ADDRESSING UNMET NEED FOR NEONATAL SURVIVAL IN TANZANIA

A SYNTHESIS REPORT

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ABBREVIATIONS

AIDS	-	Auto Immune Deficiency Syndrome
AMTSL	-	Active Management of Third Stage of Laour
ANC	-	Ante Natal Clinic
BCG	-	Bacillus Calmette–Guérin
BEmOC	-	Basic Emergency Obstetric Care
CEmOC	-	Comprehensive Emergency Obstetric Care
DPT	-	Diptheria, Pertusis Tetanus
EmOC	-	Emergency Obstetric Care
ENAP	-	Every Newborn Action Plan
EWEC	-	Every Woman, Every Child
FANC	-	Focused Antenatal Care
FP	-	Family Planning
FPU	-	Family Planning Unit
GA	-	Gestation Age
HBB	-	Helping Babies Breathe
HIV	-	Human Immune Deficiency Virus
IHI	-	Ifakara Health Institute
IMCI	-	Integrated Management of Childhood Illnesses
ITNs	-	*Insecticide* Treated *Nets*
IUGR	-	Intra Uterine Growth Retardation
LBW	-	Low Birth Weight
LLIN	-	Long Lasting Impregnated Nets
MNC	-	Maternal Neonatal Care
MNCH	-	Maternal Newborn and Child Health
MOHSW	-	Ministry of Health and Social Welfare
MTR	-	Mid Term Review

NBS	-	National Bureau of Statistics
RCH	-	Reproductive and Child Health
RCT	-	Randonized Control Trials
RMNCH	-	Reproductive Material Newborn and Child Health
SARA	-	Service Availability and Readiness Assessment
SMI	-	Safe Motherhood Initiative
SP	-	Sulphadoxine-pyrimethamine
STD	-	Sexually Transmitted Diseases
TB	-	Tuberculosis
TBA	-	Traditional Birth Attendant
UNFPA	-	United Nation Population Fund
UNICEF	-	United Nations Children's Fund (UNICEF
URT	-	United Republic of Tanzania
WHO	-	World Health Organization

EXECUTIVE SUMMARY

This systhesis report was commissioned to review literature on strategies, guidelines and interventions focusing on neonatal survival, take stock of what has been done in Tanzania to improve neonatal survival and to establsh existing gaps in uptake of existing interventions. Eventually the report is meant to provide policy, programmatic and research recommendation for improving neonatal survival.

Using literature search performed by topics related to the search terms and the conceptual framework, the report draws attention to the main causes of neonatal mortality which are asphyxia, preterm, infections, low birth weight (LBW) and hypothermia as well as elaborate their predisposing factors. Generally maternal infections such as syphylis, tuberculosis, malaria, HIV and sepsis are common risks for newborn infections, preterm and LBW. Also there are various non infection predisposing factors such as maternal under-nutrition, hypertentions, young and advance maternal age, multiparity, and premature and prolonged labour which are also risk factors for prematurity and LBW.

There are various strategies and interventions conducted worldwide to address predisposing and causes of neonatal mortality including tested strategies. The interventions conducted to addresss each cause of neonatal death are described in the continuum of care with focus on quality of care, accessibility, health systems using effective services provision interventions in both the community and health facilities. The report also highlights interventions in Tanzania to address the main causes of neonatal survival as conducted in ANC services, during child birth and in postnatal care.

There are various gaps that commonly make interventions a problem, mostly, in the area of availability of supplies, equipment, human resources, funding and drugs. Also there is a problem of accessibility to maternal and neonatal sevices especially during child birth and in the postnatal period. Finally there are gaps in the quality of care whereby there is poor effective coverage of services targeting neonatal survival.

The last section highlights secommendations to address the challenges in neonatal health. Recommendations are presented in three main areas. First programmatic recommendations are outlined. Then policy recommendations are elaborated and finally research recommendations are described.

Programmatic recommendations are described under two main areas. First there are recommendations that fall under direct/indirect causes and risks that are particularly prevalent in Tanzania with high risk and whose intervention have high impact. Secondly there recommendations that addresss interventions that have particularly low existing coverage, availability or poor quality of practice in the continuum of care in Tanzania.

In addressing policy recommendations,It is noted in the report that there are already existing policies that target maternal and neonatal health in various documents in Tanzania. As such the section has not come out with exactly new policies. Instead the recommendation is to highlight and re-emphasize existing policies with an additional stress on their implementation. As such dedicated commitment of the Ministry of Health and Social Welfare and other relevant authorities is called for to support the implementation of policies related to neonatal health. This effort is indicated in the broad area of availability of needed resources,

accessibility of services, quality of services; as well as in specific areas of continuum of care, data and integration of services targeting neonatal health in the country. Finally research recommendations are presented under causes and predisposing factors, intervention strategies, health work force, vaccines and treatment subtopics.

INTRODUCTION

BACKGROUND AND RATIONALE

Although Tanzania is seen to have achieved MDG goals in child health, the progress towards reducing neonatal mortality is unpromising. For more than seven years scientists including Ifakara Health Institute (IHI) with partners has been conducting implementation research to contribute to address this issues but it proved less successful, despite an increase in facility deliveries in project areas. The available evidence shows that most neonates die within 24 hrs of birth. As such there is a need of going back to the drawing board to establish where the challenges are. A consultant was hired with the aim of conducting a synthesis of the existing neonatal interventions to establish what interventions exist in addressing neonatal health and their impacts, explore what has been implemented in Tanzania. in order to establish gaps for policy and programmatic considerations. The study will provide an opportunity for programmatic and policy reflections regarding the ongoing efforts to improve neonatal survival in Tanzania as well as choices of intervention for addressing neonatal health issues to be considered in forthcoming implementation programs. Specific objectives of the synthesis are to:

1. Conduct literature review to establish available global strategies, guidelines and interventions focusing on neonatal survival.
2. Take stock of what has been done in Tanzania to improve neonatal survival.
3. Establish existing gaps in uptake of existing interventions.
4. Make policy and programmatic and reseach recommendation

PRESENTATION OUTLINE

After the introduction, this synthesis is presented using seven main sections. First there is a methodology section which describes how literature review was conducted and a description on the conceptual framework which directed the work. This is followed the section on the burden of neonatal mortality, direct causes and their predisposing factors in order to understand the roots of the problem. Then a section on strategies and guidelines available in in addressing neonatal health is presented. This is followed by a section on existing interventions their impacts and implementation arrangements; and then a section on what has been done in Tanzania to improve neonatal survival. Then a section on existing gaps in uptake of existing interventions follows; and finally there is a section on policy, programmatic and research recommendations.

METHODOLOGY

LITERATURE SEARCH

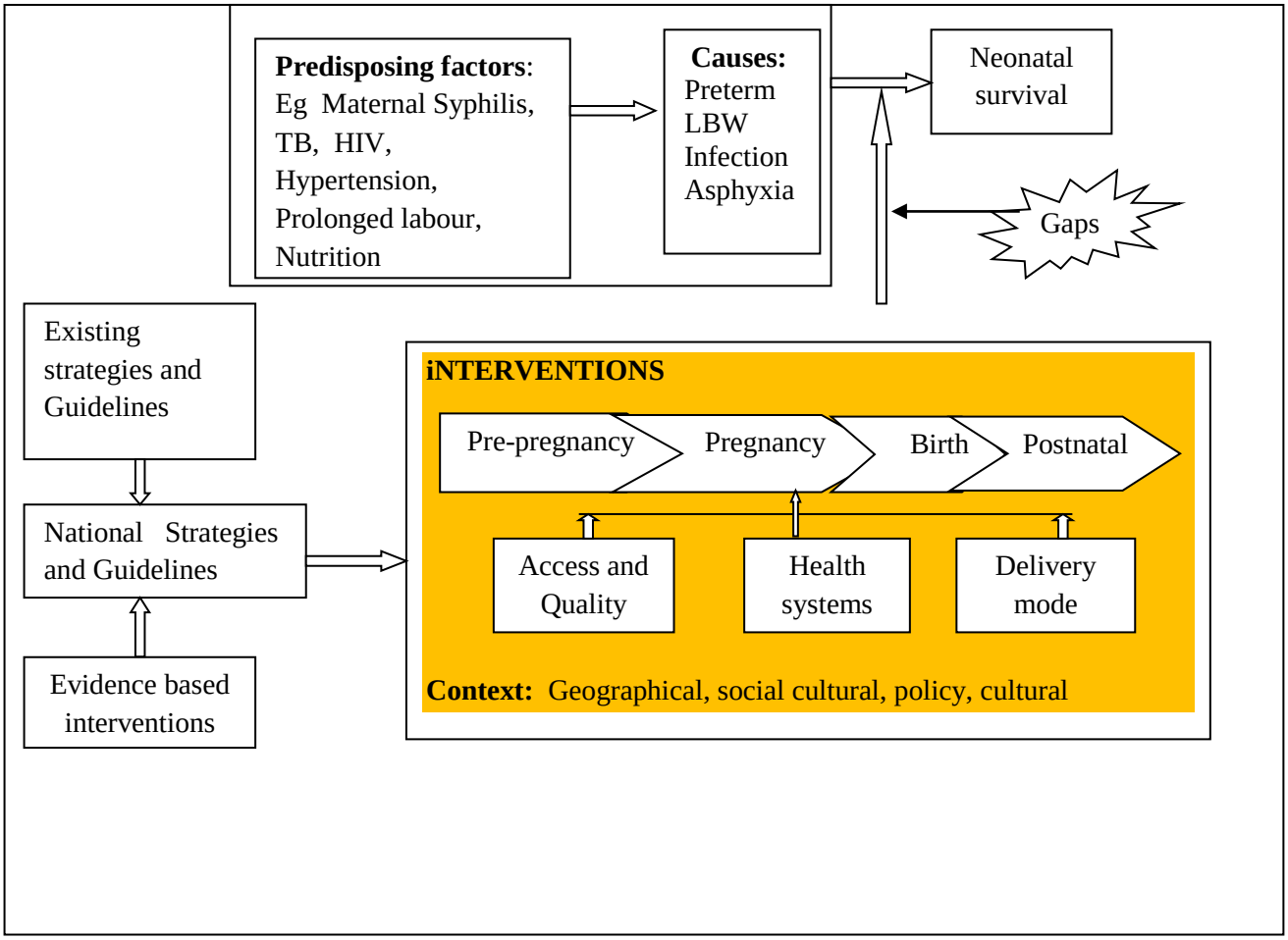
A literature search was performed using topics related to the search terms. Inclusion criteria were English written articles on original work conducted in developing countries generally and specific in Tanzania. The search was restricted to publications between 2005 and 2015 to ensure that the retrieved articles reflected the current situation and most recent responses. The search was performed on Pub Med, Google scholar, Healthy Newborn Network and Grey papers. Full articles were retrieved from HINARI, and we also undertook targeted grey literature search focusing on large institutions including World Health Organization (WHO), documents and reports from Ifakara Health Institute Digital Health Library and from the government of Tanzania.

The terms were combined by Boolean operators "AND" to narrow the search. The search strategy included the following strings: neonatal mortality AND developing countries AND interventions AND causes AND factors. The search resulted in 2097 (neonatal mortality AND developing countries) AND interventions (365); AND causes (125) AND factors (71). Twenty six (26) review papers were included. Titles which were found to be relevant to our subject area and their abstracts were retrieved and screened to determine if they matched our inclusion criteria.

THE CONCEPTUAL FRAMEWORK

A conceptual Framework (Figure 1) was developed and applied for this work. The framework consists of three main sections. The first section is composed of predisposing factors and immediate causes of neonatal survival. Predisposing factors are numerous including maternal infections such as tuberculosis, syphilis, pregnancy induced hypertension etc. These various predisposing factors singly or in combination influence the occurrence of immediate causes which are: asphyxia, preterm babies, infections, low birth weight, and hypothermia. The second part of the conception framework is comprised of the interventions to mitigate both the predisposing factors and causes of neonatal deaths. The intervention component is composed of the continuum of care which is influenced by quality and coverage of care, health systems inputs and the mode of service delivery. The third part of the conceptual frame work comprises of national strategies and guidelines which are inputs into the interventions. The national strategies are also influenced by international strategies and findings from evidence based research findings. Gaps can be identified when interventions do not adequately address the predisposing factors and causes of neonatal deaths.

Figure 1: The Conceptual framework



NEONATAL MORTALITY, DIRECT CAUSES AND PREDISPOSING FACTORS

This section presents a description of neonatal mortality globally and locally. In order to understand the roots of the problem, direct causes of neonatal deaths and their predisposing factors are also elaborated.

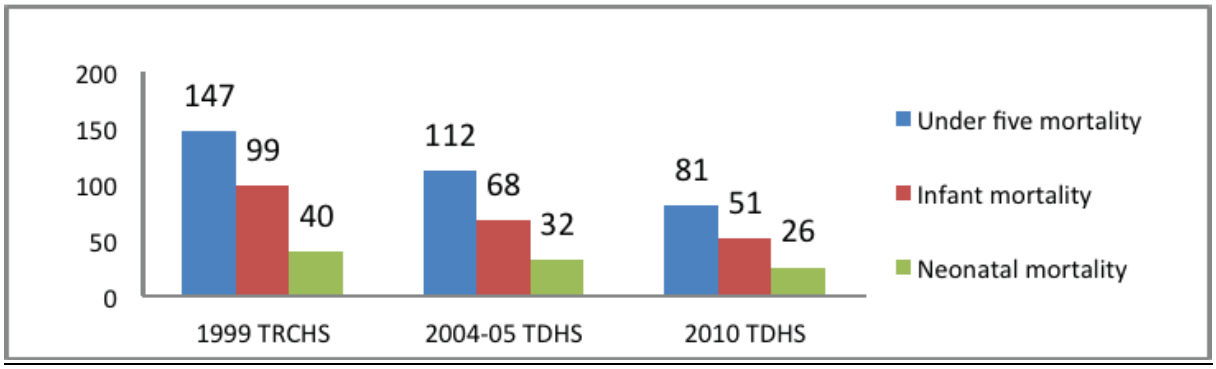
NEONATAL MORTALITY

Globally over the period 2000 –2010, decreases in mortality have been more rapid in the age group 1–59 months but the neonatal fraction of deaths has increased moderately from 38.2% to 40.3% (Liu L et al, 2012). Deaths occurring in the neonatal period (aged 0 to 27 days) account for 41% (3.575 million) of all deaths in children younger than five years (Black 2010; Lawn JE et al 2005). As such neonatal mortality has decreased at much lower rates compared to all childhood mortality (Wang H, et al 2014). This pattern of slower decline in neonatal mortality relative to older age groups has been observed globally (Hill K et al, 2012; Lozano R, 2011).

The situation in Developing countries is even worse; with the distribution of neonatal deaths which varies substantially between and within countries ((Black R.E. et al. 2010). With about 3 million neonatal deaths each year worldwide, the majority occur in South Asia and sub-Saharan Africa (UNICEF 2012;). Sub-Saharan Africa accounts for 38% of global neonatal deaths and records the highest neonatal mortality rate in the world of about 34 deaths per 1,000 live births in 2011 (UNICEF: 2012). As such progress towards achievement of MDG 4 & 5 has remained slower than desired in countries of sub-Saharan Africa (Hogan MC, et al 2010).

Although the 2010 Tanzania Demographic and Health Survey (TDHS) had shown a slight decrease in neonatal mortality (NBS Tanzania, 2011) the trend of decrease in neonatal deaths in Tanzania is unsatisfactory (See Fig 2). Recent data indicate that in Tanzania, there are 39,500 neonatal deaths annually with NMR of 21 per 1,000 live births (MOHSW, 2014c).

Figure 2: The Trend of child mortality Rate in Tanzania



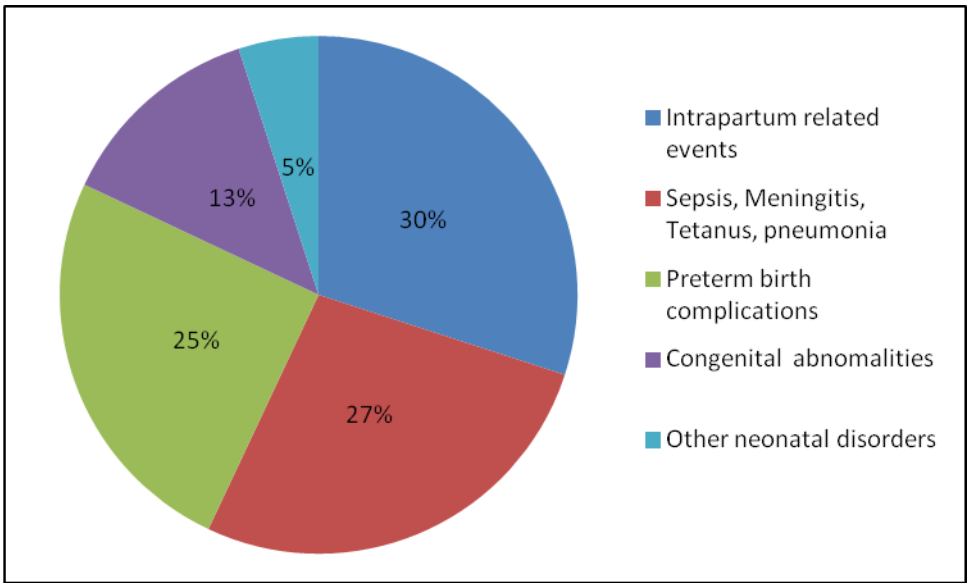
Source : Sharperned One plan 2014

Progress in reducing preventable newborn deaths has been slow compared to U5MR and IMR. In the One Plan, the target was to reduce neonatal mortality rate (NMR) to 19 per 1000 live births by 2015 (MOHSW, 2008). However the goal was not attained as NMR had declined from 32 per 1000 live births in 2004/05 to 26 per 1000 live births in 2010 and 21 neonatal deaths per 1,000 live births in 2013 (TDHS, 2004/05 & 2010; Afnan-Holmes, et al., 2015). In this regard substantial progress in neonatal mortality requires well-targeted interventions addressing the major causes and their predisposing factors which are described next.

CAUSES AND PREDESPOSING FACTORS OF NEONATAL MORTALITY

In sub-Saharan Africa the main causes of neonatal mortality are due to complications of preterm birth (25%), infections (23%) and asphyxia (20%) (Liu et al. 2012). In Tanzania complications from preterm births (25%), birth asphyxia (31%) and infections –sepsis, pneumonia and meningitis (25%) are the three main causes of neonatal deaths (Afnan-Holmes, et al., 2015). This pattern of causes is similar to the causes of neonatal mortality shown in Fig. 3.

Figure 3: Estimated causes of death in Tanzania Data for neonates are from 2012



Source *Data from WHO and Child Health Epidemiology Research Group 2013.35 estimation)*

The causes of death differ at different points in time of neonate life. During the early neonatal period (0-7 days), the major causes of death are asphyxia, infection, complications of prematurity, and birth defects; while infections cause most late neonatal deaths (8-28 days) (Lawn et al., 2001). In order to save more newborns, investment should target on improving care of premature babies, improve intrapartum care/asphyxia and newborn sepsis (Afnan-Holmes, et al., (2015). Next the main causes of death in neonates and their predisposing factors are described.

Asphyxia

Babies born in the world's least developed countries have a very high risk of 'birth asphyxia' (Lawn J, 2005). These neonates require some form of resuscitation immediately after birth but globally approximately 1 million die (Saugstad et al. 1998). The incidence of perinatal asphyxia is thought to be higher in developing than developed countries because of the higher prevalence of risk factors for the disorder such as prolonged labour, as well as the lack of appropriate interventions (Deorari et al., 2000). Data on perinatal asphyxia are largely hospital-based and therefore may either underestimate or overestimate the true magnitude of the problem, as seen in many studies (Ellis et al., 2000).

Conditions that increase the risk of asphyxia include drugs (e.g., magnesium sulfate, narcotics), given to the mother, that may depress respiration (Chandra et al., 1997). Other conditions that increase the risk of asphyxia include antepartum hemorrhage, prolonged labor and/or prolonged rupture of membranes, cord accidents, vaginal breech deliveries, multiple gestation, pregnancy-induced hypertension, congenital anomalies, and Intrauterine Growth Retardation (IUGR) with placental dysfunction (Daga et al., 1990; Chaturvedi and Shah, 1991; Boo and Lye, 1991).

Prematurity

Preterm are births that occur before 37 weeks' gestational age (UNICEF 2004). Preterm birth, is the leading cause of perinatal mortality globally (Goldenberg RL, 2008). Also premature birth is one of the leading causes of neonatal deaths in Africa (Pattinson RC. 2004) responsible for 27% of all neonatal deaths (Lawn JE, et at 2006). In Tanzania preterm is the second leading cause of neonatal death. Preterm infants are at greater risk of respiratory, gastrointestinal and neurological diseases (R D'Cruz; et al 2012). Preterm birth rates continue to rise, increasing by as much as 30% during the last 25 years, despite advances in medical care (Berkowitz GS, 1998). As many as three-quarters of deaths occur in the first week of life, and up to 90% of all babies who die are born low birth weight (LBW <2500 grams) either because of prematurity or intrauterine growth retardation (Lawn JE et al 2005). Also being born preterm increases a baby's risk of dying due to other causes, especially from neonatal infections (Lawn JE, 2005).

There are various predisposing factors for preterm births. Some maternal infections such as urinary tract infections, malaria, bacterial vaginosis, HIV and syphilis are associated with increased risk of preterm birth (Schieve L et al 1994; Gravett MG et al 2010). In particular, untreated syphilis during pregnancy increases the risk of preterm birth and late fetal death (Lumbiganon et al., 2002). Ascending intrauterine infection and inflammation with secondary premature cervical shortening (Lee SE et al 2008) are also associated with infection. Cord blood parasitemia which reflects a recent active malaria infection, has been associated with premature birth (Sullivan AD 1999).

There are also various non infection predisposing factors for preterm babies. Maternal high blood pressure (Van Lierde M, et al 1985), smoking and excessive alcohol (Felberbaum RE, 2007) and obesity (Parker A et al 2010) are associsted to preterm birth. Other predispong factors are grand-multiparity, history of preterm delivery or curetting for abortion (Cisse CAT,1998), multiple pregnancies (Blondel B Et al 2006,), presence of malformations (Honein MA et al 2009), maternal history of preterm birth (Plunkett J et al 2008), young or advanced maternal age, and low maternal body mass index (Goldenberg RL et al 2010). The presence of malformations significantly influenced preterm births in the United States (Honein MA et al 2009). Also the low number of ANC was shown to increase the risk of having a preterm infant (Nzingoula S, et al 1992).

There are factors that increase the complications of preterm birth, and death. These factors include neonates of low birth weight, respiratory distress syndrome due to surfactant deficiency (Mlay and Manji, 2000) and neonatal hypothermia which is reported to increase risks of death due to prematurity (Dragovich et al., 1997; Manzar, 1999).

Infections

More than 20 percent of children born in developing countries acquire an infection during the neonatal period, leading to an estimated 30 to 40 percent of all neonatal deaths (Stoll, 1997; Stoll, 2000). Most of these deaths are caused by acute respiratory infections, bacterial sepsis, meningitis, neonatal tetanus, and diarrhea. In many countries, bacterial sepsis accounts for a substantial burden of disease and has a 40% case fatality rate (Stoll, 2000). Several community-based studies suggest that diarrhea is responsible for approximately 3 percent of all neonatal deaths (Stoll, 2000). However, several studies from developing countries report rotavirus infections in newborns (Parashar et al., 1998b; Espinoza et al., 1997). A hospital

prospective study of congenital syphilis in a Papua New Guinea hospital found that the infection was responsible for 22 percent of all neonatal deaths (Frank and Duke, 2000). Untreated syphilis during pregnancy increases the risk of late fetal death, low birth weight, preterm birth, and severe neonatal disease (Lumbiganon et al., 2002). The risk of death due to ARI is highest in young neonates and decreases with age (Garenne et al., 1992).

There are several predisposing factors for infections - a common cause of neonatal motality. In low-resource settings, household unhygienic practices are important determinants of causes for neonatal mortality (Darmstadt GL, 2005). Early onset neonatal sepsis (48-72 hours) usually results from organisms acquired from the maternal genital tract during birth and often associated with maternal complications (Stoll et al., 2002). Late onset neonatal sepsis (7-28 days) is more likely to be caused by organisms acquired from the environment (Stoll et al., 2002) due to poor antenatal and obstetric care carried out within the community in the absence of a trained attendant at delivery (Ensor 2004).

Cultural practices which are prevalent such as the application of ghee and other unclean substances to the cord after birth increase risks (Traverso et al., 1991; Hill Z., et al 2009) of sepsis and neonatal tetanus as a major cause of neonatal death, particularly among infants delivered at home and without skilled assistance (Gurkan et al., 1999). Also preterm or prolonged rupture of the membranes, maternal fever during labor, and chorioamnionitis are risk factors for early onset neonatal sepsis and pneumonia. Similarly the risk of pneumonia increases in infants who are of low birth weight and/or malnourished, and in those who are not breastfed (Victora et al., 1999). The most common route of mother-to-child TB transmission is during postnatal period from an untreated infected mother to her newborn. As a result infected newborns are at high risk for severe disseminated TB and death (Starke, 1997; Jana et al., 1994).

Also maternal infections, including sexually transmitted diseases (STDs) such as HIV and syphilis, can be transmitted to the fetus or newborn in utero, through contact during labor and delivery, and in some cases, through breastfeeding. Also the risk of infection increases with the number of vaginal examinations performed during labor (Seaward et al., 1997). In the absence of specific interventions, the rates of transmission of HIV from infected mothers to their offsprings have been estimated to be approximately between 15% and 35% (Newell et al., 1996).

Risk factors for neonatal tetanus occur in the antenatal, perinatal, and neonatal periods due to failure to immunize the mother against tetanus; unhygienic delivery and cutting of the umbilical cord at birth; and unsterile handling of the cord in the early days of life (Traverso et al., 1991). Also neonatal hypothermia has been reported to increase the risk of infection and death (Dragovich et al. 1997; Manzar, 1999 Shamba, D, et al 2014).

Low Birth Weight

A birthweight of less than 2500g is classified as low birthweight (LBW), regardless of gestational age (Kramer 1987). LBW infants have a significantly greater mortality than other babies. Worldwide each year there are more than 20 million LBW infants born and they account for over 15% of all births. Over 95% of these births occur in developing countries (Unicef 2004). LBW babies account for the majority of neonatal deaths and this may be because of preterm birth or term babies whose growth has been restricted or a combination.

There are various predisposing factors for LBW. Poor maternal nutrition status is a risk factor for intrauterine growth restriction and eventually low birth weight (Black et al 2013). It is estimated that the risks of neonatal mortality and low birthweight are increased by almost 50% if maternal age at childbirth is less than 20 years (Kumar V.P. et al., 2011). Also short time between a birth and the subsequent birth, have been linked to adverse child outcomes (Grisaru-Granovsky S, 2009). A study conducted in Mexico City found that an inadequate number of antenatal visits was associated with 63% higher risk of intrauterine growth retardation (Coria-Soto IL 1996). There are various infections which are a risk for LBW. Malaria in the antenatal period was associated with intrauterine growth retardation (Steketee RW et al 1996). Untreated syphilis during pregnancy increases the risk of low birth weight (Lumbiganon et al. 2002) and TB in pregnant women, has been shown to increase the risk of low birth weight (Starke, 1997; Jana et al., 1994). Co-infection during pregnancy with HIV and malaria act synergistically with serious consequences for increasing the LBW rate (Kulle F.O. et al 2004)

Hypothermia

Hypothermia has been defined by WHO as body temperature below the normal range (36.5°C – 37.5°C) and has been sub-classified into three grades: mild (36.0°C – 36 .5°C), moderate (32.0°C – 35.9°C), and severe (<32.0°C) hypothermia (WHO, 1997). The extent to which newborn babies can control thermoregulation to maintain an optimal core body temperature is limited, relative to children and adults. The situation is worse with preterm babies.These babies have limited vasoconstriction capability (Knobel R.B., et al. 2009), greater surface-to-mass ratios, and preterm and/or low birth weight babies have lower brown fat deposits (Aherne W. et al. 1966) which are essential for non-shivering thermogenesis.

Hypothermia occurs due to transfer of heat from baby to contact surface, to surrounding air and through indirect transfer of heat to nearby lower temperature objects (Polin R. A. et al 2004; WHO 1997). Neonatal hypothermia as a factor contributing to mortality risk of newborns has been recognized by the World Health Organization (WHO, 1997). Indirect causes of neonatal deaths such as low birth weight and hypothermia are also important as is the link between maternal health and neonatal outcomes (Bhutta Z.A. et al., 2005).

There are various predisposing factors for hypothermia. Mortality associated with hypothermia is substantially higher among preterm babies, (Mullany LC, 2010) and low birth weight (Kumar V. 2009). Kumar et al (2009) and WHO (1997) provide a detailed discussion of possible risk practices common in home and facility births to include bathing in an insufficiently warmed room, placing the baby uncovered on the ground, floor, or other surface while awaiting delivery of the placenta, insufficient or delayed drying or wrapping of the baby after birth, immediate bathing of the baby with cool or cold water and delayed drying, and delayed breastfeeding as practices that might increase the risk of heat loss. Similar findings were found in other studies (Adejuyigbe E.A. et al., 2015) with cultural reasons such as a strong belief that the baby is seen as dirty after delivery, particularly if the vernix was visible and a fundamental belief that skin-to-skin care could harm the babies' bones or cord (Shamba, D. et al., 2014). Also a recent survey in an Indian hospital revealed weak knowledge of hypothermia diagnosis and care (Choudhary et al., 2000). Finally there is a display of the predisposing factors and main causes of neonatal deaths in Table 1.

Table 1: Predisposing Factors and Causes of Neonatal Deaths

IMMEDIATE CAUSES OF NEONATAL DEATHS	PREDISPOSING FACTORS	
	Infections	**Non infection factors**
Asphyxia		• Antepartum hemorrhage • Prolonged labor and/or prolonged rupture of membranes, • Cord accidents, • Vaginalbreech deliveries, • Multiplegestation, • Pregnancy-induced hypertension, • Congenital anomalies, • IUGR with placental dysfunction
Preterm	• Malaria • TB, • HIV • Syphilis • Urinary tract infections Bacterial vaginosis, • Ascending intrauterine infection	• Maternal high blood pressure • Smoking and excessive alcohol obesity low maternal body mass index • Grand-multiparity, • Young or advanced maternal age • Multiple pregnancies • Low number of ANC • Low birth weight, Respiratory distress syndrome, Hypothermia
Infection	• TB • HIV • Syphilis	• Maternal fever during labor, • Chorioamnionitis

	• Household unhygienic practices • Maternal genital tract infections • Poor antenatal and obstetric care • Cultural practices • Preterm or prolonged rupture of the membranes, • Not breastfed • Number of vaginal examinations • Tetanus • Bacterial infections	• Low birth weight • Neonatal hypothermia
Low Birth Weight	• Malaria • HIV • Tuberculosis • Syphilis	• Intrauterine growth retardation • Preterm birth • Poor maternal nutrition • Maternal age below 20 years • Short time between a births • Number of antenatal visits
Hypothermia		• Preterm babies, • Low birth weight • Risk practices of heat loss. • Weak knowledge of hypothermia diagnosis and care

LITERATURE ON EXISTING INTERVENTIONS ADDRESSING NEONATAL SURVIVAL

There is considerable literature on interventions addressing neonatal survival, In this section selected interventions are described by causes of neonatal deaths. In addition there is a description of intervention on accessibility, quality of care, health system, community system and on health care delivery. This overview provides a wide understanding of available interventions that can be used in the local situation.

INTERVENTIONS ADDRESSING ASPHYXIA

Preliminary studies indicate that a simple mouth-to-mask (tube and mask) device is as effective as a bag and mask in the resuscitation of asphyxiated newborns (Massawe et al., 1996). Furthermore, a recent multinational trial demonstrated that neonates can be resuscitated with room air as efficiently as with oxygen (Saugstad et al., 1998). This is particularly important for home deliveries where supplemental oxygen is not available (Saugstad et al., 1998). Neonatal resuscitation assists a baby to breathe after birth and can reduce deaths due to intrapartum-related causes by 30%.

Evidence-based educational programmes like Helping Babies Breathe are available to teach resuscitation techniques in resource-limited areas. Within one minute of birth, a baby should be breathing well or should be ventilated with a bag and mask. WHO trained birth attendants, with the goal of having at least one person who is skilled in resuscitation at the birth of every baby (Changing the Trajectory, 2013). Also the Global Network's FIRST BREATH TRIAL, in which all birth attendants, including TBAs, were taught the World Health Organization's essential newborn care skills with emphasis on neonatal resuscitation, suggested a reduction of perinatal mortality associated with this training (Carlo W.A. et al., 2010).

In order to reduce the attendant risk to the fetus and newborn of intrapartum or postpartum asphyxia or birth injuries, external cephalic version may be attempted after 37 weeks' gestation (Villar and Bergsjo, 1997). Also corticosteroids have been found to reduce respiratory distress syndrome, reduce intraventricular hemorrhage, and improve the survival of preterm infants when administered to women in preterm labor.

INTERVENTIONS ADDRESSING PREMATURITY

Since young or advanced maternal age is a risk for premature babies, fertility control contributes to improved newborn survival. Families are more likely to decide when to get children by using contraception (Darmstadt GL et, al. 2014; Jamison DT et al 2013). Improvement of reproductive health in the long term needs the engagement with young people (Santhya KG et al 2010). In many developing countries, social marketing has made contraceptives more available, but these schemes have tended to be vertically implemented, instead of linked to the broader health system.(Cleland J., et al. 2006). Also formal and health education of girls leads them in later years to seek preventive services, increase food intake during pregnancy, reduce tobacco and alcohol use, understand the implications of danger signs during labor and delivery, and seek referral care for obstetric and/or newborn complications (World Bank, 1993; Ahmed et al., 2001).

Villar J, et al (1998) identified that the treatment of asymptomatic bacteriuria during pregnancy reduces the incidence of preterm birth. Evidence from several randomized controlled trials indicates that antibiotic treatment of urinary tract infection and/or

asymptomatic bacteriuria reduces the risk of neonate prematurity (Smaill, 2003). There are also simple, inexpensive and sensitive tests for syphilis (Moodley and Sturm, 2000). Serologic screening of pregnant women for syphilis has been shown cost-effective even in areas where disease prevalence is low (Carroli et al., 2001a). WHO recommends that until syphilis screening and treatment in pregnancy have been fully and effectively implemented, all infants born to sero reactive mothers should be treated for syphilis infection (WHO, 2001).

A randomized, controlled trial in the Mwanza region of Tanzania concluded that STD treatment significantly reduced the incidence of HIV infection (Grosskurth et al., 1995) and was highly cost-effective (Gilson et al., 1997). Also a community-based, randomized trial of STD control in the Rakai district of Uganda demonstrated that reduction of STDs reduced the rate of low birth weight and early neonatal mortality (Gray et al., 2001). Evidence from several randomized trials indicates that similar maternal and neonatal outcomes could be obtained from antenatal care in as few as five visits (on average) by focusing on interventions known to be effective in reducing morbidity and mortality (Villar et al., 2001; Carroli et al., 2001b*).*

Also Kangaroo Mother Care is life saving for premature babies (Lawn JE et al. 2010). In some developing countries, administration of corticosteroids to women in preterm labor has been recommended as a low-cost, low-technology intervention likely to reduce neonatal morbidity and mortality (Bhutta et al., 1999). The ‘‘Born-too-soon initiative’’ endorses the collection of high quality data on the incidence and causes of preterm births, and the development of effective strategies to reduce the number of preterm births (WHO 2012).

INTERVENTIONS ADDRESSING INFECTIONS

Vaccination is a powerful deterrant to infections. A meta-analysis of BCG studies involving newborns and infants concluded that the vaccine was effective for up to 10 years after infant vaccination, and that it reduced the risk of infection, on average, by more than 50 percent (Colditz et al.1995). Studies in Bangladesh and Papua New Guinea showed that maternal immunization with pneumococcal polysaccharide vaccines produced an increase in type-specific serum IgG antibody level in both mother and newborn (Lehmann et al., 2002). Combination vaccines would be especially useful for populations with limited access to health services (Monto and Lehman, 1998). Also immunization of pregnant women with tetanus toxoid, which has dramatically reduced cases of neonatal tetanus, is an important, low-cost antenatal intervention (Gupta and Keyl, 1998); Tetanus toxoid is relatively heat-stable, the prefilled devices could be stored for up to one month without refrigeration (Quiroga et al., 1998). A study in Bangladesh showed that tetanus toxoid immunization has greatest effects in poorer households (Jamil et al., 1999). Also antenatal immunization against rubella provides a low-cost, effective protection from congenital rubella syndrome. Similarly maternal vaccines have been developed to protect neonates and infants against *Streptococcus pneumoniae, Haemophilus influenzae* type B, and Group B streptococcal infections.

Diagnosis and treatment is another strategy for controlling infections. Screening for and treatment of asymtomatic bacteriuria during pregancy are recommended in order to reduce risk to the neonate to be born premature (Smaill, 2003). Also there is a rapid, inexpensive serological tests for and treatment of maternal syphilis. WHO recommends that until syphilis screening and treatment in pregnancy have been fully and effectively implemented, all infants born to seroreactive mothers be treated for syphilis infection (World Health Organization, 2001)

Treatment of tuberculosis during pregnancy is essential (Pillay et al., 2001) and the specific drugs should be provided depending on safety and efficacy in pregnancy (Starke, 1997), as well as local patterns of drug sensitivity (Davidson, 1995). In developed countries broad-spectrum antibiotics are used for women suspected to have chorioamnionitis to reduce neonatal infection (Gibbs et al., 1988), mothers with preterm rupture of membranes to reduce neonatal illness (Mercer et al., 1998) and intrapartum penicillin to prevent mother to neonate transmission of group B streptococcal infection (Schuchat, 1998). Some of these interventions may be adaptable to community-level use in developing countries. Screening for and treatment of asymtomatic bacteriuria during pregancy are recommended in order to prevent maternal pyelonephritis, as well as reduce risk to the neonate deaths (Smaill, 2003).

The application of antimicrobial or antiseptic agents to the cord after birth reduces bacterial colonization of the cord and is a routine practice in many industrialized countries. In developing countries, where bacterial contamination of the cord is a higher risk, local antimicrobial agents might reduce infection. Skilled health workers are best suited to provide outreach and community services but where this is not feasible auxiliary health workers or community health workers can provide these services (Changing the Trajectory, 2013).

Many studies have documented a reduction in infectious diseases, including sepsis, diarrhea, and pneumonia (Glezen, 1991), and in infection-related mortality (Betrán et al., 2001;) among infants who are breastfed. A recent study in Ghana has also shown an association between breastfeeding within an hour of birth and neonatal survival (Edmond et al., 2006). Early and exclusive breastfeeding is one of the most important interventions to reduce neonatal sepsis and overall mortality.(Zea-Vera A. et al., 2015). Breastfeeding is particularly important where safe, affordable alternatives to breast milk are not available, hygiene is poor, and water is unsafe (Gupta and Khanna, 1999).

INTERVENTIONS ADDRESSING LOW BIRTH WEIGHT

Young maternal age and short periods between subsequent pregnancies is related to LBW. As such family planning is an important strategy to address LBW- an important cause of neonatal deaths. In this regard to improve reproductive health is essential (Santhya KG et al 2010). However even when reproductive health interventions are delivered, whether through a static facility or outreach visits, poor quality of services can hinder their use (Knippenberg R et al 2005). Most women who present at family-planning clinics have already decided which contraceptive method to use; failure to obtain that method can deter adoption and sustained use (Cleland J., et al. 2006). In many developing countries, social marketing has made contraceptives more available, but these schemes have tended to be vertically implemented, instead of linked to the broader health system (Cleland J., et al., 2006).

Malaria is a risk for LBW. WHO recommends the following package of interventions for the prevention and treatment of malaria during pregnancy:

1. use of long-lasting insecticidal nets (LLINs);
2. in areas of stable malaria transmission of sub-Saharan Africa, intermittent preventive treatment in pregnancy (IPTp) with sulfadoxine-pyrimethamine (SP) and
3. prompt diagnosis and effective treatment of malaria infections.[1]

[1] (http://www.who.int/malaria/areas/high_risk_groups/pregnancy/en/)

Also evidence from several randomized controlled trials indicates that antibiotic treatment of urinary tract infection and/or asymptomatic bacteriuria reduces the risk of low birth weight, but the mode of prevention is unclear (Villar J, et al 1998; Smaill, 2003).

A trial in rural Gambia demonstrated that nutritional supplementation during pregnancy in mothers at risk resulted in a mean increase in birth weight of 136 g (Ceesay SM, et al 1997). In particular this small increase in mean birth weight reduced the prevalence of LBW infants from 17 to 11.1%. This study also reported a substantial reduction in the prevalence of early neonatal mortality (Ceesay SM, et al., 1997). Studies of multivitamin supplementation during pregnancy have shown a positive effect. A study of over 8,000 pregnant women in Tanzania showed a significant reduction in the incidence of LBW infants from 9.4 to 7.8% (Fawzi W.W. et al., 2007)) while a study of over 30,000 pregnant women in Indonesia showed a significant reduction in early infant mortality and a trend towards reduction in the incidence of LBW infants (Lancet 2008).

Kangaroo Mother Care for low birth weight is a lifesaving interventions (Lawn JE et al. 2010). Also NCPAP with surfactant should be provided to babies from 750 grams in order to bring LBW survival rate up to that in other developing countries (Trotman H et al 2006). Home-based neonatal care produced a 64 percent reduction in case fatality for low birth weight among neonates in rural India (Bang et al., 1999). Evidence from several randomized trials indicates that similar maternal and neonatal outcomes could be obtained from antenatal care in as few as five visits (on average) by focusing on interventions known to be effective in reducing morbidity and mortality (Villar et al., 2001; Carroli et al., 2001b). Finally, one needs to recognise that a small increase in mean birth weight within disadvantaged communities can have a significant impact on both neonatal and infant mortality.(Lopez N B et al. 2009)

INTERVENTIONS ADDRESSING HYPOTHERMIA

Several studies have shown that skin-to-skin contact (Kangaroo care), proposed in 1978 by Rey and Martinez (Simkiss,1999) are effective for maintaining body temperature (Ludington-Hoe et al., 1999;). Also early initiation of breastfeeding (i.e. within 24 hours) can reduce the risk of hypothermia and exclusive breastfeeding was associated with lower hypothermia among babies in a Zambian hospital(Christensson K, et al. 1995). Early breastfeeding reduces hypothermia risk through close contact with the mother and provides the fat supply essential for active heat production in newborns (Huffman SL et al 2001). This mechanism may be partially responsible for the observed lower mortality among newborns breastfed within 24 hours (Mullany LC.,et al 2008).

A specific recommendation to delay bathing for at least six hours after birth is shown from a randomized trial in a Ugandan hospital where bathing of newborns increased hypothermia even in the presence of skin-to-skin contact and the use of warm water (Bergstrom A et 2005). The transfer of heat from mother to the newborn facilitated by direct skin contact has been demonstrated to be at least as effective as incubator care for rewarming (Christensson K et al. 1998) and for preventing hypothermia in preterm low birth weight babies(Ibe OE,et 2004). A number of summaries of skin to skin care and its benefits for reducing hypothermia risk have been published (Darmstadt GL et al. 2006) including a meta analysis indicating improved survival among preterm babies <2000 grams in hospitals (Lawn JE et al 2010).

ACCESSIBILITY OF CARE AND CARE SEEKING BEHAVIOUR

A Maternity Waiting Home (MWH) is a facility within easy reach of a hospital or health centre which provides emergency obstetric care (EmOC). Women stay in the MWH at the end of their pregnancy and await labour. Once labour starts, women move to the health facility so they can be assisted by a skilled birth attendant (WHO 1991; WHO 2004). In Zimbabwe, a cluster survey (including 235 respondents) examined the use of maternal care services in MWH and found that nearly all (97%) women attended antenatal care during their last pregnancy at least once, and 66% gave birth in hospital. The use of a MWH increased the likelihood of hospital delivery nearly six-fold. (Van den Heuvel 1999). Some studies reported improved outcomes for women, infants, or both (Chandramohan 1994; Kelly 2010). Others have also reported that distance to care is a determinant of neonatal mortality—although not in all settings (Lohela T et al 2012; Okwaraji YB. et al. 2012).

Efforts are needed to raise family and community awareness regarding danger signs in the neonate and the importance of obtaining care from trained personnel, the availability of services, and the potential impact of medical assistance on neonatal mortality (Ahmed et al., 2001). Campaigns to increase public awareness and strategies targeting hard to reach, poor and marginalised groups will helps to increase utilisation rates (Dickson KE et al. 2014).

Recent studies document that behaviour change communications during ANC can work to promote care-seeking and demand for skilled intrapartum and postnatal care, particularly in developing countries (Darmstadt GL et al 2005). Also at community level, rising demand for facility-based maternal and newborn services can lead to increases in the percentage of women accessing skilled care at childbirth (WHO. 2009). Low income countries that have achieved major reductions in maternal and neonatal mortality have also reached high coverage of skilled attendance during childbirth. (Rohde J, et al 2008) and by bringing care close to families (Padmanathan I, et al. 2003).

Reducing demand side barriers to health service by addressing context-specific delays can improve outcomes in populations where the majority of deliveries take place at home or in primary facilities (Ensor T et al 2004). Also a rights-based approach is necessary to focus attention on tailoring services to the needs of the poor and empowering mothers and communities to adopt good health practices and demand quality care (UNICEF, 2004).

INTERVENTIONS ADDRESSING QUALITY OF CARE

As the majority of neonatal deaths occur during childbirth and the early postnatal period there are limited alternatives to the provision of high quality professional care at facilities especially in low and middle income countries (Ronsmans C, et al 2006). The goal is skilled attendance at birth by an appropriately trained and supported health worker, with access to basic and comprehensive emergency obstetric care (Koblinsky M, et al 2006). Efforts to improve quality of care have focused on inservice training, obstetric simulations/drills or perinatal death audits to improve quality and institute solutions for problems that caused fatalities (Pattinson R et al 2009).

Facility-based delivery has been identified as an effective intervention for the prevention of neonatal mortality, but it is also a complex intervention that requires a functioning health system capable of providing 24-hour functioning facilities with trained staff, as well as being a component of emergency neonatal care and comprehensive emergency obstetric care (Darmstadt GL, et al., 2005; Penny S. et al., 2000). Best practices based on current international standards should be available to all women presenting with obstetrical

emergencies (Hofmeyr GJ, et al., 2009) to improve newborn survival (Hofmeyr GJ, et al 2005).

INTERVENTIONS ADDRESSING HEALTH SYSTEMS

Health systems has various components including, health financing human resources for health and governance. User fees a key impediment to service uptake and their removal is a pro- poor action (Lim SS et al 2009). Many countries in Asia and Africa have pursued user fee removal or fee exemption for care during labour and childbirth including for caesarean section (Witter S 2010) and found a rise in assisted deliveries at health facilities (Meessen B, 2009) and, in some cases, found that gains are greater in poorer groups (Witter S, et al 201)

Nurses, midwives and even patient attendants can support mothers to initiate Kangaroo Mother Care, which can be continued at home after discharge and supported by community health workers and family members (Changing the Trajectory, 2013). If MNC access is difficult some case management of sick children and newborn babies can be delegated to other healthworkers (Haines A, et al 2007). To address the shortage in human resources, countries need specific human resource plans to increase the numbers and autonomy of midwives (UNFPA 2011) as well as to include nurses with specific neonatal care skills, and to ensure that all health workers are competent and confident in newborn care.

Many countries are now rapidly scaling up production of midwives (Hoope-Bender P et al 2014) as evidence exists to show that midwife-led continuity of care models help to normalise childbirth, and lead to better neonatal outcomes (Sandall J. et al., 2013)). Also low and middle-income countries such as Burkina Faso, Cambodia, Indonesia, and Morocco have demonstrated reduction of maternal and newborn mortality through deployment of midwives (Van Lerberghe W. et al., 2014). Between 2004 and 2009, Malawi, implemented an emergency human resources plan, achieving 30% more midwives and reducing urban–rural inequities (Zimba E et al 2012). Non-physician clinicians have also been utilised in many African countries to provide EmOC services including caesarean sections (Pereira C et al 2011)

Programs to bring about sustained change in MNH outcomes should reinforce national commitment (Filippi V et al 2006). Also countries that have prioritized MNH at a national level, e.g. Rwanda and Nepal, have made major strides despite substantial challenges (Logie DE, et al., 2008; Tsai TC, 2009). The main barrier to increased coverage of integrated packages for health of mothers, neonates, and children in most countries is inadequate operational management, especially at the district level (Knippenberg R et al 2005).

COMMUNITY SYSTEMS INTERVENTIONS

Community health system involves people, structure or processes in the community. Traditional birth attendants (TBAs) remain a major provider of delivery care, especially in settings where mortality rates are highest (Sibley LM et al 2006;Sibley LM, et al 2012; UNICEF; 2009). Similarly trained community workers are considered by many to be pivotal to newborn care in the community, as they can act as catalysts for community actions and also be providers of care (WHO 2009). Research has demonstrated that a postnatal care home visit from a trained provider within two days of delivery can result in 30% to 60% reduction in neonatal mortality (WHO 2013 b).

The MaiMwana trial in Malawi, using a factorial design of women's groups and health education by peer counsellors, reported improvements in maternal and newborn health

(Lewycka, S., et al., 2013)). Projects in Nepal (Manandhar DS et al 2004) and Bolivia (O'Rourke KH-GL et al 1998) have demonstrated that substantial improvements in neonatal survival can also be achieved through encouraging community organisation and participation in women's groups and peer counseling (Haider et al., 2000; Sikorski and Renfrew, 2001).

A meta analysis and previous trials from Africa and Asia suggested a 12% reduction in newborn mortality through home visits in sub-Saharan Africa and South Asia (Kirkwood, B.R et al 2013). Also trials of home-based newborn care have shown significant reductions in neonatal mortality (Bhutta ZA, et al 2008) . Developing countries have recently invested in behavior change and community mobilisation interventions to reduce maternal and neonatal risks following the concept of "Birth Preparedness and Complication Readiness" (BPCR), which comprises elements of antenatal, intrapartum, postpartum care and neonatal care (JHPIEGO 2004).

CARE DELIVERY APPROACHES

Modes of health care delivery are facility based (clinical care), outreach or family-community based. Outreach and family-community care could work together to link communities with health facilities, and lay a foundation for improved care seeking and demand for clinical care, which are essential for the effect of clinical care services to be fully realised (Fullerton J et al 2003). In general, clinical care services are more costly to implement than outreach or family-community services and also more challenging in terms of human resource management. However, given greater effect compared with outreach or family-community care packages, clinical care interventions are also very cost- effective, particularly when compared with many other maternal and child health programmes (Lancet 2005). The postnatal care has substantial effect, greater than that of antenatal care and similar to that of intrapartum care but at lower estimated cost, is noteworthy (Lancet 2005).

EXISTING STRATEGIES AND GUIDELINES

There are various strategies and guidelines that provide direction and contribute to developing national strategies and guidelines for interventions. This section provides international strategies guidelines in addressing neonatal survival.

EVERY WOMAN EVERY CHILD (EWEC*)*

The UN Secretary-General launched the Global Strategy for Women's and Children's Health called *Every Woman Every Child* to accelerate progress on MDGs 4 and 5 (Ban. K 2010). This Global Strategy for Women's and Children's Health was developed with the support and facilitation of the Partnership for Maternal, Newborn and Child Health (PMNCH). The global strategy sets out the key areas where action is urgently required to enhance financing, strengthen policy and improve service delivery.

EVERY NEWBORN ACTION PLAN (ENAP)

The Every Newborn Action Plan (WHO, 2014) takes forward the UN Secretary-General's *Global Strategy for Women's and Children's Health*, a roadmap developed in 2010 to improve women's and children's health and accelerate progress towards the Millennium Development Goals (MDGs) for health. ENAP focuses specific attention on maternal and newborn health and identifies actions for improving their survival, health and development. ENAP was formally endorsed at the 67th World Health Assembly in May 2014 and launched at the Partners' Forum in Johannesburg, South Africa in June 2014.. ENAP has set five strategic objectives: to strengthen care around time of birth (Bhutta ZA, et al 2014*);*

strengthen health systems *(*Sheikh K, 2011*);* reach every woman and newborn; harness the power of parents, families, and communities (WHO 2012WHO 2014 ;WHO,2015) and to improve data for decision making and accountability(Oza S, et al 2015 ; WHO 2011).

THE CONTINUUM OF CARE FOR MOTHERS, NEWBORNS AND CHILDREN

The continuum of care is a core organizing principle/ strategy for health systems, which emphasizes the delivery of health care packages across time and through service delivery levels. An effective continuum of care addresses the health needs of the adolescent or woman before, during and after her pregnancy, as well as the care of the newborn and child throughout the life cycle, wherever care is provided (Kerber et al., 2007).

BORN TOO SOON (WHO 2012)

Prematurity is the world's single biggest cause of newborn death, and the second leading cause of all child deaths, after pneumonia. Many of the preterm babies who survive face a lifetime of disability. These facts should be a call to action. Fortunately, solutions exist. Born Too Soon, produced by a global team of leading international organizations, academic institutions and United Nations agencies, highlights scientifically proven solutions to save preterm lives, provides care for preterm babies and reduces the high rates of death and disability. The strategies consitst of pre conception, pregnancy and delivery and premature baby care interventions.

SAFE MOTHERHOOD INITIATIVE

There is, no single technology, drug, or procedure that can effectively address the range of medical problems that cause the majority of neonatal deaths. Similarly these problems are almost impossible to predict and difficult to prevent. As such women must have access to good quality health services with special focus on Emergency obstetric care (EmOC) (UNFPA 2001a and UNFPA 2001b).

SKILLED CARE DURING CHILDBIRTH

Skilled care (or attendance) refers to the process by which a pregnant woman and her baby are provided with adequate care during pregnancy, labor, birth, and the postpartum and immediate newborn periods (MacDonald and Starrs 2002).

HELPING BABIES BREATHE (HBB)

HBB was initiated by a public-private partnership which seeks to support countries in expanding high quality resuscitation services as part of a broader package of essential newborn care, including early and exclusive breastfeeding, thermal protection,clean cord care, and early identification and management of infections and low birth weight. The Alliance offers evidence-based training, high quality, affordable resuscitation equipment, and technical assistance to support countries in their efforts to improve coverage and quality of newborn resuscitation services as part of national efforts to reduce newborn mortality.

ESSENTIAL NEWBORN CARE (ENC)

ENC is a comprehensive strategy defined to improve the health of new born through intervention before conception during pregnancy at and soon after birth and post natal period. ENC comprises of (1) Basic preventive newborn care such as care before and during pregnancy, clean delivery practices, temperature maintenances, eye and cord care and early and exclusive breast feeding.(2) Early detection of problem or danger signs (with priority for sepsis and birth sepsis) and appropriate referral and care seeking and (3) Treatment of key problem such as asepsis and asphyxia.

INTERVENTION ADDRESSING NEONATAL SURVIVAL IN TANZANIA

Interventions addressing neonatal survival are numerous and conducted in various modalities in Tanzania. In this section there are three categories of presentation. First there is a description of key strategies that were implemented that include newnatal health. Secondly there is an explanation of specific interventions addressing neonatal survival grouped according to main causes of neonatal deaths. Finally there is a description of interventions in the area of accessibility of care, quality of care and by health systems inputs. In this way it is possible to get an understanding of the extent of performance in respective intervention areas.

KEY STRATEGIES THAT INCLUDE NEONATAL HEALTH

Antenatal Care

Tanzania adopted Focused Antenatal Care (FANC) in 2003, recommending at least four ANC visit for women without complications (at < 12 weeks gestation age (GA), 20-24 GA, 28- 32 GA and at 36 weeks), and increased visits when a problem is detected (MOHSW, 2003). A recent EmOC assesment (EmoEC assessment 2015) indicated that almost all (>85%) HFs by zone, region, type and ownership were providing Antenatal services on weekly 3-5 days a week. In the ANC it is expected that every client will be checked of BP, urine for protein, syphilis screening, haemoglobin, HIV counseling and testing and mRDT (malaria rapid test). These were performed as routine in only 47.0% for syphilis, 43.5% for haemoglobin and 35.4% for urine check. However, good coverage for ANC services was observed in checking BP, HIV counseling&testing and mRDT. Routine availability of Fefol, SP tablets and ANC card no. 4 was universal to almost all HFs by zone, region, type of HFs and ownership.

One Plan

In 2008, the Tanzania Maternal, Newborn, and Child Health Partnership launched a set of strategies for reducing mortality through the adoption of the ―One Plan and set key targets for improved maternal, newborn, and child health (URT MOHSW 2008). Two operational targets stated in the plan and reinforced in the Sharpened Plan were focusing in ensuring that 100% of hospitals provide comprehensive EmONC and 70% of health centres and dispensaries provide basic EmONC by 2015 (URT MOHSW 2014). One plan (2008- 2015) reviews has shown that the Lake and Western zones of Tanzania comprise of regions which are under performing on various RMNCH indicators compared to other regions in the country. For instance, only one-third of all women in Mara region deliver in a health facility (HF) compared to the Lake Zone average of 45% and national average of 50% (NBS 2011).

Sharpened One Plan 2014-2015 and Health sector "Big Result Now (BRN)"

Tanzania launched RMNCH Sharpened One Plan 2014-2015 and health sector "Big Result Now (BRN)" approach which, prioritised a set of interventions based on evidences from midterm review of the HSSP III and One Plan 2008-2015. The priorities include; geographical focus (Lake and Western zones), addressing issues of high burden population, target and expand coverage on selected high impact interventions, provide supportive environment for education empowerment and equity, and mutual accountability and transparent. Life Saved Tool (LisT) analysis showed that if the country needs to accelerate in reduction of maternal and newborn mortality, more resources were required to increase provision of high impact interventions, notably Family Planning services, care at birth, postpartum and postnatal care and commodity security (Afnan-Holmes et al ., 2015).

Helping Babies Breathe

Over the subsequent six to nine months following the launch of HBB, the program was implemented at the eight hospitals individually (G Msemo) as shown in BOX1

BOX 1: ACTIVITIES IN HEALPING BABIES BREATHE IN TANZANIA

- A one day training of health care providers was conducted by Dr Msemo and other Master Trainers at each hospital;

- Some of these providers became Regional Trainers and District Instructors with the defined role to subsequently train health care providers in hospitals, health centers, and dispensaries within each respective district.

- This represents a cascade model approach to train providers throughout the country.

- Additionally these trained providers continue to provide "on job" and refresher training to other service providers in the same facilities.

- A simulator was placed in the labor and delivery suite where every provider has to document application of basic skills including FMV before starting a shift.

- Since midwives attend most deliveries, a major emphasis has been placed on their training.

– Additionally, a midwife at each of the eight sites was appointed to assume primary responsibility of teaching, to reinforce the quality of training, and oversee the quality of data entry. (Outside funding covered this responsibility)

- Training is based on the HBB course material. While initially conducted in English, future training will be in both English and Swahili

HIV/ AIDS

Several preventive interventions were put in place to combat the HIV epidemic since early 90's including; behavioral, structural and medical interventions. Limiting number of sexual partners, condom promotion, STIs prevention and treatment, HIV voluntary counselling and testing, Antiretroviral Treatment program, PMTCT/EMTCT program, safe blood and male circumcision program are among the preventions that are implemented in the country.

Malaria Programme

The country had a target to achieve malaria goal of halting by 2015 and begun to reverse the incidence of malaria. As such Malaria prevalence among under fives declined from 18% to 9% in 2011-12 (THMIS, 2011-12).

Integrated Management of Childhood Illness IMCI

The Integrated Management of Childhood Illness (IMCI), a strategy developed by WHO and UNICEF, was introduced in Tanzania to reduce child mortality. The strategy focused on training health workers to manage childhood illnesses at primary health care facilities, strengthening the health system to enable effective supervision and supplies, and improving community and household practices related to child health.

Every NewBorn Action Plan

The United Republic of Tanzania's Ministry of Health and Social Welfare and partners used the 2014 World Prematurity Day to leverage direction and momentum for delivering on the various commitments made for accelerated newborn survival. These commitments include those in ENAP, the national Sharpened One Plan 2014–2015 and the health sector priorities, captured within the Big Results Now program. A stakeholders' roundtable meeting brought together Government officials with all stakeholders to deepen awareness of newborn health and improve collaboration and coordination. Participants identified key actions, which, if acted on now, could save 9400 newborn lives by 2015 as projected in the Sharpened One Plan (ENAP: Progress Report. 2015)

INTEVENTIONS GROUPED ACCORDING TO THE MAIN CAUSES OF NEONATAL DEATHS

Interventions Addressing Asphyxia

In the section on predisposing factors, conditions that increase the risk of asphyxia were noted to include antepartum hemorrhage, prolonged labor and/or prolonged rupture of membranes, vaginal breech deliveries, and pregnancy-induced hypertension. A main strategy addressing asphyxia is Helping Babies Breathe. In order to facilitate this strategy the MOHSW had a target to train 11,000 nurses and midwives on critical steps in HBB for the survival of the baby immediately after birth. Similarly during the training of EmONC the resuscitation of newborns is taught to health workers. In ANCs there is also screening and treatment for pregnancy-induced hypertension a risk factor for asphyxia.

Interventions Addressing Preterm

The section describing predisposing factors for preterm babies includes maternal infections (egTB, malaria, HIV, syphilis) and several non infection factors. In addressing infections there are various services offered at ANCs to address them. For example malaria intervention is conducted by provision of ITNs and IPTp, HIV by PMTCT, syphilis by screening and treatment. In particular malaria and HIV/ AIDS services are integrated in ANC services. Also screening and teatment for maternal urinary and genital infections are conducted to address infections which are predisposing factors for preterm babies. There are also non infection interventions for preterm babies which include: monitoring for protein in urine and blood pressure to control urinary tract infection and pregnancy- induced high blood pressure respectively. Also family planning services provided countrywide address grand multiparity and both young and advanced maternal age which are predisposing factors for preterm babies.

Intervention Addressing Infections

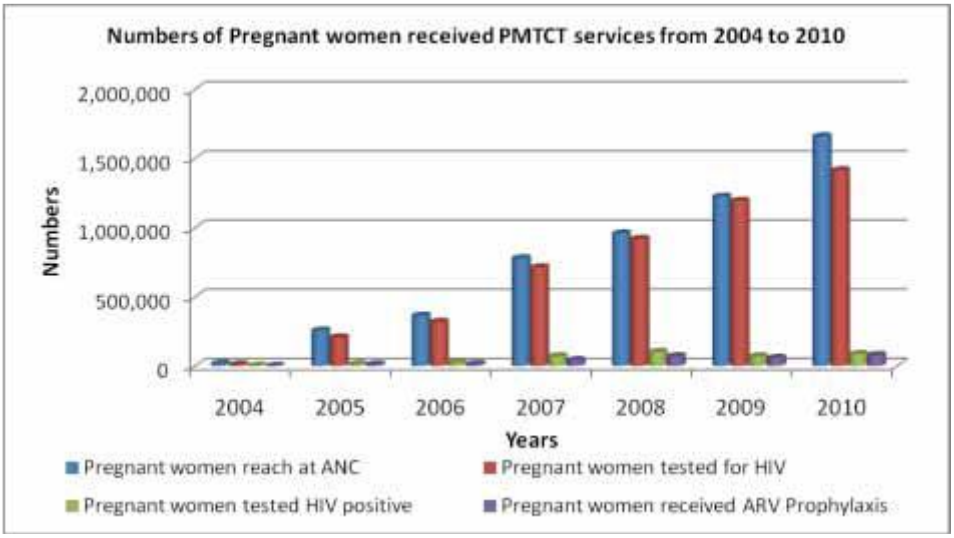
Vaccinations have considerable impact on preventing infections such as tetanus and tuberculosis. Generally, the progress in implementing the commitments in proportion of fully immunized children is encouraging in the country (SARA, 2012) although immunization coverage shows modest socioeconomic inequalities. Also maternal infections and unhygienic delivery practices are predisposing factors for neonatal infections. As noted earlier screening and teatment for maternal urinary and genital infections are conducted in ANCs to address infections. Malaria is integrated in ANC services whereby for malaria prophylaxis, women are given two doses of Fansidar for Intermittent Preventive Treatment (IPT) and supplied with subsidized Insecticide Treated Nets (ITNs).

Screening for adverse conditions in pregnancy has long been included in national policies (URT MOHSW; 2002). More than 9 of every 10 ANC facilities (94 percent) offer some

form of PMTCT services. These services are universally available in hospitals (98 percent), health centres (98 percent), and dispensaries (93 percent) that offer ANC services. (TSPAS 2014-05). Also since 2010, rapid point-of-care tests for syphilis have been available in Tanzania.

In addition the MOHSW with support from UNICEF and UNAIDS intergrated HIV and AIDS in ANC through the Prevention of Mother To Child Transmission (PMTCT). The utilization of PMTCT services are shown in Figure 4. Similarly children born from HIV positive mothers have their blood taken for early diagnosis and treatment. Postnatal visits also include HIV counseling and testing and referrals are done to care and treatment for eligibility to ART.

Figure 4: Number of Pregnant women who received PMTCT services (2004-2010)



Source National Aids Control Programme Hiv/Aids/Sti Surveillance Report Number 22, 2011

However tuberculosis services are not integrated at policy and program level, although according to the TB strategic plan 2009-2015, women at ANC found to be HIV positive are tested for TB and referred accordingly.

Early and Exclusive Breast Feeding (EBF) which prevents diarrhoea is promoted tbrough counseling on early and exclusive breast feeding during postnatal period. However EBF for the first six months of infant's life is not widely practiced, the national rate being 50%, in 2010 regardless of mother's Human Immuno-deficiency Virus (HIV) status (TNBS. 2010).

Interventions Addressing Low Birth Weight

There are various activities provided at ANC that address LBW. As noted earlier Malaria programme is integrated in ANC services. Also young maternal and short intervals between subsequent pregnancies are risk factors for LBW. As such family planning is an important intervention. A National Adolescent Reproductive Health Strategy 2011-15 was developed to facilitate adolescent sexual reproductive health. The goal was to improve reproductive health of all adolescents in Tanzania. Also Several Legislation and Regulations were established to encourage the practice of child spacing and family planning development generally. For

instance, the law which governs maternity leave of 84 days for employed female workers once every three years encourages child spacing. There is also a Family Planning Unit (FPU) of the MOHSW which became operational in 1986. Its main responsibility is to initiate and develop Family Planning standards and guidelines on its service provision, training and quality of care in family planning.

Interventions Addressing Hypothermia

Most predispong factors for neonatal hythermia are poor practices at delivery that increase heat loss. To address this problem UNICEF initiated the Kangaroo Mother Care initiave to address low birth weight baby and premature babies to keep them warm.

QUALITY AND CCESSIBILITY OF CARE, AND HEALTH SYSTEMS

Quality of Care

There is a Safe Motherhood Initiative (SMI) through life saving skills and Emergency Obstetric Care (EmOC) which is categorized into Basic (BEmOC) and Comprehensive (CEmOC). In particular the Ministry of Health and Social Welfare in collaboration with Ifakara Health Institute have established a 3 month course to train Assistant Medical Officers in carrying out emergency obstetric surgery; and nurses on how to provide safe anesthesia in rural health centres (Nyamtema AS.,et,al.2012). Graduates from this course are implementating the strategy. Table 2 shows achievements in BEmONC and CEmONC compared to the One Plan targets in Tanzania.

Table 2: BEmONC and CEmONC Performance

	BEmONC Target	**BemOC provided 2012**	**CEmONC Target**	**CemOC provided 2012**
Dispensaries	70%	20%		
Health centres	70%	39%	50%	
Hospitals			100%	73%

Source: SARA 2012

Overall, EmOC is lagging behind in its efforts to meet the stipulated targets. There was a consensus among women who have suffered serious birth injuries that the quality of care offered by nurse midwives for both BEmOC and CEmOC in maternity wards were inadequate (Mselle et al 2013). Also studies show that other essential BEmONC interventions, such as proper use of partogram for monitoring labour, and Active Management of Third Stage of Labour (AMTSL) are infrequently practised (Leshabari et al 2010, Plotkin et al,2010). Similarly in a study (Shabani J. et al., 2015) conducted in Rufiji, Kilombero and Ulanga districts in upgrading health centers for provision of CEmOC services, it was noted that a number of inter-related aspects of sustainability which include continued ownership, provision of adequate resources, and retention of technical and managerial skills are necessary and that the loss of any of these could endanger the continued levels of service access and quality.

Accesssibility of Care

Maternity waiting homes were established to increase access to obstetric care particularly in

rural areas, and also to provide a space for improving knowledge of family planning, nutrition and sanitation, consequently empowering women. (TDHS 2004/05). Also in 1994 the Tanzania Nurses And Midwives Council issued the first guidelines that directed the content and process for establishing and managing private nursing and maternity services. Such practice, geared to provide services for wider access, may include a nursing home, convalescent home, maternity home, domiciliary maternity services, maternal and child health services, nursing clinic, counselling and consultancies (Tanzania Nurses and Midewives Council 2007).

In addition reducing maternal and newborn deaths requires a functioning health system including effective communication and transport to ensure a prompt referral in the event of an obstetric emergency. Since 2009, the government provided tri-cycle ambulances in rural areas as a means of improving attendance to obstetric emergency services. In year 2009/10 a total of 370 tri-cycle ambulances were purchased and distributed to health centres and dispensaries. A recent national survey showed that only 52 % of public facilities that provide delivery care, had emergency transport available (SARA 2012). Also according to the 2012 Health Sector Performance Profile there were 1,110 motor vehicles in the regions but 20% motor vehicles are not functioning and 14% out of 1,183 motorcycles were not functioning. During the MTR field visits (MTR 2013) the districts visited had few ambulances inadequate to cater for all medical referral cases including MNCH.

The MOHSW- RCH section in partnership with key Development partners developed the National Family Planning Costed Implementation Program (NFPCIP) Strategy. The program aim was to reposition FP in the national agenda and achieve the target of 60% CPR. The repositioning of family planning has also benefited from the high level political commitment. In Tanzania only 27% of the currently married women use a modern method of family planning, and the unmet need for FP stands at 25% (MTR 2013). The use of modern FP varies by residence and region with 34 % of women in urban areas using them, compared to 25 % of women in rural areas.

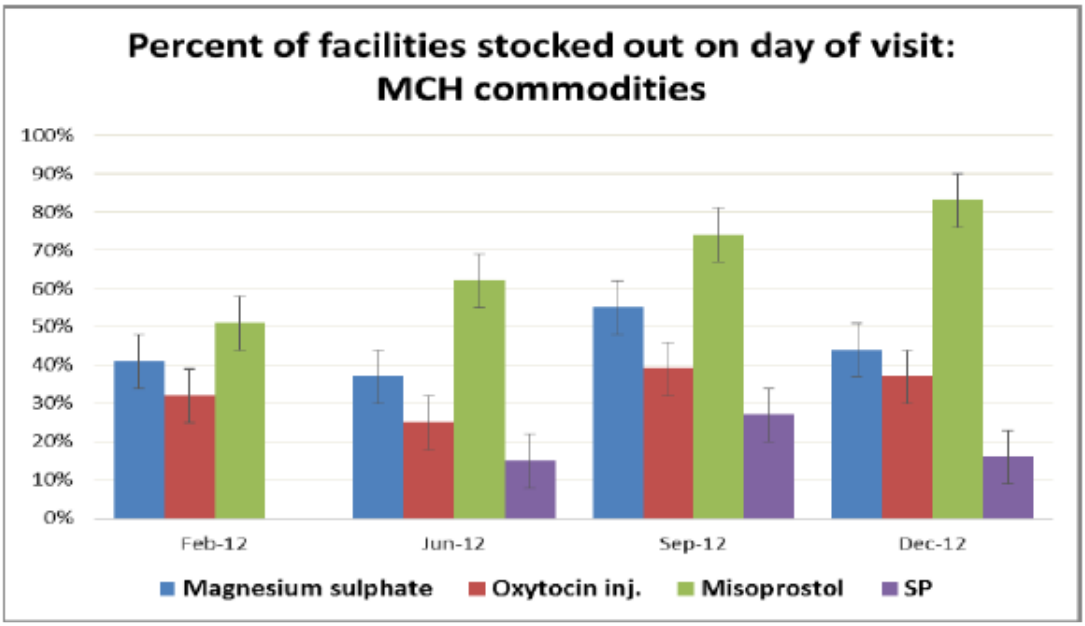
Health Systems interventions

An analysis of Human Resources for Health Country Profile data (2012–13) showed a health workforce density of 5·5 doctors, nurses, and midwives per 10 000 population in Tanzania, which is far below the WHO minimum density threshold of 23 per 10 000 population, and includes a shortage of specialist cadres (URT MOHSW,2013).

Also only $1·5 million of $11 million spent on projects mentioning the word “newborn” in 2010, were for projects specifically benefiting neonates (Pitt C et al 2010). Health insurance coverage has been increasing since 2000 when the National Health Insurance Fund (compulsory for public servants) and Community Health Fund (voluntary for the informal sector) were introduced. However, only 15% of Tanzanians use these schemes, potentially due to poor understanding of risk pooling, low quality of public health services, a lack of provider choice and limited benefit packages (Mtei G et al 2014), frequent drug stockouts in health facilities, weak design and management (Mtei and Mulligan 2007, Stoermer et al 2012). The exemption policy to provide free care for children under five and pregnant women, seem to be implemented (MOHSW 2006). but studies still report substantial out-of pocket payments (Kruk M et al 2008). Also district managers’ actions provide evidence of rule breaking, careless rule enforcement and failing to give information about entitlements (Kamuzora et al 2007).

An assessment identified that the Lake zone reports more frequent stock-outs of modern methods of family planning than do the Central and Northern zones; and sociocultural factors impeding modern methods of family planning were more prevalent in the Lake and Central zones than in the Northern zone . Figure 5 shows the percentage of facilities with stockouts of drugs essential for EmOC activities.

Figure 5: Stock-out of MVH commodities



Source: MOHSW 2013 Tanzania: Strategic Review of the National Supply Chain for Health

Policies relating to Neonatal Health

Before 2005, neonates were almost unmentioned in the policy. However from (2009) (Manji K 2009) a rapid policy focus on neonates followed. Strategies such as neonatal resuscitation, kangaroo mother care, and adaptation of the IMCI strategy to include the first week of life were introduced which were supported by district-level funding. Family planning programmes began in the late 1980s. Although implementation efforts were inadequate in the 2000s, in 2010, focus was revitalised with the national family planning costed implementation plan (URT MOHSW 2015)

Since 2010, seven of the 11 policies have been achieved, such as task shifting for midwives and maternal death notification, and antenatal corticosteroids (ILO 2015). Also postnatal home visits in the first week of life is described in a policy (Penfold S, et al 2010).

Finally there is a list of status of new born interventions in 2012 compared to target in 2015 as shown in Table 3.

Table 3: The Status of Newborn Interventions in 2012 and 2015 targets

Indicator	Status by 2012	Target by 2015
ANC 4 visits	43%	90%
ANC before 12 weeks	15%	60%
ITN coverage	71%	80%
Syphilis screening during pregnancy	38%	80%
% HIV-positive receiving ART (Option B+)	9%	90%
SBA coverage	51%	80%
Health facility deliveries	50%	90%
BEmONC coverage	20% for dispensaries &	70% for dispensary & health centres
CEmONC coverage	73% for hospitals	100% for hospitals
	9% for health centres	50% for health centers
Postnatal care visit within 2 days	31%	80%
Early breastfeeding (within 1 hour after birth)	49%	90%
ARV prophylaxis for HIV exposed infants	56%	80%; elimination at 90%

Source: TDHS 2010, THMIS 2011/12 and SARA 2013

EXISTING GAPS IN UPTAKE OF EXISTING INTERVENTIONS

In the previous section of interventions in the country, some challenges are noted. In addition , when evidence based interventions elsewhere are compared to what is happening in the country some gaps are noted. In this section, these gaps are described under the main causes of neonatal deaths. Then there is a description of gaps in quality and accessibility of care, and those related to health systems.

GAPS IN INTERVENTIONS ADDRESSING ASPHYXIA

There are some unsatisfactory performances relating to interventions addressing asphyxia in health facilities. In one study in the country AMTSL was noted to be implemented in some (69%) health centres and few (28%) dispensaries (Hanson et al. 2013,). Also uterotonics were available in only 90 (69%) of dispensaries. Some health centres (85%) and dispensaries (63%) stated that they always monitor labour with help of a partograph but unsatisfactory use of partographs was reported in some hospitals in Tanzania (Bosse G, et al 2002) and insufficient recoding of foetal wellbeing. Also only 25% of institutional births or 10% of all women who gave birth in one study area received an essential childbirth care package (Hanson et al. 2013). Similarly a suction apparatus (mucus extractor) was less widely available, with only 23 percent of facilities that offer normal delivery services having one available at the service site on the day of visit. Also a neonatal bag and mask were available in about three- quarters of the facilities (SPAS 2014-2915).

GAPS IN INTERVENTIONS ADDRESSING PRETERM

Maternal conditions such as high blood pressures and maternal infections are associated with prematurity. In one study some hospitals (33%), health centres (31%) and dispensaries (36%) reported that low implementation level of the cost effective and technically easy interventions such as blood pressure screening for pre-eclampsia during pregnancy and childbirth at all levels of care are considerable (Hanson et al. 2013). In another study conducted in Tanzania majority of facilities visited (4 hospitals, 15 health centres and 156 dispensaries) 61% of facilities had a blood pressure machine (Penfold et al. 2013). One study indicated that syphilis screening was only available in 51 (43%) dispensaries (Mrisho M et al 2009). Also low levels for measurement of haemoglobin and urine protein is reported (Urassa D et al 2003) in ANC services.

GAPS IN INTERVENTIONS ADDRESSING INFECTIONS

PMTCT is high on the agenda and financially supported through the Global Fund. One study indicated that PMTCT was offered in 94 (79%) dispensaries (Mrisho M et al 2009). There is currently a strong consensus regarding the importance of integrating health services and creating synergies to meet the health needs of populations (SCMHTF 2014),as reflected in national policies. In Tanzania, external partners support implementation of PMTCT within a framework which states that "testing for HIV is an integral part of ANC and should be accompanied with all other necessary tests such as syphilis, (URT MOHSW 2012). However it is noted that such policies do not necessarily lead to the provision of integrated services unless financing and support are comprehensive rather than selective.

For syphilis and HIV screening, the results are also similar to the WHO estimates of 44% of pregnant women being tested for syphilis and 86% being tested for HIV in Tanzania (WHO 2015). Also The Eliminating Congenital Syphilis initiative, led by WHO, is less known and supported and apparently poorly funded, despite the strong evidence base (Khan J. et al. 2014). Also in some cases a lack of sterilization equipment and use of the second or third best option for sterilization put patients at risk (Penfold S,et al. 2013). Although TB is an important disease that affects the health of prospective mothers and their neonates, there are no TB interventions available specifically to women at child bearing age.

One study shwed that only 35 percent of ANC facilities had IPTp guidelines, 43 percent had staff trained in malaria treatment and 12 percent had insecticide-treated nets (ITNs) available on the day of the survey. Sulphadoxine- pyrimethamine (SP) for the prevention of malaria in pregnancy was available in 61 percent of these facilities. Also only 14 percent of ANC facilities had a functioning microscope with glass slides and relevant stains for malaria microscopy (SPAS 2014-2015).

The mode of cord cutting in rural areas contributes to neonatal deaths through infection (Mrisho M et al 2008) and umbilical cord infection in rural settings contributes significantly to newborn infection and subsequent neonatal death (WHO, 1998a). Traditional healers who are widely believed to be able to heal sick neonates are often consulted (Mrisho M et al 2008) for traditional treatments and local medicine at home (Mrisho M et al 2008) which may risk infection (Mrisho M et al 2008).

Another study indicated that neonates are not always breastfed immediately after birth, and generally in Tanzania exclusive breastfeeding is not common (Mrisho M et al 2008; Armstrong-Schellenberg et al., 2002; Shirima et al., 2001). Delay in initiation of breastfeeding and discarding of colostrum were common in rural area due to widespread lack of knowledge about the benefits of early and exclusive breastfeeding (Okollo et al., 1999; Shirima et al., 2001). In one study thirteen facilities (9%) of those stocking any antibiotic, had a stock out of all parenteral antibiotics at least once in the last six months of 2008 (Penfold et al. 2013). Although the availability of some supplies greatly improved between the two surveys, e.g. syphilis test kits (from 0% to 54%) and intravenous kits (from 5% to 38%) most commonly staff reported long durations, which increased the likelihood of stock outs (Penfold et al. 2013; Riwa P. et al 2007).

GAPS IN INTERVENTIONS ADDRESSING LOW BIRTH WEIGHT

Young maternal age and close child spacing is associated to LBW. Despite an increase in the national prevalence rate of modern contraceptive methods among married women, some zones report exceptionally low (15%) use of modern contraceptive methods and high (26%) unmet need for family planning (Afnan-Holmes, et al., 2015). Coverage remains low for the proportion of demand for family planning satisfied by modern contraceptive methods (46% in 2010), with large inequities by socioeconomic status (socioeconomic status quintile difference 22% (Afnan-Holmes, et al., 2015).

The low rate of ANC visits has been associated with LBW. A DHS in 2010 reported that 96% of women attended ANC at least once but 43% made the recommended four visits (NBS;Tanzania 2011). Although pregnant women are advised to start attending ANC before the 16th week of gestation, more than 80% of pregnant women initiate ANC later than 17 weeks of gestation (NBS 2005). Several barriers were identified including lack of money, distance to the health facility, lack of privacy to attending ANC (Klisch SA, 2007)). It was also reported that late attendance deny some clients ANC services (Mrisho M et al 2009).

GAPS IN QUALITY OF CARE

Poor effective coverage of maternal and newborn health interventions in some districts of the United Republic of Tanzania reinforces the need to prioritize health service quality (Baker U et al. 2015). In this section observed gaps in effective coverage in Tanzania are described.

<u>Gaps in ANC</u>

Efective coverage of essential screening for pregnant mothers remains low in Tanzania with the highest effective coverage achieved for HIV in Tanzania (65%). Perceptions of the underlying determinants included lack of integration of support for different aspects of ANC and central level procurement problems (Baker, U., et al 2015). Also an EmONC Assessment study conducted in September 2015, observed that urine check, syphilis screening and haemoglobin estimation were essentially performed in less than 50% of health facilities providing FANC services (EmONC Assessment, 2015).

<u>Poor Emergency Obstetric Care</u>

It is reported that capacity for emergency obstetric care in some health facilities was lacking (Mrisho M et al , 2012) and low quality of care especially obstretic care was observed (Kruk M, et al 2009;URT, MOHSW 2007). The availability of EmOC was well below international recommendations, often due to unavailability of parenteral anticonvulsants (WHO 2009). Also inadequate equipment and supplies were reported to have caused delays in

patients receiving services and increased workload for staff and unnecessary referrals (Penfold et al. 2013).

Also the availability of BEmONC is limited in Tanzania with only 25% of the facilities offering all the 7 signal functions while the target was to have 70% of dispensaries and health centers fully functional by 2015 (SARA, 2013; MOHSW, 2014). The functionality is worse at the dispensaries (20%) than the health centers (39%) or hospitals (MOHSW, 2014). The challenge in meeting the target of BEmONC functionality is observed in the performance of mainly two EmONC signal functions, namely assisted vacuum delivery and manual removal of placenta. The coverage of Assisted vacuum delivery was observed to be 17.1%, 33.1% and 67% for dispensaries, health centres and hospitals respectively. The study also found that only 8.1% (400) of the surveyed health facilities are fully functional EmONC facilities. The overall reported national rate of women giving birth in fully functional EmONC facilities was 31.3%, whereby only Dar Es Salaam, Pwani, Mara and Lindi showed appreciably increased rate of 50-80% (EmONC Assessment, 2015).

The EmONC assessment observed that regions such as Katavi, Geita, Simiyu, Shinyanga, Tabora and Arusha had a huge gap of available fully functional CEmONC health facilities ranging from as low as 0.0% to 65% (EmONC Assessment, 2015). The survey further observed that most health facilities conducting delivery were lacking critical reference protocols to guide management of AMSTL, PPH, Antepartum Haemorhage, pre eclampsia/eclampsis, obstructed labour, sepsis and babies born with difficulty in breathing. The EmONC target was not met due to inequitable coverage of signal functions, marginalized quality of EmONC services, poor referral system, erratic supply of essential commodities and supplies and critical shortage of skilled staff especially at the rural areas and low technical competency of staff (SARA, 2013; MOHSW, 2014, EmONC Assessment, 2015). The coverage of Kangaroo Mother Care practice is limited to less than 20% of health facilities conducting delivery (EmONC Assessment, 2015).

Skilled Birth Attendants (SBA) challenges

Low (2%) use of assisted deliveries was reported from referral institutions in Tanzania (Sorbye I, et al 2011). In one study among the sample, most neonatal deaths, (63%, 125/199) occured at home, (Mrisho et al, 2012) where births are assisted by Traditional Birth Attendants (TBAs), neighbors or relatives (Mrisho et al, 2012) who are mostly unskilled (Mrisho M et al 2008) and unable to handle complications such as prolonged labor (Mrisho M. 2012).

Tanzania DHS survey indicates that the proportion of women giving birth under the supervision of skilled birth attendants (SBA) has slowly increased from 43% in 2004 to 51% in 2010 (TDHS, 2004/05 & 2010). In the same period the proportion of women giving birth in the health facilities also increased from 47% to 50%. There is marked disparity in SBA coverage between urban (83% in 1999 & 83 in 2010) and rural areas (44% in 1999 & 51% in 2010), showing that urban settings had attained the 2015 goal of having 80% of births attended by SBA in 90's compared to rural areas which need accelerated efforts (TDHS 2004/05; 2010). Zonal and regional disparity on SBA coverage has been observed with

Western and Lake Zones performing poorly compared to Eastern or Northern zones (MOHSW, 2014)

Labour and delivery care challenges

Improving universal coverage of routine functions like monitoring and management of labour using partograph and active management of the 3rd stage of labour (AMTSL) for every woman would improve survival (WHO, 2012). However inconsistent use of the partograph is common at all levels of care in the country (Nyamtema et al, 2008). The National EmONC Assessment observed that less than 20% of health facilities conducting delivery had partograph and so used it, indicating critical gap of monitoring labour (EmONC Assessment, 2015). Strategies like payment for performance (P4P) that improved use of partograph from 12% to 69% in Pwani region should be tried in other regions (P4P Assessment Report, 2013).

Gaps in Essential Newborn Care (ENC):

ENC is routine care that all newborns should receive immediate after delivery. The target was to have 75% of the facilities with deliveries offering ENC (WHO, 2014), However this has not been realized. In particylar the prevalence of breastfeeding within 1 hour of birth declined from 59% in 2004/05 to 49% in 2010. In Tanzania, a higher prevalence of breast feeding (BF) within 1 hour was noted in urban areas, among educated and wealthier women, among women delivering at health facilities (HF) and among women delivering with a skilled birth attendant (SBA).

HBB Challenges

Although HBB has had a significant impact in reducing ENM including in the premature and low birth weight population, to achieve an even greater effect, additional strategies, for example targeting temperature regulation, will likely be necessary to avoid later deaths. (G Msemo)

GAPS IN ACCESSIBILITY OF CARE

Only 52% of public facilities that provide delivery care, had emergency transport available (SARA 2012). Also according to the 2012 Health Sector Performance Profile of the available 1,110 motor vehicles in the regions 20% are not functioning and 14% out of 1,183 motorcycles are not functioning (MOHSW 2013c). During the MTR field visits (MTR 2013) the districts visited had few ambulances inadequate to cater for all medical referral cases including MNCH. Also about 6 in 10 facilities have emergency transport (SPAS 2014-2915).

ANC

The TDHS 2010 report showed that attendance for antenatal care at least once is universal (98%). However, women start ANC care late i.e. only 15% of pregnant women attended for first antenatal care with less than four (16 weeks) month of gestation (TDHS 2004/05 & 2010). The attendance for ANC 4 or more times as recommended in the FANC has decreased over time from 71% in 1999, 62% in 2004/05 and 43% in 2010 compared to the national target of 90% (TDHS 2004/05; 2010). Booking late (after 4 months) for ANC, perception of quality of antenatal services and long distance were factors associated with less than 4

antenatal care visits (Gupta et al, 2013). Country specific approaches to refocus ANC are a critical area that needs to be considered**.**

Poor Distribution of Neonatal Services

Levels of coverage for child health services are higher than those for reproductive, maternal, and newborn services (Tanzania's Countdown to 2015). In 2010, about 50% of women gave birth in a health facility, which has the greatest inequity by socioeconomic status and geographical locations and level of facility (Penfold S, et al 2010). Also half (51%) of all births were attended by a health professional [Tanzania] 2011). Lack of privacy (Mrisho M et al.2007) and disrespectuful care (McMahon SA et al 2014) in some health facilities discourage attendence or cause women to bypass services that are close to their home (Kruk M, et al 2009). Other barriers to accessing good care at health facilities are due to lack of money, poor transport, (Mrisho et al., 2007) and also fear of encountering wild animals on the way (Mrisho et al 2009; Klisch SA, 2007).

The coverage of EmOC in the Southern Zone of Tanzania was 0.7 facilities/500,000 people for basic emergency care, which is below the United Nations recommended level of 4 facilities/500,000 people (NBS: Tanzania 2007) and deficiencies in access to life-saving comprehensive EmOC in rural areas (Hunger C et al 2007). Basic EmOC in some parts of Tanzania was reported to be only available in a small minority of first-line health facilities (Olsen OE et al 2005). For care provided at birth, women living in rural areas are disadvantaged. Women in urban areas are twice as likely to deliver in a health facility and three times more likely to deliver by caesarean section than are those living in rural regions(Tanzania's Countdown to 2015)

EmONC) was generally better in the Lake than the Western zone, in Private than public and in hospitals than lower level facilities.The overall distribution of fully functional EmONC HFs services exceeds the minimum UN standards in Mwanza and Kagera regions. Most regions were above 50% of the recommended level per population except Simiyu and Shinyanga regions that operate at only one- third of the minimum recommended level (EmoEC assessment 2015)

Post Natal Care (PNC) challenges

Services for mothers who recently delivered are either widely underutilised or unavailable (Mrisho et al 2009). Only 31% of women received postnatal care within 2 days of birth(Tanzania's Countdown to 2015). Also only 13% of women have the recommended one or more postpartum care visit within two days of delivery, with rates as low as 2% in some regions (NBS 2005). Barriers to attending PNC include lack of money, distance to the health facility, lack of privacy (Klisch SA, 2007) as well as lack of drugs and abusive language by health personnel were mentioned as barriers to neonatal care-seeking (Mrisho M et al 2008). Also PNC coverage is limited by the cultural tradition of keeping the baby indoors (Mrisho et al 2009; Winch PJ,et al 2005). Payment arrangements can also deter clients to health care facilities. Traditional healers are contacted frequently because they accept payment in kind, and that payment rates can be negotiated (Mrisho M et al 2008).

GAPS IN HEALTH SYSTEMS

HRH gap

The ratio of health workers to population has a direct relationship with survival of children in early infancy in that as the number of health workers declines, survival declines

proportionately (Anand S, et al 2004). In Tanznia there is a health workforce density of 5·5 doctors, nurses, and midwives per 10 000 population which is below the WHO minimum density threshold of 23 per 10 000 population (URT MOHSW 2013).

A study from Southern Tanzania (Manzi, F., et al 2012) reported that compared to the national Tanzanian guidelines, health facilities in Lindi and Mtwara regions in 2004 had only 20% of the required prescribers and 14% of the required nurses employed. Approximately two midwives per every 1,000 births in the country; 42% of rural births where more than 80% of the Tanzania's population live are attended by skilled health personnel; and the majority of rural births are done at home (UNFPA 2009; NBS 2011).

There is also a heavy urban/rural imbalance,.The imbalances are even more pronounced at district level: there are more than 20,622 untrained medical attendants at all levels of health care services and no single medical specialists in Geita and Katavi regional referal hospitals. Highly trained HRH including medical doctors, degree and specialized nurses/midwives, pharmacists, dentists as well as diagnostic personnel are extremely unequally distributed, serving only a fraction of the population. The great majority of Tanzanians therefore rely on associate health professionals for clinical, nursing, midwifery, diagnostic, therapeutic, rehabilitation, preventive and promotional services (Tanzania HRH Profile 2014)

Also there is variation in distribution of health workers by region. There is extremely heavy bias toward the Bussiness Region like Dar es Salaam, Kilimanjaro and Mwanza which is evident. These regions employs third quarter of all nurses and midwifery professional cadres (degree holders and specialist registered nurses) medical doctors, dentists and pharmacists. The imbalance is also evident when health worker to population ratios are calculated for various cadres in each region Also the Census analysis also revealed an urban/rural imbalance. Professionals such as those with degrees were predominantly in urban environment areas. For instance 74% of medical doctors were serving urban population, while the majority of associate professionals including clinical officers registered and enrolled nurses and midwives were found in rural areas as indicated in Tanzania HRH Profile (2014)

Attrition among health workers and low productivity are attributed to poor and delayed payments in the public sector, lack of promotion, training opportunity and career progression especially under Local Government, poor leadership with harassment and lack of transparency, lack of decent accommodation and poor working conditions, health workers going for training and deaths due to HIV/AIDS, accidents and other incidencies. The single spine structure as well as professional protectionism contributes to lack of flexibility of the HRH system to adequately respond to the challenging and rapidly changing service needs. (Tanzania HRH Profile 2014)

Gap in Equipment and Supplies

In a study conducted in Tanzania majority of facilities visited (4 hospitals, 15 health centres and 156 dispensaries) had basic equipment for providing patient care but only 58% of facilities had a fridge kept at 2–8 C ; 61% of facilities had a blood pressure machine, 70% had an infant weighing scale and 57% had a speculum. The availability of every item of equipment was high in hospitals and low in dispensaries (Penfold et al. 2013). Also a number of items present at the facility were not functioning, most commonly refrigerators, telephones, blood pressure machines and stethoscopes (Penfold et al. 2013). Functioning blood pressure

meters were available in five 5 (83%), 13 (100%) and 72 (55%) of hospitals, health centres and dispensaries respectively (Hanson et al. 2013). Staff reported durations from three days to a year for supplies to be received or equipment repaired (ibid).

According to the SARA report thirty seven percent (37%) of dispensaries and 22% of health centers in Tanzania do not have injectable antibiotics (SARA, 2013). Good infection prevention practices are essential in preventing sepsis at health facilities unfortunately, 60-80% of dispensaries or health centers lack sterilization equipment, 50% of PHC centers lack basic things like soap & water/alcohol based hand rub, and 20% lack disinfectant (SARA, 2013).

Similar obsevations are shown by other studies . An EmOC assessment in 2015 noted that the gap for newborn resuscitation was in the lack of suction machine, newborn suction catheters and source of oxygen.Generally there was weak supportive infrastructure to provided neonatal care in neonatal rooms whereby less than 20% of the HFs had phototherapy machines, suction machine, Kangaroo Mother Care services, and source of oxygen, room thermometers and pulsoxymeters. The situation was the same for availability of weighing scale and neonatal ambu bag and mask with overall less than 50% HFs in the regions having these equipment (EmoEC assessment 2015).

Health Information gap

There is adequate evidence that both births and deaths are largely unregistered as most of them occur out of reach of the health services (Schellenberg J. R. et al 2002) and deaths very soon after birth (Baqui, A. H. et al., 2006). Detailed information about the actual quality and effectiveness of ANC in practice is scant (Rooney, C. et al., 1992). This is largely because the packages vary so much from place to place in terms of components, timing, frequency of visits, and provider. Similarly, little evidence is available for the packaging of interventions for routine PNC for mother and newborn (Haws, R.A. et al., 2007). Kangaroo mother care, neonatal resuscitation, and antenatal corticosteroids all need coverage data to enable their scale-up to be tracked. Nearly 50% of newborn complications and deaths occur within the first 24 hours after birth, and care offered to newborns during this period is key to survival. However there is no data on the proportion of newborns that are seen within 48 hours after delivery (TDHS, 2010).

Policy gaps

Since 2010, seven of the 11 RMNCH policies were achieved, including task shifting for midwives, but gaps remain in protection of maternity in national law and practice (ILO 2000), and antenatal corticosteroids. Postnatal home visits in the first week of life is described in a policy but implementation awaits the results of a large-scale assessment (Penforld, S. et al., 2010). Similarly Tuberculosis services are not integrated with MNC at policy and program level.

In summary, Table 4 displays gaps to indicate aspects, examples and the level of gaps. In the *level of gap* column Green indicates quite high coverage, or reasonably high considering the resource setting; Yellow indicates more work to be done to raise coverage and Red indicates alarmingly low coverage which means a major opportunity for progress. As such the gaps that are coloured red would be considered a priority for recommendations that are described in the next section**.**

Table 4: Summary of Gaps in Tanzania

CONTINUUM OF CARE	DESCRIPTION OF THE GAP		LEVEL OF GAP
ANTENATAL CARE	Accessibility of services	Booking late (after 4 months) for ANC, perception of quality of antenatal services and long distance were factors associated with less than 4 antenatal care visits (Gupta et al, 2014).	
	Availability of resources	Only 35 percent of ANC facilities had IPTp guidelines, 43 percent had staff trained in malaria treatment and 12 percent had insecticide-treated nets (ITNs) available on the day of the survey. Sulphadoxine- pyrimethamine (SP) for the prevention of malaria in pregnancy was available in 61 percent of these facilities. Also only 14 percent of ANC facilities had a functioning microscope with glass slides and relevant stains for malaria microscopy (SPAS 2014-2915).	
	Quality of services	Urine check, syphilis screening and haemoglobin estimation were essentially performed in less than 50% of health facilities providing FANC services. (EmONC Assessment, Sept 2015).	
		44% of pregnant women are being tested for syphilis in Tanzania (WHO 2015). Also The Eliminating Congenital Syphilis initiative, led by WHO, is less known and supported and apparently poorly funded, despite the strong evidence base (Khan J. et al. 2014). One study indicated that syphilis screening was only available in 51 (43%) dispensaries (Mrisho M et al 2009).	
LABOUR AND DELIVERY SERVICES	Accesibility of services	There is marked disparity in SBA coverage between urban (83% in 1999 & 83 in 2010) and rural areas (44% in 1999 & 51% in 2010)	
		EmONC) was generally better in the Lake than the Western zone, in Private than public and in hospitals than lower level facilities. (EmoEC assessment 2015)	
		86% of pregnant women being tested for HIV (in Tanzania WHO 2015). More than 9 of every 10 ANC facilities (94 percent) offer some form of PMTCT services. These services are universally available in hospitals (98 percent), health centres (98 percent), and dispensaries (93 percent) that offer ANC services. (TSPAS 2014-05). PMTCT is high on the agenda and financially supported through the Global Fund. One study indicated that PMTCT was offered in 94 (79%) dispensaries (Mrisho M et al 2009).	

		Only 52 % of public facilities that provide delivery care, had emergency transport available (SARA 2012). During the MTR field visits (MTR 2013) the districts visited had few ambulances inadequate to cater for all medical referral cases including MNCH. Also about 6 in 10 facilities have emergency transport (SPAS 2014-2915)	
	Availability of resources	A high percentage of HFs that did not provide EmONC services should alert HF managers and Council Authorities of a high number of women with complications that are affected with the shortages. (EmoEC assessment 2015)	
		A number of items present at the facility were not functioning, most commonly refrigerators, telephones, blood pressure machines and stethoscopes (Penfold et al. 2013).	
		An EmOC assessment in 2015 noted that the gap for newborn resuscitation was in the lack of suction machine, newborn suction catheters and source of oxygen(EmoEC assessment 2015)	
		A suction apparatus (mucus extractor) was less widely available, with only 23 percent of facilities that offer normal delivery services having one available at the service site on the day of visit. Also a neonatal bag and mask were available in about three- quarters of the facilities (SPAS 2014-2915).	
	Quality of services	The availability of BEmONC is limited in Tanzania with only 25% of the facilities offering all the 7 signal functions while the target was to have 70% of dispensaries and health centers fully functional by 2015 (SARA, 2013; MOHSW, 2014).	
		Facilities that offer blood transfusion and Caesarean section in addition to the 7 Basic EmONC functions are available in 73% of the hospitals and 9% of upgraded health centers (SARA, 2012).	
		Most health facilities conducting delivery were lacking critical reference protocols to guide management of AMSTL, PPH, Antepartum Haemorhage, pre eclampsia/eclampsis, obstructed labour, sepsis and babies born with difficulty in breathing. (EmONC Assessment, Sept 2015).	
		Assessment observed that less than 20% of health facilities conducting delivery had partograph and so used it, indicating critical gap of monitoring labour (EmONC Assessment, Sept 2015).	
		Tanzania DHS survey indicates that the proportion of women giving birth under the supervision of skilled birth attendants (SBA) has slowly increased from 43% in 2004 to 51% in 2010 (TDHS, 2004/05 & 2010).	
POST NATAL CARE	Accesibility of services	ENC is routine care that all newborns should receive immediate after delivery. The target was to have 75% of the facilities with deliveries offering ENC, However this has not been realized. (MOHSW, 2014; WHO, 2014)	
		In Tanzania, a higher prevalence of breast feeding (BF) within 1 hour was noted in urban areas, among educated and wealthier women, among women delivering at health facilities (HF) and among women delivering with a skilled birth	

		attendant (SBA).	
		Barriers to attending PNC include lack of money, distance to the health facility, lack of	
		Privacy (Klisch SA, 2007) as well as lack of drugs and abusive language by health personnel were mentioned as barriers to neonatal care-seeking (Mrisho M et al 2008).	
		While maternal coverage of option B+ is high (79%), coverage of PMTCT intervention during the neonatal period or infancy is low. (PMTCT Unit, 2014).	
		Generally, the progress in implementing the commitments in proportion of fully immunized children is encouraging in the country (SARA, 2012) although immunization coverage shows modest socioeconomic inequalities	
	Availability of resources	60-80% of dispensaries or health centers lack sterilization equipment, 50% of PHC centers lack basic things like soap & water/alcohol based hand rub, and 20% lack disinfectant (SARA, 2013).	
		Generally there was weak supportive infrastructure to provided neonatal care in neonatal rooms whereby less than 20% of the HFs had phototherapy machines, suction machine, Kangaroo Mother Care services, and source of oxygen, room thermometers and pulsoxymeters. The situation was the same for availability of weighing scale and neonatal ambu bag and mask with overall less than 50% HFs in the regions having these equipment (EmoEC assessment 2015).	
	Quality of services	The prevalence of breastfeeding within 1 hour of birth declined from 59% in 2004/05 to 49% in 2010. EBF for the first six months of infant's life is not widely practiced, the national rate being 50%, in 2010 regardless of mother's Human Immuno-deficiency Virus (HIV) status (TNBS. 2010). Neonates are not always breastfed immediately after birth, and generally in Tanzania exclusive breastfeeding is not common (Mrisho M et al 2008; Armstrong-Schellenberg et al., 2002; Shirima et al., 2001). Delay in initiation of breastfeeding and discarding of colostrum were common in rural area due to widespread lack of knowledge about the benefits of early and exclusive breastfeeding (Okollo et al., 1999; Shirima et al., 2001)	

Key: *Red* Alarmingly low coverage ie major opportunity for progress
Yellow- More work to be done to raise coverage)
Green Quite high coverage, or reasonably high considering the resource setting

RECOMMENDATIONS

In this final section, recommendations are presented in three main areas. First programmatic recommendations are outlined.Then policy recommendations are elaborated and finally research recommendations are described.

PROGRAMMATIC RECOMMENDATIONS

Programmatic recommendations are described under two main areas. First there are recommendations that fall under direct/indirect causes and risks that are particularly prevalent in Tanzania with high risk and whose intervention have high impact. Secondly there recommendations that addresss interventions that have particularly low existing coverage, availability or poor quality of practice in the continuum of care in Tanzania (See Table 6).

Recommendation Addressing Prevalent Predisposing Factors

Table 5 displays the predisposing factors on causes of neonatal mortality by their impact. It is clear from the table 5 that maternal HIV, syphylis, malaria and tuberculosis which are prevalent in Tanzania have considerable impact with risks on preterm, infections and LBW. Then prolonged rupture of membranes and delayed lack of exclusive breast feeding, follow with impact on infection, and hyothermia. Predisposing factors with less impact on causes of neonatal mortality which follow are non infectious causes such as hypertention, number antenatal visits, multiple gestation as shown in the table. In this regards recommendations focus on the following priority areas:

1. HIV and malaria are prevalent risk factors . As such their interventions should be expanded through support from national programmes. Screening for syphilis and HIV should be an essential element of antenatal care (ANC). Also TB should be integrated into MNC activities.

2. Screening for syphilis and HIV, is an essential element of antenatal care (ANC) and its importance remains uncontested (Bhutta, Z.A. et al., 2014; WHO 2011) Almost two-thirds of adverse outcomes in newborns could be prevented through effective screening followed by treatment and/or prophylaxis for mothers infected with syphilis and/or HIV, respectively (Gomez, G.et al., 2013; WHO 2010). There is need to increase the coverage and quality of syphilis and HIV services in ANC services.

3. The protective efficacy of topical antimicrobials during delivery and the administration of corticosteroids to women in preterm labor has been recommended as as low-cost, low-technology intervention likely to reduce neonatal morbidity and mortality.

4. There is need to promote family planning and early and exclusive breast feeding through innovative activities such women's groups and health education by peer counsellors to improve health seeking behaviours and health practices respectively.

5. There is need to improve screening and treatment of pregnant induced hypertention to reduce preterm births.

Table 5: A Summary of Predisposing Factors by their Impact on Causes of Neonatal Mortality

Predisposing factors	Risks to the following causes of neonatal deaths				
	Asphyxia	Preterm	Infections	LBW	Hypothermia
1. Maternal HIV, syphylis, TB and Malaria, Genital tract infection, maternal fever, Bacteuria		X	X	X	
2. Preterm or prolonged rupture of the membranes	X		X		
3. Delayed and Exclusive breastfeeding, Maternal genital tract infections			X		X
4. Young or advanced maternal age, multiple gestation, Inadequate number of antenatal visits Poor Maternal nutritional status, Short time between subsequent births		X		X	
5. Maternal high blood pressure, stress, smoking and excessive alcohol, neonatal low birth weight. Multiple gestation		X			
6. Respiratory distress syndrome, Antepartum haemorrhage, IUGR with placental dysfunction, breach delivery, hypertention, congenital anomalies, cord accidents	X				

Table 6: Programmtic Recommendations Addressing Interventions With Low Coverage, Availability Or Quality Of Care

CONTINUUM OF CARE	RECOMMENDATIONS	
ANTENATAL CARE	Accessibility of services	There is considerable late booking and less that 4 antenatal care visits due to poor perception of service quality and long distances to ANC .As such there is need to encourage early booking and adequate ANC visits through advocacy and provision of ANC services close to the community.
	Availability of resources	Few ANC facilities have guidelines, staff trained in Malaria treatment and ITNs and drugs for prevention of malaria in pregnancy, Also only some ANC facilities have functioning microscope and and stains for malaria microscopy. In this regard there is need to equip adequately ANC facilities with resources required for ANC services.
	Quality of services	Urine check and syphilis screening are conducted in less than50% of health facilities providing Focused Antenatal Care. There is need to enable all facilities providing ANC services to provide needed checks including syphilis screening and treatment through better funding and training of health workers.
LABOUR AND DELIVERY SERVICES	Accesibility of services	There is marked disparity in SBA coverage between urban and rural areas. As such there is need to increase SBAs coverage in the rural area where the majority of client population live.
		There is poor distribution of EmOC services in some zone compared to others. Also these services are better covered in the private compared to public hospitals. It is important to improve these services where they are poorly distributed.
	Availability of resources	Shortage or lack of functioning resources such as refigirators, blood pressure machine and stethoscope, sction machines, newborn cathetoer and oxygen contribute to poor EmONC and delivery services. As such there is need to ensure the presence of adequate and functioning instruments for adequate EmONC and delivery services.
	Quality of services	There is considerable poor quality of delivery and early care of neonates due to lacking critical reference protocols to guide management of AMSTL, PPH, Antepartum Haemorhage, Pre eclampsia/eclampsis, Obstructed labour, sepsis and babies born with difficulty in breathing, inadequate use of partogram and low numbers of SBA. As such there is need to improve the delivery and care of neonates by provision of adequate and relevant guideline, use of partograms and increasing the number of SBAs.
		Since the target to have 75% of the facilities with deliveries offering ENC, this has not been realized. (MOHSW, 2014; WHO, 2014), there is need to fully implement the ENC as a routine care immediately after delivery.

		In Tanzania, a higher prevalence of breast feeding (BF) within 1 hour was noted in urban areas, among educated and wealthier women, among women delivering at health facilities (HF) and among women delivering with a skilled birth attendant (SBA). As such there should be programmes to expand EEBF in rural areas and other marginalized groups.
		There is need to address barriers to attending PNC such as lack of money, distance to the health facility, lack of privacy (Klisch SA, 2007) as well as lack of drugs and abusive language by health personnel.
		While maternal coverage of option B+ is high (79%), coverage of PMTCT intervention during the neonatal period or infancy is low. (PMTCT Unit, 2014). As such there is need to address low coverage of PMTCT intervention during the neonatal period.
		There is weak supportive infrastructure for neonatal care in neonatal rooms whereby less than 20% of the HFs had phototherapy machines, suction machine, Kangaroo Mother Care services, and source of oxygen, room thermometers and pulsoxymeters. Also the situation is the same for availability of weighing scale and neonatal ambu bag and mask. In this regard there is need to improve the supportive infrastructure for neonatal services in neonatal rooms. Similarly there is need to improve sterilization equipmentas well as as availability of soap and disinfectants.
		EEBF is not widely practiced in the country. As such programmes should be developed to inctease the coverage of this practice to improve neonatal survival.

POLICY RECOMMENDATIONS

Introduction

There are already existing policies that target maternal and neonatal health in various documents in Tanzania. As such this section has not come out with specific new policies. Instead policies that are highlighted in this section are re-emphasis of existing policies with an additional stress on their implementation. Existence of a policy is one thing and its implementation is quite another. As such dedicated commitment of the Ministry of Health and Social Welfare and other relevant authorities is called for to support the implementation of policies related to neonatal health. This effort is indicated in the broad area of availability of needed resources, accessibility of services, quality of services; as well as in specific areas of continuum of care, data and integration of services targeting neonatal health in the country.

Availability of human and non human resources

Human Resources for Health

Adequate and skilled HRH is crucial for the implementation of Neonatal health services. However Tanzania has a low a health workforce far below the WHO minimum density. In additions there are considerable regional and rural urban inequalities.There are various policies and strategies addressing the problem of shortage and distribution of staff including those relevant for MNC services. In particular the Ministry in implementing a ten-year Primary Health Service Development Programme 2007/2008 – 2016/2017 alongside the 2008-2013 five-year Human Resource for Health Strategic Plan and the 3rd Health Sector Strategic Plan aimed at enhanced training, recruitment and deployment of health workers (HRH Profile,2014) Also there are relevant strategies intended to enhance effectiveness and efficiency in the implementation of recruitment, retention, development and utilization of health and social welfare workers at all levels to ensure adequate staffing of all primary health care facilities(HRH Strategic Plan 2014-2019).The policy challenge is the extent to which the policy is / will be implementation.

Funding, Equipment and Supplies

In order to improve neonatal health there is need for stock availability of essential medicines such as adequate supply of medicines and health products and through refurbishment and equipping of health facilities providing care including Maternal and newborn care. Again there are policies addressing this challenge. For example a ten-year Primary Health Service Development Programme 2007/2008 – 2016/2017 emphasizes the provision of standardized medical equipment, instruments, pharmaceuticals and sundries to all primary health facilities to ensure optimal performance; and to increase financial allocation to the sector with a view to attain the Abuja Call of 15% of the annual budget. However the implementation of these policies has not been adequate.

Accessibility of Maternal and Newborn health services

In Tanzania only 50% of women give birth in a health facility, with the greatest inequity by socioeconomic status and geographical locations. This situation necessitates improvement of accessibility of health services including MNC. Various policies address this challenge. For

example policies such as: to rehabilitate, upgrade and establish facilities at primary level to ensure equity and access of quality health care to all Tanzanians and to ensure that referral system is operational, and existence of mobile clinics and outreach services to support health facilities quality health care and to minimize unnecessary referrals **(**Primary Health Service Development Programme 2007/2008 – 2016/2017). There is also an intention of 20% reduction in maternal mortality ratio and neonatal mortality rate in 5 poorly performing regions and improving equitable access to services in the country by focusing on vulnerable groups in the population with higher risks (HSSP4). Similarly **t**he BRN focus is on most underserved Regions and Councils, where health outcomes are below average, and to enhance equity of access for rural populations. There is need to focus on the implementation of these policies.

Quality of Services

Although the number of EmonC health facilities and delivery in EmONC HFs had improved, quality services were suboptimal in all the regions indicating that maternal care system is not working well (EmOC Assessment Report 2015). Also HBB has had a significant impact in reducing ENM including in the premature and low birth weight population, but to achieve an even greater effect, there is need for additional strategies, for targeting temperature regulation, to avoid later deaths.

Continuum of Care

There are various policies in the country that target neonatal health in the continuum of care. There is thus a need to strengthen the implementation of these policies. These policies are as follows:

- Adolescent girls and young women are at a higher risk of HIV infection and will receive adequate care (HSSP4). Also there is need to strengthen adolescent, youth friendly reproductive health services through improvement of contraceptive use, life skills, including healthy behaviours and diets, knowledge in overall sexuality and reproductive health(One Plan 2).
- There is need to scale up of Emergency Obstetric and Newborn Care (EmONC), especially Basic Emergency Obstetric and Newborn Care (BEmONC), at primary health facilities to improve maternal and newborn survival(One Plan 2); and to reinforce community awareness campaign with emphasis on early identification of severe obstetric complications and reporting to appropriate HFs. This campaign should aim at increasing the met need for EmONC.(EmOC Assessment 2015)
- There is need to improve coverage of postnatal care services to reach women that deliver newborns at home; to scale up of services to target women and newborn in the first 7 days post-delivery by increasing home visits by outreach teams or by community health workers.(One Plan **2)** and to strengthen Essential Newborn Care (ENC), and Newborn resuscitation for children requiring help at birth and Kangaroo Mother Care for preterm and low birth weight babies (One Plan **2)**

Data

1. There is need to put in place a functioning system at the health facility, district and regional levels that analyses EmONC indicators regularly and give feedback for

improvement. Recognition of HFs with consistently good performance may improve EmONC services (Emoc Assessment Report 2014)

2. There is adequate evidence that both births and deaths are largely unregistered as most of them occur out of reach of the health services (Schellenberg, J. R. et al. 2002) and deaths very soon after birth (Baqui, A. H. et al., 2006). Detailed information about the actual quality and effectiveness of ANC in practice is scant as well (Rooney C et al 1992. These vital data should be collected for statistics related to Maternal and neonatal health.

3. Little evidence is available for the packaging of interventions for routine PNC for mother and newborn (Haws RA, et al 2007), Also intervention data on Kangaroo mother care, neonatal resuscitation, and antenatal corticosteroids is not collected. These interventions need coverage data to enable their scale-up to be tracked.

Integration of Services

TB is an important disease that affects the health of prospective mothers and their neonates but there are no TB interventions available specifically to women at child bearing age. Also TB services are not integrated with MNC at policy level. This situation calls for a establishing a policy for integrating TB into MNC services. and level of facility (Penfold S, et al 2010).

RESEARCH RECOMMENDATIONS

Research recommendations are presented under causes and predisposing factors, intervention strategies, health work force, vaccines and treatment subtopics.

Causes and predisposing factors.

1. Limited epidemiological research indicates the main causes of neonatal deaths are infections, birth asphyxia, birth injuries, complications of preterm birth, and birth defects. The true burden of neonatal mortality in Tanzania is unknown because many deaths occur in the home and are not reported. Also despite significant research in developed countries, there is little known about the causes of preterm birth in many developing countries.
2. Effective prevention and treatment of neonatal infections requires knowledge of infectious agents in the community and of their antimicrobial susceptibility. Hospital data, while more commonly available, may not represent the infectious disease burden in the community. As such there is need to acquire more knowledge on infectious agents in the community and of their antimicrobial susceptibility

Intervention Strategies

1. Innovative behavior change and service delivery strategies must be designed and tested to provide postnatal care during the period immediately after birth particularly to reach mothers and their babies after home birth and when newborns are secluded in the home.

2. We have an understanding of the single health actions and packages that will reduce perinatal mortality in low-resource settings. The task is to crystallise a manageable

remit for community workers to deliver them, and a clear framework that includes both community-based and institutional care. To achieve this there is need of methodological innovations that move beyond the probability designs favoured in efficacy research (eg, RCTs) towards the plausibility and adequacy designs (before–after studies, phased roll-out) more suited to large-scale effectiveness.

3. There is an urgent need to explore community-based financing schemes to help alleviate transport problems for women experiencing obstetric emergencies or for sick newborns.

4. Quantitative studies are needed to assess the prevalence of community practices in different settings. For example, it is important to establish how frequently mothers delay initiation of breastfeeding and how commonly a mother would leave her house with a sick neonate to seek care. In addition, operational research is needed to improve links between communities and different levels of health facilities

5. There is an urgent need for studies to provide evidence to assess the effect of a MWH on pregnancy outcomes for women and neonates in low-resource countries. This information will be best obtained from randomised controlled trials.

Health Workforce

1. More evidence is needed to inform effective ways of scaling up the mid-wifery workforce particularly in terms of the education, regulation, in-service training, career progression, deployment, and retention and increasing of the quality, relevance, and productivity of midwives across public, private, and not-for-profit sectors.

Vaccines

1. Further studies are needed on the efficacy and safety of rotavirus vaccines for prevention of diarrhoea in neonates in developing countries.

Treatment

1. The use of topical antimicrobials as a complement to maternal immunization against tetanus warrants further study as part of the global effort to eliminate this disease.

2. Supplementation of micronutrients such as zinc, folate and magnesium with antimicrobial interventions to prevent preterm births are areas that require further research.

3. Surveillance capacity and the transfer of surveillance information must be developed to determine the local impact of resistant microorganisms and to identify interventions that can address this threat.

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ANNEX 1: Description of maternal and neonatal intervention packages and components

Intervention	Description
Primary level care, including outreach	
Antenatal care:	
Tetanus toxoid	Two tetanus toxoid Immunisations
Screening for pre-eclampsia	Blood pressure measurements for all pregnant women, urine test for proteinuria, and pre-referral care of women with pre-eclampsia or eclampsia
Screening and treatment	
Asymptomatic bacteriuria	Screening urine of all pregnant women at antenatal visits and treatment of bacteriuria with amoxicillin
Syphilis	Screening all pregnant women by rapid plasma reagin test and treatment of syphilis with benzathine penicillin
Skilled maternal care and immediate care of newborn (intrapartum):	
Normal delivery by skilled attendant	Includes safe delivery, cord care, identification of complications, first aid, and referral of complicated cases
Active management of third stage of labour	Administration of prophylactic oxytocin, cord clamping, and delivery of placenta by controlled cord traction
Initial management of post-partum haemorrhage	Management of postpartum haemorrhage with additional oxytocin, uterine massage, manual removal of placenta, repair of lacerations, and management of shock
Neonatal resuscitation	Detection of breathing problems and resuscitation of newborn when required
Referral level care	
Treatment of severe pre-eclampsia or eclampsia (antenatal and intrapartum)*	Inpatient care, including airway management, treatment with magnesium sulphate, treatment with antihypertensives, and care during labour when undelivered
Antibiotics for preterm premature rupture of membranes (antenatal and intrapartum)*	Administration of oral antibiotics to women with preterm premature rupture of membranes, and care during labour
Steroids for preterm births (antenatal and intrapartum)*	Administration of steroids and inpatient care of women with suspected preterm labour

Intervention	Description
Management of obstructed labour, breech presentation, and fetal distress*	External cephalic version for breech presentation; management of obstructed labour, persistent breech presentation, and fetal distress by operative delivery (vacuum extraction, forceps and vaginal breech delivery, and caesarean section)
Management of severe postpartum haemorrhage (intrapartum and post partum)*	Inpatient care of postpartum haemorrhage, including blood transfusion, treatment for shock, and hysterectomy
Management of maternal sepsis (intrapartum and post partum)*	Inpatient care of maternal sepsis, including treatment with intravenous or intramuscular antibiotics
Emergency neonatal care:	
Management of very low birthweight babies*	Inpatient care for very low birthweight babies, including special feeding support, additional warmth, close monitoring, and treatment with oxygen if necessary
Management of severe neonatal infections*	Inpatient care for severe neonatal infections, including treatment with intravenous or intramuscular antibiotics
Management of severe neonatal asphyxia*	Inpatient care for neonatal encephalopathy including treatment with oxygen
Management of neonatal jaundice*	Inpatient care for severe neonatal jaundice, including phototherapy
Community care of newborn	
Community newborn care package (first two components):	
Support for breastfeeding mothers (antenatal and neonatal)	Home visits to promote early and exclusive breast feeding provided by skilled care providers and community health workers
Support for low birthweight babies	Home visits to promote extra warmth for low birthweight babies and to support breastfeeding mothers provided by skilled care providers and community health workers
Community based management of neonatal pneumonia	Home visits for diagnosis and management of pneumonia in neonates and treatment with oral antibiotic therapy provided by community health workers

ANNEX 2: Tanzania Policy, Guidelines and Strategies with influence on improving newborn survival

Strategy/ Guideline	Focus or Aim
Millennium Development Goals (MDGs) (Goal 4 and 5)	Improving maternal, newborn and child health
Tanzania Vision 2025	Access to quality reproductive health services, reduction in infant and maternal mortality

National Strategy for growth and reduction of Poverty (NSGRP):	Improve maternal, newborn and child health
The Health sector strategic plan IV (HSSPIV) 2016-2020	reducing maternal and child morbidity and mortality
Primary Health services Development program PHSDP-MMAM 2007-2017	Increase coverage and quality of primary health care services for communities in rural areas
The health sector support programme III 2008-2012	Addresses maternal, newborn and child health issues in terms of alignment with government policies, resource mobilization and donor harmonization
National Package of Essential reproductive and child health interventions (NPERCHI), 2003:	Improving the quality of life for women, adolescent and children (components of package include; antenatal care, care during child birth, care of obstetric emergencies, newborn care, postpartum care, post abortion care, family planning, diagnosis and management of HIV/AIDs including PMTCT, other sexually transmitted infections (STI/RTI), management of immunizable disease and Nutrition care
Tanzania Food and Nutrition Policy1992	Emphasize adequate post-delivery leave for women to breastfeed, for working and non working women, promotion of breastfeeding practices until age 2
National Nutrition Strategy July 2011/12/-June 2015/16	Raising the prevalence of exclusive breastfeeding; Maternal nutrition
National Strategy on infant and young child Nutrition (2004):	Aaccess to skilled behavior change, counseling and support for infant and young child nutrition
Adolescent friendly reproductive health services (AFHS),	expansion and provision of quality adolescent friendly health service, developing a standardized definition of AFHS, charting out what to be done to improve quality and expand coverage.
National guidelines2007	Management of sexually transmitted and reproductive tract infections
National policy guidelines for collaborative TB/HIV activities, 2008	No mention of maternal or newborn
National guidelines for Diagnosis and Treatment of Malaria, 2006	Management of malaria in pregnancy, management of malaria in the neonatal and infants below 5 kg
National guidelines on PMTCT 2008	Management of HIV/AIDs in pregnancy and neonates