The University of Zambia

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Correlates and Trend analysis study of Under-five Mortality among displaced populations: A case of Meheba refugee camp

by

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A dissertation submitted to the University of Zambia in partial fulfilment of the requirements for the award of the degree of Master of Public Health Population Studies

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Declaration

I declare that this dissertation titled *"**Correlates and Trend analysis study of Under-five Mortality among displaced populations: A case of Meheba refugee camp**"* which I hereby submit for the degree Master of Public Health Population Studies to the University of Zambia is my own original work and where other people's work has been used, it has been properly acknowledged and referenced. Neither this work, nor any part of it, has been submitted to any other tertiary institution for any degree or diploma.

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Certificate of Completion

I…….hereby certify that this dissertation is the product of my own work and, in submitting it for the Degree of Master of Public Health-Population Studies programme, further attest that it has not been submitted to another university in part or whole for the award of any programme.

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I Dr……..having supervised and read this dissertation is satisfied that this is the original work of the author under whose name it is being presented.

I confirm that has been completed satisfactorily and is ready for presentation to the examiners.

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Certificate of Approval

This dissertation by Nachela Malisenti Chelwa is approved in partial fufilment of the requirements for the award of a Master of Public Health-Population Studies by the University of Zambia.

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Abstract

Introdution: Under-five mortality, which is the probability of a child dying before their fifth birthday, is of concern in Zambia as infant and child mortality rates are important social indicators. Demographic health surveys conducted between 1992 and 2014 show notable reductions in under-five mortality levels from 191/1000 in 1992 to 75/1000 in 2014. Displaced population in camps provide a basis for under-five mortality surveillance because detailed registration databases have been developed. Additionally, health data routinely collected on mortality allowed for a review of mortality trends and identification of correlating factors to under-five mortality. Literature suggests a number of factors that influence child mortality including biological, socio-econimic and environmental factors. However, while progress in reducing mortality is evident disparities in under-five mortality trends have been observed within rural areas. Studies conducted on the evolution of mortality in refugee camps suggest that camp mortality levels reach comparable levels or much lower than host population following effective survival interventions and the camp reaches the "post emergency phase".

Methodology: The study examined differential levels and trends of under-five mortality with correlating factors in Meheba refugee camp in Northwestern province of Zambia which is presently in its post emergency phase. The retrospective cross-sectional study reviewed the ProGres and Health Information System (HIS) databases under-five mortality data for a seven (7) year period (2008-2014) and included all children aged less than five years in each year of review. The cummulative total of children reviewed in seven year reviewed period was 20,600 under-five years children with average population of 2943 children. STATA 12 and Microsoft Excel 2010 where used for data analysis and computation of findings.

Results: Malaria and respiratory infections (Pneumonia and Non Pneumonia) accounted for 81% of under-five deaths reported in the period while cases of Diarrhoea were responsible for 10% of reported mortalities. Seventy five percent (75%) of all mortalities were reported in children aged less than 1year (<1yr) with highest mortalities reported in 2013. While no significant variations in mortality were noted as a result of time, increased frequency of visits to health centre significantly ($P<0.05$) reduced mortalities in children by 3/1000 in each year.

Conclusion: In addition to improving health infrastructure and reducing distances to health facilities, the study also recommends sensitization programmes targeted at ensuring accessibility to health care services for children under-five years. The study found that increased health centre visitations were associated with reduction in under-five mortality and encourages intiatives targeted at sensitizing communities to seek health care. Furthermore, collaboration between the health systems, community and NGOs is key in addressing higher infant mortality observed. It is envisaged that this will contribute to the reduction in mortality cases and will compliment already existing strategies.

Dedication

To Jevarson and Eunice whose investment in their children has only started bearing fruit. I hope this makes you proud and rewards all the hard work you put in to seeing me get to this point

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List of Acronyms

ALRI	Acute Lower Respiratory Infection
CDC	Centre for Disease Control
CMRs	Crude Mortality Rates
CSO	Central Statistics Office
DMO	District Medical Office/Officer
EMA	Emergency Medical Assitance
GNP	Gross National Product
HIS	Health Information System
ITN	Insecticide Treated Mosquito Net
MDGs	Millenium Development Goals
OPD	Out Patient Department
PHC	Primary Health Care
RHC	Rural Health Centre
U5MR	Under-five Mortality Rate
UNDP	United Nations Development Program
UNHCR	United Nations High Commision for Refugees
UNICEF	United Nations International Childens Emergency Fund
WHO	World Health Organisation
ZDHS	Zambia Demographic Health Survey

CHAPTER 1: Background and Introduction

1.0 Introduction

There has been global discourse by many schools of thought concerning what the most representative measure of development in a country should be. Widespread agreement is that development should be measured using other variables besides GNP (Gross National Product) per capita (Hanmer, Lensick, & White, 2004). Health variables such as child mortality and maternal mortality should be used to indicate a country's development status (Hanmer, Lensick, & White, 2004). Under-five mortality, which is the probability of a child dying before their fifth birthday, is of concern in Zambia as infant and child mortality rates are important social indicators of wellbeing (CSO, 2014).

Demographic health survey data collected between 1992 and 2013 suggests that Zambia has made tremendous progress towards attainment of Millennium Development Goals (MDGs) evidenced, in part, by the reduction of child mortality (CSO, 2014). While strides made in reducing the number of children dying before their fifth birthday are good, a lot more must be done to ensure that many more children do not die of preventable and curable diseases (UNICEF, 2013). Table 1 below shows trends reported in U5MR (under-five mortality rate) through five (5) Demographic Health Surveys which have been undertaken in Zambia. As at 2014, Zambia reported 75 deaths per 1000 children occurring among children before reaching their fifth birthday.

Table 1: Trends in under-five mortality rates 1992-2014

Survey	Approx. calendar Period	Under-five mortality
ZDHS 2013 - 2014 (Preliminary report findings)	2012 - 2014	75
ZDHS 2007	2003 - 2007	119
ZDHS 2001-2002	1997 - 2001	168
ZDHS 1996	1992 - 1996	197
ZDHS 1992	1987 - 1991	191

Source: Adapted from (CSO, 2014)

The reduction of under-five mortality rates globally remains a key developmental priority for countries. Despite numerous global efforts to curb child mortality, the proportion of children who die before their fifth birthday remains high (UNICEF, 2013). The need to accelerate reduction in U5MR calls for robust and proven initiatives to sustain gains made through childhood immunisation programs, government commitment to girl child

education and the availability for first line medical care in communities. Additionally, while progress in Zambia to reduce U5MR is evident it remains below internationally agreed targets for 2015 MDGs resulting in as many as 75/1000 children dying of preventable and curable diseases or conditions. A UNICEF report highlights that if current trends of under-five mortality continue, the world will not meet Millennium Development Goal 4 – to cut the rate of under-five mortality by two-thirds by 2015. Furthermore the report highlights that if current trends continue, the goal will not be reached until 2028. The cost of such inaction is high because as many as 35 million more children globally could die mostly from preventable causes between 2015 and 2028, if the global community does not take immediate action to accelerate progress (UNICEF, 2013).

However, displaced populations present a somewhat different scenario once the post emergency phase is reached. Studies conducted among displaced populations globally suggest that following transition to host country, refugee U5MR reaches rates that are much lower than those of the host nation and community (Toole & Waldman, 1988). Under-five mortality rate is also a common indicator used in crisis situations and is widely considered as an indicator of health status of a population as a whole (Vogt, Heudtlass, & Guha-Sapir, 2011). Mortality data collected consistently and routinely provides information relevant for decision making regarding the health of the population. Additionally, the availability of retrospective data helps to ensure Refugee populations' health status is reviewed. Furthermore, this data helps present scenarios as a basis for U5MR surveillance as creative data collection methods have been employed. These include 24 hour grave yard surveillance and complex databases to track inflow and outflow of populations have been developed. Millions of people around the world live as displaced persons, often for lengthy periods of time (Singh, Karunakara, Burnham, & Hill, 2005). Refugees are usually at the highest risk of mortality during the period immediately after their arrival in the country of asylum, reflecting long periods of inadequate food and medical care prior to, or during, their flight (Toole & Waldman, 1997). Studies conducted of refugees from Mozambique hosted in Zimbabwe have shown the effects of massive deprivation suffered by the Mozambicans prior to their

fleeing the country. A study of these populations by Centre for Disease Control and Prevention (CDC) in 1993 revealed that during July and August 1992, the Crude Mortality Rate (CMR) among the Mozambican refuges who had been in a refugee camp for less than one month was 8 per 10,000 population. This is four times the death rate of refugees who had been in the camp between 1 and 3months, and 16 times the death rate that is normally reported for non-displaced populations in Mozambique (CDC, 1993). In their study Toole and Waldman observed that high CMRs mask higher mortality rates for certain age groups. They reported that in all three study populations the rates of mortality for children less than 5 years of age were far greater than those for those of older age groups.

Another study by Elias et.al suggested that the analysis of mortality trends can be used to evaluate the effectiveness of assistance programs in these camps as infectious disease control in long term camps has proven to be more effective than short term camp structures. The Vietnamese invasion of Cambodia in 1979 saw an influx of refugees into camps in Thailand who arrived physically, mentally and nutritionally exhausted after close to a decade of war (Elias, Alexander, & Sokly, 1990). Ten (10) years following the war close to 350,000 refugees with an age distribution skewed towards the very young (23% under age 5) were still resident in these camps. A study conducted at two of the camps set up revealed that in the long term camps the estimated infant and U5MR were comparable to those in countries such as Panama and Korea and were considerably lower than the host country Thailand (Elias, Alexander, & Sokly, 1990). The rate at which mortality rates have declined among refugee populations has varied significantly. The high initial death rates among Cambodian refugees in Thailand declined to almost baseline levels (i.e. mortality rates of host population) within one month (Toole & Waldman, 1997).

Studies undertaken on disparities in U5MR in Zambia reveal disparities exist between urban and rural areas and among rural areas themselves owing to the limited access to health care services, poor state of infrastructure and malnutrition, all of which plague refugee camps at initiation. Zambia's MDG (Millennium Development Goal) 2013

progress report suggests that *significant reforms and investments* are required to meet the MDG 2015 target. The observed declines in child mortality rates in Zambia are insufficient to reach the 2015 target which stood at 137.6 deaths per 1000 live births in 2010 (UNDP, 2013). Marked disparities in the levels of under-five mortality rates (U5MR) between and within provinces exist, raising issues of equity in health services provision. Although strides have been made to roll out key child survival interventions, large proportions of children under the age of five are still not reached and disparities are observed in coverage (Macwan'gi & Phiri, 2008).

Research has revealed that in the geographical distribution of U5MR in Zambia, mortality is constantly higher in rural areas than in urban areas. In their paper, Macwan'gi and Phiri highlighted that in 1992, 1996 and 2001/2002; U5MR in urban areas was 151, 171 and 140 deaths per 1000 live births respectively while corresponding Figures for rural areas were 201, 205 and 182 deaths per 1000 live births.

1.1 Problem Statement

In the mid-1990s, a study of the expected evolution of mortality over time suggested 4-6 months as the time taken for mortality to return to normal after an effective hummanitarian response (Burkholder & Toole, 1995) in refugee camps. Whilst the U5MR remains high in the acute emergency and late emergency phases, crude mortality rates tend to reach those of host countries some 6-12 months after the original events, the situation is judged as stable and the post emergency phase begins (Burkholder & Toole, 1995). Guidelines on the specific technical issues were produced during the late 1980 and early 1990s that have benefited the UN agencies and non-governmental organisations operating health programmes in humanitarian emergencies (Salama, Spiegel, Talley, & Waldman, 2004). Since 1995, mortality rates in camps have rarely been more than double the emergency threshold of one death per 10,000 per day (Salama, Spiegel, Talley, & Waldman, 2004). In long established refugee camps, the U5MRs are systematically lower for refugees than for surrounding host populations.

In discussing disparities that exist within rural settings, displaced population camps most often set up in rural areas provide a basis for discussing universal access to health care programmes that may be adopted in natural rural settings to address U5MR. In a 2000 address to the committee of the High Commisioner for Refugees, Kofi Annan (former Secretary General of the United Nations) is quoted as having stated this:

> *" Sometimes they flee across national frontiers. Sometimes not. To them it makes little difference. They may not even know which country they are in, when they first arrive in a place of refuge. Those who are still in their own country are in just as desperate need of protection and relief as those who are not. And those who have crossed a border sometimes find themselves better off than the 'host' population which gives them refuge, but which does not benefit from the same assistance programmes".*

Such assitance programmes most often demand stronger coordination, increased accountability and a more strategic positioning of non-governmental organisations and UN agencies are crucial to achieving lower maternal and child morbidity and mortality rates in camps for complex emergencies (Salama, Spiegel, Talley, & Waldman, 2004).

While scientifically proven child survival strategies are being implemented and that a steady decline in U5MR has been recorded, levels of mortality are still high and unless research revitalizes child survival interventions, the country will lag behind in attainment of global developmental goals. An assessment of on-going programmes, availability of services and coverage of health care facilities as well as review of U5MR data for refugee camps will provide insight into the nature of design of programmes to address higher levels of mortality in rural areas. Refugee camp populations provided a basis for surveillance as well as review of mortality data. It is hoped that this research has provided comparable data for the design and implementation of programmes to help accelerate progress in reducing the number of children dying before their fifth birthday.

1.2 Rationale of the Study

One of the hallmarks of epidemiologic analysis is the understanding that health outcomes in a population can only be fully understood if their frequency and distribution

is examined in terms of person, place, and time (Rosenburg, 1997). While literature reviewed discusses mortality in number of countries worldwide hosting refugee populations, recent studies have not explored the subject of under-five mortality trends among refugee populations in Zambia. This is besides the country's refugee history dating back to the 1960s; there is no literature that conclusively highlights under-five mortality trends among refugee populations in Zambia. This study helped determine whether proven strategies currently being implemented in the refugee health care system have shown remarkable reduction of under-five mortality rates. The study is cognisant of the fact that literature globally highlights that a large proportion of deaths occurring in children under-five in developing countries are caused by diseases for which low cost interventions exist. Refugee camps and displaced population groups provide a basis to noting this trend as they provide an ideal setup where vital population data is routinely and accurately collected, analysed and disseminated. Refugee camps display a number of similarities to rural areas including being largely agricultural, settlers residing in village type housing, long distances to centrally located facilities such as schools, health facilities and commercial activities. This makes them an ideal model for studying U5MR.The review of U5MR trends in the camp setting provided insight into possible solutions for continued U5MR reduction in Zambia's rural areas. Specifically, this study was expected to contribute to the understanding of the levels, trends and correlates of under-five mortality among refugee populations. It is posited that the factors which contributed to the reduction of U5MR up to the post emergency phase of a refugee camp could apply to rural areas.

1.3 Research Objectives

Under-five mortality data, properly collected, interpreted and used, have much to contribute to the appropriateness and effectiveness of interventions targeted at improving population health. The question the study addressed was "*What changes are there in under-five mortality trends among displaced populations and what factors account for such discrepancies?"*

General Objective

To examine differential levels and trends of under-five Mortality with correlating factors in the refugee camp of Meheba in Zambia

Specifically the study objectives sought:

- To describe under-five mortality trends for the period 2003 to 2013.
- To determine programming and health facility distribution in refugee camps.
- To profile priority causes of mortality.
- To develop a model for effective strategies in under-five health care in Zambia.

Chapter 2: Literature Review

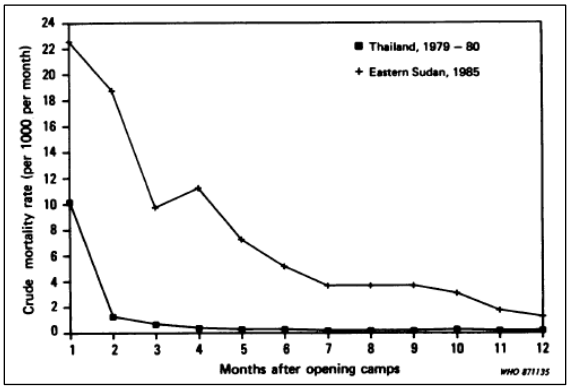
2.0 Literature Review

Under-five mortality globally has been linked to a number of factors including biological factors, maternal education and socio-economic standing of family. Additionally, large disparities that exist between varying societal groups have shown to influence underfive mortality. While all this is known, children in this age group continue to die particularily in rural areas were socio-economic factors affect mortality. Governments in developing countries have implemmented some long term programmes aimed at addressing socio-economic causes of mortality the need for short term interventions becomes necessary.

Displacement may occur within an individual's own country (internal displacement), or lead to flight across national boarders to neighbouring or other countries (as aslyum seekers). The process of displacement will inevitably lead to an added health and social burden on a receiving state, region or country (Thomas & Thomas, 2004). In discussing displaced persons this research will contextually define displaced persons as individuals who have had to cross national boundaries and are resident within Meheba Refugee camp.

In a study by Toole and Waldman on mortality trends among refugee populations in three selected countries a significant reduction in crude mortality rates was observed. Figure 1 shows mortality trends in Thailand and Sudan as revealed from data collected.

Figure 1: Mortality trend in Thailand and Eastern Sudan



An initial review of mortality data from refugee camps in Thailand (1979-80), Somalia (1980-85), and Sudan (1984-85) indicated that crude mortality rates (CMRs) for newly established camps were up to 40 times higher than those for the non-refugee populations in the host countries (Toole & Waldman, 1988). In eastern Sudan, approximately 5% of the population of eight camps died in the first three (3) months of the emergency and daily CMRs as high as 14 per 10 000 were reported.

These rates dropped to values comparable with those of the host country within 6 weeks in the Thai camps; however, in Somalia and Sudan this process took 12 months (Toole & Waldman, 1988). Mortality rates among under-five year olds in the early phases, which were as high as 32.6 per 10 000 per day, are six times greater than those in the world's least developed countries during non-emergency times. Acute respiratory infections, diarrhoeal diseases, malaria, measles, and under-nutrition were the causes of most reported deaths, the majority of which could have been prevented by adequate food rations, clean water, measles immunization, and an oral rehydration programme.

Although CMRs were initially high in both populations, the rates of decline differ. Mortality rates in Thai camps fell within six (6) weeks to levels comparable with the Thai national rate, whereas in the Sudanese case/situation this did not happen until 12 months after camps were opened (Toole & Waldman, 1988). The study concluded on the need for future programmes targeting emergency relief situations to try and avert high mortality in acute phase of camp establishment.

Another recent study by Polonsky et.al in 2011 studied under-five mortality among displaced populations of Somalia resident in refugee camps in Kenya. The aim of the study was to identify cause specific mortality of camp setting environment to ensure effective humanitarian response. In this study 6,488 children under-five were part of the study population and accounted for 52% of all deaths recorded for a 177days recall period. U5MR was calculated at 1.8 per 10,000 person days and more than two-thirds were reported to have been associated with diarrhoea, cough and other breathing difficulties and fever causes which are common in most sub-Saharan Africa. The study noted a decreasing crude and under-five death rate with length of stay in the camp from 1.5 and 2.5 deaths per 10,000 person-days (CDR and U5MR, respectively) among the most recent arrivals in the camp, to 0.6 and 1.4 deaths per 10,000 person-days (CDR and U5MR, respectively) among the longest-established refugees (Polonsky, Ronsee, Ciglenecki, Rull, & Porten, 2013).

In a study done in Zambia on disparities in mortality trends revealed that underfive mortality rates had periods of regression and improvement and stood at 119 deaths per thousand live births (Macwan'gi & Phiri, 2008). Although strides had been made to roll key child survival interventions, large proportions of children under-five are still not reached and disparities are observed in coverage. Effective targetting of child survival interventions require specific information not only at what age children die but also about where they are dying (Macwan'gi & Phiri, 2008). In Macwan'gi's study the analysis of ZDHS data on mortality among children under-five years by districts also showed variation in the extent of mortality within provinces. The data showed that for Northern Province (with twelve districts), two districts had infant mortality ranging between 88 and 104 deaths per thousand live births while two other districts had infant mortality above 155 deaths per thousand live births (Macwan'gi & Phiri, 2008). The study concluded that various factors contribute to differentials in levels of mortality by age and geographical areas. The factors included that poor targeting and coverage of health services, shortage of human resource for health, inadequate infrastructure mainly for communication, poor care seeking behaviour especially in rural areas, cultural practices and nutritional habits and socio economic status including education levels (Macwan'gi & Phiri, 2008).

Another study by Toole and Waldman in their paper on refugees and displaced populations highlights that between the 1990's and 1993 the number of refugees, worldwide, increased by 40% from 32million to over 43million refugees and internally displaced populations. Crude death rates among refugees arriving in host countries ranged from five to 12 times the baseline CDRs in their countries of origin. Among both refugees and internally displaced populations, death rates among children less than five years of age were far higher than among older children and adults (Toole & Waldman, 1993). Their paper further posits that since 1990, the most commonly reported causes of death among refugee populations during the influx included diarrheal diseases, acute respiratory infection, measles and other infectious diseases. While measles was cited as a major cause of death prior to 1990, fewer measles cases were reported among camp populations bewteen 1990 and 1993 (Toole & Waldman, 1993).

Spiegel et al. 2002, looked at health programmes associated with decreased mortalities among displaced populations and found that recently established camps had higher mortality than those in their post emergency phase. The study conducted in 51 refugee camps looking at a three (3) month retrospective mortality review period reported that newly established camps also had fewer health workers per person than long established camps (Spiegal et al., 2002). Further studies conducted on the causes of mortality in the post emergency phase found that as in stable settings, Malaria, Pneumonia and diarrhoea are important causes of mortality among refugee children in African refugee camps (Hershey, et al., 2011). Analysis of UNHCR HIS data from 90 refugee camps in 16 countries indicated that the primary causes of mortality among camp-based refugee children younger than five years of age were malaria (20%), pneumonia (20%), diarrheal disease (7%), neonatal deaths (11%) and acute malnutrition (10%) (Hershey, et al., 2011).

2.1 Health Care in the Post Emergency Phase

The post emergency phase begins when the excess mortality of the emergency phase is controlled and basic needs (water, food, shelter) have all been addressed through implementation of some top 10 priorities needs identified for a refugee camp. These top 10 priorities identified by Medecin San Frontieres for reduced mortality in refugee populations include: initial assessment of health care needs, measles immunization, water and sanitation, food and nutrition, shelter and site planning, health care in the emergency phase, control of communicable diseases and epidemics, public health surveillance, human resources training and finally coordination. These are conducted simulteanously and only becomes feasible if different relief teams are involved.

The emergency phase, the period following immediate displacement, requires that relief programmes are initiated promptly if excessive mortality rates are to be rapidly reduced and priority is often given to measures likely to have a swift impact on mortality Figures. Experience has shown that mortality is reduced when assistance becomes organised and coordinated (Medecin Sans Frontieres, 2000). The post emergency phase is

charecterised by greater stability as problems linked to emergency have stabilised and refugee welfare has improved as most would already be involved in income generating activities. While some influx of new refugess may occur, the post emergency phase represents as fragile state of equilibrium which requires vigilance and adequate input to sustain it (Medecin Sans Frontieres, 2000).

Disease patterns in the post emergency phase are the same as those in non-refugee populations and include diarrhoeal diseases, acute respiratory infections and malaria as major killers and most frequently encountered problems (Medecin Sans Frontieres, 2000). The phase also records reduced mortalities and increased access to health services compared to the emergency phase and as such the health status of refugees increasing becomes better than that of the local population. The host population health needs are more often overlooked as relief and hummanitarian organisations work towards maintaining ensuring continued stability. Health care services intended for children in this post emergency camps include:

- Paediatric curative care (under-five clinics)
- Early detection of malnourished children and referral to nutrional services
- Therapeutic and supplementary feeding programmes
- Immunization programmes
- Vitamin A supplementation and other micro-nutrients indicated in the Expanded Programme on Immunization (EPI) recommendations (Medecin Sans Frontieres, 2000).

2.2 Concept of Primary Health Care vs Emergency Medical Assistance

Primary Health Care (PHC) and Emergency Medical Assitance (EMA) are two fundamentally different structures of delivering health care as PHC is conceptualised as part of overall development while EMA is delivered in disaster or emergency situations (Van Damme et al., 2002). The declaration of Alma-ata during the International Conference on Primary healthcare in 1978 exprssed the need for urgent action by all governments, all health and development workers, and the world community to protect and promote the health of all people of the world. This declaration emerged as a major

milestone in the field of public health identifying PHC as the key to attainment of global health for all. This declaration defined a global commitment by the global community to health development and equity in health.

Primary Health Care: The declaration of Alma-ata defined primary health care as essential health care based on practical, scientifically sound and socially acceptable methods and technology made universally accessible to individuals and families in the community through their full participation and at a cost that the community and country can afford to maintain at every stage of their development in the spirit of self reliance and self-determination. It is the first level of contact of individuals, the family and community with the national health system bringing health care as close as possible to where people live and work, and constitutes the first element of continuing health care process (WHO, 1978). Key issues in the declaration included:

- The existing gross inequality in the health status of the people particularly between developed and developing countries as well as within countries is politically, socially and economically unacceptable and is, therefore, of common concern to all countries.
- Addressing the main health problems in the community, providing promotive, preventive, curative and rehabilitative services accordingly.
- Education concerning prevailing health problems and the methods of preventing and controlling them; promotion of food supply and proper nutrition; an adequate supply of safe water and basic sanitation; maternal and child health care, including family planning; immunization against the major infectious diseases; prevention and control of locally endemic diseases; appropriate treatment of common diseases and injuries; and provision of essential drugs.
- Relies, at local and referral levels, on health workers, including physicians, nurses, midwives, auxiliaries and community workers as applicable, as well as traditional practitioners as needed, suitably trained socially and technically to work as a health team and to respond to the expressed health needs of the community (WHO, 1978).

As part of the declaration, governments were tasked to formulate policies, strategies and plans of action to launch and sustain PHC in addition to requesting for countries to coorperate in the spirit of partnership and service. The Zambian government adopted primary health care as the main focus in the development of national health care services. Already existing even before the declaration at Alma-Ata were a number of factors that already favoured the introduction of PHC. Existing policies at the time called for free medical services for all, and the National development plans emphasised the need to give priority to the rural population, whose needs were greatest. Community participation through self help projects a long established tradition evidenced by the fact 30% of existing rural health centres were built on a self help basis (WHO, 1994). Zambia begun the implemmentation of primary health care in 1981 with the formation of community health committees and selection of community health workers (including traditional birth attendants) for training. Strengthening of infrastructure included among other developments:

- Rural health centres were constructed or upgraded to provide adequate coverage of facilities for preventive and curative services and for supervision and continued training and support of community health workers and traditional birth attendants
- Distribution of medicines was improved to ensure that adequate supply of essential medicines reached the district hospitals, rural heath centres and community health workers
- Planning and management at all levels were also strengthened, particularly at district level in order to increase effectiveness of support for primary health care activities within the health sector (WHO, 1994).

Following the formal approval of PHC, community health committees where established. Literature suggests that the bulk of these communities that established committees were highly organised committees and not necessarily those in need (WHO, 1978). This suggests that mostly urban centres started implementing PHC as they were more organised and had necessary expertise.Therein lies the onset of disparitiry in healthcare delivery resulting in it affecting mortality trends between rural and urban areas. The

ZDHS 2013-2014 report highlights the disparities in mortality trends among urban and rural areas with underfive mortality being found at 72 per 1000 live births in urban areas compared with 85 per 1000 live biths in rural areas.

Emergency Medical Assistance: Emergency Medical Assistance (EMA), or medical relief concentrates on protecting physical survival. WHO defines relief as "*assistance and/or intervention during or after a disaster to meet the life preservation and basic subsistence need"* (Van Damme et al., 2002). EMA should be designed as part of a package of emergency relief measures, including provision of water, shelter and food, usually involving the utilisation of all resources that can be mobilised. Rationalisation in this approach aims at producing a maximum output in terms of lives saved with the available resources (Van Damme et al., 2002).

The Sphere project which is the Humanitarian Charter and minimum standards in humanitarian response provides guidance for child health care provision in emergency situations. The standards identified for implemmentation in emergency situations include:

- Prevention of vaccine-preventable diseases - Ensuring children aged between 6 months and 15years have immunity against measles and access to EPI services once situation has stabilised.
- Management of newborn and childhood illness – Children are given priority access to health services that are designed to address major causes of newborn and childhood morbidity and mortality (Sphere project, 2011).

During emergencies, children are especially vulnerable to increased rates of morbidity and mortality. Addressing their specific health needs requires child-focused interventions (Sphere project, 2011). Child health interventions must include those that address the major causes of excess morbidity and mortality, including acute respiratory infections, diarrhoea, measles, malnutrition and neonatal causes. This forms the basis for emergency assistance in refugee camps. Table 1 below shows the paradigms of of

PHC and EMA to show focus of human survival for emergency assistance rather than the focus on health as a condition of human development and wellbeing.

Table 2: Paradigms of Primary Health Care (PHC) and Emergency Medical Assistance (EMA)

	PHC	EMA
Aim	Health, as a condition for human development and well being	Physical survival, as a pre-condition for human development
Relation to context	In harmony with other sectors of society	Part of the package of emergency relief maesures
Resource-use	Use a 'reasonable' share of the overall resources	Use 'all resources that can be mobilized'
Technical Dimension (Ratinalization)	Optimization (effectiveness and efficiency)	Maximization (Effectiveness)
Social Dimension	Autonomy and participation (responsiveness)	Dignity and compliance
Time perspective	Long term	Short term

Adapted from (Van Damme, Van Lerberghe, & Boelaert, 2002)

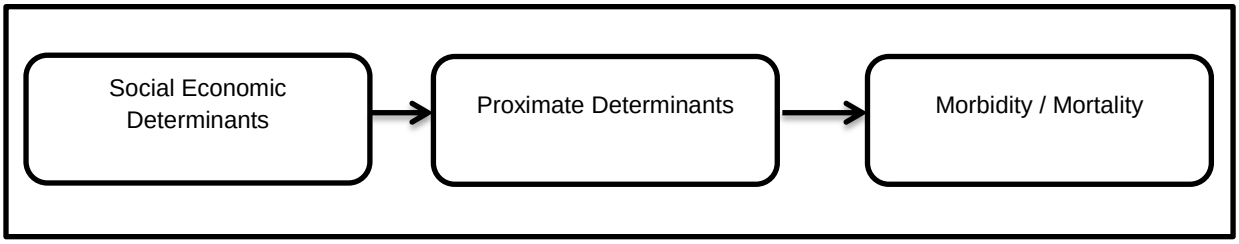
2.3 Concept of proximate and social economic mortality determinants

The analytical framework developed by Mosley and Chen in 1984 is also adapted in this study to depict the mechanisms through which various determinants operate and affect underfive mortality. In their model, Mosley and Chen identify factors that contribute to morbidity and in turn mortality.

Literature reveiwed on the subject suggests that in the post emergency phase, refugee populations access health care facilities and necessary resources to support health, such as adequate water, sanitation as well as availability of land for cultivation to increase household food security contribute to the reduction in numbers of under-five mortalities. These account for some environmental factors identified in the Mosely and Chen framework.

The core of the framework is the idea that all background (social and cultural) variables have to operate through a limited set of proximate determinants that directly influence the risk of disease and the outcome of disease processes (Hill, 2003). Mosley and Chen argue that the framework presents an opportunity to not only assess the overall health impact of development strategies but also more sharply define which among a number of specific factors amenable to change by health policy makers are of greatest consequence for child survival (Hill, 2003). Figure 2 below shows the summarised Mosley and Chen Framework

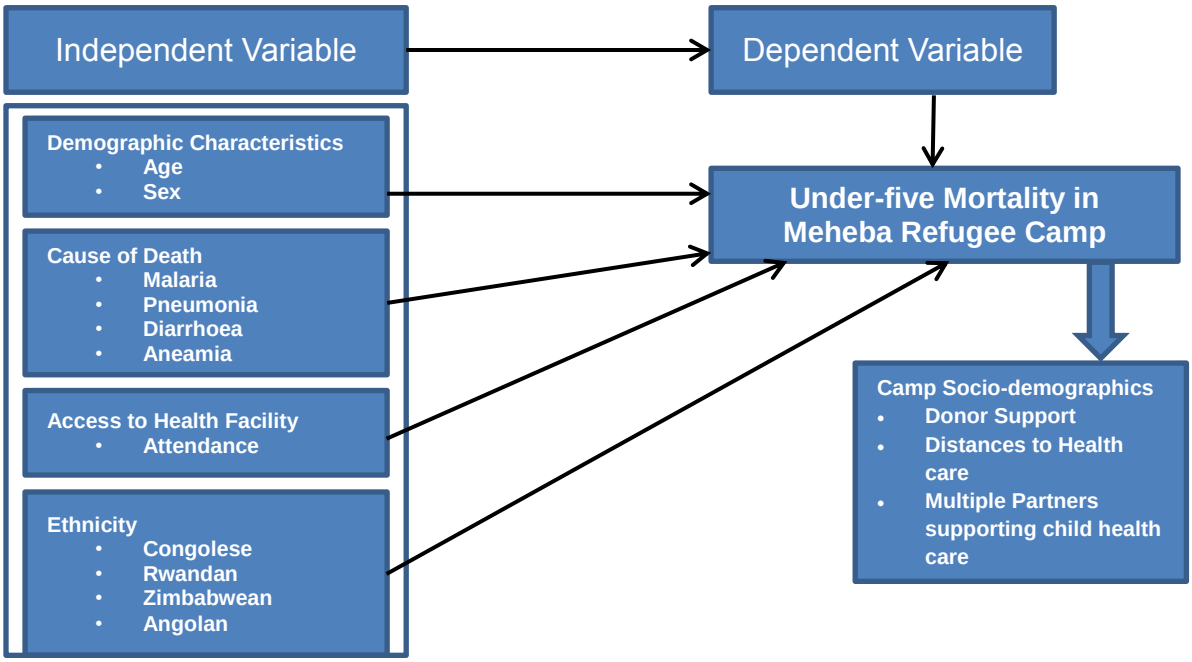
Figure 2:Summarised Mosley and Chen Framework



Source: Extracted from Mosley and Chen Framework

Owing to the fact that the UNHCR ProGres data is not collected with this analytical framework in mind, modification of the original framework to suit the scope of the data being used in this research becomes necessary, thus the study modifies the model to include parameters of data that will be utilized in the research. This framework has been adopted as the analytical framework owing to the fact that it helps to clarify the various factors involved in child survival as a basis for deriving policy for continued mortality reduction. The adapted model for the study is shown below in Figure 3 below:

Figure 3: Modified study framework



The framework explored the influence of four (4) factors on U5MR as a means of developing a model for cost effective implementation in rural communities in Zambia.

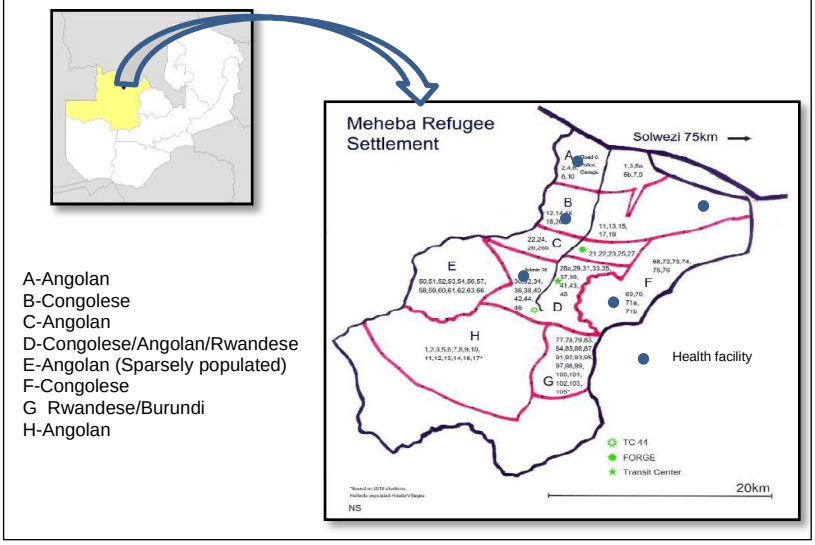
Chapter 3: Research Methodology

3.1 Study Setting

Zambia presently hosts over 30,000 refugees in two refugee camps (Mayukwayukwa and Meheba) as well as thousands more who have already been integrated in the Zambian society. This study will draw lessons from Meheba refugee camp, the largest refugee settlement in the country. Meheba Refugee camp sits on a 720 km^2 property and houses over 15,000 refugees.

The camp which is located approximately 75km from Solwezi is demarcated into zones housing refugee populations from similar countries in specific zones. Presently, the camp hosts refugees from Democratic Republic of Congo (Congo DR), Rwanda, Angola and Burundi. Meheba is an established camp meaning that the refugees resident in this place have their whole lives centred on camp activities and the majority of the children in the area have only ever known the camp as their home. This presents a similar environment to most of Zambia's rural areas and gives a basis for recommending future strategies to improve child health.

Figure 4: Location of Meheba Refugee Camp and distribution of facilities



While the camp established in 1971, has experienced a general reduction in refugee numbers in the recent past owing to voluntary repatriation programmes (particularly for refugees from Democratic Republic of Congo and Angola) spearheaded by UNHCR, Mehaba remains Zambia's largest refugee settlement. Additionally, Zambia is among the countries that is facilitating the local integration of refugees within local communities and contributed to about 10, 000 refugees reported to have been locally integrated in three countries Namibia, South Africa and Zambia in 2013 (UNHCR, 2013). The

repatriation and integration exercises have contributed to reductions in the number of refugee population in the camp.

The health facilities are managed by Ministry of Health through the Solwezi District Medical office and UNHCR. Meheba RHC is located in Zone A while Zone B houses two health facilities namely Jaigamo RHC and Meheba B RHC. Meheba clinic D and Meheba F are located in zones D and F respectively. The Appendix shows distribution of health facilities within Meheba refugee Camp as well as the different Zones.

3.2 Study Population

The study focused on all under-five mortality cases reported during the period 2003 – 2013 through the camp based HIS database as well as number of children under the age of five residents in the camp who were assigned refugee status at Meheba. Study participants were derived from vital events records of births and deaths in a particular year.

3.3 Study Design

The study design was a cross sectional study looking at mortality data retrospectively for a period of 10 years. Secondary data collected by the Office of the Commissioner for Refugees at Ministry of Home Affairs and updated by the UNHCR Country Office and Solwezi District Medical Office (DMO) were used as the main source of data for the study. The refugee camp manages two databases for the reporting of vital statistics and health related concerns. ProGres database stores all vital statistics pertaining to the refugee camp including arrival dates to the camps, departure dates as well as all births and deaths occurring within the refugee population. The UNHCR HIS (Health Information System) records all health related data reported from the health facilities within the camp. Both data sets were used in addition to reviewing annual facility reports for purposes of triangulation.

The ProGres database is used for the administration of the refugee status determination process. It is a standardized system for refugee registration, which allows for

registration of Refugees upon arrival, thus, improving camp management by accurately determining the size and composition of refugee populations at any point in time. The HIS was developed to monitor camp-based refugee health programmes. The aim of this database has been to record and monitor the health status of refugees and other displaced persons as input into evidence-based policy formulation and better management of health programmes. The HIS collects data at facility level routinely and records all Out Patient Department (OPD) cases and records all mortality cases reported to the facilities disaggregated by national and refugee status. Data collection forms used in the HIS are attached in the Appendix.

Owing to the fact that the study is looking at trends in mortality and therefore conducted at an ecological level, the observation units of the study were time periods represented in years and not necessarily individuals (Rosenburg, 1997). Data obtained from the HIS and ProGres databases were selected as reported at each year end falling within 2003-2013 and number of registered children under-five and reported deaths for refugees in the 0-5years age group were plotted. Data entered into HIS at camp facilities for all reported under-five mortality cases for the 10year review period formed the basis for review of trends.

3.3.1 Eligibility Criteria

Inclusion criteria

- All children aged below five years registered as refugees and resident in Meheba Refugee Camp for the period 2003-2013

Exclusion criteria

- All children aged exactly five years and above for each year under review
- All Children aged below age five but are Zambian nationals

3.3.2 Selection of Study Units

The retrospective study was conducted at an ecological level, as such the sample is drawn from observation units (years) and not individuals. According to Rosenburg,

owing to the fact that observation units of interest were time periods, there were 10 observations selected, one for each year. These observations will therefore be a sample in time (Rosenburg, 1997) giving a sample size of 10 and using the total populations of each period as population denominators. A ten year period was selected to increase the precision in identifying patterns of change in mortality following years prior to the signing of MDGs. Additionally, controlling for confounding factors including socio-demographic charectaristics of population such as change in age structure or income level the sample size period presents a period that allows for meaningful interpretation of results and comparison from year to year.

3.3.3 Survey Data sources

The HIS and ProGres databases were used largely to extract data on births, deaths and any migrations that may have taken place during the period of interest. The study also reviewed UNHCR Annual reports, Refugee publications and hospital records for a 10 year retrospective period and did not interact directly with camp residents in trying to collect data.

3.4 Data Management

A checklist was designed to extract data from the ProGES and HIS data set. The checklist included variables such as the sex of deceased child, age, place of residence, ethnic background, frequency of visits to facility and reported cause of death.

3.5 Data Analysis Procedures

The first stage in the assessment of data for the study revolved around plotting reported deaths for all children aged less than five for the period 2008 -2014. Number of deaths reported through health facilities in the HIS was obtained including neo-natal, infant and child mortality rates were tabulated to allow for examining of changes in mortality trends and respective confidence intervals were drawn for analysis. Ordinary Least Square (OLS) regression analysis in STATA were used to model the observed series of rates for the 10 year sampled period.

3.5.1 Framework of Variable Measurement

Table 3: Study Variables

Type	Variable	Operational definition	Indicator	Scale of Measurement
Dependent Variable:	Under-five Mortality	Children who die before reaching 5years. This includes neonatal, infant and child mortality.	Number of Children who died between 2008-2014	Ratio
Independent Variables	Time (years)	The years reviewed for the trend study	2008-2014	Ratio
	Age	Child aged under the age of five	Reported age at last birthday	Ratio
	Place of Residence	This refers to whether identified record is for a child from within Refugee Camp or resides outside refugee camp	1. Camp 2. Host village (outside camp)	Nominal
	Cause of death	This refers to the reported cause of death	Type of Disease	Nominal
	Attendance	This refers to the average number of visits recorded for a child aged 0 to under-five in given year	Average number of visits per child	Ratio
	Ethnicity	This refers to ethnic origin/ country of origin refugees	1. Angola 2. Rwanda 3. Burundi 4. Congo 5. Other	Nominal

3.6 Ethical Considerations

An application was made to ERES converge for Ethical Approval to conduct the study and commencement of data collection commenced once permission to conduct study was granted by ERES and UNHCR through the office of the Commisioner of Refugees.

The purpose of study was explained to participating organisation within the broader context of the research study. The researcher ensured that the study objectives were clearly explained to UNHCR staff as well as MoH staff so that a clear understanding of objectives of the study was appreciated by the partcipants.

Risks

The study used secondary data for analysis and reporting. Owing to the fact that there was no direct interaction with community members in Meheba limited risks were

experienced during the duration of the study. The data was used in aggragete form and as such no individuals were identified.

Benefits from the study

Benefits in terms of availability of research findings that will support the development of appropriate strategies to reduce child mortality in the refugee camps with the possibility of portability to rural areas

3.7 Dissemination of Results

Once study is completed, findings of the study will be shared with the University of Zambia-School of Medicine, Department of Public Health, UNHCR, Ministry of Home Affairs, Ministry of Health and a peer reviewed article will be published in an identified journal.

Chapter 4: Research Findings

4.0 Findings Overview

Meheba's 2014 population reached 17,297 registering an increase from 2008 population which stood at 15,763. Under-five children accounted for 13% (2,198 children) of Meheba Refugee Camp population in 2014. The camp which is in its post emergency phase is more of a Zambian indigenous settlement as most of the camps youthful populations were born in Meheba. It has five (5) health facilities located in four of its eight (8) Zones.

4.1 Descriptive Analysis

This section highlights descriptive analysis of Meheba camp data discussing attributes of the camp in terms of population size and composition distributed across the seven (7) data points reviewed. The ProGres database has data in predetermined age groups of 0-4 (birth to 59months), 5-9yrs and so on. The HIS database has data in age groups categorized as less that one year (<1year) and one to under-five (12 to 59months). Neither one of the databases has the information dissaggreated per specific age group.

4.1.1 Population Distribution

The proportion of children aged 0-59months in Meheba represented 13% of the Camp population reflecting a significant age group whose well being was necessary for review. The table below shows number of refugee children aged less than five resident in Meheba refugee camp for the period 2008 to 2014. The data revealed an almost equal (50-50) distribution between female and male population with numbers of females in the 0-4year category being slightly higher than that of their male counterparts with an exception for the year 2014. The size of the population in this age group has seen periods of peaks and declines when compared amongst the years of review.

Table 4: Meheba Underfive Population by sex and age 2008-2014

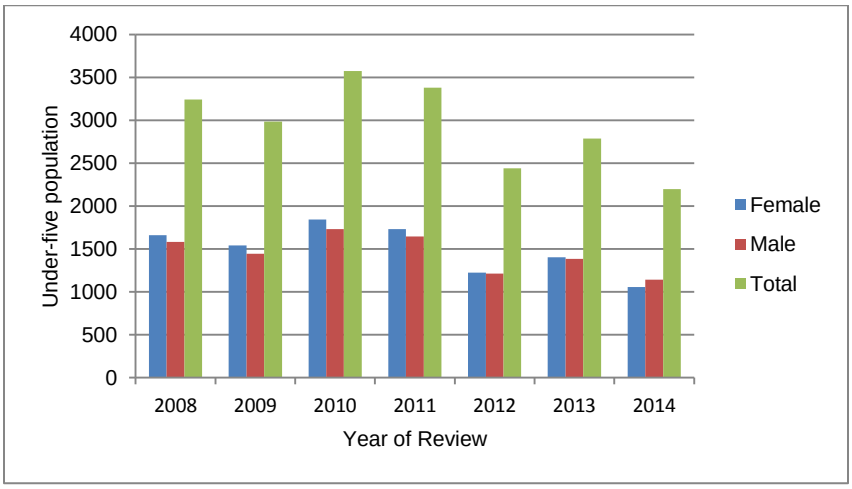
Year of Reporting	Female (0-4years)	Male (0-4years)	Totals
2008	1661	1581	3242
2009	1540	1443	2983
2010	1842	1730	3572
2011	1731	1647	3378
2012	1226	1213	2439
2013	1402	1386	2788
2014	1055	1143	2198

Source: UNHCR ProGRes Database, 2015

The Figure below is a graphical depiction of this population distribution for the period under review. The average number of children in this age group was 2,943 children and the highest under-five population in the camp was recorded in 2010, when about 3572 children were recorded as being present in the camp. Annual reports by the UNHCR provide some explanation of population changes across the years reviewed. The 2010 Global Annual report highlights that despite ongoing repatrition of refugees in the country about 2100 Congolese refugees who opted not to repartriate from the two camps (Mange and Kala Camp) that were closing were relocated to Meheba (UNHCR, 2011).

This explains the increase in number of children in 2010. Additionally, refugee numbers dwindled in 2012 as UNHCR paced towards meeting the return deadline for Angolan refugees of June 30 in 2012. This resulted in refugees willing to return to countries of origin being repartriated to Angola. The population increase in 2013 by 14% from 2439 came about as a result of an inflow of refugees and assylum seekers from Congo.

Figure 5: Meheba Population distribution 2008-2014



Source: UNHCR ProGRes Database, 2015

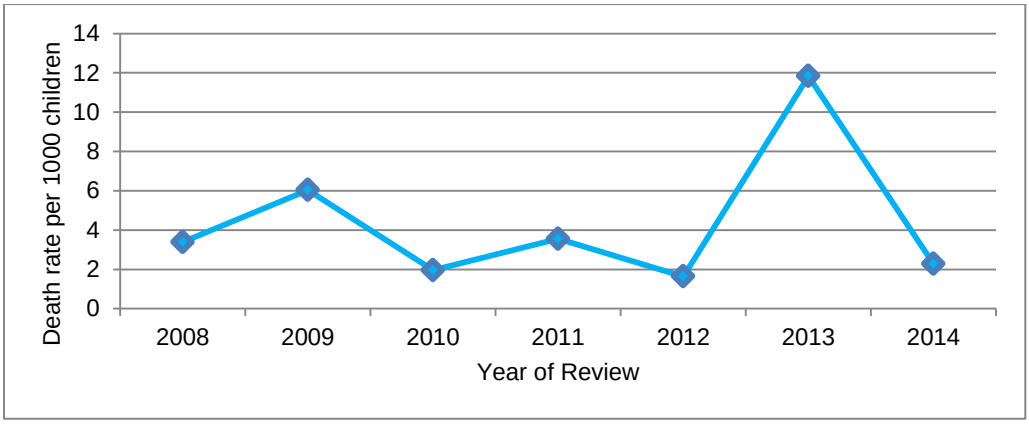
4.1.2 Under-five Mortality

While the ProGRes database reports on the number of refugees present in the Camp the HIS database managed by UNHCR and Solwezi DMO was used to establish mortality cases reported and their respective causes. The data revealed that during the

period 2008-2014, a total of eighty (80) deaths were reported for children in this age group. The mortality pattern when placed on the trend line shows periods of peaks and declines over the seven year period.

Figure 6 below plots death rate trends at Meheba between 2008 and 2014. The calculated average death rate was 4.4 deaths per 1000 population. The highest rate recorded was 11.8 in 2013 and the lowest was 1.6 in 2012. Before 2013, the mortality trend showed a regressing mortality with fewer deaths being reported but changed with 2013 deaths.

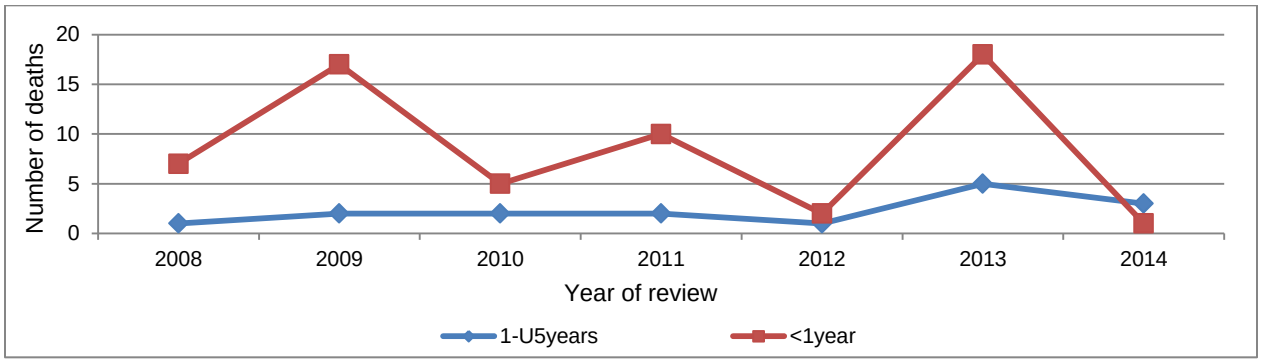
Figure 6: Under-five death rate trends 2008-2014



Source: UNHCR/Solwezi DMO HIS, 2015

Mortality trends among under-five children for 2008-2014 showed peaks and reduction in the number of deaths reported with the highest proportion of deaths being reported in 2013 [29% of total deaths reported in the period]. To assess variability in mortality patterns, mortalities reported where disaggregated by age group as infant and child deaths respectively. The data reviewed revealed that the majority [75%] of the deaths were reported in infant category coded as <1year. Mortality in children aged less than one year (<1year) was highest compared to that of children aged between one and less than five years of age whose age category showed a stable mortality pattern reported between 2009-2011. Figure 7 shows reported mortality cases categorized by <1year and 1-5years as recorded at facilities for the period 2008 - 2014.

Figure 7:Reported deaths in children aged less than Five years by age group 2008-2014



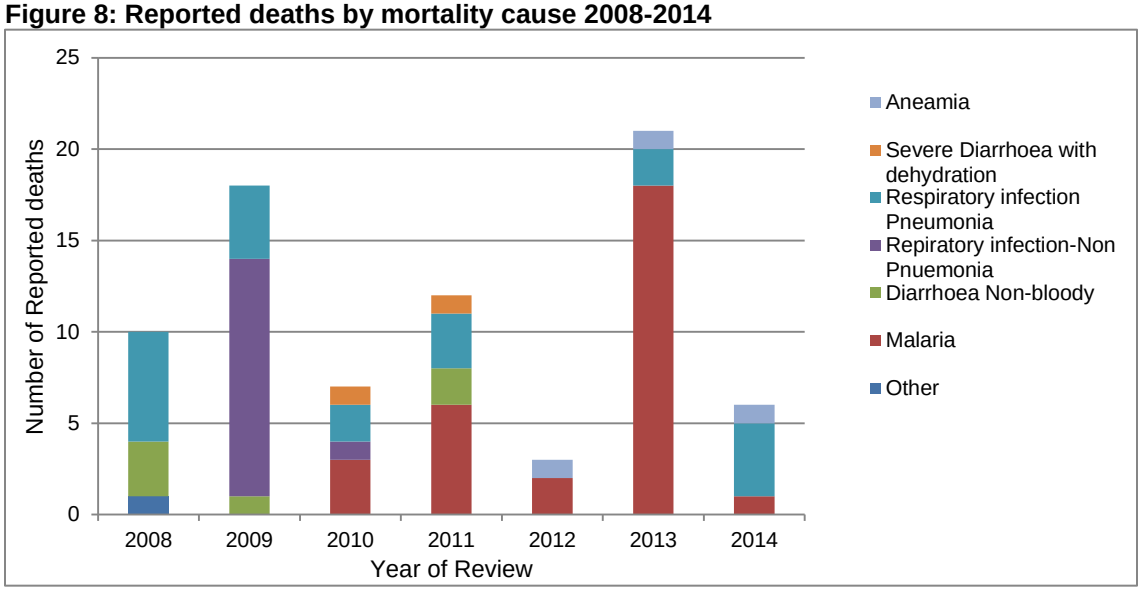
Source: UNHCR/Solwezi DMO HIS, 2015

4.1.3 Mortality Causes

All the individual mortality causes between 2008-2014 were identified and grouped. This resulted into the identification of six (6) major causes of mortality which included Pneumonia, Other respiratory infections (non-pneumonia), Malaria, Diarrhoea non bloody, Severe diarrhoea with dehydration and Aneamia. An additional group for mortality caused by trauma, snakebites and accidents was grouped together and referred to as “other”.The data when analysed revealed that Malaria infection in children resulted in the 37.5% [out of the total reported, malaria cases 27% occurred in the 1-U5years age group and 73% in the <1year age group] of reported deaths between 2008 and 2014. The leading causes of mortality where Malaria [37.5%], Pneumonia [26%] and other respiratory infection-non pneumonia [17.5%].

While Diarrhoea (bloody and non-bloody) did not result in the majority of deaths in Meheba, deaths reported as a result of dehydration were evident in the period under review. Mortality by cause for the period 2008-2014 are shown in the Figure 8.

Figure 8: Reported deaths by mortality cause 2008-2014



Source: UNHCR/Solwezi DMO HIS, 2015

4.1.4 Confidence intervals around reported deaths

Rosenburg (1997) recommends the calculation of confidence limits around each death rate in review of trend data. The use of confidence limits allows for preliminary reviews of trend data before statistical test are run. The plotted trend in deaths shows the instability and difficulty to meaningfully interprete data of mortalities in the Meheba Refugee Camp for U5MR reported for 2008-2014. The confindence intervals around each rate were calculated using the formulae below:

CI where calculated as follows

95% Confidence interval (CI)= Rate ± $1.96\sqrt{Rate/Pop \times 1000}$

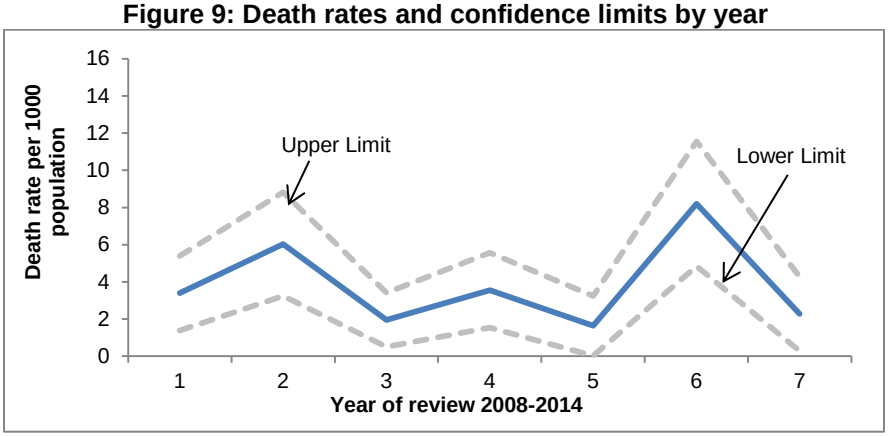
The confidence intervals around each rate are very wide resulting in the pattern displayed in Figure 9 which has a jagged instability in the trend that presented difficultly in intrepreting the data between years and making comparisons. This is due to the fact that different occurences between years account for different changes in mortalitiy trends. The period 2013-2014 saw the commencement of the local intergration project for some refugees in the camps while 2010 and 2012 saw influx of refugees into the

camp. These occurances show reductions and increases in overall number of refugees in the camp which could be linked to mortality changes.

Table 5: Meheba death rates and 95% confidence intervals

Years	Reported deaths	Total U5 Population	Deaths/population (per 1000 children)	95%CI
2008 (Year 1)	11	3242	3.4	(1.4 - 5.4)
2009 (Year 2)	18	2983	6.0	(3.2 - 8.8)
2010 (Year 3)	7	3572	2.0	(0.5 - 3.4)
2011 (Year 4)	12	3378	3.6	(1.5 - 5.6)
2012 (Year 5)	4	2439	1.6	(0.0 - 3.2)
2013 (Year 6)	23	2788	8.2	(4.8 - 11.6)
2014 (Year 7)	5	2198	2.3	(0.3 - 4.3)

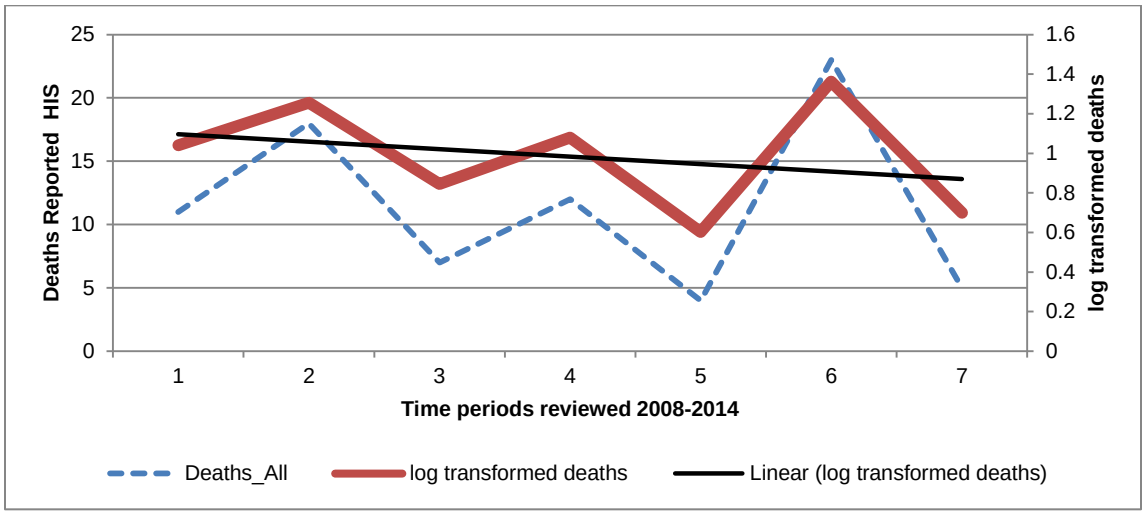
Figure 9: Death rates and confidence limits by year



4.1.5 Log transformations of Mortality data

In order to perform linear regression analysis for the trend data logarithmic transformations were performed. Log transformation of trend data provides more appropriate and realistic results because it “flattens” the series of observations (Rosenburg, 1997). As can be seen from the Figure 10, while the overall shape of the trend is unchanged, rates of increase or decrease have been altered to avoid the wide differences in reported deaths. The application of log transformations allowed for the fitting of a trend line.

Figure 10: Reported deaths by year (2008-2014) on linear and log scales



Trendline equation: log (all deaths of Children under-five) = -0.0378time(years) + 1.1344

Although transformation of data allows for improved data interpretability and provides appropriate results because series of rates are flattened it provided very little basis for data analysis of the trend data across the years. The trend line fitted on log transformed deaths suggests that for every addition year the death rate for children under the age of five will reduce by 0.4/1000children in a given year.

4.2 Correlating factors

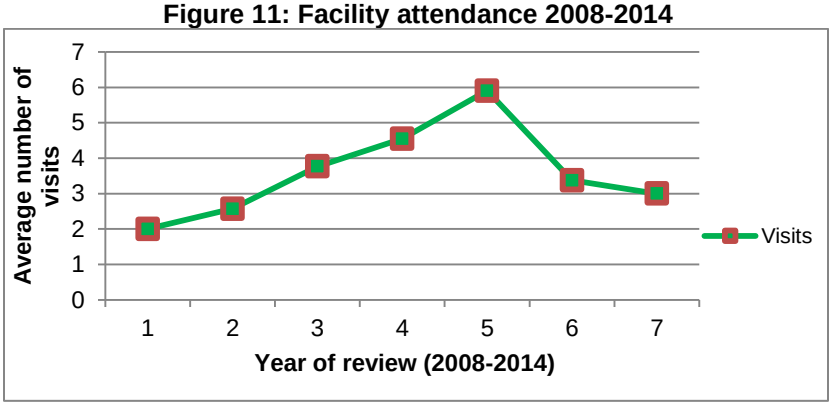
The study identified key factors likely to influence underfive mortality in Meheba refugee camp. These factors include access to health services (facility attendance), age of deceased child and ethnic background of deceased child.

4.2.1 Facility Attendance

The HIS data was reviewed to observe the health centre attendance variable. This variable is aggregated to show first attendance to the health facilities for different ailments. As with mortality trends, health facility attendance trends showed periods of peaks and reduction varying across the years of review. Figure 11 shows the trend in facility attendance. The data showed an average four (4) visits per child to a facility. The average number of visits was calculated by totalling the total number of first (1st)

attendance recorded and divided by the number of children falling within the age group for a particular year. Repeat visits were not included in the analysis.

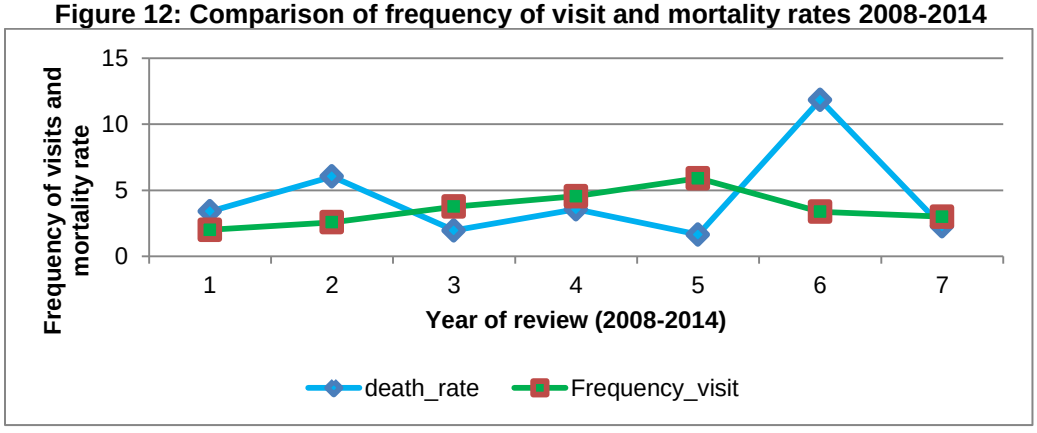
Figure 11: Facility attendance 2008-2014



Source: UNHCR/Solwezi DMO HIS, 2015

An attempt was made to examine differential trends between frequency of visits and the reported deaths to see if this had a bearing on number of deaths reported per year. The results of this descriptive review depicted that for years with higher mortality rates, the frequency of visits (attendance variable) was lower as compared to years with lower mortalities reported. Figure 12 shows the comparison between frequency of visits and mortality rates between 2008 and 2014.

Figure 12: Comparison of frequency of visit and mortality rates 2008-2014

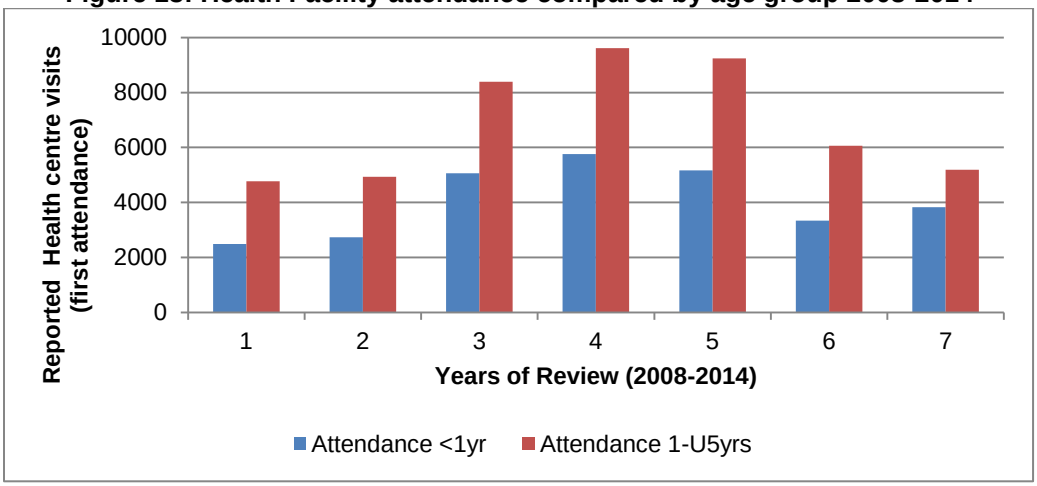


Source: UNHCR/Solwezi DMO HIS, 2015

Attendance was further assesed among the age groups <1year and the 1-U5years age group. The data revealed that 63% of all reported visits to the health facilities occurred in the 1-U5 age group. This data could suggest that the increased visits for the 1-U5 age group averted a number of deaths compared to the <1year age group which

accounted for 75% of recorded mortalities. Figure 13 below shows health centre attendance by age reviewed by year of review from 2008 – 2014.

Figure 13: Health Facility attendance compared by age group 2008-2014



Source: UNHCR/Solwezi DMO HIS, 2015

4.2.2 Age at Death

The descriptive review of data showed that mortality trends among the under-five age group is higher in the <1year group (Infant mortality) than in the reported child mortality. While exact age at death was not known as data was collected it was assessed as being in two age groups. This is discussed in earlier sections of this chapter.

4.2.3 Ethnicity

The study intended to measure if ethinicity influenced mortality. Meheba refugee camp has eight (8) zones and five (5) health centres that cater for for health needs of the entire meheba camp. The HIS data did not provide data on the exact country of origin for the deceased child. The location of health facility and the catchment area of the facility was identified and nationality of refugees resident in an area obtained and was used as a proxy measure for ethnicity. Table 6 below shows reported deaths at health facility and ethnicity of largest group in the in the Zone or close proximity of the zone with health facility. Angolan and Congolese nationals account for the highest number of refugees in Meheba. From the data in the table most (77%) mortalities were linked largely to Angolan nationals.

Table 6: Reported deaths by Ethnicity

Facility Name	Ethnic composition of Population served by facility	Total Deaths
Jagaimo & Meheba B	Congolese (86%)	20
	Angolan (92%) from Zone C	
Meheba A	Angolan (86%)	18
Meheba D	Mixed Angolan (49%), Congolese (9%), Rwandan (10%)	39
	Angolan (100%) from zone E and H	
Meheba F	Congolese (54%)	3
	Rwandan (91%) and Burundian(8%) from Zone G	
Total		**80**

4.3 Test for significance

To determine that the findings discussed earlier in the descriptive analysis are statistically significant ordinary least squares regression analysis was performed. The independent variables where assesed and their individual influence on child mortality measeared using ordinary least square regression analysis.

$$y = a \pm bx_1 + bx_2 + ------$$

Under-five Mortality = Time + Age + Sex + Ethnicity + Attendance

The analysis looked at the influence of time on mortality as well as the role attendance played in averting deaths in children aged less than five (5) years old. The findings of this analyses is outlined in table 8 below.

Table 7:Significance tests of variables

Variable	Category	Findings	P-Value	95% Confidence Interval
Time	2008-2014	80 deaths in entire period	0.716	-1.60 – 2.17
Age	<1year	60 deaths (75%) reported in this age group	Population not disaggregated by exact age while mortalities were dissagregated (<1year and 1-U5years)	
	1-U5years	20 deaths (25%) reported in this age group	Population not disaggregated by exact age while mortalities were dissagregated (<1year and 1-U5years)	
Attendance	Average number of	Average 4 visits per child	0.03*	-5.85 – (-0.72)

	visits to the health facility	(63% of visits occurred in 1-U5age group)		
Ethnicity	Angolan Congolese Rwandan Burudian	77% of deaths among Angolan refugees	Deaths not reported by country of origin but only by refugee status	

*Significant finding

4.3.1 Time

There were no significant variations in death rate noted as a result of time owing to some of the factors identified below:

- Various occurences in the specifc years can account for the changes in the mortality pattern and these will vary from year to year. Inflow or outflow of refugees have increased mortality trends in certain years while reducing deaths in other years. Also the health interventions introduced have also varied from year to year hence in insignificat p value (P>0.05)
- The obervation units of interest taken as part of the sample were very few and as such did not allow for adquate review of trends. Rosenburg (1997) points out that the usage of smaller sample in trend data review results in loss of statistical power due to size of sample (observation units of interest)

4.3.2 Attendance

This varible measured as the frequency of hospital visits in a year when modelled with time and death rate showed that the reduction in mortality obseved in years with higher frequency of visits was statistically significant (P<0.05).

The attandance variable showed that for every additional visit by a child (U5) a resultant 3/1000 children will not die in a given year. ***Years with reduced mortality where associated with increased facility visits.***

4.4 Summary of findings

Chapter four presented the findings for correlates and trend analysis study of under-five mortality in Meheba Refugee Camp. Key findings revealed that a larger proportion of children do no reach their first birthday as compared to those in the 12-59 months age

group. Malaria was the highest cause of mortality and continues to require annual interventions to address the problem. The next chapter presents the diiscussion of the research findings provides conclusions and recommedations.

Chapter 5: Discussion

5.0 Overview

This section discusses the research findings of the underfive mortality study. The first section discuses research findings by reviewing study variables and addresing key challenges arising from the study. The second section reviews and discusses key findings around each objective broadly linking findings to documented literature.

5.1 Discussion of Findings

Literature and annual reports record that 2013 marked the commencement of the local intergration program in Zambian refugee camps which was not completed during the period hence a reduction in the camp populations in 2014. This suggests that the refugee population remained housed within the camps throughout the country. Despite 2013 recording the highest number of deaths the preceding year recorded only 6% (of total deaths reported in the period) of deaths for children in this age group. The lowest mortalities of the region were recorded in 2012 accounting for only five per cent [5% of total deaths reported in the period] of all deaths recorded between 2008 and 2014.

5.1.1 Age and Under-five Mortality

The analysis of mortality data revealed that infant mortality remains high when compared to child mortality in Meheba which is in line with ZDHS 2013-2014 findings with child mortality at 31 per 1000 births and infant mortality reported at 45 per 1000 births. This is attributed to focus on under-five clinic care for children and socio-economic status of household being stable. Infant deaths however are as a result of a number of biological causes and are dependent on maternal health and care throughout pregnancy. Infant mortality is an important measure of the overall health status and wellbeing of the population. Wolfe et al. produced a paper of infant mortality levels in the United Kingdom in 2012. The study revealed that 60% of all reported deaths in children (defined by the study as anyone aged less than 18 years) occurred before the first birthday.

Infant deaths therefore reflected on the quality of midwifery, obstetric and new born care in the United Kingdom (Wolfe et al., 2014). Factors such as low birth weight, pre-term births and neonatal mortality are associated. Although the Meheba study did not look at

maternal health care services in the area, the high infant mortality levels could have resulted from the quality of maternal care in Meheba. Studies of health care in refugee camps have shown that 80% of the refugee population comprises of women and children and more often maternal health infrastructure does not meet the health needs of the population (Bartlett, et al., 2002). Moss et al. identified that the highest mortality rates in refugee camps occurred in children under the age of one and these mortality rates were higher than those of the 1-U5years age category.

Despite the fact that the exact age at death was not obtained a study of pregnancy outcomes among Burundian refugees in Tanzania in 1998 could provide some explanation for the trend observed in Meheba. The study found that neonatal and maternal deaths accounted for 16% of all deaths in the period being reviewed and neonatal mortality rates stood at 29.3 per thousand live births and 22% of all births were low birth weight (Moss, et al., 2006). Another study of Afghan refugees in Pakistan found neonatal mortality accounted for 19% of all deaths and was the single largest "cause" of death (Bartlett, et al., 2002).

Furthermore, Malaria resulted in 37.5% mortalities throughout the study review period. However, 90% of all deaths in 2013 were resultant from malaria. A review of documentation and annual reports from UNHCR revealed that the repatriation and local intergration programes in Meheba were just beginning in 2013. This suggests that the number of refugees present in the camp was higher that 2014 when refugee populations reduced due to the influx of refugees.

5.1.2 Ethnicity

The study revealed that 77% of mortalities reported were among Angolan refugees while refugees of Rwandan origin were had the lowest mortality numbers reported. According to Becher et al. ethnicity and religion show the diversity of mortality risk factors in given population. In a study of child mortality trends in Burkina Faso, it was observed that groups with low infant mortality where groups with highest proportion of Christians (Becher, et al., 2004). The Burkina Faso study found that childhood mortality

risk factors in a given population were likely to be explained by several cultural differences. Owing to the fact that religion and ethnic group were correlated they were not disentangled for the study. Rwanda comprises about 96.5% of Christians which is similar to Angola. Although this study did not explore religion, it parallels the Becher study on the basis that cultural differences are likely to be mortality risk factors.

5.1.3 Health service provision and attendance

Frequency of health facility visits (assessed as attendance in the study) was seen to significantly reduce the proportion of children dying in a year in the Meheba study. A study was conducted in Iran to identify risk factors of mortality among children aged 1-59months. In the Iran study more frequent health care visits was an important protective factor in reducing mortality. The number of total child health care visits was related to under-five year old mortality (Chaman, et al., 2012). In fact, late onset of child care and/or lack of care were significant risk factors for children death (Chaman, et al., 2012). Regular care visits were observed to be important in early diagnosis and treatment of children's acquired or congenital health problems.

In response to the study objectives set out at the onset of the research the findings are highlighted below:

Under-five mortality trends for the period 2008 to 2014

Meheba's under-five population accounted for 13% of the total population of the camp in 2014. Mortality varied from year to year with highest mortality rates reported in 2013 and lowest rates reported in 2012. UNHCR annual reports reveal that ongoing repatriation exercises and some inflows of Congolese refugees in some years can account for changes in population size and composition. It was observed that periods with higher numbers of reported deaths were met with reductions in following years. For example, in 2009 U5MR was higher than was reported in 2008. Further review of data reveals that although there were no outbreaks of communicable diseases, the clinics, health post and laboratory facilities in Meheba were renovated and equipped with solar panels and emergency communication systems as well as supplied with medical

equipment (UNHCR, 2009). After these changes in the health care infrastructure we note a reduction in mortality numbers in 2010.

Programming and health facility distribution in refugee camps

Meheba refugee camp which is in its post emergency phase has a total of five (5) health facilities distributed across eight zones (A-H). Health facilities are located in close proximity of populations which is usually in central part of the zone. The Ministry of Health through Solwezi DMO manages the health facilities with support from UNHCR in the maintenance of facilities and supply of essential drugs. UNHCR also trains health centre staff in various in-service training programmes intended to adequately equip health personnel in cases of disease outbreak. The underlying principle in health care for refugee populations is to rapidly provide basic health care as an early measure.

The objectives are to help reduce excess mortality and morbidity in the refugee population by ensuring appropriate medical care for all refugees and responding to epidemics (Medecin Sans Frontieres, 2000). As with protocol for primary health care, the facilities in Meheba were set up to ensure that they fulfil the following criteria

- Provide curative treatment for the most common communicable killer diseases;
- Reduce suffering from other debilitating diseases;
- Have the capacity to carry out active case finding;
- Be able to cope with the high demand for curative care;
- Provide easy access to different levels of care, including referral services;
- Deal with the majority of illnesses at a basic level of care;
- Contribute to surveillance activities (ensuring routine data collection);
- Combine both curative and preventive services;
- Be flexible enough to adapt to changes in the health situation of the camp (Medecin Sans Frontieres, 2000).

Priority causes of mortality

The study revealed that there were no malaria deaths reported in 2008 and 2009. The 2009 UNHCR global report states that medical staff and community based health

workers were guided in comprehensive malaria prevention by the UNHCR. This measure resulted in a notable reduction in the number of Malaria cases reported from 4000 in 2008 to 1000 in 2009 in all four refugee camps (this included Mwange and Kala camp which have since closed) at the time (UNHCR, 2009). The report further identifies that malaria morbidity and mortality rates dropped to a minimum level due to wider distribution of Mosquitoe nets and awareness campaigns.

The study identified the top four causes of mortality as malaria, respiratory infections, diarrhoea and anaemia. The identified causes of mortality in this study parallel findings by Moss. In 1999, 80% of deaths in Congolese children younger than five (5) years in Lugufu Camp in Tanzania where due to Malaria, Pneumonia and Diarrhoea (Moss, et al., 2006). In defining a model for adoption in planning for health care in refugee populations, Medecin Sans Frontiers recommends that the model selected should be based on knowledge that 50% - 95% of mortality in refugee situations is caused by four communicable diseases: diarrhoeal diseases, acute respiratory infections, measles and malaria.

These “killer diseases” are easily diagnosed and cured and early diagnosis through accessible health facilities is vital to successful health care services (Medecin Sans Frontieres, 2000). The major causes of childhood morbidity and mortalities in complex emergencies have not changed in the past decade (Moss, et al., 2006). A study conducted on mortality among under-five Congolese refugee children housed in Tanzania revealed that 80% of all deaths in Lugufu camp Tanzania were due to malaria, diarrhoea and pneumonia.

UNHCR efforts to address malaria prevalence and reduce deaths resultant from malaria infection in 2008-2009 showed zero malaria deaths as a result of indoor spraying, ITN distribution and training of health centre staff in malaria prevention and control. Indoor residual spraying with Malathion in refugee camps in eastern Sudan 1997 was associated with reduced mortality from, but not incidence of, clinical malaria (Moss, et al., 2006).

In the Albert Schweitzer hospital service area of rural Haiti, the leading causes of death among under-five children between 1995 and 1999 were Acute Lower Respiratory Infection (ALRI) and diarrhoea (Perry et al., 2005). This study further identified that deaths were concentrated in the first few months of life as obtained in the Meheba study. The Sphere hand book provides for the minimum standards in Health action for complex emergency situations.

Control measures are centred on halting transmission of the agent causing the outbreak. In general, response activities include controlling the source and preventing exposure (by ensuring improved water source to prevent diarrhoeal diseases), interrupting transmission and/or preventing infection through mass immunization and use of ITNs to prevent malaria (Sphere project, 2011).

Adaptable strategies in under-five health care

On the basis of the findings of this study identified a model for cost effective child mortality reduction was developed for adoption in rural Zambia. This model is discussed as part of the recommendations of the study in Chapter 6 of this dissertation. It is intended that the adopted model once implemented in rural areas which are plagued with similar health concerns but lack the foreign investment assistance evident in refugee camps can contribute to the reduction of mortality to minimum levels.

Chapter 6: Conclusion and Recommendations

6.2 Conclusion of the Study

The study revealed that preventable diseases for which low cost treatment is available continue to result in underfive mortality in Mehaba refugee camp. These disesase included Malaria, Pnuemonia, Diarrhoea and other respiratory infections. Findings from this study also explored invertventions by the UNHCR and the MoH in reducing under-five deaths and revealed that years with higher mortality levels were met with responses around malaria control and notable increases in facility attandance by residents. Increase facility attendance was noted to reduce mortality levels to upto 3/1000 children in the camp. The study also found that infant mortalility rates were higher than child mortality patterns which speaks into the quality of maternal health that was not explored in this study. Displaced populations hosted in the Zambia also face similar trends in mortality patterns and more infant deaths occur compared to child mortality. Although in its post emergency phase Meheba refugee camp data revealed that mortality can be significantly reduced or controlled at minimal levels if efforts are sustained towards prevention of “killer” diseases as has been observed in the review of data in the Meheba Refugee Camp study.

6.2 Recommendations

Increased health facility visitations was associated with reduction in mortality and therefore, local initiatives to sensitize the community should be encouraged. In view of these findings, the study recommends strategies focused on increasing facility attendance for children in the under-five age group and more so in the neonatal category. As regards higher infant mortality rates compared to child mortality patterns the need to recognise that the solution of the problem requires both the community and the health system to ensure that expectant mothers receive the necessary care during preganancy and delivery as well as the recognition of the community role in supporting child health and wellbeing.

Although, it seems that complex and multiple factors may be involved in mortality of under 5-year-old children, combined efforts propsed would be necessary to address mortality. Various types of interventions can be considered to prevent a majority of

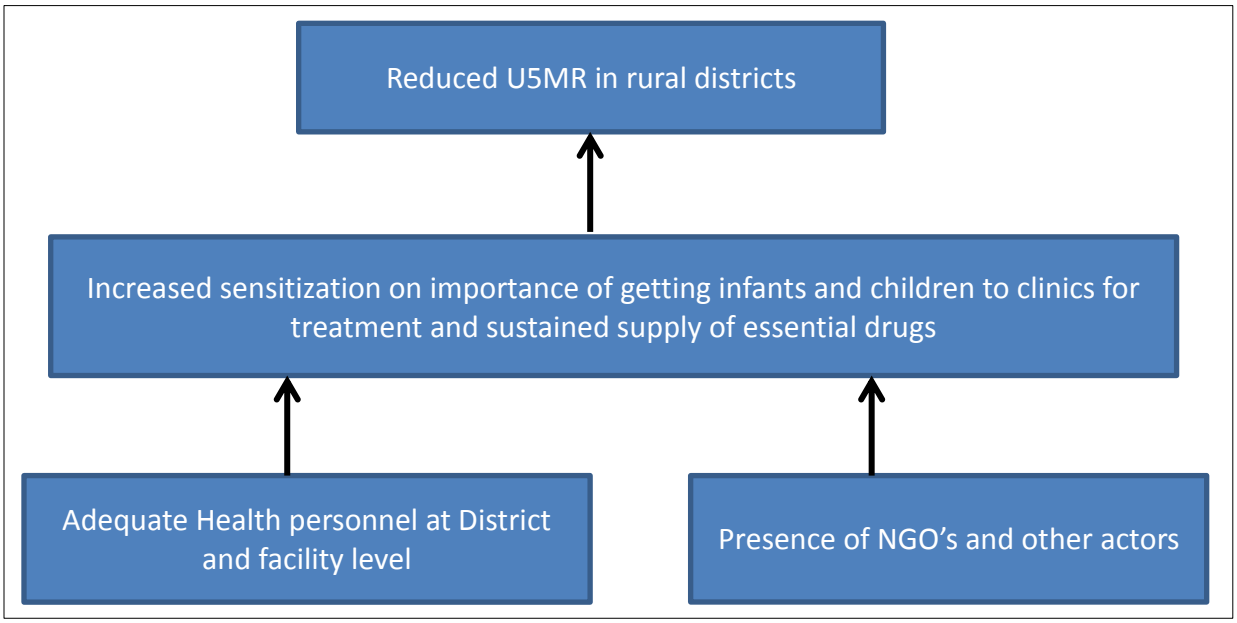
deaths in the age group of interest. The importance of health care visits needs to be encouraged to expectant mothers and more so in rural health centres. This study has shown that for every single visit to the health centre, mortality reduces by three per thousand population.

Other correlating factors discussed by numerous studies such as the socio-economic status of household, education level of mother, age at first birth and birth order are key in addressing mortality, they require political will and more investment to improve the living standards of the people. As governments and international aid organisations continue to pool resources for investment in socio-economic development to create employment for masses, proven low cost measures can be adopted such as increased sensitization on benefits of health facility visits.

The model recommended by the study is therefore as highlighted in Figure 14 below. This model recognises the need for adequate health personnel at facility level as well and coordination among district actors in health care. This suggests a more supervisory role for government at district level bringing together various organistaions acting in the health sector at District level.

The government's role will be to ensure sustained drug availability at health centres while NGOs and other coorperating partners can work together towards sensitizing communities on health care access especially for children under the age of five. The combination of these methods are hoped to reduce mortality among rural populations and support measures already being implemmented in the country's health system.

Figure 14: Proposed model for implemmentation in Refugee Camps and RHC



6.2.1The Meaning of this Study

It seems that complex and multiple factors may be involved in mortality of under 5-year-old children, so combined efforts would be necessary to improve child health indicators (Chaman, et al., 2012). Various types of intervention can be considered to prevent a majority of deaths in the age group of interest. The Meheba refugee study of underfive mortality trends shows that if let unattended and without signinifaicant reforms to reduce the reported numbers of mortality the number of children who die will continue to show slow progress in meeting global development goals.

6.3 Study limitations

Despite the study responding to all the study objectives and the research question it should be noted that the use of trend study design and secondary data had some limitations. Additionally the use of secondary data sources inhibited further exploration of other variables already identified in the text. The study is however intended to start discussion on the subject of low cost measures to child mortality reduction among refugee populations and inturn rural areas. Limitations arising during course of study include the following:

- Unavailablity of data on correlating factors like distance to health facility, education status of mother and health worker/patient ratio where not available for review as the databases used did not have any socio-economic data. Additionally, Mortality data was not disaggregated by sex to facilitate the exploration of differential trends based on sex of deceased children.
- UNHCR exports all HIS data to their Geneva based server and does not retain records at the Zambia country office. Data for 2003-2007 could not be retrieved from Geneva to allow for review of data for intial review period. The study period was reduced by three years and affected trend data analysis.
- Delay in gaining access to data owing to three way approval process required to access refugee data (UNHCR, Solwezi DMO, Ministry of Home Affairs).

6.4 Areas of Future Research

Since the study was conducted using secondary data, the researcher recommends that future studies into refugee health care or rural health for children aged five (5) years and below should use primary data sources to include variables not measured in this study. Qualitatiive methods should also be employed to explore cultural differences in child care to examine if differences in mortality can be explained by varying ethic beliefs in the population. The researcher also recommends a comparative study in rural mortalies and health care between refugee populations and their host populations.

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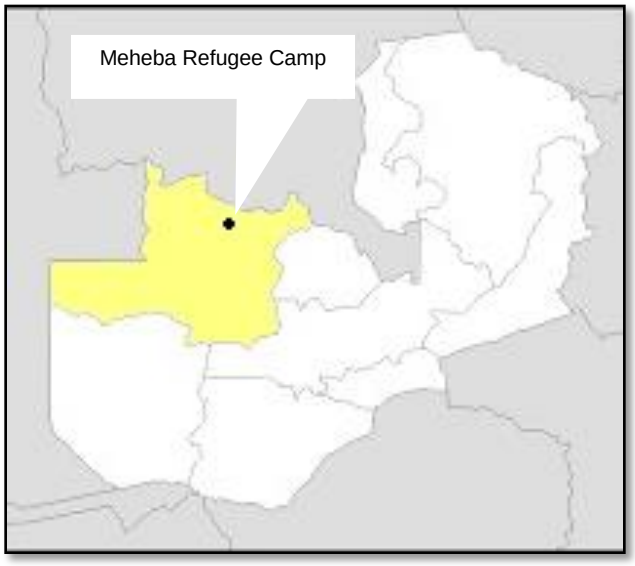
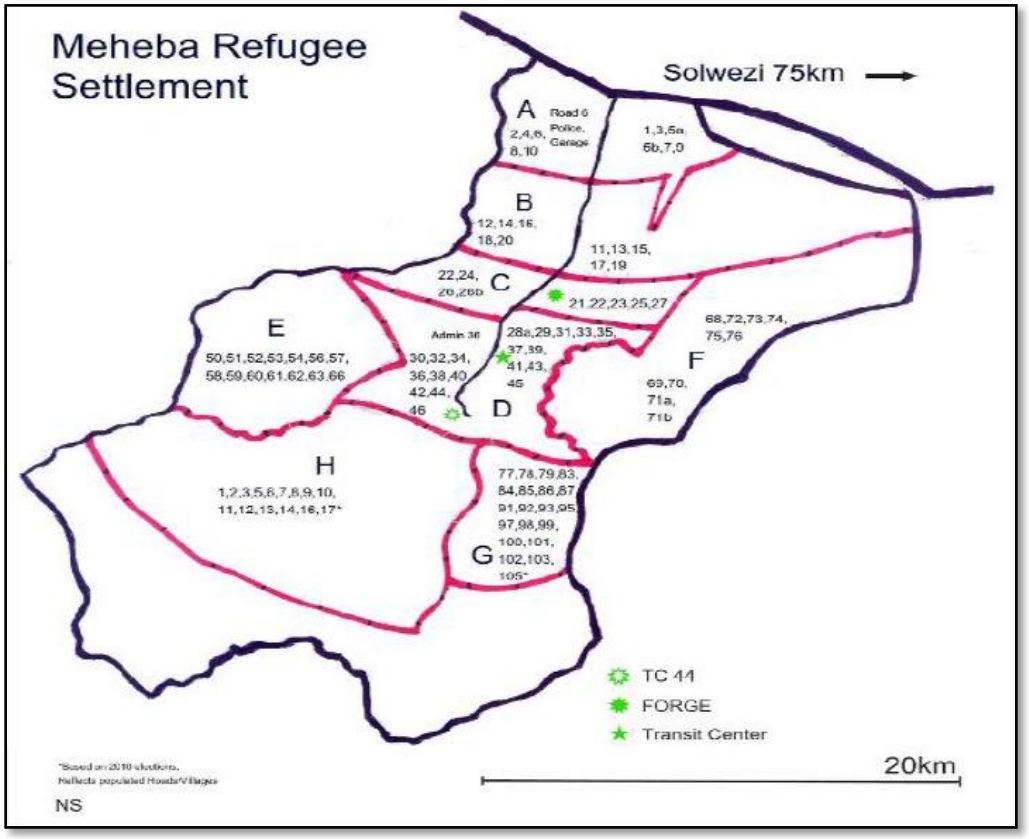
Appendices

Location of Meheba Refugee Camp



Map showing Maheba Refugee Camp Set up



Record Review Checklist for Underfive deaths in Meheba Refugee camp Western province

Checklist Number ……

Research Objectives	**Variables**
To describe Mortality trends for the period 2003 to 2013	Sex 1. Male 2. Female
	Age at death ☐☐
	Location of death 1. Health Facility 2. Home
	Place of residence 1. Camp 2. Outside Camp
	Ethnicity 1. Congo 2. Angola 3. Rwanda 4. Burundi 5. Other
To profile priority causes of Mortality	Cause of Death 1. …… 2. …… 3. …… 4. …… 5. …… 6. ……

Facilty services data extraction tool

Name of Facility:

Number of Doctors:

Number of Nurses:

Other Staff:

OPD Services Offered

1. ……
2. ……
3. ……
4. ……
5. ……
6. ……
7. ……
8. ……

Does facility offer under-five clinic?

What are some common illnesses reported for neonates, innfants and Children aged between 0-5years.

Besides UNHCR, who are some of the partners this facility is working with and what services do they provide

Name of Partner	**Services provided/Assistance Rendered**

Summary of extracted Figures

Variable	Males	Females	Number <1year	Number 1-U5years
Population				
2008	1581	1661	-	-
2009	1443	1540	-	-
2010	1730	1842	-	-
2011	1647	1731	-	-
2012	1213	1226	-	-
2013	1386	1402	-	-
2014	1143	1055	-	-
Deaths Reported				
2008	-	-	7	1
2009	-	-	17	2
2010	-	-	5	2
2011	-	-	10	2
2012	-	-	2	1
2013	-	-	18	5
2014	-	-	1	3
Death Rate/1000pop			All	
2008	-	-	3.4	
2009	-	-	6.0	
2010	-	-	1.9	
2011	-	-	3.5	
2012	-	-	1.6	
2013	-	-	11.8	
2014	-	-	2.3	
Facility Attendance				
2008	-	-	2487	4768
2009	-	-	2734	4931
2010	-	-	5062	8390
2011	-	-	5761	9609
2012	-	-	5169	9234
2013	-	-	3340	6067
2014	-	-	3825	5169
Cause of Death			All	
Malaria			30	
Pneumonia			21	
Other repiratory			14	
infections			8	
Diarrhoea			4	
Aneamia			3	
Other				

Budget

The study budget is as outlined below:

#	Details of Activity	Cost per Unit(ZMK)	Quantity	Total (ZMK)
1	**Submission of Protocol to ERES for Approval**			
	Protocol submission	1000	1	1000
2	**Data Collection**			
	Local travel in Lusaka	100	4	400
	Printing of Material for MoH and UNHCR including letters and other correspondence	0.5	100	50
	Travel to Solwezi and Meheba (Includes local travel within Solwezi and to and from Meheba)	300	10	3000
	Accommodation (Solwezi)	250	10	2500
3	**Data Entry and Cleaning**			
	Recruitment and payment of two (2) Data Entry Staff at 150/day	300	4	1200
4	**Data Analysis and Interpretation**			
	Analysis of data	0	0	0
5	**Data Dissemination**			
	Poster Presentation	200	1	200
	Printing of Six (6) bound Copies of dissertation	200	6	1200
	Printing of Health Facility Briefs	25	15	375
	Total			**9925**

Project timeline

Correlates and Trend analysis study of Under-five Mortality among displaced populations:
A case of Meheba refugee camp

	December 2013-April 2015															
Activity Details	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**
1. Preparing the proposal																
Submit draft of proposal with methodology																
Present proposal																
Submit proposal																
2. Data collection and submission for marking																
Submit to ERES Converge																
Make Corrections																
Re-submit to ERES with corrections																
Commence data collection																
Data analysis and findings																
Poster presentation																
Submit for marking																
3. Manuscript and dissemination																
Submit Manuscript and disseminate findings																

UNHCR HIS Tools

Health Information System

Organisation: _____

3.0 Morbidity

Location: _____

Out-Patient Department Tally Sheet

XXXXX XXXXX_EN_ddmmyy

Note

Remove tally sheets from pad when finished and attach to corresponding weekly report.

Health Information System

Location _____ Name of Staff Member _____

Health Centre _____ Date (s) ___/___/_____ to ___/___/_____

This tally sheet records: **Refugee / National data** (select appropriate)

NEW VISITS

Male	Female
00000 00000 00000 00000	00000 00000 00000 00000

RE-VISITS

Male	Female
00000 00000 00000 00000	00000 00000 00000 00000

DIAGNOSIS Record New Visits ONLY	< 5 Male	< 5 Female	≥ 5 Male	≥ 5 Female
1. * Malaria (suspected)	00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000	00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000	00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000	00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000
2. * Malaria (confirmed)	00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000	00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000	00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000	00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000 00000
3. URTI	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000
4. LRTI	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000
5. Skin disease	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000
6. Eye disease	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000
7. Dental conditions	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000
8. Intestinal Worms	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000
9. * Watery diarrhoea	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000
10. * Bloody diarrhoea	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000
11. Tuberculosis	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000
12. * AFP / Polio	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000
13. * Measles	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000
14. * Meningitis	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000
15. HIV/AIDS	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000
16. ** STI (non HIV/AIDS)	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000
17. Acute malnutrition	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000
18. Anaemia	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000
19. Chronic disease	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000
20. Mental illness	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000
21. *** Injuries	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000
22.	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000
23.	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000
24.	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000
25.	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000
26.	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000	00000 00000 00000 00000
27. Other	00000 00000 00000 00000 00000 00000 00000 00000	00000 00000 00000 00000 00000 00000 00000 00000	00000 00000 00000 00000 00000 00000 00000 00000	00000 00000 00000 00000 00000 00000 00000 00000

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3.0 Morbidity

Also record STI case information in table below:

	SYNDROMIC DIAGNOSIS	< 18 Male	< 18 Female	≥ 18 Male	≥ 18 Female	Contacts Treated
Sexually Transmitted Infection (STI)	Urethral Discharge Syndrome (UDS)	00000 00000 00000		00000 00000 00000		00000 00000
	Vaginal Discharge Syndrome (VDS)		00000 00000 00000		00000 00000 00000	00000 00000
	Gential Ulcer Disease (GUS)	00000 00000 00000	00000 00000 00000	00000 00000 00000	00000 00000 00000	00000 00000
	Pelvic Inflammatory Disease (PID)		00000 00000 00000		00000 00000 00000	00000 00000
	Opthalmia Neonatorum	00000 00000 00000	00000 00000 00000			
	Congential Syphilis	00000 00000 00000	00000 00000 00000			
	Others	00000 00000 00000	00000 00000 00000	00000 00000 00000	00000 00000 00000	00000 00000

Weekly Alert Thresholds for each Health Facility:

Malaria	1.5 times the baseline†
Watery Diarrhoea	1.5 times the baseline†
Suspected Cholera	1 case
Bloody Diarrhoea	5 cases
Acute Flaccid Paralysis / Polio	1 case
Measles	1 case
Meningitis	5 cases or 1.5 times the baseline†

† Baseline = average weekly number of cases of the disease calculated over the past 3 weeks

If weekly thresholds are exceeded:

1. Report to clinic supervisor

2. Complete Outbreak Alert Form

** Disease with outbreak potential. If weekly alert threshold is exceeded report immediately to supervisor . ** Also record syndromic diagnosis; < 18 / ≥ 18 age group; and treatment of contacts in the STI table above.*
**** Includes SGBV; complete incident report form for all cases*

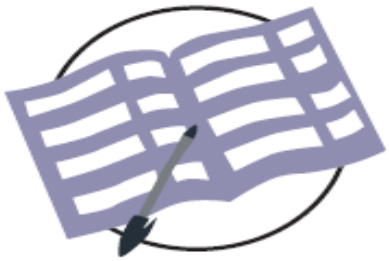
Health Information System

Organisation: _____

2.0 Mortality

Location: _____

Mortality Register



		DEATH REGISTRATION						
Serial No.	Ration Card No.	Name	Age†	Sex (M / F)	Status (Ref / Nat)	Address	Date of death	Location Home / Hospital / Other (*specify*)

† for children under five, ensure that age in years and ***months*** is entered accurately

Mortality Register

CLASSIFICATION OF DEATH			CASE FOLLOW-UP			
Direct cause of death*	Underlying cause(s) of death**	Reported cause of death***	Case Investigation requested? (Y / N)	Outbreak Alert Issued? (Y / N)	Death Notification Issued? (Y / N)	If YES, enter reference number

* a single reason should be given as the direct cause of death

** the direct cause of death may be "due to" or "as a consequence of" a sequence of (normally one or two) underlying conditions

*** a single cause of death should be selected from the "direct" or "underlying" column for reporting purposes (see guidelines)