodou	Nyantanina	
Malaria	11	8	6	6	3	16	6	5	1	6	13	2	83
ARI	3	9	4	2	5	14	10	3	1	3	4	1	59
Neonatal tetanus	2	3	4	0	1	14	3	3	0	3	1	0	34
Severe infection	5	1	1	3	2	2	5	1	0	3	2	1	26
Diarrhea/dysentery	2	4	2	2	5	2	1	1	1	3	0	2	25
Birth asphyxia	2	1	4	0	2	5	1	1	1	1	4	1	23
Malnutrition	2	0	0	1	1	6	4	0	3	2	0	2	21
ARI/diarrhea-dysentery	2	0	2	2	2	3	0	0	1	0	1	1	14
Malaria/diarrhea-dysentery	0	0	2	1	3	1	2	0	0	0	1	1	11
Other	0	0	2	1	2	3	2	0	0	0	1	0	11
Malaria/ARI	1	2	1	1	3	0	0	0	0	0	2	0	10
No possible diagnosis	0	0	1	0	1	2	1	0	0	2	0	0	7
Measles	0	0	0	2	0	4	0	0	0	0	0	0	6
Total	30	28	29	21	30	72	35	14	8	23	29	11	330

Figure 4.5 Causes of Death as Defined by Expert Panel

Malaria 26%

Other 6%

Measles 2%

Malaria/ARI 3%

Malaria/Diarrhea 3%

Diarrhea/ARI 4%

Severe Infection 8%

Diarrhea/Dysentery 8%

Malnutrition 6%

Birth Asphyxia 7%

Neonatal Tetanus 9%

ARI 18%
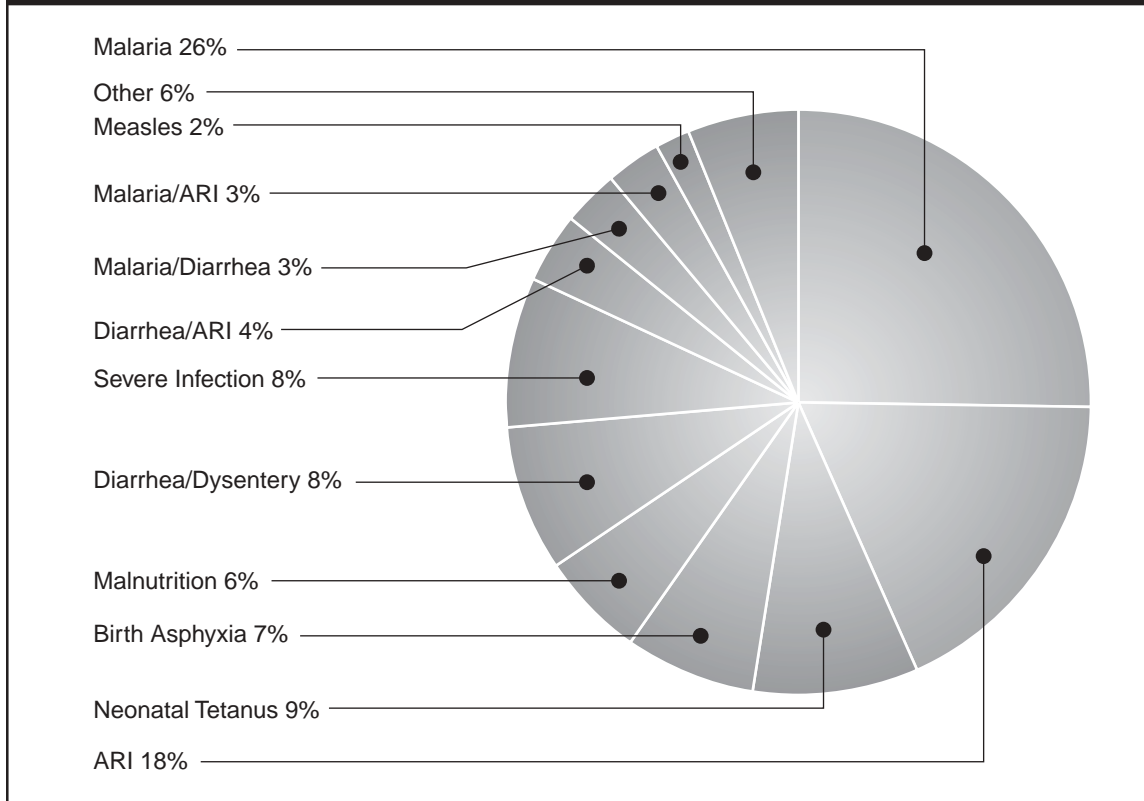
deaths in this age group, birth asphyxia for 24%, ARI for 10%, and other severe infections (including meningitis or septicemia) for 22%. Sixty-four percent of all neonatal deaths were due to severe infections (tetanus, ARI, and other infections), probably related to the care given during labor and delivery.

For children from 1 month to under 5 years old, malaria alone accounted for 36% of all deaths; when added to deaths from malaria associated with other diseases, the percentage becomes 45%. ARI/pneumonia alone or associated with other diseases was present in 31% of the cases, followed by diarrhea/dysentery alone or associated with other diseases in 21% of all cases. Malnutrition was identified as the primary cause of death in 9% of the cases for this age group (Table 4.4).

In the conceptual framework known as the Pathway to Survival, the behaviors of two distinct groups who guard children's well-

being (the caretakers and the health providers) are shown as part of the determinants for the death of the child. Defining the breakdowns in this model can guide the content of child health programs and the allocation of resources within them. Figure 4.6 shows the data for the 330 child deaths plotted along the Pathway to Survival. The denominators of the percentages at each point in the pathway are the 330 children identified in the study.

Pathway to Survival Analysis

Illness and Danger Sign Recognition
The first step in the care-seeking process is the caretaker's recognition that the child is ill. In response to open-ended questions about signs or symptoms they noted, the caretakers reported an increasing number, variety, and severity of symptoms as the disease progressed.

Table 4.4 Causes of Death Among Neonates, Post-neonates, and Children (12–59 months old) as Determined by the Expert Panel

Age	Cause of death (n=330)	Percentage of those who died
Less than one month (Neonate)	Neonatal tetanus	32% (31)
	Birth asphyxia	24% (23)
	Neonatal infection	13% (13)
	ARI	10% (10)
	Severe infection (meningitis/septicemia)	8% (8)
	Other diagnosis	9% (9)
	No possible diagnosis	3% (3)
	(n=97)	**29%**
One month through 11 months (Post-neonate)	Malaria	31% (29)
	ARI	28% (26)
	Malnutrition	12% (11)
	Malaria and ARI	4% (4)
	Severe infection (meningitis, septicemia)	3% (3)
	Diarrhea	3% (3)
	Dysentery	2% (2)
	ARI and dysentery or diarrhea	2% (2)
	Measles with and without complications	2% (2)
	Neonatal infection	1% (1)
	Malaria and dysentery or diarrhea	1% (1)
	Other diagnosis	4% (4)
	No possible diagnosis	4% (4)
	(n=92)	**28%**
12 months through 59 months (Child)	Malaria	38% (54)
	ARI	16% (23)
	Dysentery	9% (13)
	ARI and dysentery or diarrhea	9% (12)
	Malnutrition	7% (10)
	Malaria and dysentery or diarrhea	7% (10)
	Diarrhea	5% (7)
	Malaria and ARI	4% (6)
	Measles with or without complications	3% (4)
	Tetanus	0.07% (1)
	Severe infection (meningitis, septicemia)	0.07% (1)
	(n=141)	**43%**

When prompted, the caretakers identified the following symptoms for neonates (n=97): stopped being able to suckle normally (54%), fever (43%), fast breathing (41%), convulsions (38%), and unconsciousness (38%).

For children older than 1 month at the time of death, caretakers, when prompted by interviewers, most commonly mentioned fever (82%), pale palms (57%), fast breathing and blood in stools (both 43%), frequent/watery stools (40%), and chest in-drawing (40%).

Figure 4.6 Mandiana Pathway to Survival
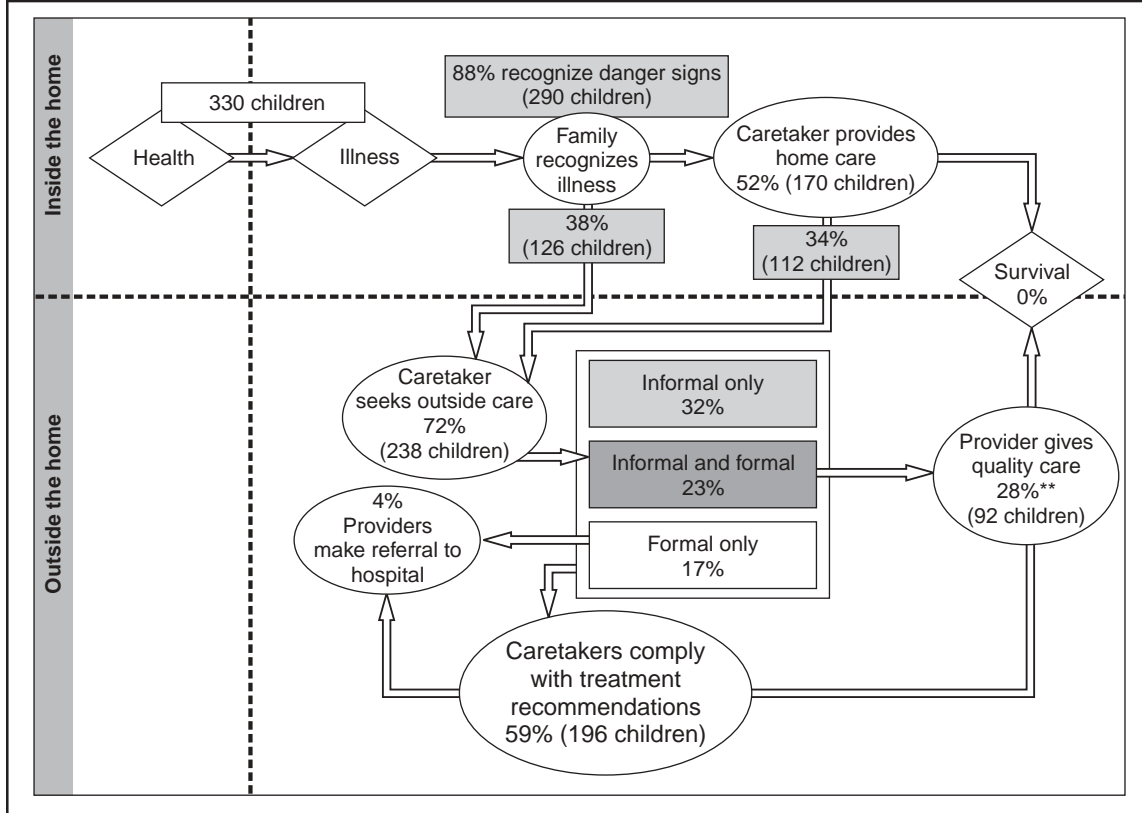
Inside the home

330 children

Health → Illness → Family recognizes illness

88% recognize danger signs (290 children)

Family recognizes illness → Caretaker provides home care 52% (170 children)

38% (126 children)

34% (112 children)

Survival 0%

Outside the home

Caretaker seeks outside care 72% (238 children)

Informal only 32%

Informal and formal 23%

Formal only 17%

4% Providers make referral to hospital

Provider gives quality care 28%** (92 children)

Caretakers comply with treatment recommendations 59% (196 children)

Note: Informal health providers include traditional healers and family elders, formal health services include public health centers, health posts, hospitals and private clinics.

** Quality care is defined as "average" or better, as assessed by the expert panel.

There were important differences between symptoms mentioned in response to interviewers' prompts and those mentioned spontaneously. For example, although fever was not one of the 10 most common spontaneously mentioned symptoms, it was mentioned frequently when caretakers were prompted by the interviewer (in 43% of the neonates and 82% of the children older than 1 month). Fast breathing during the illness that led to the death of the child was identified in response to prompts in 41% and 43% of neonates and children older than 1 month of age respectively, but it was only mentioned spontaneously in a few cases.

In their narratives, the caretakers often began the description of their child's illness with the severe symptoms (convulsions, contractions, stopped being able to feed) or

symptoms that they considered to be severe, skipping other symptoms that might be more common and less severe (fever). In most narratives, the first symptoms mentioned were related to an action taken, and these actions occurred when the child was already severely ill. Even though caretakers noticed danger signs like fast breathing, fever in the neonates, or diarrhea, they did not seem to recognize these signs as severe and did not seek care because of these signs.

The narrative on the next page is an example of how a mother described her child's illness, defining the onset as the presence of a severe symptom (stiff neck) while omitting previous symptoms that are probably more common and less severe, such as fever.

According to the respondents, most children (88%) had one or more danger signs

during the illness that led to death. Danger signs are defined as those symptoms that upon recognition by the caretaker should lead to seeking care at a health provider, ideally a health center/post or hospital. Danger signs include blood in the stool, bulging fontanel, chest in-drawing, fast or difficult breathing, convulsions, contractions of the body, inability to feed or breastfeed, stiff neck, sunken fontanel, skin pustules, bleeding, red umbilicus, or being "very thin."

For the analysis, the danger sign mentioned first was recorded as the primary symptom, even though most of the children had more than one symptom. Twenty-five percent of the caretakers whose children displayed one or more danger signs reported not seeking any outside care, while 35% did not take any action at all. A large proportion (42%) of the children with danger signs whose caretakers did not seek care were less than 8 days old at the time of death, and one-half of those were no older than a day. Newborns with problems during the first days of life were taken less frequently to a health provider, probably because of their acute condition, probable poor outcome, and difficult access to a health provider. This low care-seeking for neonates was also partly due to cultural practices that require the mother and child to remain in the home for the first 7 days of life.

Thirty-six percent of the caretakers of children older than 1 month of age reported that a health provider did not see the child at

Figure 4.7 Type of Home Treatment Given (n=170)

Treatment	Percentage
Pray/Massage	4
Aspirin/Paracetamol	4
ORS	5
External Traditional Medicine	8
Oral Traditional Medicine	16
Antibiotics	16
Malaria Drug	21
Other Medicine	26
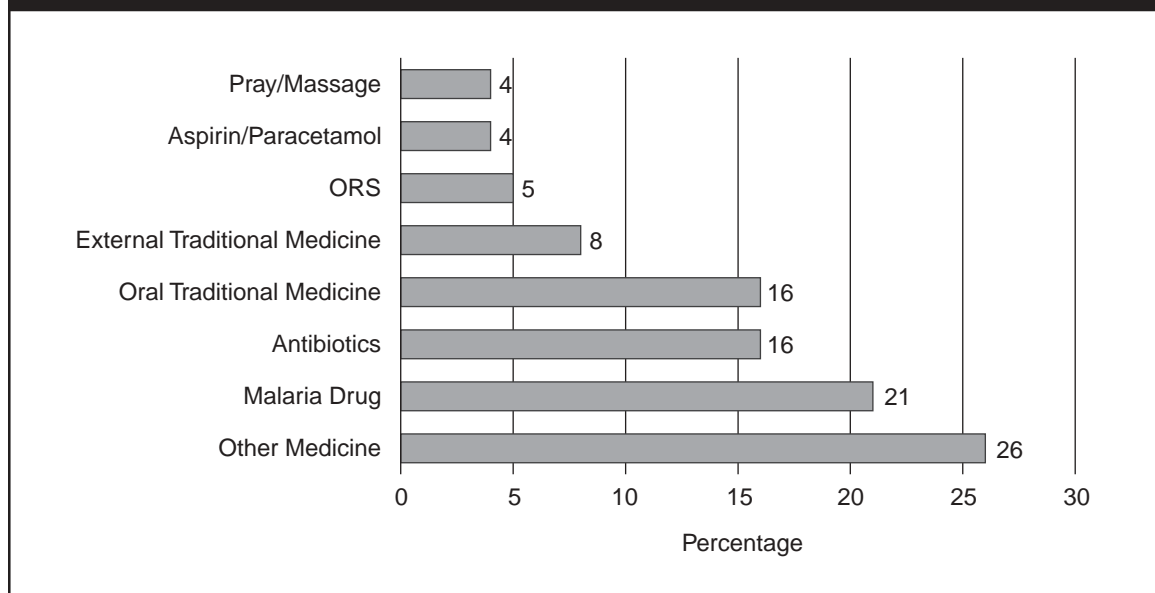
all. In this age group the most common danger signs the caretakers mentioned include respiratory symptoms (difficult/fast breathing or chest in-drawing) for 42%, convulsions (27%), very low weight (12%), and inability to feed or blood in the stool (6% each). The caretakers reported recognizing 88% of these signs during the first 2 days of the child's illness.

Thirty-three percent of caretakers said that they provided home care shortly after they recognized the danger sign(s). Forty-two percent sought outside care shortly after recognizing the danger sign; 28% consulted a traditional provider, and 14% sought help from a modern provider (health center/post or hospital). The danger sign that most often led to seeking care from a modern health provider was convulsions (16 cases), followed by respiratory problems (7 cases). Seeking care at a traditional provider was more common for most other danger signs.

Home Treatment

Home treatment, as shown in Figure 4.7, is any kind of medicine or action given to the child at home before the caretaker seeks any outside care. Fifty-two percent of the caretakers provided home care as their first response to the child's illness.

"External traditional medicine" most frequently included putting some herbs, barks, and/or roots on the body with massage or giving the child an herbal bath, sometimes accompanied by the recital of prayers. Caretakers often mixed herbs, roots, and barks to produce a concoction for treating a specific disease or symptom. Eighty-seven (26%) of the caretakers reported giving unspecified herbal infusions to the sick child. "Modern medicine"—aspirin/paracetamol, ORS (oral rehydration salts), antibiotics, malaria drug, and "other medicine"—was the most frequent treatment given to children in the home.

Medicine for the treatment of malaria was the most common home treatment given to children as the first response to the illness

(21%), not only to those children who subsequently died of malaria, but frequently to those children who had fever. Because of the high prevalence of malaria in the subprefecture of Mandiana, self-medication with antimalarial medications is a common practice. Sixteen percent of the modern medicines given to children during home treatment were antibiotics and anti-parasitics, mainly cotrimoxazole, metronidazole, mebendazole, and ampicillin. ORS constituted only 5% of all modern medicine administered, and antipyretics constituted 4%. Other modern medicine included sulfaguanidine and other unspecified tablets or syrup.

In the following narrative, the mother of a child who was not taken to any health provider during the illness that led to his death describes the illness and actions taken by his caretakers. The child was 1 month old at the time of death, which the expert panel diagnosed as being caused by ARI.

His belly was swollen the day it happened, we didn't know what to do and his father went to pick up some leaves that we boiled and gave him to drink, his belly came down. The other day his belly was still swollen and his father went for more leaves that we cooked and gave to the child and his belly came down a little that day. We sat down the whole day and nobody felt comfortable. We gave him infusion of leaves to drink. After he drank this solution he was not able to "hold himself," his condition was not normal. At dawn I took the child and wanted to wash him. He was unconscious but I didn't notice it. I poured the leaves solution on him. My sister-in-law came to take the child to her house while his father went to the house of somebody for medicines to give to the child. Before he returned, the child died.

— Mother

Care-Seeking Behavior

Information on care-seeking behavior was obtained from four sources: the social and verbal autopsy questionnaires, the medical records, and the health cards kept by

caretakers. While the verbal and social autopsy questionnaires were administered to 330 caretakers, the researchers were able to obtain medical records and health card information for less than 20% of the children. This information complements the verbal and social autopsy results. Over the one-year period of the study, the study team obtained medical records of 59 children included in this study. Of the 59 records, 9% are hospital records, 64% are from a health center, and 27% are from a health post. The medical records show that the health technician (*agent technique de santé*) saw most of the children (75%), followed by the health agent (17%) and the physician (8%). The hospital is the only health facility with a physician, while the health agent and *agent technique de santé* are the health providers in the health centers and posts.

Of the medical records that were reviewed, only 76% of the recorded consultations were part of the care-seeking for the illness that led to death. For 15% of the cases, the information on the medical record is related not to the illness that led to death but to a prior episode of illness, and for 9% it could not be determined. For 8%, there

is no date of consultation recorded, which makes it impossible to determine if the information is related to the illness that led to death or to the exact moment during the illness that the consultation took place.

As shown in Figure 4.8, 58% of the children for whom medical records are available were male, and most of them were older than 1 month, with an almost equal distribution between children in the post-neonatal period (25%) and children 12 months or older (29%). Medical records are available for only four neonates. It appears that neonates are taken less frequently to a health provider, especially if the illness is birth-related such as birth asphyxia (where only 9% sought care) or the death occurs shortly after birth. This care-seeking behavior might explain the low proportion of medical records found in this age group.

During the interview, the survey team asked all caretakers to show the health card of the deceased child. Fifty-five respondents had health cards available, and for those who sought care, general information about the illness could be obtained, including the main symptom that motivated the mother or caretaker to seek care at a certain moment, the signs observed by the health worker, the diagnosis, and the prescribed treatment. On 10 health cards, three different consultation dates are recorded, while 25 cards have two consultation dates, and 20 cards have only one consultation date recorded.

To analyze this information, it was decided to use data from the visits to a health worker recorded on the health card during the illness that led to the death of the child. This was determined from the information about the duration of the illness mentioned by the respondent, the age of the child at time of death, the date of death, and the dates of the consultations. These criteria indicate that, of the 55 children with health cards, 35 (64%) had at least one consultation recorded during their last episode of illness. Of these, 77% had one consultation, and 15% had two related consultations with a health worker. The

Figure 4.8 Distribution of All Deaths of Children Under 5 with Medical Records (n=59)
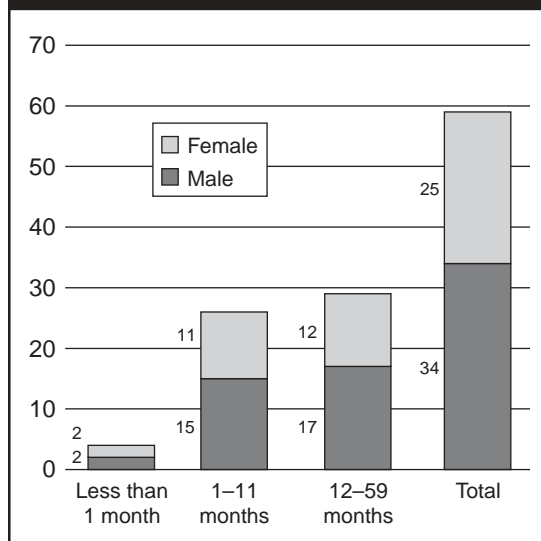
health card analysis focuses only on those visits to a health worker that were related to the illness that led to the child's death. One child was less than 7 days old at the time of death, three were post-neonates, and four were older than 12 months.

According to the social autopsy for 10% of the 330 children in the study, the caretakers took no action at all after the illness was recognized. Eighteen percent report providing home care, and 28% state that the child was not taken to any health provider during the illness that led to death. This held true across all diagnoses. Seventy-two percent of the caretakers sought care outside the home, with 55% of these going to an informal provider, and 40% of these going to a formal health provider. No gender difference in care-seeking behavior is found for the first action taken by caretakers. Although 41% of the male children were taken for outside care compared to 31% of the female children, this difference is not statistically significant.

In the following narrative, a mother described how her child was not taken to a formal health provider during the illness that led to the child's death. The child was 15 days old at the time of death, which the expert panel diagnosed as caused by tetanus.

> *Lamine's illness started with the warming up of her body and crying. I bought quinine as pills to give to her but there was no improvement. We left it this way and her belly started to swell, I gave her mint alcohol that I applied afterwards on her body without any improvement. After that the contractions, closed hands and she frequently refused breastfeeding. We went to see a traditional healer who gave us leaves and told us to boil them to wash the child, but I didn't respect him because it is said that the leaves can worsen an infection. It was at this moment when the child found the death.*
>
> *— Mother*

Age and Geographical Considerations

The proportion of caretakers who reported that they did not take their child to any health provider in the various subprefectures ranges from 9% to 38%. Care-seeking was poorest in Faralako (14%) and Nyantanina (9%) and best in Sansando (38%) and Balandougouba (37%). Low levels of care-seeking were not directly correlated to the distance of a village from the health post or health center. The low rate of care-seeking in Faralako and Nyantanina was partially due to the long distance (15 km) from the village to the health post; in Nyantanina, it was partially due to a lack of medication in the health center, which forced patients to purchase medicine at a site 35 km away. However, several of the villages that sought care at the Sansando and Balandougouba health centers are also a long distance away (more than 15 km), but the upgrading of the health centers in material and training, as well as the mobilization of the population by the trained village health committees, contributed to higher care-seeking rates.

In addition to geographical differences, other factors that determined whether caretakers sought care in or outside the community were the age of the child at the time of the illness leading to death and the duration of the illness. The average age of the 34 children whose caretakers took no action at all after the illness was recognized was 4.9 months, compared to an average age of 11.2 months for those who did seek outside care. The caretakers of 65% of the neonates less than 8 days old reported seeking no outside care. This percentage was especially high for newborns; caretakers of 88% of those who were less than 1 day old did not seek outside care. In the other age groups, this proportion did not show major differences, varying between 14% and 25%. The duration of the illness was another important factor; 83% of all children not taken to any provider had an illness lasting 5 days or less.

Care-Seeking Patterns by Disease

Birth asphyxia, an acute illness affecting only newborns right after birth or during the first days of life, was the neonatal condition for which care was least likely to be sought. As Table 4.5 shows, only 9% of the caretakers of neonates with birth asphyxia reported taking the child to any health provider. Other diagnoses with a low proportion of care-seeking are measles with or without complications (50%), severe infections (62%), and diarrhea/dysentery (76%).

Medical records show that the most common reasons for seeking care at a health provider were fever, cough, convulsions, and

Table 4.5 Care-seeking Behavior by Cause of Death (as Defined by the Expert Panel)							
Disease	No action taken by caretaker	Only home care provided	No outside care sought	Average duration of illness (days)	Percentage taken for outside care	Average number of days between recognizing illness and seeking outside care	Average number of times care was sought
ARI (n=59)	–	10 (17%)	10 (17%)	12	83%	2.3	1.3
ARI and dysentery or diarrhea (n=14)	–	1 (7%)	1 (7%)	15.7	93%	2.8	1.8
Diarrhea/ dysentery (n=25)	–	6 (24%)	6 (24%)	27.5	76%	3.4	1.2
Birth asphyxia (n=23)	14 (61%)	7 (30%)	21 (91%)	1	9%	0	0.1
Malaria (n=83)	5 (6%)	13 (15.6%)	18 (22%)	5.6	78%	1.7	1.2
Malaria and ARI (n=11)	–	1 (9%)	1 (9%)	13	91%	2.6	1.4
Malaria and dysentery or diarrhea (n=11)	–	–	–	31.5		1.7	1.7
Malnutrition (n=21)	2 (9.5%)	1 (4.7%)	3 (14%)	53.7	86%	3.1	1.3
Measles with/ without complications (n=6)	–	3 (50%)	3 (50%)	17	50%	4.7	0.8
Neonatal tetanus (n=34)	3 (8.8%)	5 (14.7%)	8 (23%)	4.4	77%	1.3	1.2
Severe infection (meningitis, septicemia, neonatal infection) (n=26)	6 (23%)	4 (15.3%)	10 (38%)	4	62%	2.1	1.0
No diagnosis possible (n=7)	3 (42%)	2 (28.5%)	5 (71%)	21	29%	1.0	0.6
Other (n=11)	1 (9%)	5 (45%)	6 (54%)	10.5	46%	3.2	0.6
Total	34 (10%)	58 (18%)	92 (28%)	16.7	72%	2.3	1.1

Table 4.6 Most Common Reasons for Taking Child to Health Provider, and Signs and Symptoms Most Frequently Observed by Health Provider (n=59)

Signs or symptoms	Given as reason for seeking care		Signs and symptoms most frequently observed by the health provider	
	No.	%	No.	%
Fever	55	93	55	93
Cough	27	46	25	42
Convulsions	17	29	12	20
Diarrhea	14	24	3	5
Vomiting	5	8	1	2
Low weight or pallor (anemia)	3	5	26	44
Difficult breathing	3	5		
Crepitant sound (auscultation)			17	29

diarrhea. Even though low weight or pallor was the cause for consultation in only 5% of the cases, the health provider noted anemia in 44% of the cases by examining the palms of the hands (19%) and the conjunctiva (25%). According to the medical records for the four neonates, the signs observed by the health worker were different from those described by the caretaker (Table 4.6); one neonate was unconscious, three were not able to breastfeed, two were not able to cry, and one had a problem with the umbilicus.

The health cards indicate that the main reasons for consultation were fever and diarrhea, followed by respiratory problems, vomiting, and anorexia. The reason for consultation and the signs observed by the health worker were only partially recorded on the health card by the health worker. Based on the available data, fever (78%), respiratory problems (37%), convulsions (26%), and diarrhea (22%) were the most common symptoms. Signs of severe illness such as inability to breastfeed or drink, stiff neck, and unconsciousness were neither recorded as a reason for consultation nor observed by the health worker. Unfortunately, no detailed information on the clinical findings during examination was recorded.

Delay in Care-Seeking

The caretakers reported that the average duration of illness was 16.7 days. Variations in the duration of the illness were evident between those children with more acute conditions and those with chronic illnesses such as malnutrition. Both diarrhea and dysentery had a long average duration of illness, 26 and 29 days respectively, while birth asphyxia, neonatal infection, neonatal tetanus, and malaria had short durations. The number of times caretakers reported seeking outside care during a given illness was similar across all diagnoses. For all conditions, the caretakers reported seeking care for the first time, on average, after 2.3 days.

The analysis of medical records and health cards confirms the care-seeking behavior analysis of the social autopsy questionnaire. According to the medical records, the average duration of illness was 17 days, with a range from 1 to 150 days (median: 5, mode: 3). For the 45 children who were taken to a health provider as part of the care-seeking for the illness led to death, the consultation took place an average of 11 days after the illness was recognized (median: 4, mode: 3, SD: 17.91). Because of

the great differences between the duration of illnesses, the number of days after consultation that the child died varied from 0 to 83 days, with an average of 32 days (median: 4, mode: 1). Similarly, according to the health cards, the average duration of illness was 18 days (median: 8 days, mode 3 days, range: 1–180 days). The caretakers sought care with a formal provider after an average of 7 days of illness. All neonates were already severely ill with little probability of survival by the time they were taken to the health provider. The mean duration of illness for the neonates was 8 days, and the infants died an average of 1.5 days after this consultation.

Source of Care
According to the social autopsy results, 55% of the caretakers reported seeking care from a traditional provider. The distribution of the number of times a traditional or modern provider was visited varies with the disease. For example, the majority of caretakers reported seeking care from traditional providers for neonatal tetanus (78%), ARI (68%), and malnutrition (59%). Conversely, for diarrhea/dysentery (61%) and measles (80%), caretakers more often reported seeking care from modern providers.

> *The traditional healer was not only the most common overall provider consulted but also frequently the first provider consulted during the illness of the child.*

The traditional healer was not only the most common overall provider consulted but also frequently the first provider consulted during the illness of the child. Public health facilities were visited when the child was already severely ill; specifically, hospitals were a more common choice for the third and fourth actions. The traditional healer was the most frequently visited provider, accounting for 57% of all of the care-seeking over the

course of the illness. Seeking assistance from the health centers increased during the second action to 42% of all care-seeking and to 50% during actions five and seven.

When caretakers were asked as a closed-ended question in the verbal autopsy questionnaire whether they had sought care at a drug seller, 103 said they had. However, when asked to describe care-seeking (through an open-ended question), caretakers did not mention consulting drug sellers as part of any action taken during the illness although they did mention giving some type of modern medicine. Not only were there differences between the responses to the two questions in the type of providers consulted during the illness, but there were also differences in the number of children who were brought for care to any provider. In the verbal autopsy questionnaire (closed-ended question), respondents indicated that only 77 children were not brought for care to any provider, but in the social autopsy questionnaire (open-ended question), this number rises to 92 children. This may represent the perception of the community that the drug seller is not a source of medical care or advice but a place of purchase for self-medication.

Reasons for Not Seeking Care
According to the caretakers, formal health workers saw only 40% of the children prior to their death. There are many reasons cited by caretakers for not visiting a public health provider (health agent or hospital).

As shown in Table 4.7, the most frequently mentioned reason was lack of money (26%); caretakers did not have the money to pay for transportation, consultation, and in some cases medication. Thirteen percent of the caretakers said that they did not recognize the severity of the illness, and 13% also thought that the illness could not be cured by modern medicine. The illnesses most commonly believed untreatable by modern medicine were malaria (27% of these

cases), neonatal tetanus (24%), ARI (16%), and diarrhea or dysentery (15%). Symptoms of severe malaria and neonatal tetanus include convulsions, which are commonly considered to have a spiritual origin and

> *The illness of the child started while the child was lying down. He was sleeping when suddenly he cried out loud. I took him and sat him on my feet. His arms were contracted as well as his body and liquid came out of his mouth. I sent the child to the health center without having boiled the leaves, and the health agent gave the child 6 injections without any improvement . . . Every time the health agent came to look at the child he would give him an injection, made the child lie down and nobody could touch him. At night I told him to stop with the injections because they didn't seem appropriate to me, and that is why we returned to our house, laid him down and suddenly he died.*
>
> *— Mother*

thus not treatable by modern medicine. The group of caretakers who believed that the illness could not be treated by modern medicine increases if the 8% who did not go to any health agent or hospital because of fear of injections are included. Fear of injections, a common type of treatment prescribed by the formal health services, may also account for the belief by 4% of the caretakers that the child was too small to be taken to the health agent/hospital. It seems that there are certain conditions that caretakers believe will worsen if treated with injections. An example of the fear of injections can be seen in the narrative to the left about a child diagnosed with malaria, 30 months old at the time of death.

Accessibility in terms of distance and hours was also a concern. Four percent of the respondents said that "It [was] too far," and 4% also stated, "No health service was available at that moment [at night]." Caretakers were asked what type of health facility they usually took their child to for any

Table 4.7 Ten Most Frequently Mentioned Reasons for Not Going to a Health Post/ Center or Hospital (n=1103)

Reasons mentioned spontaneously	Health agent/center		Hospital		Total
	#	%	#	%	# (%)
No money	126	12	157	14	283 (26%)
Thought that the illness was not serious	74	7	74	7	148 (13%)
The illness couldn't be treated with modern medicine	79	7	69	6	148 (13%)
An injection would risk child's life	28	2.5	56	5	84 (8%)
We first wanted to try traditional medicine	28	2.5	20	2	48 (4%)
It is too far, I was at the field	21	2	26	2	47 (4%)
The child was too small to be taken to the health agent/hospital	25	2.5	20	1.8	45 (4%)
No health service was available at that moment (at night)	36	3	6	0.05	42 (4%)
Poor transportation	15	1	25	2.5	40 (4%)
My husband was not at home	17	1.5	21	2	38 (3%)
The child had already been seen by a health agent	29	3	4	0.04	33 (3%)
Other	81	7	66	6	147 (13%)

Table 4.8 Providers' Actions and Prescriptions

Provider	Provider's Actions		Provider's Prescriptions	
Traditional healer or men/women of the village	Gave the child herbs (roots, barks, leaves)	40%	Herbs/traditional medicine to bathe the child and/or give it to drink	75%
	Massaged the child while reciting Koranic verses and/or blessing the child	28%	Modern medicine	12%
			Cited the child for follow-up	5%
	Examined the child	16%	Advised continued feeding for the child	4%
	Gave the child unspecified products	6%	Referred the child to another provider	4%
	Bathed or rubbed the child with traditional medicine	5%	Other	1%
	Gave the child modern medicine or injection	2%		
	Other	3%		
	(n=313 actions)		**(n=212 recommendations)**	
Heath agent or heath center	Gave the child modern medicine	47%	Modern medicine	81%
	Examined the child	26%	Referred the child to another provider	3%
	Gave the child an injection	23%	Cited the child for follow-up	3%
	Gave the child traditional medicine	1%	Injections	2%
	Gave the child ORS	1%	Traditional medicine	2%
	Other	2%	Advised continued feeding for the child	2%
			Other	7%
	(n=211 actions)		**(n=220 recommendations)**	
Hospital	Gave the child modern medicine or injection	60%	Hospitalized the child	50%
	Gave unspecified products	20%	Modern medicine	42%
	Examined the child	10%	Give the child more fluids	8%
	Cured the umbilicus	10%		
	(n=10 actions)		**(n=12 recommendations)**	
Private provider	Gave modern medicine or injection	89%	Modern medicine or injection	78%
	Examined the child	11%	Cited the child for follow-up	11%
			Advised continued feeding for the child	11%
	(n=9 actions)		**(n=9 recommendations)**	

illness or event and how long it took to get there by their usual means of transportation. Because the number of times a child was taken to the health post (health center in each subprefecture) was very low, the average and median time spent is calculated for the entire prefecture. As expected, the average time spent to travel to a health post (1.46 hours) was less than the time required to go to the health center (2.45 hours)—a difference of almost one hour. The following narrative provides an example of the difficulties encountered in accessing a health post or center.

> *The illness of the child started with the white infection (pallor/anemia). I gave him pills but they had no effect. I washed him in the water of cooked leaves without any improvement. The next day I decided to go to the village because we live in a small settlement but a storm flooded everything and the stream overflowed. I waited for the level of the water to drop because this usually doesn't take too long. Right afterwards I took the path to the village. That day the level of the water came up to my waist . . .*
>
> *— Mother*

Quality of Care

Table 4.8 summarizes the actions taken by both informal and formal providers according to the caretakers' responses to the social autopsy questionnaire. Most of the treatments given during consultation with the traditional healer involved giving the child some type of traditional medicine, usually roots, herbs, or leaves boiled in water and then given to the child to drink or used for bathing, rubbing, or massaging the child (51%). Reciting Koranic verses during the massage is mentioned 88 times (28%). From the caretakers' answers, it seems that follow-up visits to complete the treatment, which continued the blessing, reciting verses, and giving the traditional medicine, were common, and that the child was normally taken more than one time to the traditional healer.

In most cases, the health workers prescribed some type of modern medicine, and in 23% of the cases they gave an injection. Injections seem to be a common means of administering medication. The rate of injections was possibly even higher than reported because the recorded data includes only what the caretaker spontaneously mentioned during the interview. In most interviews, the caretaker mentioned injections as a common treatment when any formal health agent was consulted. In some cases,

injections were seen as the right medication, but in other cases they were considered to cause harm and worsen the child's condition (fear of injections was mentioned 84 times as the caretakers' reason for not having consulted any health center/post or hospital during the illness of the child).

In addition to the social autopsy questionnaire, the quality of care of formal providers was evaluated in this study by analyzing the medical records of the deceased children in the health facilities and the health cards of the deceased children kept by the caretakers. A panel of experts assessed and scored the quality of care based on the medical records (see p. 33).

Fever Management

The most common presenting complaint in the medical records was fever (93%). Interestingly, 93% of the medical records reflected that the providers also noted fever even though only 56% of the medical records documented the child's rectal temperature, of which 51% were elevated. Even though many illnesses could cause fever, malaria was the diagnosis of record in 58% of the cases although only 8% had a blood smear performed. This is consistent with the Ministry of Health's policy to presumptively treat suspected cases of malaria, based on the presence of fever or anemia, with chloroquine.

The medical records of 12 children reported the presence of convulsions, and the records for 2 children noted a stiff neck. None of the records documented generalized skin rash or bleeding.

The symptomatic treatment of fever was prescribed to 93% of the children, most of them receiving acetylsalicylic acid or paracetamol. In addition to the antipyretic medication prescribed to almost every child examined, treatment for malaria was given to 49 children (83% of those presenting with fever), even though a diagnosis was made for only 34 of them. Treatments for malaria were given to six children who were pale.

Respiratory Management

Twenty-seven (46%) of the medical records are related to the assessment of children with a presenting complaint cough. Other respiratory danger signs, such as fast breathing, difficult breathing, and chest in-drawing, were identified as the presenting complaint in only 2 or 3 children.

The records state that 21 children (36%) were diagnosed with pneumonia, and 20 of these children also had another illness. The records reflect that the providers largely established a diagnosis of pneumonia by auscultation; 17 children had crepitant sounds. The medical records state the respiratory rate for only one child and the presence of chest in-drawing in three children. It is not clear from the data whether the remaining 56 children had chest in-drawing. Oral antibiotics were prescribed for 28 children, in some cases without a clear diagnosis (according to the data in the medical record), such as in cases of diarrhea.

Diarrhea Management

The medical records state that diarrhea was the main presenting complaint for 14 (24%) children. A complete evaluation of the diarrhea was not properly recorded in the medical records. According to the medical records, one-half of the children with diarrhea were severely dehydrated and 22 had some dehydration, but the records do not describe whether dehydration was assessed or not for the other 7 children. The duration of the diarrhea and the number of stools per day were recorded in only one case. The records reflect that the presence of blood in the stool was assessed in only 25 of the children. The diarrhea episode was related to the illness episode that led to death for 11 of the 14 children. Of these 11 children with diarrhea, none were neonates, two were 1 to 6 months old, and nine were older than 6 months at the time of death. On average, the duration of the illness that led to death was 23 days, with a median of 10 days.

The records state that all but three of the children were diagnosed with diarrhea,

including those with other diagnoses, usually malaria and/or pneumonia. Of the 11 children who were seen during the illness episode that led to their death, 2 were hospitalized and died the same day. The records for the other nine children indicate that these children were sent back home with an ORS prescription, parenteral, or oral antibiotics. Two of these children died the day after consultation, and one died three days after consultation.

Nutritional Evaluation

Even though 47 (80%) of the medical records for the 59 children record the child's weight, it does not appear that the health provider used the weight for age chart because no specific action or treatment was prescribed for the 11 (19%) children with very low weight for age or for the 18 (31%) children with low weight for age. Only five (8%) of the charts record a diagnosis of malnutrition.

Diagnosis and Prescribed Treatment

For most of the children seen at a health facility, more than one diagnosis is documented in the medical records, with malaria being the most common. Seventy-six percent of the clinical records (45 of 59) are related to the illness that led to death of the child. It is surprising that the average duration of illness (mean=17 days) was so high. Even though the average was high, the median was only 5 days.

The seven most frequently prescribed medicines were antipyretics (55), oral antimalarials (49), oral antibiotics (28), intravenous/intramuscular (IV/IM) antimalarials (18), ORS (15), iron/folic acid (13), and anti-convulsives (11). Other medicines prescribed were IV/IM antibiotics (4), thiamin (3), cortisone (2) given to a child with pneumonia and one with meningitis, treatment for parasites (metronidazole and mebendazole) for 2 children, immunoglobulin for tetanus (1) given to a child diagnosed as having pneumonia, and gentian violet (1).

The three children diagnosed with tetanus did not receive immunoglobulin during the

consultation, but all of them were referred and received an unspecified treatment for convulsions.

In 79% of the cases, the medications prescribed were available and provided, at cost, at the health facility.

Expert Panel Evaluation of the Quality of Care at the Health Facilities (Analysis of the Medical Records)

The expert panel analyzed the 45 medical records of the children seen by the health provider during the illness that led to death and then established a quality score, which included the following aspects:

■ General information about the child such as age and sex.

■ Information related to the child's illness including its duration, signs, and symptoms, and the point during the illness when the health worker saw the child.

■ Information about the child collected when he/she was seen by the health worker (not only what signs and symptoms were recorded, but also if there was information missing).

■ Health worker's diagnosis compared with the panel's diagnosis.

■ Prescribed treatment.

Figure 4.9 Comparison of Diagnosis Given by Health Worker and Expert Panel (n=45)
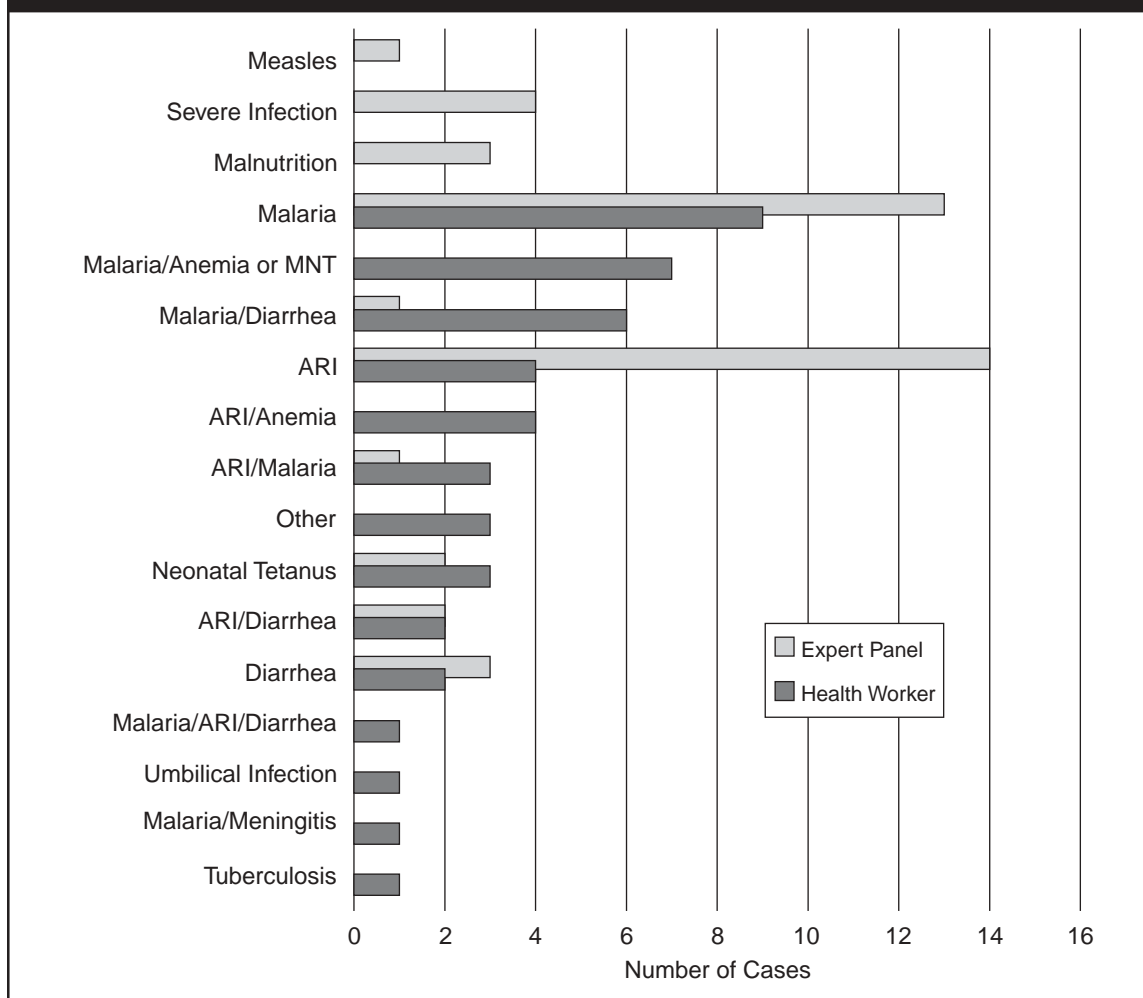
For each criterion, the expert panel assigned a score from 1 to 3 and added the scores at the end to find the overall quality of care. Annex E contains the detailed scale used for the quality assessment.

There is a large variation between the diagnoses given by the health workers and the diagnoses assigned by the expert panel (Figure 4.9). The health workers did not recognize cases of measles, severe infection, and malnutrition that were diagnosed by the expert panel. Similarly, the expert panel diagnosed the cause of death to be malaria or ARI for a number of cases diagnosed otherwise by the health workers. This difference might be because the health worker established one or more diagnoses of disease, while the expert panel tried to determine, with the available data, the probable cause of death. Multiple diagnoses with a significant presence of ARI/pneumonia and malaria can be seen.

Quality of care scores, as assessed by the expert panel, are represented in Figure 4.10. According to the quality assessment of the expert panel, 10% of the health workers provided good care, 61% average care, and 29% poor care. The average quality score for health centers (18.2%) is very similar to that of health posts (20.3%). Although health providers in the health centers have attained a higher educational level than those at health posts, this is not reflected in the quality of care given. There is not enough data to report on differences in quality of care given according to the diagnosis of cause of death.

Treatment and Referral Recommendations

Of the caretakers who sought external care, 196 (82%) reported following the providers' recommendations for treatment. Only 42 (18%) of the caretakers said they did not follow the recommendations, but this was mainly because the child was severely ill and died shortly afterwards.

Figure 4.10 Quality Assessment of the Care Provided by Health Worker

Good 10%

Average 61%

Poor 29%
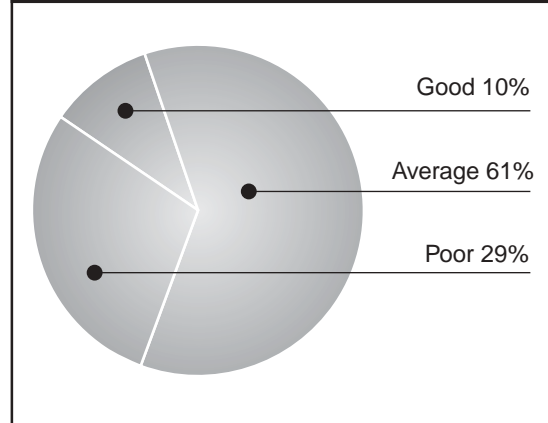
The number of referrals from one provider to another could not be determined for all children from the social autopsy questionnaire. As in many studies, caretakers often neglected to mention actions taken unless they were prompted, and in this case, the interviewer did not specifically ask about referrals. Partial information is available from the medical records analysis. According to the medical records, 78% of the children seen by the health provider were sent home, 2% died before admission, 10% were hospitalized, and 10% were referred. All of the neonates were referred because of the severity of their illness.

Discussion

Save the Children undertook this study to determine the factors that contribute to the high child mortality rates in Mandiana, basing the analysis on the Pathway to Survival. The objective was to describe both the proximate disease processes that led to the death of children in Mandiana and the behaviors of the children's caretakers and health care providers that contributed to mortality. There is

currently little information about the causes of death among children under the age of 5 in the country or the region, and what information is available is from facility-based data. This may be the first study to use community-based data to describe the epidemiology of childhood mortality in Guinea.

Comparison of Sample Characteristics

The results of this study can be used to inform decision making for future child survival interventions in Guinea only if the sample population is representative of the populace as a whole. To determine whether the study group is significantly different from the population of Mandiana as a whole, the results of this study were compared to data for Mandiana's general population found in the 1997 SC/US project baseline Knowledge, Practices, and Coverage (KPC) survey for mothers of children under the age of 2 years, who were selected by means of a 30-cluster sampling methodology, as well as to national data drawn mainly from the 1999 *Demographic and Health Survey* (DHS). These comparisons are important in determining whether this sample has unique characteristics that have implications in interpreting the results of the study.

Socioeconomic Conditions of the Study Population

The study population is poorer than the general rural population in Guinea. The housing characteristics of the study population indicate that the study population are living in more crowded conditions; 66% of the study population shares a one-bedroom house with three or more people. This is higher than national (rural) average of 2.6 people per room, with only 37% of households having three or more people sleeping in a single room (Save the Children 1997a). The proportion of houses with earthen floors (89%) is also higher than the national rural average of 76%. An exception to these poorer conditions is access to potable water. Only 9% of the study population obtains drinking water from unprotected sources compared to most of rural Guinea in which 43% of the population obtains drinking water from rivers, streams, ponds, and other unprotected sources. In the recent years, many wells have been drilled in Mandiana, and this has increased the population's access to potable water. The occupational characteristics are similar to the SC/US's 1997 KPC findings for the general population of Mandiana. This suggests that although the study population is poorer than the general rural population, it is not poorer than the Mandiana population.

The literacy level of women in the study population is only 5%. This is even lower than what was found in the Mandiana KPC study and is much lower than national levels. The proportion of adult female

literacy in Guinea is 20% (Census 1992), dropping to 10% in Mandiana (Save the Children 1997a). Because 82% of the population in Guinea is Muslim, other studies (1997 KPC) have found that 8.9% of the women interviewed had attended a Koranic school. This response was not included in this study, so there may be a percentage of women who are actually literate in Arabic, which would mean that the literacy level of the study population is likely not different from that of the general population in Mandiana.

Maternal Obstetric History

Nationally, the average number of children ever born to all women is 3.42 (DHS 1999), and the average number who survive is 2.63 (DHS 1999). The average number of children born to women in the study group is 4.55. This is 33% higher than the national average. The average number surviving is 2.46, only slightly lower than the national average. The study population has a higher number of children born but approximately the same number of surviving children.

In this study, 84% of the births were home deliveries, with 38% of these attended by health workers and 25% of these attended by trained midwives. Thus 63% of women had trained labor support at delivery. This is much higher than the KPC data, which found that only 9.9% of the women received support from a trained physician, midwife, or nurse. The proportion of births assisted by a traditional birth attendant (TBA) was 44% in this study and 51.5% in the KPC. Nationally, according to the 1999 DHS, 21.3% of births were assisted by a medical provider and 23.9% by TBAs. This proportion is much lower than what was found in this study. The differences might be explained by the fact that for 29% of the cases in this study (neonatal deaths), there might have been complications with the pregnancy or delivery that would result in a higher proportion of women seeking care from a trained health provider. Another reason is that the MOH and SC/US began an extensive safe motherhood program that included training for traditional midwives and health workers as well as communications to promote deliveries by

Table 5.1 Comparison of Vaccination Coverage (Children 12–23 Months Old) by Card

Vaccines	Child mortality survey (n=33) %	KPC Study (n=139) %	SC/US/MOH September 1999 data %	Guinea official statistics (1997 provincial and district data from MOH provincial HIS) %
BCG	76	29.5		
OPV Birth	57	28.8		
OPV 1	73	25.9		
OPV 2	70	21.6		
OPV 3	61	16.5		71
DPT 1	76	28.1		
DPT 2	70	23		
DPT 3	61	18		
Measles	54	18		71
Complete coverage	**45**	**15**	**64**	

trained personnel. In the 1992 Census, there are large differences between rural and urban settings. In the rural areas, medical or trained health providers assisted in 18% of the births, TBAs assisted in 29%, and 15% of the deliveries occurred unassisted.

Wellness Behaviors

Immunization
To make the study data comparable with other immunization coverage reports, only those children 12 months or older (33 children) are included in the denominator in Table 5.1. This is a small sample so it should be interpreted cautiously.

There is considerably higher vaccination coverage in the study children than in the population surveyed for the 1997 KPC study. In 1997, the complete coverage was 15%; in the study population it was 45%. The proportion of children without immunization was lower (22%) than for the KPC study (36%). This improvement is due to the intensive support SC/US has provided to the MOH immunization program. The MOH reported that the complete vaccination coverage level was 64% in September 1999. This is higher than the coverage found in the study population for the same period of time. The difference in coverage in the study children may appear minor, but it is probably significant because the lack of vaccination protection may have contributed to some of the deaths of the children.

Breastfeeding
Even though breastfeeding is a common practice for most women in Guinea (91% of the children in this study were breastfed, compared to 93% found in the KPC study and the 1992 Census), exclusive breastfeeding is much less extensive. Eighty-six percent of the caretakers in this study responded that the child never exclusively breastfed, and only 4% exclusively breastfed the child during ages 1 to 6 months. This data is comparable

with KPC findings and national data, which found exclusive breastfeeding in 5.2% and 4.4% of the under-6-month-old infants, respectively.

Growth Monitoring
The post-neonatal group contributed the most to the high proportion of very low weight and low weight for age in the infant group (0 to 11 months). This could be explained by the generally poor complementary feeding and breastfeeding practices at this age in Mandiana (see discussion on breastfeeding above). The 1997 KPC survey found poor supplementary feeding practices in children 6 to 11 months old. Only 56% of the mothers of these children reported that they gave semi-solid foods to their children. Only 35% of these mothers reported giving meat or fish to the children, and only 14% reported giving eggs or non-breast milk. Vitamin-rich fruits and vegetables were not usually given (39% offered fruit). Complementary feeding practices were not explored in the mortality study, but they are likely similar to the practices found in the general population in Mandiana.

For all ages in the study population children, 26% had very low weight for age, 31% had low weight for age, and 43% had adequate weight for age. The age group that seemed to be more affected by malnutrition was 12 to 23 months old; 53% of these children had very low weight for age. The study findings show much higher levels of malnutrition than the SC/US and the MOH growth monitoring data for the general population. Growth monitoring data between January and September 1999 finds a range of 5–11% with very low weight for age and 15–22% with low weight for age in children under 3 years old. This is also similar to the DHS data in which 23.2% are low weight for age and 5.1% are very low weight for age. The poorer nutritional status of the study population indicates the important contribution malnutrition had to the mortality of children.

Table 5.2 Age-Specific Childhood Mortality in Guinea

Area	Neonatal mortality (per 1,000 live births)	Post-neonatal mortality (per 1,000 live births)	Infant mortality (per 1,000 live births)	Under-5 mortality (per 1,000 live births)
Mandiana (current study)	50	47	97	171
Guinea (national)	48.4	49.6	98	177
Rural Guinea	55.1	60.7	115.8	210.6
Upper Guinea region	61.8	66.8	128.5	221.9

Data are from the current study and the 1999 DHS study.

Mortality Rates

Age-specific mortality rates in the study area compare favorably with the rates for both rural and Upper Guinea and more closely approximate national level data from the most recent (1999) DHS. This improvement may be attributed to the Save the Children child survival project interventions.

The age distribution of childhood mortality in Mandiana, Guinea, is comparable to that found in similar studies in Bolivia and Cambodia. In Mandiana, 57% of all childhood deaths occurred in children less than 1 year old (compared to 71% in Bolivia and 75% in Cambodia) (Aguilar *et al.* 1997, RACHA 2000). Twenty-eight percent of these deaths occurred during the post-neonatal period (40% in Bolivia and 43% in Cambodia) and 29% occurred during the neonatal period (31% in Bolivia and 32% in Cambodia). Early neonatal mortality was about one-half of neonatal mortality, neonatal mortality was about one-half of infant mortality, and infant mortality accounted for about one-half of the

Table 5.3 Primary Causes of Child Mortality in Guinea

Cause of Child Mortality	1998–99 Mortality Study (SC/US/ BASICS)	Rank	1986 Estimate (USAID)	Rank	1992 MOH Tally	Rank
Malaria	32%	1	21%	1	11%	4
ARIs	25%	2	14%	4	16%	2
Diarrheal Diseases	15%	3	18%**	2	9%	5
Neonatal Tetanus	9%	4	6%	6	9%	5
Severe Neonatal Infection	8%					
Birth Asphyxia	7%	5	–		–	
Malnutrition	6%	6	16%***	3	20%	1
Measles	2%	7	10%	5	13%	3
Other	6%		16%		22%	

MOH data is health facility-based.

There can be several diseases that contribute to one death, so the total for all diseases is more than 100%.

** Includes gastroenteritis for 1986.

*** Includes anemia for 1992 (7%); source: CIHI 1995.

total under-5 mortality (Table 5.2). This age distribution follows the expected pattern for a less-developed setting like Guinea. Save the Children expected a higher proportion of deaths during the neonatal period than was found in this study. The relatively high post-neonatal mortality could be due to a high prevalence of infectious diseases in this age group and possible lack of appropriate home care and external provider care.

Fifty-four percent (178/330) of the children who died were male. There were more deaths of male children in all age groups except among post-neonates (1–11 months). This finding is consistent with the literature of gender-specific mortality (Kurz and Johnson-Welch 1997). However, the gender difference does not reach statistical significance. A larger sample size may be required to adequately capture this difference.

Causes of Death

The vast majority of illness and mortality in Guinea results from preventable diseases. Table 5.3 ranks the primary causes of child mortality according to three different sources, including this study.

Malaria, ARIs, diarrhea, malnutrition, vaccine-preventable diseases (measles and tetanus), and birth asphyxia are the leading causes of child death in Guinea. Their ranking depends on the data source. This study is the most recent, and it provides information on all deaths in the community, rather than the small proportion of deaths that occur in health facilities.

This study shows that the most common cause of death in children under 5 in Guinea was malaria. Eighty-three (25%) of the 330 cases of under-5 mortality were caused by malaria, and another 21 (6%) were due to malaria and another co-existing disease such as ARI or diarrhea. Malaria was the most common cause of death in both the post-neonatal group (31%) and the 1 through 4 years group (38%). However, no cases of malaria were reported in the neonatal age group. Malaria is also a common cause of

morbidity among children in Guinea. Of 748 children with fever in a community in the prefecture of Maferinyah, 99 (13%) were found to have malaria, diagnosed with a positive thick smear test (Diallo *et al.* 2001). Only 24% of these children received chloroquine. It is likely that this combination of high prevalence and poor treatment is also prevalent in the prefecture of Mandiana, leading to malaria as the primary cause of child mortality.

The second highest cause of death was ARI, with 59 of the cases suffering from ARI alone (18%), and another 24 cases (7%) with ARI as part of a dual diagnosis. ARI was the second most common cause of death amongst post-neonates (28%) and children ages 1 to 4 years (16%). ARI also caused the death of neonates; however, it was less prevalent in this age group (10%), ranking as the fourth most common cause of death.

Diarrhea (15%) is the third most common cause of death in children under 5 in Mandiana. This was followed by tetanus (9%), severe neonatal infections including meningitis and septicemia (8%), and birth asphyxia (7%). Other causes of death that were identified include malnutrition (6.4%), neonatal infections (4.2%), meningitis/sepsis (3.6%), and measles (1.8%). Sixty-two percent of the children who died had a diagnosis of either malaria, ARI, or diarrheal disease.

Sixty-two percent of the children who died had a diagnosis of either malaria, ARI, or diarrheal disease.

The unusually low proportion of deaths from measles may be due to the recent strengthening of the immunization program by the MOH and SC/US. One year before the mortality study was conducted, the 1997 baseline KPC survey reported 15% coverage for measles antigen. The project worked hard to strengthen coverage and, in a five-month

period between November 1998 and March 1999, reported that 51% of 0- to 11-month-olds were completely vaccinated. This correlates with the analysis of the 106 children in the study who had health cards showing that 53% of the children 9 months or older were correctly vaccinated for measles. In September 1999 at the end of the study, the SC/US/MOH reported a complete vaccination coverage level of 64%.

Among children for whom anthropometric information was present, 57% were found to be malnourished according to their health cards, as were 62% of those for whom a weight was recorded in the facility medical record. Malnutrition is a contributing factor in more than one-half of childhood deaths worldwide (Pelletier *et al.* 1995). It is also important to note that this study reflects the well-accepted age distribution of malnutrition. Neonates were least likely to be affected by malnutrition, with rates of malnourishment increasing with age to 2 years, followed by an improvement in malnutrition rates in the age group between 3 and 5 years.

Seasonal, Geographical, and Age Distribution of Deaths

An expected seasonal pattern of deaths due to malaria occurred in July and August, while for ARI, the seasonality is not as clear; deaths from ARI presented several peaks throughout the year (October 1998, February 1999, and August 1999). Most deaths due to neonatal tetanus occurred in July 1999, while most deaths caused by diarrhea/dysentery occurred in December 1998. The seasonality of diarrhea/dysentery is predictable because of the dry season and the more limited access to water. The trend in neonatal tetanus, however, is not readily explained. The severe infections (including meningitis, septicemia, and neonatal infections) did not demonstrate a defined pattern throughout the year, presenting only small variations.

There are important geographical differences in the distribution of diagnoses of death in the different subprefectures, which may be attributed to the variation in the accessibility of preventive and curative health services and to the variations in environmental conditions. Malaria was the main cause of death in Morodou (45%), Kinieran (37%), and Faralako (36%). In all other subprefectures, malaria was an important cause of death among children under 5, with a range of 12% to 28%. Morodou subprefecture had four villages in the study, two of which are more than 18 km from a health center where treatment is available for malaria. The four villages are 1–2 km from the Sankarani River, which contributes to a higher mosquito density. Similarly, one of the two villages in Kinieran subprefecture is 25 km from a health center, and this subprefecture has favorable ecological conditions for mosquitoes, including swamps and the Fié River. There is a health center in Faralako; however, it is not part of the system that supplies medicines for treatment of malaria. Marena, the Faralako village included in the study, is 45 km from the nearest health center. Thus, each of the three sub-prefectures with the highest proportion of deaths due to malaria has environmental conditions favorable to high concentrations of mosquitoes as well as problems of accessibility to appropriate treatment.

Great variations can be noted in the proportion of mortality due to ARI. The highest proportions are found in Koundian subprefecture where ARI accounted for 32% of all mortality, followed by Mandiana with 29%. There are no obvious explanations for this variation.

Malnutrition accounted for 38% of all deaths in Saladou subprefecture. In Saladou, Maletoumanina village is 28 km from the nearest health center. Saladou is a very poor zone with limited agricultural resources and no fishing, hunting, or commerce such as a weekly market. Sources of foods like as meat, fish, bread, or salt are far away. It is likely that poor food availability contributed to the high rates of malnutrition.

Deaths resulting from measles were found in only two subprefectures, Dialakoro and Koundianakoro. These are two areas in which there are large movements of the population in local mining activity, which contribute to difficulties in providing vaccination services.

In this study, 31 cases of neonatal tetanus (9%) were identified. Faralako had the highest proportion of neonatal tetanus (21%), followed by Dialakoro (19%) and Kantoumanina (13%). In the subprefectures of Koundianakoro, Saladou, and Nyantanina, no cases of neonatal tetanus were identified. This distribution of deaths due to neonatal tetanus corresponds to the distribution of tetanus toxoid vaccination coverage of pregnant women. During the eight-month period preceding the study, the tetanus toxoid coverage of pregnant women for Mandiana was 36%. Faralako and Dialakoro had low coverage levels, 3% and 14% respectively. The low vaccination coverage in Faralako is explained by the lack of a health center and mobile vaccination posts from the urban health center. The low vaccination coverage in Dialakoro is due to the proliferation of gold mines and small hamlets where the population resides for more than half the year. The MOH mobile vaccination posts do not serve the mines and hamlets.

ARI was diagnosed in children of all age groups and was responsible for 25% of all deaths analyzed in this study. Even though 17 cases of ARI were diagnosed in infants less than 4 months old, this diagnosis accounted for only 15% of the deaths in this age group. Most of the ARI cases were identified in the 4–6-month-old group (47%). Infants under 6 months old, as well as male infants, have higher rates of ARI/pneumonia identified in the literature (Benguigui *et al.* 1997). In this study, no differences in infection rates by gender were identified.

Diarrhea or dysentery was diagnosed in only a few (8) children less than 12 months old. Most of the deaths due to acute or persistent diarrhea/dysentery occurred in children who were 12 months or older. More

cases of diarrhea would have been expected at 6 months and older due to weaning and the introduction of complementary food at this age.

Pathway to Survival Analysis

The conceptual framework known as the Pathway to Survival was used to analyze the data. The Pathway to Survival was developed by BASICS and the U.S. Centers for Disease Control and Prevention. In this model, the behaviors of two distinct groups of people who guard children's well-being (caretakers and health providers) are shown as part of the determinants for the death of the child. The discussion that follows identifies and quantifies the main breakdowns in the pathway (Figure 4.6) and makes recommendations on how the interventions of the child health programs can be more effectively targeted.

Recognition of Illness and Danger Signs

The first step in the care-seeking process is the caretaker's recognition that the child is ill. The majority of caretakers recognized a number of danger signs but not necessarily the severity of the danger signs. Thus, caretakers often provided home care or sought care from traditional providers, which delayed finding appropriate treatment for a serious illness.

With prompting, the caretakers were able to identify a number of the most important danger signs. The recognition of illness and danger signs was not a main breakdown in the pathway to survival; however, the actions taken (home treatment and care-seeking) when these signs and symptoms were recognized were problematic.

Home Treatment

The second step in the pathway is the provision of home care. Home care was provided shortly after the caretaker recognized the danger sign in 34% of the children. A total of 52% of the children received some type of

home treatment either before the caretaker sought outside care or in combination with outside care. Fifty-eight children (18%) received only home care (no outside treatment). The home treatments consisted of both traditional (41%) and modern medicine (54%). Caretakers often provided traditional home care and modern medicine in the home and waited to see if the child improved. The traditional herbal baths/drinks and massage were probably not detrimental in themselves, but they may have delayed the seeking of appropriate outside care. The modern medicine included in the home care may have been appropriate in some cases, but this study did not evaluate the appropriateness of this practice of self-medication.

Care-Seeking Behavior

The next step in the pathway is care-seeking outside the home. Care-seeking in Mandiana is inadequate. In this study, delays in seeking biomedical care were associated with several factors, including preference to automedicate (52%), the high use of traditional healers (57% of all the care-seeking over the course of an illness), and obstacles such as the geographical availability of health care. The majority (72%) of families sought outside care at some point during the illness. Many families sought care from both the formal and informal health providers (23%), while a larger proportion sought care only from the informal providers (32%). Only 17% of cases sought care only from the formal health system. Because of the remoteness of most of the villages in this area in Guinea, it is impressive to find that 40% of all the children were taken to a health facility. This is much higher than the median of 23% (range 4–72%) from nine studies of fatally ill children (Hill, Kirkwood, and Edmond 2001).

For most of the danger signs, caretakers more commonly sought care from a traditional provider than from a formal provider. No clear difference could be found between the recognition of a certain danger sign and the consultation of a certain type of provider (analysis was performed only for the first danger sign recognized by the caretaker). On the other hand, most of these children had more than one symptom or danger sign in a given moment. It is probable that the overall condition of the child in a certain moment during the illness that led to death determined the actions taken and the providers visited by the caretaker. It seems that follow-up visits to informal providers to complete the treatment were common, and that the child was normally taken more than one time to the traditional healer. This also led to delays in seeking care from a formal health provider.

The number of times care was sought during a given illness was similar across all diagnoses. The average duration of all illnesses was 16.6 days. Variations in the duration of the illness were evident between those children with more acute conditions and those with chronic illnesses like malnutrition. Both diarrhea and dysentery had a surprisingly long average duration of illness, 26 and 29 days respectively, possibly because of the inclusion of persistent diarrhea in these groups. Not surprisingly, causes of death such as birth asphyxia, neonatal infection, neonatal tetanus, and malaria had shorter durations. Newborns with problems during the first days of life were taken less frequently to a health provider, probably because of the acute condition of the baby, poor probable outcome, and difficult access to a health provider. It is surprising that cases of chronic conditions like malnutrition did not show a much higher number of visits to any provider, even though the caretaker recognized the duration of the illness as being an average of 54 days. For all conditions, the caretaker sought care for the first time, on average, after 2.3 days. Care-seeking at hospitals and health centers was further delayed at 3.5 days (range 0–60 days) after the onset of illness. However, almost one-third (25.8%) of caretakers sought care from formal providers on the first day of illness.

Closely associated with care-seeking is the accessibility of health facilities. Lack of

accessibility is considered one of the most important reasons for the caretakers not going to a health facility. The average time spent travelling to a health post was 1.46 hours and travel time to a health center was 2.45 hours. There are many reasons caretakers may not visit public health providers. The most frequently mentioned reason, mentioned twice as many times as the second, was "no money." This is an important barrier to accessing appropriate services and is currently being addressed in Mandiana by the establishment of emergency *caisses*, which were initially established through community contributions. The community members can borrow money from the *caisses* for both transportation and health care costs. The effectiveness of this system in improving accessibility will need to be closely monitored.

The care-seeking findings suggest that interventions should be strengthened to prevent delays in seeking treatment. The behavior change interventions need to focus on prompt recognition and appropriate care-seeking for severe illness. Specific barriers and delays to care-seeking, such as inappropriate automedication, use of traditional healers, and inaccessibility of health facilities, will need to be addressed to improve care-seeking behavior.

Quality of Care Provided by Informal and Formal Sources

Some groups have found that working with traditional healers (THs) may be one way to improve chances for child survival (Nations *et al.* 1988). These groups discuss traditional beliefs with the THs in order to gain their support for reinforcing appropriate management of diarrheal and acute respiratory infections. Because 67.6% of the caretakers sought traditional treatment either alone or in combination with modern treatment, working with the traditional healers is vital. SC/US has incorporated THs in the majority of village health committees, and THs are being trained in the use of ORT, appropriate feeding practices, and the need

for timely referral to health care facilities. Health education efforts need to build upon the positive, rather than confronting traditional beliefs and practices that are not in themselves detrimental.

The medical records analysis and the review by the expert panel led this study to conclude that medical care in Mandiana, Guinea, is often inappropriate. The expert panel found that only 10% of the health workers provided good care, 61% gave average care, and 29% gave poor quality care. This finding of low quality of care by health providers is similar to the data found in the health facility assessment (HFA) conducted in Mandiana in 1997 (Save the Children 1997b). In the 1997 HFA, the majority of children did not have a complete history taken during consultations. In addition, the conditions diagnosed often did not receive the appropriate treatment. For example, 21% of the malaria cases were not given antimalarials, and 45% of simple diarrhea cases were not given ORT. However, antibiotics were given for all ARI cases.

Similar problems were noted in this study. For example, when the medical records were analyzed, it appeared that the duration of the diarrhea was not taken into account when the diagnosis was made. Four of the children were sent back home with an ORS prescription and parenteral and oral antibiotics and then died shortly thereafter. For these four children, it is probable that the health provider failed to recognize the severity of the illness during the consultation and prescribed home treatment instead of hospitalization or referral for additional care, or else the home treatment provided by the

Efforts should be made to train primary health care providers to diagnose preventable and common childhood diseases (malaria, pneumonia, diarrhea, measles, and malnutrition), to prescribe the appropriate treatment, or to immediately refer cases with complications to the district hospital.

caretaker did not meet the quality criteria for home case management.

Only 6% of the deaths occurred in health centers or hospitals, and 91% occurred at home. Eight children (3%) died en route to a health facility. However, of the 39% of the children examined at least once by a health worker, the majority (73.8%; 96/130) had malaria, diarrhea, ARI, or a combination thereof. It is likely that death could have been averted if appropriate treatment had been initiated in time. This suggests the need to improve the quality of medical interventions to ensure that children with severe symptoms are adequately managed at health care facilities. Efforts should be made to train primary health care providers to diagnose preventable and common childhood diseases (malaria, pneumonia, diarrhea, measles, and malnutrition), to prescribe the appropriate treatment, or to immediately refer cases with complications to the district hospital. The training courses for health workers should be based on the new integrated clinical guidelines for the management of the sick child (Costello 1997). The IMCI (Integrated Management of Childhood Illnesses) guidelines are currently being adapted to the Guinea context.

Compliance and Referral

Health workers gave treatment recommendations in 97% of the cases, and 81% of the caretakers followed these recommendations. Seventy-nine percent of the children seen by the health provider were sent home, 10% were hospitalized, and 9% were referred. The variation between the duration of illness, the time between the recognition of the illness and the consultation with the health worker, and the time of the child's death for each type of diagnosis makes it difficult to judge the validity of the health worker's decision to refer or hospitalize the child or to send him or her home. All of the neonates were referred because of the severity of their illness. The success of, and

compliance with, the prescribed treatment depended at least partially on the availability of medication at the health facility. In 79% of the cases, the medications prescribed were given at the health facility.

Methodology Limitations

Some limitations should be considered in the interpretation of the results. First, because the data were collected retrospectively, there is the potential for recall bias. However, previous studies suggest that mothers are able to recall the signs and symptoms of their child's fatal illness, and their reports can be used to accurately diagnose the conditions proximate to the time of death (Hoekelman, Kelly, and Zimmer 1976). It should be noted that the educational status of the mothers has been associated with the accuracy of their reporting; educated mothers are more likely to report the events accurately than their less-educated counterparts (Datta, Mand, and Kumar 1988). Thus, the low educational status of the mothers interviewed may limit the results. Nonetheless, verbal autopsy is a tool with acceptable sensitivity and specificity (Kalter *et al.* 1991, Marsh *et al.* 1995), and the study results can be used for program planning.

Conclusions and Recommendations

Based upon the study, there are five major findings and associated recommendations that the MOH and its partners (SC/US and others) should consider in focusing their efforts to improve child survival in Mandiana, Guinea.

1. **Almost one-third (29%) of the under-5 deaths were in neonates.** Thirty-two percent of these deaths were due to neonatal tetanus, and another 24% were due to birth asphyxia. Efforts should focus on the prevention of tetanus through improved maternal immunization with tetanus toxoid and through the promotion of clean deliveries. The tetanus toxoid immunization coverage level was

36% preceding the study and has not improved dramatically since then. The barriers to achieving higher coverage, such as the movement of women to the gold mines and to the small hamlets for farming, could be addressed by extending the outreach of mobile vaccination posts. The current strategy of promoting clean deliveries by the training of TBAs will also address neonatal tetanus. To address deaths due to birth asphyxia, efforts can include training of TBAs to improve recognition of birth asphyxia and to perform simple resuscitation techniques, but additional operations research is needed in this area to document the impact of community-based interventions.

2. **Almost one-third (31.5%) of under-5 deaths were associated with malaria.** Both preventive and curative services need to be strengthened to impact on the high rate of malaria mortality. The use of insecticide-treated bednets is low in Mandiana (less than 10%) for reasons of both supply and demand; this problem needs to be addressed by a bednet promotion and distribution program. Access to appropriate treatment is the second important factor in addressing mortality due to malaria. The distance of the population from the health centers where treatment is available, especially in the rainy season, is a barrier. Community case management by village health workers and the home management of fever build on the existing practice of self-medication. These approaches have been proven to be safe and effective in other countries and should be considered in this setting. Advocacy at the policy level is required to enable community-based workers to distribute antimalarials.

3. **Although 40% of the children in this study did visit a formal health facility, the quality of care they received in these facilities is a major concern.** Efforts are needed to improve the quality of care provided at first-level facilities. The current IMCI strategy improves the quality of care in health facilities by training peripheral health workers in the IMCI protocols. This training would have directly impacted the quality of care of the 12% of the 330 children who received "poor" treatment in the facilities. It would also have improved treatment for the 24% who received "average" treatment. Improving the quality of facility-based IMCI treatment would have had the potential for improving the outcomes of over one-third of the deceased children in the Pathway to Survival. Improving the quality of care may also have the collateral effect of increasing utilization of health services by those who would otherwise not seek care.

4. **For the 60% of the children who never visited a health facility, improving appropriate care-seeking is essential.** The partners need to critically examine care-seeking, one of the 12 key practices identified by WHO and UNICEF in the IMCI strategy. This practice is defined by WHO as "Recognize when sick children need treatment outside the home and seek care from appropriate providers." There are three interlinked components of care-seeking: recognition of illness, labeling of illness, and resort to care. In this study, all caretakers initially recognized their children were ill, but how the illness was labeled in terms of severity was a bit problematic. Most caretakers (88%) recognized that their child had one or more danger signs or a symptom that, according to international standards, should lead to seeking care at a health provider. Yet one-quarter (25%) of these children (whose caretakers recognized severe illness) or 28% of all the children in the study were not taken for outside care, formal or traditional. This means that the symptom was not "labeled" by the caretakers as severe or

dangerous enough to warrant seeking outside care. A programmatic approach to improve caretakers' recognition and labeling of danger signs through behavior change communications would address this step in the Pathway to Survival.

5. **The resort-to-care step of care-seeking is influenced by other factors that also need to be addressed.** Lack of money (to pay for transportation, consultation, and, in some cases, medication) is the most important barrier to going to a health center/post (26% of respondents). Although 72% of the children were taken for outside care because the caretaker recognized danger signs, many of these caretakers delayed seeking care. Only 38% sought care shortly after recognizing the danger sign. Another even more important contributor to inappropriate care-seeking is the use of traditional providers who are both the first outside provider consulted and the most commonly consulted during the course of the illness (57% of all care-seeking). Many caretakers recognized the danger signs but believed that the illness could not be cured by modern medicine (13% of respondents). This finding affirms the value of two of the current strategies developed by the MOH and SC/US in Mandiana. The first strategy is to incorporate and train traditional healers as part of the CVSs. This training requires adaptation and follow-up to ensure that THs will recognize severe illness and refer patients to health centers or health points. The second strategy is to organize emergency transport funds and mechanisms through the CVSs. This strategy has been focused on obstetrical emergencies. However, the findings of this study indicate that the system should be expanded to include severely ill children.

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Verbal Autopsy Questionnaire

Child's Identification Number __ __ __ __

Instructions to surveyor: Section 1 below will be complete when your supervisor gives you the questionnaire. The Verbal Autopsy Surveyor's Procedures Manual explains how to use this information to help you conduct the interview. Complete Section 2 according to the instructions in the procedures manual. The actual interview starts with section 3.

Section 1: Background information from animator

1.1   Animator's code number _____ ____/____/____

1.2   Address of household: Notes to find the concession _____
       1.2.1   Quartier/Commune: _____ Code: _____
       1.2.2   District: _____ Code: _____
       1.2.3   Secteur: _____ Code: _____
       1.2.4   Sous-prefecture: _____ Code: _____

1.3   Name of child _____

1.4   Sex of child .... 1. Male ___
                                                  2. Female ___

1.5   Date of report .... ___ ___/___ ___/___ ___
                                                          (d d / m m / y y)

1.6   Child's age at time of death:
       1.6.1   Age in completed days (if less than 28 days) .... days ___ ___
       1.6.2   Age in completed months (if 28 days or more) .... months ___ ___

Section 2: Information about the interview

2.1   Language of the interview _____

2.2 Surveyor's code number	____/____	Date of first interview attempt	____/____/____
2.3 Date of interview	____/____/____	Date and time arranged for second interview attempt	____/____/____
Date form checked by supervisor	____/____/____	Date and time arranged for third interview attempt	____/____/____
Date entered in computer	____/____/____	Date interview abandoned	____/____/____

Child's Identification Number __ __ __ __

Instructions to surveyor: Introduce yourself and explain the purpose of your visit. Say that you are interested in the illness that led to death. Ask to speak to the person who was the child's main caregiver during the illness. If this is not possible, arrange a time to revisit the household when this person will be home.

Section 3: Background information from caretaker

3.1   "What is your name?" _____

3.2   "What is your relationship to _____?" .... 1. Mother ___
2. Father ___
3. Co-mother ___
4. Grandmother ___
5. Grandfather ___
6. Aunt ___
7. Uncle ___
8. Other male (specify_____) ___
9. Other female (specify_____) ___

3.3   Who was _____'s usual caretaker? .... 1. Mother ___
2. Father ___
3. Co-mother ___
4. Grandmother ___
5. Grandfather ___
6. Aunt ___
7. Uncle ___
8. Other male (specify_____) ___
9. Other female (specify_____) ___

3.4   Record whether other persons are present at the
interview or not .... 1. Yes, other persons present ___
.... 2. No, only the respondent is present ___
(If "No", go to 3.5)

  3.4.1   "Of the persons in the room with us now, who helped care for the child during his/her illness?"

	Present at interview	Helped care for child
1. Mother	___	___
2. Father	___	___
3. Co-mother	___	___
4. Grandmother	___	___
5. Grandfather	___	___
6. Aunt	___	___
7. Uncle	___	___
8. Other male (specify _____)	___	___
9. Other female (specify _____)	___	___

Child's Identification Number __ __ __ __

3.5   If mother is not present at the interview, ask: "Is _____'s mother still alive?" ... 1. Yes ___
                                                                                            2. No ___
                                                                                            8. Don't know ___

3.6   "What is your age (in years)?" .... years ___ ___
                                                                                      (Don't know = 88)
                                                                     (If respondent is the mother, go to 3.7)

       3.6.1 If respondent is not the mother, ask:
       "What is/was _____'s mother's age?" (now or at time of death) .... years ___ ___
                                                                                      (Don'' know = 88)

3.7   "Did you go to school?" ....1. Yes ___
                                                                                            2. No ___
                                                                     (If "No," go to 3.7.1)

       3.7.A   "What was the highest level you achieved?" .... 1. Primary ___
                                                                                            2. Secondary ___
                                                                                            3. Superior (university) ___
                                                                                            4. Professional (trade school) ___
                                                                     (If respondent is the mother, go to 3.8)

       3.7.1   If respondent is not the mother, ask:
               "Did _____'s mother go to school?" ....1. Yes ___
                                                                                            2. No ___
                                                                                            8. Don't know ___
                                                                     (If "No" or "Don't know," go to 3.8)

       3.7.1.A "What is the highest level that she achieved?" .... 1. Primary ___
                                                                                            2. Secondary ___
                                                                                            3. Superior (university) ___
                                                                                            4. Professional (trade school) ___
                                                                                            8. Don't know ___

3.8   "What is your occupation?" _____
       3.8.A   "Do you do farming?" ....1. Yes ___
                                                                                            2. No ___
                                                                     (If "No," go to 3.8.B)

       3.8.A.1 "Do you work on .... 1. your own or your family's field ___
               (Slowly read the choices and mark   2. a cooperative field ___
               the one best choice.)   3. a borrowed field ___
                                                                4. someone else's field ___

       3.8.B   "Do you go to the mines for work?" ....1. Yes ___
                                                                                            2. No ___
                                                                     (If "No," go to 3.8.1)

       3.8.B.1 "In the last 12 months, how much time
               have you spent working in the mines?" ...... days (if less than one month) ___ ___
                                                                months (if one month or more) ___ ___
                                                                                      (Don't know = 88)

Child's Identification Number __ __ __ __

3.8.B.2 "When you go to work at the mines,
do you sleep there or return home each day?" ... 1. Always sleep at the mines ___
2. Sometimes sleep at the mines ___
3. Always return home ___
4. Other (specify _____) ___

3.8.B.3 "During the three months before _____'s death,
did (s)he ever go to the mines with you?" .... 1. Yes, always went to the mines ___
2. Yes, child sometimes went ___
3. No, child never went ___
4. No, I didn't go to mines during the last 3 months ___
(If "Yes, always went," go to 3.8.1)

3.8.B.3.1 "During the three months before _____'s death,
who cared for the child when you were at the mines?" ... 1. Mother ___
(Multiple answers allowed.) 2. Father ___
3. Co-mother ___
4. Grandmother ___
5. Grandfather ___
6. Aunt ___
7. Uncle ___
8. Other male (specify _____) ___
9. Other female (specify _____) ___
(If respondent is the mother, go to 3.9)

3.8.1 *If respondent is not the mother, ask:*
"What is/was (*if deceased*) the mother's occupation?" _____

3.8.1.A "Does/did (*if deceased*) the mother do farming?" .... 1. Yes ___
2. No ___
8. Don't know ___
(If "No" or "Don't know," go to 3.8.1.B)

3.8.1.A.1 "Does/did (*if deceased*) the
mother work on .... 1. her own or her family's field ___
(Slowly read the choices and 2. a cooperative field ___
mark the one best choice.) 3. a borrowed field ___
4. someone else's field ___
8. Don't know ___

3.8.1.B "Does/did (*if deceased*) the mother go to the mines for work?" .... 1. Yes ___
2. No ___
8. Don't know ___
(If "No" or "Don't know," go to 3.9)

3.8.1.B.1 "In the last 12 months, how
much time did the mother spend
working in the mines?" .... days (if less than one month) ___ ___
months (if one month or more) ___ ___
(Don't know = 88)

Child's Identification Number __ __ __ __

3.8.1.B.2 "When the mother goes/went (***if deceased***) to
work at the mines, does/did she sleep there
or return home each day?" .... 1. Always sleep at the mines ___
2. Sometimes sleep at the mines ___
3. Always return home ___
4. Other (specify _____) ___

3.8.1.B.3 "During the three months before _____'s
death, did (s)he ever go to the mines
with the mother?" .... 1. Yes, always went to the mines ___
2. Yes, child sometimes went ___
3. No, child never went ___
4. No, mother didn't go to mines during the last 3 months ___
(If "Yes, always went," go to 3.9)

3.8.1.B.3.1 "During the three months before
_____'s death, who cared for the child
when the mother was at the mines?" .... 2. Father ___
(Multiple answers allowed) 3. Co-mother ___
4. Grandmother ___
5. Grandfather ___
6. Aunt ___
7. Uncle ___
8. Other male (specify _____) ___
9. Other female (specify _____) ___

Instructions to surveyor: Questions 3.9 to 3.13 are about the child's mother. If the respondent is the
mother, read the questions as "...have you...," "...do you...," or "...of your..." "If the respondent is not the
mother, read the questions as "...has _____'s mother..., "does _____'s mother...," or _____'s mother..."

3.9 "How many times have you/has _____'s
mother been pregnant?" .... number of times ___ ___
(Don't know = 88)

3.10 "How many times have you/has _____'s mother given birth
(including _____)?" .... number of times ___ ___
(Don't know = 88)

3.11 "How many living children do you/does _____'s number of living children ___ ___
mother have now?" *(Don't know = 88)*

3.12 "How many of your/_____'s mother's number of deceased children ___ ___
children have died (including _____)?" *(Don't know = 88)*

3.13 "Do you/does _____'s mother belong to a community organization?" .... 1. Yes ___
2. No ___
8. Don't know ___
(If "No" or "Don't know," go to 3.14)

Child's Identification Number __ __ __ __

3.13.1 **If "Yes," ask:** "What is its name?" _____

3.13.2 "What does the organization do?" _____

3.14 "What is/was _____'s father's age .... years ___ ___
(in years, now or at time of his death)?" *(Don't know = 88)*

3.15 "Did _____'s father go to school?" .... 1. Yes ___
2. No ___
8. Don't know ___
(If "No" or "Don't know," go to 3.16)

3.15.A "What was the highest level that he achieved?" .... 1. Primary ___
2. Secondary ___
3. Superior (university) ___
4. Professional (trade school) ___
8. Don't know ___

3.16 "What is/was the father's occupation?" _____
3.16.A "Does/did (*if deceased*) the father do farming?" .... 1. Yes ___
2. No ___
8. Don't know ___
(If "No" or "Don't know," go to 3.18)

3.16.A.1 "Does/did (if deceased) the
father work on .... 1. his own or his family's field ___
(Slowly read the choices and 2. a cooperative field ___
mark the one best choice.) 3. a borrowed field ___
4. someone else's field ___
8. Don't know ___

3.17 NOTHING

3.18 "What language is spoken most often in the household where _____ lived?"_____

_____

3.19 "At the time that _____ died, for how long had the (husband's)
family (menage) lived in their current house?"................................. months/years ___ ___
(Circle the correct word) *(Don't know = 88)*

Child's Identification Number __ __ __ __

3.20.A "In the household where _____ lived, what are
all the water sources used for washing hands
and dishes in the rainy and dry seasons?" .... 1. Pump in the house/compound ___
(Multiple answers allowed)   2. Public pump ___
3. Private well ___
4. Public well ___
5. Spring ___
6. Seasonal lake ___
7. Marsh/lake ___
8. River ___
9. Rain water ___
10. Other (specify _____) ___

3.20.B "In the household where _____ lived, what
are all the sources of drinking water during the
rainy and dry seasons?" .... 1. Pump in the house/compound ___
(Multiple answers allowed)   2. Public pump ___
3. Private well ___
4. Public well ___
5. Spring ___
6. Seasonal lake ___
7. Marsh/lake ___
8. River ___
9. Rain water ___
10. Other (specify _____) ___

3.21.A "What is the floor made of in the house where _____ lived?" .... 1. Wood/cement ___
2. Earth ___
8. Don't know ___

3.21.B "What is the roof made of where _____ lived?" .... 1. Tin ___
2. Straw ___
8. Don't know ___

3.22 "In the household (foyer—immediate family)
where _____ lived, how many rooms were used for sleeping?" .... number of rooms ___
(Don't know = 88)

3.23 "Including _____, how many people lived
in the household (foyer—immediate family)?" .... number of people ___ ___
(Don't know = 88)

3.24 "What is the name of the health facility where
_____ was usually taken for his/her care?" _____

    3.24.1 "How long does it usually take to reach there?" minutes/hours ____ ____ ____
(Circle the correct word) *(Don't know = 888)*

Child's Identification Number __ __ __ __

Section 4: Information about the child

4.1 "Can you tell me _____'s date of birth?" .... ___ ___/___ ___/___ ___
(d   d / m   m / y   y)

4.2 "Where was _____ born?" .... 1. Home ___
2. Health post ___
3. Health center ___
4. Hospital ___
5. Other (specify _____) ___
8. Don't know ___

    4.2.1 "Who attended the birth?" .... 1. No one ___
2. Trained TBA ___
3. Un-trained TBA ___
4. Health agent ___
5. Other (specify _____) ___
8. Don't know ___

4.3 "How many children did you/_____'s mother have .... number ___ ___
before _____ was born?" *(Don't know = 88)*

4.4 "Can I please see _____'s health card?" .... 1. Yes ___
2. No, or don't have a health card ___
8. Don't know if have a health card ___
(If "No" or "Don't know," go to 4.5)

Mark whether each antigen was given:

4.4.0 BCG .... 1. Yes ___ 2. No ___	4.4.5 DPT1 .... 1. Yes ___ 2. No ___
4.4.1 Polio 0 .... 1. Yes ___ 2. No ___	4.4.6 DPT2 .... 1. Yes ___ 2. No ___
4.4.2 Polio 1 .... 1. Yes ___ 2. No ___	4.4.7 DPT3 .... 1. Yes ___ 2. No ___
4.4.3 Polio 2 .... 1. Yes ___ 2. No ___	4.4.8 Measles .... 1. Yes ___ 2. No ___
4.4.4 Polio 3 .... 1. Yes ___ 2. No ___	

    4.4.9 Record the last weight from the health card .... kilograms ____ ____.____
(No weight recorded = 88.8)

    4.4.10 Record the date of the last weight .... ___ ___/___ ___/___ ___
(d   d / m   m / y   y)

4.5   "Was _____ ever breastfed?"   .... 1. Yes ___

                   2. No ___

                   8. Don't know ___

                   (If "No" or "Don't know," go to 4.6)

        4.5.1   If "Yes," ask: "For how many months

                did _____ drink only breastmilk?" .... months ____ ____ . ___ ___

                (Don't know = 88.88)

        4.5.2   If "Yes," ask: "How old (in months) was

                _____ when (s)he stopped breastfeeding?" .... months ____ ____ . ___ ___

                (Don't know = 88.88)

4.6   "What was the date of _____'s death?" .... ___ ___/___ ___/___ ___

                   (d   d / m   m / y   y)

4.7   "How many days long was the illness that led to _____'s death?" .... days ___ ___

4.8   "During the month before _____'s death, did you seek
care for him/her outside the home?" .... 1. Yes ___

                   2. No ___

                   (If "No," go to 4.11)

     If "Yes," ask: "Where or from whom did you seek care? Did you seek care from...

        4.8.1   a traditional healer (including a TBA)?" .... 1. Yes ___

                   2. No ___

        4.8.2   a religious leader?   .... 1. Yes ___

                   2. No ___

        4.8.3   a health center, health post or dispensary .... 1. Yes ___

                   2. No ___

                   (If "No," go to 4.8.4)

             4.8.3.1   If "Yes" for health center, health post or dispensary, ask:

                        "What is the name and address of the facility?" _____

                        _____

                        _____

        4.8.4   a hospital? .... 1. Yes ___

                   2. No ___

                   (If "No," go to 4.8.5)

             4.8.4.1   *If "Yes" for hospital, ask:*

                        "What is the name and address of the hospital?" _____

                        _____

                        _____

        4.8.5   NOTHING

             4.8.5.1   NOTHING

        4.8.6   a private physician? .... 1. Yes ___

                   2. No ___

                   (If "No," go to 4.8.7)

Child's Identification Number __ __ __ __

    4.8.6.1   ***If "Yes" for private physician, ask:***
"What is the physician's name and address?" _____
_____
_____

4.8.7   a pharmacy, drug seller, store, market? .... 1. Yes ___
2. No ___

4.8.8   NEANT

4.8.9   a relative or friend outside the household .... 1. Yes ___
2. No ___

(If no care was sought outside the home, go to 4.11)

4.9   "How many days was _____ ill before you
first sought care for the illness outside the home?" .... days ___ ___

(If no care was sought at a formal health facility, go to 4.11)

4.10   "How many days was (s)he ill before you first
sought care at a hospital or other health facility?" .... days ___ ___

4.11   "Where did _____ die?"
1. Hospital ___
2. Other health facility ___
3. On route to hospital or other health facility ___
4. Home ___
5. Other (specify _____) ___

(If "On route to hospital or other health facility," "Home," or "Other," go to Section 5)

For deaths at hospital or other health facility, ask:
4.11.1   "What is the facility name and address?"

Section 5: Open history question

"Could you tell me briefly about your child's illness that led to death?"

Prompt: "Was there anything else?"

Instructions to surveyor: Allow the respondent to tell you about the illness in his or her own words. Do not prompt except for asking whether there was anything else.

_____

_____

_____

_____

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_____

_____

5.1   *Tick all items mentioned spontaneously:*

5.1.1 .... Diarrhea (local terms: _____, _____) ___

5.1.2 .... Cough (local terms: _____, _____) ___

5.1.3 .... Fever (local terms: _____, _____) ___

5.1.4 .... Rash (local terms: _____, _____) ___

5.1.5 .... Injury (local terms: _____, _____) ___

5.1.6 ....Coma (local terms: _____, _____) ___

5.1.7 .... Convulsion (local terms: _____, _____) ___

5.1.8 .... Stiff neck (local terms: _____, _____) ___

5.1.9 ....Tetanus (local terms: _____, _____) ___

5.1.10 .... Measles (local terms: _____, _____) ___

5.1.11 .... Kwashkiorkor (local terms: _____, _____) ___

5.1.12 .... Marasmus (local terms: _____, _____) ___

5.1.13 .... Difficult breathing (local terms: _____, _____) ___

5.1.14 .... Fast breathing (local terms: _____, _____) ___

5.1.15 .... Wheezing (local terms: _____, _____) ___

5.1.16 .... Complicated delivery (local terms: _____, _____) ___

5.1.17 ....Malformation (local terms: _____, _____) ___

5.1.18 .... Multiple birth (local terms: _____, _____) ___

5.1.19 .... Very small at birth (local terms: _____, _____) ___

5.1.20 .... Very thin (local terms: _____, _____) ___

5.1.21 .... Born early (local terms: _____, _____) ___

5.1.22 .... Pneumonia (local terms: _____, _____) ___

5.1.23 .... Malaria (local terms: _____, _____) ___

5.1.24 .... Jaundice (local terms: _____, _____) ___

5.1.25 .... Abdominal pain (local terms: _____, _____) ___

5.1.26 .... Other terms (specify: _____, _____, _____, _____) ___

Section 6: Injury

6.1   "Did _____ die from an injury, bite, burn, poisoning or drowning?" .... 1. Yes ___

                           2. No ___

                           8. Don't know ___

                   (If "No" or "Don't know," go to Section 7)

      6.1.1   ***If "Yes," ask:*** "What kind of injury?" .... 1. Motor vehicle accident ___

                           2. Fall ___

                           3. Drowning ___

                           4. Poisoning ___

                 5. Bite or sting by venomous animals ___

                           6. Burn ___

                           7. Violence ___

                           8. Birth injury ___

             9. Other injury (specify _____) ___

      6.1.2   ***If "Yes," ask:*** "Did _____ die within 24 hours of this injury?" .... 1. Yes ___

                           2. No ___

          IF "YES, DIED WITHIN 24 HOURS," GO TO SOCIAL AUTOPSY

                 IF "NO," CONTINUE WITH SECTION 7

Section 7: Age Determination

7.1   Record the child's date of birth from question 4.1 .... ___ ___/___ ___/___ ___

                                                        (d   d / m m / y   y)

7.2   Record the child's date of death from question 4.6 .... ___ ___/___ ___/___ ___

                                                        (d   d / m m / y   y)

7.3   Determine the age:

        Mark the child's age in months at the time of death: .... 1. Less than one month ___

        [Subtract the birth date (question 7.1) from the date   2. One month or more ___

        of death (question 7.2)]

      7.3.1   "I have calculated that _____ was

             ___ ___ days/months old when (s)he died. Is this correct?" .... 1. Yes ___

             (Circle the correct word)   2. No ___

                   IF "ONE MONTH OR MORE," SKIP TO

                SECTION 9. POSTNEONATAL DEATHS

                  IF "LESS THAN ONE MONTH," CONTINUE

                 WITH SECTION 8. NEONATAL DEATHS

Section 8: Neonatal deaths

8.1   Record the child's age in days at the time of death

        (from question 7.3.1)   .... days ____ ____

8.2 "Did this child's pregnancy end early, on time, or late?" .... 1. Early ___
2. On time ___
3. Late ___
8. Don't know ___

8.3 "Did the waters break before labor or during labor?" .... 1. Before ___
2. During ___
8. Don't Know ___
(If "During" or "Don't know", go to 8.4)

8.3.1 If waters broke before labor ask: "How much time
before labor began did the waters break?" .... 1. Less than one day ___
2. More than one day ___

8.4 "Did (s)he have any malformations at birth?" .... 1. Yes ___
2. No ___
8. Don't know ___
(If "No" or "Don't know," go to 8.5)

If "Yes," ask: "Where were the malformations? Were they on the:

8.4.1 head?" .... 1. Yes ___
2. No ___

8.4.2 body?" .... 1. Yes ___
2. No ___

8.4.3 arms or hands?" .... 1. Yes ___
2. No ___

8.4.4 legs or feet?" .... 1. Yes ___
2. No ___

8.5 "At the time of birth was _____ .... 1. Very small? ___
(Read all the possible answers to the respondent)   2. Smaller than usual? ___
3. About average? ___
4. Larger than usual? ___

8.6 "Was _____ able to breathe after the birth?" .... 1. Yes ___
2. No ___
8. Don't know ___

8.7 "Was _____ able to suckle in a normal way after birth?" .... 1. Yes ___
2. No ___
8. Don't know ___
(If "No" or "Don't know," go to 8.8)

8.7.1 If "Yes," ask: "Did _____ stop suckling?" .... 1. Yes ___
2. No ___
(If "No" or "Don't know," go to 8.8)

8.7.1.1 If "Yes," ask: "How many days after birth
did _____ stop suckling?" .... days ___ ___

8.8   "Was _____able to cry after birth?" .... 1. Yes ___

                                                             2. No ___

                                                           8. Don't know ___

                                        (If "No" or "Don't know," go to 8.9)

    8.8.1   If "Yes," ask: "Did _____ stop being able to cry?" .... 1. Yes ___

                                                          2. No ___

                                            (If "No" or "Don't know," go to 8.9)

        8.8.1.1   If "Yes," ask: "How many days after birth

                      did _____ stop crying?" .... days ___ ___

8.9   "During the illness that led to death,

        did _____ have spasms or convulsions?" .... 1. Yes ___

                                                          2. No ___

8.10   "During the illness that led to death, did s(he) become

        unresponsive/unconscious?"   .... 1.Yes ___

                                                           2. No ___

                                                        8. Don't know ___

8.11   "During the illness that led to death, did (s)he have a bulging fontanelle?" .... 1.Yes ___

                                                          2. No ___

                                                          8. Don't know ___

8.12   "During the illness that led to death, did _____ have .... 1.Yes ___

        redness or drainage from the umbilical cord stump?"   2. No ___

                                                            8. Don't know ___

8.13   "During the illness that led to death, did (s)he have a skin rash

        with bumps containing pus?"   .... 1.Yes ___

                                                           2. No ___

                                                           8. Don't know ___

8.14   "During the illness that led to death, did _____ have a fever?" .... 1. Yes ___

                                                           2. No ___

                                                           8. Don't know ___

                                          (If "No" or "Don't know," go to 8.15)

    8.14.1   If "Yes," ask: "How many days did the fever last?" .... days ___ ___

8.15   "During the illness that led to death, did _____ have frequent liquid,

        watery or loose stools? .... 1. Yes ___

                                                           2. No ___

                                                           8. Don't know ___

8.16   "During the illness that led to death, did _____ have

        (local terms for diarrhea: _____, _____)?" .... 1. Yes ___

                                                           2. No ___

                                                           8. Don't know ___

                            (If "No" or "Don't know" for 8.15 and 8.16, go to 8.17)

If "frequent liquid, watery or loose stools or local term for diarrhea," ask:

8.16.1 "For how many days did (s)he have
liquid/watery/loose stools?" .... days ____ ____

8.16.2 "Was there visible blood in the liquid/watery/loose stools?" .... 1. Yes ___
2. No ___
8. Don't know ___

8.17 "During the illness that led to death, did _____ have a cough?" .... 1. Yes ___
2. No ___
8. Don't know ___
(If "No" or "Don't know," go to 8.18)

8.17.1 *If "Yes," ask:* "For how many days did the cough last?" .... days ____ ____

8.18 "During the illness that led to death, did _____ have difficult breathing?" .... 1. Yes ___
2. No ___
8. Don't know ___
(If "No" or "Don't know," go to 8.19)

8.18.1 *If "Yes," ask:* "For how many days did the
difficult breathing last?" .... days ____ ____

8.19 "During the illness that led to death, did _____ have fast breathing?" .... 1. Yes ___
2. No ___
8. Don't know ___

8.20 "During the illness that led to death, did _____ have indrawing of the chest?" .... 1. Yes ___
(Demonstrate chest indrawing) 2. No ___
8. Don't know ___

GO TO SOCIAL AUTOPSY QUESTIONNAIRE

Section 9: Postneonatal deaths

9.1 Record the child's age in completed months
at the time of death (from question 7.3.1) .... Number of completed months ____ ____

9.2 "During the last month of the illness that led to death,
did _____ have a fever?" .... 1. Yes ___
2. No ___
8. Don't know ___
(If "No" or "Don't know", go to 9.3)

9.2.1 *If fever, ask:* "How many days did the fever last?" .... days ____ ____

9.3 "During the last month of the illness that led to death,
did _____ have frequent liquid, watery or loose stools?" .... 1. Yes ___
2. No ___
8. Don't know ___

Child's Identification Number __ __ __ __

9.4 "During the last month of the illness that led to death, did (s)he have
(local terms for diarrhea:_____, _____)?" .... 1. Yes ___
2. No ___
8. Don't know ___
(If "No" or "Don't know" for 9.3 and 9.4, go to 9.5)

If frequent liquid/watery/loose stools or local term for diarrhoea, ask:

9.4.1 "For how many days did (s)he have
liquid/watery/loose stools?" .... days ____ ____

9.4.2 "Was there visible blood in the liquid/watery stools?" .... 1. Yes ___
2. No ___
8. Don't know ___

9.5 "During the last month of the illness that led to death,
did _____ have a cough?" .... 1. Yes ___
2. No ___
8. Don't know ___
(If "No" or "Don't know", go to 9.6)

9.5.1 If "Yes", ask: "For how many days did the cough last?" .... days ____ ____

9.6 "During the last month of the illness that led to death,
did _____ have difficult breathing?" .... 1. Yes ___
2. No ___
8. Don't know ___
(If "No" or "Don't know", go to 9.7)

9.6.1 *If "Yes", ask:* "For how many days did the
difficult breathing last?" .... days ____ ____

9.7 "During the last month of the illness that led to death,
did _____ have fast breathing?" .... 1. Yes ___
2. No ___
8. Don't know ___

9.8 "During the last month of the illness that led to death,
did _____ have indrawing of the chest?" .... 1. Yes ___
2. No ___
8. Don't know ___

9.9 "Did _____ experience any generalized convulsions
during the last month of the illness that led to death?" .... 1. Yes ___
(Demonstrate a generalized convulsion) 2. No ___
8. Don't know ___

9.10 "Was _____ unconscious at any time during the last month of the
illness that led to death?" .... 1. Yes ___
2. No ___
8. Don't know ___

9.11 "At any time during the last month of the illness
that led to death, did _____ stop being able to grasp?" .... 1. Yes ___
2. No ___
8. Don't know ___
(If "No" or "Don't know," go to 9.12)

    9.11.1 ***If "Yes," ask:*** "How long before (s)he died
did _____ stop being able to grasp?" .... 1. Less than 12 hours ___
2. 12 hours or more ___

9.12 "At any time during the last month of the illness that led to death,
did _____ stop being able to respond to a voice?" .... 1. Yes ___
2. No ___
8. Don't know ___
(If "No" or "Don't know," go to 9.13)

    9.12.1 ***If "Yes," ask:*** "How long before (s)he died
did _____ stop being able to respond to a voice?" .... 1. Less than 12 hours ___
2. 12 hours or more ___

9.13 "At any time during the last month of the illness that led to death, did _____
stop being able to follow movements with his/her eyes?" .... 1. Yes ___
2. No ___
8. Don't know ___
(If "No" or "Don't know," go to 9.14)

    9.13.1 If "Yes," ask: "How long before (s)he died
did _____ stop being able to follow movements
with his/her eyes?" .... 1. Less than 12 hours ___
2. 12 hours or more ___

9.14 "Did _____ have a stiff neck during the last month of the illness
that led to death?" .... 1. Yes ___
(Demonstrate a stiff neck) 2. No ___
8. Don't know ___

9.15 "Did _____ have a bulging fontanelle during the last month of the illness
that led to death?" .... 1. Yes ___
2. No ___
8. Don't know ___

9.16 "During the last month of the illness that led to death, did _____
bleed into his/her skin or from any body opening?" .... 1. Yes ___
2. No ___
8. Don't know ___

9.17 "During the month before death, did _____ have a skin rash?" .... 1. Yes ___
2. No ___
8. Don't know ___

Child's Identification Number __ __ __ __

9.17.A "During the month before death, did _____ have a measles rash?" .... 1. Yes ___
2. No ___
8. Don't know ___
(If "No" or "Don't know" for 9.17 and 9.17.A, go to 9.18)

9.17.1 ***If "Yes, rash or measles rash,"*** ask:
"Where was the rash?" .... 1. Face ___
2. Body ___
3. Arms/legs ___
8. Don't know ___

9.17.2 ***If "Yes, rash or measles rash,"*** ask:
"How many days did the rash last?" .... days ____ ____

9.18 "Was _____ very thin during the month before (s)he died?" .... 1. Yes ___
2. No ___
8. Don't know ___

9.19 "Did _____ have swollen legs or feet during the month before (s)he died?" .... 1. Yes ___
2. No ___
8. Don't know ___

9.20 "Did _____ have "marasmus" (local term: _____)
during the month before (s)he died?" .... 1. Yes ___
2. No ___
8. Don't know ___

9.21 "Did _____ have "kwashiorkor" (local term: _____)
during the month before (s)he died?" .... 1. Yes ___
2. No ___
8. Don't know ___

9.22 "During the month before s(he) died, did _____ have pale palms?"
(Show photo and/or explore local terms: _____, _____) .... 1. Yes ___
2. No ___
8. Don't know ___

GO TO SOCIAL AUTOPSY QUESTIONNAIRE

SOCIAL AUTOPSY FORM

CHILD'S ID #: __ __ __ __ DATE: __/__/__ SURVEYOR ID #: __ __

INSTRUCTIONS TO SURVEYOR: 1) COMPLETE I.D. 2–4) REVIEW THE ILLNESS SYMPTOMS. 5–6) ASK ABOUT THE ACTIONS TAKEN FOR THE ILLNESS. COMPLETE ONE ROW FOR EACH ACTION. 7) CHECK FOR ERRORS.

2) Transfer the symptoms from the Medical Autopsy form to the symptoms box below. Then: 3) state: "Now I would like to review the symptoms of your child's illness. First, let's try to put them in the order that they occurred. You mentioned that the child had (read the symptoms). Which happened first? Which happened next? 4) STATE: "Now for each symptom, I would like to know the day of the illness that the symptom started, how long it lasted, and the reason you think the child had the problem. 4A) What day did (symptom __) start? 4B) How many days did it last? 4C) Why do you think the child got (symptom __)?"

INSIDE-THE-HOME

SYMPTOMS	1	2	3	4	5	6	7	8	9	6A) *If the action was in-home treatment, ask:*
DAY OF SYMPTOM										
DURATION OF SYMPTOM										
REASON FOR SYMPTOM										"Why did you think that (treatment) was a good thing to do?"

5) RECORD ACTION CODE & DAY OF ACTION, AND CHECK SYMPTOM BOXES. 5A) STATE: "Now, what was the first thing you did when you noticed that the child was ill?" 5B) "How many days had the child been ill when you (first) took this action?" [5C) "How many days had the child been ill when you last took this action?"] 5D) "Which symptoms did (s)he have when you (first) did this?"

#	ACTION	FIRST DAY OF ACTION	LAST DAY OF ACTION	1	2	3	4	5	6	7	8	9	
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													

ANNEX B

6 9

OUTSIDE-THE-HOME

6B) IF THE ACTION WAS AN OUTSIDE-THE-HOME TREATMENT, ASK:

INSIDE or OUTSIDE-THE-HOME

6C) IF THE CHILD WAS NOT SEEN BY A HEALTH AGENT, ASK:

A C T I O N	"Why did you go there ?"	"What did the person you saw do for the problem ?"	"What did this person suggest that YOU do for the problem ?"	"Were you able to do (the first thing) that this person suggested ?"		"Were you able to do (the second thing) that this person suggested ?"		"What prevented you from taking the child to see a (health agent) at this time ?" Nurse or nurse auxiliary	Doctor or midwife
				1= Y 2= N	If "NO", ask: "Why were you not able to follow the advice ?"	1= Y 2= N	If "NO", ask: "Why were you not able to follow the advice ?"		
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									

Treatment and Records Questionnaire

Child's Identification Number __ __ __ __

Instructions for surveyor: This questionnaire is administered after the Social Autopsy, and is the last part of the interview. It provides more information on outside-the-home health care provided to the child during the illness that led to death. The Treatment and Records and Birth and Death Certificate Surveyor's Procedures Manual explains how to complete this questionnaire.

STATE: *"Now I world like to ask you some questions abort any records you may have of _____'s birth and medical treatments."*

1.   "Was a birth certificate issued?" .... 1. Yes ___
                                                                                          2. No ___
                                                                                          8. Don't know ___
                                                                                  (If "No" or "Don't know", go to 2)

   1.1   "May I see the certificate, please?" .... 1. Yes ___
                                                                                          2. No ___

   1.2   Record the date of birth .... ___ ___/___ ___/___ ___
                                                                                          (d   d / m   m / y   y)

2.   "Do yor have any health records from the child's illness?" .... 1. Yes ___
                                                                                          2. No ___
                                                                                          8. Don't know ___
                                                                                  (If "No" or "Don't know", go to 4)

   2.1   *If "Yes", ask:* "May I see the health records? .... 1. Yes ___
                                                                                          2. No ___
                                                                                  (If "No", go to 4)

3.   MEDICAL NOTES

   3.A   Number of the Child's health card .... ___/___/___
   3.1   *The date of the last note*

   Date of the   **Date of the next**   **Date of the prior**
   last note   **to last note**   **to next to last note**

   3.1.1 __ __/__ __/__ __   3.1.2. __ __/__ __/__ __   3.1.3. __ __/__ __/__ __
        (d d / m m / y y)   (d d / m m / y y)   (d d / m m / y y)

3.2 *Record the source of the note*

3.2.1 **Source of the last note**	3.2.2 **Source of the next to last note**	3.2.3 **Src. of the prior to next to last note**
3.2.1 .1 1. Health Card (blue) ___ 2. ANC card (red) ___ 3. Other (specify:_____) ___	3.2.2 .1 1. Health Card (blue) ___ 2. ANC card (red) ___ 3. Other (specify:_____) ___	3.2.3 .1 1. Health Card (blue) ___ 2. ANC card (red) ___ 3. Other (specify:_____) ___
3.2.1 .2 Control Visit .. 1. Yes ___ .... 2. No ___	3.2.2 .2 Control Visit .. 1. Yes ___ 2. No ___	3.2.3 .2 Control Visit .. 1. Yes ___ 2. No ___

Transcribe the note

3.3 *The Symptoms*

3.3.1 **Symptoms of the last note**	3.3.2 **Symptoms of the next to last note**	3.3.3 **Sym. of the prior to next to last note**
3.3.1 .1 Diarrhea .... 1. Yes ___ 2. No ___	3.3.2 .1 Diarrhea .... 1. Yes ___ 2. No ___	3.3.3 .1 Diarrhea .... 1. Yes ___ 2. No ___
3.3.1 .2 Fast breathing 1. Yes ___ 2. No ___	3.3.2 .2 Fast breathing 1. Yes ___ 2. No ___	3.3.3 .2 Fast breathing 1. Yes ___ 2. No ___
3.3.1 .3 Other respiratory problems .... 1. Yes ___ 2. No ___	3.3.2 .3 Other respiratory problems .... 1. Yes ___ 2. No ___	3.3.3 .3 Other respiratory problems .... 1. Yes ___ 2. No ___
3.3.1 .4 Fever .... 1. Yes ___ 2. No ___	3.3.2 .4 Fever .... 1. Yes ___ 2. No ___	3.3.3 .4 Fever .... 1. Yes ___ 2. No ___
3.3.1 .5 Rash .... 1. Yes ___ 2. No ___	3.3.2 .5 Rash .... 1. Yes ___ 2. No ___	3.3.3 .5 Rash .... 1. Yes ___ 2. No ___
3.3.1 .6 Malnutrition or anemia 1. Yes ___ 2. No ___	3.3.2 .6 Malnutrition or anemia ...... 1. Yes ___ 2. No ___	3.3.3 .6 Malnutrition or anemia ...... 1. Yes ___ 2. No ___
3.3.1 .7 Injury 1. Yes ___ 2. No ___	3.3.2 .7 Injury .... 1. Yes ___ 2. No ___	3.3.3 .7 Injury .... 1. Yes ___ 2. No ___
3.3.1 .8 Other (specify _____) 1. Yes ___ 2. No ___	3.3.2 .8 Other (specify _____) 1. Yes ___ 2. No ___	3.3.3 .8 Other (specify _____) 1. Yes ___ 2. No ___
3.3.1 .9 Evolution of the illness 1. Noted ___ 2. Missing ___	3.3.2 .9 Evolution of the illness ... 1. Noted ___ 2. Missing ___	3.3.3 .9 Evolution of the illness ... 1. Noted ___ 2. Missing ___

3.4 *Observations*

3.4.1 **Observations of the last note**	3.4.2 **Ob. next to the last note**	3.4.3 **Ob. prior to the next to the last note**
3.4.1 .1 Diarrhea .... 1. Yes ___ 2. No ___ 9. Missing ___	3.4.2 .1 Diarrhea .... 1. Yes ___ 2. No ___ 9. Missing ___	3.4.3 .1 Diarrhea .... 1. Yes ___ 2. No ___ 9. Missing ___
3.4.1 .2 Dehydration ... 1. Yes ___ 2. No ___ 9. Missing ___	3.4.2 .2 Dehydration ... 1. Yes ___ 2. No ___ 9. Missing ___	3.4.3 .2 Dehydration ... 1. Yes ___ 2. No ___ 9. Missing ___

Child's Identification Number __ __ __ __

3.4.1 .3 Blood in the ... 1. Yes ___ stools 2. No ___ 9. Missing ___	3.4.2 .3 Blood in the stools .... 1. Yes ___ 2. No ___ 9. Missing ___	3.4.3 .3 Blood in the stools .... 1. Yes ___ 2. No ___ 9. Missing ___
3.4.1 .4 Fast breathing 1. Yes ___ 2. No ___ 9. Missing ___	3.4.2 .4 Fast breathing 1. Yes ___ 2. No ___ 9. Missing ___	3.4.3 .4 Fast breathing 1. Yes ___ 2. No ___ 9. Missing ___
3.4.1 .5 Lower chest wall indrawing .... 1. Yes ___ 2. No ___ 9. Missing ___	3.4.2 .5 Lower chest wall indrawing .... 1. Yes ___ 2. No ___ 9. Missing ___	3.4.3 .5 Lower chest wall indrawing .... 1. Yes ___ 2. No ___ 9. Missing ___
3.4.1 .6 Crepitant rales 1. Yes ___ 2. No ___ 9. Missing ___	3.4.2 .6 Crepitant rales 1. Yes ___ 2. No ___ 9. Missing ___	3.4.3 .6 Crepitant rales 1. Yes ___ 2. No ___ 9. Missing ___
3.4.1 .7 Rectal Temperature .... ___ ___ . ___ *(Missing = 99.9)*	3.4.2 .7 Rectal Temperature. .... ___ ___ . ___ *(Missing = 99.9)*	3.4.3 .7 Rectal Temperature .... ___ ___ . ___ *(Missing = 99.9)*
3.4.1 .8 Many or severe skin pustules .... 1. Yes ___ 2. No ___ 9. Missing ___	3.4.2 .8 Many or severe skin pustules .... 1. Yes ___ 2. No ___ 9. Missing ___	3.4.3 .8 Many or severe skin pustules .... 1. Yes ___ 2. No ___ 9. Missing ___
3.4.1 .9 Rash generalized .... 1. Yes ___ 2. No ___ 9. Missing ___	3.4.2 .9 Rash generalized .... 1. Yes ___ 2. No ___ 9. Missing ___	3.4.3 .9 Rash generalized .... 1. Yes ___ 2. No ___ 9. Missing ___
3.4.1 .10 Stiff neck ...... 1. Yes ___ 2. No ___ 9. Missing ___	3.4.2 .10 Stiff neck ...... 1. Yes ___ 2. No ___ 9. Missing ___	3.4.3 .10 Stiff neck ...... 1. Yes ___ 2. No ___ 9. Missing ___
3.4.1 .11 Bulging .... 1. Yes ___ fontanelle 2. No ___ 9. Missing ___	3.4.2 .11 Bulging fontanelle ...... 1. Yes ___ 2. No ___ 9. Missing ___	3.4.3 .11 Bulging fontanelle ...... 1. Yes ___ 2. No ___ 9. Missing ___
3.4.1 .12 Convulsions .. 1. Yes ___ 2. No ___ 9. Missing ___	3.4.2 .12 Convulsions .. 1. Yes ___ 2. No ___ 9. Missing ___	3.4.3 .12 Convulsions .. 1. Yes ___ 2. No ___ 9. Missing ___
3.4.1 .13 Unconscious . 1. Yes ___ or lethargic 2. No ___ 9. Missing ___	3.4.2 .13 Unconscious or lethargic .... 1. Yes ___ 2. No ___ 9. Missing ___	3.4.3 .13 Unconscious or lethargic .... 1. Yes ___ 2. No ___ 9. Missing ___
3.4.1 .14 Malnutrition severe or moderate ... 1. Yes ___ 2. No ___ 9. Missing ___	3.4.2 .14 Malnutrition severe or moderate ... 1. Yes ___ 2. No ___ 9. Missing ___	3.4.3 .14 Malnutrition severe or moderate ... 1. Yes ___ 2. No ___ 9. Missing ___

3.4.1 .15	Edema of two feet .... 1. Yes ___ 2. No ___ 9. Missing ___	3.4.2 .15	Edema of two feet .... 1. Yes ___ 2. No ___ 9. Missing ___	3.4.3 .15	Edema of two feet .... 1. Yes ___ 2. No ___ 9. Missing ___
3.4.1 .16	Pale palms .... 1. Yes ___ 2. No ___ 9. Missing ___	3.4.2 .16	Pale palms .... 1. Yes ___ 2. No ___ 9. Missing ___	3.4.3 .16	Pale palms .... 1. Yes ___ 2. No ___ 9. Missing ___
3.4.1 .17	Injury .... 1. Yes ___ 2. No ___ 9. Missing ___	3.4.2 .17	Injury .... 1. Yes ___ 2. No ___ 9. Missing ___	3.4.3 .17	Injury .... 1. Yes ___ 2. No ___ 9. Missing ___
3.4.1 .18	Absence of weak capacity to breastfeed or cry .... 1. Yes ___ 2. No ___ 9. Missing ___	3.4.2 .18	Absence of weak capacity to breastfeed or cry .... 1. Yes ___ 2. No ___ 9. Missing ___	3.4.3 .18	Absence of weak capacity to breastfeed or cry .... 1. Yes ___ 2. No ___ 9. Missing ___
3.4.1 .19	Umbilical redness extending ...... 1. Yes ___ to skin 2. No ___ 9. Missing ___	3.4.2 .19	Umbilical redness extending ...... 1. Yes ___ to skin 2. No ___ 9. Missing ___	3.4.3 .19	Umbilical redness extending ...... 1. Yes ___ to skin 2. No ___ 9. Missing ___
3.4.1 .20	Malformation. 1. Yes ___ 2. No ___ 9. Missing ___	3.4.2 .20	Malformation. 1. Yes ___ 2. No ___ 9. Missing ___	3.4.3 .20	Malformation . 1. Yes ___ 2. No ___ 9. Missing ___

3.5 *Neonatal Diagnosis*

Use this section for children who were one month old or more before dying. If the child was more than one month at the time of death use section 3.6.

3.5.1	**Diagnosis of the last note**	3.5.2	**D. next to the last note**	3.5.3	**D. prior to the next to the last note**
3.5.1 .1	Diarrhea .... 1. Yes ___ 2. No ___	3.5.2 .1	Diarrhea .... 1. Yes ___ 2. No ___	3.5.3 .1	Diarrhea .... 1. Yes ___ 2. No ___
3.5.1 .2	Pneumonia .... 1. Yes ___ 2. No ___	3.5.2 .2	Pneumonia .... 1. Yes ___ 2. No ___	3.5.3 .2	Pneumonia .... 1. Yes ___ 2. No ___
3.5.1 .3	Meningitis ..... 1. Yes ___ 2. No ___	3.5.2 .3	Meningitis ..... 1. Yes ___ 2. No ___	3.5.3 .3	Meningitis ..... 1. Yes ___ 2. No ___
3.5.1 .4	Septicimia ..... 1. Yes ___ 2. No ___	3.5.2 .4	Septicimia ..... 1. Yes ___ 2. No ___	3.5.3 .4	Septicimia ..... 1. Yes ___ 2. No ___
3.5.1 .5	Injury .... 1. Yes ___ 2. No ___	3.5.2 .5	Injury .... 1. Yes ___ 2. No ___	3.5.3 .5	Injury .... 1. Yes ___ 2. No ___
3.5.1 .6	Low birthweight or born premature ...... 1. Yes ___ 2. No ___	3.5.2 .6	Low birthweight or born premature ...... 1. Yes ___ 2. No ___	3.5.3 .6	Low birthweight or born premature ...... 1. Yes ___ 2. No ___

3.5.1 .7	Neonatal tetanus	1. Yes ___ 2. No ___	3.5.2 .7	Neonatal tetanus	1. Yes ___ 2. No ___	3.5.3 .7	Neonatal tetanus	1. Yes ___ 2. No ___
3.5.1 .8	Birth .... Asphyxia	1. Yes ___ 2. No ___	3.5.2 .8	Birth Asphyxia	1. Yes ___ 2. No ___	3.5.3 .8	Birth Asphyxia	1. Yes ___ 2. No ___
3.5.1 .9	Trauma	1. Yes ___ 2. No ___	3.5.2 .9	Trauma	1. Yes ___ 2. No ___	3.5.3 .9	Trauma	1. Yes ___ 2. No ___
3.5.1 .10	Malformation .	1. Yes ___ 2. No ___	3.5.2 .10	Malformation .	1. Yes ___ 2. No ___	3.5.3 .10	Malformation ..	1. Yes ___ 2. No ___
3.5.1 .11	Other .... (specify ____)	1. Yes ___ 2. No ___	3.5.2 .11	Other .... (specify_____)	1. Yes ___ 2. No ___	3.5.3 .11	Other .... (specify _____)	1. Yes ___ 2. No ___

3.6 *Post-neonatal Diagnosis*
Use this section for children who were one month old or more before dying. If the child was less than one month at the time of death use section 3.5.

3.6.1	**Diagnosis of the last note**		3.6.2	**D. next to the last note**		3.6.3	**D. prior to the next to the last note**	
3.6.1 .1	Diarrhea	1. Yes ___ 2. No ___	3.6.2 .1	Diarrhea	1. Yes ___ 2. No ___	3.6.3 .1	Diarrhea	1. Yes ___ 2. No ___
3.6.1 .2	Pneumonia	1. Yes ___ 2. No ___	3.6.2 .2	Pneumonia	1. Yes ___ 2. No ___	3.6.3 .2	Pneumonia	1. Yes ___ 2. No ___
3.6.1 .3	Measles	1. Yes ___ 2. No ___	3.6.2 .3	Measles	1. Yes ___ 2. No ___	3.6.3 .3	Measles	1. Yes ___ 2. No ___
3.6.1 .4	Meningitis	1. Yes ___ 2. No ___	3.6.2 .4	Meningitis	1. Yes ___ 2. No ___	3.6.3 .4	Meningitis	1. Yes ___ 2. No ___
3.6.1 .5	Malaria	1. Yes ___ 2. No ___	3.6.2 .5	Malaria	1. Yes ___ 2. No ___	3.6.3 .5	Malaria	1. Yes ___ 2. No ___
3.6.1 .6	Hemorragic fever Dengue	1. Yes ___ 2. No ___	3.6.2 .6	Hemorragic fever Dengue	1. Yes ___ 2. No ___	3.6.3 .6	Hemorragic fever Dengue	1. Yes ___ 2. No ___
3.6.1 .7	Septecimia	1. Yes ___ 2. No ___	3.6.2 .7	Septecimia	1. Yes ___ 2. No ___	3.6.3 .7	Septecimia	1. Yes ___ 2. No ___
3.6.1 .8	Malnutrition ...	1. Yes ___ 2. No ___	3.6.2 .8	Malnutrition ...	1. Yes ___ 2. No ___	3.6.3 .8	Malnutrition	1. Yes ___ 2. No ___
3.6.1 .9	Anemia	1. Yes ___ 2. No ___	3.6.2 .9	Anemia	1. Yes ___ 2. No ___	3.6.3 .9	Anemia	1. Yes ___ 2. No ___
3.6.1 .10	Injury	1. Yes ___ 2. No ___	3.6.2 .10	Injury	1. Yes ___ 2. No ___	3.6.3 .10	Injury	1. Yes ___ 2. No ___
3.6.1 .11	Other .... (specify_____)	1. Yes ___ 2. No ___	3.6.2 .11	Other .... (specify_____)	1. Yes ___ 2. No ___	3.6.3 .11	Other .... (specify_____)	1. Yes ___ 2. No ___

Child's Identification Number __ __ __ __

3.7 *Treatments*

	3.7.1 **Treatments of the last note**	3.7.2 **Tr. of the next to the last note**	3.7.3 **Tr. prior to the next to the last note**
3.7.1.1 / 3.7.2.1 / 3.7.3.1	IV solutions ... 1. Yes ___ 2. No ___	IV solutions ... 1. Yes ___ 2. No ___	IV solutions ... 1. Yes ___ 2. No ___
3.7.1.2 / 3.7.2.2 / 3.7.3.2	ORS .... 1. Yes ___ 2. No ___	ORS .... 1. Yes ___ 2. No ___	ORS .... 1. Yes ___ 2. No ___
3.7.1.3 / 3.7.2.3 / 3.7.3.3	Antibiotic Injections ...... 1. Yes ___ 2. No ___	Antibiotic Injections ...... 1. Yes ___ 2. No ___	Antibiotic Injections ...... 1. Yes ___ 2. No ___
3.7.1.4 / 3.7.2.4 / 3.7.3.4	Oral antibiotics ..... 1. Yes ___ 2. No ___	Oral antibiotics ..... 1. Yes ___ 2. No ___	Oral antibiotics ..... 1. Yes ___ 2. No ___
3.7.1.5 / 3.7.2.5 / 3.7.3.5	Antimalarial Injections ...... 1. Yes ___ 2. No ___	Antimalarial Injections ...... 1. Yes ___ 2. No ___	Antimalarial Injections ...... 1. Yes ___ 2. No ___
3.7.1.6 / 3.7.2.6 / 3.7.3.6	Oral antimalarial .... 1. Yes ___ 2. No ___	Oral antimalarial .... 1. Yes ___ 2. No ___	Oral antimalarial .... 1. Yes ___ 2. No ___
3.7.1.7 / 3.7.2.7 / 3.7.3.7	Tetanus Immunoglobulin .... 1. Yes ___ 2. No ___	Tetanus Immunoglobulin .... 1. Yes ___ 2. No ___	Tetanus Immunoglobulin .... 1. Yes ___ 2. No ___
3.7.1.8 / 3.7.2.8 / 3.7.3.8	Anti-convulsant .... 1. Yes ___ 2. No ___	Anti-convulsant .... 1. Yes ___ 2. No ___	Anti-convulsant .... 1. Yes ___ 2. No ___
3.7.1.9 / 3.7.2.9 / 3.7.3.9	Other Medication .... 1. Yes ___ (specify ____) 2. No ___	Other Medication .... 1. Yes ___ (specify ____) 2. No ___	Other Medication .... 1. Yes ___ (specify ____) 2. No ___
3.7.1.10 / 3.7.2.10 / 3.7.3.10	Nutritional therapy .... 1. Yes ___ 2. No ___	Nutritional therapy .... 1. Yes ___ 2. No ___	Nutritional therapy .... 1. Yes ___ 2. No ___
3.7.1.11 / 3.7.2.11 / 3.7.3.11	Surgery .... 1. Yes ___ 2. No ___	Surgery .... 1. Yes ___ 2. No ___	Surgery .... 1. Yes ___ 2. No ___
3.7.1.12 / 3.7.2.12 / 3.7.3.12	Other Treatment ...... 1. Yes ___ (specify _____) 2. No __	Other Treatment ...... 1. Yes ___ (specify _____) 2. No __	Other Treatment ...... 1. Yes ___ (specify _____) 2. No __

Child's Identification Number __ __ __ __

4.   "Was a death certificate issued?" .... 1. Yes ___
2. No ___
8. Don't know ___
(If "No" or "Don't know", go to end)

4.1 "May I see the death certificate?" .... 1. Yes ___
2. No ___
(If "No", go to end)

5.   Record the causes of death and the date of death on the back of this form

END OF INTERVIEW

THANK THE RESPONDENT FOR HER/HIS HELP AND TIME

Medical Records Abstraction Form

Child's Identification Number __ __ __ __

Instructions to abstractor: Section 1 will be complete when the mortality project logistics coordinator gives you this form. Use this information to help you locate the health facility where the child received care and the record that you must abstract. Complete Sections 2 and 3 by abstracting the record.

Section 1: Background information from interview

1.1	Name of child_____	
	1.1.A Child's health card # .... ___/___/___	

1.2	Sex of child .... 1. Male ___	
	2. Female ___	

1.3	Child's birth date .... ___ ___/___ ___/___ ___	
	.... (d d / m m / y y)	

1.4 Child's age (in completed days or months) at time of death: .... days/months ___ ___
(Circle the correct word. Use "days" if <28 days.)

1.5	Date of the death .... ___ ___/___ ___/___ ___	
	(d d / m m / y y)	

1.6 Facility name and address _____

_____

1.7 Facility type .... 1. Hospital ___
2. Health center ___
3. Health post or dispensary ___
4. Private office ___
5. Other (specify _____) ___

Section 2: Information about the record abstraction

2.1 Abstractor's code number	____
2.2 Date of record abstraction	___ ___/___ ___/___ ___
Date form checked by project representative	___ ___/___ ___/___ ___
Date entered in computer	___ ___/___ ___/___ ___

Child's Identification Number __ __ __ __

Instructions to abstractor: Introduce yourself to the facility director and explain the purpose of your visit. The director should be expecting you. You should have informed him or her of your visit and the record(s) that you need to abstract, before your arrival.

Section 3: Medical record abstraction

3.1   Type of provider who saw child .... 1. Physician ___
2. Midwife ___
3. Health aid ___
4. Technical health agent ___
5. Other (specify _____) ___

3.2   Date child seen   .... ___ ___/___ ___/___ ___
(d   d / m   m / y   y)

3.3   Information source .... 1. Register or discharge logbook ___
2. Medical record ___
3. Other (specify _____) ___

3.4   Reasons for visit (chief complaints)
(Check "Yes" or "No" for each reason. If the caregiver did not have a particular complaint, then mark "2. No.")

    3.4.1   Diarrhea   .... 1. Yes ___
2. No ___

    3.4.2   Blood in the stool .... 1. Yes ___
2. No ___

    3.4.3   Cough   .... 1. Yes ___
2. No ___

    3.4.4   Fast breathing .... 1. Yes ___
2. No ___

    3.4.5   Difficult breathing (dyspnea) .... 1. Yes ___
2. No ___

    3.4.6   Other respiratory problem (specify _____) .... 1. Yes ___
2. No ___

    3.4.7   Fever   .... 1. Yes ___
2. No ___

    3.4.8   Convulsions .... 1. Yes ___
2. No ___

    3.4.9   Rash   .... 1. Yes ___
2. No ___

    3.4.10   Malnutrition or anemia .... 1. Yes ___
2. No ___

    3.4.11   Injury   .... 1. Yes ___
2. No ___

3.4.12   Other (specify _____) .... 1. Yes ___

2. No ___

(If the child was >1 month old at death, then go to 3.5)

3.4.13   Newborn problem (specify _____) .... 1. Yes ___

2. No ___

3.4.A   Evolution of the illness .... 1. Present ___

2. Missing ___

3.5   Medical exam findings

3.5.1   Diarrhea exam findings:

3.5.1 .1 Liquid, watery or loose stools observed	1. Yes ___ 2. No ___ 9. Missing ___
3.5.1 .2 Dehydration	1. Severe ___ 2. Some ___ 3. None ___ 9. Missing ___
	(If "No," or "Missing" to 3.5.1.1 <u>and</u> 3.5..1.2 then go to 3.5.2)

If liquid, watery or loose stools or any dehydration observed, then ask 3.5.1.3–3.5.5.6.	
3.5.1 .3 Number of days diarrhea observed ...... ___ ___ *(Missing = 99)*	3.5.1 .5 Vomiting observed . 1. Yes ___ 2. No ___ 9. Missing ___
3.5.1 .4 Stools observed per day on heaviest day .. ___ ___ *(Missing = 99)*	3.5.5 .6 Blood observed ...... 1. Yes ___ in stools 2. No ___ 9. Missing ___

3.5.2 Respiratory exam findings:

3.5.2. .1	Respiratory rate .... ___ ___ ___ *(Missing = 999)*	3.5.6 .6	Crepitant rales .... 1. Yes ___ 2. No ___ 9. Missing ___
3.5.2 .2	Cough .... 1. Yes ___ 2. No ___ 9. Missing ___	3.5.2 .7	Grunting .... 1. Yes ___ 2. No ___ 9. Missing ___
3.5.2 .3	Fast breathing .... 1. Yes ___ 2. No ___ 9. Missing ___	3.5.2 .8	Nasal flaring .... 1. Yes ___ 2. No ___ 9. Missing ___
3.5.2 .4	Lower chest .... 1. Yes ___ wall indrawing 2. No ___ 9. Missing ___	3.5.2 .9	Fever .... 1. Yes ___ 2. No ___ 9. Missing ___
3.5.2 .5	Intercostal .... 1. Yes ___ retractions 2. No ___ 9. Missing ___		

3.5.3 Fever or rash exam findings:

3.5.3 .1	Rectal temp. .... C^0 ___ ___.___ *(Missing = 99.9)*	3.5.3 .6	Stiff neck .... 1. Yes ___ 2. No ___ 9. Missing ___
3.5.3 .2	Many or severe ..... 1. Yes ___ skin pustules 2. No ___ 9. Missing ___	3.5.3 .7	Bulging fontanelle .. 1. Yes ___ 2. No ___ 9. Missing ___
3.5.4 .3	Generalized rash ... 1. Yes ___ 2. No ___ 9. Missing ___	3.5.3 .8	Convulsions .... 1. Yes ___ (observed) 2. No ___ 9. Missing ___
3.5.3 .4	Red eyes .... 1. Yes ___ 2. No ___ 9. Missing ___	3.5.3 .9	Unconscious or ...... 1. Yes ___ obtunded 2. No ___ 9. Missing ___
3.5.3 .5	Nasal discharge .... 1. Yes ___ 2. No ___ 9. Missing ___	3.5.3 .10	Bleeding into skin .. 1. Yes ___ or from opening 2. No ___ 9. Missing ___

Child's Identification Number __ __ __ __

3.5.4 Nutrition exam findings:

3.5.4 .1 Weight (kg) .... ___ ___.___ *(Missing = 99.9)*	3.5.4 .5 Excess fluid of ...... 1. Yes ___ both feet 2. No ___ (edema) 9. Missing ___
3.5.4 .2 Height (cm) .... ___ ___ ___ *(Missing = 999)*	
3.5.4 .3 Appearance .... 1. Severe wasting ___ 2. Thin ___ 3. Normal ___ 4. Overweight ___ 9. Missing ___	3.5.4 .6 Pale palms .... 1. Yes ___ 2. No ___ 9. Missing ___
	3.5.4 .7 Pale conjunctivae .... 1. Yes ___ 2. No ___ 9. Missing ___
3.5.4 .4 Generalized or oral edema .... 1. Yes ___ 2. No ___ 9. Missing ___	

3.5.5 Injury exam f findings:

3.5.5 .1 Injury .... 1. Yes ___ 2. No ___ 9. Missing ___ **(If "No" or "Missing," go to 3.5.6)**	3.5.5 .3 Injury type .... 1. Trauma ___ 2. Drowning ___ 3. Poisoning ___ 4. Animal bite or sting ___ 5. Burn ___ 6. Other (specify_____) ___ 9. Missing ___
3.5.5 .2 Circumstances 1. Fall ___ 2. Violence/war ___ 3. Fire weapon ___ 4. Steel blade ___ 5. Intentional hits ___ 6. Motor vehicle accident ___ 7. Other accident ___ 8. Birth injury ___ 9. Missing ___	

3.5.6 Newborn exam findings:
(If the child was >1 month old at death, then go to 3.6)

3.5.6 .1 Level of consciousness . 1. Unconscious ___ 2. Lethargic ___ 3. Irritable/agitated ___ 4. Normal ___ 9. Missing ___	3.5.6 .5 Umbilical redness .. extending to skin or purulent discharge 1. Yes ___ 2. No ___ 9. Missing ___
3.5.6 .2 Suckle .... 1. None ___ 2. Weak ___ 3. Normal ___ 9. Missing ___	3.5.6 .6 Many or severe ...... skin pustules 1. Yes ___ 2. No ___ 9. Missing ___
3.5.6 .3 Cry .... 1. None ___ 2. Weak ___ 3. Normal ___ 9. Missing ___	3.5.6 .7 Malformation .... 1. Yes ___ 2. No ___ 9. Missing ___ **(If "No" or "Missing," go to 3.6)**
3.5.6 .4 Bulging fontanelle .. 1. Yes ___ 2. No ___ 9. Missing ___	3.5.6 .8 Location of malformation(s) *(Multiple responses allowed)* 1. Head ___ 2. Body ___ 3. Arms/hands ___ 4. Legs/feet ___ 5. Internal organ ___ 9. Missing ___

3.6   Examens de laboratoire
   3.6.1   Complete blood count

3.6.1 .1 CBC 1. Completed ___ 2. Not ordered ___ (Si "Not ordered," go to 3.6.2)	
3.6.1 .2 Hgb .... ___ ___.___ g/dl	3.6.1 .4 Polys .... ___ ___ %
3.6.1 .3 WBC __ __ __ __ __ /mm3	3.6.1 .5 Lymphocytes ___ ___ %

3.6.2 Lumbar puncture

3.6.2 LP .... 1. Completed ___
 .1   2. Not completed ___
 (Si "Not completed," go to 3.6.3)
 	
 3.6.2 Bacteria   1. Numerous ___
 .2   2. Some ___
                 3. Rare ___
                 4. None ___
	3.6.1 Total white cells
	 .4 ___ ___ ___ ___ ___ /mm3

3.6.2 Bacterial .3 morphology _____	3.6.2 Polys ___ ___ % .5
	3.6.2 Lymphocytes ___ ___ % .6

3.6.3 Thick smear for parasites

3.6.3 Thick smear .... 1. Completed ___   .1   2. Not ordered ___   ***(Si "Not ordered," go to 3.7)***

3.6.3 Plasmodia .... 1. Numerous ___
 .2   2. Some ___
                                               3. Rare ___
                                               4. None ___

3.7   Diagnoses
(Check "Yes" or "No" for each diagnosis. If a particular diagnosis is not recorded, then mark "2. No.")

3.7.1 Neonatal diagnoses *Use this section for children who were <1 month old at death. If the child was >1 month old at death, then go to section 3.7.2*	
3.7.1 Diarrhea .... 1. Yes ___ .1 2. No ___	3.7.1 Neonatal tetanus ... 1. Yes ___ .7 2. No ___
3.7.1 Pneumonia .... 1. Yes ___ .2 2. No ___	3.7.1 Birth asphyxia .... 1. Yes ___ .8 2. No ___
3.7.1 Meningitis .... 1. Yes ___ .3 2. No ___	3.7.1 Birth trauma .... 1. Yes ___ .9 2. No ___
3.7.1 Septicemia with ..... 1. Yes ___ .4 no known focus 2. No ___	3.7.1 Malformation .... 1. Yes ___ .10 2. No ___
3.7.1 Injury .... 1. Yes ___ .5 2. No ___	3.7.1 Other .... 1. Yes ___ .11 (specify _____) 2. No ___
3.7.1 Low birth weight/ ... 1. Yes ___ .6 prematurity 2. No ___	3.7.1 Other .... 1. Yes ___ .12 (specify _____) 2. No ___

3.7.2 Postneonatal diagnoses. *Use this section for children who were >1 month old at death.*	
3.7.2 Diarrhea .... 1. Yes ___ .1 2. No ___	3.7.2 Septicemia with ..... 1. Yes ___ .7 no known focus 2. No ___
3.7.2 Pneumonia .... 1. Yes ___ .2 2. No ___	3.7.2 Malnutrition .... 1. Yes ___ .8 2. No ___
3.7.2 Measles .... 1. Yes ___ .3 2. No ___	3.7.2 Anemia .... 1. Yes ___ .9 2. No ___
3.7.2 Meningitis .... 1. Yes ___ .4 2. No ___	3.7.2 Injury .... 1. Yes ___ .10 2. No ___
3.7.2 Malaria .... 1. Yes ___ .5 2. No ___	3.7.2 Other .... 1. Yes ___ .11 (specify _____) 2. No ___
3.7.2 Dengue .... 1. Yes ___ .6 hemorrhagic fever 2. No ___	3.7.1 Other .... 1. Yes ___ .11 (specify _____) 2. No ___

3.8   Treatments prescribed, and given or purchased
(Mark "Yes" or "No" for each treatment prescribed. If a particular prescription was not recorded, then mark "2. No" and go to the next treatment. For each treatment that was prescribed, mark whether it was given to the child or purchased at the facility. Mark: "8. Missing" if this information is not recorded.)

3.8 .1	Intravenous fluids prescribed .... 1. Yes ___ 2. No ___ *(If "No," go to 3.8.2)*	3.8 .8	Anticonvulsant prescribed .... 1. Yes ___ (specify _____) 2. No ___ *(If "No," go to 3.8.9)*
3.8 .1.A	*If "Yes," mark whether given/ ..... purchased ....* 1. Yes ___ 2. No ___ 9. Missing ___	3.8 .8.A	*If "Yes," mark whether given/ ..... purchased ....* 1. Yes ___ 2. No ___ 9. Missing ___
3.8 .2	ORS prescribed ..... 1. Yes ___ 2. No ___ *(If "No," go to 3.8.3)*	3.8 .9	Other medicine ...... 1. Yes ___ prescribed (specify _____) 2. No ___ *(If "No," go to 3.8.10)*
3.8 .2.A	*If "Yes," mark whether given/ ..... purchased* 1. Yes ___ 2. No ___ 9. Missing ___	3.8 .9.A	*If "Yes," mark whether given/ ..... purchased* 1. Yes ___ 2. No ___ 9. Missing ___
3.8 .3	Injection antibiotics 1. Yes ___ prescribed 2. No ___ *(If "No," go to 3.8.4)*	3.8 .10	Other medicine ...... 1. Yes ___ prescribed (specify _____)2. No ___ *(If "No," go to 3.8.11)*
3.8 .3.A	*If "Yes," mark whether given/ purchased* 1. Yes ___ 2. No ___ 9. Missing ___	3.8 .10.A	*If "Yes," mark* whether given/ purchased 1. Yes ___ 2. No ___ 9. Missing ___
3.8 .4	Oral antibiotics 1. Yes ___ prescribed 2. No ___ *(If "No," go to 3.8.5)*	3.8 .11	Nutrition therapy prescribed 1. Yes ___ 2. No ___ *(If "No," go to 3.8.12)*
3.8 .4.A	*If "Yes," mark whether given/ purchased* 1. Yes ___ 2. No ___ 9. Missing ___	3.8 .11.A	*If "Yes," mark whether given/ purchased* 1. Yes ___ 2. No ___ 9. Missing ___
3.8 .5	Injection antimalarial prescribed .... 1. Yes ___ 2. No ___ *(If "No," go to 3.8.6)*	3.8 .12	Surgery .... 1. Yes ___ 2. No ___ *(If "No," go to 3.8.13)*
3.8 .5.A	*If "Yes," mark whether given/ ..... purchased ....* 1. Yes ___ 2. No ___ .... 9. Missing ___	3.8 .12.A	*If "Yes," mark whether given/ ..... purchased ....* 1. Yes ___ 2. No ___ 9. Missing ___

Child's Identification Number __ __ __ __

3.8 Oral antimalarial .... 1. Yes ___ .6 prescribed 2. No ___ **(If "No," go to 3.8.7)** 3.8 **If "Yes," mark** .6.A **whether given/.....** 1. Yes ___ **purchased** 2. No ___ 9. Missing ___	3.8 Other treatment .13 prescribed .... 1. Yes ___ (specify _____) 2. No ___ **(If "No," go to 3.8.A)** 3.8 **If "Yes," mark** .13.A whether given/ .... 1. Yes ___ purchased 2. No ___ 9. Missing ___
3.8 Tetanus immuno- .... 1. Yes ___ .7 globulin prescribed 2. No ___ **(If "No," go to 3.8.8)** 3.8 **If "Yes," mark** .7.A **whether given/** **purchased** 1. Yes ___ 2. No ___ 9. Missing ___	

3.9.A Reason for (treatment _____) being
prescribed but not given/purchased .... 1. Treatment temporarily out of stock at facility . ___
(Write in treatment number) 2. Treatment available at facility but family
could not afford cost ___
3. Treatment never available at facility/to be purchased by family outside ___
4. Other (specify:_____) ___
8. Don't know ___

3.9.B Reason for (treatment _____) being
prescribed but not given/purchased .... 1. Treatment temporarily out of stock at facility . ___
(Write in treatment number) 2. Treatment available at facility but family
could not afford cost . ___
3. Treatment never available at facility/to be purchased by family outside . ___
4. Other (specify:_____) . ___
8. Don't know . ___

3.10 Disposition .... 1. Dead on arrival at facility or died before being admitted ___
2. Admitted to facility . ___
3. Referred to another health facility . ___
4. Sent home ___
5. Other (specify _____) . ___
(If "Sent home," go to 3.11; otherwise, go to end)

3.11 Instructions for home care
(Complete only if 3.10 = "Sent home")

_____
_____
_____
_____

Scoring Criteria Used by the Expert Panel to Determine "Quality of Care"

I.   Signs mentioned by the mother 5
    ■ Without signs   0
    ■ With signs   3
    ■ Evolution   2

II. Observations 5
    ■ Without observations   0
    ■ Temperature taken   0,5
    ■ Weight and height recorded   1
    ■ Evaluation   2
    ■ Auscultation   0,5
    ■ Examination   1

III. Diagnosis 5

IV. Treatment 5
    ■ No treatment   0
    ■ No "standard" treatment   1
    ■ "Standard" treatment   4

V. Follow up 5
    ■ Not following the established therapeutic guidelines   0
    ■ Following the established guidelines   5

VI. Recommendations 5
    ■ No recommendations given   0
    ■ Recommendations given to caretaker   5

Scale used to define quality of care:
    Good quality care: 25–30
    Average quality care: 15–24
    Poor quality care: Less than 14