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Management of Malaria, Pneumonia and Diarrhea in Children under Five in Kolofata, Cameroon: An Assessment of Health Worker Performance

By

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_____

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An abstract of
A thesis submitted to the Faculty of the
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2012

ABSTRACT

Management of Malaria, Pneumonia and Diarrhea in Children under Five in Kolofata, Cameroon: An Assessment of Health Worker Performance

By Jessica Slim

Background: The Far North Region of Cameroon has one of the highest child mortality rates in the country, 186 per 1000 live births. Malaria, pneumonia and diarrhea together with undernutrition are the major causes of death. Proper medical care is critical to reducing child mortality. The Integrated Management of Childhood Illness (IMCI) is an intervention designed for use by health providers in developing countries to reduce mortality among children under age five.

Aim: To measure the quality of care provided to children in the Kolofata Health District of the Far North Region.

Methods: Structured observations of consultations with children were conducted before IMCI intervention in seven health facilities in Kolofata. Clinical performance of health providers was compared to gold-standard IMCI guidelines. Quality of care was determined by assessment of sick children for danger signs, common illnesses, undernutrition, and vaccination status.

Results: Forty-four sick child observations were conducted in seven health facilities. Forty (91%) children presented to the clinic for complaints that are outlined in the IMCI algorithms. Children were assessed by the health providers for the following: zero for 3 or more danger signs, 38 (86%) for cough, 44 (100%) for fever, 42 (96%) for diarrhea, 34 (77%) for anemia and 24 (55%) for vaccination status. Forty-two (96%) children were weighed; zero weights were plotted on a growth chart. The mean integrated assessment score was 6.7 out of 10, indicating room for improvement in health care performance.

Conclusion: The Far North Region is in a silent state of emergency. More than 90% of children observed were undernourished, with 60% severely undernourished. Nonetheless, IMCI implementation has not yet been prioritized to this region. Two IMCI training sessions were provided to local health workers. The importance of using standard WHO growth charts to identify undernourished children was a particular focal point during training.

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INTRODUCTION

Regional differences in child mortality have been found to be highly associated with Cameroon's considerable geographic diversity (Keuzeta and Merlin, 1988). The Far North Region is a rural, semi-arid area that is exposed to adverse and extreme climate, with very little rainfall and poor soil quality. Additionally, the region is predisposed to yearly flooding during the short rainy season due to a landscape consisting of plains (Central Emergency Response Fund (CERF), 2011). The north of Cameroon recently experienced droughts in 2009 and 2011 and flooding in 2010 (CERF, 2012).

Besides geographical considerations, child mortality in Cameroon is also linked to poverty, low levels of maternal education and limited formal employment (DHS 2011). Illiteracy is very high in the Far North, where the locally dominant Fulani tribe resides; fewer than 5% of the region's women can read or write. The population consists primarily of subsistence level farmers and herders. Together, these factors make the Far North one of the poorest regions in the country (CERF, 2011).

The 2004 Demographic and Health Survey - the most recent year that regional data are available - estimates an under-five mortality of 186 deaths per 1000 births for the Far North Region of Cameroon, significantly higher than 2004's national under-five mortality rate of 149 deaths per 1000 births. This is equivalent to saying that one in five children born in the Far North will die in the first five years of life (DHS, 2004).

In a setting where children are highly susceptible to disease - secondary to extreme environmental conditions, poverty and lack of maternal education - reduction in child mortality will require the provision of quality care to sick children in homes, communities

and health care facilities. Accurate diagnoses and treatment must be made available for children suffering from common yet deadly diseases. This means that access to quality health care, health care interventions and medical supplies must be significantly expanded and improved.

Health facilities in the Far North lack radiologic imaging, electronic medical services, laboratory facilities and trained physicians that are typically available in standard health facilities. Absent diagnostic equipment and inadequate supplies of medicines limit the effectiveness of rural health care. As well, limited resources leave a restricted number of health care providers with few opportunities to perform intricate clinical procedures. Rather, they must rely on clinical diagnoses, made on the basis of patient-reported symptoms and medical signs, rather than diagnostic tests to identify the disease and subsequent course of management.

The World Health Organization (WHO) reports that many sick children are not properly assessed and treated once they are brought to health care facilities in low-income countries. WHO and the United Nations Children's Fund (UNICEF) have addressed this issue by developing a strategy called the Integrated Management of Childhood Illness (IMCI). This strategy is an approach to support growth and development and reduce mortality among children under age five using evidence-based guidelines. One of the main components of this strategy centers on improving overall health facilities by promoting accurate identification and referral of childhood illnesses in outpatient settings and ensuring appropriate assessment, diagnosis, treatment and management of all major illnesses. The core of the IMCI approach is an integrated clinical case management algorithm that provides simple guidelines for assessing sick children for the most common causes of childhood illnesses, classifying their conditions, and then

managing these conditions or referring the patient to a higher-level facility that can manage these conditions. The IMCI approach ensures that a comprehensive and accurate assessment is made of a sick child using simple yet reliable clinical signs at the first patient encounter. IMCI is a cost-effective means of expanding the capacity of clinicians to make correct diagnoses and offer appropriate management in the face of absent diagnostic tools (WHO, 2008).

Cameroon began national implementation of IMCI guidelines in 2005 after a pilot study in the East Region showed significant improvement in case management and health outcomes of childhood illnesses (Plan International, 2006). However, training has not yet been introduced to the Far North due to the remoteness of the region and a lack of financing and human resources.

PROBLEM STATEMENT

Mortality rates for children under five remain significantly higher in the Far North region of Cameroon compared to the rest of the country. At the regional level, under-five mortality varies from less than 120 deaths per 1,000 births in the Littoral and North-West (Nord-Ouest) Regions to more than 180 deaths per 1,000 births in the East (Est), North (Nord), and Far

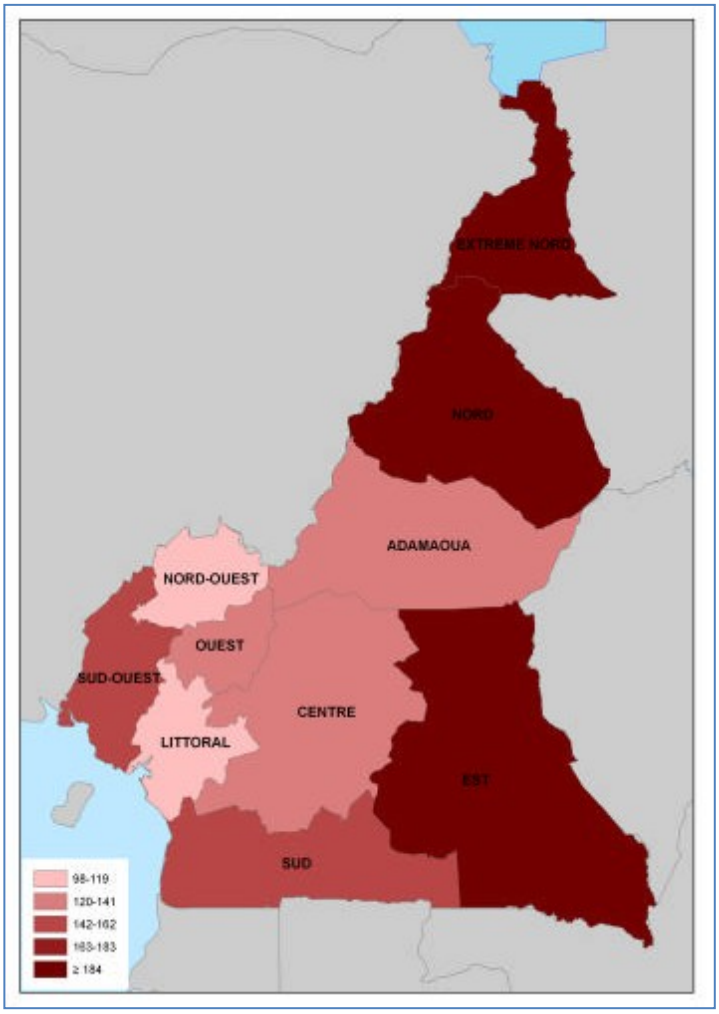


Figure 1. Under Five Mortality Rates per 1000 Births, By Region, Cameroon (DHS, 2004).

North (Extreme-Nord) Regions (Figure 1, DHS 2004).

The IMCI guidelines have been accepted by the Cameroon Ministry of Public Health to be standard of care for children under age five (Plan International, 2004). Nevertheless, while the Far North Region has one of the highest under-five mortality rates in the country, implementation of IMCI training has not yet been initiated in this region.

Strengthening health facilities in the Far North by introducing the IMCI guidelines will provide simple, affordable solutions for common illnesses, reduce child mortality disparities in the Far North and save many young lives.

OBJECTIVE

This study describes a baseline assessment of health worker performance during sick child consultations to understand delivery of care to children attending health facilities in the Far North Region, to identify the main constraints to improved performance and to recognize how IMCI training can improve this performance. Obtained data will allow for the most effective integration of IMCI by identifying what case management skills are most lacking by health care workers.

This study evaluates the health care workers' assessment and management of sick children between 2 months and 5 years of age who present to any one of the seven health centers in the Kolofata Health District of the Far North Region. First, this study will determine whether or not health care workers assess for the following:

- IMCI defined 'danger signs' (representative of a seriously ill child)
- cough

- fever
- diarrhea
- anemia
- malnutrition

Following assessment of the child, the study investigator will examine whether or not an accurate diagnosis is made for the above conditions and if correct treatment is given to the child per IMCI guidelines. Finally, the investigator will check for health workers' verification of the child's vaccination status and if appropriate action is taken.

RESEARCH QUESTION

This paper aims to answer the following research questions using IMCI guidelines as the gold standard of care for the Kolofata Health District in the Far North Region:

ASSESSMENT:

- Do health workers assess children who present to the health facility for the four IMCI-defined danger signs?
    - Is the child vomiting everything?
    - Is the child able to drink/breastfeed?
    - Does the child have convulsions from this episode of illness?
    - Is the child lethargic or unconscious?
- Do health workers assess children who present to the health facility for common yet deadly childhood diseases?
    - Acute Respiratory Infections, including Pneumonia (i.e. cough or difficult breathing)
    - Malaria (i.e. fever)

    - Diarrheal Disease
- Do health workers assess the nutritional status of all children who present to the health facility?
    - Are all children who present to the health facility weighed?
    - Are weights plotted on an appropriate growth chart with WHO recommended growth standards for the child's age?
    - Are all children assessed for the presence of anemia?
- Do health workers check the vaccination status of children who present to the health facility?
    - Is age-appropriate vaccination provided to children who are not up-to-date?
    - Are all WHO recommended vaccines available at each health facility?

DIAGNOSIS:

- Do health workers correctly diagnose and classify children who present to the health facility for the following conditions?
    - Pneumonia
    - Malaria
    - Diarrheal Disease
    - Anemia
    - Malnutrition

TREATMENT:

- Do health workers provide appropriate treatment for children who present to the health facility for the following conditions?
    - Pneumonia
    - Malaria
    - Diarrheal Disease
    - Anemia
    - Malnutrition
        - Is nutritional consultation provided to all care takers of undernourished children?

SIGNIFICANCE OF STUDY

This study is the first to determine the health care workers' skill set in managing cases of common childhood diseases within the Far North Region. This investigation is unique because data are collected prior to IMCI training to highlight health care practices that could better incorporate child health interventions, as opposed to implementing the standard course of training. This strategy has the benefit of delineating areas of weakness that can become areas of focus when IMCI guidelines are introduced to the region.

By reviewing the study results with the health care workers and health district medical director, this study will promote best practices in integrated management of childhood illnesses and ultimately reinforce the capacities of health care workers.

LITERATURE REVIEW

The Far North Region is in a silent state of emergency. Nonetheless, IMCI implementation has not yet been prioritized to this region. The objective of this study is to estimate the potential child survival benefits of effective IMCI integration in health facilities of the Far North for control of the most common causes of child illness. This study describes a quality assessment of health care workers in the Far North Region to identify areas that IMCI can offer improvement in the case management of sick children.

This literature review first presents demographics and regional trends pertinent to the health of children under age five to illustrate the diverse conditions between the nation's ten regions and to understand the particularly harsh conditions faced by children living in the Far North. Trends in maternal health, child mortality, childhood illnesses, immunization coverage and nutritional status are analyzed by means of preliminary data from the Demographic Health Survey of 2011. This study then thoroughly reviews the common causes of under-five mortality in Cameroon to identify what interventions can be taken.

After reviewing the causes of child mortality in Cameroon and the conditions that increase a child's susceptibility to illness, the IMCI strategy for improved child survival is presented. A monitoring report from Plan International is then examined to review the initial integration of IMCI to three primary regions in Cameroon. The methodology used and the results of IMCI training within these primary regions is emphasized to allow for a comparison with the current study's introduction of IMCI to the Far North. Finally, the health conditions in the Far North are summarized and the case for an IMCI intervention is made.

DEMOGRAPHIC HEALTH SURVEY, CAMEROON 2011

The Demographic and Health Survey (DHS) is a nationally representative household survey that collects and disseminates demographic, health and nutrition data from over 70 countries in order to advance global understanding of population and health trends worldwide. DHS surveys are typically conducted every five years to allow comparisons over time and cover a wide range of topics. Recognized as the gold standard for survey research in developing countries, the DHS plays a critical role in strategic decision making for policies on population and health, designing national programs, and for serving as a foundation for advocacy efforts (DHS, 2011).

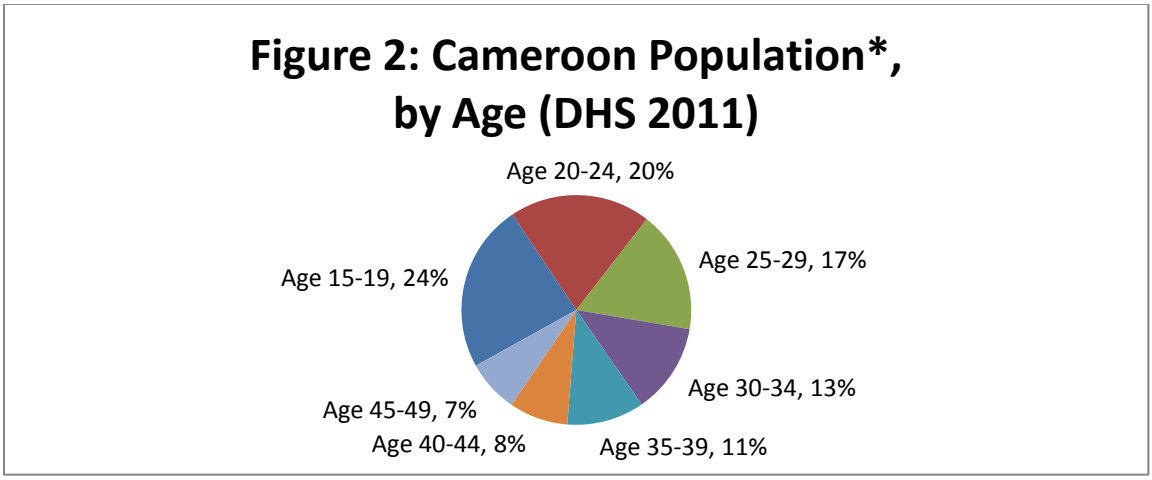
The 2011 DHS was the fourth to be conducted in Cameroon. Previous surveys were carried out in 1991, 1998 and 2004. Data collection in the field began January 24, 2011 in Yaoundé and was completed August 15, 2011. Although a full analysis of the data is not yet available, several key indicators can be generated from the available data. The following indicators are presented in this study: maternal health, child mortality, common childhood illnesses, immunization coverage and nutritional status of children under age five.

The DHS 2011 surveyed over 14,000 households, 15,426 women and 7,191 men. Women aged 15-49 years, those of childbearing age, and men aged 15-59 were the target populations of the DHS.

CAMEROON SNAPSHOT

According to the DHS survey, Cameroon is a youthful population. Approximately a quarter of the population are within the 15-19 age range (23% of women and 25% of

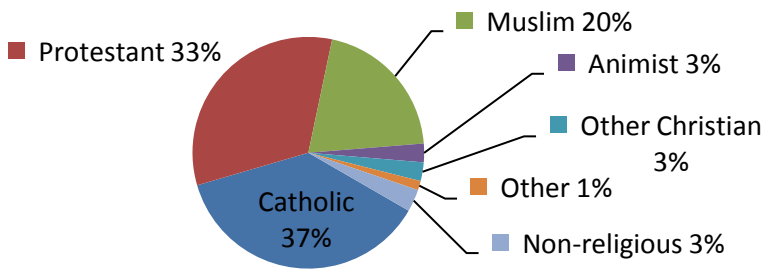
men), and a fifth within the 20-24 year age range (20% of women and 19% of men, Figure 2).



*Includes only persons aged 15-49, as surveyed by the DHS 2011. Percentages may not add to 100 due to rounding.

More than 70% of the population self-identifies as Christian (37% Catholic, 33% Protestant, 3% other) and another 20% as Muslim (Figure 3). The English-speaking provinces of the western region are mostly Protestant and the French-speaking provinces of the southern and western regions are Catholic. The locally-dominant Fulani ethnic group of northern Cameroon is Muslim (Gordon, 2005). Traditional indigenous religious beliefs (3%) are practiced in rural areas throughout the country but rarely are practiced publicly in cities (DHS, 2011).

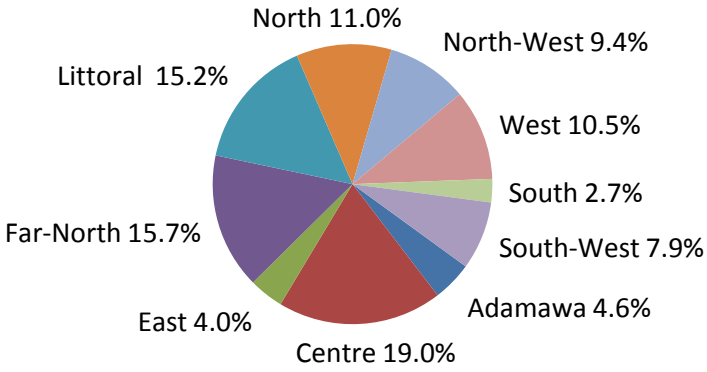
Figure 3: Religious Affiliations in Cameroon* (DHS 2011)



*Includes only persons aged 15-49, as surveyed by the DHS 2011. Percentages may not add to 100 due to rounding.

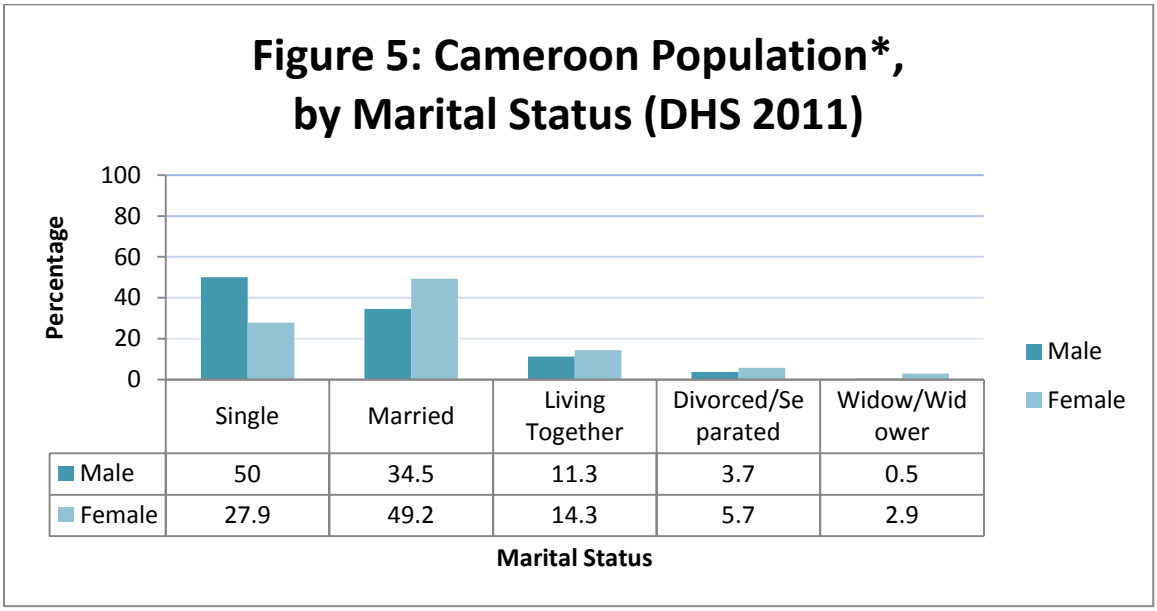
Just over half of the population live in urban areas (54% of women and 56% of men), with half of these living in Yaoundé or Douala, the two largest cities in Cameroon. The distribution by region reflects the demographic weight of each region (Figure 4). The Center Region (including Yaoundé) is the most populated (19.0%), followed by the Far North Region (15.7%, DHS, 2011).

Figure 4: Cameroon Population*, by Region (DHS 2011)



*Includes only persons aged 15-49, as surveyed by the DHS 2011. Percentages may not add to 100 due to rounding.

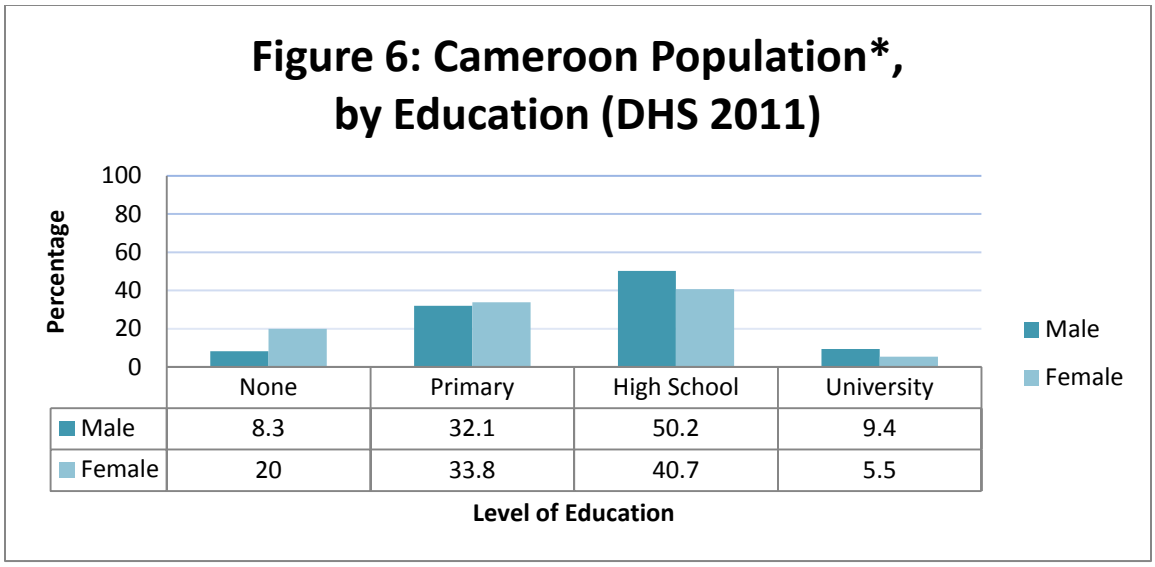
At the time of the survey, 65% of women and 46% of men were married or living together (in union, Figure 5). The proportion of singles is higher in men than women (50% vs. 28%) because men tend to marry later than women, often times to first pursue an education. Additionally, 3 in 10 women in Cameroon are in a polygynous union (DHS, 2004).



	Single	Married	Living Together	Divorced/Separated	Widow/Widower
Male	50	34.5	11.3	3.7	0.5
Female	27.9	49.2	14.3	5.7	2.9

*Includes only persons aged 15-49, as surveyed by the DHS 2011. Percentages may not add to 100 due to rounding.

The proportion of women who have only a primary level of education is 34% compared to 32% in men. The percentage of women who have received some level of high school education is 41%, compared to 50% in men. Although growing, the number of men and women who have achieved higher education levels (college or university) is still low (6% in women and 9% in men). Typically, men are more educated than women, with 20% of women having received no education, compared to only 8% of men (Figure 6, DHS, 2011).



*Includes only persons aged 15-49, as surveyed by the DHS 2011. Percentages may not add to 100 due to rounding.

As previously mentioned, it is important to note that maternal education significantly impacts child survival in Cameroon. As the level of maternal education increases, the level of child mortality decreases. Educating mothers consistently improves their prenatal care, postnatal care and childbirth survival rates. Educated women have higher self-esteem, are more likely to avoid HIV infection, violence and exploitation, and are more likely to spread good health and sanitation practices to their families and communities. An educated mother is also more likely to send her children to school (UNICEF, 2008).

MATERNAL HEALTH

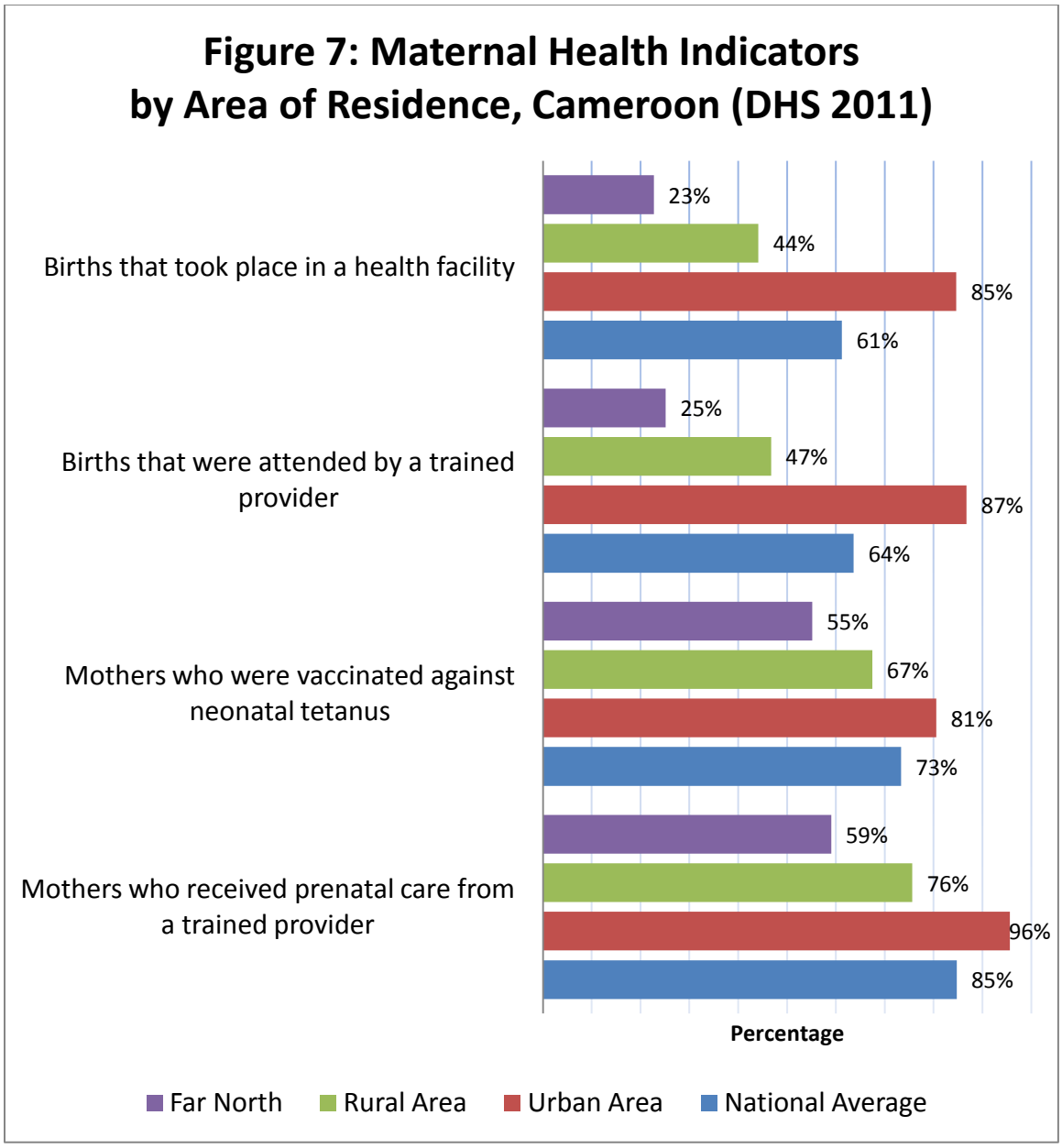
Maternal health is intimately connected with the health of a child. In relation to child mortality, maternal health is described as a mother's ability to eat healthy, to have access to safe reproductive strategies, to seek and have access to the appropriate medical services, and to get educated on how to ensure that their life and the life of their child remains healthy (UNICEF, 2008). Because a quarter of all child deaths occur within

the first month of life in Cameroon, providing skilled care to mothers prior to, during and after pregnancy can greatly contribute to child survival (DHS, 2011).

The DHS survey asked all mothers who had a birth within the last five years a series of questions concerning their prenatal care and the health of the child. For each child who was born within the preceding five years of the survey, mothers were asked whether or not they had visited antenatal clinics, which clinics they had consulted, whether or not they had they been vaccinated against tetanus, and who assisted during the delivery.

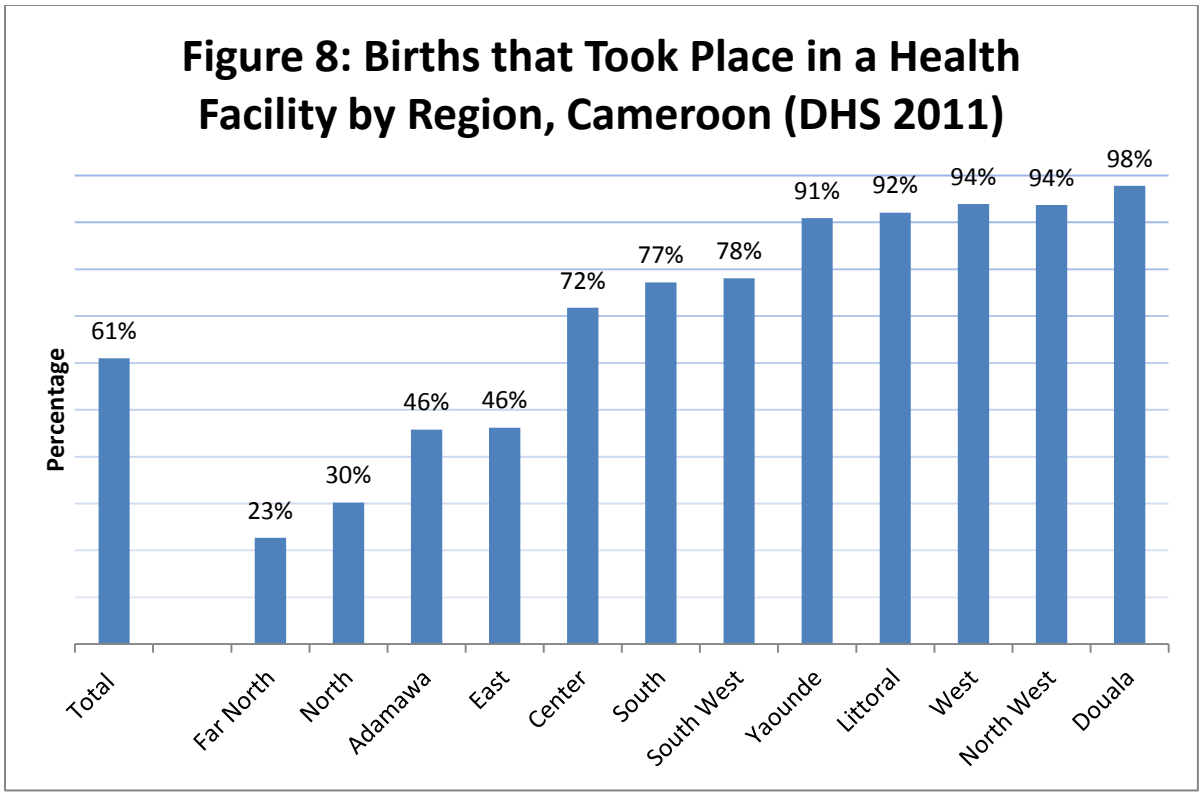
Prenatal Care

Overall, 85% of women had consulted a health professional during their most recent pregnancy (Figure 7). However, the survey observed significant differences in the seeking of prenatal care between Cameroon's various regions. Women living in urban areas were more likely to consult a health professional than those living in rural areas (96% vs. 76%, Figure7). The Far North Region was characterized by the lowest rate of prenatal care (59%, Figure 7). In other regions, more than 90% of women consulted a health professional during pregnancy (Appendix A, Table A1).



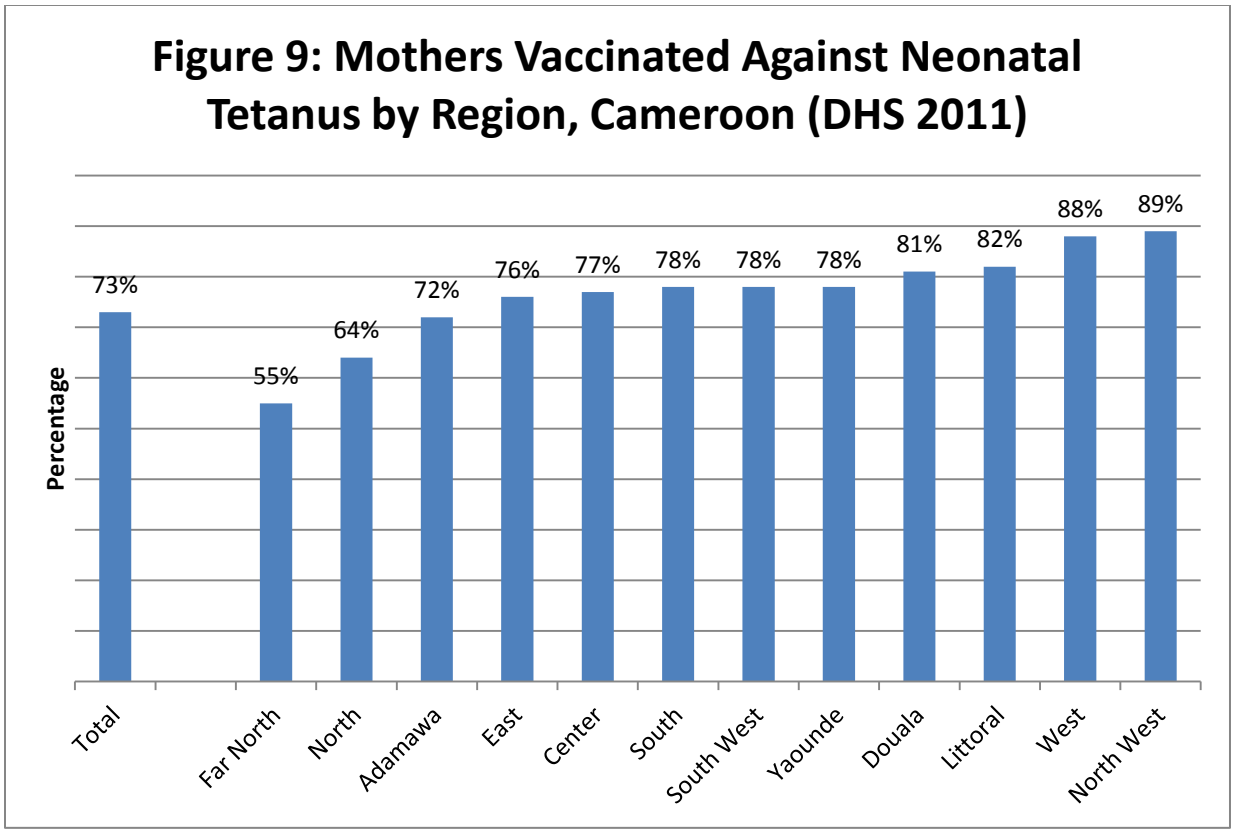
Birth Place

The 2011 DHS survey revealed that 61% of births took place in a health facility. Within urban areas, 85% took place in a health facility, compared to only 44% in rural areas (Figure 7). The regional differences were again significant. The West and North West stood out with 94% of births occurring in health institutions compared to only 23% in the Far North Region and 30% in the North Region (Figure 8).



Tetanus Immunization

One of the most important causes of neonatal mortality is tetanus. In addition to a clean delivery and clean cord care, the mother must be immunized to protect the newborn from neonatal tetanus. In Cameroon, just over 7 in 10 women (73%) receive tetanus injections required to prevent neonatal tetanus (Figure 7). Infants of mothers living in urban areas (81%) are more commonly protected than those in rural areas (67%, Figure 7). Comparing across regions, the coverage of neonatal tetanus vaccination exceeds 70% in all regions, except for the Far North (55%) and North Region (64%, Figure 9).



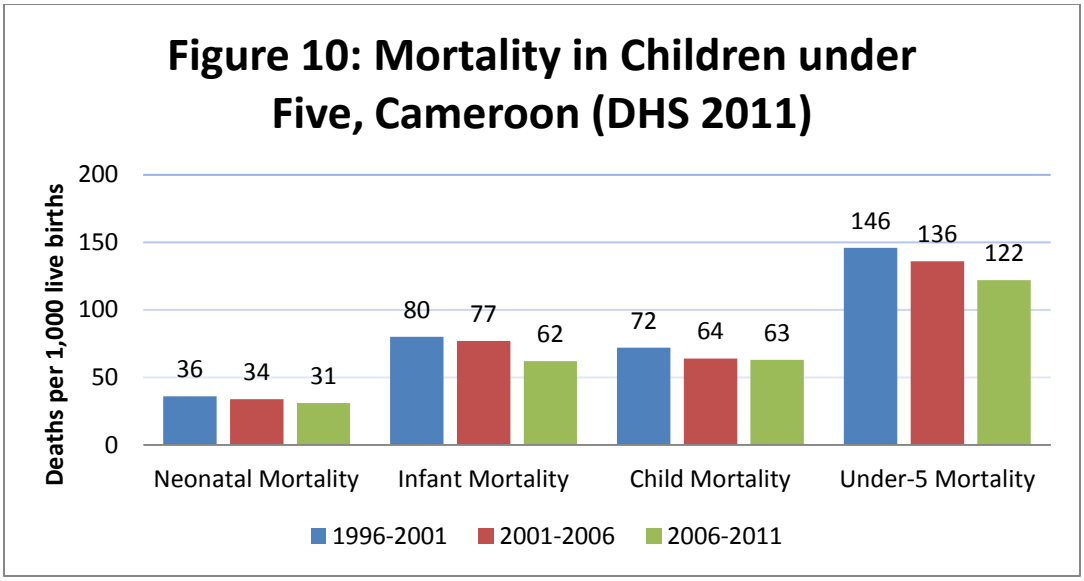
After reviewing the regional breakdown of maternal health indicators, it is apparent that the Far North Region has the lowest proportion of all indicators and is consistently below the national average for all indicators. In the Far North, only 59% receive prenatal care from a trained provider (compared to the national average of 85%), 55% received protection against neonatal tetanus (national average 73%), 25% of births were attended by a trained provider (national average 64%), and only 23% of births took place in a health facility (compared to the national average of 61%, Figure 7).

INFANT AND CHILD MORTALITY

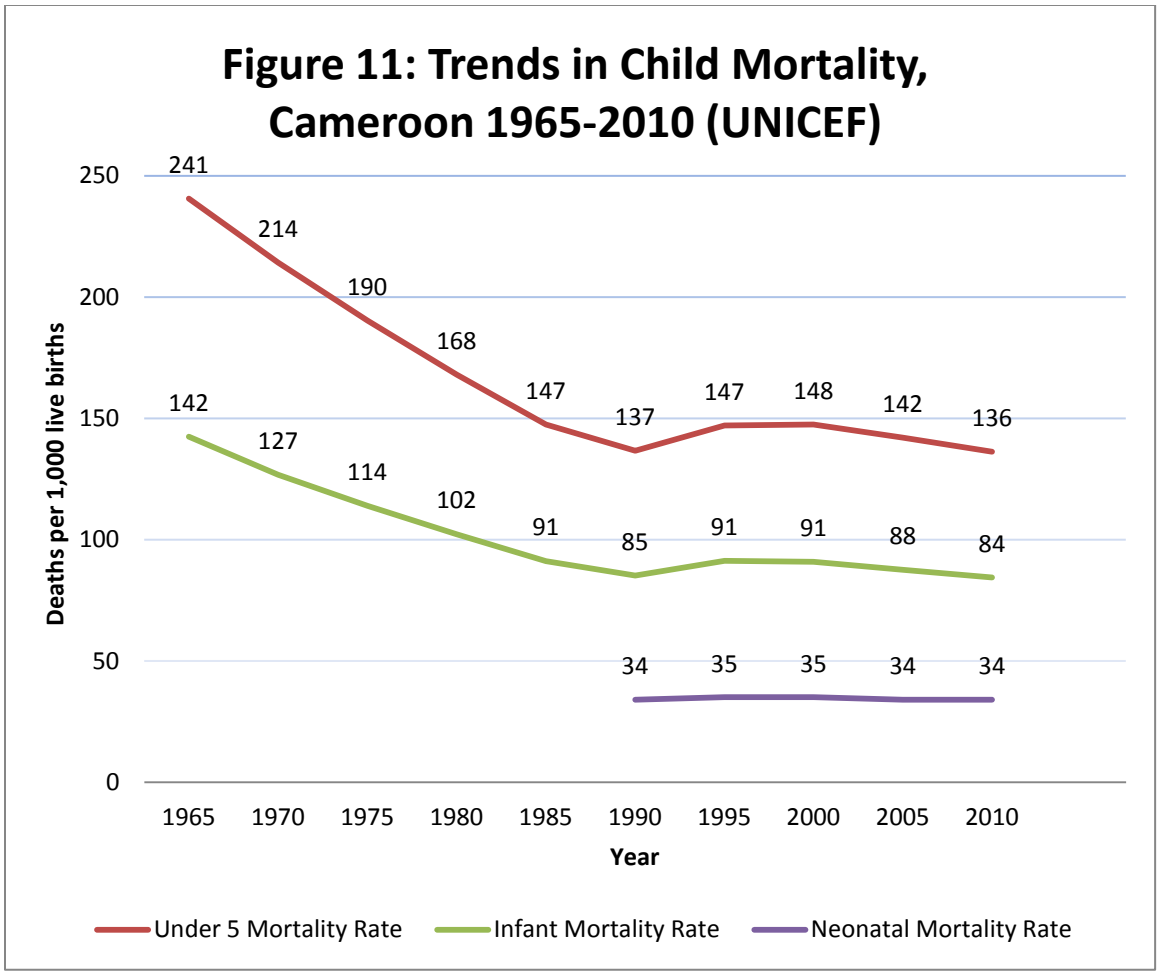
The estimated level of infant and child mortality is a main objective of the DHS.[1] Five indicators were calculated based on information gathered directly from mothers about birth history. Neonatal mortality measures the probability of a child born alive to die within the first 28 days of life. Post-neonatal mortality measures the probability of a child dying between the ages of 1 and 12 months and is calculated by subtracting neonatal mortality from infant mortality. Infant mortality measures the probability of a child born alive to die before their first birthday. Child mortality excludes the first year of life and measures the probability that a one year old child will subsequently die before age five, and under-five child mortality is the probability that a child born alive will die before their fifth birthday.

These indicators were measured for 3 five-year periods preceding the 2011 survey. Figure 10 presents four of these indicators for the following 3 periods: 1996-2001, 2001-2006 and 2006-2011. For 2006-2011, the under-five mortality rate was 122 per 1000 live births, down from 136 per 1000 live births in 2001-2006 and 146 per 1000 live births in 1996-2001.

[1]The mortality rate is not a real rate (i.e. the number of deaths divided by the number of population at risk during a certain period of time) but a probability of death derived from a life table and expressed as a rate per 1,000 live births.



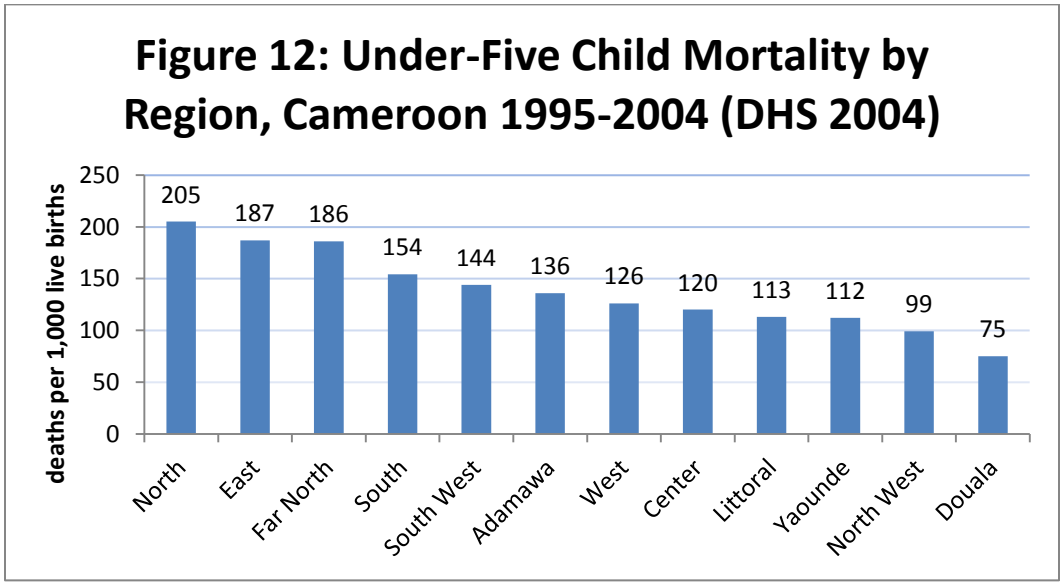
The under-five mortality rate (U5MR), the probability of dying between birth and age 5 expressed per 1000 live births, is used as a measure of the level of child health and overall development in countries (WHO, 2011). The current national U5MR in Cameroon is 122 deaths per 1000 live births, a minor decrease from the 1990 figure of 137 deaths per 1000 births (UNICEF, 2010). The progress in Cameroon's child mortality rates from 1965 to 2010 is depicted in Figure 11.



*Neonatal Mortality rates were not provided for years prior to 1990 in this study.
Source: UNICEF Levels and Trends in Child Mortality 2010 Report.

Reduction of child mortality is the fourth of the United Nations' Eight Millennium Development Goals (MDGs). The MDGs were developed by the United Nations in 2000 to decrease extreme poverty, fight global epidemics and reduce child and maternal deaths worldwide by 2015. In order to achieve the fourth MDG - a goal to reduce U5MR by two thirds from 1990 to 2015 – Cameroon's U5MR must be reduced to 46 deaths per 1000 live births (UNICEF, 2010).

A regional breakdown of under-five child mortality rates reveal that the North, East and Far North regions have the highest numbers of deaths in children under age five (Figure 12, DHS 2004).



ACUTE RESPIRATORY ILLNESSES, FEVER AND DIARRHEA

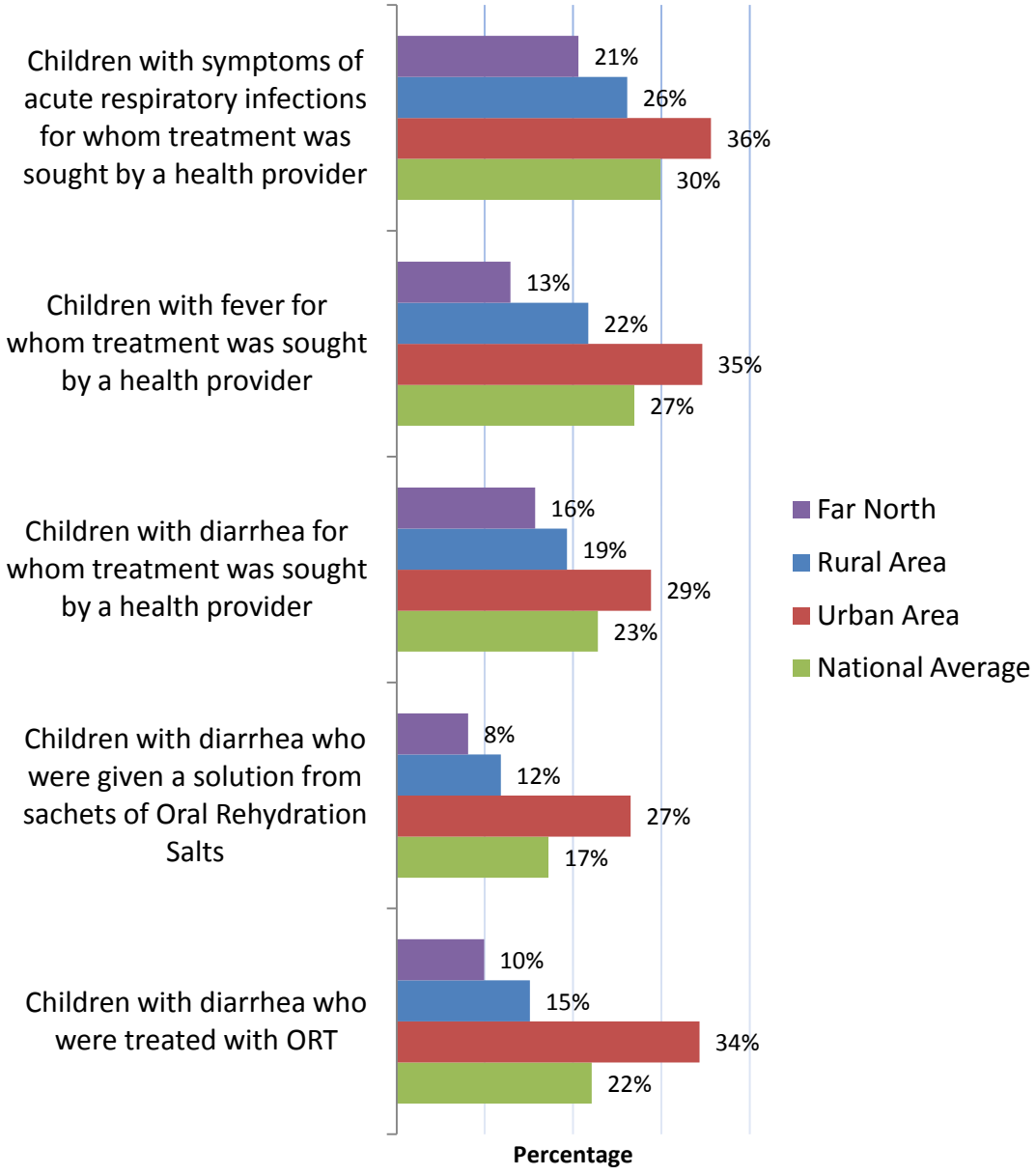
Acute respiratory illness (ARI), fever and dehydration secondary to severe diarrhea are significant health problems for children in Cameroon. To gather information on the prevalence and treatment of these diseases in children under age five, the DHS survey asked mothers if their child had suffered from symptoms of ARI (cough, fast breathing or shortness of breath), fever or diarrhea within the two weeks preceding the survey. In these two weeks, one in twenty children (5%) had cough with short, rapid breathing, one in four (26%) had fever, and one in four (21%) had diarrhea (DHS, 2011).

Among the 5% of children who showed symptoms of ARI, medical treatment from a health professional was sought for 30% of them. Care was less frequently sought for children less than six months and by mothers who had no education (Appendix A, Table

A2). Children in urban areas were more often treated (36%) than those in rural areas (26%, Figure 13). Mothers in the Far North Region sought treatment for only 21% of children with symptoms of ARI (Figure 14).

Of the 26% of children who had a fever, medical treatment by a health professional was sought for 27% of them (Figure 13). Treatment was least frequently sought for rural children (22%) and those whose mothers had no education (12%, Appendix A, Table A2). Children in the Far North and North Regions were least likely to receive care (13% and 15%, respectively, Figure 14; DHS, 2011).

Figure 13: Treatment for Acute Respiratory Infections, Fever and Diarrhea, Cameroon (DHS 2011)



Of the 21% of children who had diarrhea, medical treatment was sought for only 23% (Figure 13). Of these, 17% received a solution of oral rehydration salts (ORS) and 22%

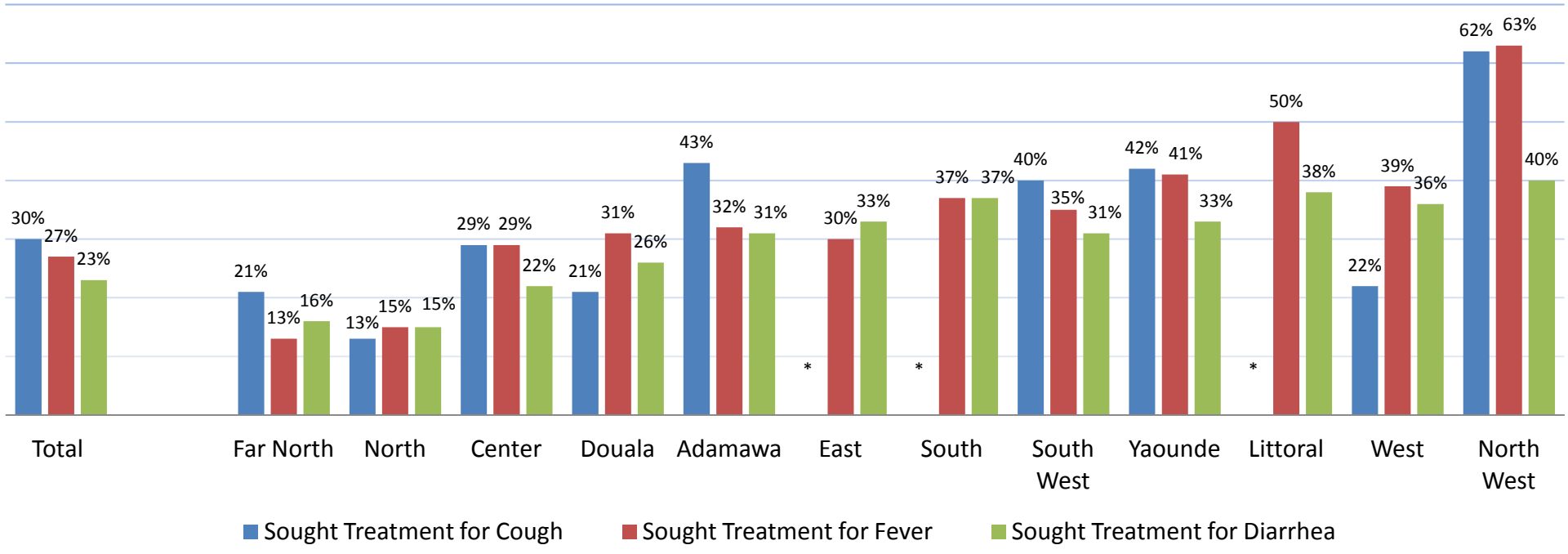
received oral rehydration therapy (ORT).[2] Urban residents had a higher proportion of those seeking health care and also had the highest use of ORT (29% and 34% vs. 19% and 15% in rural areas, respectively, Figure 13).

The North and Far North Regions are the least likely to seek medical care when treatment is needed (Figure 14). Unfortunately, due to the extreme poverty of this area, many families are unable to pay for services at the health facilities and therefore do not take their children in when they are sick. Furthermore, when they do take them to the health facility, many are unable to purchase the prescribed medication to complete the recommended treatment. In addition to improving correct treatment received by children who present to the health care facility, there is an urgent need to strengthen the education of care takers to seek medical care for these conditions.[3]

[2] Since 2004, UNICEF and WHO recommend treating childhood diarrhea by replacing fluids through oral rehydration therapy, using oral rehydration salts (ORS), the 'gold standard' for oral rehydration therapy (ORT). If ORS are not available, recommended home-made fluids or increased fluids are also recommended (WHO IMCI Handbook, 2008).

[3] Counseling caretakers is an additional component integrated within IMCI strategy (WHO, 2008).

Figure 14: Care Seeking Behavior for Acute Respiratory Infections, Fever and Diarrhea by Region, Cameroon (DHS 2011)



* The number of children who had symptoms of acute respiratory infections in the East, South and Littoral Regions were too few to determine statistically significant values for care seeking behavior of cough.

VACCINATION OF CHILDREN

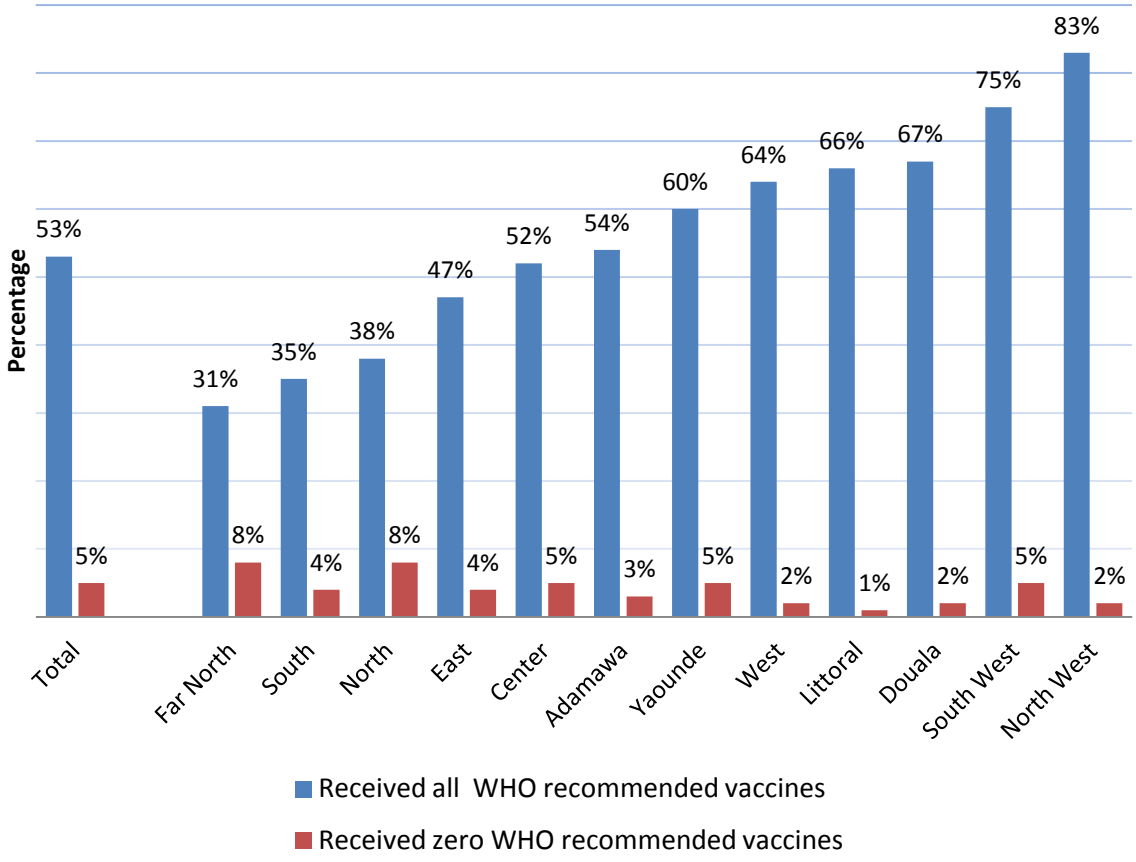
The vaccination of children in Cameroon is implemented by the Ministry of Public Health as part of the Expanded Program of Immunization. In accordance with WHO recommendations, a child is considered fully immunized if he has received the BCG vaccine against tuberculosis, three doses of DPT against diphtheria, tetanus and pertussis, three doses of vaccine against polio, and the vaccine against measles. These vaccines must be administered during the child's first year of life (Cameroon Ministry of Public Health, 2006).

The 2011 DHS survey collected vaccination status for children between the ages of 1 and 2 years using two methods: the child's vaccination status was determined either from the child's vaccination card or by answers provided by the mother when the vaccination card was not available[4].

According to the DHS survey, 53% of children between the ages of 12-23 months received all WHO recommended vaccines, 42% received some of the recommended vaccines and 5% received none of these vaccines (Figure 15). The vaccination coverage varies greatly between regions. In the North West and South West Regions, over 70% of children are fully vaccinated (83% and 75%, respectively). In sharp contrast, only 31% of children in the Far North Region are fully vaccinated. According to the DHS survey, 8% of children aged 12-23 months in the Far North and North region have received none of the WHO recommended vaccines (Figure 15).

[4] All children in Cameroon are required to bring their health care pamphlet to the health care facility or provider. This booklet includes the vaccination schedule and documented vaccinations inside the front cover of the booklet (Kolofata District Hospital, 2011).

Figure 15: Percentage of Children aged 12 to 24 months who received all or none of WHO recommended vaccines, Cameroon (DHS 2011)



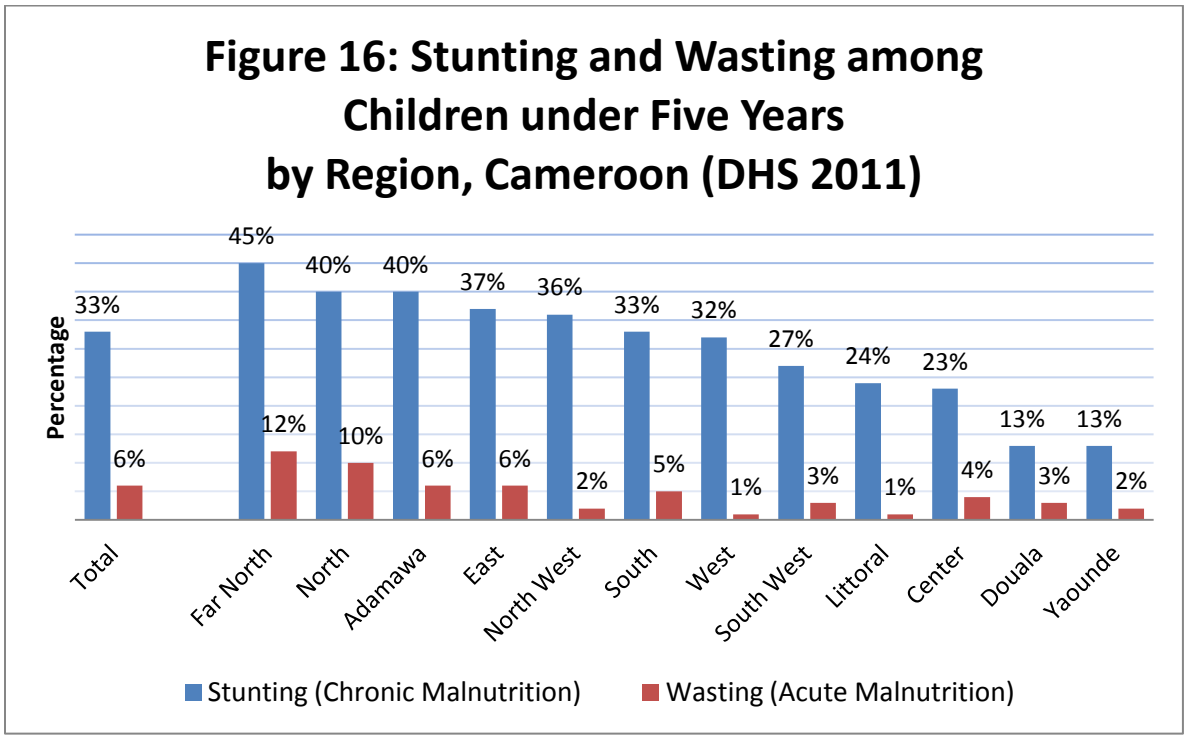
NUTRITIONAL STATUS

The 2011 DHS survey recorded measurements of weight and height for children born during the five years preceding the survey.[5] Table A4 (Appendix A) shows the nutritional status of children less than five years of age according to age, region, and maternal

[5] Nutritional status is assessed using anthropometric measurements to calculate three indices: height-for-age, weight-for-height and weight-for-age. These indices are expressed in terms of number of units of standard deviation from the median standard using WHO Child Growth standards. Children who are at least two standard deviations below the median of the study population are considered undernourished. Children that are at least three standard deviations below the median are considered severely undernourished (WHO, 1995).

education. Children whose height-for-age is below two standard deviations from the median of the study population have stunted growth, a sign of chronic malnutrition, and reflects a situation in which inadequate nutrition or chronic or repetitive illness occurred. Children whose weight-for-height is below two standards deviations from the median of the study population suffer from wasting, a form of acute malnutrition, which can be due to recent poor nutrition, such as diarrhea.

The survey reveals significant nutritional disparities between regions of residence. More than 40% of children in the Far North region are stunted, compared to the national average of 33%. Both the Far North and North Regions have a high prevalence of acute malnutrition exceeding 10%, compared to Littoral and the West Regions, with only 1% of acute malnutrition (Figure 16).



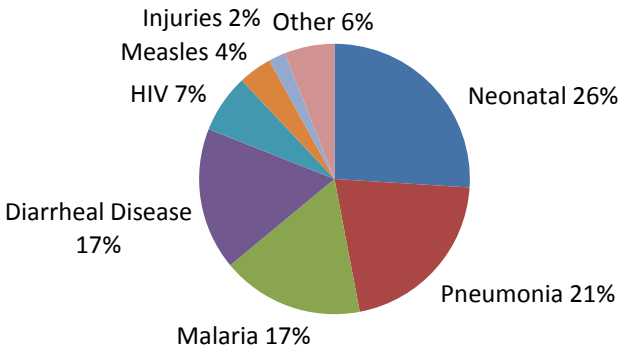
According to UNICEF, 55,000 under-five children in Cameroon's Far North and North regions have severe acute malnutrition. This is equivalent to 70% of the country's severely malnourished children, even though these two regions are home to only one-third of the country's children (UNICEF Humanitarian Action Update, Cameroon 2009).

The nutrition situation of children in Cameroon has worsened in both absolute terms (number of children) and relative terms (percentage). Poor nutritional status of children has been used to explain why survival goals have not been met in the country for the last 15 years. New efforts are needed to prevent and care for child malnutrition in Cameroon (UNICEF Humanitarian Action Update, Cameroon 2009).

DETERMINANTS OF UNDER-FIVE MORTALITY IN CAMEROON

According to 2010 figures, 93,000 children under age five die every year in Cameroon (UNICEF Levels and Trends Child Mortality Report, 2011). The World Food Program reports that these deaths are due to the following: infectious and parasitic diseases, a low rate of child vaccination, poor access to drinking water and sanitation, deterioration between 1991 and 2004 of the nutritional status of children and pregnant and lactating women, and inefficient healthcare arising from a shortage of health care staff (World Food Program, 2007). Malaria (17%), pneumonia (21%), and diarrheal disease (17%) are responsible for more than half of all deaths among children less than five years of age in Cameroon. Malnutrition contributes to more than half of these deaths (Figure 17, DHS 2004).

Figure 17: Causes of Death in Chilren Under Age Five in Cameroon (DHS 2004)



Most of the deaths in children under age five are due to conditions that can be prevented or easily treated with access to simple and affordable interventions. Research and experience show that most of the children who die each year could be saved by low-tech, cost-effective measures such as antibiotics, oral rehydration therapy, insecticide-treated bed nets, vaccines and vitamin supplementation. In addition to these interventions, education could be provided to mothers about how they can make simple changes to living conditions such as improving hygiene in order to improve the health of their children. Mothers who are educated will also have increased capacity to take care of their children. The Integrated Management of Childhood Illness has taken all of these cost-effective measures and incorporated them into one set of standardized instructions (WHO, 2008).

INTEGRATED MANAGEMENT OF CHILDHOOD ILLNESS (IMCI)

The realization that only a small number of diseases account for a high proportion of child deaths, that these diseases are often present in the same children with overlapping signs and symptoms, and that effective interventions are available for these diseases revealed the need for an integrated approach. Integrated management increases the probability that a child will receive the correct treatment for his or her condition and decreases the chance that a child will receive treatment for one disease and die from another unrecognized illness (WHO, 2008).

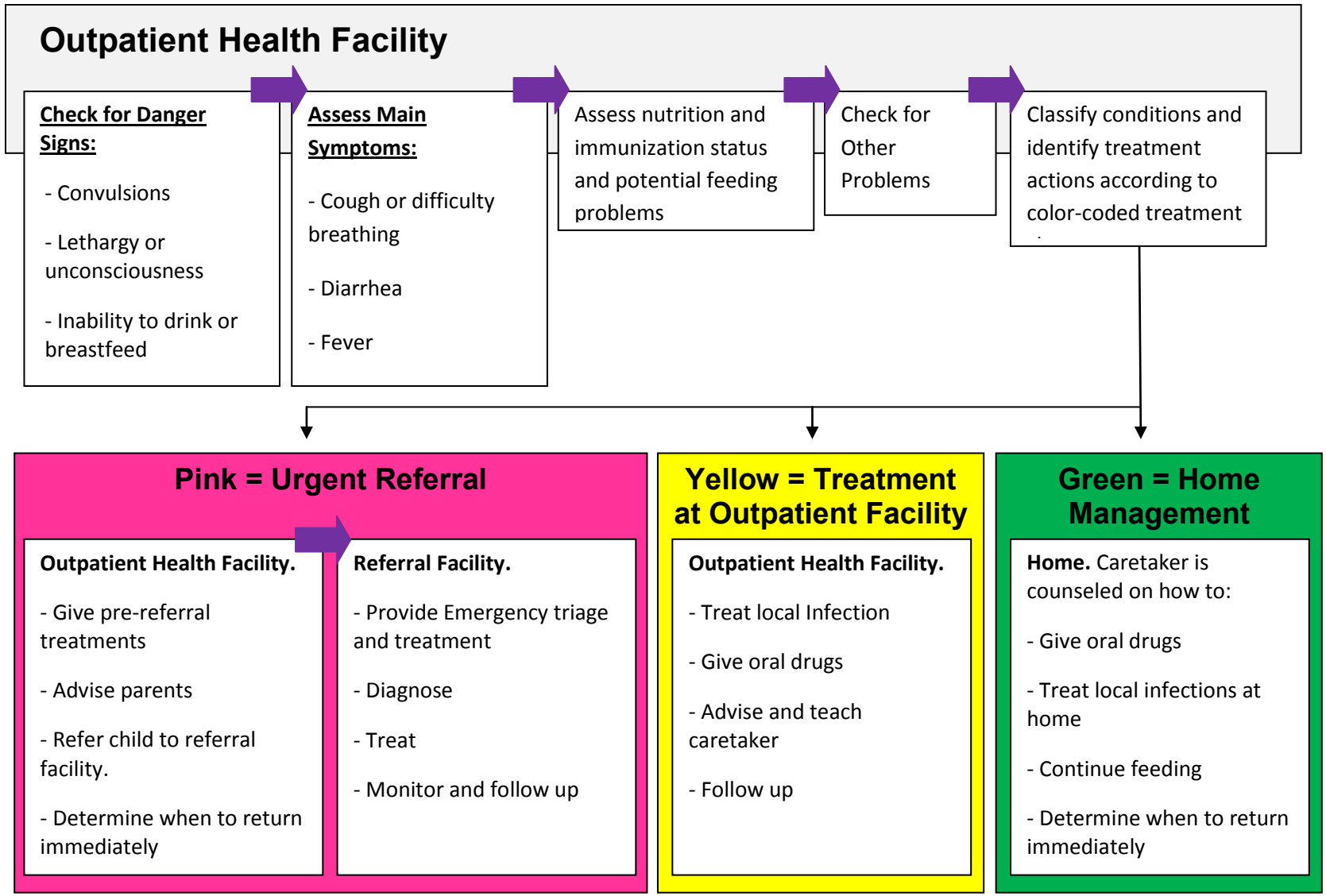
The IMCI strategy is offered to countries which have high under-five mortality rates exceeding 40 per 1000 live births (WHO/UNICEF, 2011). It is a strategy that has become central to child survival and development in countries with limited resources (WHO, 2008). Tanzania and Uganda began implementation in 1996 and now, more than 100 countries have adopted this strategy (WHO, 2011).

An important component of the IMCI approach is the application of standard guidelines in the management of sick children who present to the health facility. These guidelines facilitate the accurate identification of childhood illnesses in outpatient settings, ensure integrated and effective treatment of all major illnesses, strengthen the counseling of caretakers, and speed up the referral of severely ill children. The current version of the IMCI guidelines covers children between ages 1 week and 5 years, and is based on the detection of simple clinical signs without resorting to radiologic imaging or laboratory services, followed by empirical treatment (WHO, 2008).

Figure 18 presents a general outline of the approach for children age two months to five years (WHO and UNICEF, 2008). Separate case-management algorithms are available for children under two months of age. Sick children who attend a health facility are initially checked for the four WHO defined ‘danger signs’ (inability to drink or breastfeed, vomiting everything, convulsions during the current episode of illness and lethargy or unconsciousness) and for the main symptoms of key IMCI diseases: pneumonia, diarrhea, malaria, measles and other severe infections. Next, all children are assessed for malnutrition and anemia, followed by immunization verification. Additional health problems relayed by family members are then assessed, and children are classified according to a color code: pink (immediate referral to a hospital), yellow (management with specific drugs in the outpatient facility), or green (symptomatic management at home, Cesar, et. al, 2006). (IMCI algorithms for the assessment of sick children between 2 months and 5 years of age are available in Appendix B.)

Figure 18. Schematic Outline of IMCI Case Management for Children Age Two Months to Five Years.

(Adapted from WHO's *Integrated Management of Childhood Illness: ICMI Chart Booklet*, 2008.)



Recent studies of IMCI, including the Multi-Country Evaluation (MCE) and the Analytic Review of IMCI Implementation, have demonstrated that integrated approaches can produce significant improvements in quality of care (WHO, 2012). The WHO Department of Maternal, Newborn, Child and Adolescent Health (MCA) conducted the MCE in Brazil, Bangladesh, Peru, Uganda and the United Republic of Tanzania. The results of the MCE indicate that: IMCI improves health worker performance and their quality of care, IMCI reduces under-five mortality and improves nutritional status when implemented correctly, and IMCI is worth the investment, as it costs up to six times less per child correctly managed than current care (WHO, 2012).

INDUCTION OF IMCI IN CAMEROON

Plan International piloted IMCI in the East Region in Cameroon as part of a national pilot program, with the intention of using the experiences from the pilot for national scale up. Plan's IMCI intervention in the Cameroon Expanded Impact Child Survival Project (EIP) began in 2000 and preceded the government implementation of IMCI in Cameroon by two years. Plan trained all of the 46 health care staff working in three project districts of the East Region initially using a 6-day IMCI training, which was later followed up by a standard 11-day training recommended by WHO. The project supported the health facility workers in fully integrating IMCI into their daily practice at the health centers in the three districts. Based on the lessons learned from this pilot project, IMCI was adopted by the Ministry of Health (MOH) as a strategy to reduce child mortality (Plan International Child Survival Project XVI, 2004).

Between 2005 and 2010, Plan International, in collaboration with MOH, implemented the Child Survival Project in 11 health districts in three of Cameroon's 10 regions (East,

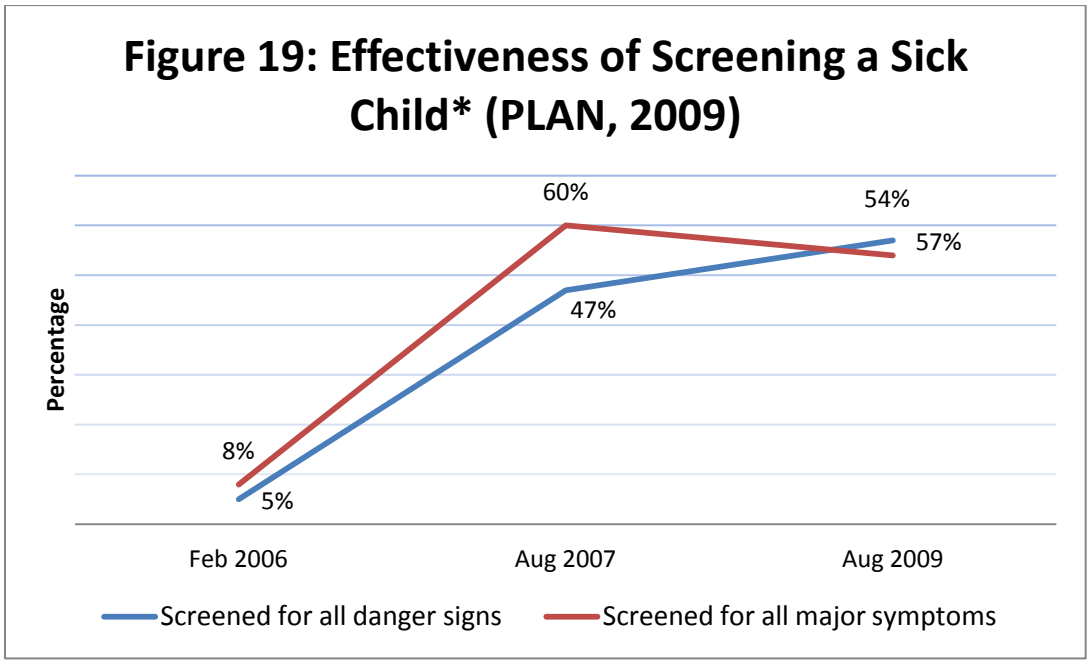
North West and Center). This project centered on five areas of intervention: malaria (40% level of focus), malnutrition (30%), diarrhea (10%), ARI (10%), and immunization (10%). Monitoring surveys were used to track the progress of IMCI implementation in these 11 districts and to recognize improvement in the health care providers' quality of care after being trained in IMCI (Plan International Child Survival Project XXI, 2009).

IMCI PILOT PROJECT RESULTS

Health care providers and supervising facilitators received training by Plan International on the practice of IMCI in each of the 11 districts of the three EIP target regions. The availability of these local facilitators allowed continued training of new frontline health care providers on child health care using the IMCI protocol. The EIP used an observation checklist as the survey instrument (an Integrated Health Facility Assessment tool developed by BASICS). Screening, clinical examination, and treatment tasks were reported by the observation checklist. Plan measured 16 indicators at the baseline, biannual periods, and end of the project related to IMCI, malaria, diarrhea, immunization and nutrition (Plan International, 2009).

Eighty-seven health care personnel were observed from the same number of health facilities; 43 target health facilities were private institutions, 10 were hospitals, and 77 were health centers. Of the 87 medical personnel observed, 8 were medical doctors, 20 state register nurses, 2 midwives, 45 nurses, 10 nurse aids and 2 state agents. A total of 454 children age zero to five were observed, 31% who complained of diarrhea/ vomiting, 56% complained of fever/malaria and 49% complained of cough or difficult breathing (Plan International, 2009).

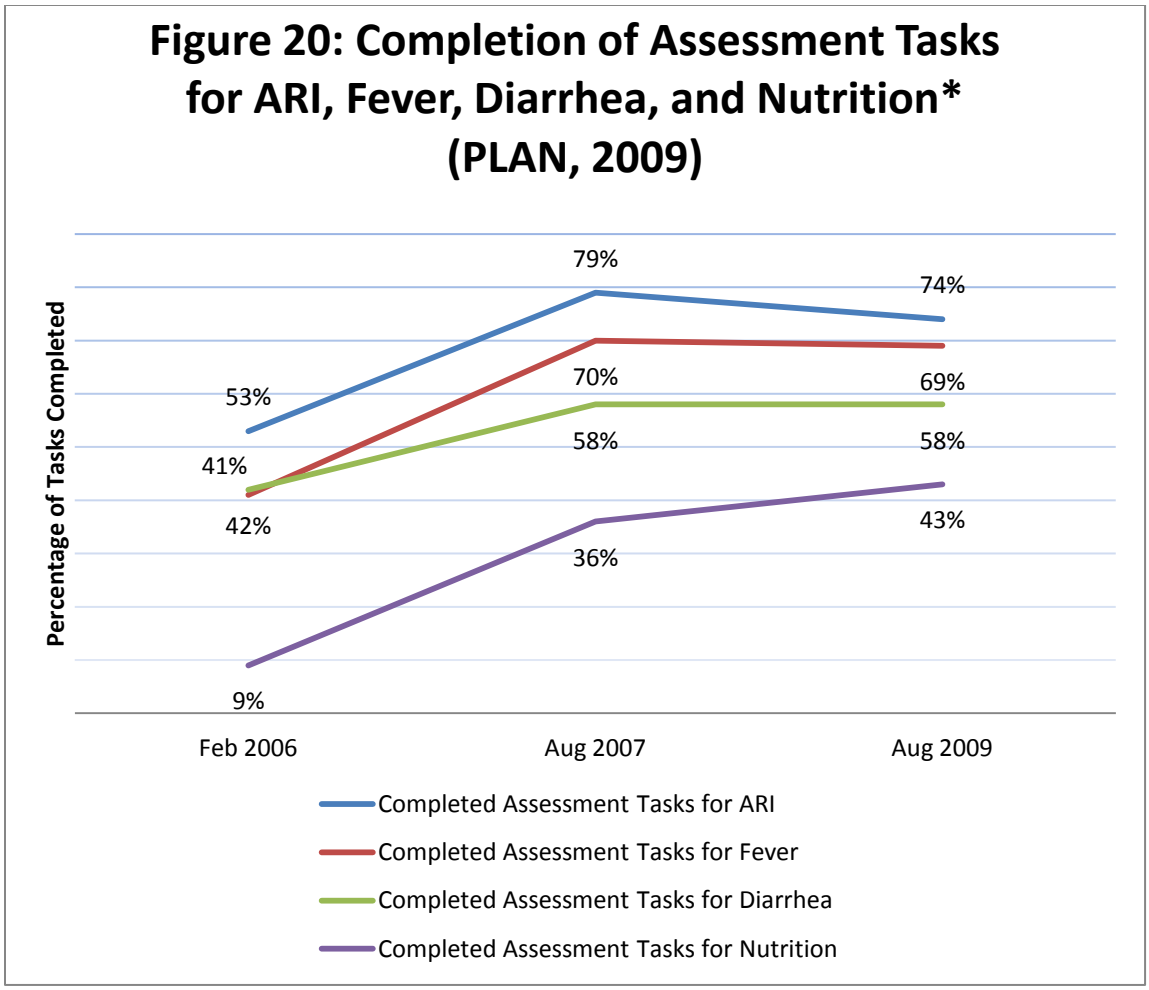
Two indicators were used to assess the effectiveness of screening a sick child: screening for all danger signs and screening for all main symptoms. Screening for all danger signs permits the consulting health worker to identify children who are seriously ill and attend to them or refer them immediately to an equipped health facility. Screening for all main symptoms helps to ensure the identification of other co-existing illnesses the caretaker might not have been aware of, thus increasing the chances of taking care of all of the child's problems and in an integrated manner. The proportion of children who presented for consultation who were screened for all danger signs increased from 5% at baseline (prior to IMCI training) to 57% at the midpoint evaluation (2 years following IMCI training) in the entire project area. Screening for all major symptoms was observed to increase from 8% to 60% and then to subsequently decrease to 54% (Figure 19, Plan International, 2009).[6]



[6] This may imply that after the baseline, mid-term refresher courses are necessary to sustain the practice of the protocol.

*Feb 2006 is a baseline assessment prior to any IMCI training. Aug 2007 is an assessment post completion of IMCI training. Aug 2009 is partway through the 5 year PLAN project and represents whether or not IMCI trained health care staff continued to use the guidelines.

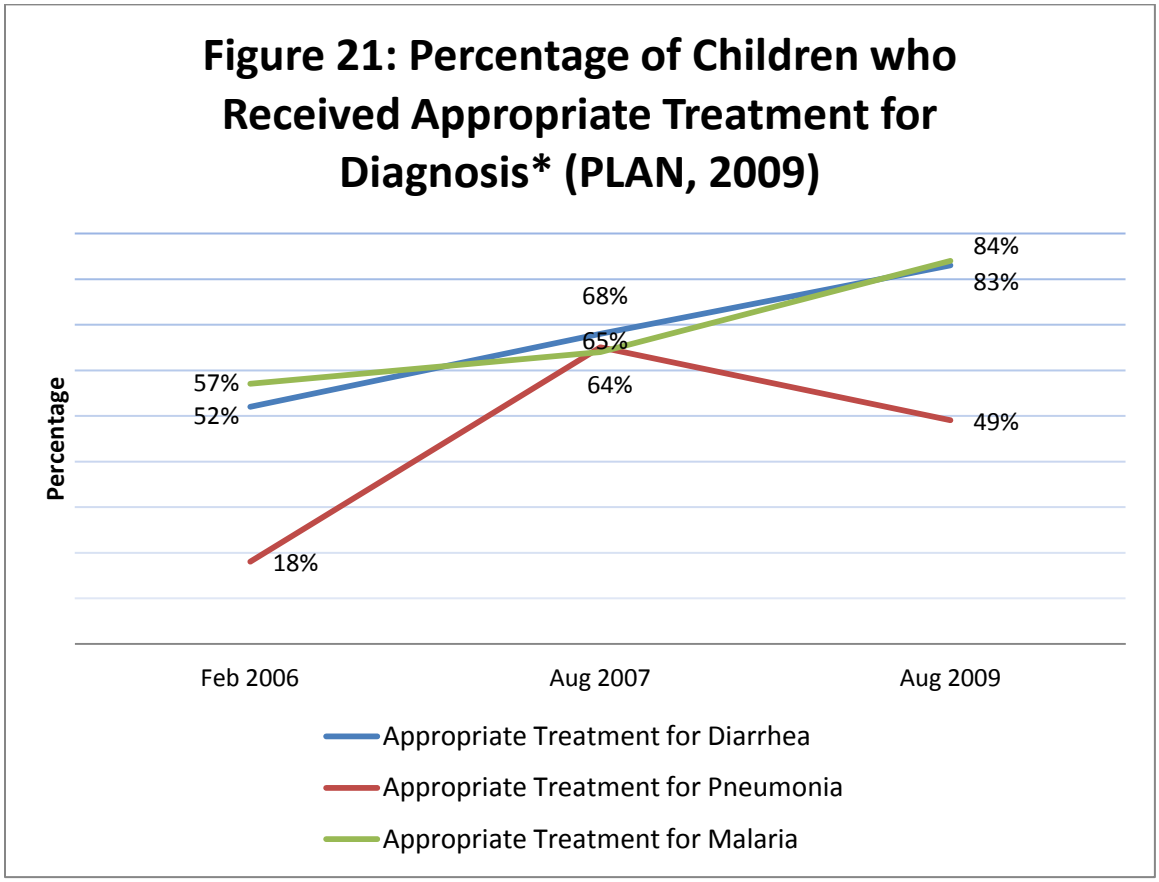
Thorough history and examination for clinical signs enables the health care consultant to make the correct diagnosis, accurately classify the severity of disease and prescribe the appropriate treatment. Six indicators were used to assess the completeness of the clinical examination of the sick child: 1) The number of assessment tasks completed for cases with history of diarrhea, 2) ARI, and 3) fever; 4) nutrition status; 5) weight plotted on a growth chart and 6) cases whose weights were determined. The proportion of assessment tasks completed for sick children with a history of diarrhea increased from 42% at baseline to 58% at the mid-point (Figure 20). The assessment of sick children with a history of ARI increased from 53% to 79% and for children with a history of fever, the assessment increased from 41% to 70%, (Figure 20, Plan International 2009).
The assessment of nutrition showed an increased trend from 9% at baseline to 36% post-IMCI training and 43% at the study's midpoint (Figure 20). More staff members checked the vaccination card at the sick visit of the child, from 50% to 74% to 84%, and there was substantial improvement in vaccinating or referring the cases not up-to-date, from 48% to 53% to 67% (Figure 20, Plan International, 2009).



*Feb 2006 is a baseline assessment prior to any IMCI training. Aug 2007 is an assessment post completion of IMCI training. Aug 2009 is partway through the 5 year PLAN project and represents whether or not IMCI trained health care staff continued to use the guidelines.

Accurate treatment of illness will lead to cure of the illness, reinforce the confidence of the mothers or caretakers in the health care system and cut down the cost of treatment. Four indicators were used to assess appropriate treatment for diagnosis: 1) appropriate treatment for diagnosis, 2) ORS/ORT for diarrhea, 3) appropriate antibiotic for pneumonia and 4) appropriate antimalarial for malaria. The proportion of children who received an appropriate medication for the diagnosis made by the health worker showed an increasing trend from 52% to 68% to 83% (Figure 21). The proportion who received accurate ORS/ORT therapy for diarrhea increased from 50% to 71% to 93%. For

pneumonia, the trend increased from 18% to 65%, and then decreased to 49%. The trend for appropriate treatment for malaria increased from 7% to 64% to 84%, (Figure 21, Plan International, 2009).



*Feb 2006 is a baseline assessment prior to any IMCI training. Aug 2007 is an assessment post completion of IMCI training. Aug 2009 is partway through the 5 year PLAN project and represents whether or not IMCI trained health care staff continued to use the guidelines.

Plan International's child survival project revealed an overall improvement in the management of child illnesses by health care providers in the post IMCI training stage within the pilot regions, as illustrated by the improvement of the assessment indicators (Plan International, 2009).

IMCI EXPANSION IN CAMEROON

Plan is now assisting the Ministry of Health (MOH) in expanding IMCI to the entire country. The EIP is supporting the scale up of health facility IMCI utilization by training a pool of national trainers. As of October 2009, 659 health staff has been trained and are practicing IMCI (284 in the EIP project area and 375 in other regions of the country) in more than 133 health facilities. EIP has also increased access to maternal and child health information by training 25,860 community organization members who promote key IMCI community education and behaviors among pregnant women and mothers of children under age five (Plan International, 2009).

In addition, a one week training module on IMCI has been integrated into the curriculum of medical residents in pediatrics at the University of Yaoundé, and plans are underway to integrate IMCI into undergraduate medical studies, a plan to sustain IMCI long beyond the life of the project (Plan International Child Survival Project XXI, 2009).

AN INTERVENTION IN THE FAR NORTH

Although significant progress is being made to advance IMCI expansion throughout Cameroon, no set criteria exists for promoting IMCI guidelines in regions and districts where health interventions are most needed (Victoria et al, 2006). As is depicted throughout the literature review, the Far North Region is hard-pressed for a child health intervention. Compared to the rest of Cameroon, this region has one of the highest under-five child mortality rates in the country, the lowest maternal health indicators, the lowest treatment seeking behavior for cough, fever and diarrhea, the lowest proportion of children who have received all WHO recommended vaccinations, and the highest proportion of children with acute and chronic malnutrition (DHS, 2011). However, IMCI has not yet been introduced to this region.

METHODOLOGY

A BASELINE PERFORMANCE ASSESSMENT

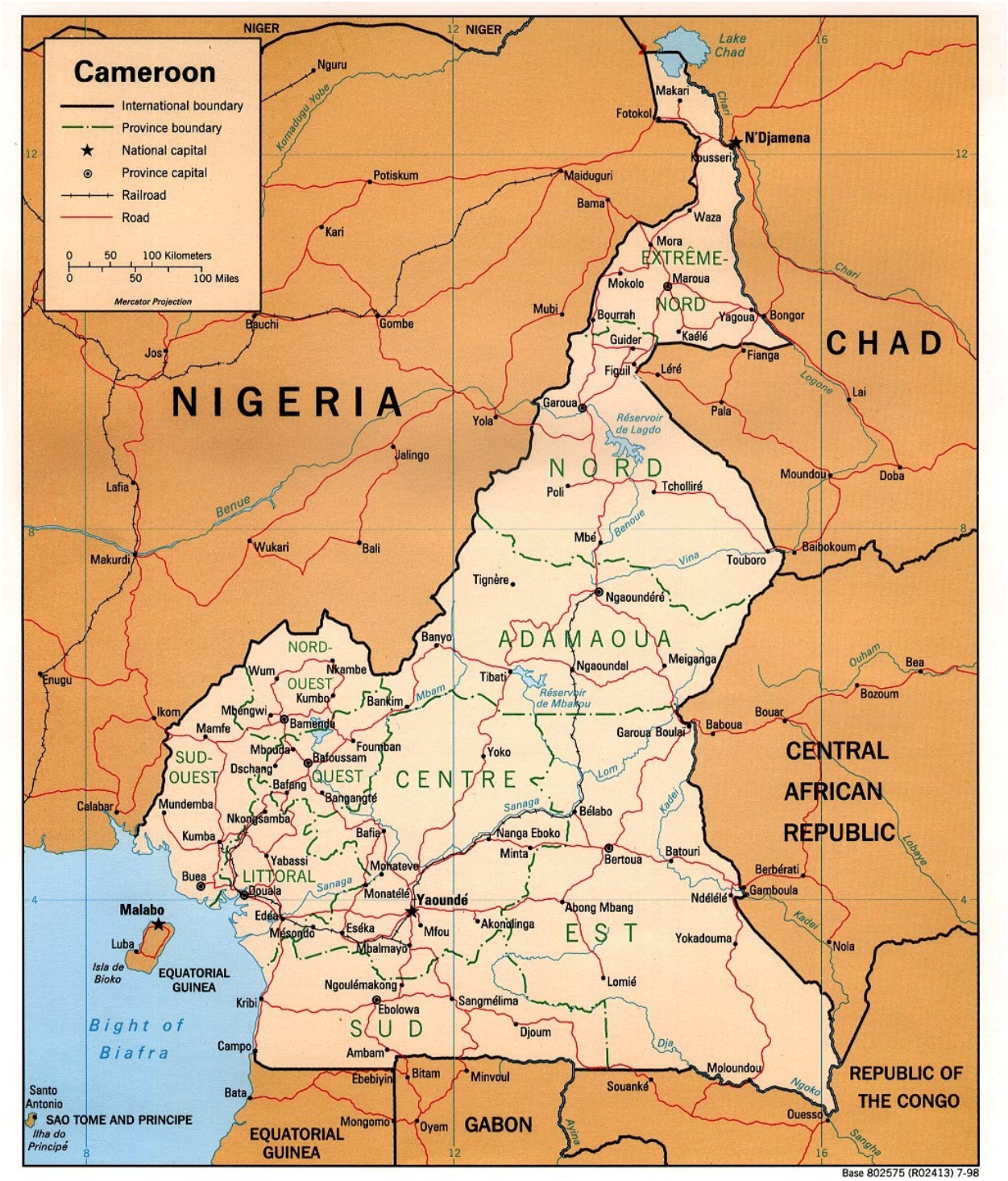
A quality assessment was developed to help identify the current quality of care provided to sick children in the Kolofata District of the Far North. It is being used as a strategy for evaluating child health services in the Far North Region by comparing the care received by sick children to the best practices described by the IMCI clinical guidelines.[7] The results may be used to improve the quality of care provided in this district through reinforced health worker training and the appropriate provision of essential equipment and supplies.

LOCATION

The Far North (Extreme-Nord) Region is the northernmost province of Cameroon. It borders the North (Nord) Region to the south, Nigeria to the west and Chad to the east (Figure 22). The Kolofata Health District covers an 850km^2 rural zone within the Far North Region (Figure 23). Health care is provided by six primary health centers and a 120 bed hospital (Direct Relief International, 2011). The most common language spoken in this district is Fulfulde, although more than 5 languages are commonly spoken throughout the region. The educated minority, such as the health care workers, speak French (Kolofata District Hospital, 2011).

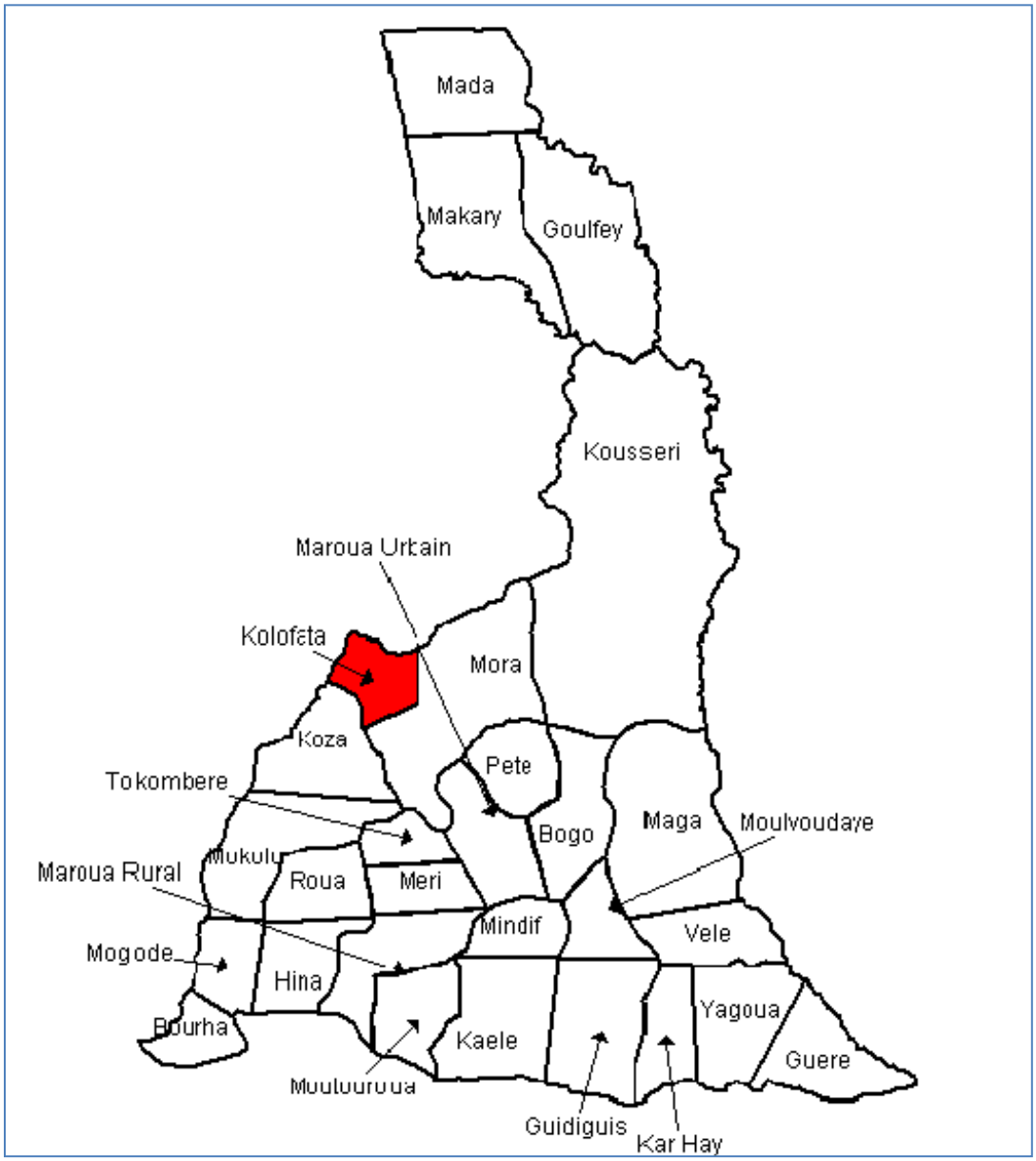
[7] A quality assessment is the measurement of the quality of healthcare services. It measures the difference between expected and actual performance to identify opportunities for improvement. Performance standards can be established for most dimensions of quality, such as technical competence, effectiveness, efficiency, safety, and coverage. Where standards are established, a quality assessment measures the level of compliance with standards. Where standards are not established or are more difficult to identify, as in Kolofata and the Far North Region, a quality assessment describes the current level of performance with the objective of improving it (Lin Y. and Tavrow P. 2000).

Figure 22. Regional Map of Cameroon*



* Cameroon's 10 regions are titled in Green. Source: Perry-Castañeda Library Map Collection, University of Texas Libraries.

Figure 23. Health Districts in the Far North Region, Cameroon.*



*Kolofata is represented in red. Source: International Federation of Red Cross and Red Crescent (IFRC).

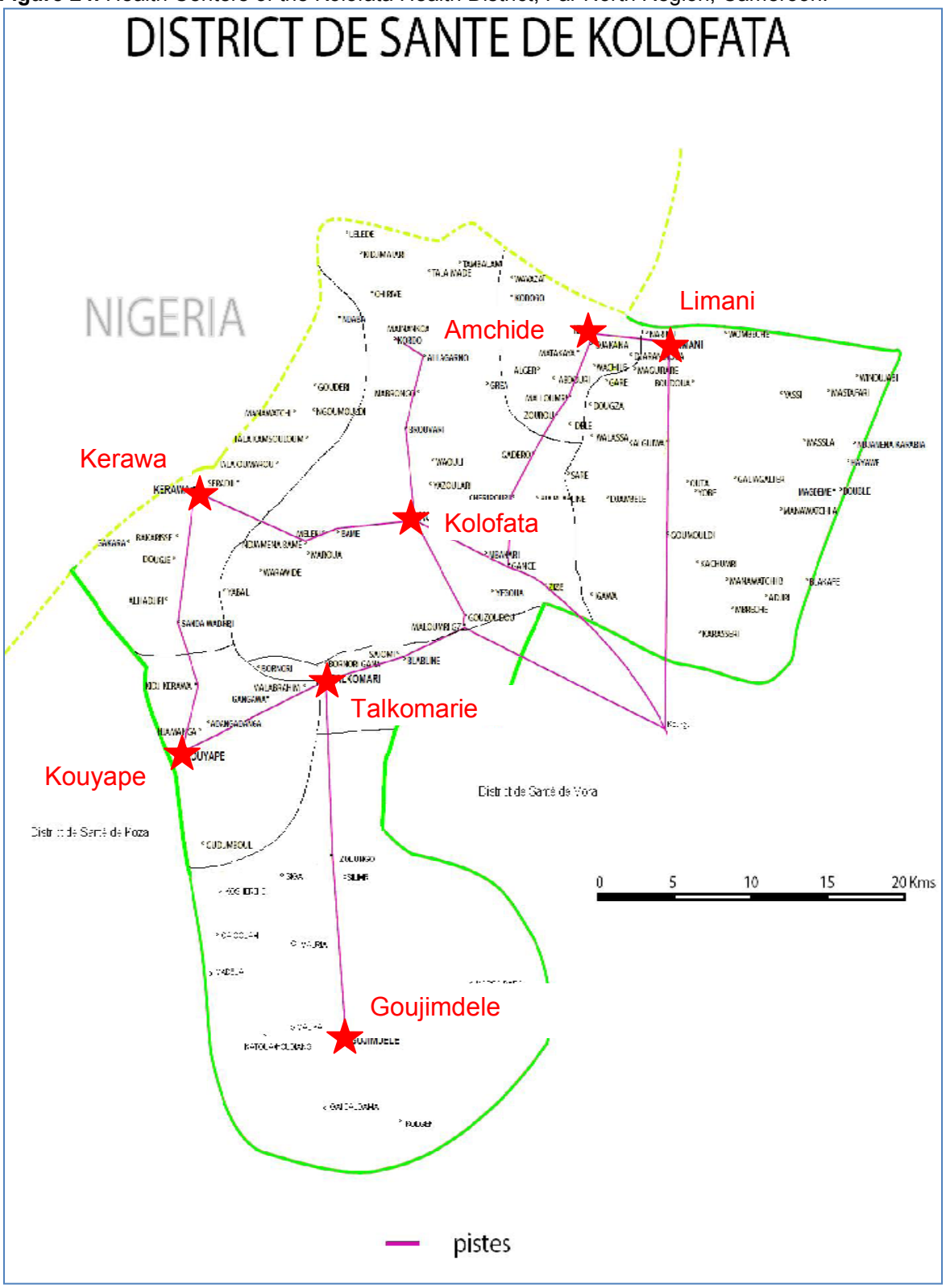
STUDY SITE AND PARTICIPANTS

All government health facilities in the district of Kolofata, seven in total (Figure 24), were selected to participate in the assessment under the welcome and guidance of the Kolofata Regional Medical Officer and the District Hospital Director. Six are first level

health care facilities and one is the regional district hospital, which also serves as a seventh outpatient health care facility. All seven health chiefs (head nurses) from these facilities were selected and observed with sick children presenting to these seven health facilities. All of the seven medical personnel observed are nurses. Zero of the medical personnel in the district have been trained as physicians, except for the District Hospital Director. All of the nurses are male. None of the health workers had received any IMCI training prior to the study, allowing for a baseline assessment before IMCI program training is provided to health workers in the Kolofata District.

To explain the goals of the assessment and to obtain consent, the principal investigator gave a presentation to the health chiefs (head nurses) of all seven health facilities before the survey began. The study was conducted in partnership with the District Medical Officer and all first level health workers in the district were informed by the Medical Officer that a survey of child health practices was to be undertaken. Because they were employed by the District Medical Officer, they were required to participate. Health workers were assured that their competence was not being evaluated and that the assessment was to provide feedback to health workers on performance and to design solutions to improve quality of care.

Figure 24. Health Centers of the Kolofata Health District, Far North Region, Cameroon.*



*The seven health centers are highlighted in red. The district hospital is located in Kolofata.
Source: Kolofata District Hospital.

SELECTION OF OBSERVED CONSULTATIONS

Children who were included in the study were those between 2 months and 5 years (59 months), described as sick by the caretaker with at least one of the following complaints (one of four danger signs, fever/malaria, cough, fast/difficulty breathing, pneumonia, or diarrhea), and were at their first visit to the health facility for the current problem.[8] If a caretaker had more than one sick child, then each child was screened separately and treated separately. A caretaker could have more than one child included in the survey. A minimum sample of 70 sick children between the ages of 2 months and 5 years was desirable.

Verbal consent was obtained from caretakers of children for observation of the consultation with the health worker.[9] The caretaker was informed that the child would still be seen and treated by the local caregivers if the caretaker chose not to participate in the study. Health workers and observed children were allocated codes and no identifying information was recorded. Ethical approval was obtained from the Emory University Institutional Review Board (IRB Exemption, page 127).

[8] General danger signs are signs used by IMCI practitioners to identify children who need to be referred urgently to a hospital. In IMCI, general danger signs are assessed first. A general danger sign is present if: 1) the child is unable to drink or breastfeed, 2) the child vomits everything, 3) the child has had convulsions with this illness, or 4) the child is lethargic or unconscious (WHO, 2008).

[9] Caretaker: An individual who has primary responsibility for the care of the child. Often, it is the child's mother, but could also be his or her father, grandparent, older sibling, or other member of the community (UNICEF, 2008).

DESIGNING AND PREPARING FOR THE ASSESSMENT

Tools that WHO has developed for health worker assessment during observation were reviewed and a facility inventory checklist was subsequently drafted (Appendix C). After incorporating suggestions from the District Medical Officer, a 25-question provider knowledge and assessment examination was developed using IMCI standardized questions (Appendix F).[10] The questionnaire was translated into French. Answers were collected and used to facilitate presentation of district level results.

SURVEY METHOD

Survey methods included observing the case management of sick children who attended the health facility the day of the survey, reviewing facility equipment and supplies the same day of the survey, and administering the knowledge examination to each of the health workers at the end of the each observation day.

The observer checked for the health care provider's accurate assessment of children who present for a sick consultation using the observation checklist. The observer did not disrupt the consultation session. A single observation checklist was completed for all consultations that were observed, with each consultation representing a new column in the data spread sheet. After the health care providers were observed, an inventory of available drugs and supplies necessary for IMCI implementation was conducted. After the inventory of the health facilities, all health care providers of each facility were given the provider knowledge and assessment examination. Health care providers were

[10] A quality assessment frequently combines various data collection methods to overcome the intrinsic biases of each method alone. These methods include direct observation of patient-provider encounters, staff interview, patient focus group, record review, and facility inspection, among others (Lin Y. and Tavrow P. 2000).

allowed unlimited time to take the examination but were not allowed to use any materials to answer the questions.

No specimens were collected. There were no risks or direct benefits to any participants in the survey, but participation contributed to improved health services in the regional facilities.

DATA COLLECTION

A dataset containing the results of the observation checklist was developed and cleaned using Excel. Quantitative data was analyzed onsite using Excel. Data that were collected and analyzed include the assessment of the sick child observation checklist, the inventory of the health facility, and the results of the examination. Participant names or other identifying information was not collected and does not appear in any data set. There is no way to link specific activities to a health care provider, caretaker or child. No identifying data was collected, obtained or retained.

STATISTICAL ANALYSIS

Because there were less than 10 facilities, all 7 health facilities were chosen for observation and sampling was not necessary.

CAPACITY BUILDING

Two days of ICMI training were carried out with the district health workers. The first PowerPoint presentation was provided on May 30, 2011 at the Kolofata District Hospital. The purpose of this presentation was to introduce the IMCI intervention and rationale and to teach the IMCI algorithms for the identification and management of respiratory disease, fever and diarrheal disease. Thirty-five people were in attendance, which included faculty nurses, nurse aids, community aids and community/hospital translators. Although the IMCI instructor taught in English, the hospital medical director translated the presentation to French. As well, the PowerPoint was provided in French (The PowerPoint slides are available in Appendix D as a Microsoft Word document).

The second presentation was provided on June 1, 2011 and was also held at the Kolofata District Hospital. The purpose of this presentation was to introduce the IMCI intervention and to discuss the pre-IMCI examination results. Six of seven health facility chiefs were in attendance. Similar to the first presentation, the instruction was provided in both English and French. A PowerPoint was provided with the examination results in French (Appendix E).

RESULTS

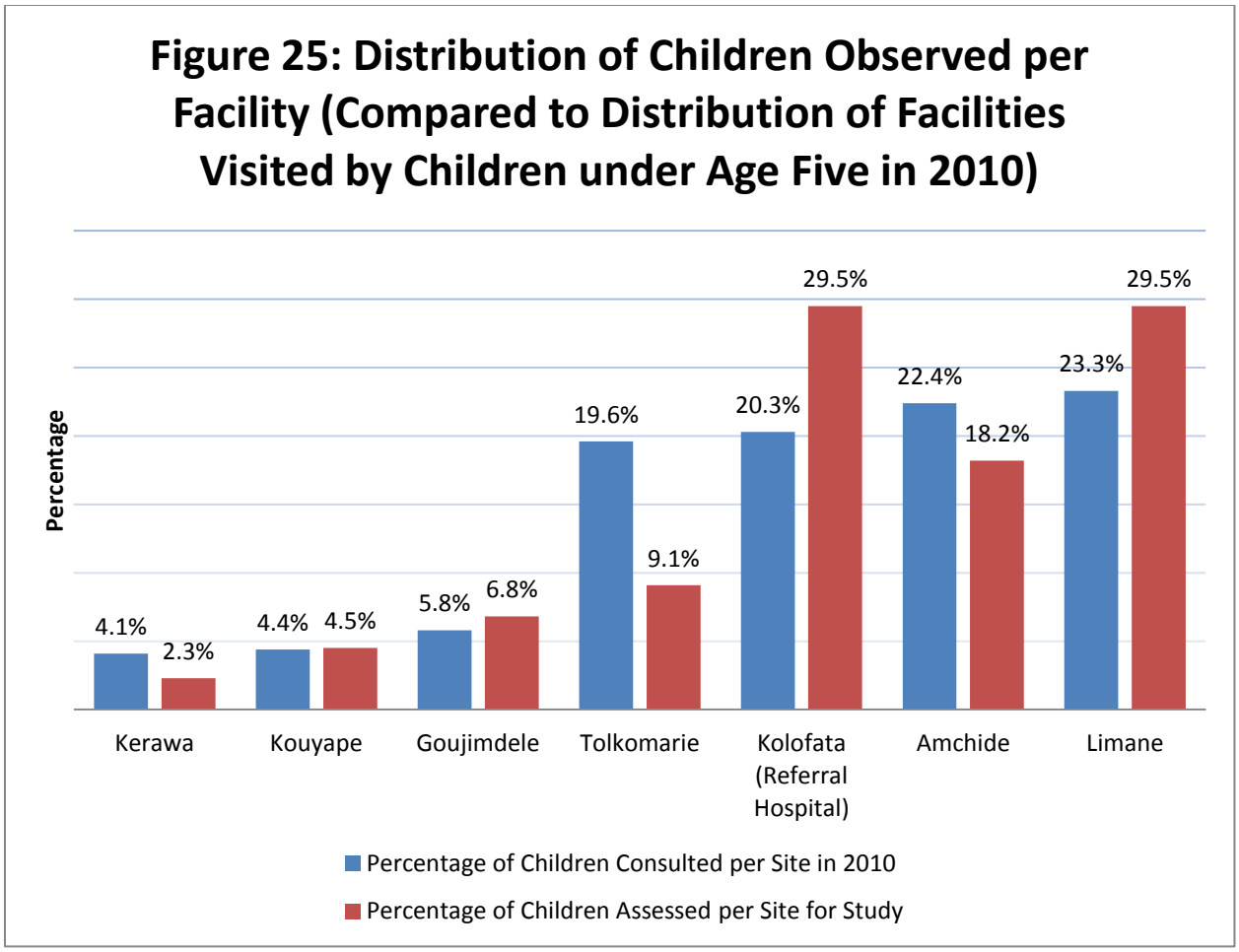
The seven health chiefs from each of the seven health facilities were observed between May 1 and June 1, 2011. A total of 44 sick child consultations were assessed. In each health facility, a team of one IMCI instructor and one English-French translator observed the consultation of each sick child between the ages of 2 months and 5 years. The IMCI instructor was present for all 44 consultations and two translators alternated between consultation days.

Five facilities were visited once and two facilities (Kerawa and Tolkomarie) were visited twice. Only one sick child under age five presented to each of these two clinics during the original assessment days. Thus, a second day was spent at each facility to better represent the distribution of facilities visited by sick children throughout the year (Figure 25). Zero children presented on the second assessment day at Kerawa, whereas three additional assessments were made at Tolkomarie. The distribution of children assessed per site, compared to the distribution of site usage (as of 2010) is presented in Table 1 and Figure 25.

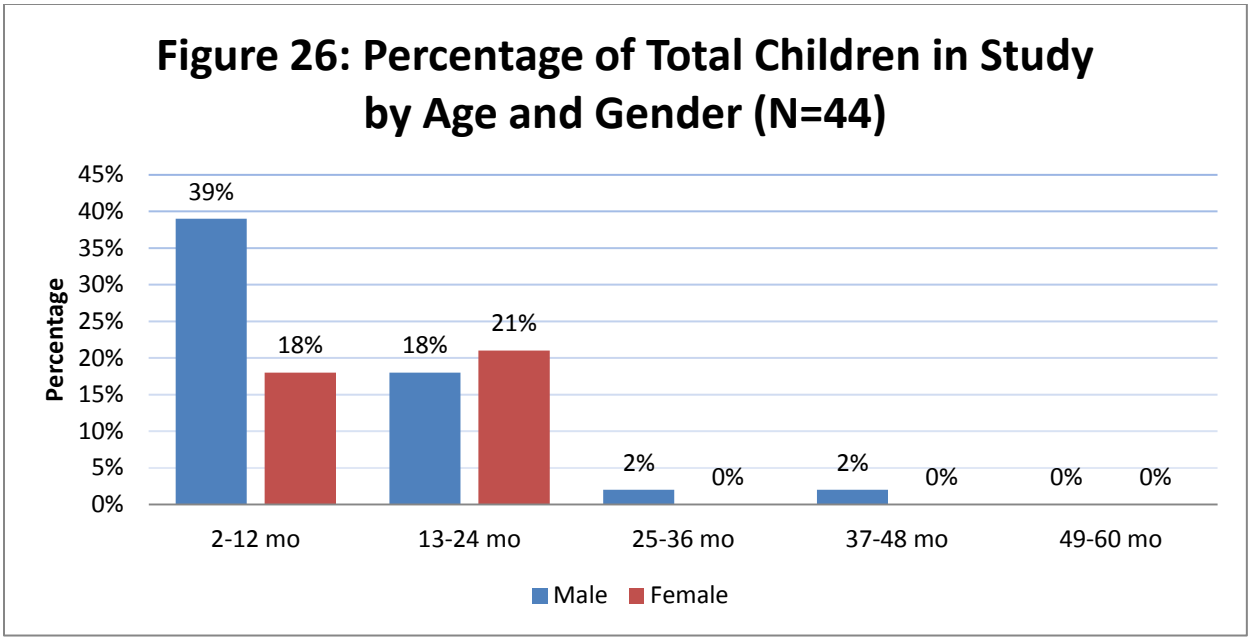
Table 1. Number of Case-Management Assessments per Facility

Facility:	Kerawa	Kouyape	Goujimdele	Tolkomarie	Kolofata	Amchide	Limani
Study Cases per Facility*	1/44 (2.3%)	2/44 (4.5%)	3/44 (6.8%)	4/44 (9.1%)	13/44 (29.5%)	8/44 (18.2%)	13/44 (29.5%)
Cases per year per facility**	750/ 18,353 (4.1%)	814/ 18,353 (4.4%)	1067/ 18,353 (5.8%)	3604/ 18,353 (19.6%)	3718/ 18,353 (20.3%)	4119/ 18,353 (22.4%)	4281/ 18,353 (23.3%)

* Total study cases were 44. **Total cases seen at all facilities in 2010 were 18,353 (Kolofata District Hospital, 2011).



The age range of the children observed was between 2 months and 48 months of age, with a mean age of 14 months and median age of 12 months. The proportion of children in the 2- 12 month age range was highest, 57% (Figure 26). The number of children seeking care declined with age and decreasing significantly after 24 months of age. Of the 44 children observed, 27 (61%) were male (Figure 26). Males under age one were twice as likely as females under age one to visit a health facility (Figure 26). Male child preference may account for the lower proportion of girls seen by health care workers.



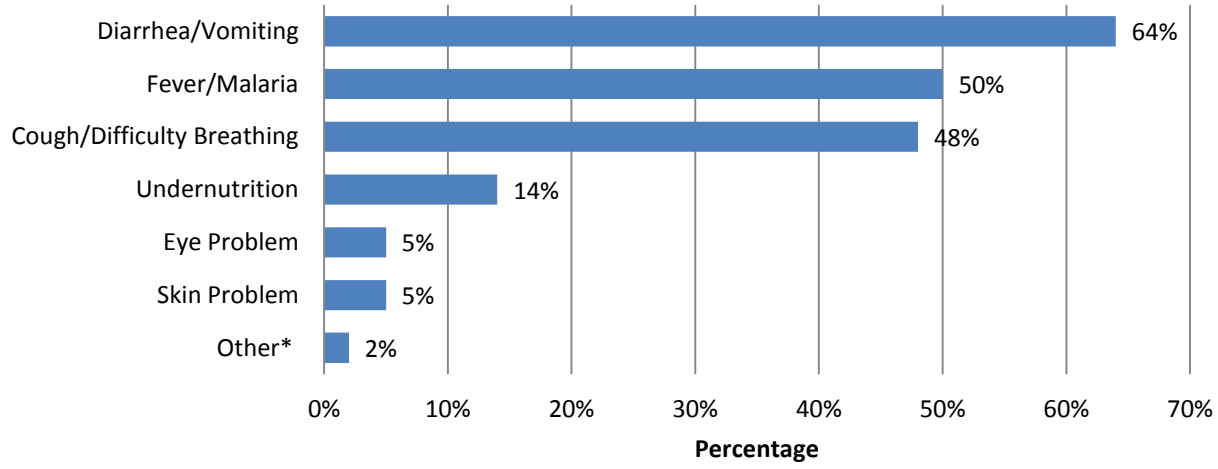
CHIEF COMPLAINT

The average number of symptoms reported was 2.0 per child. Twenty-eight children (64%) came to the health facility for diarrhea, 22 (50%) came for fever/malaria and 21 (48%) came for cough or difficulty breathing (Figure 27). Twenty-five (57%) children presented to the health clinic with more than one of these three illnesses (at least two or more complaints of diarrhea/fever/cough). Seven (16%) children presented to the clinic for illnesses that did not include diarrhea, fever, or cough.

Six children presented to the clinic for undernutrition, of which only one case was recognized by the caretaker as such (Figure 27). Three caretakers came for 'swollen bellies', one came for skin desquamation and another came because a recent polio eradication campaign member had told her to bring the child to a clinic for malnutrition. Although only six children presented to the clinic for symptoms of undernutrition, a much higher percentage of children had a diagnosis of undernutrition.

Only four children (9%) presented to the clinic for complaints that are not outlined in the IMCI guidelines. These four complaints included 2 eye problems and 2 skin problems (Figure 27). Overall, more than 95% of the reported symptoms were related to four conditions: diarrhea, fever, cough, and malnutrition.

Figure 27: Percentage of Children Who Reported the Following Major Symptom Categories to Health Care Workers (N=44)



* Other Symptoms included inability to drink/breastfeed and oral ulcers.
** Percentage does not add to 100 because children had more than one symptom of illness.

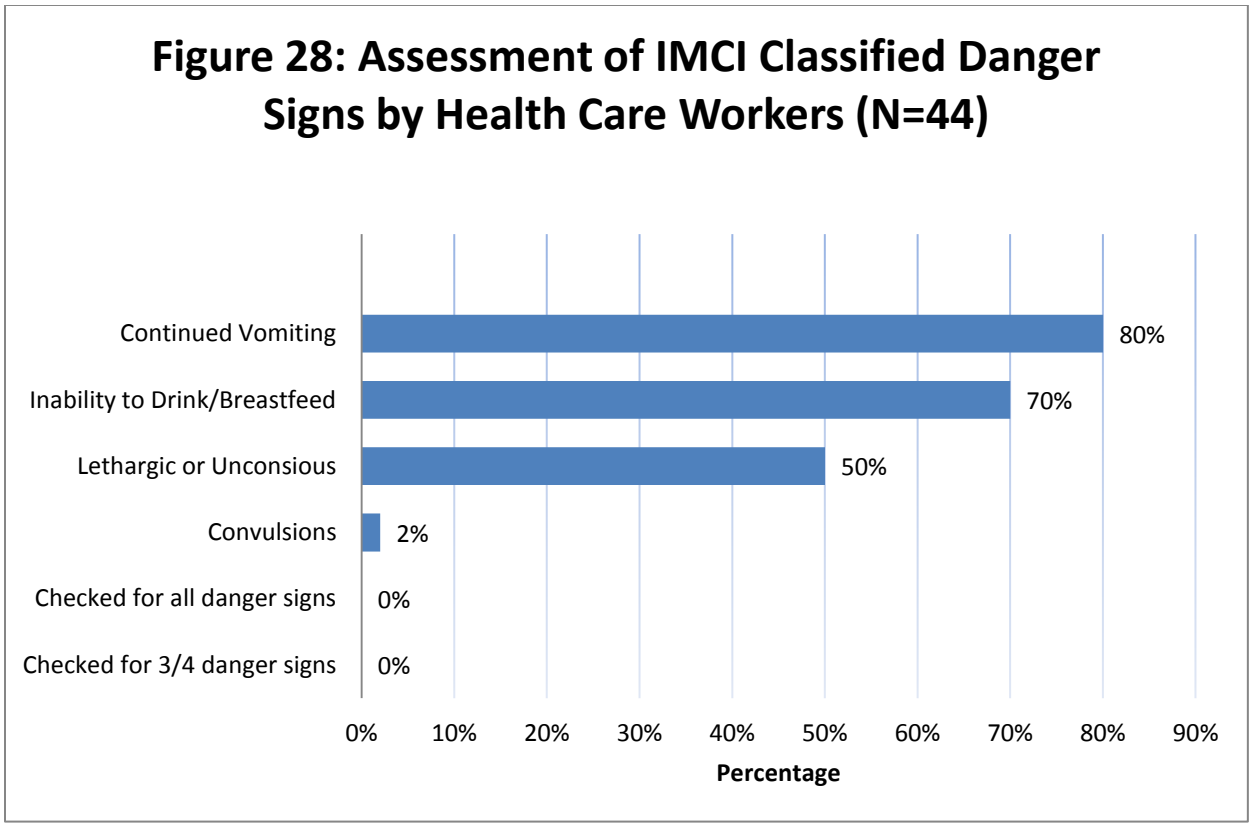
OBSERVATION ASSESSMENT

This study assessed whether or not the following ten tasks where carried out by the health care workers: checking for danger signs, diarrhea, cough, fever, anemia, vaccination status, child's weight, and whether or not the weight was plotted on a standard growth curve.

Danger Signs

Assessment of general danger signs (lethargic/unconscious, not able to drink or breast feed, vomiting everything, and convulsions in this illness) by health care workers was not frequently done. The most commonly assessed danger sign was the presence of continued vomited during this illness and the least commonly assessed was the presence of convulsions in this illness. Thirty-five children of 44 (80%) were asked for whether or not they had continued vomiting, 30/43 (70%) were asked if they could drink or breastfeed[11], and only 1/44 (2%) was checked for the presence of convulsions. Of two children who were not visibly awake (playing, smiling or crying with energy), one was checked for lethargy or unconsciousness (50%). None of the sick children were assessed for more than 2 of the danger signs (Figure 28). General dangers signs indicate that a child has a serious problem and needs life-saving treatment and urgent referral to a hospital.

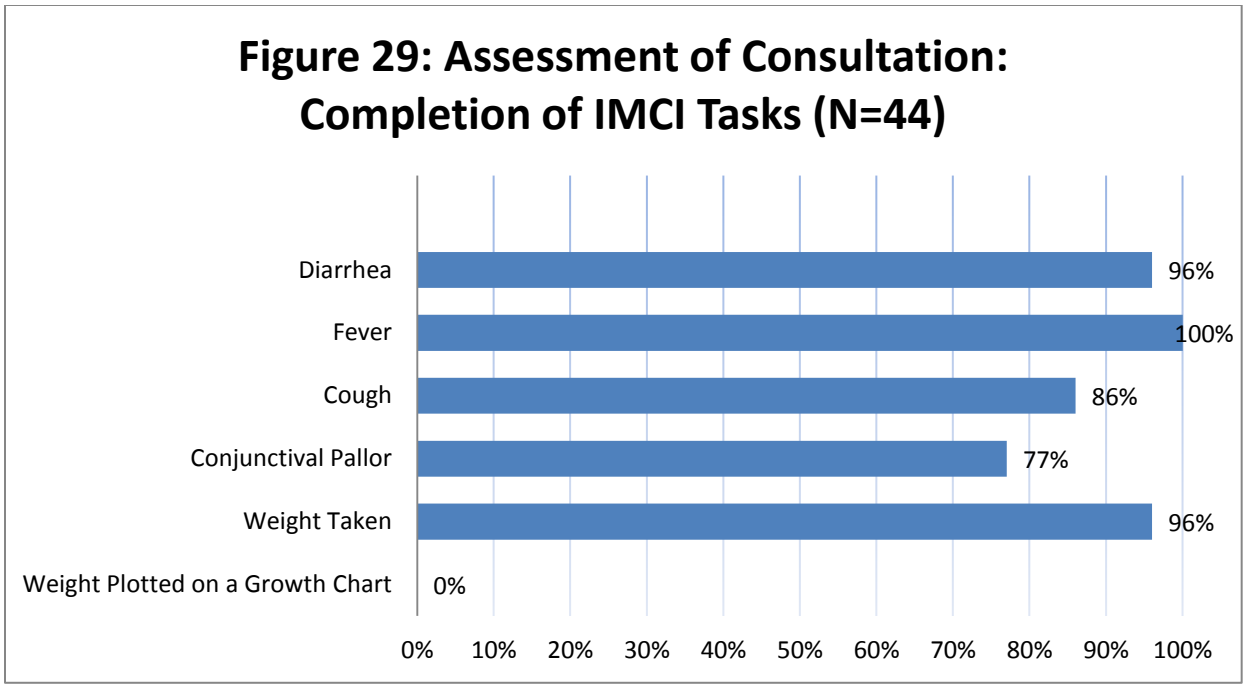
[11] Denominator here is 43 because one of 44 children was brought in for inability to breastfeed, and therefore was not applicable to the question.



As previously stated, none of the health care workers had prior training in IMCI guidelines and thus, they may have never received any training to suggest that these four signs should be checked in all children under age five.

Major Illnesses

Figure 28 shows that 42 children (96%) who came to the health facility were assessed for symptoms of diarrhea and 38 (86%) were assessed for symptoms of cough. All 44 children were assessed for a recent history of fever, 43 of which had a temperature taken with a thermometer (Figure 29). These numbers are relatively higher than pre-IMCI assessment studies carried out in other countries and could be due to the fact that all nurses were verbally consented for their participation in a study concerning pneumonia, malaria and diarrheal disease (see discussion).



Nutrition

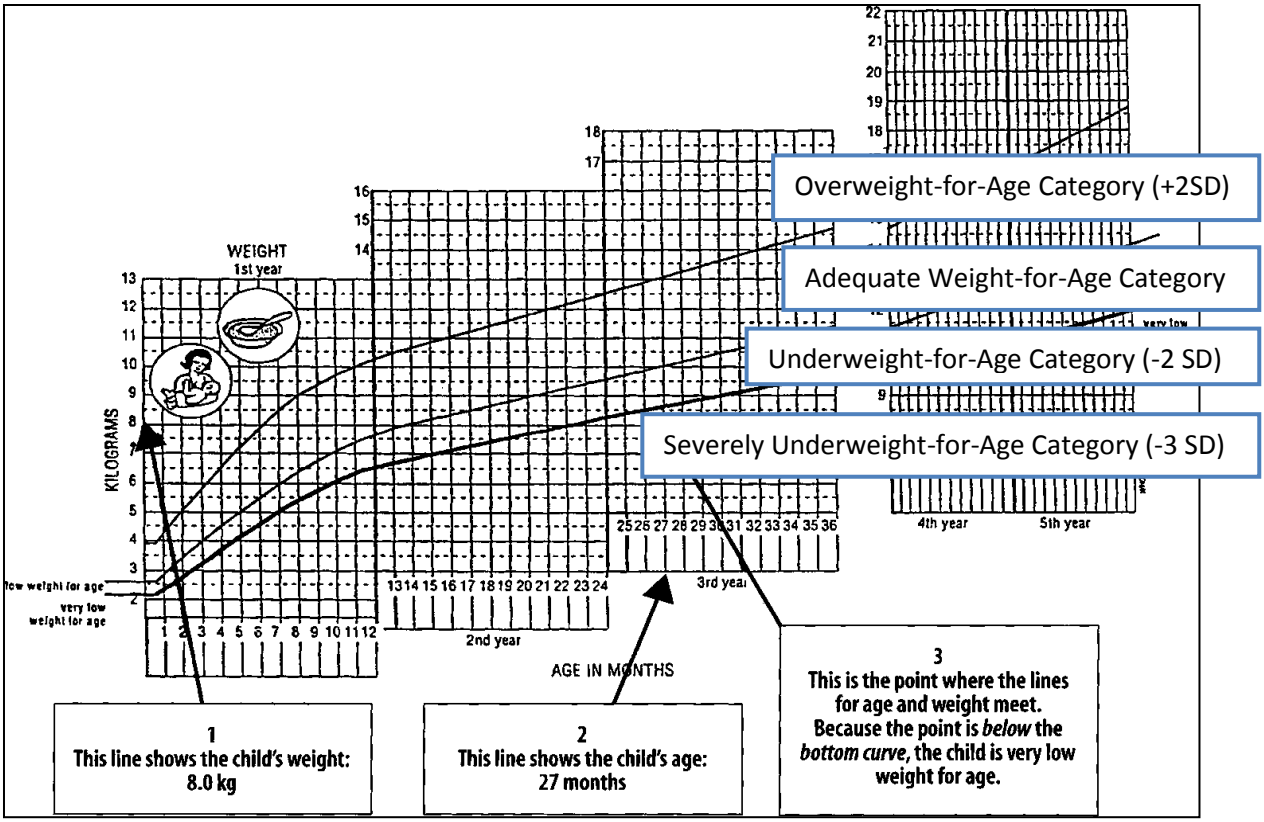
Forty-two children (96%) were weighed during their consultation to the clinic. One of the 7 facilities did not have the equipment to weigh a child; however, only one child came to this clinic during the assessment day. When the IMCI instructor made a return visit to this site, a scale had been added to the clinic's equipment.

Although 96% of children were weighed, none of the weights were plotted on a growth chart. Interestingly, growth charts were available either in vaccination booklets presented by caretakers or on walls in the clinics. The IMCI instructor began recording the weights of children under age 5 partway through the study in order to review the following nutrition data with the health care workers at the end of the study.

Thirty-one total weights were recorded of the 44 children consulted. Using the IMCI Growth Curve (Figure 30), 1 child (3.2%) was overweight-for-age and 2 children (6.5%)

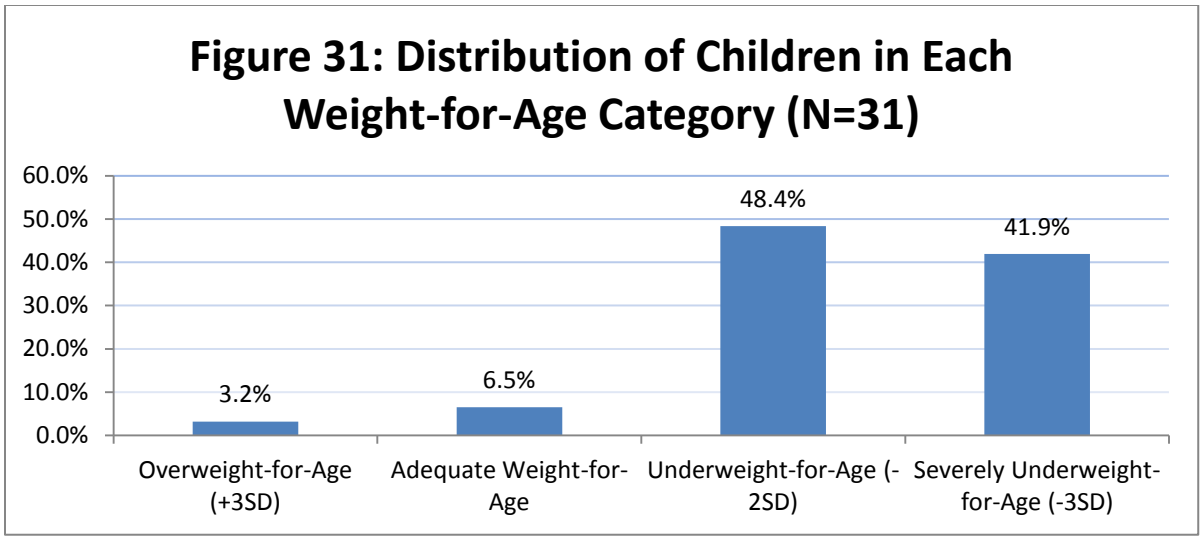
were within the weight-for-age range. Twenty-eight children (90%) were underweight[12] (had a weight-for-age below -2 standard deviations, Figure 31). Fifteen of these 28 children (54%) were severely underweight (had a weight-for-age below -3 standard deviations). Two of the 15 (13%) below -2SD and 9 of the 13 (69%) below -3SD received a diagnosis of undernutrition. Five children in the below -3SD category received nutrition counseling and 2 received HIV testing (after it was determined that the child's weight was not due to underfeeding of adequate foods).

Figure 30. IMCI Standardized Growth Chart with Weight Categories Depicted.



Source: Handbook: IMCI integrated management of childhood illness (WHO/UNICEF, 2008).

[12] Underweight is defined internationally as the proportion of preschool children whose weight-for-age falls below -2 standard deviations (SDs) from the National Center for Health Statistics/World Health Organization (NCHS/WHO) international reference median value for weight-for-age (WHO 2008).



There are two main reasons for routine assessment of nutritional status in sick children. First, health care workers must identify children with severe undernutrition who are at increased risk of death and refer them to where they can receive active treatment. Second, health care workers need to identify children with inadequate growth due to ongoing deficits in dietary intake plus repeated episodes of infection (stunting), and who may benefit from nutritional counseling and resolution of feeding problems.

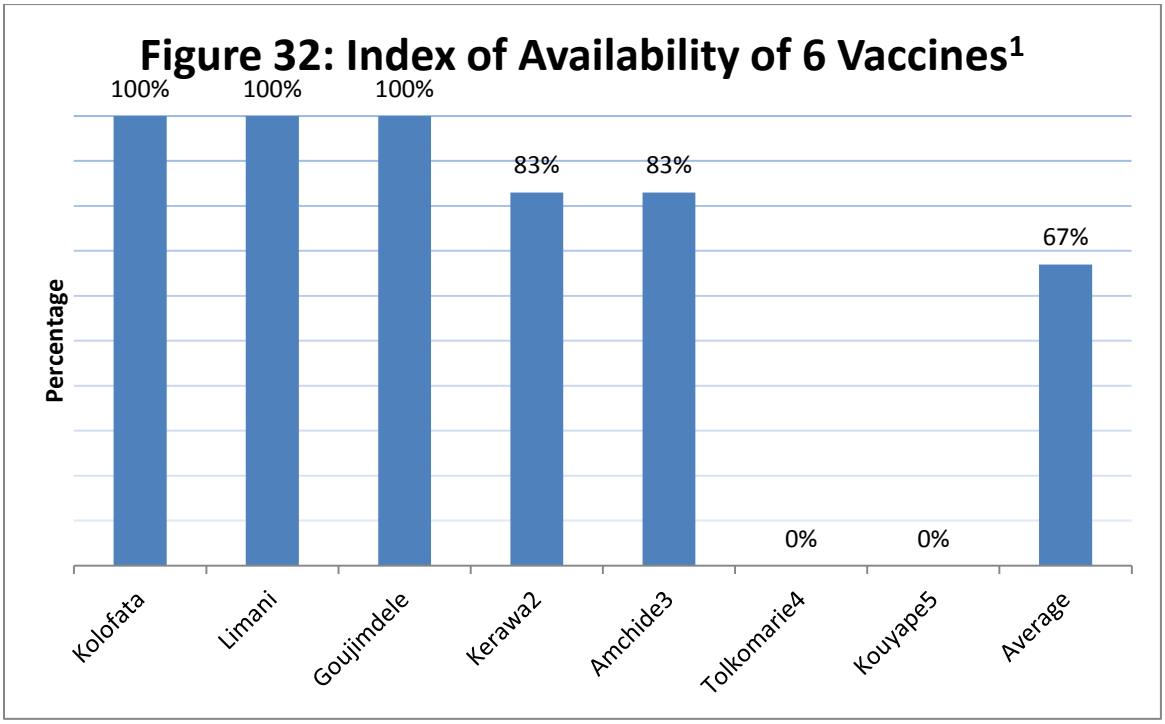
Vaccination Status

Vaccination status was checked by the health care worker by either reviewing the child's vaccination booklet or asking the caretaker about the child's vaccination history. Just over half the children (55%) had their vaccination status checked (Figure 29). However, no children received vaccinations during their sick child visits. It was discovered that children who are not of Cameroonian descent are not to receive vaccines from the health facilities due to limited funding. This is unfortunate as the Kolofata Health District is located on the Nigerian border, the border is very fluid, and many of the children seen

in the clinics are either from Nigeria or Chad. Children of Cameroonian descent are advised to come for well-child visits and have vaccinations updated at that time. On the other hand, health care facilities organize monthly vaccination campaigns in the local villages where they vaccinate all available children.

Facility Support for Vaccinations

Three of 7 facilities had all 6 vaccines that are recommended by Cameroon's Expanded Program of Immunization (EPI). Two facilities had 5 of 6 EPI recommended vaccines. Two facilities lacked all 6 vaccines due to the lack of a generator during a power outage (Figure 32).

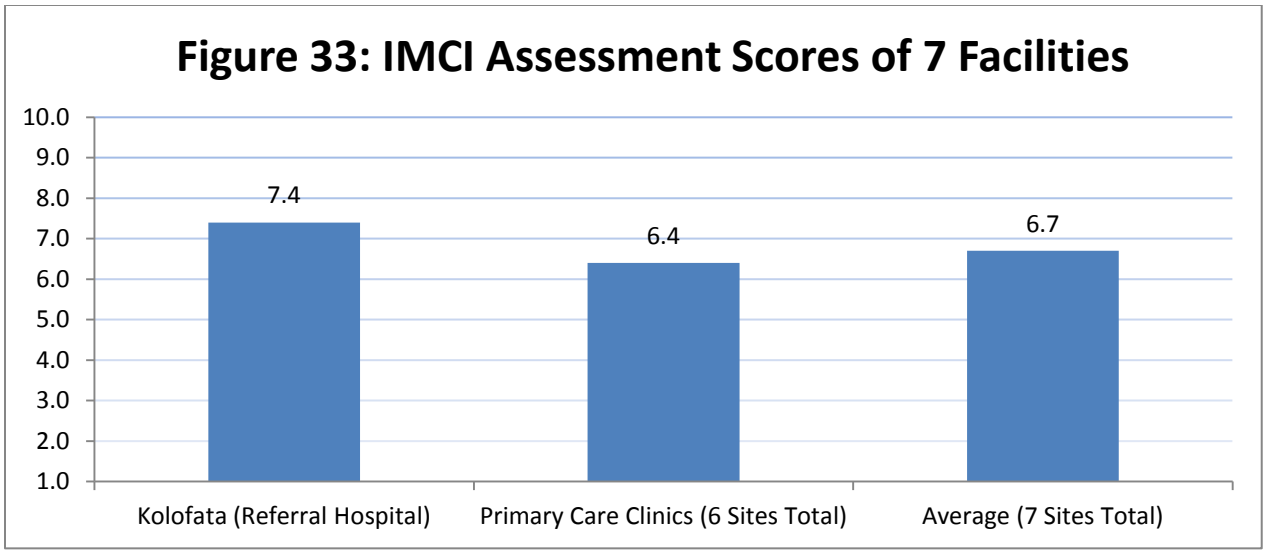


[1]Six vaccines: BCG (Tuberculosis), DPT (Diphtheria, Pertussis, Tetanus), OPV (Oral Polio Vaccine), Measles, Yellow Fever, TT (Tetanus Toxoid)
[2]Missing Measles vaccine
[3]Missing BCG vaccine
[4]No generator during power outage.
[5]No generator during power outage.

Six of the 7 health facilities did not have electricity during the time of the study due to downed power lines (a common theme during the dry season). Four of these 6 facilities had working generators or gas-powered refrigerators and thus vaccine capability. Two of the six facilities did not have a generator or gas-powered refrigerator and thus did not have any of the 6 vaccines onsite. The one facility with electricity was also equipped with a generator should they lose power (Figure 32).

Index Assessment

An index of integrated assessment was created during data analysis, according to the WHO analysis plan. The integrated assessment is a mean of assessment tasks performed for each sick child consulted, giving a score of 1 for each of the following 10 tasks performed: checking for three danger signs, diarrhea, cough, fever, conjunctival pallor, vaccination status, child's weight, and whether the weight was plotted on the growth card. Each consultation could therefore score a maximum of 10. A higher score indicates a more comprehensive assessment. The mean score observed during the survey was 6.7 (295/44, Figure 33). The referral hospital (Kolofata) had a score of 7.4 (96/13) and the primary health clinics had an average score of 6.4 (199/31). This is higher than average index of assessment scores in other countries (as is reviewed in the discussion), suggesting that this district provides a higher quality of care. However, an overall average of 6.7 does reveal that there is room for improvement in the assessment of sick children in the Kolofata Health District (Figure 33).



Diagnosis and Treatment

The re-examination of sick children by the IMCI instructor to determine the correct IMCI-guided diagnosis was an objective of the study. However, re-examination could not be performed for multiple reasons (see limitations). Because assessment for the correct diagnosis was not completed, further assessment for the correct treatment could not be done.

EXAMINATION RESULTS

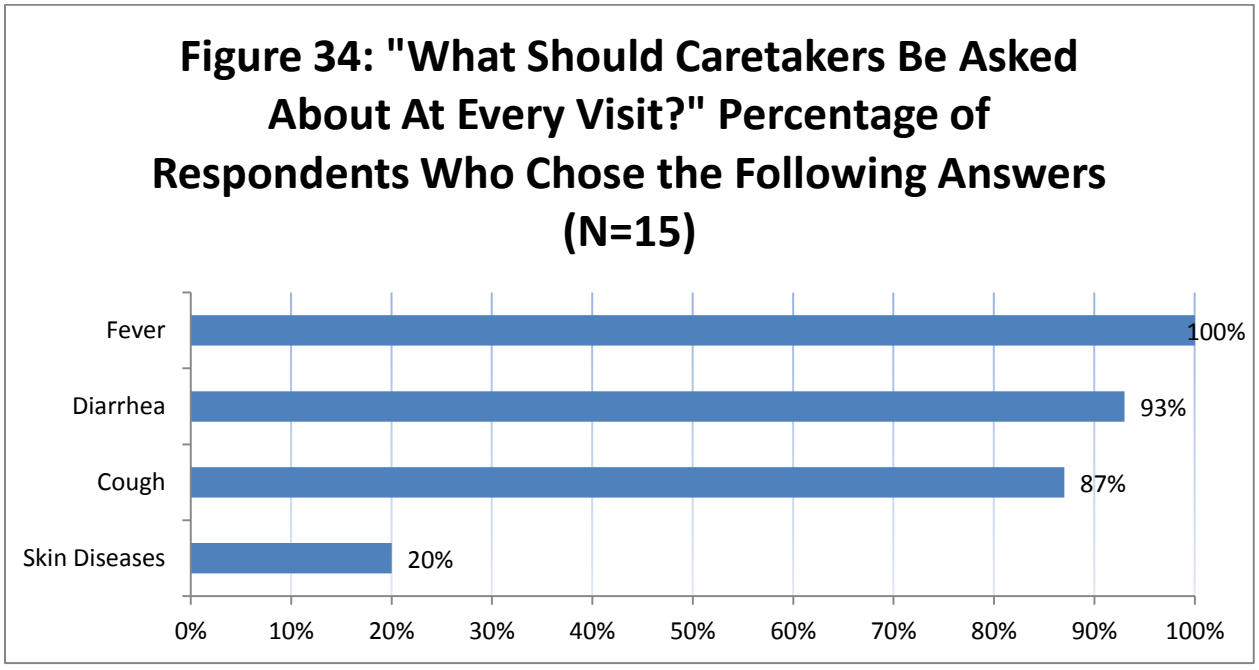
The objective of the examination was to identify strengths and weaknesses in diagnosis, classification and treatment of pneumonia, malaria and diarrheal diseases among the health care workers and to ultimately provide a means of dialogue to introduce and discuss the IMCI guidelines. A 25-question, paper examination was administered to seven head nurses and eight nurse aids from the seven health facilities (Appendix F). The questions were taken from the WHO IMCI question bank of multiple-choice questions (MCQs) on the standard IMCI guidelines (WHO Regional Office for the Eastern Mediterranean, IMCI Pre-Service Education, 2010). The examination was

developed in French and provided to the medical director for input and approval before distribution.

The examination was completed by the health workers at their respective health facilities at the end of each assessment day. Examinations were anonymous and each examinee was given a local soda product for their participation in the examination.

At the end of the study period, all seven head nurses traveled to the Kolofata referral hospital for the examination review. The review allowed for self-evaluation of knowledge prior to IMCI instruction and created an environment for discussion of IMCI guidelines and why answers were either right or wrong. This next section reviews some of the answers that were provided by the test takers and the group discussions that took place concerning the examination.

Question 1. What should health care workers ask caretakers about at every visit?

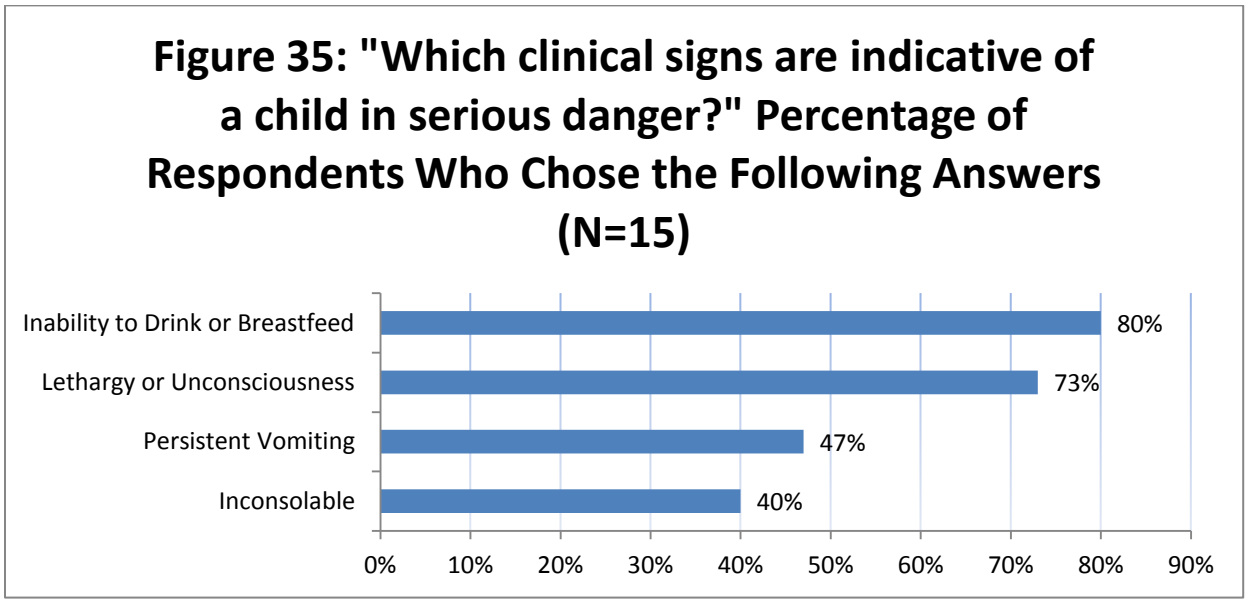


Respondents chose the following answers when asked, “What should caretakers be asked about at every visit?”(Question 1, Figure 34):

- 100% (15/15) answered fever
- 93% (14/15) answered diarrhea
- 87% (13/15) answered cough
- 20% (3/15) answered skin diseases

Fever, diarrhea and cough should be assessed during every sick child visit. According to IMCI guidelines, skin diseases do not mandate assessment during every visit.

Question 2. What are clinical signs indicating a child is in imminent danger?



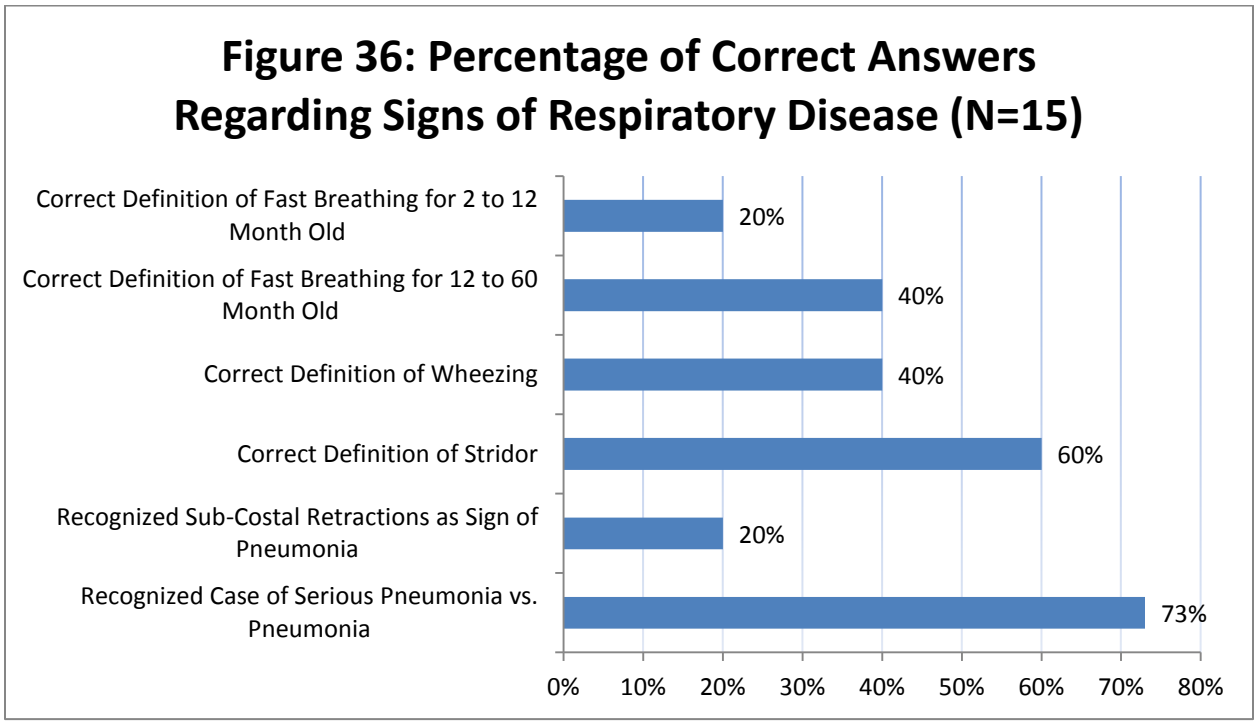
Respondents correctly answered the following to be grave clinical signs that can present in sick children and indicate a child is in danger:

- 80% (12/15) answered inability to drink or breastfeed
- 73% (11/15) answered lethargy or unconsciousness
- 47% (7/15) answered persistent vomiting

Six respondents (40%) answered that a child who is inconsolable is in serious danger. Although not an IMCI general danger sign and considered a wrong answer in the IMCI question bank, the medical director and IMCI instructor agreed to keep 'inconsolable child' a correct answer of dangerous signs in children should a child present with appendicitis, peritonitis or perforated bowl.

Questions 3-8: Signs of Respiratory Disease

Questions 3-8 concerned the diagnosis and IMCI classification of pneumonia (Figure 36). The responses of these six questions were used to teach the 'cough or difficulty breathing' section of the IMCI guidelines and how to classify a child into 'severe pneumonia or severe disease, pneumonia, or no pneumonia (cough or cold)'.



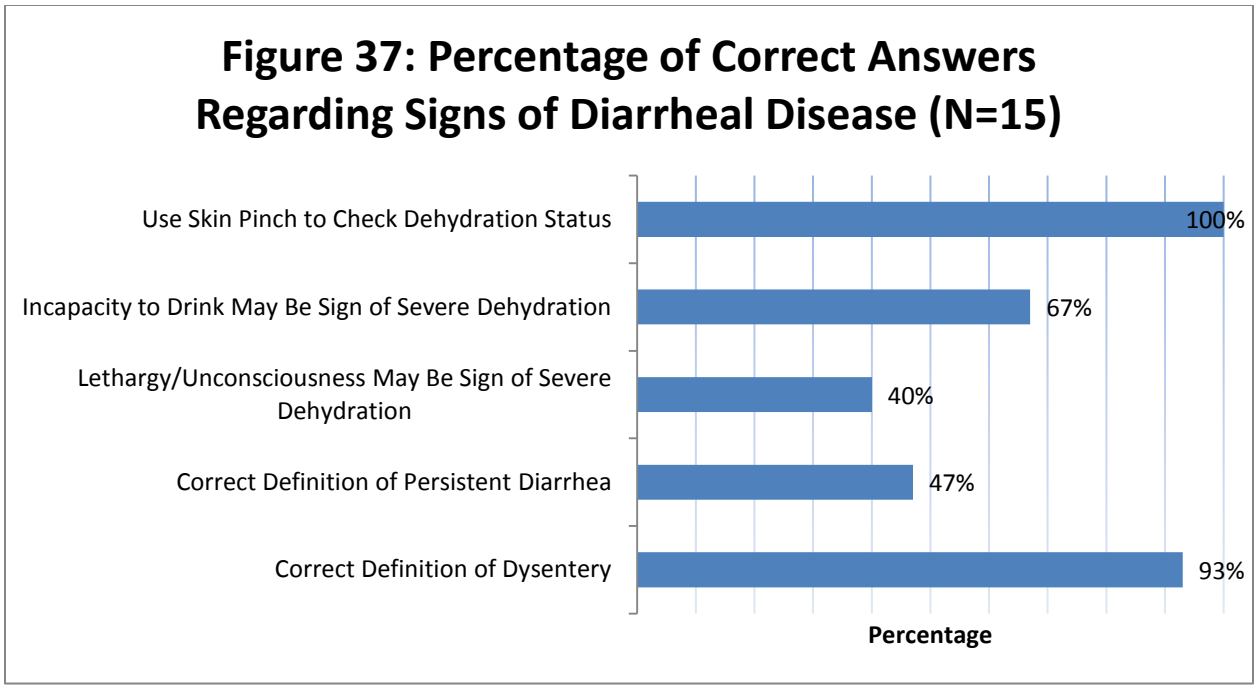
It is important to differentiate pneumonia from viral infections or other non-serious conditions that do not require antibiotics. According to IMCI guidelines, one can identify almost all cases of pneumonia in a child with cough using these two clinical signs: fast breathing and chest indrawing (WHO IMCI Handbook, 2005). However, few respondents correctly recognized these two clinical signs:

- 20% (3/15) correctly chose 50 respirations or more per minute as the definition of fast breathing in a 2 to 12 month old child
- 40% (6/15) correctly answered 40 respirations or more as the definition of fast breathing in a 12 month old up to 5 years
- 20% (3/15) correctly chose subcostal retractions as most characteristic of respiratory disease due to pneumonia (as opposed to intercostal retractions)

Six of 15 (40%) correctly identified the sound of wheezing as a sound heard when the child breaths out, as opposed to breathing in, such as stridor (Figure 36). Nine of 15 respondents (60%) correctly answered stridor as a sign of severe respiratory disease. However, during examination review, none of the respondents were aware that stridor is an upper airway problem and not a sign of pneumonia. It was explained that stridor occurs when there is swelling of the larynx, trachea, or epiglottis and can be life-threatening if the child's airway is blocked.

Questions 9-13: Diarrheal Disease and Dehydration

Questions 9-13 focused on the assessment and classification of diarrheal disease, severity of dehydration (severe, some or no dehydration) and treatment plan according to degree of dehydration (IMCI Treatment Plan A, B or C). Figure 37 reveals the results of some of these questions.



Respondents correctly answered the following as methods to check a child's dehydration status:

- 100% (15/15) answered skin turgor (skin pinch)
- 67% (10/15) answered incapacity to drink
- 40% (6/15) answered lethargy and unconsciousness as possible signs of severe dehydration

Lethargy or unconsciousness can also be signs of very severe pneumonia, meningitis or cerebral malaria.

Respondents recognized the following diarrheal conditions (Figure 37):

- 93% (14/15) correctly defined dysentery
- 47% (7/15) correctly defined persistent diarrhea

These definitions are important as they require different types of treatment and follow up care.

Questions 14-16: Fever

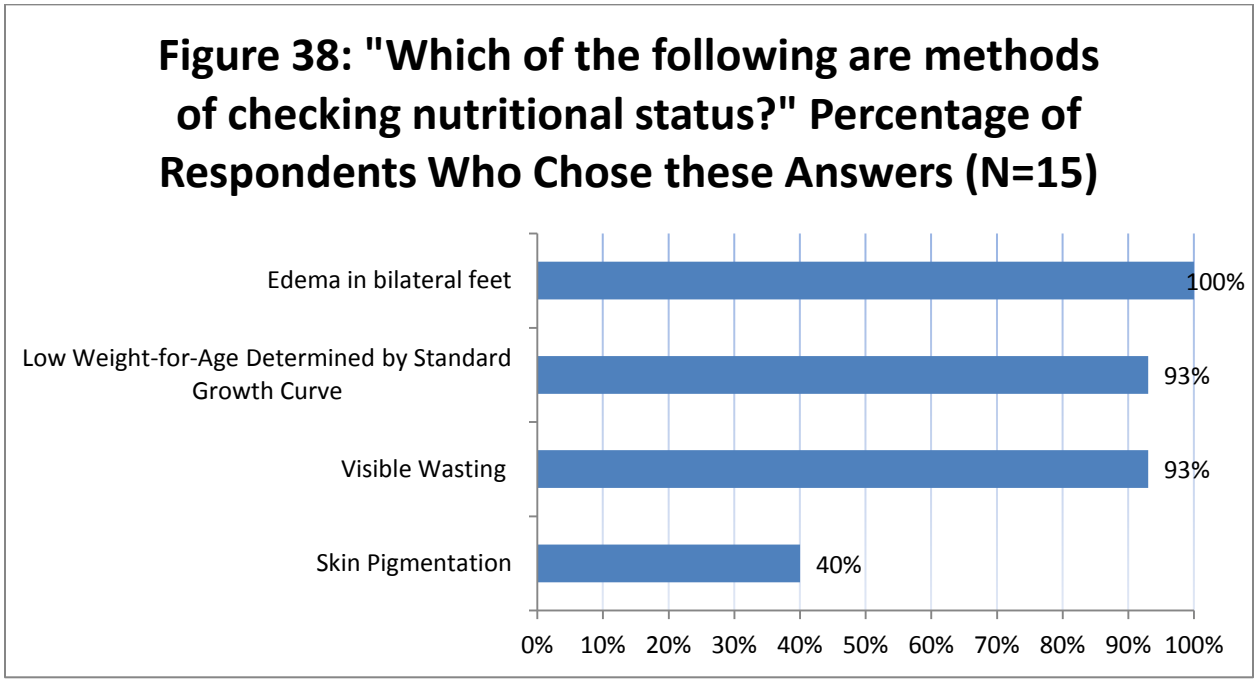
Questions 14 through 16 were multiple choice questions concerning fever. Respondents answered the following:

- 93% (14/15) correctly answered that a patient with fever and stiff neck may have meningitis or severe malaria
- 53% (8/15) identified a fever as 37.5 C or higher
- 47% (7/15) identified a fever as 39 C or higher

According to IMCI guidelines, 37.5 C is defined as fever, although only a temp of 38.5 C and higher is treated with anti-pyretic medication.

Question 17: Nutrition

Question 17 asked respondents to identify clinical signs or methods of determining a child's nutritional status (Figure 38).



Respondents answered the following as clinical signs of an undernourished child:

- 100% (15/15) answered edema of both feet (sign of severe undernutrition)
- 93% (14/15) answered low weight-for-age as determined by growth curve
- 93% (14/15) answered visible wasting (marasmus)
- 40% (6/15) answered skin pigmentation

Review of the examination with the head nurses allowed for discussion of skin desquamation (dry, scaly skin) versus skin pigmentation. The proportion of respondents who chose 'skin pigmentation' was determined to be a problem of language translation used in the examination.

Questions 18- 25: Vaccination and Integrated Treatment

Question 18 was a case study concerning a sick 9 month old child with diarrhea who was not up to date on her immunizations. The answers to this question were used to review Cameroon's immunization schedule, as well as the few contraindications to immunization. All 15 respondents correctly answered the case study, although as mentioned previously, sick children were not given vaccinations during sick child visits.

The last set of questions (19-25) were case studies centered on integrated treatment of convulsions, pneumonia, malaria, and diarrhea/dehydration and again allowed for open dialogue to discuss optimum treatment plans according to IMCI guidelines.

DISCUSSION

The IMCI intervention has been shown to improve pediatric health care in developing countries through numerous multi-country IMCI evaluations. These results have been recognized in Cameroon's East Region, where integration of IMCI by Plan International improved identification and treatment of acute illnesses in children (see literature review). The aim of this study was to observe the identification and management of common diseases in children of the Far North Region and to evaluate how implementation of the IMCI guidelines could improve the quality of care provided to these children.

Structured observations of sick child consultations were conducted before IMCI instruction in all seven health facilities of the Kolofata Health District, located in Cameroon's Far North Region. Interventions included identifying weaknesses in child consultations that could be improved by IMCI gold standard guidelines, providing feedback to health workers on health care performance, introduction to the IMCI algorithms, and case management training using pre-IMCI test bank questions.

Overall, the standard of care provided to children in the Kolofata Health District prior to IMCI introduction is towards the high end compared to pre-IMCI assessments performed in other countries. The mean integrated assessment score – a value from one to ten – was 6.7 in the Kolofata District. This is in contrast to the majority of studies carried out around the world, ranging from 4.0 in Malawi and 4.2 in Botswana and Brazil, to 5.2 in South Africa and 6.1 in Tajikistan (WHO Health Facility Survey: Malawi, 2005; WHO Health Facility Survey: Botswana, 2005; Amaral et al., 2004; Chopra et al., 2005; World Bank Quality of Child Health Services in Tajikistan, 2006). However, because the

assessment score is out of 10, opportunity exists for improvement in the quality of care provided to sick children in the Kolofata Health District.

REVIEW OF STUDY RESULTS WITH HEALTH CARE WORKERS

DANGER SIGNS

The recognition of danger signs is critical. An outpatient study in rural Kenya showed that the mortality risk associated with having at least one danger sign was more than six times higher than that for children without any sign (Paxton, 1996). Children who display any of the four danger signs need urgent referral to the hospital if life-saving treatment is not available in the first-level health facility (intravenous medications, oxygen, 24 hour monitoring, etc.). More than half (64%) of children observed in the study were assessed for two danger signs. However, zero children were assessed for 3 or more danger signs. Implementing IMCI guidelines in the Far North Region has the potential to reduce child mortality by teaching the assessment of danger signs, as well as teaching their significance in recognizing children who have life-threatening conditions.

COMMON ILLNESSES

Numerous studies in developing countries have established the presence of co-morbidity in many sick children and the benefits of taking an integrated approach towards assessment. The average number of symptoms reported per child in this study was 2.0. More than half (57%) of the observed children reported co-morbid symptoms with two of the three main causes of illnesses – cough, fever and diarrhea. More than 95% of all complaints were related to four conditions – cough, fever, diarrhea and malnutrition – and only 9% of children had conditions that were not covered by IMCI guidelines. This suggests that the guidelines have good coverage of the common causes of illnesses in

this region. Skin conditions were one of the main complaints of observed children that are not currently covered by guidelines.

NUTRITION

Undernutrition, as measured by underweight status, is associated with a substantially increased risk of child mortality. In the Far North Region, there is high prevalence of undernutrition among the under five population. As was presented in the literature review, 45% of children in the Far North have chronic malnutrition (stunting) and 12% have acute malnutrition (wasting, DHS, 2011).

Approximately 90% (28/31) of the children in this study who had a weight plotted were undernourished (below -2 SDs from the WHO median value). Of these, more than half (54%) were severely malnourished (below -3 SDs). Although it does not distinguish between wasting and stunting, low weight-for-age (underweight) represents a combination of both and has a high positive predictive value as an indicator for child malnutrition in developing countries (WHO, 1995). Unfortunately, less than 40% of undernourished children received this diagnosis.

It is also a matter of concern that zero of the children's weights were plotted on a WHO standard growth curve by the observed health workers. With such a high proportion of malnourished children in the region, low weight-for-age may be considered the norm. As a result, it may be harder to recognize undernutrition without plotting on a weight chart. It is important that health workers make every effort to identify these children early in order to improve nutritional intake, resolve feeding problems, recognize children with possible HIV infection, and to counsel caretakers.

VACCINATION STATUS

In the Kolofata Health District, children are not vaccinated during sick child visits, but are vaccinated during well child visits only. This is a bad practice because it delays immunization. The caretakers may have travelled a long distance to bring the sick child to the clinic and cannot easily bring the child back for immunization at another time. The child is then left at risk of getting measles, polio, diphtheria, pertussis, or tetanus.

One might argue that vaccination campaigns are carried out throughout different communities on a regular basis, thus ensuring that children receive their vaccinations. However, these campaigns are not timed to when an individual child needs to receive a particular vaccine, leaving ample opportunity for possible infection. Additionally, it is possible to overlook children during vaccination campaigns. During the time of this study, for example, a polio eradication campaign was being performed in the district. When caretakers were asked by health care workers whether or not their child had received the polio vaccine, many caretakers admitted to having missed the vaccination campaign. One caretaker even stated that she thought she had to pay for the immunizations and thus purposely kept her children from the campaign.

It is important that health workers do not think that minor illness is a contraindication to immunization. According to the IMCI handbook, there are only three situations at present that are contraindications to immunization (WHO IMCI Handbook, 2005):

- Do not give BCG to a child known to have AIDS.
- Do not give DPT 2 or DPT 3 to a child who has had convulsions or shock within 3 days of the most recent dose.
- Do not give DPT to a child with recurrent convulsions or another active neurological disease of the central nervous system.

In sum, there are no contraindications to immunization of a sick child if the child is well enough to go home (WHO IMCI Handbook, 2005).

EXAMINATION REVIEW

The examination was well received by health care workers, who were appreciative of didactic training and the opportunity for assessment of self knowledge and practices. The examination was not all-encompassing but did serve as an educational tool to introduce the IMCI guidelines and provide a medium for in depth participatory dialogue. The examination allowed for teaching of medical terminology used in the IMCI algorithms, such as wheezing, stridor, dysentery, persistent diarrhea, and fever, which are conducive for future IMCI implementation. This examination and review was a single step in a larger process, which included the assessment of child consultations and an additional (previously mentioned) presentation on the IMCI instructions. After the examination review, health care workers were able to explain the aim of the IMCI strategy, explain the components of the IMCI strategy, recognize the danger signs indicative of a seriously ill child and name the main symptoms that all children must be assessed for child consultations.

LIMITATIONS

A number of limitations became apparent throughout the study. First, the re-examination of sick children by the IMCI instructor was desired, but could not be performed for multiple reasons. In most cases, there was not a separate room for the observer to evaluate children and the observer did not want to bias the health provider as to what additional physical examination should be completed. As well, danger signs and other main symptoms could not be assessed from the caretaker if the health provider did not evaluate for them because of the multiple languages spoken in the Far North region. The

observer would have had to use the health care provider as the translator, which again would bias the provider. To overcome this limitation, the health provider knowledge and assessment examination was developed.

Another significant limitation was the low patient utilization of the individual health facilities. Although a minimum of 70 consultations was desired, only 44 consultations were ultimately observed. A minimum of 4 hours was spent at each of the health care facilities during the mornings and afternoons, the peak utilization time period for the health facilities. There are many possible reasons as to why very few children presented to the health care facilities. As previously illustrated in the literature review, the Far North Region is least likely of the regions to seek medical care when treatment is needed, secondary to the extreme poverty of this region. Families are unable to pay for services at the health facilities and are also unable to purchase the prescribed medications to complete the recommended treatment.

Additionally, the survey was carried out during the dry season. Although this is a good time to perform a survey as all roads are passable and thus all health facilities accessible, this is the most difficult season of the year for people living in the Far North Region because of scarce rain and minimal food options. As well, due to the high winds that were experienced during this time, many of the power lines were down. This power outage altered the capacity for vaccine storage in many of the health facilities that were visited during the survey period. Furthermore, during the month that the survey was carried out (May), many local holidays (including 4 national holidays) and traditions were being celebrated in the community, possibly requiring mothers and caretakers to tend to other family and cultural obligations.

LESSONS LEARNED

In the face of significant limitations, this study met its objective in determining how IMCI implementation can improve health worker performance in the Far North Region. Areas of weakness that were identified, as determined by the IMCI guidelines, included a lack of assessing for danger signs, lack of plotting weights on WHO standard growth curves (although available), under recognition of malnourished children, under counseling of caretakers with malnourished children, and lack of vaccinating all children who are not up-to-date. The implementation of IMCI guidelines, coupled with supervisory support, can help to ensure that these habits become routine and thus, can improve pediatric health care outcomes in the region.

Although Cameroon is working to expand IMCI throughout the country, key constraints to implementation of IMCI are monetary and human resources. These determinants, coupled with remoteness, have excluded the Far North Region from IMCI implementation. Unfortunately, no criteria exist for promoting IMCI expansion to certain regions, and areas of greatest need are not prioritized (Victoria et al., 2006).
Notably, this study reveals that health care workers appreciate continued education and engage in opportunities that allow for educational dialogue. Thus, they can benefit from future opportunities that provide clinical and didactic training to improve child health care. Health care workers in this region look forward to IMCI training and further educational opportunities.

FUTURE STUDIES

The IMCI intervention is a strategy with 3 components: improve health providers' skills, improve health systems to deliver IMCI, and improve family and community practices

related to child health and development (WHO Regional Office for Eastern Mediterranean (EMRO), 2012). The objective of this study was limited in scope to improve health providers' skills. Additional studies that continue to focus on this component might include:

- A follow-up observation assessment of sick child consultations
- Assessment of standard IMCI implementation and post-implementation quality of care
- Assessment of health providers' communication skills
    - Counseling offered to caretakers
    - Caretakers' understanding of the child's illness, how to provide home care and when to follow-up

Further studies that focus on promoting healthy family and community practices in the region have significant potential to improve child survival. These practices include exclusive breastfeeding for infants up to six months, adequate micronutrients, good hygiene, complete immunization, use of bed nets and care-seeking habits (WHO EMRO, 2012).

It is also possible that determining the proportion of children who are not of Cameroonian descent among the children evaluated in the Far North health clinics might allow for future funding for vaccination coverage of these children in the facilities.

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APPENDICES

Appendix A: Selected Indicators for Health, Cameroon (DHS 2011)

Table A1. Maternal Health Indicators

Among women aged 15-49 who had a live birth during the five years preceding the survey, percentage who received antenatal care from a trained provider for the last live birth and percentage of women whose last live birth was protected against neonatal tetanus, among all live births five years preceding the survey, the percentage of those whose delivery was attended by a trained provider and percentage of those that took place in a health facility, by selected characteristics, Cameroon 2011 (DHS, 2011).

Sociodemographic Characteristics	**Percentage of women who received prenatal care from a trained provider[1]**	**Percentage of women with live birth was protected against neonatal tetanus[2]**	Number of Women	**Percentage of births whose birth was attended by a trained provider**	**Percentage of births that took place in a health facility**	Actual births
Age of the Mother at Birth						
<20	**84.9**	**68.2**	1367	**60.6**	**57.7**	2295
20-34	**85.5**	**74.8**	5212	**64.7**	**62.6**	8106
35+	**80.5**	**72.7**	1069	**61.9**	**58.4**	1347
Residence						
Yaoundé/Douala	**98.4**	**79.3**	1367	**95.8**	**94.3**	1854
Other Cities	**93.8**	**81.3**	2106	**81.3**	**78.8**	3106
Urban Area	**95.6**	**80.5**	3473	**86.7**	**84.6**	4960
Rural	**75.6**	**67.4**	4175	**46.7**	**44.1**	6788
Region						
Adamawa	**87.8**	**71.7**	387	**47.4**	**45.8**	596
Centre (excluding Yaoundé)	**92.8**	**77.3**	568	**78.5**	**71.8**	876
Douala	**99.2**	**81.3**	648	**98.8**	**97.8**	906
Est (East)	**85.4**	**75.8**	327	**48.9**	**46.2**	500
Extreme-North	**59.0**	**55.1**	1592	**25.1**	**22.7**	2682
Littoral (excluding Douala)	**97.4**	**81.5**	283	**94.2**	**92.1**	404
North	**71.1**	**64.1**	971	**32.9**	**30.2**	1662
North-West	**97.6**	**88.5**	649	**93.6**	**93.7**	905
West	**98.9**	**87.7**	820	**95.8**	**93.9**	1314
South	**94.2**	**78.3**	198	**82.2**	**77.2**	283
South-West	**91.3**	**78.2**	485	**80.1**	**78.1**	672
Yaoundé	**97.6**	**77.5**	719	**92.9**	**90.9**	948
Level of Education						
None	**60.2**	**54.1**	2020	**22.9**	**20.7**	3359
Primary	**89.1**	**77.6**	2910	**69.2**	**66.3**	4639
High School	**98.1**	**82.7**	2454	**92.5**	**90.2**	3398
University	**99.1**	**85.8**	263	**99.2**	**99.8**	353
Total	**84.7**	**73.3**	7647	**63.6**	**61.2**	11748

Table A2. Treatment of Acute Respiratory Infections (ARI) and Fever				
Among children under five years who had symptoms of acute respiratory infections (ARI) or had a fever during the two weeks preceding the survey, percentage for whom sought treatment at a health care facility or with a health care provider, according to some sociodemographic characteristics, Cameroon 2011 (DHS, 2011).				
	Children with symptoms of ARI[1]		**Children with Fever**	
Sociodemographic characteristics	**Percentage for whom treatment was sought from an institution / provider health[2]**	Number of children with IRA	**Percentage for whom treatment was sought from an institution / provider health[2]**	Number of children with fever
Age Group in Months				
<6	**16.2**	60	**23.2**	181
6-11	**33.8**	88	**32.1**	404
12-23	**31.2**	155	**28.8**	709
24-35	**33.6**	112	**26.7**	560
36-47	**31.4**	86	**22.9**	505
48-59	**26.8**	77	**25.5**	419
Sex				
Male	**31.6**	293	**27.8**	1429
Female	**28.3**	285	**26.0**	1348
Residence				
Yaoundé/Douala	**31.9**	123	**36.7**	403
Other Cities	**39.7**	111	**33.5**	722
Urban Area	**35.6**	223	**34.6**	1125
Rural	**26.1**	345	**21.7**	1653
Region				
Adamawa	**(42.5)**	24	**31.8**	98
Centre (excluding Yaoundé)	**(28.8)**	41	**28.5**	261
Douala	**21.0**	58	**31.0**	163
Est (East)	*	14	**30.0**	91
Extreme-North	**20.6**	142	**12.9**	679
Littoral (excluding Douala)	*	7	**49.5**	87
North	**13.0**	81	**15.0**	509
North-West	**62.2**	63	**50.5**	135
West	**(22.4)**	46	**39.2**	241
South	*	8	**37.0**	72
South-West	**(37.9)**	30	**35.0**	203
Yaoundé	**(41.8)**	64	**40.6**	241
Level of Education				
None	**16.0**	166	**11.9**	856
Primary	**33.7**	217	**28.5**	1078
High School	**39.3**	168	**38.5**	83
University	*	28	**55.0**	27778
Total	**29.9**	578	**26.9**	2778

Table A3a. Immunization by Selected Sociodemographic Characteristics

Percentage of children 12-23 months who received specific vaccines at any time prior to the survey by source of information (by vaccination card or statements of the mother), and percentage for which a vaccination was presented to the interviewer by selected characteristics, Cameroon 2011 (DHS, 2011).

Sociodemographic Characteristics	BCG	DPT 1	DPT 2	DPT 3	Polio 0[1]	Polio 1	Polio 2	Polio 3	Measles
Sex									
Male	86.6	84.4	78.4	68.1	70.0	93.6	86.7	70.4	70.0
Female	87.5	86.4	78.3	68.6	73.3	93.0	84.3	69.2	71.1
Residence									
Yaoundé/Douala	95.6	92.8	87.2	81.4	89.2	95.0	89.5	73.1	81.3
Other Cities	94.5	92.4	87.6	78.7	86.0	94.5	89.0	78.3	79.0
Urban Area	94.9	92.5	87.4	79.8	87.3	94.7	89.2	73.5	79.9
Rural	81.4	80.5	71.8	60.1	60.4	92.3	82.8	67.1	63.8
Region									
Adamawa	89.4	91.6	84.1	69.0	74.3	95.7	89.0	76.1	64.0
Centre (excluding Yaoundé)	92.6	87.9	84.6	75.5	73.7	91.3	82.8	66.9	73.0
Douala	98.1	96.7	91.1	84.1	92.5	97.5	92.1	74.7	84.8
Est (East)	91.0	91.4	82.0	65.9	65.4	92.5	77.0	57.4	74.4
Extreme-North	69.6	69.4	58.9	45.2	40.4	91.6	80.8	61.0	52.4
Littoral (excluding Douala)	98.3	96.9	88.3	80.9	90.7	95.7	88.2	75.7	85.6
North	74.8	71.8	60.9	48.9	55.1	89.7	78.1	61.4	51.7
North-West	98.3	97.8	97.8	95.4	96.7	98.3	98.3	86.7	93.1
West	95.9	94.4	87.0	75.5	84.4	92.5	87.5	76.6	79.8
South	91.1	85.6	70.5	56.7	65.0	96.0	76.5	50.6	69.5
South-West	95.4	95.1	93.9	88.7	95.0	94.8	91.8	81.1	82.6
Yaoundé	93.6	89.7	84.1	79.3	86.6	93.0	87.4	71.9	78.6
Level of Education									
None	71.1	70.9	59.1	45.1	43.9	92.2	79.0	58.3	51.3
Primary	87.6	85.9	79.6	69.4	72.7	92.2	86.3	72.1	70.1
High School	97.5	95.3	90.3	82.7	89.9	94.9	88.3	74.1	84.4
University	98.9	95.6	90.9	89.8	90.4	98.9	98.2	87.7	84.6
Total	87.1	85.5	78.3	68.4	71.7	93.3	85.5	69.8	70.6

Table A3b. Immunization by Selected Sociodemographic Characteristics

Percentage of children 12-23 months who received specific vaccines at any time prior to the survey by source of information (by vaccination card or statements of the mother), and percentage for which a vaccination was presented to the interviewer by selected characteristics, Cameroon 2011 (DHS, 2011).

Sociodemographic Characteristics	All Vaccines[1]	No Vaccine	Percentage who presented a vaccination booklet	Number of Children
Sex				
Male	52.4	4.4	54.3	1113
Female	54.1	4.8	59.6	1152
Residence				
Yaoundé/Douala	63.1	3.4	68.6	385
Other Cities	62.9	3.4	61.3	564
Urban Area	63.0	3.4	64.3	950
Rural	46.1	5.5	51.7	1315
Region				
Adamawa	53.7	2.9	73.1	111
Centre (excluding Yaoundé)	51.6	4.8	46.7	168
Douala	67.3	1.9	73.2	168
Est (East)	47.3	4.3	48.0	93
Extreme-North	30.9	7.6	39.5	476
Littoral (excluding Douala)	66.3	0.8	66.0	90
North	38.1	7.5	46.9	286
North-West	82.5	1.7	83.9	199
West	63.7	2.3	52.2	272
South	35.2	4.0	40.8	53
South-West	75.2	4.6	83.5	132
Yaoundé	59.9	4.5	65.1	217
Level of Education				
None	32.2	6.2	43.1	565
Primary	54.3	6.0	59.0	888
High School	65.9	2.1	63.0	740
University	73.9	1.1	79.7	73
Total	53.2	4.6	57.0	2265

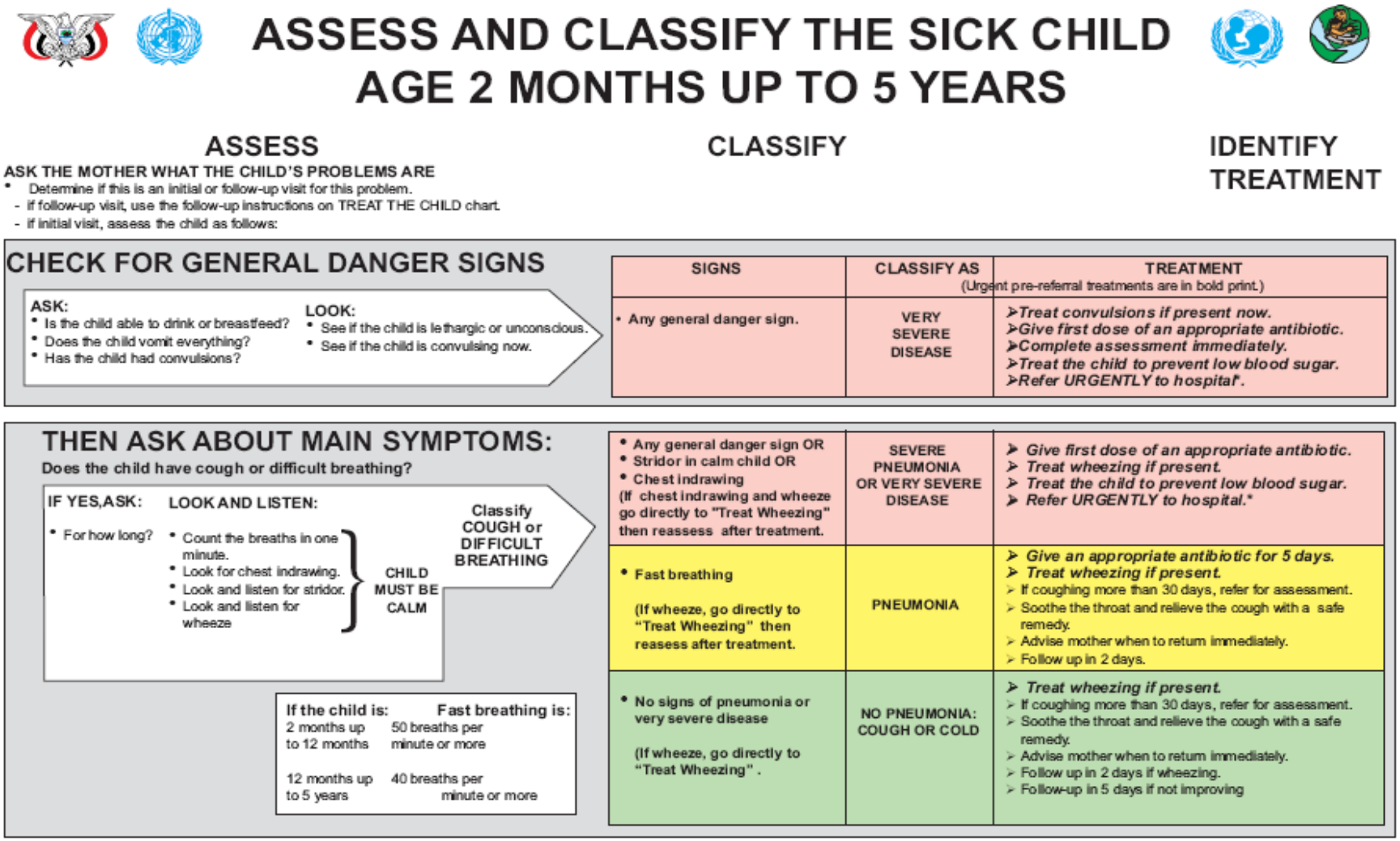
Table A4. Nutritional Status of Children under Five

Percentage of children under five considered malnourished according to three anthropometric indices for measuring the nutritional status: The size depending on age, weight for height and weight according to age, by selected characteristics, Cameroon 2011 (DHS, 2011).

	Height-for-**age**[1]		Weight-for-height			Weight-**for-age**			
Sociodemographic characteristics	% -3 SD	% -2 SD	% -3 SD	% -2 SD	% +2 SD	% -3 SD	% -2 SD	% +2 SD	Number of Children
Age Group in Month									
<6	4.0	12.1	2.6	9,8	12.3	1.8	7.1	5.0	546
6-8	4.8	11.8	3.9	10.4	6.5	4.9	15.6	5.7	339
9-11	7.9	16.5	1.9	9.2	7.1	3.7	14.6	3.9	340
12-17	10.4	27.4	3.8	10.5	4.8	6.7	15.6	3.5	694
18-23	17.3	42.4	2.3	6.5	5.4	6.0	18.1	2.4	565
24-35	20.0	42.3	1.6	3.6	6.5	4.6	15.4	0.7	1134
36-47	16.8	38.7	0.8	2.8	5.2	4.5	14.8	0.4	1135
48-59	15.9	35.5	0.8	2.6	4.7	3.9	14.6	0.7	1107
Sex									
Male	16,4	35.1	2.5	6.5	7.3	5.0	15.1	2.3	2862
Female	11.9	30.0	1.3	4.8	5.1	4.1	14.2	1.7	2998
Residence									
Yaoundé/Douala	3.9	12.8	1.2	2.4	8.2	0.8	3.4	2.6	918
Other Cities	9.7	27.0	0.7	3.3	6.4	1.7	9.4	2.6	1603
Urban Area	7.6	21.9	0.9	3.0	7.0	1.4	7.2	2.6	2521
Rural	19.1	40.5	2.6	7.6	5.5	6.9	20.2	1.5	3339
Region									
Adamawa	18.2	39.8	0.8	6.4	6.2	4.4	20.8	1.0	316
Centre (excluding Yaoundé)	8.5	23.4	0.6	4.3	5.1	1.9	8.3	3.0	414
Douala	4.3	12.9	1.2	2.5	8.5	0.5	3.2	1.7	477
Est (East)	16.5	37.3	2.2	5.9	6.2	5.3	15.4	0.6	263
Extreme-North	25.5	44.9	4.1	11.8	2.4	11.3	31.6	1.4	1195
Littoral (excluding Douala)	7.3	24.4	0.0	1.2	11.1	1.2	4.7	5.2	226
North	17.9	40.2	3.4	10.2	1.8	7.9	23.6	0.5	759
North-West	14.4	35.6	0.7	2.1	11.2	1.5	7.1	3.2	542
West	10.1	32.0	0.4	0.7	10.7	1.0	4.9	2.6	702
South	12.8	33.1	2.9	4.5	4.9	3.3	10.1	0.8	158
South-West	8.1	27.0	0.4	2.8	4.8	1.3	8.0	2.1	367
Yaoundé	3.5	12.8	1.3	2.3	7.8	1.2	3.6	3.6	441
Level of Education									
None	24.7	45.5	4.2	11.6	2.4	11.6	31.2	1.0	1383
Primary	12.7	33.5	1.2	4.7	6.6	3.0	11.4	1.9	2200
High School	5.7	19.9	1.1	3.1	8.8	1.2	5.4	2.6	1482
University	3.2	7.1	0.0	1.7	8.4	0.0	1.5	2.5	175
Total	14.1	32.5	1.9	5.6	6.2	4.5	14.6	2.0	5860

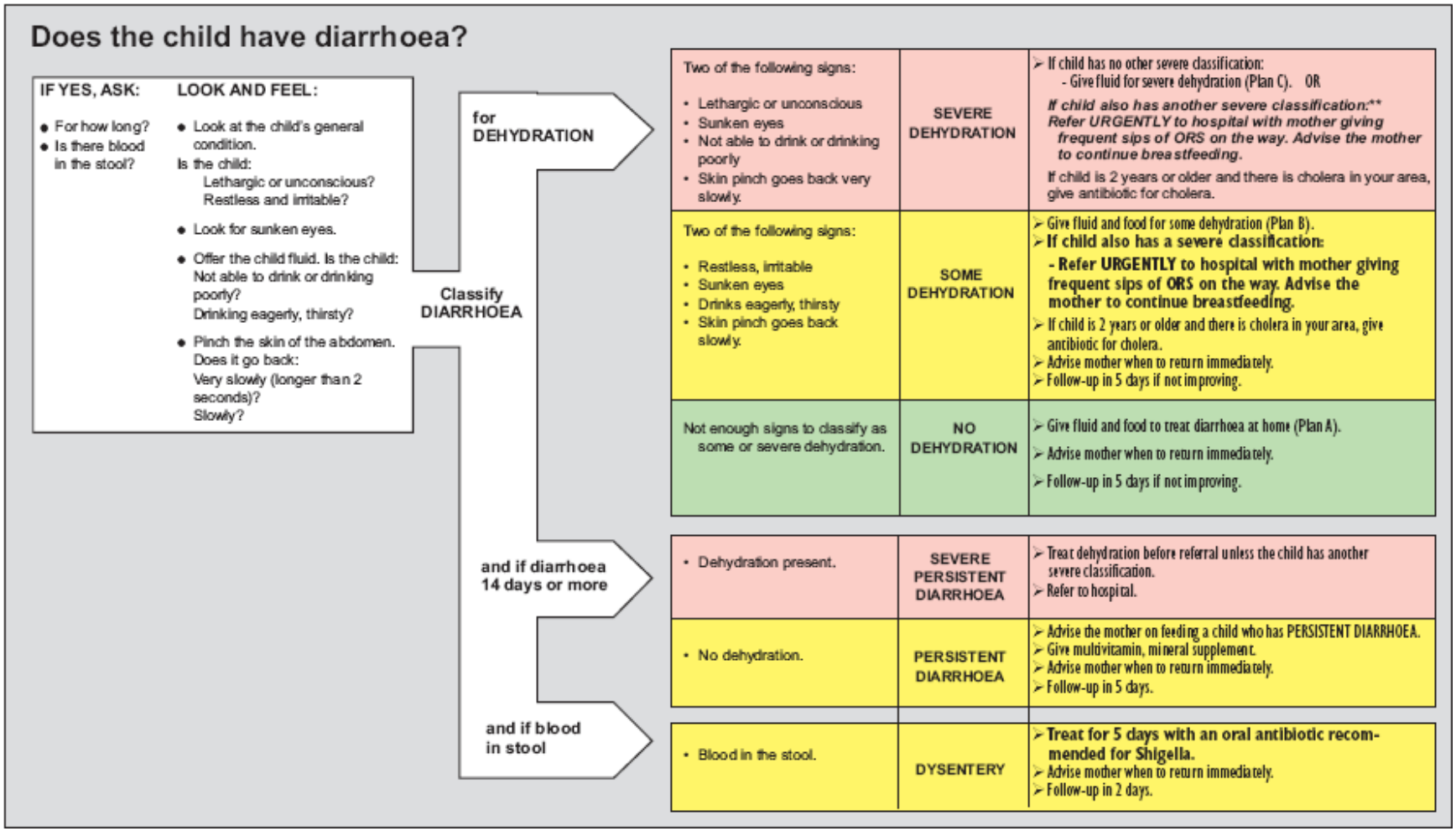
Appendix B: IMCI Guidelines: Assess and Classify the Sick Child, Age 2 Months up to 5 Years

Figure B1. Check for general danger signs and cough/difficulty breathing.



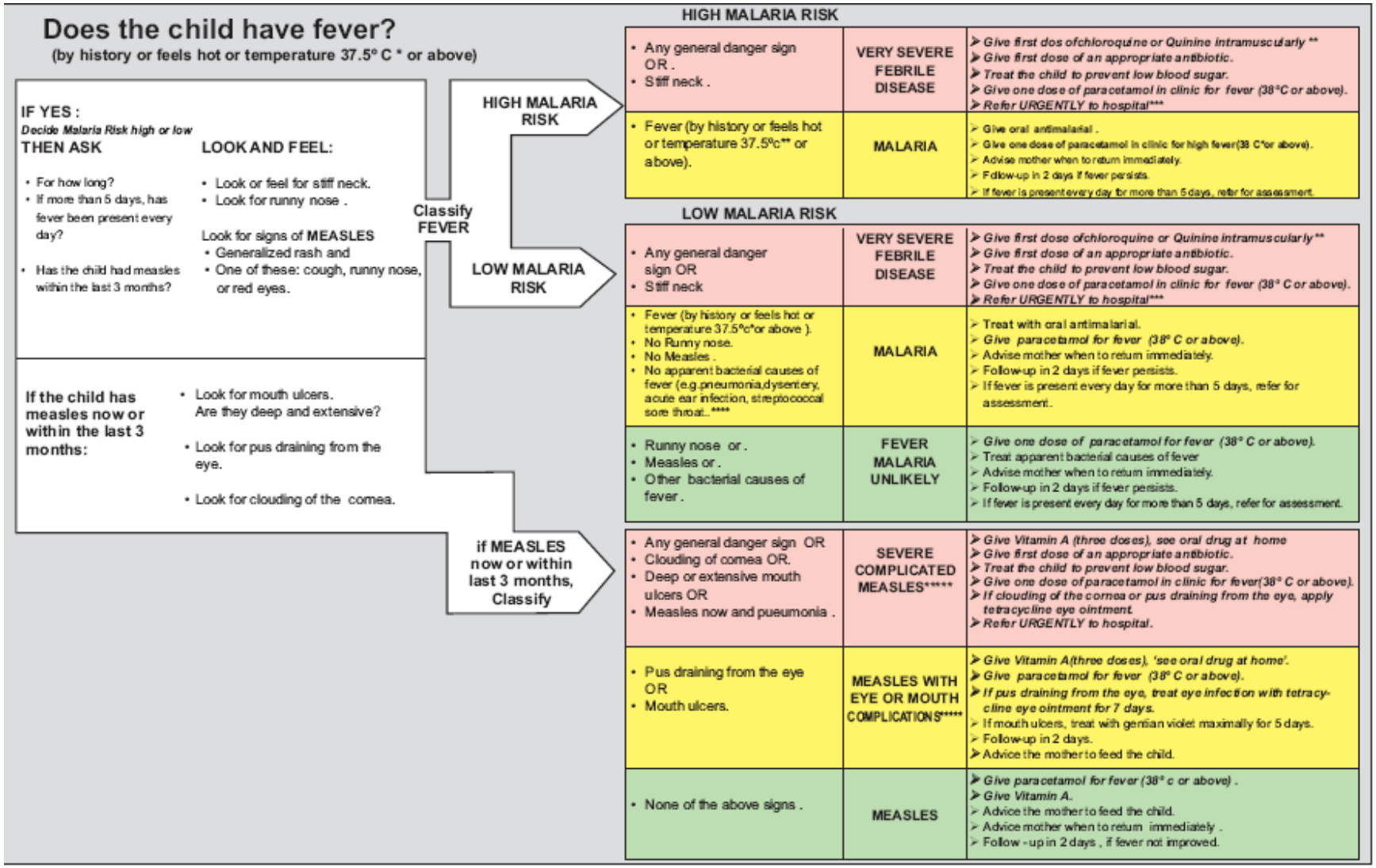
Source: WHO IMCI Standard Booklet (2008).

Figure B2. Check for diarrhea.



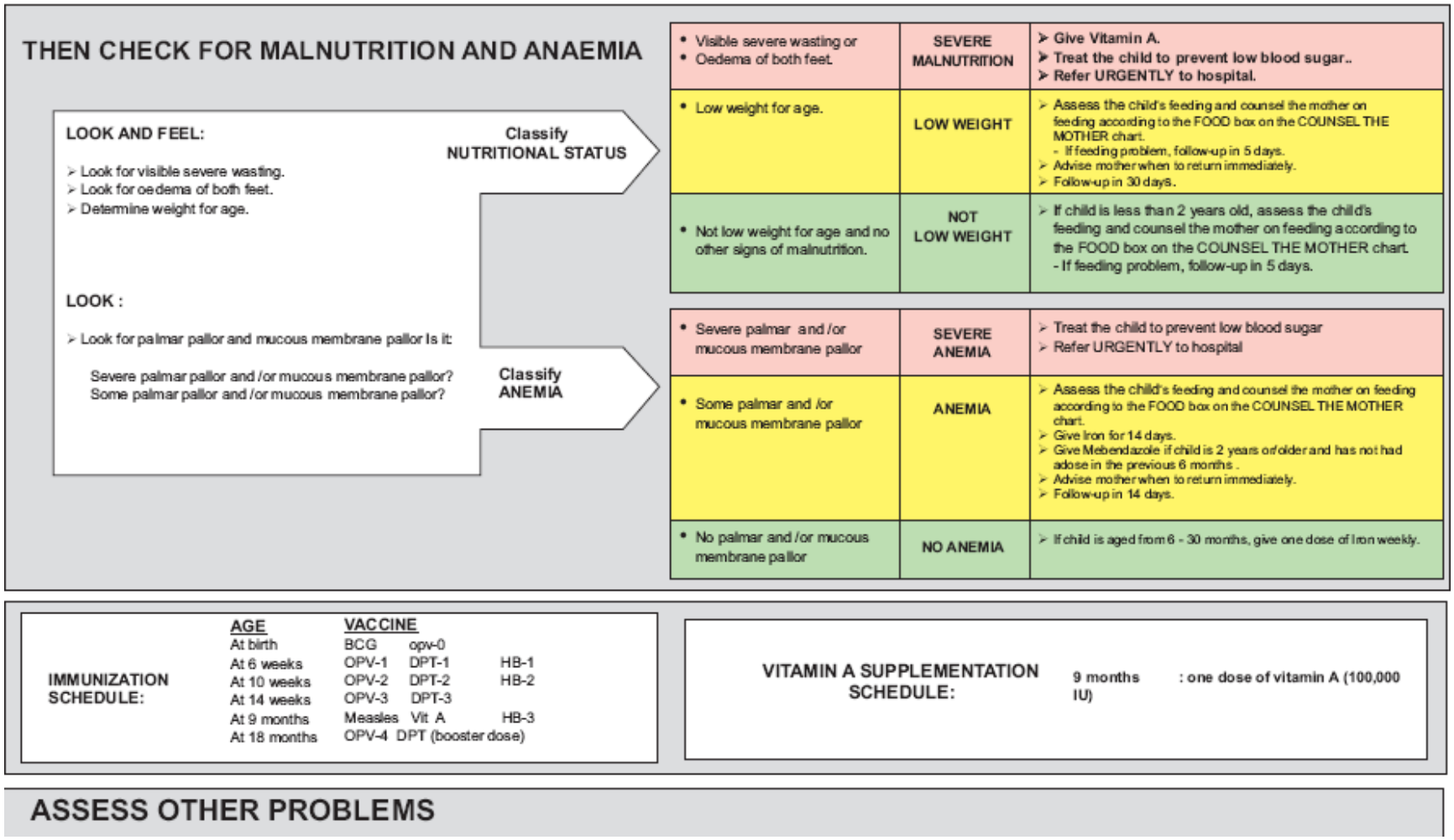
Source: WHO IMCI Standard Booklet (2008).

Figure B3. Check for fever.



Source: WHO IMCI Standard Booklet (2008).

Figure B4. Check for malnutrition and anemia.



Source: WHO IMCI Standard Booklet (2008).

Appendix C: Survey Instrument

Assessment Module: **Location:** **Age:** **Study Number:**

#	Indicator	1=Yes	2=No	Don't Know
A1	Does the health worker, or another staff, weigh and record the weight of the child today?			
A2	Does the health worker, or another staff, check the temperature of the child?			
A3	What reasons does the caretaker give for bringing the child to the health facility? Circle all signs mentioned.			
	• diarrhea/vomiting	(1) mentioned	(2) not mentioned	
	• fever/malaria	(1) mentioned	(2) not mentioned	
	• fast/difficult breathing/cough/pneumonia	(1) mentioned	(2) not mentioned	
	• other, specify:	(1) mentioned	(2) not mentioned	
A4	Does health worker ask whether the child is able to drink or breastfeed?			
A5	Does health worker ask whether the child vomits everything?			
A6	Does health worker ask whether the child has convulsions?			
A7	Is the child visibly awake (e.g. playing, smiling, crying with energy?)			
A8	If child not visibly awake, does health worker check for lethargy or unconsciousness (try to wake up the child)?			
A9	Does the health worker ask for cough or difficult breathing?			
A10	Does health worker ask for diarrhea?			
A11	Does health worker ask/feel for fever (or refer to temperature if taken previously)?			
A12	Does health worker look for palmar pallor?			
A13	Does health worker check child's weight against a growth chart?			
A14	Does health worker ask for and check child's vaccination card?			
A15	Does the caretaker have the child's vaccination card?			
A16	Does health worker ask about breastfeeding?			
A17	Does health worker ask whether feeding changed during illness?			
A18	Does health worker give one more IMCI classifications for the child?			

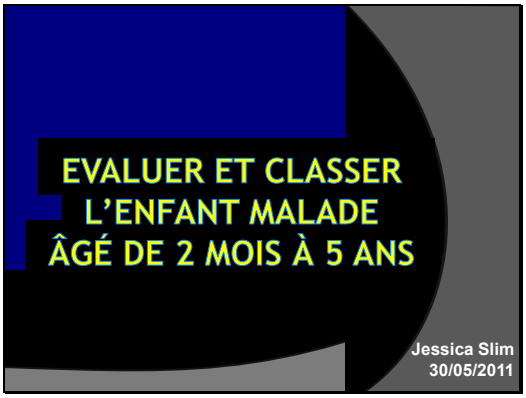
#	Classification	1= Yes	2 = No	Don't Know		Based on Reexamination of the Child, Circle Observer Classifications	
C1	Does health worker give one or more classifications for the child?						
C5	One or more danger signs					D5	One or more danger signs
C10	Severe pneumonia/very severe disease					D10	Severe pneumonia/very severe disease
C11	Pneumonia					D11	Pneumonia
C12	No Pneumonia					D12	No Pneumonia
C20a	Severe Dehydration					D20a	Severe Dehydration
C20b	Some Dehydration					D20b	Some Dehydration
C20c	No Dehydration					D20c	No Dehydration
C21	Severe persistent diarrhea					D21	Severe persistent diarrhea
C22	Persistent diarrhea					D22	Persistent diarrhea
C23	Dysentery					D23	Dysentery
C30	Very severe febrile disease					D30	Very severe febrile disease
C31	Malaria					D31	Malaria
C32	Fever, malaria unlikely					D32	Fever, malaria unlikely
C33	Fever, no malaria					D33	Fever, no malaria

#	Treatment			1= Yes	2= No
T1	Does health worker administer or prescribe injection(s)				(if no skip to #T3)
T2	If yes, record all injections given:				
T2a	Antimalarial: specify -				
T2b	Antibiotic: specify -				
T2c	Other injection: specify -				
T3	Does health worker administer or prescribe ORS?				(if no, skip to #T5)
T4	If yes, health worker administer ORS at the facility?				
T5	Does health worker administer or prescribe oral treatment?				
T6	Record all oral treatment (tablet/syrup) given: (Circle all oral treatment given below)				
T6a	antidiarrheal/antimotility	T6h	Vitamin A		
T6b	metronidazole	T6i	Multi-vitamins		
T6c	recommended antimalarial	T6j	Other vitamins		
T6d	another antimalarial	T6k	Mebendazole		
T6e	Paracetamol/aspirin	T6l	Iron		
T6f	recommended antibiotic	T6m	Unknown Type		
T6g	other antibiotic	T6n	Other: specify -		

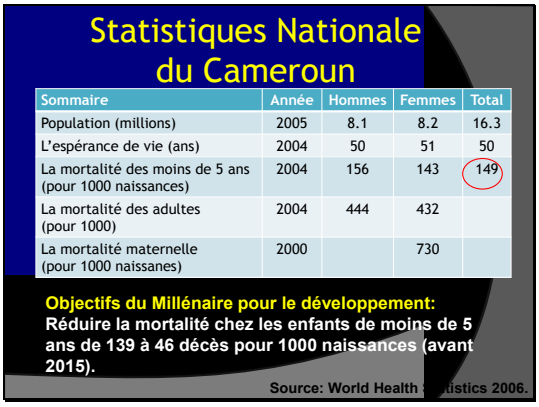
Health Facility Survey: Tool to evaluate quality of care delivered to sick children attending outpatient facilities. Adapted from http://whqlibdoc.who.int/publications/2003/9241545860.pdf.

Appendix D: IMCI Presentation to Kolofata District of Health

Slide 1



Slide 2



Slide 3

Distribution de la Mortalité chez les enfants

Cause de Mortalité	Pourcentage
Neonatal	26%
Pneumonie	21%
Paludisme	17%
Les maladies diarrhéiques	17%
VIH	7%
Rougeole	4%
Blessures	2%
Autres	6%

Source: DHS 2004

Slide 4

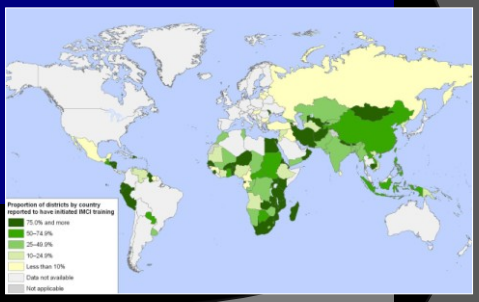
PRISE EN CHARGE INTÉGRÉE DES MALADIES DE L'ENFANT

(PCIME)

- Approche intégrée de la santé de l'enfant qui met l'accent sur le bien-être de l'enfant dans sa globalité.
- Ensemble de lignes directrices fondées sur des preuves.
- Conçu afin de fournir au personnel sanitaire des outils efficaces et faciles à utiliser leur permettant de faire face aux causes majeures de mortalité et morbidité infantiles.

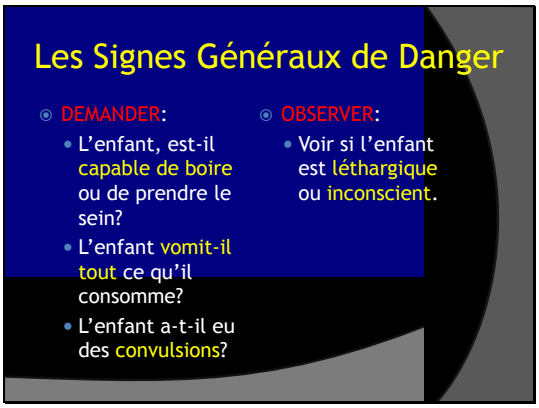
Slide 5

PCIME: Où est-il utilizé?

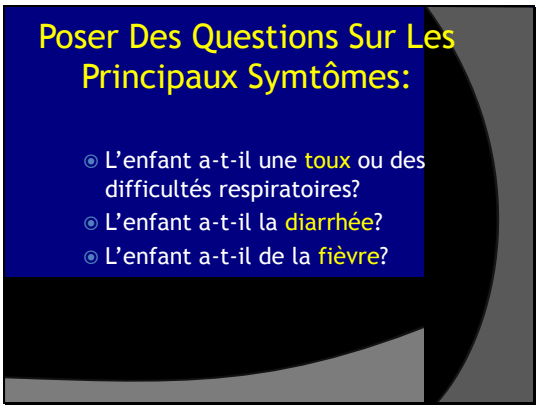


Source: Organization Mondiale de la santé

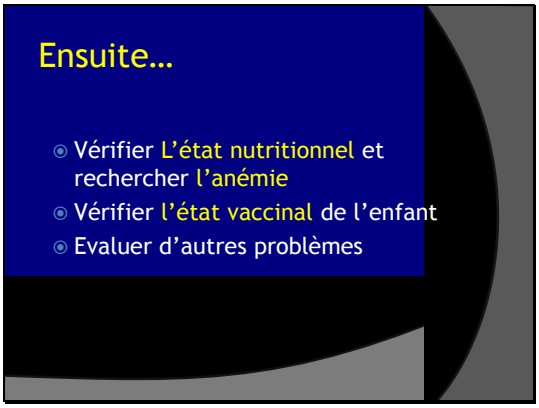
Slide 6



Slide 7



Slide 8



Slide 9

Evaluer La Toux

- Compter les respirations par minute:

Si l'enfant a:	Une respiration rapide est:
De 1 semaine a 2 mois	60 respirations par minute ou plus
De 2 mois a 12 mois	50 respirations par minute ou plus
De 12 mois a 5 ans	40 respirations par minute ou plus

- Rechercher un tirage sous-costal.
- Regarder et écouter si l'enfant a un stridor.

Slide 10

Classer La Toux

Signes	Classer:
•Tout signe général de danger •Tirage sous-costal •Stridor	Pneumonie Grave ou Maladie Très Grave
•Respiration Rapide.	Pneumonie
Pas de signe de pneumonie ou de maladie très grave.	Pas de Pneumonie: Toux ou Rhume

Slide 11

Traitement

Pneumonie Grave	Pneumonie
Péni-Procaïne IM précédée de 24 heures de Pénicilline G IM	Cotrimoxazole or Péni-Procaïne IM

Slide 12

Evaluer la Diarrhée

- Demander:
  - Depuis combien de temps?
  - Y-a-t-il du sang dans les selles?
- Observer:
  - Lethargique ou inconscient?
- Regarder si les yeux de l'enfant sont enfoncés.

Slide 13

Evaluer la Diarrhée:

- Offrir à boire à l'enfant:
  - Est-il capable de boire ou boit-il difficilement?
  - Boit-il avidement, est-il assoiffé?
- Pincer la peau de l'abdomen. Le pli cutane s'éfface-t-il:
  - Tres lentement (plus de 2 secondes)?
  - Lentement?

Slide 14

Pli Cutané

Slide 15

Traitez Le Déshydratation

Signes	Classer	Traitement
•Léthargique ou inconscient •Yeux enfoncés •Incapable de boire ou boit difficilement •Pli cutané s'éfface très lentement (>2 secondes)	Déshydratation Sévère	Plan C
•Agité, irritable •Yeux enfoncés •Boit avidement, assoiffé •Pli cutané s'éfface lentement	Déshydratation	Plan B
Pas de signes de déshydratation.	Pas de déshydratation	Plan A

Slide 16

Plan A	Plan B	Plan C
- À la maison - Hydratation normale et addition de SRO - Augmentation de la nourriture - RV après 3 jours si pas d'amélioration	- SRO (approx 75 x poids la première heure) - Allaitement - Donnez à l'enfant autant de SRO qu'il veut	- Admission à l'hôpital - SRO par SNG - À 20 mg/kg/hr x 6 hr

Slide 17

Evaluer la Fièvre

- Demander:
  - Depuis combien de temps?
  - Si depuis plus de 7 jours, tous les jours?
  - L'enfant a-t-il eu la rougeole des 3 derniers mois?
- Observer et rechercer:
  - Une raideur de la nuque.
  - Si le nez coule.
  - Des signes de la rougeole.

Slide 18

Classer et Traite La Fever

Signes	Classer	Traitement
Tout signe général de danger ou Raideur de nuque	Maladie Fébrile Très Grave	•Donner de la quinine IM pour paludisme severe. •Eau sucrée pour éviter l'hypoglycemie. •Donner la premier dose d'antibiotique approprié. •Paracetamol
Fièvre (37,5°C ou plus) et pas d'autre cause de fièvre.	Paludisme	•Artésunate-Amodiaquine •Paracetamol

Appendix E: Examination Review with Health Care Workers

Slide 1

Gestion de la toux ou des difficultés respiratoires, diarrhée et fièvre.

Slide 2

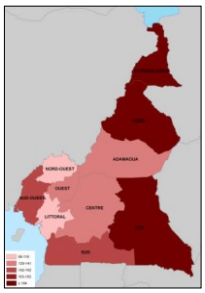
1. Parmi les symptômes suivants, quels sont ceux qu'il faut toujours rechercher chez les enfants de 2 mois à 5 ans qui sont malades? (Encerclez toutes les réponses correctes.)
   a. La toux
   b. Douleur abdominale
   c. Fièvre
   d. Infections de la peau
   e. La diarrhée

Slide 3

1. Parmi les symptômes suivants, quels sont ceux qu'il faut toujours rechercher chez les enfants de 2 mois à 5 ans qui sont malades? (Encerclez toutes les réponses correctes.)
   a. La toux
   b. Douleur abdominale
   c. Fièvre
   d. Infections de la peau
   e. La diarrhée

Slide 4

Distribution de la Mortalité chez les enfants



Cause de Mortalité	Pourcentage
Neonatal	26%
Pneumonie	21%
Paludisme	17%
Les maladies diarrhéiques	17%
VIH	7%
Rougeole	4%
Blessures	2%
Autres	6%

Source: DHS 2004

Slide 5

2. Parmi les signes suivants, quels sont ceux qu'il faut toujours verifier et qui peuvent indiquer que l'enfant est gravement malade? (Encerclez toutes les réponses correctes.)
   a. L'enfant est léthargique ou inconscient
   b. L'enfant est agité ou irritable
   c. L'enfant n'est pas capable de boire ou de téter
   d. L'enfant vomit tout
   e. L'enfant a une respiration rapide ou difficile

Slide 6

2. Parmi les signes suivants, quels sont ceux qu'il faut toujours verifier et qui peuvent indiquer que l'enfant est gravement malade? (Encerclez toutes les réponses correctes.)

a. L'enfant est léthargique ou inconscient
b. L'enfant est agité ou irritable
c. L'enfant n'est pas capable de boire ou de téter
d. L'enfant vomit tout
e. L'enfant a une respiration rapide ou difficile

Slide 7

Les Signes Généraux de Danger

- DEMANDER:
  - L'enfant, est-il capable de boire ou de prendre le sein?
  - L'enfant vomit-il tout ce qu'il consomme?
  - L'enfant a-t-il eu des convulsions?
- OBSERVER:
  - Voir si l'enfant est léthargique ou inconscient.

Slide 8

3. Qu'est-ce que la respiration rapide chez un enfant qui a 3 mois? (Encerclez une seule réponse.)

a. 20 respirations par minute ou plus
b. 30 respirations par minute ou plus
c. 40 respirations par minute ou plus
d. 50 respirations par minute ou plus
e. 60 respirations par minute ou plus

Slide 9

3. Qu'est-ce que la respiration rapide chez un enfant qui a 3 mois? (Encerclez une seule réponse.)
   a. 20 respirations par minute ou plus
   b. 30 respirations par minute ou plus
   c. 40 respirations par minute ou plus
   d. 50 respirations par minute ou plus
   e. 60 respirations par minute ou plus

Slide 10

4. Qu'est-ce que la respiration rapide chez un enfant qui a 13 mois? (Encerclez une seule réponse.)
   a. 20 respirations par minute ou plus
   b. 30 respirations par minute ou plus
   c. 40 respirations par minute ou plus
   d. 50 respirations par minute ou plus
   e. 60 respirations par minute ou plus

Slide 11

4. Qu'est-ce que la respiration rapide chez un enfant qui a 13 mois? (Encerclez une seule réponse.)
   a. 20 respirations par minute ou plus
   b. 30 respirations par minute ou plus
   c. 40 respirations par minute ou plus
   d. 50 respirations par minute ou plus
   e. 60 respirations par minute ou plus

Slide 12

Evaluer La Toux

- Compter les respirations par minute:

Si l'enfant a:	Une respiration rapide est:
De 1 semaine a 2 mois	60 respirations par minute ou plus
De 2 mois a 12 mois	50 respirations par minute ou plus
De 12 mois a 5 ans	40 respirations par minute ou plus

- Rechercher un tirage sous-costal.
- Regarder et écouter si l'enfant a un stridor.

Slide 13

5. Lequel des signes suivants est le plus caractéristique de détresse respiratoire due à la pneumonie? (Encerclez une seule réponse.)
   a. La respiration profonde
   b. Une respiration superficielle
   c. Tirage intercostal
   d. Tirage sous-costal

Slide 14

5. Lequel des signes suivants est le plus caractéristique de détresse respiratoire due à la pneumonie? (Encerclez une seule réponse.)
   a. La respiration profonde
   b. Une respiration superficielle
   c. Tirage intercostal
   d. Tirage sous-costal

Slide 15

6. Lequel des signes suivants décrit le mieux une respiration sifflante? (Encerclez toutes les réponses correctes.)
   a. Il s'agit d'un son rauque à l'inspiration.
   b. Il s'agit d'un son musical doux pendant l'expiration.
   c. Elle est caractérisée par une expiration prolongée.
   d. Il s'agit d'un son musical doux pendant l'inspiration.

Slide 16

6. Lequel des signes suivants décrit le mieux une respiration sifflante? (Encerclez toutes les réponses correctes.)
   a. Il s'agit d'un son rauque à l'inspiration.
   b. Il s'agit d'un son musical doux pendant l'expiration.
   c. Elle est caractérisée par une expiration prolongée.
   d. Il s'agit d'un son musical doux pendant l'inspiration.

Slide 17

7. Lequel parmi les signes suivants vous ferait classer un enfant de 5 mois qui a des difficultés respiratoires dans la categorie de la pneumonie sévère *ou maladie très grave*? (Encerclez une seule réponse.)
   a. Vomissements
   b. Irritabilité
   c. Stridor lorsque le calme
   d. La température axillaire ≥ 39,0 ° C

Slide 18

7. Lequel parmi les signes suivants vous ferait classer un enfant de 5 mois qui a des difficultés respiratoires dans la categorie de la pneumonie sévère *ou maladie très grave*? (Encerclez une seule réponse.)
   a. Vomissements
   b. Irritabilité
   c. Stridor lorsque le calme
   d. La température axillaire ≥ 39,0 ° C

Slide 19

8. Comment classez-vous un enfant de 3 ans qui a une toux, une fréquence respiratoire de 55 respirations / minute et des tirages sous-costals? (Encerclez une seule réponse.)
   a. Pneumonie grave
   b. Pneumonie
   c. Pas de Pneumonie: toux ou rhume

Slide 20

8. Comment classez-vous un enfant de 3 ans qui a une toux, une fréquence respiratoire de 55 respirations / minute et des tirages sous-costals? (Encerclez une seule réponse.)
   a. Pneumonie grave
   b. Pneumonie
   c. Pas de Pneumonie: toux ou rhume

Slide 21

Classer La Toux

Signes	Classer:
•Tout signe général de danger •Tirage sous-costal •Stridor	Pneumonie Grave ou Maladie Très Grave
•Respiration Rapide.	Pneumonie
Pas de signe de pneumonie ou de maladie très grave.	Pas de Pneumonie: Toux ou Rhume

Slide 22

9. Pour classer l'etat de deshydration d'un enfant de 8 mois qui fait la diarrhée, quel sont les signes et symptoms qu'il faut rechercher? (Encerclez toutes les réponses correctes.)

a. Léthargique ou inconscient
b. Élasticité de la peau (pli cutané)
c. Incapable de boire
d. Plus de 3 selles liquides

Slide 23

9. Pour classer l'etat de deshydration d'un enfant de 8 mois qui fait la diarrhée, quel sont les signes et symptoms qu'il faut rechercher? (Encerclez toutes les réponses correctes.)

a. Léthargique ou inconscient
b. Élasticité de la peau (pli cutané)
c. Incapable de boire
d. Plus de 3 selles liquides

Slide 24

10. Comment classez-vous un enfant de 12 mois qui fait la diarrhée depuis 4 jours, qui est irritable, qui a les yeux enfoncés, qui boit normalement et chez qui le pli cutané se retire très lentement (en 3 secondes)? (Encerclez une seule réponse.)

a. Déshydratation sévère (Donnez traitement Plan C)
b. Signes évidents de déshydratation (Donnez traitement Plan B)
c. Pas de déshydratation (Donnez traitement Plan A)

Slide 25

10. Comment classez-vous un enfant de 12 mois qui fait la diarrhée depuis 4 jours, qui est irritable, qui a les yeux enfoncés, qui boit normalement et chez qui le pli cutané se retire très lentement (en 3 secondes)? (Encerclez une seule réponse.)

a. Déshydratation sévère (Donnez traitement Plan C)
b. Signes évidents de déshydratation (Donnez traitement Plan B)
c. Pas de déshydratation (Donnez traitement Plan A)

Slide 26

Traitez Le Déshydratation

Signes	Classer	Traitement
•Léthargique ou inconscient •Yeux enfoncés •Incapable de boire ou boit difficilement •Pli cutané s'éffface très lentement (>2 secondes)	Déshydratation Sévère	Plan C
•Agité, irritable •Yeux enfoncés •Boit avidement, assoiffé •Pli cutané s'éffface lentement	Déshydratation	Plan B
Pas de signes de déshydratation.	Pas de déshydratation	Plan A

Slide 27

11. Quels sont les signes/symptoms qui classeraient un enfant attient de la diarrhée en Plan B? (Encerclez toutes les réponses correctes.)

a. les yeux enfoncés et le pli cutané s'efface très lentement (3 secondes)
b. les yeux enfoncés et léthargique
c. les yeux enfoncés et inquiète
d. les yeux enfoncés et boit avec avidité
e. les yeux enfoncés et sang dans les selles

Slide 28

11. Quels sont les signes/symptoms qui classeraient un enfant attient de la diarrhée en Plan B? (Encerclez toutes les réponses correctes.)

a. les yeux enfoncés et le pli cutané s'efface très lentement (3 secondes)
b. les yeux enfoncés et léthargique
c. les yeux enfoncés et inquiète
d. les yeux enfoncés et boit avec avidité
e. les yeux enfoncés et sang dans les selles

Slide 29

12. Lequel des signes suivants est conforme à une classification de diarrhée persistante? (Encerclez une seule réponse.)

a. Diarrhée qui dure 7 jours ou plus
b. Diarrhée qui dure 10 jours ou plus
c. Diarrhée qui dure 14 jours ou plus

Slide 30

12. Lequel des signes suivants est conforme à une classification de diarrhée persistante? (Encerclez une seule réponse.)
   a. Diarrhée qui dure 7 jours ou plus
   b. Diarrhée qui dure 10 jours ou plus
   c. Diarrhée qui dure 14 jours ou plus

Slide 31

13. Comment classez-vous un enfant de 5 mois qui a fait la diarrhée avec sang depuis 15 jours qui ne présente aucun signe général de danger, qui a les yeux enfoncés, qui boit normalement et chez qui le pli cutané se retire immédiatement? (Encerclez une seule répondre.
   a. Signes évidents de déshydratation
   b. Diarrhée persistante sévère
   c. Dysenterie

Slide 32

13. Comment classez-vous un enfant de 5 mois qui a fait la diarrhée avec sang depuis 15 jours qui ne présente aucun signe général de danger, qui a les yeux enfoncés, qui boit normalement et chez qui le pli cutané se retire immédiatement? (Encerclez une seule répondre.
   a. Signes évidents de déshydratation
   b. Diarrhée persistante sévère
   c. Dysenterie

Slide 33

14. Le definition d'une fièvre est:
   a. La température axillaire de 37,0°C ou plus
   b. La température axillaire de 37,5°C ou plus
   c. La température axillaire de 39,0°C ou plus

Slide 34

14. Le definition d'une fièvre est:
   a. La température axillaire de 37,0°C ou plus
   b. La température axillaire de 37,5°C ou plus
   c. La température axillaire de 39,0°C ou plus

Slide 35

15. Qui a classez-vous un enfant de 17 mois qui a une fièvre depuis 4 jours, une température axillaire de 38.6°C et qui a convulsé hier nuit? (Encerclez une seule réponse.)
   a. Paludisme, méningite, ou convulsions fébriles possible
   b. Paludisme seulement
   c. Fièvre, mais paludisme peu probable

Slide 36

15. Qui a classez-vous un enfant de 17 mois qui a une fièvre depuis 4 jours, une température axillaire de 38.6°C et qui a convulsé hier nuit? (Encerclez une seule réponse.)

a. Paludisme, méningite, ou convulsions fébriles possible

b. Paludisme seulement

c. Fièvre, mais paludisme peu probable

Slide 37

16. Comment classez-vous un enfant de 3 ans qui a une fièvre depuis deux jours, une température axillaire 39.5°C et une résistance lorsque vous essayez de plier son cou vers l'avant vers sa poitrine? (Encerclez une seule réponse.)

a. Meningite

b. Paludisme

c. Pneumonie

Slide 38

16. Comment classez-vous un enfant de 3 ans qui a une fièvre depuis deux jours, une température axillaire 39.5°C et une résistance lorsque vous essayez de plier son cou vers l'avant vers sa poitrine? (Encerclez une seule réponse.)

a. Meningite

b. Paludisme

c. Pneumonie

Slide 39

17. Parmi les signes suivants, les quels sont utilisés pour vérifier la malnutrition? (Encerclez toutes les réponses correctes.)

a. Poids pour l'âge
b. Ulcères de la bouche
c. Oedème aux deux pieds
d. Pigmentation de la peau
e. Amaigrissement visible et sévère

Slide 40

17. Parmi les signes suivants, les quels sont utilisés pour vérifier la malnutrition? (Encerclez toutes les réponses correctes.)

a. Poids pour l'âge
b. Ulcères de la bouche
c. Oedème aux deux pieds
d. Pigmentation de la peau
e. Amaigrissement visible et sévère

Slide 41

18. Vous recevez en consultation un enfant de 9 mois atteint de diarrhée plan B? Sa carte de vaccination montre qu'elle a déjà reçu les vaccins suivants: BCG, polio 0-3, et DTC 1-3. Quel vaccine faut-il donnez maintenant. (Encerclez toutes les réponses correctes).

a. Polio-3
b. DTC-3
c. La antirougeoleux
d. La vitamine A
e. La fièvre jaune
f. Aucune parce que l'enfant est malade

Slide 42

18. Vous recevez en consultation un enfant de 9 mois atteint de diarrhée plan B? Sa carte de vaccination montre qu'elle a déjà reçu les vaccins suivants: BCG, polio 0-3, et DTC 1-3. Quel vaccine faut-il donnez maintenant. (Encerclez toutes les réponses correctes).

a. Polio-3
b. DTC-3
c. La antirougeoleux
d. La vitamine A
e. La fièvre jaune
f. Aucune parce que l'enfant est malade

Slide 43

19. Quel traitement devrait être donné à un enfant de 2 ans, qui a des convulsions à la formation sanitaire? (Encerclez toutes les réponses correctes.)

a. Diazépam par voie intramusculaire
b. La première dose d'un antibiotique approprié
c. Première dose de calcium IV
d. L'eau sucre pour prévenir l'hypoglycémie
e. Diazépam par voie orale

Slide 44

19. Quel traitement devrait être donné à un enfant de 2 ans, qui a des convulsions à la formation sanitaire? (Encerclez toutes les réponses correctes.)

a. Diazépam par voie intramusculaire
b. La première dose d'un antibiotique approprié
c. Première dose de calcium IV
d. L'eau sucre pour prévenir l'hypoglycémie
e. Diazépam par voie orale

Slide 45

20. Parmi les actions suivantes, les quelles doivent être incluses dans le plan de traitement d'un enfant souffrant d'une PNEUMONIE? (Encerclez toutes les réponses correctes.)

a. Transférer d'urgence à l'hôpital
b. Donnez un rendez-vous dans 2 jours
c. Donnez antibiotique par voie orale pendant 3 jours
d. Donnez un rendez-vous dans 5 jours si aucune amélioration
e. Donner un antibiotique pour 7 jours

Slide 46

20. Parmi les actions suivantes, les quelles doivent être incluses dans le plan de traitement d'un enfant souffrant d'une PNEUMONIE? (Encerclez toutes les réponses correctes.)

a. Transférer d'urgence à l'hôpital
b. Donnez un rendez-vous dans 2 jours
c. Donnez antibiotique par voie orale pendant 3 jours
d. Donnez un rendez-vous dans 5 jours si aucune amélioration
e. Donner un antibiotique pour 7 jours

Slide 47

21. Parmi les actions suivants, les quelles font partir du traitement Plan B de la diarrhée? (Encerclez toutes les réponses correctes.)

a. Donner davantage de liquides
b. Cesser de se nourrir pendant la maladie
c. Réduire l'allaitement maternel
d. Poursuivre l'alimentation

Slide 48

21. Parmi les actions suivants, les quelles font partir du traitement Plan B de la diarrhée? (Encerclez toutes les réponses correctes.)

a. Donner davantage de liquides
b. Cesser de se nourrir pendant la maladie
c. Réduire l'allaitement maternel
d. Poursuivre l'alimentation

Slide 49

22. Parmi les actions suivantes, les quelles font partir du traitement d'un enfant moyennement deshydraté souffrant d'une diarrhée aiguë sanglante (PLAN B)? (Encerclez toutes les réponses correctes.)

a. SRO
b. Antibiotique pendant 5 jours
c. Le métronidazole pendant 7 jours
d. Continuer l'allaitement maternel

Slide 50

22. Parmi les actions suivantes, les quelles font partir du traitement d'un enfant moyennement deshydraté souffrant d'une diarrhée aiguë sanglante (PLAN B)? (Encerclez toutes les réponses correctes.)

a. SRO
b. Antibiotique pendant 5 jours
c. Le métronidazole pendant 7 jours
d. Continuer l'allaitement maternel

Slide 51

23. Quel volume de SRO doit-on donner à domicile à un enfant de 6 mois souffrant de diarrhée aiguë sans déshydratation (Plan A)? (Encerclez une seule réponse.)

a. Autant que l'enfant veut
b. 50 à 100 ml après chaque selle molle
c. 200 ml après chaque selle molle
d. 400 à 700 ml pendant 4 heures
e. 700 à 900 ml pendant 4 heures

Slide 52

23. Quel volume de SRO doit-on donner à domicile à un enfant de 6 mois souffrant de diarrhée aiguë sans déshydratation (Plan A)? (Encerclez une seule réponse.)

a. Autant que l'enfant veut
b. 50 à 100 ml après chaque selle molle
c. 200 ml après chaque selle molle
d. 400 à 700 ml pendant 4 heures
e. 700 à 900 ml pendant 4 heures

Slide 53

Plan A - À la maison

-Hydratation normale et addition de SRO
- MONTRER À LA MÈRE COMBIEN DE LIQUIDE ELLE DOIT DONNER EN PLUS DE LA CONSOMMATION NORMALE:
  - Jusqu'à 2 ans: 50 à 100 ml après chaque selle liquide
  - 2 ans et plus: 100 à 200 ml après chaque selle liquide
-Augmentation de la nourriture
- RV après 3 jours si pas d'amélioration

Slide 54

Plan B - Traiter les signes évidents de déshydratation

- Administrer, au dispensaire et sur une période de 4 heures, la quantité de solution de SRO recommandée:

Age	Jusqu'a 4 mois	de 4 mois à 12	De 12 mois à 2 ans	De 2 ans à 5 ans
POIDS	<6 kg	6 - <10 kg	10 - <12 kg	12 – 19 kg
En ml	200-400	400-700	700-900	900-1400

- Allaitement
- Donnez à l'enfant autant de SRO qu'il veut

Slide 55

Plan C – Traiter rapidement la déshydratation sévère

-Admission à l'hôpital
- SRO par SNG À 20 ml/kg/hr x 6 hr
  (total 120 ml/kg)

- Si l'hydratation n'améliore par l'état de l'enfant après 3 heures - perfusion intraveineuse.

•Après 6 heures, réévaluer l'enfant. Classer la déshydratation (plan A, B ou C) pour continuer le traitement.

Slide 56

24. Devant un enfant qui a une température axillaire de 37,8 ° C et une raideur de la nuque, que faut-il faire? (Encerclez toutes les réponses correctes.)

a. Hospitaliser le patient
b. Donner la première dose d'un antibiotique approprié
c. Traiter l'enfant pour éviter l'hypoglycémie
d. Donnez antipaludiques (première dose)

Slide 57

24. Devant un enfant qui a une température axillaire de 37,8 ° C et une raideur de la nuque, que faut-il faire? (Encerclez toutes les réponses correctes.)

- **a. Hospitaliser le patient**
- **b. Donner la première dose d'un antibiotique approprié**
- c. Traiter l'enfant pour éviter l'hypoglycémie
- **d. Donnez antipaludiques (première dose)**

Slide 58

25. Pour un enfant paludisme qui a une température axillaire de 39,1 ° C,que faut-il faire? (Encerclez toutes les réponses correctes.)

- a. Administrer une dose de paracétamol pour la fièvre élevée
- b. Transférer d'urgence à l'hôpital
- c. Suivi en 5 jours
- d. Donnez antipaludiques (première dose)
- e. Observer jusqu'à température descend

Slide 59

25. Pour un enfant paludisme qui a une température axillaire de 39,1 ° C,que faut-il faire? (Encerclez toutes les réponses correctes.)

- **a. Administrer une dose de paracétamol pour la fièvre élevée**
- b. Transférer d'urgence à l'hôpital
- c. Suivi en 5 jours
- **d. Donnez antipaludiques (première dose)**
- **e. Observer jusqu'à température descend**

Slide 60

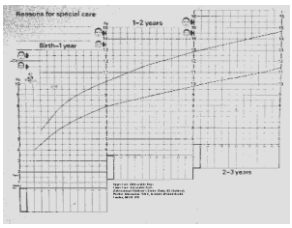
Observations –44 enfants au total

- 61% Garçons
- 57% un an ou plus
- 48% avec la toux, 50% avec la fièvre, 644% avec la diarrhée

Sommaire	% (N)
Vérifié pour la toux	86% (38)
Vérifié pour la diarrhée	96% (42)
Vérifié pour la fièvre	100% (44)
Vérifié pour l'anémie	77 % (34)
Vérifiez la capacité de boire ou de téter	70% (30)
Vérifiez pour l'achèvement de vaccination	55% (24)
Record de poids	100% (44)
Poids plot le tableau de croissance	0% (0)

Slide 61

Malnutrition



- 10 enfants atteints de malnutrition
- 5/10 enfants ont reçu une excellente consultation nutritionnelle
- Sur 31 enfants:
  - (+2 SD) = 1
  - (- 2 SD) = 28

Appendix F: 25-Question Examination Given to Health Providers (French)

Général:

1. Parmi les symptômes suivants, quels sont ceux qu'il faut toujours rechercher chez les enfants de 2 mois à 5 ans qui sont malades? (Encerclez toutes les réponses correctes.)
    a. La toux
    b. Douleur abdominale
    c. Fièvre
    d. Infections de la peau
    e. La diarrhée

2. Parmi les signes suivants, quels sont ceux qu'il faut toujours verifier et qui peuvent indiquer que l'enfant est gravement malade? (Encerclez toutes les réponses correctes.)
    a. L'enfant est léthargique ou inconscient
    b. L'enfant est agité ou irritable
    c. L'enfant n'est pas capable de boire ou de téter
    d. L'enfant vomit tout
    e. L'enfant a une respiration rapide ou difficile

Toux ou des difficultés respiratoires:

3. Qu'est-ce que la respiration rapide chez un enfant qui a 3 mois? (Encerclez une seule réponse.)
    a. 20 respirations par minute ou plus
    b. 30 respirations par minute ou plus
    c. 40 respirations par minute ou plus
    d. 50 respirations par minute ou plus
    e. 60 respirations par minute ou plus

4. Qu'est-ce que la respiration rapide chez un enfant qui a 13 mois? (Encerclez une seule réponse.)
    1. 20 respirations par minute ou plus
    2. 30 respirations par minute ou plus
    3. 40 respirations par minute ou plus
    4. 50 respirations par minute ou plus
    5. 60 respirations par minute ou plus

5. Lequel des signes suivants est le plus caractéristique de détresse respiratoire due à la pneumonie? (Encerclez une seule réponse.)
    a. La respiration profonde
    b. Une respiration superficielle
    c. Tirage intercostal
    d. Tirage sous-costal

6. Lequel des signes suivants décrit le mieux une respiration sifflante? (Encerclez toutes les réponses correctes.)
    a. Il s'agit d'un son rauque à l'inspiration
    b. Il s'agit d'un son musical doux pendant l'expiration
    c. Elle est caractérisée par une expiration prolongée
    d. Il s'agit d'un son musical doux pendant l'inspiration

7. Lequel parmi les signes suivants vous ferait classer un enfant de 5 mois qui a des difficultés respiratoires dans la categorie de la pneumonie sévère? (Encerclez une seule réponse.)

a. Vomissements
b. Irritabilité
c. Stridor lorsque le calme
d. La température axillaire ≥ 39,0 ° C

8. Comment classez-vous un enfant de 3 ans qui a une toux, une fréquence respiratoire de 55 respirations / minute et des tirages intercostals? (Encerclez une seule réponse.)

a. PNEUMONIE GRAVE
b. PNEUMONIE
c. PAS DE PNEUMONIE: TOUX OU RHUME

Diarrhée:

9. Pour classer l'etat de deshydration d'un enfant de 8 mois qui fait la diarrhée, quel sont les signes et symptoms qu'il faut rechercher? (Encerclez toutes les réponses correctes.)

a. Léthargique ou inconscient
b. Élasticité de la peau (pli cutané)
c. Incapable de boire
d. Plus de 3 selles liquides

10. Comment classez-vous un enfant de 12 mois qui fait la diarrhée depuis 4 jours, qui est irritable, qui a les yeux enfoncés, qui boit normalement et cehz qui le pli cutané se retire très lentement (en 3 secondes)? (Encerclez une seule réponse.)

a. Déshydratation sévère (Donnez traitement Plan C)
b. Signes évidents de déshydratation (Donnez traitement Plan B)
c. Pas de déshydratation (Donnez traitement Plan A)

11. Quels sont les signes/symptoms qui classeraient un enfant attient de la diarrhée en Plan B? (Encerclez toutes les réponses correctes.)

a. les yeux enfoncés et le pli cutané s'efface très lentement (3 secondes)
b. les yeux enfoncés et léthargique
c. les yeux enfoncés et inquiète
d. les yeux enfoncés et boit avec avidité
e. les yeux enfoncés et sang dans les selles

12. Lequel des signes suivants est conforme à une classification de diarrhée persistante? (Encerclez une seule réponse.)

a. Diarrhée qui dure 7 jours ou plus
b. Diarrhée qui dure 10 jours ou plus
c. Diarrhée qui dure 14 jours ou plus

13. Comment classez-vous un enfant de 5 mois qui a fait la diarrhée avec sang depuis 15 jours qui ne présente aucun signe général de danger, qui a les yeux enfoncés, qui boit normalement et chez qui le pli cutané se retire immédiatement? (Encerclez une seule répondre.)

a. Signes évidents de déshydratation

b. Diarrhée persistante sévère
c. Dysenterie

Fever:

14. Le definition d'une fièvre est:
a. La température axillaire de 37,0°C ou plus
b. La température axillaire de 37,5°C ou plus
c. La température axillaire de 39,0°C ou plus

15. Qui a classez-vous un enfant de 17 mois qui a une fièvre depuis 4 jours, une température axillaire de 38.6°C et qui a convulsé hier nuit? (Encerclez une seule réponse.)
a. Paludisme, méningite, ou convulsions fébriles possible
b. Paludisme seulement
c. Fièvre, mais paludisme peu probable

16. Comment classez-vous un enfant de 3 ans qui a une fièvre depuis deux jours, une température axillaire 39.5°C et une résistance lorsque vous essayez de plier son cou vers l'avant vers sa poitrine? (Encerclez une seule réponse.)
a. Meningite
b. Paludisme
c. Pneumonie

Malnutrition:

17. Parmi les signes suivants, les quels sont utilisés pour vérifier la malnutrition? (Encerclez toutes les réponses correctes.)
a. Poids pour l'âge
b. Ulcères de la bouche
c. Oedème aux deux pieds
d. Pigmentation de la peau
e. Amaigrissement visible et sévère

Le statut vaccinal:

18. Vous recevez en consultation un enfant de 9 mois atteint de diarrhée plan B? Sa carte de vaccination montre qu'elle a déjà reçu les vaccins suivants: BCG, polio 0-3, et DTC 1-3. Quel vaccine faut-il donnez maintenant (Encerclez toutes les réponses correctes).
a. Polio-3
b. DTC-3
c. La antirougeoleux
d. La vitamine A
e. La fièvre jaune
f. Aucune parce que l'enfant est malade

Identifiez-traitement

19. Quel traitement devrait être donné à un enfant de 2 ans, qui a des convulsions à la formation sanitaire? (Encerclez toutes les réponses correctes.)
a. Diazépam par voie intramusculaire
b. La première dose d'un antibiotique approprié
c. Première dose de calcium IV

d. L'eau sucre pour prévenir l'hypoglycémie
e. Diazépam par voie orale

20. Parmi les actions suivantes, les quelles doivent être incluses dans le plan de traitement d'un enfant souffrant d'une PNEUMONIE? (Encerclez toutes les réponses correctes.)

a. Transférer d'urgence à l'hôpital
b. Donnez un rendez-vous dans 2 jours
c. Donnez antibiotique par voie orale pendant 3 jours
d. Donnez un rendez-vous dans 5 jours si aucune amélioration
e. Donner un antibiotique pour 7 jours

21. Parmi les actions suivants, les quelles font partir du traitement Plan B de la diarrhée? (Encerclez toutes les réponses correctes.)

a. Donner davantage de liquides
b. Cesser de se nourrir pendant la maladie
c. Réduire l'allaitement maternel
d. Poursuivre l'alimentation

22. Parmi les actions suivantes, les quelles font partir du traitement d'un enfant moyennement deshydraté souffrant d'une diarrhée aiguë sanglante(PLAN B)? (Encerclez toutes les réponses correctes.)

a. SRO
b. Antibiotique pendant 5 jours
c. Le métronidazole pendant 7 jours
d. Continuer l'allaitement maternel

23. Quel volume de SRO doit-on donner à domicile à un enfant de 6 mois souffrant de diarrhée aiguë sans déshydratation (Plan A)? (Encerclez une seule réponse.)

a. Autant que l'enfant veut
b. 50 à 100 ml après chaque selle molle
c. 200 ml après chaque selle molle
d. 400 à 700 ml pendant 4 heures
e. 700 à 900 ml pendant 4 heures

24. Devant un enfant qui a une température axillaire de 37,8 ° C et une raideur de la nuque, que faut-il faire? (Encerclez toutes les réponses correctes.)

a. Hospitaliser le patient
b. Donner la première dose d'un antibiotique approprié
c. Traiter l'enfant pour éviter l'hypoglycémie
d. Donnez antipaludiques (première dose)

25. Pour un enfant paludisme qui a une température axillaire de 39,1 ° C,que faut-il faire? (Encerclez toutes les réponses correctes.)

a. Administrer une dose de paracétamol pour la fièvre élevée
b. Transférer d'urgence à l'hôpital
c. Suivi en 5 jours
d. Donnez antipaludiques (première dose)
e. Observer jusqu'à température descend

EMORY UNIVERSITY

Institutional Review Board

April 18, 2011

RE: Determination: No IRB Review Required
Title: Malaria, Pneumonia and Diarrhea in Kolofata, Cameroon: An Assessment of Health Worker Performance
PI: Jessica Slim

Dear Ms. Slim:

Thank you for requesting a determination from our office about the above -referenced project. Based on our review of the materials you provided, we have determined that it does not require IRB review because it does not meet the definition(s) of "research" or the definition of "clinical investigation" as set forth in Emory policies and procedures and federal rules, if applicable. Specifically, in this project, you will be improving the quality of care given to children in Kolofata, Cameroon.

This determination could be affected by substantive changes in the study design, subject populations, or identifiability of data. If the project changes in any substantive way, please contact our office for clarification.

Thank you for consulting the IRB.

Sincerely,

Andrea Goosen, MPH
Research Protocol Analyst
This letter has been digitally signed

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