MATERNAL AND NEWBORN HEALTH IN CHUI PROVINCE & KYRGYZSTAN: ASSESSMENT AND IMPLICATIONS FOR INTERVENTIONS

Ministry of Health
of the Kyrgyz Republic

unicef

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This publication presents the results of an evaluation of maternal and neonatal assistance and related programmes in Kyrgyzstan. It describes activities designed to improve maternal and newborn health, and innovative methods for overcoming existing difficulties, and also suggests models to evaluate the effectiveness of evidence-based medical programmes which can resolve difficult situations.

Recommendations are given for primary healthcare institutions. These recommendations are based on programme strategies described in a series of Lancet publications about Child and Neonatal Survival. These are essential so that rational decisions can be made about investment, both in existing programmes and in the development of new effective projects in the field of maternal and child health.

The evaluation was carried out with the support of UNICEF and at the request of Kyrgyzstan's Ministry of Health by Professor Zulfiqar Bhutta from the Aga Khan University (Pakistan). Dr Bhutta was assisted in this task by Arjumand Rizvi and Dr Yasir Khan, and the team worked in close partnership with the following specialists from the Ministry of Health of Kyrgyzstan and other national partners.

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The insertion of facts into the document and their interpretation reflect the views of the authors, and not necessarily the views of UNICEF.

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List of Abbreviations

ADB	Asian Development Bank
ANC	Antenatal Care
APH	Ante partum Haemorrhage
ARV	Antiretroviral
CDC	Centre for Disease Control
CIDA	Canadian International Development Agency
DFID	Department for International Development
DHS	Demographic Health Survey
EMOC	Emergency Maternal Obstetric Care
EPC	Effective Perinatal care
EPI	Expanded Programme for Immunization
FAP	Health Centre (in rural area with a feldscher and midwife)
FGP	Family Group Practice
FMC	Family Medical Centre
FP	Family Planning
GAVI	Global Alliance for Vaccines and Immunization
GDP	Gross Domestic Product
IDA	Iron Deficiency Anaemia
IMCI	Integrated Management of Childhood Illness
IMR	Infant Mortality Rate
JICA	Japanese International Cooperation Agency
KfW	German Development Bank
LBW	Low Birth Weight
MCH	Maternal Child Health
MDG	Millennium Developmental Goal
MICS	Multiple Indicator Cluster Survey
MM	Maternal Mortality
MMR	Maternal Mortality Ratio
MNT	Maternal and Neonatal Tetanus
MoH	Ministry of Health
NGO	Non-Governmental Organization
NMR	Neonatal Mortality Rate
ORT	Oral Rehydration Therapy
PHC	Primary Health Care
PMR	Perinatal Mortality Rate
PPH	Post-Partum Haemorrhage
STI	Sexually Transmitted Infections
SWAp	Sector Wide Approach
U5MR	Under five Mortality Rate
UNFPA	United Nations Fund for Population Activities
UNICEF	United Nations International Children's Education Fund
USAID	United States Agency for International Development
VHC	Village Health Centres
WHO	World Health Organization
ZP	Zdrav Plus

EXECUTIVE SUMMARY

For a nation to prosper it is important that it should focus on the health of its underprivileged female population as well as its children. Recent years have seen a major emphasis on the persisting burden of maternal, child and newborn mortality globally with a particular focus on the Millennium Development Goals for maternal and child health. The burden of maternal, child and infant mortality and interventions to reduce this have been the subject of several recent features in Lancet and other publications on child and maternal health.

Millennium Development Goal	Target
International formulation	International formulation
Goal 4. Reduce child mortality	Target. Reduce by two-thirds, between 1990 and 2015, the under-five mortality rate
Goal 5. Improve maternal health	Target. Reduce by three-quarters, between 1990 and 2015, the maternal mortality rate

It is a proven fact that social and economic development cannot occur without human development, and health is the cornerstone upon which human development is built. Many key interventions to prevent maternal, neonatal and child deaths can be delivered to whole populations through community based approaches and outreach programmes. However, implementation and scaling up of these interventions are slow or non-existent in Kyrgyzstan. More importantly, where interventions exist, monitoring and evaluation frameworks are poor and evaluation of and research into its effectiveness extremely limited.

For Kyrgyzstan we focused on interventions which could be delivered at the PHC level; i.e. in community settings and at primary level facilities in district health systems. This document reviews information from various data sources that outlines the state of maternal and neonatal health and interventions in the Kyrgyzstan. In addition, empirical analysis is made that might be relevant to policy making. Analysis by the authors of government and other reports reveals that there is a wide array of maternal and newborn health interventions being reported within the country. This paper suggests a template for evaluating evidence based interventions that can make a difference and the current state of coverage in Kyrgyzstan. It also highlights some of the efforts currently underway to improve maternal and neonatal health including the challenges faced by the Ministry of Health and NGOs working in Kyrgyzstan, and innovative methods to overcome them.
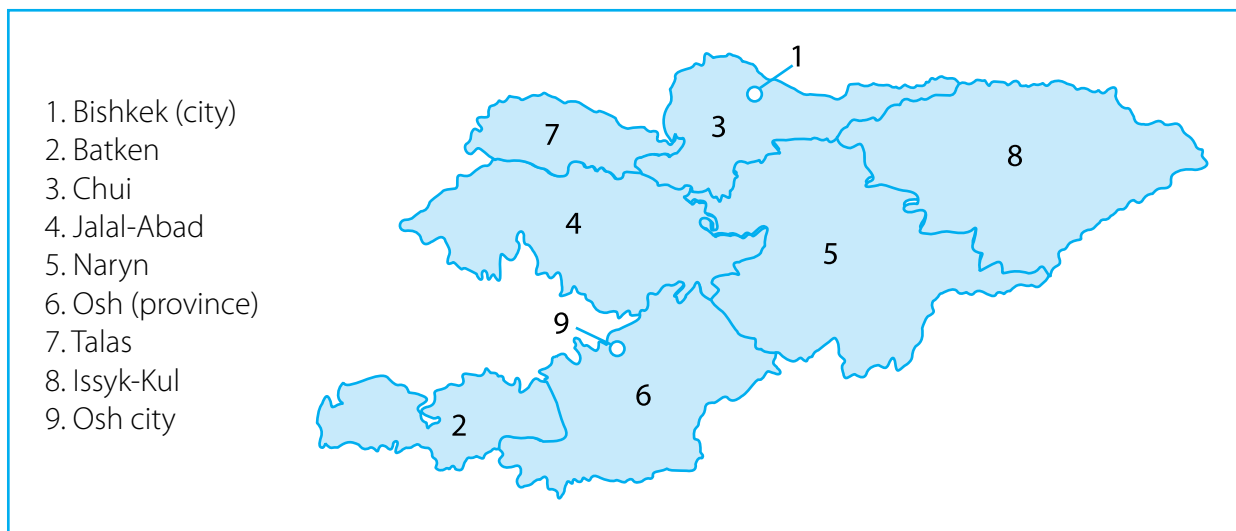
The last part of our document provides recommendations based on the PHC model to determine the proportion of maternal, neonatal and child deaths that can be averted by means of the intervention strategies outlined in the Lancet Neonatal and Child Survival Series, and the number of deaths that could be averted if these proven interventions were provided at 90 per cent coverage. Such analysis is necessary to facilitate wise investment in existing programmes and development of cost-effective new programmes. The impact of intervention packages can assist programme planning and help donors and policymakers identify staged targets for investment in maternal, newborn and child health.

INTRODUCTION

Kyrgyzstan is a landlocked country in Central Asia, bordering Kazakhstan, China, Tajikistan and Uzbekistan. The mountainous region of the Tian Shan covers over 80 per cent per cent of the country. The climate varies regionally. The south-western Fergana Valley is subtropical and extremely hot in summer, with temperatures reaching 40°C (104°F). The northern foothills are temperate and the Tian Shan varies from dry continental to polar climate, depending on elevation. Due to the country's predominantly mountainous terrain, less than 8 per cent per cent of the land is cultivated, and this is concentrated in the northern lowlands and the fringes of the Fergana Valley.

Kyrgyzstan is divided into seven provinces (oblasts) administered by appointed governors. The capital, Bishkek, and the second large city Osh are administratively independent cities (shaar) with equivalent status to the provinces (figure 2).

1. Bishkek (city)
2. Batken
3. Chui
4. Jalal-Abad
5. Naryn
6. Osh (province)
7. Talas
8. Issyk-Kul
9. Osh city

Population and Human Development.

The country has a population of 5.0 million people. The average population density is 69 people per square mile (29 people per km^2).The majority of the population (65 per cent) lives in rural areas, and 35 per cent live in urban areas. With regards to the age structure, 53 per cent of the population is considered to be able-bodied adults, 38 per cent are children, and 9 per cent elderly people. Kyrgyzstan has a diversity of ethnic groups within its borders. The majority of the population (about 65 per cent) is Kyrgyz, and the other two largest ethnic groups, which are approximately equal in number, are Uzbeks and Russian: together they make up about one quarter of the country's population. Other ethnic groups and nationalities represent less than 10 per cent of the population. The people of Kyrgyzstan have a high educational level; the literacy rate amongst the adult population is 98.7 per cent. Life expectancy at birth for 2001 was 68.7 years for the country as a whole, for men - 65.0 years, and for women 72.6 years.

Economy:

Despite the backing of major Western lenders, including the International Monetary Fund (IMF), the World Bank and the Asian Development Bank, Kyrgyzstan has had economic difficulties following independence. Initially, these were a result of the breakup of the Soviet trading bloc and resulting loss of markets, which impeded the republic's transition to a free market economy. The government has reduced expenditure, ended

most price subsidies, and introduced value-added tax. Overall, the government appears committed to the transition to a market economy. While economic performance has improved considerably in the last few years, and particularly since 1998, difficulties remain in securing adequate fiscal revenues and providing an adequate social safety net.

Agriculture is an important sector of the economy in Kyrgyzstan. In 2002 agriculture accounted for 35.6 per cent of GDP and about half of employment. Kyrgyzstan's terrain is mountainous, which accommodates livestock raising, the largest agricultural activity, so the resulting wool, meat, and dairy products are major commodities. The main crops include wheat, sugar beet, potatoes, cotton, tobacco, vegetables, and fruit. As the prices of imported agrichemicals and petroleum are so high, much farming is done by hand and by horse. Agricultural processing is a key component of the industrial economy.

Kyrgyzstan is rich in mineral resources but has negligible petroleum and natural gas reserves. Metallurgy is an important industry and the government has actively encouraged foreign involvement in extracting and processing gold. The country's plentiful water resources and mountainous terrain enable it to produce and export large quantities of hydroelectric energy.

Although poverty has been declining in Kyrgyzstan since 1998 with rapid reduction of extreme poverty from 30 per cent to 11 per cent by 2005, rates are still high. In 2005 more than four in ten people (43 per cent) were not able to meet their basic consumption needs; one in ten persons (11 per cent) could not even meet the basic food needs. Poverty is largely, though not exclusively, a rural phenomenon: urban poverty is 30 per cent (with 6.5 per cent extreme poverty) and rural poverty is 51 per cent (14 per cent extreme poverty).

Health services:

Health care is one of the sectors of the economy of Kyrgyzstan that have undergone the most fundamental reform. In 1996-2006 the Manas National Health Care Reform Programme was implemented in the country. In 2006 the Government approved the 2006-2010 Manas Taalimi National Health Care Reform Programme. This Programme was developed as a result of active cooperation between relevant ministries and agencies, the entire community of specialists dealing with health care, and donor organisations.

Kyrgyzstan has a well-developed health system with an extensive infrastructure of facilities that provide maternal care services. Health services in Kyrgyzstan are provided in provincial and republican hospitals, in specialised hospitals and dispensaries, and in research institutes. The clinical treatment offered at these facilities is intended to minimise the effects of disease and disability. This system includes special delivery hospitals, the obstetric and gynaecology departments of general hospitals, women's counselling centres, and doctor's assistant / midwife posts (FAPs). There is an extensive network of FAPs throughout rural Kyrgyzstan. Maternal and child health services in Kyrgyzstan are largely provided through a wide network of primary health care institutions. Almost 98 per cent of all deliveries occur at delivery hospitals and, in rare cases, at regular hospitals. In general, doctors at the women's consulting centres (which are part of urban polyclinics) are responsible for the provision of prenatal care, regional and rural ambulances, and FAPs. Prenatal care starts early in pregnancy (usually during the first trimester) and continues on a monthly basis throughout the pregnancy.

Child health services in Kyrgyzstan include neonatal care, a service typically provided in the first week after delivery when a woman and her newborn are still in the delivery hospital. After discharge from the delivery hospital, the child is visited by a patronage nurse who provides the mother with general counselling on child care and carries out a physical examination of the child. Mothers are required to bring their children in for

regular check-ups and vaccination at polyclinics or outpatient clinics several times during the first two years of the child's life. A doctor in the polyclinic can refer the child to a paediatrician if the child develops a disease or any other conditions that require special care or hospitalisation.

The socioeconomic changes in Kyrgyzstan during the last five years have influenced the health sector. The reduction in financial resources has become the main obstacle to ensuring medical care and services, and this in turn has led to a deterioration in the health of the population.

BACKGROUIND

The existing system of perinatal care is insufficiently effective for reduction of perinatal, neonatal, infant, and maternal mortality in Kyrgyzstan. Comparison of the 1997 Demographic Health Survey (DHS) with the 2006 Multiple Indicator Cluster Survey (MICS) shows that the Infant Mortality Rate (IMR) has fallen from 66.0 to 38.0, U5MR (Under 5 Mortality Rate) from 72.3 to 44.0, and Maternal Mortality Rate (MMR) from 110 to 104. In addition, official Ministry of Health data demonstrate progress in accurate birth and death reporting, as reflected by increasing mortality rates approaching survey estimates.

However, all mortality indicators remain unacceptably high, and indicate the need for urgent and concerted efforts and programme investment to accelerate reduction in mortality.

Table 1.1: IMR, U5MR, and MMR, estimates based on survey data[1]

	1990	1995	1997 DHS	2000	2003	2005	2006 MICS	2007
IMR < 12mos	68.0	63.0	66.0	61.3	59.0	58.0	38.0	33.0
U5MR <5 yrs		70.0	72.3			45.0	44.0	42.0
MMR				110.0		150.0	104.0	

In 2004, Kyrgyzstan adopted the international definition of live births (with increased registration of neonatal deaths, rising by approximately 50 per cent from 2003 to 2004). Mortality rates continue to be underestimated, as deaths are missed, concealed or misclassified. World Bank data for 1992, 1995 and 2001, as well as the DHS survey in 1997, have consistently rated infant mortality at 30 to 35 points above the official government rates. Infant and maternal mortality are determined by a multitude of causes: economic, social, cultural, the situation of the public health system, the demographic structure, behaviour and so on. While there is a tendency for infant and child mortality to fall, the maternal mortality rate remains constant. It is well known that infant mortality is one of the most sensitive indicators of the level of poverty in a given country or, in a broader sense, of the level of socio-economic and human development. Addressing infant, child and maternal mortality is an urgent public issue and should be a priority on the agenda of the authorities.

Figure 1.1: Progress towards MDG related to IMR, U5MR and Maternal mortality.[2]
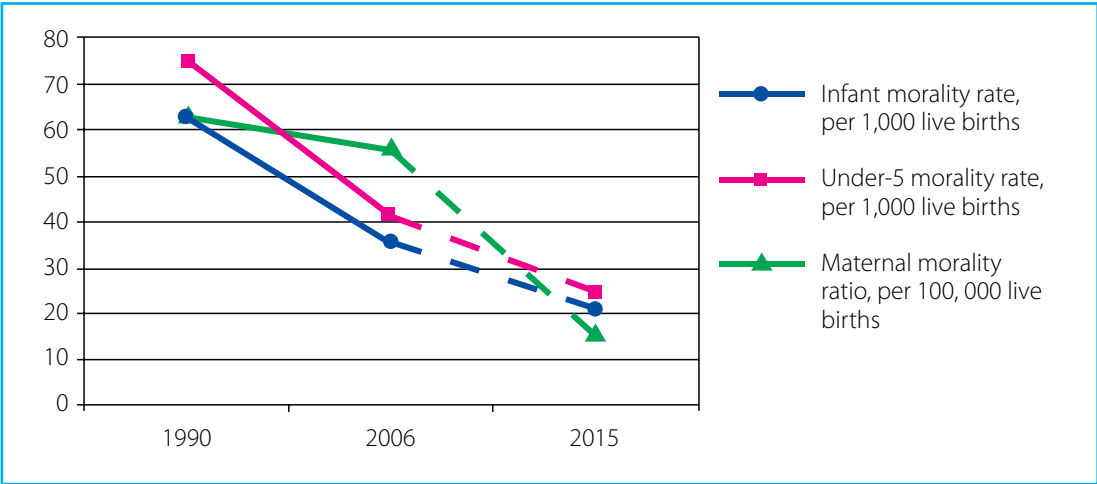
The results of the 2006 MICS show that actual rates of maternal and infant (under 1 year) mortality are higher in the republic than official data shows. Thus the maternal mortality rate is 104 per 100 thousand live births, the infant mortality rate is 38 per 1000 newborns, and the mortality rate in rural areas is 1.4 times higher than that in urban areas.

GOALS	Quantity & Regularity of Survey Information			Quality of Survey Information			Statistical Analysis			Statistics in Policy-Making			Reporting and Dissemination of Information		
	Strong	Fair	Weak	Strong	Fair	Weak	Strong	Fair	Weak	Strong	Fair	Weak	Strong	Fair	Weak
Reduction of Child Mortality		√			√			√			√			√	
Improvement of Maternal Health		√			√			√			√			√	

Mortality reductions are attributed to: 1) implementation of improved perinatal care and baby friendly services in 48 per cent of the 62 maternity hospitals in the country, directly addressing the primary causes of newborn and maternal deaths; 2) country wide implementation of Integrated Management of Clinical Illness (IMCI), addressing the primary causes of child death; and 3) high coverage rates of immunisation, breast feeding, and reproductive health services and supplies. Achievements in maternal, newborn, and child health are correlated with investments made in training and mentoring of providers; basic minimum infrastructure, equipment, and supplies; and high political commitment, as reflected by the inclusion of children under 5, pregnant and lactating women and women using contraceptives in the state guaranteed benefit package, the establishment of a national MCH centre and unit, state financing of vaccines, approval for the perinatal programme, and incorporation of updated maternal and child health content into continuing medical education provided by the Kyrgyz State Medical Institute.

Infant and Child Mortality

Identification of the infant/child mortality level in Kyrgyzstan is complicated by the fact that until 2004, the live/stillbirth criteria established during the Soviet era were still in use. This led to an underreporting of real infant/child mortality rates.

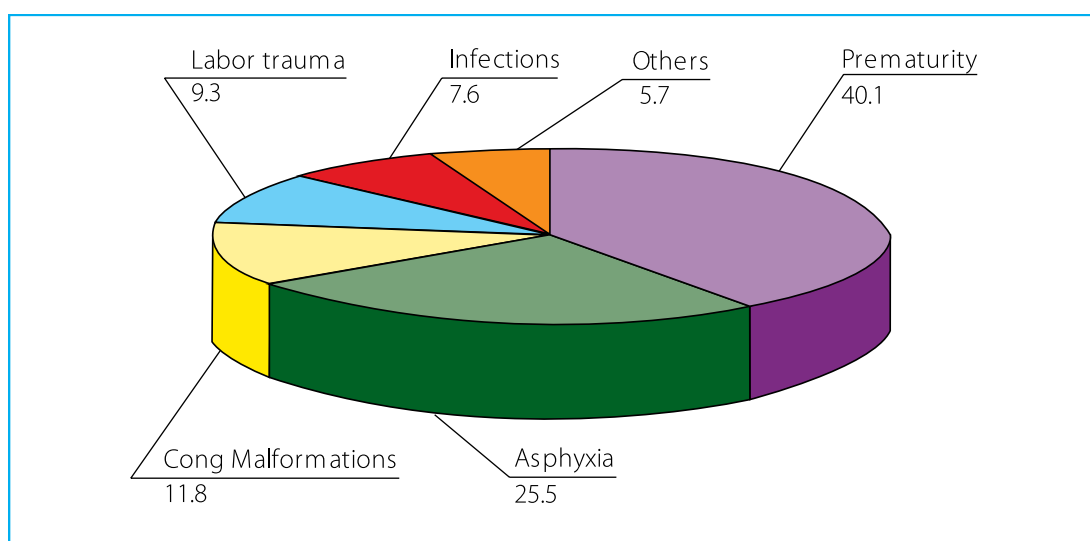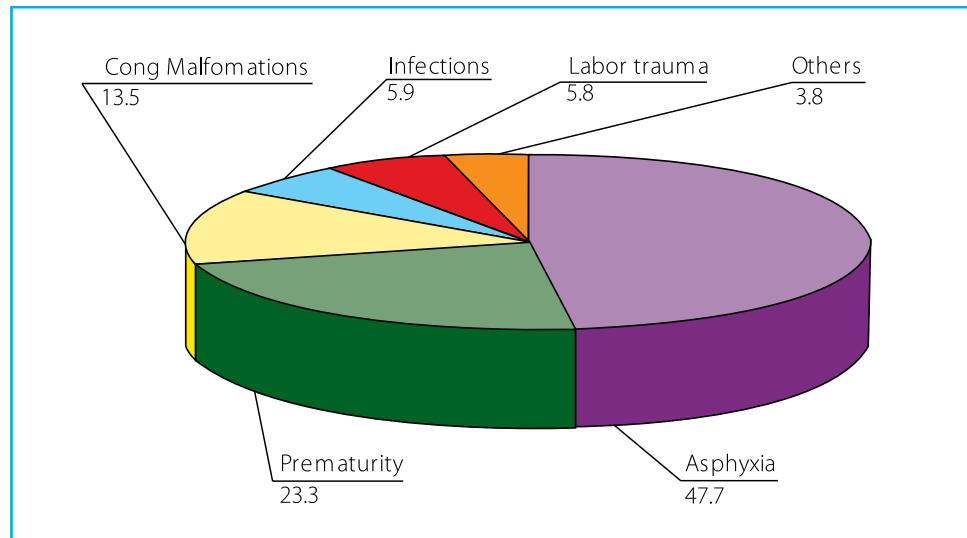*Figure 1.2: Causes of Early Neonatal Mortality in Kyrgyzstan (2006) %[4]*

Labor trauma 9.3
Infections 7.6
Others 5.7
Prematurity 40.1
Cong Malformations 11.8
Asphyxia 25.5

Figure1.3: Structure of Causes of Perinatal Mortality, Kyrgyz Republic, 2006 (%) [4]

With the transition in 2004 to the live birth and still-birth criteria recommended by WHO, a predicted growth of infant mortality figures has been recorded in the country (2004 - 25.6 per 1000 newborns; 2007 – 29.8, National Statistical Committee, according to the MoH - 32.6). In the age structure of maternal mortality more than two thirds of infants die in the neonatal period (0-27 days); 87-89 per cent of these deaths occur in the early neonatal period (0-6 days). Figure 1.2 shows the breakdown of main causes for early neonatal mortality and figure 1.3 the main causes of perinatal conditions.

Of all infant deaths in the first year of life (IMR) 50 per cent occur within the first 28 days, and 75 per cent of these occur within the first 7 days of life. Deaths during the perinatal period account for the majority of cases of child mortality. In 2006, these types of cases accounted for 61 percent of the total number of deaths among children under 1 year of age. Causes include respiratory disease, congenital anomalies, infectious diseases, and parasites. Mortality during this period is also related to undiagnosed problems during pregnancy, insufficient prenatal and postnatal care, deficiencies in the qualifications of obstetrics staff, and a lack of resuscitation services for newborns.

 A comparison of neonatal mortality between provinces shows a downward trend in provinces where effective perinatal care strategies have been initiated and an upward or stagnant trend where effective perinatal care strategies have not yet been introduced. This comparison demonstrates the need to accelerate the national scale-up of improvements in effective perinatal care, especially in Osh, Jalalabad, and Chui provinces, which account for a large proportion of all births and infant deaths in the country. Without investments to improve effective perinatal care in Osh, Jalalabad, and Chui, the national trends will not improve as expected by 2010.

According to MICS survey data, infant mortality in Kyrgyzstan is 38, while child mortality is 44. Male mortality both before the first birthday and under five years of age is 1.8 times higher than female mortality, a figure largely determined by biological factors. In rural areas where the living standard is lower, the child mortality rate is 1.4 times more than in urban areas.

Table 1.3: Infant and Under 5 Mortality in Kyrgyzstan 2006[5]

	Infant mortality rate	Under 5 mortality rate
SEX		
Male	48	56
Female	27	31
RESIDENCE		
Urban	31	35
Rural	43	50
Total	38	44

Under-five mortality is also dependent on appropriate and integrated management of childhood illness and immunisation coverage. IMCI has been implemented at the primary care level throughout the country, IMCI drugs are included in MHI drug lists, and national immunisation coverage is 98.8 per cent. Further declines will be dependent on the implementation of hospital IMCI to complement activities completed at the primary care level.
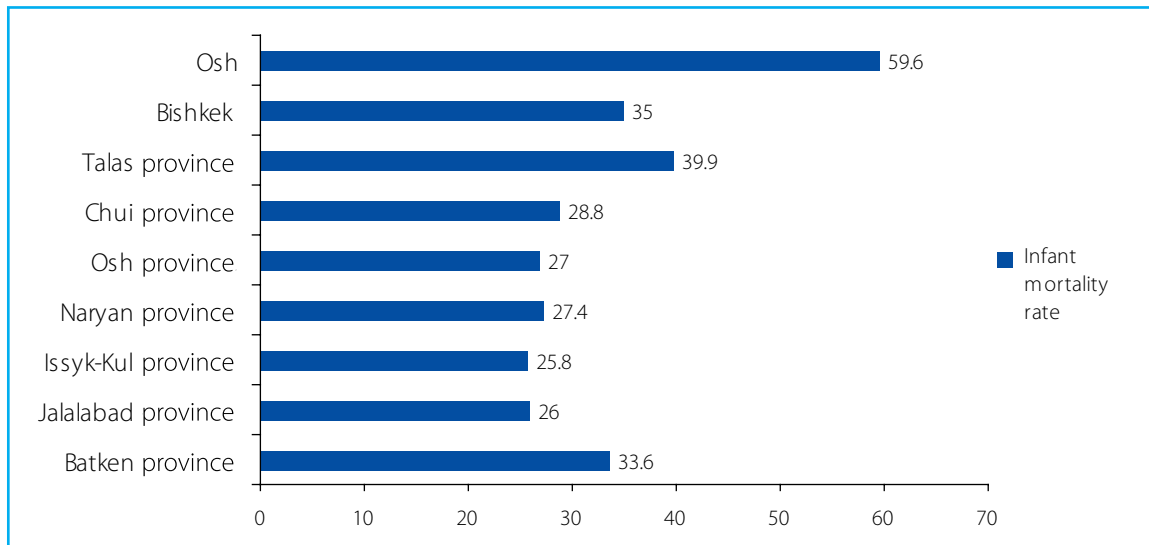
A comparison with estimates for infant and child mortality based on the Demographic and Health Survey of 1997 shows a steady reduction of these indicators since the 1980s.

Figure 1.4: Trend in under-5 mortality rates, Kyrgyz Republic, 2006 [5]
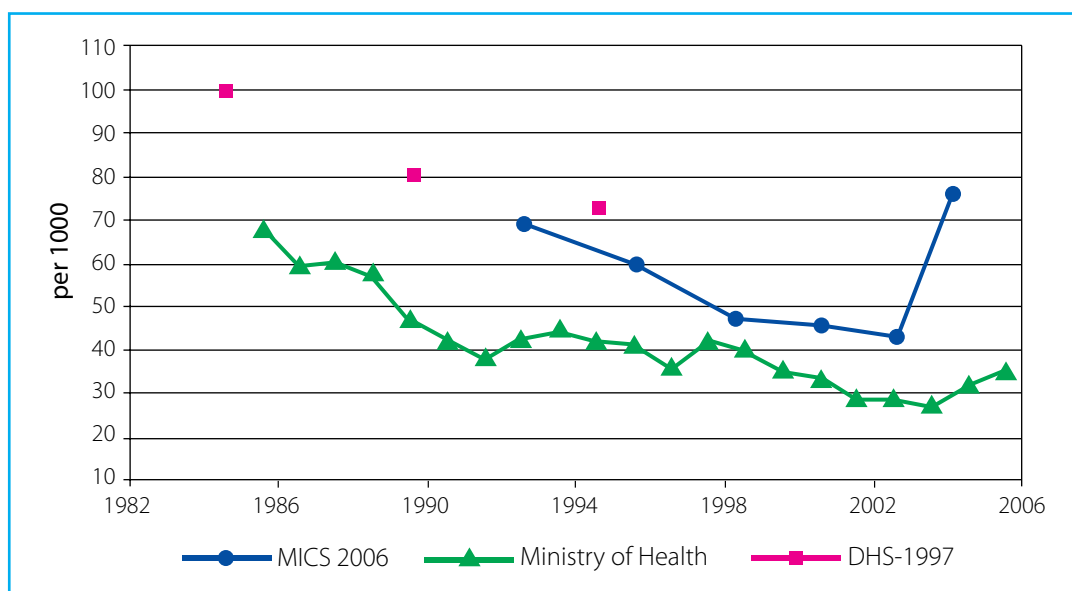
Until 2003 there was a tendency for reduction of child mortality. However after new methodology and evaluation criteria were adopted the child mortality rate increased between 2003 and 2005 to 29.7 per million. There is substantial misbalance of these indicators by regions – child mortality is higher in the regions where prenatal centres are located (Bishkek and Osh). Indicators of child mortality vary significantly by region. The lowest mortality rates are in Chui and Issyk Kul provinces, the highest rates are found in Batken and Osh provinces. Statistics show that Bishkek has the highest percentage of child mortality, due mainly to the large number of internal migrants living in very poor conditions. There is a great dispersion of neonatal care between different hospitals in Bishkek. In particular at the second stage of caring for newborns, there is no clear differentiation of functions between hospitals, and thus an overlapping of services.
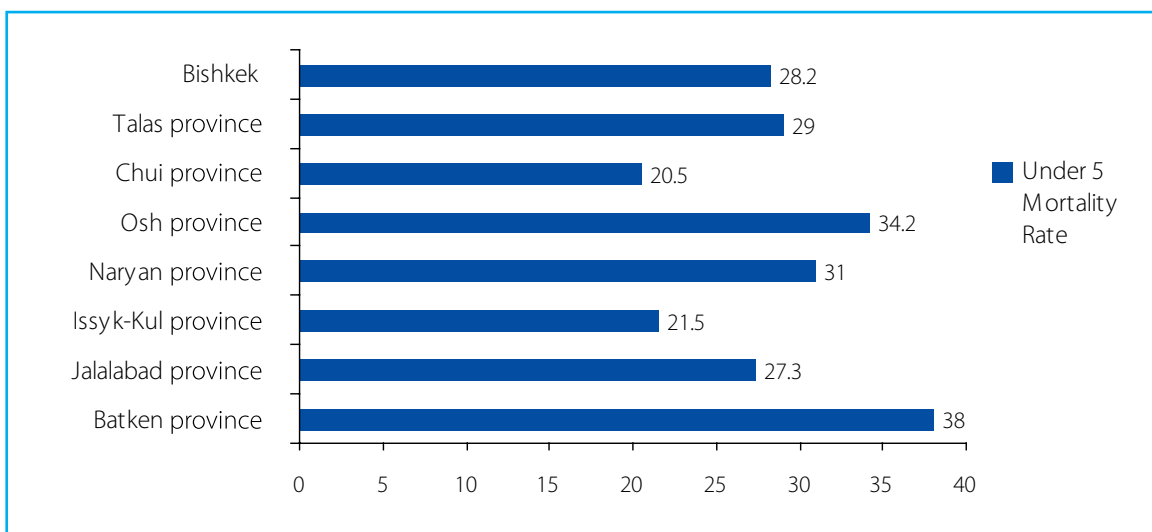
Figure 1.5: UNDER 5 MORTALITY IN KYRGYZSTAN BY REGION [6]

Region	Infant mortality rate
Osh	59.6
Bishkek	35
Talas province	39.9
Chui province	28.8
Osh province	27
Naryan province	27.4
Issyk-Kul province	25.8
Jalalabad province	26
Batken province	33.6

The fact that child and infant mortality rates are several times higher in Bishkek and Osh than in other parts of Kyrgyzstan supports the idea that there is insufficient access to high-quality medical services for children; parents bring children from remote regions to the cities for treatment and difficult cases very often result in fatal outcomes as seen in figures 1.5 and 1.6. **In terms of regions, the worst indicators are observed in Batken and Talas provinces.**

Analysis of mortality cases in the republic has shown that the majority of neonatal deaths occur in the first 7 days of infants' life, and that the largest share of these cases occurs during the first 24 hours after childbirth. This means that the majority of neonatal deaths take place when a mother and a child are under the supervision of health professionals. Therefore, the focus should be on quality of health services to mother and child delivered by health care organisations and the qualifications and competence of health professionals. This has the potential to improve the outcomes of deliveries and to prevent neonatal mortality. Diarrhoea is one of the leading causes of illness for children under five. Children in rural areas had episodes of diarrhoea 1.5 times more often than children in urban areas. The highest frequency of cases occurred in children of 6-23 months of age. Oral Rehydration Therapy (ORT) was not given to 79.6 per cent of children with diarrhoea.

Figure 1.6: INFANT MORTALITY RATE IN KYRGYZSTAN [7]

Region	Under 5 Mortality Rate
Bishkek	28.2
Talas province	29
Chui province	20.5
Osh province	34.2
Naryan province	31
Issyk-Kul province	21.5
Jalalabad province	27.3
Batken province	38

Maternal mortality:

Maternal mortality is defined by the ILBD as a woman's death caused by pregnancy complications (irrespective of its duration and site), which occurs during pregnancy or during the 42 days after its termination. Thus, the rate of maternal mortality is defined by the number of women who die due to complications during the pregnancy, delivery or postpartum period per 100,000 live births. The officially maternal mortality rate in Kyrgyzstan in 2007 was 51.9 cases per 100,000 live births, according to the NSC, and 62.3 cases per 100,000 live births, according to data from the Republican Medical Information Centre of the Ministry of Health. (For comparison, in Europe the maternal mortality rate is 15.05 cases per 100,000). However, it is evident that these official statistics understate the true situation; according to MICS survey data, the maternal mortality rate is 104 cases per 100,000 live births.[5]

Maternal mortality is dependent on appropriate care for women during pregnancy, labour, delivery, and post partum, but is especially linked to the quality of hospital obstetric care for normal delivery and emergency care. It is highly dependent on competent provider skills. In Kyrgyzstan women have good access to antenatal and delivery care, with 97 per cent of pregnant women receiving antenatal care and 97 per cent delivering with a trained provider in hospital. In addition, improved perinatal care practices have been introduced in 48 per cent of all maternities, where monitoring data indicate an increase in active management of the third stage of labour, and a decline in post partum haemorrhage.

An additional achievement in Kyrgyzstan is the high contraceptive prevalence rate (47.8 per cent), which is associated with fewer unplanned pregnancies, abortions and deliveries, and lower pregnancy related deaths. Further declines in maternal mortality are dependent on three key factors 1) the scale-up of training and mentoring to remaining maternities to implement effective perinatal care practices; 2) training and mentoring on the management of obstetric emergencies, including haemorrhage and eclampsia, and 3) sustained access to reproductive health services and contraceptives especially for women living in rural and remote areas.

Table 1. 4: Coverage of Maternity care (WHO 2005)[9]

Country	Deliveries attended by Skilled attendant (%)	Deliveries in Health Facilities (%)	Antenatal care Visits (4 or more) (%)	Neonatal Mortality Rate (%)	Maternal Mortality Ratio (%)
Kyrgyzstan	98	96	81	55	110

Despite these achievements, maternal mortality in Kyrgyzstan is still unacceptably high: 63.2 per 100 thousand live births in 2007. According to the MICS 2006 survey results, the maternal mortality rate in Kyrgyzstan was 104 deaths per 100,000 live births, which approximately corresponds to the estimates of international organisations (UNICEF, UNFPA, WHO) throughout the last 10 -15 years. In contrast with infant and child mortality rates, the maternal mortality rate remains constant.
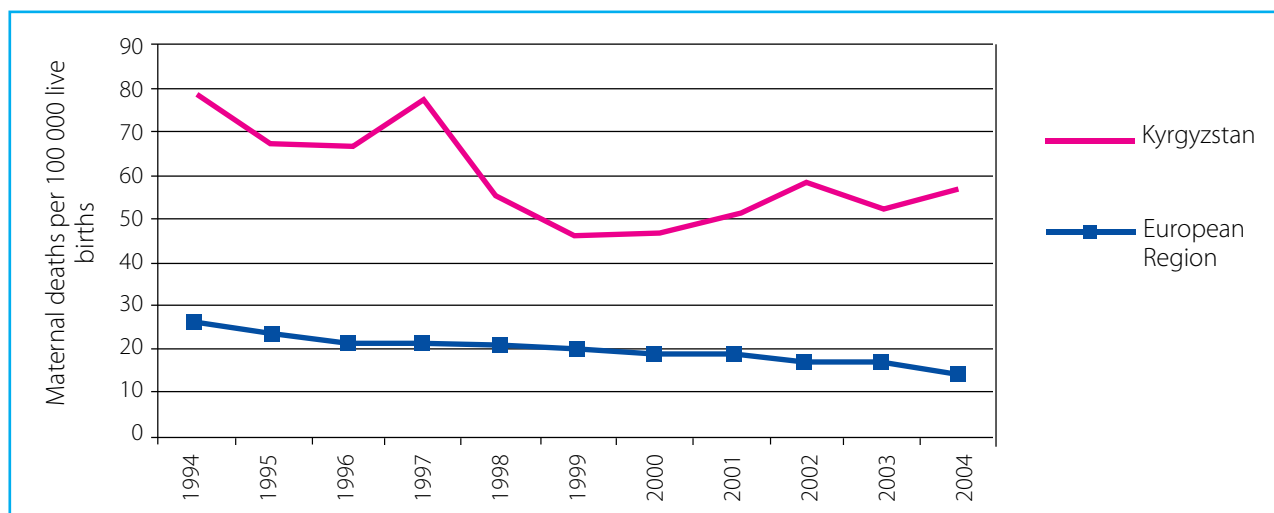
There are significant regional differences in maternal mortality ratios. The highest rate of maternal mortality is observed in the poorest provinces - Naryn and Talas, and the lowest in Osh province and in the city of Bishkek. This indicates a dependence of the given indicator on living standards and poverty as the key reasons for a high maternal mortality ratio in the republic .

*Figure 1.8: Maternal Mortality ratio from 2000-04 by oblast* [7]
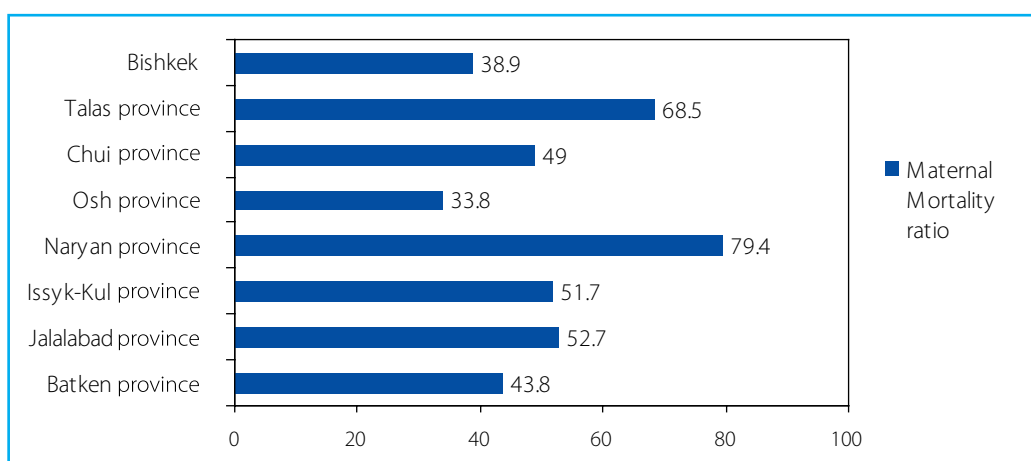
Causes of Maternal Mortality

Hypertensive disorders in pregnancy (40.0 per cent), obstetric bleeding (21.5 per cent) and septic complications predominate among causes of maternal mortality. The most common fatal complication is post-partum haemorrhage. Sepsis, complications of unsafe abortion, prolonged or obstructed labour and hypertensive disorders of pregnancy, especially eclampsia, claim further lives. These complications require prompt access to quality obstetric services equipped to provide lifesaving drugs, antibiotics and transfusions and to perform caesarean sections and other surgical interventions that prevent deaths from obstructed labour, eclampsia and intractable haemorrhage. Maternal mortality is 1.5 - 2 times higher at the level of primary hospitals, which lack qualified personnel and specialised care, and the main causes of deaths are emergency obstetric conditions. Therefore the majority of pregnant women or women in childbirth die without getting to provincial maternal organisations or perinatal centres as a result of a lack of well-timed delivery of emergency care or poor quality of this care.
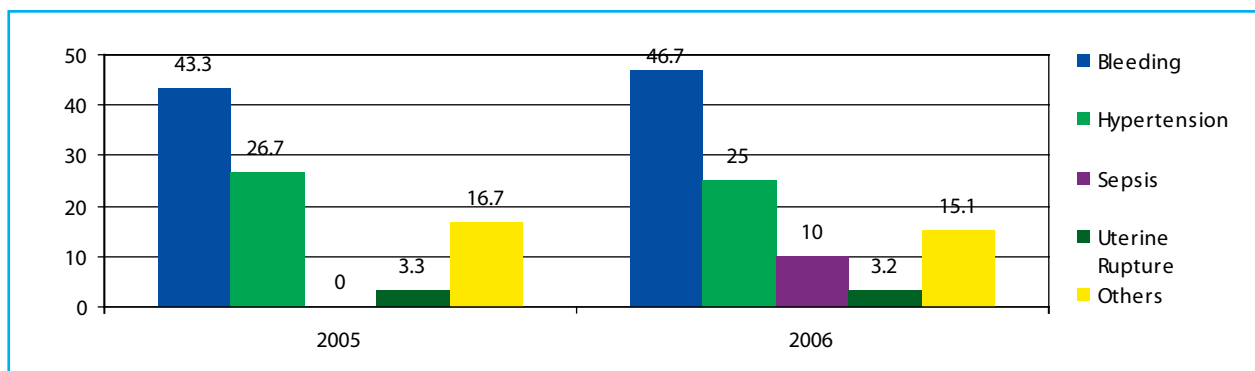
The number of births with various complications has significantly increased. Today, easy deliveries make up only 40 per cent of all deliveries in the republic (compared with 56 per cent in Russia, and 44 per cent in Ukraine). In Batken and Talas Provinces easy deliveries make up less than one-third of all deliveries.

Thus, infant, child and maternal mortality rates are relatively high in Kyrgyzstan. Infant and maternal mortality are determined by a multitude of causes: economic, social, cultural, the situation of the public health system, the demographic structure, behaviour and so on. Addressing infant, child and maternal mortality is an urgent public policy matter and should be a priority on the agenda of the public authorities.

Antenatal care:

The antenatal period is the time of intrauterine development of the foetus from the time the zygote is formed until labour takes place. It is very important to adequately organise a system of antenatal care (antenatal monitoring) which includes care provided to pregnant women to protect their health as well as the health of their unborn children, and to ensure necessary assistance for partners or families to ease the transition to motherhood and fatherhood.

Antenatal care envisages prophylaxis, early screening and treatment of diseases for mother and foetus. Training that helps women correctly prepare for labour and enhances their trust in health personnel (birth attendants) plays an important role. Adverse outcomes such as low birth weight can be reduced through a combination of interventions to improve women's nutritional status and prevent infections (e.g., malaria and STIs) during pregnancy. Quality health care and testing during the antenatal period allows early stage prevention and detection of the signs and symptoms of diseases or deviations and gives the mother an opportunity to seek appropriate treatment. This, in turn, assists in reducing newborn morbidity and infant mortality.

WHO recommends a minimum of four antenatal visits based on a review of the effectiveness of different models of antenatal care. WHO guidelines are specific on the content on antenatal care visits, which include:

Blood pressure measurement

Urine testing for bateriuria and proteinuria

Blood testing to detect syphilis and severe anaemia

Weight/height measurement (optional)

Table 1.5: Antenatal care (MICS survey) [5]

	% of Pregnant women receiving antenatal care one or more times during pregnancy	Blood test taken	Blood Pressure measured	Urine specimen taken	Weight Measured
Batken	97.4	97.1	97.1	97.1	97.1
Jalalabad	92.7	92.4	92.6	92.0	90.0
Issyk-Kul	99.4	99.4	97.7	99.4	99.2
Naryn	97.2	97.2	97.2	97.2	96.7
Osh	96.8	94.4	96.3	94.2	95.5
Talas	97.9	96.8	97.9	96.8	97.9
Chui	99.9	99.7	97.4	99.7	99.4
Bishkek	99.4	99.4	99.4	99.4	99.4

Coverage of antenatal care (by a doctor, nurse, or midwife) is nearly a standard in Kyrgyzstan with 97 percent of women receiving antenatal care at least once during pregnancy. There are also negligible differences with regard to background characteristics. Eighty-five per cent of women receive antenatal care from a medical doctor during pregnancy.

Table 1.6: Antenatal care in Kyrgyzstan 1997- 2006

	Any skilled	Doctor	Nurse/midwife trained
Kyrgyzstan, 1997	97.5%	65%	32%
Kyrgyzstan, 2006	97%	85%	11%
Urban 1997	99%	92%	6%
Urban 2006	99%	95%	4%
Rural 1997	97%	58%	39.5%
Rural 2006	95%	79%	16%

The proportion of pregnant women who received skilled antenatal care/monitoring once or several times during the pregnancy is 96.9 per cent. The analysis reveals no significant difference by region. However, there was some difference in percentage of pregnant women who received skilled antenatal care between urban and rural areas (95.4 per cent and 99.0 per cent respectively). In the poorest quintile group, these women accounted for 93.6 per cent, and in the richest quintile they accounted for 99.0 per cent. According to the survey results, in 85.3 per cent of cases, doctors provided antenatal care services and in 11.3 per cent of cases, a nurse or midwife provided the services. Of the surveyed women, 2.5 per cent did not obtain any antenatal care services during pregnancy. It is noted that there is a difference between rural and urban areas in terms of antenatal care services provided by a physician (79.0 per cent vs. 94.6 per cent respectively).

The highest proportion of women who received antenatal care from medical doctors are located in Bishkek (98.2 per cent) and Naryn Province (94.6 per cent), while in Issyk Kul and Batken Provinces the percentages of women who received antenatal care were 78 per cent and 75.5 per cent respectively (Figure 1.10). Correspondingly, the highest proportion of pregnant women who received antenatal care from a nurse or midwife was observed in these regions (18.5 per cent in Issyk Kul Province and 21.8 per cent in Batken Province). There was also a correlation between the household wealth index and antenatal care coverage by doctors. The lowest coverage rate was observed in the poorest and the second poorest quintile groups (71.7 per cent and 82.4 per cent respectively), and the highest coverage rate is observed in the richest and the second richest quintiles (93.3 per cent and 88.6 per cent respectively).

Figure 1.10: Coverage by antenatal care, Kyrgyz Republic, 2006 [5]
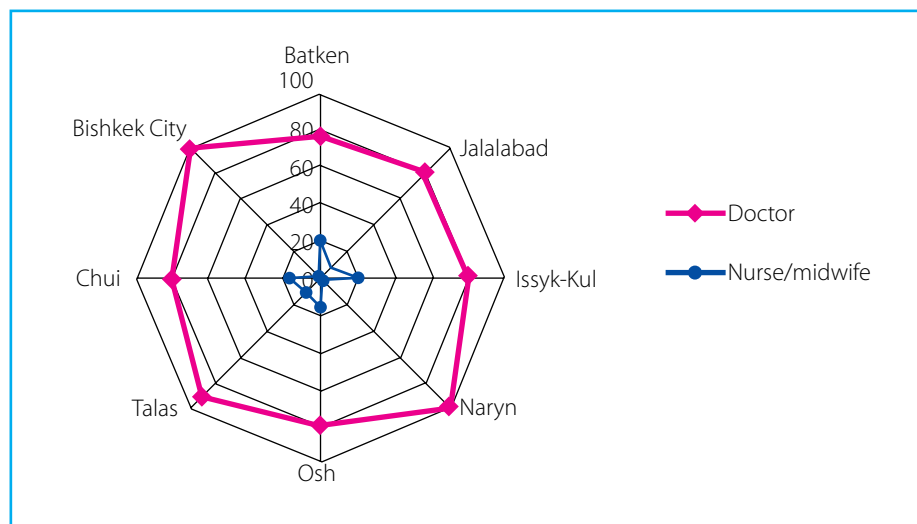
It should be noted that low quality of antenatal care is related to a lack of an antenatal services package for pregnant women with different pathologies, in particular in rural areas, including a lack of criteria for timely referral of a patient to an appropriate specialty doctor or appropriate obstetric facility, lack of monitoring of compliance to clinical protocols, high attrition of human resources and a lack of incentives for good performance for health professionals. Some FAPs and FGPs in remote areas have hospital beds designed for deliveries. However, these obstetric organisations do not have appropriate equipment and qualified personnel, and it is impossible to ensure safety of deliveries for both women in childbirth and for newborns.

Providing care in antepartum period, delivery, and postpartum period for women and newborns

There is no system of guaranteed supplies of contraceptives in the republic, limited resources do not allow for procurement, and therefore the country is dependent on donor supplies (UNFPA and USAID). An unjustifiably long procedure for approval of clinical protocols hampers implementation of efficient, internally recognised programmes for providing care to mothers and children. Forty-five per cent of delivery facilities are not covered by efficient perinatal technologies, there is no system of monitoring and practical training, heads of facilities show low interest, there is insufficient work carried out with the population, and there is no system of preparation of families for delivery. Introducing of maternal and perinatal mortality audits is delayed.

Infrastructure in most delivery facilities is in bad condition: absent or non-functional sewage, water supply systems, and roofing; inadequate heat provision, oxygen supply system, and hand washing facilities; and absence of required drugs and medical supplies. Providing urgent emergency obstetric care is not at a sufficient level. There is no single approach to management of pregnant women with severe forms of eclampsia and pre-eclampsia shared by obstetrician-gynaecologists, anaesthetists and experts in resuscitation. Though reliability of registration of maternal and child mortality is being improved, there is still considerable variation between official data and independent sources.

Three quarters of all maternal deaths occur during delivery and the immediate post-partum period. The single most critical intervention for safe motherhood is to ensure that a competent health worker with midwifery skills is present at every birth, and transport is available to a referral facility for obstetric care in emergencies. A World Fit for Children goal is to ensure that women have ready and affordable access to skilled attendance

at delivery. The indicators are the proportion of births with a skilled attendant and proportion of institutional deliveries. The basic goals of assistance to women during the birthing process include safe (non-traumatic) delivery, early diagnosis and treatment of delivery complications (such as excessive bleeding, eclampsia, obstructed labour, etc.), early diagnosis and treatment of post-partum complications and effective post-partum care. No less important is the attention given to the newborn in the early neonatal period.

*Table 1.7: Assistance during delivery, Kyrgyzstan, 1997 and 2006*

	Total 1997	Total 2006	Urban 1997	Urban 2006	Rural1997	Rural 2006
Any skilled	98%	98%	100%	100%	98%	95%
Doctor	61%	76%	77%	94%	56%	64%

The MICS included a number of questions to assess the proportion of births attended by a skilled attendant. A skilled attendant includes a doctor, nurse, midwife or auxiliary midwife. At present, delivery at a hospital is free of charge in Kyrgyzstan. However, in spite of this, delivery assistance in hospitals is not accessible for all women, especially those who live in remote, mountainous areas, for example, in Naryn, Osh and Jalalabad Provinces.

The analysis revealed that deliveries in the overwhelming majority of cases (96.9 per cent throughout the country) took place in medical institutions. For the most part, large regional differences were not observed, except for the Batken and Jalalabad Provinces. In these regions, the percentage of deliveries that took place in medical institutions were 88.3 per cent, and 92.6 per cent, respectively.

All the deliveries in Chui and Issyk-Kul Provinces and Bishkek city were assisted by skilled health personnel. In a majority of cases (76.3 per cent), doctors provided delivery assistance, while in 20.9 per cent of cases a nurse or midwife handled the task. In just 1.8 per cent of cases, skilled birth attendants did not attend the delivery (Figure 1.11).

Figure 1.11: Percentage of deliveries assisted by skilled attendant. Kyrgyz Republic. 2006 [5]
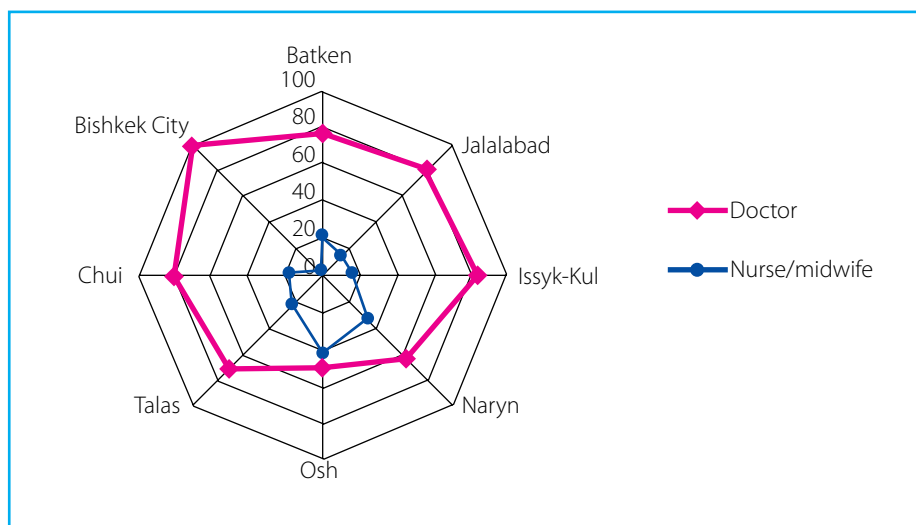
It was revealed that the percentage of deliveries assisted by doctors, nurses or midwives depended on the woman's place of residence. In urban areas, 94.2 per cent of deliveries were assisted by doctors and only 5.7 per cent were assisted by a nurse or midwife. In rural areas doctors administered 64.0 per cent of births with 31.2 per cent of births assisted by nurses/midwives.
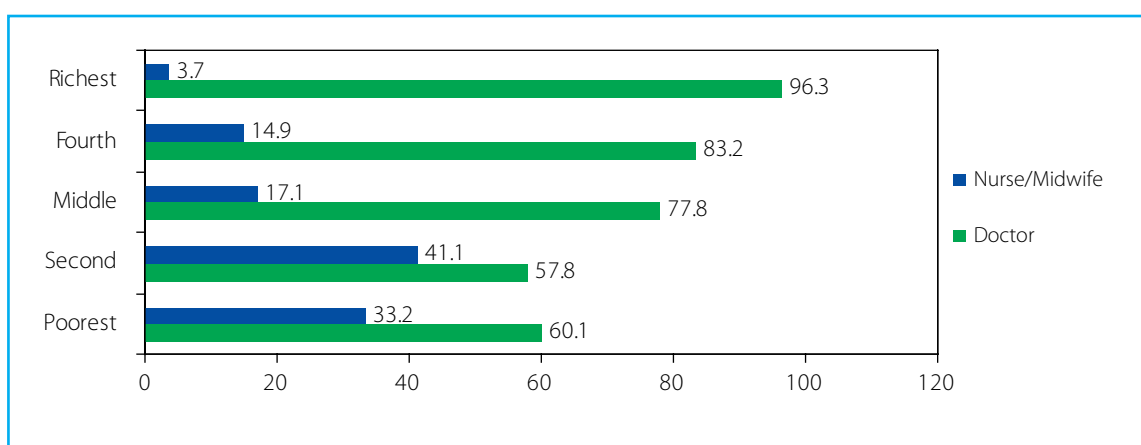
The survey results by ethnic group showed that the percentage of deliveries assisted by doctors is a little higher for Russian respondents (86.4 per cent) compared to other groups, and 100 per cent of their deliveries are in medical institutions. The percentage of deliveries assisted by doctors for Kyrgyz women was 74.0 per cent, while 22.7 per cent of births were assisted by nurse or midwife. For Uzbek women the percentages were 72.6 per cent and 23.6 per cent, respectively.

According to the survey results, the higher the educational level of a woman, the higher the likelihood that her delivery was assisted by doctors, while a higher percentage of women with just primary education received delivery assistance from a nurse or midwife.

The wealth index level of a household also has an impact on the type of medical assistance at delivery. As Figure 1.12 shows, nearly 60 per cent of women from the poorest quintile group of households had their deliveries assisted by doctors, while 33.2 per cent of women from these households received assistance from a nurse or midwife. For the richest quintile groups these indicators are 96.3 per cent and 3.7 per cent, respectively.

Breast feeding

Across Kyrgyzstan, better hygiene, skin-to-skin contact immediately after birth and exclusive breastfeeding are becoming standard practices. Statistics on early initiation of breastfeeding (from the MICS survey) indicate that almost 70 per cent initiate breastfeeding within an hour after birth and 89 per cent on the first day. This is a marked improvement over the corresponding 1997 figures of 53 percent and 64 per cent respectively. Meanwhile rates of exclusive breastfeeding in early infancy also show improvement, although rates of exclusive breastfeeding at 6 months remain low.

The DHS measured initial breastfeeding, breastfeeding status and median duration.

Initial breastfeeding	1997	2006
Started breastfeeding within one hour	53 per cent	70 per cent
Started breastfeeding within first day	65 per cent	89 per cent

Exclusive breastfeeding	1997	2006
Children 0-3 months exclusively breastfed	31%	41%
Children 0-5 months exclusively breastfed	15%	32%
Children 6-9 months adequately fed	-	49%
Children 12-15 months breastfed	79%	68%
Children 20-23 months breastfed	21%	26%

Nutrition

In Kyrgyzstan 13.7 per cent of children are stunted in their first five years of life. The spread of stunting is different in various provinces of the country. Substantial differences in nutritional indicators exist between provinces. Stunting in children under 5 is highest in Talas, Issyk Kul and Batken Provinces (approximately 22-27 per cent), and lowest (approximately 8-10 per cent) in Jalalabad and Chui Provinces and Bishkek City, with Naryn and Osh Provinces showing stunting levels between 14 and 15 per cent. Wasting was highest (8-9 per cent) in Jalalabad and Issyk Kul Provinces. Interestingly, obesity in children is most notable in Issyk Kul and Talas Provinces – regions with the highest occurrence of stunting

The results of the 2005 MICS indicate that nutritional status of children in Kyrgyzstan has improved since 1996. In the 1996 DHS, almost 25 percent of children age 0-35 months were stunted, compared with 13.7 percent of under-fives in the 2005 MICS, and 11 percent were underweight, compared with 3.4 per cent percent in the 2005 MICS.

Table 1.8: Prevalence of malnutrition in Kyrgyzstan, 1996- 2005 [11]

Nutrition	Stunting	Severe stunting	Wasting	Severe Wasting	Underweight	Severe underweight
Under five years 2005	13.7	3.7	3.5	0.4	3.4	0.3
Under three years 2005						
Under three years 1996	25	6	3.4	0.7	11	1.7

Coverage of children with Vitamin A supplementation is 93.7 per cent. During pregnancy only 17.0 per cent of pregnant mothers received folic acid, 40.8 per cent of mothers received vitamin A supplementation within the first days after the delivery, although folic acid supplementation within the first 3 months of pregnancy is envisaged by the National Clinical Protocols, and obligatory vitamin prescription within the first days after delivery had been approved by Order #260 of 2004 of the Ministry of Health. Among 6-24 month old children 10.7 per cent were diagnosed as stunted below median level by more than -2CO.

50.6 per cent of 6-24 month old children are diagnosed as having anaemia. Severe anaemia (haemoglobin level less than 7.0 g/decilitre) is found in 1.0 per cent of children. The whole anaemia severity picture is 2.1 per cent with severe anaemia and 97.0 per cent with medium anaemia. The prevalence of iron-deficiency anaemia (IDA) among 6-24 month old children is 40.1 per cent. Iron reserve depletion and iron deficiency are found more frequently than IDA.

Figure 1.13: Regional distribution of malnutrition in 0-59 month old children, Kyrgyz Republic, 2006 [5]
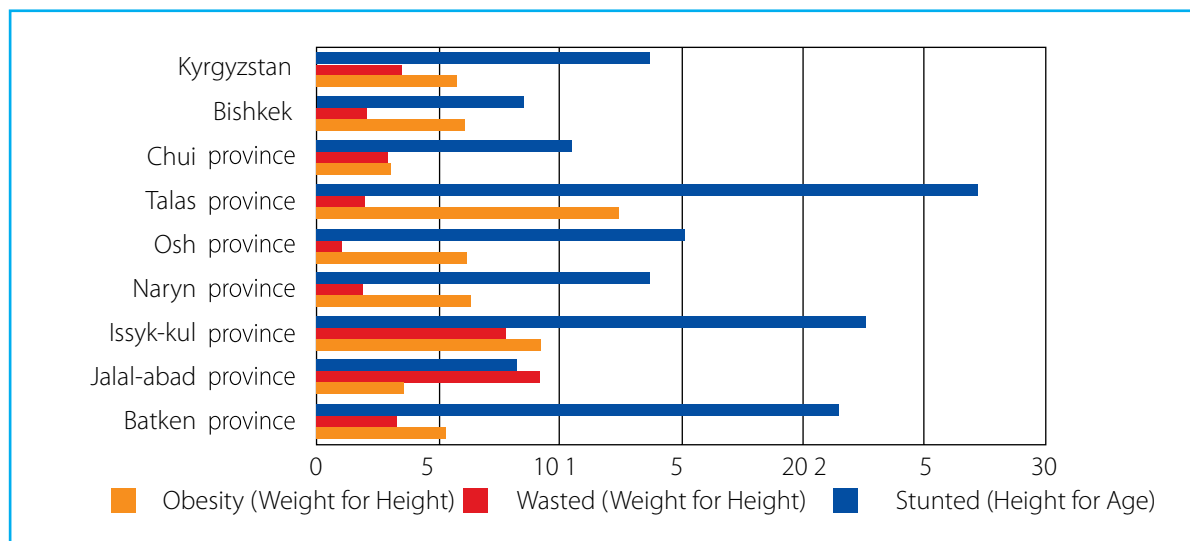
There has been some improvement in food security between 2000 and 2003, both for children and the population as a whole. However, average levels of food consumption remain below the recommended minimum calorific values. There are clear regional differences, with child food consumption in calorific terms being higher in provinces with strong agricultural sectors, such as Jalalabad and Batken. Nevertheless, in all provinces, with the recent exception of Jalalabad, average child calorie intake remains below the recommended nutritional minimum. Nutritional standards are lowest in Bishkek, highlighting the fact that access to material resources is not necessarily translated into good nutritional intake. There was a sharp drop in nutritional intake amongst children aged 0-17 in Talas and Batken between 2002 and 2003.

CURRENT MATERNAL AND NEWBORN HEALTH PROGRAMS IN KYRGYZSTAN

With the help of international organisations a number of programmes have been introduced in Kyrgyzstan based on WHO strategies. These include making pregnancy safer / promoting effective perinatal care, breast-feeding, primary resuscitation of newborns, criteria for live and still birth and registration of newborns. These programmes are mainly financed by donors at the level of pilot regions and due to lack of funds their future institutionalisation might be difficult. Their effectiveness is undermined by inadequate coordination and integration into the existing health system, and difficulties with monitoring after completion of the projects

Ministry of Health (MoH) Programmes

The Ministry of Health (MoH) is responsible for developing and implementing national health policy and the State Benefits Programme. It is also in charge of quality control of pharmaceuticals, medical products and equipment and of the quality of health services. The Ministry has a supervisory role in relation to all health-related organisations (including medical education), regardless of ownership and administrative level; and direct managerial responsibility for a small number of specialised republican health facilities and tertiary level facilities in the capital, Bishkek. In addition, the MoH coordinates the activities of other health care organisations by means of coordination commissions on health management.

Manas Taalimi Program (2006-2010)

Priorities of the Manas Taalimi national healthcare reform programme include improving the health status of the population and achieving the Millennium Development Goals (MDGs) by addressing key issues of health protection and improvement. Its main goal is to further improve the delivery system of individual healthcare and to improve access to high quality health care services for the population at all levels of an integrated service delivery system with a leading role for PHC and with the support of efficient inpatient care.

The objectives of the programme include further development of primary health care with particular emphasis on:
- improved performance of FAPs, FGPs and emergency care;
- optimisation of performance of FMCs, hospital Ambulatory Diagnostic Departments and health organisations delivering specialised health care services in an outpatient setting;
- further restructuring and optimisation of inpatient care to establish a hospital network that would respond flexibly to population needs;
- optimisation of the performance of tertiary level health organisations in order to improve access to highly specialised and expensive types of healthcare;
- improvement of management models of organisations providing individual healthcare services in order to increase performance efficiency and quality of healthcare services delivered and further enhance managerial and financial autonomy;
- development of efficient mechanisms of integration and interaction of health organisations delivering individual health care services that would ensure continuity and feedback;
- improvement of physical infrastructure and provision of modern types of medical and laboratory equipment to health organisations that provide individual healthcare services; and
- improvement in the quality of healthcare services delivered to the population by health organisations at different levels of healthcare delivery.

This program is being implemented under a sector wide approach (SWAp). This is a government led process in which government and donors work together to deliver a time bound and costed health sector strategy

that uses national financial management systems. The health sector strategy has been supported by the following developmental partners through parallel financing and pooled budget support: KfW, DFID, Sida, SDC, World Bank, WHO, UNICEF, UNAIDS, UNFPA, ADB, GFATM, CDC, and USAID.

In recent years, Manas Taalimi's maternal and child health component has produced some remarkable achievements including sustained inclusion of treatment of children under 5 and deliveries in the State Guarantee Benefit Package. These have significantly improved access to health services for children and pregnant women. A National Centre for Mother and Child Health (NCMCH) has been established and a Maternal and Child Health unit set up at the Ministry of Health. Effective interventions such as IMCI have been implemented countrywide at the primary health care level. Effective perinatal care and a baby friendly hospitals initiative have been introduced in 48 per cent of facilities. To this end, official data show that in provinces with support for the implementation of effective perinatal care (EPC) early newborn mortality significantly fell whereas in those without such programmes quality of care indicators appear to be stagnating or worsening. Training programmes on child and maternal health have been incorporated in the education programmes of the Kyrgyz State Medical Institute for Retraining and Continuing Education. To improve registration of maternal and child mortality, an electronic newborn register has been gradually expanding to cover the whole country.

Perinatal Care Improvement Programme in Kyrgyzstan for 2008-2017:

The essence of the perinatal care regionalisation programme is that woman should give birth at in-patient facilities which are appropriate for the risk degree associated with their pregnancy or labour. This Programme for improvement of perinatal care in Kyrgyzstan for 2008-2017 has been developed in accordance with the national health policy, framed by the Manas Taalimi National Healthcare Reform Programme for 2006-2010 and the National Reproductive Health Strategy until 2015. It is aimed at implementing commitments towards achieving the MDGs in the health sector. The goal of the Programme is reduction in maternal, perinatal, neonatal and infant mortality, and improvement in quality of health care to mothers and newborns with equal opportunities and in all provinces of the country. This includes building a multilevel system of perinatal/neonatal care with development of main provisions on antenatal, perinatal and neonatal care based on effective WHO methods and the principles of evidence-based medicine, development of a monitoring and evaluation system for quality of perinatal and neonatal care and establishment of a differentiated system of perinatal care funding, based on different level packages of services, depending on the severity of cases.

It is evident that these and other programmes to protect children's health require public support and promotion of a healthy lifestyle in order to be successfully implemented and produce sustainable results. They are also dependent on a well thought-out strategy of cooperation with international organisations actively engaged in this area.

As far as maternal health is concerned significant problems are faced by the system of medical services for mothers and pregnant women. They include physical deterioration of the equipment in obstetrical institutions, lack of qualified obstetricians, gynaecologists and other necessary medical staff, and insufficient training for family practitioners in rendering assistance to women. Public awareness - especially in rural areas - of family planning methods, protection of reproductive health, and safe contraception methods is still insufficient. There is a lack of specialised literature on how to lead a healthy lifestyle, family education, and family planning.

The MoH Department of Medical Service and MCH Unit have worked hard and done an excellent job to raise the

level of operational management and donor coordination for MCH activities. The MCH subcomponent is largely supported by parallel financiers including WHO, UNFPA, UNICEF, USAID, CDC, ADB and KFW. MoH leadership has also enabled the donors to better coordinate their work. Activities such as geographic or operational mapping to define gaps in support for critical MCH interventions have become commonplace and representative of improved stewardship. Finally, a heightened awareness of the importance of monitoring and evaluation is increasing MoH and partner capacity to respond to implementation experience and productively refine and develop technical, management, and coordination processes. In particular, there has been considerable progress made in improving birth and death registration using the international live birth criteria, which was facilitated by the introduction of birth registration and electronic registration (in 3 provinces).

To improve MCH in Kyrgyzstan many international organisations are giving external support to the MoH in areas including hospital care, medical care, and outreach as well as in drafting laws policies and protocols.

Table 1.9: External support to Kyrgyz Ministry of Health - to improve Maternal, Newborn and Child Health and survival [12]

	Policy / Law National strategies, laws, policies, protocols	Provider Practices - Medical Care Services Quality of Care Hospital Care , Primary Care, Out reach	Population Out reach	Procure-ment	M & E
MDG: Reduce Maternal Mortality

Maternal health Reproductive Health Family Planning | RH Strategy (WHO)

STI protocol (UNFPA)

PEPC protocols (WHO, UNFPA, ZP) | Making Pregnancy Safer: Hospital Care
Includes blood safety/Infection control
(WHO, UNFPA, ZP, RHA, ADB, Hope, USAID, Global Fund, KFW)

Making Pregnancy Safer: Prenatal / Primary Care
Including Iron and Folic Acid (ZP, ADB, Hope…) Family planning (UNFPA, ZP…) STI/RTI services (UNFPA, SRC, ZP…) | Village Health Committees – anemia & RTI (SRC)
Stepping stones (UNFPA)
Population education (ZP, HOPE…)
FP Social marketing (PSI) | ObGyn equipment (KFW, UN FPA?)

Contraceptives (UNFPA, ZP, PSI) | Maternal death & near miss audit (WHO, ZP, UNFPA)
Contraceptive Logistics system (UNFPA)
PEPC monitoring (ZP, WHO, UNFPA) |
| MDG: Reduce Infant Mortality

Newborn care | Perinatal Care strategy (UNICEF, UNFPA)

Protocols on newborn care (UNICEF) | Newborn care & Newborn resuscitation
(UNICEF, WHO, UNFPA, ZP, RHA, ADB, Hope)
Breastfeeding (UNICEF, WHO, UNFPA, ZP, RHA, ADB, Hope) Blood Safety / Infection control (UNICEF, WHO, UNFPA, ZP, RHA, ADB, Hope, USAID, KFW) PMTCT (UNICEF, Global Fund) | Village Health Committees (SRC)

Population education (UNICEF, WHO, ZP, Hope, SRC) ARV, express tests (Global Fund) | Cold chain equipment (UNICEF)

Vaccines (GAVI, ADB) | Birth & Death registration, electronic register (UNICEF, CDC)
Live Birth Definition (CDC, WHO, UNICEF) |

MDG: Reduce Child	IMCI strategy (WHO, UNICEF, ADB) Breast-feeding strategy (UNICEF/WHO)	Child nutrition: Breastfeeding, Supplementary feeding, Micronu-trients: A, Fe, FA (UNICEF, WHO, ZP, Hope, SRC, ADB, CDC, SWAP)	Village Health Committees (SRC, SWAP)	Vitamin A (UNICEF, SWAP) Iron (SRC)	Community based and medical train-ing's monitoring (UNICEF) Sitan, monitoring (UNICEF, SWAP)
Mortality Child Health Adolescent		Management of childhood illness: IMCI, ARI, CDD, Helminthes, Ratio-nal Drug Use (UNICEF, WHO, ZP, Hope, SRS, Aga-Khan Fund, SWAP) Immunization (UNICEF, GAVI)	Village health Committees (SRC, SWAP)	Mebendazole (UNICEF) Albenda-zole (Fund Rastropovich-Vishnevskaya)	

ONGOING MATERNAL AND CHILD HEALTH INTERVENTIONS

Analysis of government and other reports by the authors revealed that there is a wide array of maternal and newborn health interventions being reported within the country. In general these interventions have been operationalised with a maternal health perspective. As summarised in the following tables, while the primary objective for a large number of these outcomes is to improve maternal and reproductive health, they all have the potential to impact favourably on perinatal health outcomes.

A number of state programmes are currently being implemented which aim to promote children's healthcare and reduce the mortality rate in Kyrgyzstan. The national programme for improvement in perinatal assistance is looking at measures to ensure safe motherhood based on the introduction of modern technologies. The republican programme for the protection of reproductive health seeks to ensure that optimum spacing between births is observed, and that modern family planning methods are used, in order to promote the birth of healthy and wanted children. The programme on integrated monitoring of practices related to childhood looks at the prevention, and treatment of, childhood diseases (acute respiratory diseases, diarrhoea, measles, and anaemia). In this regard, an effective measure could be to encourage breastfeeding. The programme "Immunisation for 2001- 2005" seeks to reduce the prevalence of infectious diseases among children. Of course, the implementation of these specialised programmes will be combined with the overall strengthening of the health sector.

Table 1.10: Current MNCH Interventions in Kyrgyzstan

Maternal Interventions	Manas Taalimi	Perinatal Care Improvement Program	The republican programme for the protection of reproductive health	The programme on integrated monitoring of practices	The programme "Immunization for 2001- 2005"	State sectoral programme "Jan- Ene" for 2002-2006
Promotion of reproductive health and family planning	√		√			
Seeking skilled care for child birth	√	√	√			
Tetanus toxoid					√	
Iron Folate administration						
Screening of UTI and UTI management	√					
Hypertension screening and treatment for severe hypertension						
Basic obstetric care	√	√				
Emergency Obstetric care						
Neonatal Interventions						
Immediate breastfeeding	√	√		√		
Exclusive breastfeeding	√	√		√		
Periconceptual folic acid suppl.		√				
Tetanus toxoid immunization					√	
Routine postnatal care and care of LBW infants	√	√		√		
Cord care and clean delivery Kit		√				
Antenatal steroids		√				

Neonatal resuscitation	√					
Vitamin A supplementation	√				√	
Antibiotics for PPROM						
EPI (Including new vaccines Hib,pneumococcal and RV)	√				√	
Injectible Antibiotics for Sepsis	√			√		
Oral Antibiotics for pneumonia	√			√		

Table 1.11:

Community	Delivery mode
Family planning (birth spacing)	FAPs/FGPs
Exclusive breastfeeding education/promotion support strategies	FAPs/FGPs, VHC
Extra care of LBW infants (swaddling, thermal care and early breastfeeding)	
Home-based pneumonia management	
Outreach	
Antenatal care	FGPs
Iron-folate supplementation	
Tetanus toxoid	
IPT for malaria during pregnancy	
Skilled attendant at delivery	Family Medicine Centre (FMC)
Newborn resuscitation	
Facility	
Skilled attendant at delivery	FMC/Secondary and Tertiary Hospital Levels
Corticosteroids for preterm labor	
Emergency Obstetric care (impacting newborn outcomes e.g. asphyxia, sepsis etc)	
Newborn resuscitation	

EVIDENCE BASE FOR WHAT WORKS FOR MATERNAL AND NEWBORN HEALTH

The Millennium Development Goal for child survival cannot be met without a substantial reduction in neonatal mortality. Three-quarters of neonatal deaths happen in the first week—the highest risk of death is on the first day of life. With the plethora of interventions, it is important to reach consensus on a reasonable number of interventions that work at the primary health care (PHC) level and also to identify delivery strategies to get these interventions to all who need them.

We focused on interventions which could be delivered at the PHC level: i.e. in community settings and at primary level facilities in district health systems. Primary care settings and interventions were defined as those that include family and community interventions (largely at household or domiciliary level); interventions through outreach services including community health workers operating from village health outposts or primary level facilities; interventions suitable for delivery in primary level facilities, including basic emergency obstetric and newborn care as well as treatment of common serious childhood illnesses; and interventions to improve the continuity of care within and between these levels. The principal objective was to identify a set of evidence-based interventions that could be implemented in an integrated manner for maternal, newborn and child health in these settings through existing cadres of workers and also make the case for new approaches, if needed. We evaluated the potential impact of an improved repertoire of preventive and curative MCH services delivered at PHC level in Kyrgyzstan using available health workers at two levels of coverage: a pragmatic increment from current levels and universal (99 per cent) coverage.

Recent findings suggest that focusing on addressing MCH and survival at PHC level is both feasible and a priority for countries to reach their MDG targets for reducing maternal and child mortality. Recent years have seen a major emphasis on the persisting burden of maternal, child and newborn mortality globally with a particular focus on the MDGs for maternal and child health. Issues pertaining to the burden of this mortality and on interventions to reduce it have been the subject of several recent reports in Lancet and other publications. All of these analyses have provided estimates of disease burden and described a wide array of effective interventions that could make a difference. With the plethora of interventions, it is important to reach consensus on a reasonable number of interventions that work at primary health care (PHC) level and also identify delivery strategies to get these interventions to all who need them.

In the Lancet Review, which focuses on interventions to address maternal, newborn and child survival, 42 MCH interventions were identified with the potential to improve MCH outcomes in PHC settings. Of these 25 could be classified as providing sufficient evidence of impact, cost effectiveness as well as plausibility for inclusion within primary care programmes through a range of care providers and delivery platforms.

Tables 1.12-1.14 summarise the pathways by which interventions that are feasible in PHC settings may impact on MNC mortality and provide cause-specific impact estimates. [13]

Table 1.12: Maternal Interventions Reviewed and Impact pathways

Intervention Categories	Interventions	Target populations	Maternal Sepsis / Infections	Maternal HIV infections	Maternal Anemia and hemorrhage	Maternal Hypertensive Disorders	Obstructed Labour	Abortion & unmet contraceptive needs	Other outcomes and pathways	Impact estimates
PROMOTIVE INTERVENTIONS	Basic 4 visit antenatal care package including 1. Counseling for seeking skilled care, 2. Tetanu s toxoid, screening for UTI and hypertension 3. Iron folate administration	Universal	√		√	√	√	√	√	Improved screening and early detection of PIH and increased referral rates for skilled care and high risk cases [14] — 90% reduction in maternal tetanus in women 20-40 years of age [15] — Antibiotic treatment is 75% effective in clearing asymptomatic bacteriuria (95% CI 0.14 -0.48) and risk of pyelonephritis (RR 0.23, 95% CI 0.13 - 0.41). Antibiotic treatment for UTI was also associated with a 34% reduction in the incidence of LBW births (95% CI 0.49 - 0.89). 16. — 67% reduction in iron deficiency anaemia at term (RR 0.33, 95% CI 0.16, 0.69, random effects [17]. Assumed to reduce the risk of anemia and hence to reduce risk of maternal death by 23% [18]. — 62% reduced risk of LBW (<2500g) seen at term among studies undertaken in community settings (95% CI=0.18 - 0.81).
	Promotion of early initiation and exclusive breastfeeding through counseling strategies	Universal						√	√	Observational evidence of improved birth spacing and maternal nutrition through exclusive and prolonged breastfeeding [19]. — Breastfeeding education had a significant effect on increasing initiation rates compared to routine care (RR 1.53, 95% CI 1.25 to 1.88) [18] (RR) for stopping any breastfeeding before 6 months was 0.91 (95% CI 0.86–0.96). All forms of extra support together affected the duration of exclusive breastfeeding more strongly than the likelihood of any breastfeeding (RR 0.81, 0.74–0.89). Lay and professional support together extended the duration of any breastfeeding (RR before 4–6 weeks 0.65, 0.51–0.82; RR before 2 months 0.74, 0.66–0.83). — Individual counselling, the odds of exclusive breastfeeding were substantially increased in the neonatal period (OR 3.45, 95% CI 2.20–5.42, random effects) and at 6 months of age (1.93, 95% CI 1.18–3.15). — Group counselling increased the odds of exclusive breastfeeding in the neonatal period, (six studies; 3.88, 2.09–7.22, p<0.0001; random effects) and at 6 months of age (five studies; 5.19, 1.90–14.15, p<0.00001; random effects) [18]

Category	Intervention	Type	Evidence
PROMOTIVE INTERVENTIONS	Birth spacing and Family Planning strategies and prevention of unsafe abortion	Universal	After adjustment for major confounding factors, compared with those conceiving at 18 to 23 months after a previous birth, women with inter-pregnancy intervals of 5 months or less had higher risks for maternal death (OR 2.54; 95% CI 1.22 to 5.38), third trimester bleeding (OR 1.73; 95% CI 1.42 to 2.24), premature rupture of membranes (OR 1.72; 95% CI 1.53 to 1.93), puerperal endometritis (OR 1.33; 95% CI 1.22 to 1.45), and anaemia (OR 1.30; 95% CI 1.18 to 1.43). [19] Compared with interpregnancy intervals of 18 to 23 months, interpregnancy intervals shorter than 6 months were associated with increased risks of preterm birth, low birth weight, and small for gestational age (pooled adjusted OR 1.40, 95% CI 1.24-1.58), OR 1.61, 95% CI 1.39-1.86) and OR 1.26, 95% CI 1.18-1.33 respectively). Intervals of 6 to 17 months and longer than 59 months were also associated with a significantly greater risk for the 3 adverse perinatal outcomes [19]
PREVENTIVE INTERVENTIONS	STD prevention, screening for syphilis and treatment Community studies for STD prevention	Situational	Benefit of syphilis treatment on maternal health is established, although no RCTs are available. Mixed results from community studies. Recognition and treatment of syphilis reduces perinatal mortality by 63%, 95% CI 0.18 – 0.76 [(19-22)]
	HIV prevention and MTCT	Situational	A combination of ZDV and 3TC given to mothers in the antenatal, intrapartum and postpartum periods and to babies for a week after delivery or a single dose of NVP given to mothers in labour and babies immediately after birth may be most effective. Any zidovudine vs placebo/no treatment: 88% Reduction in Still Birth RR 0.22, 95%CI 0.06,0.07) [23,24] Where HIV infected women present late for delivery, post-exposure prophylaxis with a single dose of NVP immediately after birth plus ZDV for the first 6 weeks of life is beneficial [25]
	Balanced Energy Protein supplements and nutrition counseling	Situational	Nutrition advice can increase intake of energy and protein and has been shown to reduce preterm births RR 0.46, 95% CI 0.21-0.98) [18] Balanced energy protein supplementation is associated with a significant reduction in incidence of small-for-gestational-age (SGA) births (RR 0.68, 95% CI 0.56 to 0.84). Reduction in stillbirth (RR 0.55, 95% CI 0.31 to 0.97) and neonatal death (RR 0.62, 95% 0.37 to 1.05) [26]
	ITN/IPT in pregnancy in malaria endemic areas	Situational	In Africa, ITNs, compared with no nets, reduced placental malaria in all pregnancies (RR 0.79, 95% CI 0.63 to 0.98). Fetal loss (RR 0.68, 95% CI 0.48 to 0.98), LBW (RR 0.80, 95 % CI 0.64 to 1.00)[27]. Two dose IPT with SP among women during their first and second pregnancy vs case management or placebo is associated with reduced maternal parasitemia at delivery (RR 0.40, 95% CI 0.31 to52. [28] IPT in pregnancy reduced low birth weight (RR 0.77, 95% CI 0.61 to 0.98)[29,30] and fetal loss in the first to fourth pregnancy (RR 0.67, 95% CI 0.47 to 0.97).

Table 1.13

Impact and Pathways of action for newborn health interventions

Intervention Categories	Interventions	Evidence	Cause specific newborn morbidity and mortality						Impact estimates & outcomes
			Birth Asphyxia	Prematu-rity	Serious Neonatal bacterial infections / sepsis	Neonatal Tetanus	Congenital Malforma-tions	Others	
PROMOTIVE INTERVENTIONS	Tetanus toxoid immunization (as part of maternal ANC) and clean delivery)	11 RCTs, 1 review	√	√	√	√			Reduction in deaths from neonatal tetanus (RR 0.26, 95% CI 0.09, 0.78. Random effects [31,32]
	Advice and sup-port for early and exclusive breast-feeding	Britton C et al 2007			√				Significant evidence for reduced neonatal mor-tality with early initiation of breastfeeding [33]. Support of mothers with sick Infants resulted in reduction in recurrence of diarrhoea 2 to 3 weeks after discharge from health care facility (RR 0.70, 95% CI 0.54, 0.90). [34]
PREVENTIVE IN-TERVENTIONS	Neonatal vitamin A supplementa-tion								Neonatal supplementation of children in Asia assumed to reduce mortality by about 20% between 2 days and 6 months of age. 18

Table 1.14: Impacts and pathways for selected child health interventions

Intervention Categories	Interventions	Evidence	Impact on child health and mortality outcomes and pathways							Impact estimates / Outcomes
			Diarrhea	Pneumonia	Malaria	HIV / AIDS	Measles	Injuries	Moderate to SAM	
PROMOTIVE INTERVENTIONS	Breastfeeding education/promotion strategies		√	√					√	Support of mothers with sick children led to reduced recurrence of diarrhoea 2 to 3 weeks after discharge from healthcare facility RR 0.70, 95% CI 0.54, 0.90) [18,34] Mortality impact from observational studies suggests a 17% reduction in child mortality [33]
	Strategies to promote optimal complementary feeding through nutrition education in food secure populations	2 Reviews, 31 Trials Systematic review of RCTs (web Appendices 3 & 4)	√	√					√	Reduced stunting (In food secure populations educational intervention vs control: HAZ WMD= 0.25 (95% CI= 0.01, 0.49) random effects [18]
	Complementary feeding support including education plus provision of food supplements or CCTs	Systematic review of RCTs (web Appendices 3 & 4)	√	√					√	Reduced stunting. In food insecure populations, provision of complementary food with or without education: HAZ WMD= 0.41; 95% CI= 0.05, 0.76) random effects [18]
PREVENTIVE INTERVENTIONS	Iron-folate/iron supplementation	Systematic review of RCTs (96, 97) (web Appendix 8)								-Improved MN status (Hb conc g/dL WMD = 0.74; 95% CI= 0.61, 0.87) - Potential increased risk of death in malaria areas so only recommended for non-malarial areas as a treatment strategy [18]
	Vitamin A supplementation	Systematic review of RCTs (Web Appendices 10 & 11)	√	√			√			- Reduced mortality between 6-11 months age by 24% (RR 0.76; 95% CI 0.69 to 0.84) -Impact usually assumed to reduce the risk of mortality by 12% (1 dose) and 22% (2 doses) in children aged 6-59 months [18]
PREVENTIVE INTERVENTIONS	Preventive Zinc Supplementation in Children	3 Reviews	√	√	√	√				Zinc-supplemented children had 41% reduction in incidence pneumonia (95% CI 0.41 to 0.83) [35]. Zinc supplementation also leads to significant gains in height and weight, with effect sizes of 0.350 (95% CI: 0.189, 0.511) and 0.309 (0.178, 0.439) [36]

	Intervention	Studies						Evidence
TREATMENT INTERVENTIONS	IMCI integration in primary care settings		√	√	√		√	Improved quality of care in IMCI facilities, improved case management and significantly reduced cost of care per child with IMCI. Increased utilization and correct treatment in IMCI facilities 37–41. The mortality rate was 13% lower in IMCI in the two IMCI districts than in comparison districts (95% CI 5 to 21) [42].
	Community detection and management of pneumonia	2 Review			√			Community management of pneumonia reveals a reduction in total mortality of 20% (95 % C.I 11-28%), and 24% (95 % C.I 14-33%) among infants and children 0-4 years of age, respectively.
	Improved diarrhea management by ORT and zinc	2 Review	√					Incidence of diarrheal episodes in children who received zinc supplementation or a placebo. RCTs 15, RR (random) 0.86 95% CI (0.79, 0.93) Incidence of episodes of severe diarrhea and/or dysentery in children who received zinc supplementation or a placebo. RCTs 5, RR (fixed) 0.85 95% CI (0.75, 0.95) Incidence of episodes of persistent diarrhea in children who received zinc supplementation or a placebo. RCTs 3, RR (fixed) 0.75 95% CI (0.57, 0.98) Number of days with diarrhea in children who received zinc supplementation or a placebo. RCTs 7, RR (random) 0.86 95% CI (0.79, 0.93) 45 Use IZINCG treatment review
TREATMENT INTERVENTIONS	Improved diarrhea management by Zinc	4 Review, 10 Trials	√					
	Deworming in Children	2 Reviews						5-10% reduction in rates of anemia in populations with high rates of intestinal helminthiasis. Improved MN status (Hb g/l WMD 1.71; 95% CI=0.70, 2.73) -Increase in height with a single dose was 0.14 cm (95% CI 0.04 to 0.23) [17] A single dose was associated with an average 0.24 kg increase in weight (95% CI 0.15 kg to 0.32 kg). For multiple doses, the increase was 0.10 kg (0.04 kg to 0.17 kg) for up to one year of follow-up. Single dose: change in value Weight (kg) RCTs 9 WMD (Random) 95% CI 0.34 [0.05, 0.64] [43] Effect of treating intestinal worms on children's growth and nutritional status. Antihelminth vs control Mean change in hemoglobin concentration (g/L) WMD (fixed) 95% CI -0.93 (-2.97, 1.10) [46,47]

CURRENT COVERAGE RATES AND GAPS IN MNH INTERVENTIONS IN KYRGYZSTAN

For Kyrgyzstan we focused on interventions which could be delivered at the PHC level; i.e. in community settings and at first level facilities in district health systems. Primary care settings and interventions were defined as those that includes family and community interventions (largely at household or domiciliary level), interventions through outreach services including community health workers operating from village health outposts or first level facilities, interventions suitable for delivery in first-level facilities, including basic emergency obstetric and newborn care as well as treatment of common serious childhood illnesses, interventions to improve the continuity of care within and between these levels. The principal objective was to identify a set of evidence-based interventions that could be implemented in an integrated manner for maternal, newborn and child health in these settings through existing cadres of workers and also make the case for new approaches, if needed.

Table 1.15: Maternal Interventions

Maternal Interventions	Current Coverage	
	Kyrgyzstan[48]	Chui Oblast[5]
Promotion of reproductive health and family planning	48%	51.1%
Percentage of women of reproductive age who uses contraceptives	35.9%*	30.2%*
Promotion of appropriate care seeking and antenatal care during pregnancy	97%	99%
Percentage of women who gave birth but were not under the care and management of medical workers	5.8%*	7.6%*
Percentage of women who gave birth and were under the care and management of medical workers	94.2%	92.4%
Iron Folate administration OR MMN during pregnancy	NA	NA
% of women who gave birth and had anemia after birth measure of anemia	43.4%*	44.6%*
% of women who had anemia during pregnancy	36%*	41.3%*
Promotion of skilled care for child birth	98%	100%
Delivery at the inpatient medical facility	96.9%*	
Calcium supplementation for PIH	NA	NA
We don't have special program on supplementation of calcium for PIH but it is prescribed to the women at risk on hypertension on the tertiary level	30% ▼	40% ▼
Low dose aspirin in pregnancy for at-risk women	NA	NA
Low dose aspirin is prescribed only to the risk group on hypertension on the tertiary level	5% ▼	5% ▼
Antibiotics for preterm rupture of membranes and suspected chorioamnionitis and post abortion care	NA	NA
This protocol on prescription of antibiotics in such cases started to be implemented only since 2008. It is assumptions only	40% ▼	55% ▼
Basic obstetric care (clean delivery)	98% ▼	99% ▼
We usually say that clean delivery is a delivery at the medical facility. But about 40% of maternity hospitals have problems with water system or sewage system. The program on infection control is expected to work in all facilities but no data	80% ▼	85% ▼
Basic obstetric care (active management of third stage of labour, including misoprostol, oxytocics, ergotamine and manual removal of the placenta) also included D&C for post abortion care	NA	NA
There are standards, programs in pilot regions. No data on monitoring. We can assume only on the base of data that 55% of maternity hospitals covered by PEPS program	55% ▼	60% ▼
Emergency Obstetric care (including blood transfusion and LSCS)	97% ▼	
(Institutional births)	99.4%▼	
It was done only one small evaluation on emergency care. Only now we started to discuss the need of such data	40% ▼	55-60% ▼
ITN/IPT in pregnancy in malaria endemic areas	NA	NA
Prevalence of malaria per 100 000 population	1.8*	

Table 1.16: Neonatal Interventions

Neonatal Interventions	Current Coverage	
	Kyrgyzstan[48]	Chui Oblast[5]
Immediate breastfeeding	64.9%2	48.1%
Early initiation of breast feeding	85%	86%
Exclusive breastfeeding	32%	2.5%
Exclusive breast feeding till 3 months	81.2%*	92.2%*
Periconceptual folic acid supplementation	NA	NA
The folic acid supplementation is included in the standard on management of pregnant women	60% ▼	75% ▼
Data on congenital malformation among children under 1 year per 100000 population	43.2	
Tetanus toxoid immunization	82%	NA
Coverage by this vaccine immunization	94.1%*	94%*
Routine postnatal care and care of LBW infants	NA	NA
Standard on neonatal care of newborns with low weight will be approved only in January-February 2009 in the package of neonatal care in hospitals	40% ▼	50% ▼
Antibiotics for PPROM	NA	NA
Antibiotics for PPROM	45%	55%
Cord care and clean delivery Kit	NA ▼	NA ▼
Cord care without antiseptics in maternity hospitals	80%	87%
Antenatal steroids	NA ▼	NA ▼
The standard exists but was not implemented properly	50%	55%
Neonatal resuscitation	NA ▼	NA ▼
The program on neonatal resuscitation exists with support by UNICEF. Only now cascade trainings will be started	55% ▼	60% ▼
Emergency Obstetric care	NA	NA
According to the opinion of doctors, who are working with this program the coverage is	40%	50%
Emergency neonatal care (for prematurity, post asphyxial care)	NA	NA
We don't have standards but we have training module	55%	60%
Oral Antibiotics for pneumonia	45% ▼	NA ▼
We don't have practice to prescribe oral antibiotics to children under 7 days	65% ▼	
Injectible Antibiotics for Sepsis	NA ▼	NA
According to opinion of doctors who are working in this programs	60% ▼	65% ▼

NA-Data Not Available

* Data of republican medical Information Center for 2007 year

  - opinion of leading team in MCH of Kyrgyzstan

▼* Data of IMCI Center

Since the IMCI Centre began working in 2006, the programme has been rolled out throughout the republic at the PHC level, and IMCI coordinators have been trained at rayon and oblast levels. In 2006 the Drugs List on Additional MHI Programme was broadened, and all necessary drugs for IMCI, as well as for micronutrient deficiency have been included. For the first time since 2005 the state budget has started to fund procurement of vaccines for children, and the share of state financing was increased to 60 per cent in 2008. The high level of vaccination coverage of children has been retained: coverage with vaccination against measles was 98.8

per cent (RMIC 2007). European immunisation weeks have been successfully used to increase vaccination of children under one year of age.

According to MICS data, high-quality iodised salt is used in 76.1 per cent of households. In response to the deteriorating nutritional status of children in Talas Province (27 per cent of early age children are stunted) activities have begun to train mothers on rational child nutrition with the involvement of rural health committees and retraining of medical workers. With the support of UNICEF, vitamin A supplementation is carried out for children of 6 to 59 months of age, as well as for mothers during the first 8 weeks after delivery.

RECOMMENDATIONS FOR SCALING UP MATERNAL, NEWBORN AND CHILD HEALTH INTERVENTIONS AND PACKAGES OF CARE

While a number of interventions are feasible, the following are the summary recommendations of the research:

1. Although Kyrgyzstan is implementing policies for the improvement of maternal and neonatal health by giving adequate antenatal care and emergency services, improvement is needed in the quality of services provided. Health system staff should be trained and standard protocols developed according to the improved cost-effective WHO recommended model including calcium and low dose aspirin.

2. Well equipped Emergency Maternal Obstetric Care (EMOC) services and centres are needed with improved audit systems. Medical staff should be properly trained for emergency services. EMOC services need to be scaled up.

3. Low dose aspirin should be included in the expanded antenatal package for at risk women as it is estimated that providing low dose aspirin leads to a 17 per cent reduction in the risk of proteinuric pre-eclampsia, reduced foetal and neonatal deaths, reduction in small gestational age and reduced risk of preterm birth (< 37 weeks).

4. Calcium supplementation during pregnancy should also be included as a part of the expanded antenatal package as calcium leads to reduced risk of both high blood pressure as and pre-eclampsia. Routine calcium supplementation in pregnancy with low baseline dietary calcium intake is associated with reduced maternal death and serious morbidity.

5. There should be early referral for maternal emergency obstetric neonatal care and improved oxytocic use with clear criteria for referral of patients and premature newborns to higher level hospitals or second stage nursing should exist. Prophylactic oxytocin shows benefits (reduced blood loss compared to no uterotonics). Active rather than expectant management of labour reduces the risk of severe post-partum haemorrhage (PPH) by 67 per cent. However, compared to conventional injectable uterotonics, oral misoprostol has been associated with a higher risk of severe PPH. Oral or sublingual misoprostol compared to placebo was effective in reducing severe PPH and blood transfusion. The benefit of emergency referral and lower section caesarean section for obstructed labour and maternal complications has been well established with evidence that provision and strengthening of emergency obstetric care services can increase utilisation

6. There should be a focus on improving the management of key maternal and newborn problems which exist but are poorly implemented such as prevention and management of maternal pregnancy-induced hypertension (magnesium sulphate etc). There is strong evidence of the benefits of magnesium sulphate for the prevention and management of eclampsia, and this intervention should be included in the repertoire of management strategies in primary level health facilities.

7. Adequate management of PPH by providing misoprostol and safe blood transfusion.

8. Improved neonatal resuscitation training by implementing training modules and providing adequate equipment (Ambu Bags, mannequins for training). Families should be educated on prevention strategies and training should be provided to all the staff involved in delivery services.

9. Pilot projects should be initiated that include community support groups and linkage to patronage nurses.

Evidence based interventions to save newborn lives		
Packages along the continuum of care	Care for girls and women before pregnancy (community effort)	• Education with equal opportunities for girls • Nutrition promotion especially in girls and adolescents • Prevention and management of HIV and sexually transmitted infections • (STI) Family planning birth spacing, health education, advice, and counselling
	Care during pregnancy (ANC)	• Focused antenatal care (ANC) including • At least 2 doses of tetanus toxoid vaccination (TT2+) • Management of syphilis/STIs • Management of pre-eclampsia • Intermittent preventive treatment for malaria in pregnancy (IPTp) and insecticide treated bednets (ITN) • Prevention of mother-to-child transmission of HIV • Birth and emergency preparedness at home, demand for care
	Nutrition Package	• Nutrition promotion especially in girls and adolescents • Balanced energy protein supplementation • Maternal nutrition during pregnancy • Iron and Folate supplementation • Multiple micronutrients in pregnancy • Early and exclusive breastfeeding for babies
	Childbirth care (Prematurity and Pre-term Care Package)	• Skilled attendance at birth • Promotion of use of Antenatal Steroids for preterm labour • Emergency obstetric care including management of PPROM • Improved linking of home and health facility • Thermoregulation, support for clean childbirth practices and essential newborn care (drying the baby, warmth, cleanliness and early exclusive breastfeeding) at home • Management and care of low birth weight (LBW) babies including Kangaroo Mother Care (KMC) • Low cost nasal CPAP and surfactant use for preterm infants with respiratory distress syndrome
	Comprehensive Maternal and Newborn Emergency care	• Administer parenteral (injection) antibiotics • Administer parenteral (injection) oxytoxics • Administer parenteral anticonvulsants for pre-eclampsia /eclampsia • Perform manual removal of placenta • Perform removal of retained products, e.g. through manual vacuum aspiration • Perform assisted (instrumental) vaginal births, e.g. vacuum extraction • Perform safe blood transfusions • Perform surgery (births by caesarean section) • Newborn Resuscitation & Immediate care

Antenatal Care:

Essential elements for focused antenatal care include:
- Identification and surveillance of the pregnant woman and her expected child
- Recognition and management of pregnancy-related complications, particularly pre-eclampsia
- Recognition and treatment of underlying or concurrent illness
- Screening for conditions and diseases such as anaemia, STIs (particularly syphilis), HIV infection, mental health problems, and/or symptoms of stress or domestic violence
- Preventative measures, including tetanus toxoid immunisation, de-worming, iron and folic acid, intermittent preventive treatment of malaria in pregnancy (IPTp), insecticide treated bed nets (ITN)
- Advice and support to the woman and her family for developing healthy home behaviours and a birth and emergency preparedness plan to:
  - Increase awareness of maternal and newborn health needs and self care during pregnancy and the postnatal period, including the need for social support during and after pregnancy
  - Promote healthy behaviours in the home, including healthy lifestyles and diet, safety and injury prevention, and support and care in the home, such as advice and adherence support for preventive interventions like iron supplementation, condom use, and use of ITN
  - Support care-seeking behaviour, including recognition of danger signs for the woman and the newborn as well as transport and funding plans in case of emergencies
  - Help the pregnant woman and her partner prepare emotionally and physically for birth and care of their baby, particularly preparing for early and exclusive breastfeeding and essential newborn care and considering the role of a supportive companion at birth;
  - Promote postnatal family planning/birth spacing.

Table1.18: Focused antenatal care (ANC): The four-visit ANC model outlined in WHO clinical guidelines

	First visit 8-12 weeks	Second visit 24-26 weeks	Third visit 32 weeks	Fourth visit 36-38 weeks
	Confirm pregnancy and EDD, classify women for basic ANC (four visits) or more specialized care. Screen, treat and give preventive measures. Develop a birth and emergency plan. Advise and counsel.	Assess maternal and fetal well-being. Exclude PIH and anaemia. Give preventive measures. Review and modify birth and emergency plan. Advise and counsel.	Assess maternal and fetal well-being. Exclude PIH, anaemia, multiple pregnancies. Give preventive measures. Review and modify birth and emergency plan. Advise and counsel.	Assess maternal and fetal well-being. Exclude PIH, anaemia, multiple pregnancy, malpresentation. Give preventive measures. Review and modify birth and emergency plan. Advise and counsel.
Rapid assessment and management for emergency signs, give appropriate treatment, and refer to hospital if needed				
History (ask, check records)	Assess significant symptoms. Take psychosocial, medical and obstetric history. Confirm pregnancy and calculate EDD. Classify all women (in some cases after test results)	Assess significant symptoms. Check record for previous complications and treatments during the pregnancy. Re-classification if needed	Assess significant symptoms. Check record for previous complications and treatments during the pregnancy. Re-classification if needed	Assess significant symptoms. Check record for previous complications and treatments during the pregnancy. Re-classification if needed

Examination (look, listen, feel)	Complete general, and obstetrical examination, BP	Anaemia, BP, fetal growth, and movements	Anaemia, BP, fetal growth, multiple pregnancy	Anaemia, BP, fetal growth and movements, multiple pregnancy, malpresentation
Screening and tests	Haemoglobin Syphilis HIV Proteinuria Blood/Rh group* Bacteriuria*	Bacteriuria*	Bacteriuria*	Bacteriuria*
Treatments	Syphilis ARV if eligible Treat bacteriuria if indicated*	Antihelminthic**, ARV if eligible Treat bacteriuria if indicated*	ARV if eligible Treat bacteriuria if indicated*	ARV if eligible If breech, ECV or referral for ECV Treat bacteriuria if indicated*
Preventive measures	Tetanus toxoid Iron and folate+	Tetanus toxoid, Iron and folate IPTp ARV	Iron and folate IPTp ARV	Iron and folate ARV
Health education, advice, and counselling	Self-care, alcohol and tobacco use, nutrition, safe sex, rest, sleeping under ITN, birth and emergency plan	Birth and emergency plan, reinforcement of previous advice	Birth and emergency plan, infant feeding, postpartum/postnatal care, pregnancy spacing, reinforcement of previous advice	Birth and emergency plan, infant feeding, postpartum/postnatal care, pregnancy spacing, reinforcement of previous advice

Record all findings on a home-based record and/or an ANC record and plan for follow-up

Acronyms: (EDD=estimated date of delivery; BP=blood pressure; PIH=pregnancy induced hypertension; ARV=antiretroviral drugs for HIV/AIDS; ECV= external cephalic version; IPTp=intermittent preventive treatment for malaria during pregnancy;

ITN=insecticide treated bed net)

*Additional intervention for use in referral centres but not recommended as routine for resource-limited settings

** Should not be given in first trimester, but if first visit occurs after 16 weeks, it can be given at first visit

+Should also be prescribed as treatment if anaemia is diagnosed

Table 1.19:

Type of intervention	What exists presently?	What is needed?	How can this be delivered?
Iron-folate administration in pregnancy	Iron folate (poor strategies)	Iron folate availability and community education	Social marketing Iron-folate availability Community strategies
Multiple micronutrients in pregnancy	Multiple micronutrients (MMN)	MMN to replace iron folate when available and community education	Social marketing MMN availability Community strategies
Community support groups for promotion of maternal and newborn care	No systematically organized and structured community support groups exist	Community support	

Improved Antenatal Care	Traditional ANC	Improved cost-effective WHO recommended model (including calcium and low dose aspirin)	Training of health system staff and development of standard protocol Improving quality of services
Promotion of use of Antenatal Steroids for preterm labour	Commodity available in facilities but underutilized	Physician education in use of antenatal steroids Commodity availability	Physician training Use audit
Antibiotics for preterm premature rupture of membranes (PPROM)	Limited and patchy coverage No national data on coverage & standardized protocols	Physician education in use of antibiotics for PPROM Commodity availability	Physician training Use audit
Improved emergency obstetric and reproductive health care	Dysfunctional and limited facilities for EMOC	Effective and Quality Blood transfusion services	Effective transport linkages Trained staff Well equipped EMOC services and audit systems
Newborn Resuscitation & Immediate care	Negligible staff training in newborn resuscitation	Updated Training modules (AAP & WHO ratified new protocol) Equipment (Ambu Bags, mannequins for training)	Family education in prevention strategies Mandatory training for all staff involved in delivery services (physicians, nurses & midwives) and providing them with adequate equipment
Care of the Very low birth weight /preterm infants (referral if necessary) [Thermoregulation, Kangaroo Mother Care, early and appropriate breastfeeding]	Very limited training Basic equipment (thermal cots, overhead heaters, breast milk expression pumps, promotional materials and lactation support services)	Training modules in low cost and appropriate management Provision of basic drugs and adequate equipment	All facilities to be equipped for first level sick newborn care and stabilization
Exclusive and very early breastfeeding promotion	Insufficient emphasis and indicator tracking	Specific intervention strategies to promote early and exclusive breast feeding	Indicator to be developed and tracked at facility level and country level
Stabilization, care and referral of sick newborn infants with sepsis / pneumonia	No management strategies or staff training	Staff training Basic equipment (pulse oxymeters, infusion pumps, incubator or heated cot) Appropriate drugs for newborn care	Concerted program with graded newborn and young infant care between facilities Trained medical and nursing staff availability
Low cost nasal CPAP and surfactant use for preterm infants with respiratory distress syndrome	Very limited training Limited Basic equipment High cost of surfactant	Staff training Basic equipment (pulse oxymeters, nasal CPAP units Appropriate drugs for newborn care	

POTENTIAL IMPACT OF SCALING UP MNCH INTERVENTIONS AT PRIMARY CARE LEVEL IN KYRGYZSTAN

Globally, the main direct causes of neonatal death are estimated to be preterm birth (28 per cent), severe infections (26 per cent), and asphyxia (23 per cent). Neonatal tetanus accounts for a smaller proportion of deaths (7 per cent), but is easily preventable. In Kyrgyzstan total neonatal death are around 3450 and the major cause of neonatal death is birth asphyxia which accounts for 48.7 per cent of mortality cases followed by prematurity (27.4 per cent). Other causes include congenital malformations (14.3 per cent), infections (6.2 per cent) and delivery related traumas (4.0 per cent).

The interventions that were identified for possible inclusion in Kyrgyzstan were further evaluated systematically in order to obtain estimates of the effect on outcomes across the continuum of MCH in primary care settings. We specifically sought information on interventions which had evaluated integrated delivery of maternal, newborn and child health and nutrition interventions and proven outcomes that were relevant to the reported major causes of maternal, newborn and child mortality in Kyrgyzstan. We based the final selection of interventions for possible delivery in primary care settings on a combination of several approaches including cost-effectiveness, feasibility and potential impact within the MDG time frame.

To estimate the numbers and proportions of neonatal deaths that could be averted, we derived the effect of components of intervention packages on specific causes of neonatal mortality, using available published work and expert opinion. We estimated the potential impact of these interventions on MNC survival when delivered through a plausible incremental improvement strategy as well as with universal coverage. To undertake this assessment in a cohort model for Kyrgyzstan, the intervention effects were applied to estimates of the current numbers of deaths due to each cause assuming that the population impact increases linearly with coverage. The number of deaths prevented for a given cause of death by a given intervention was calculated as:

$$\text{Deaths prevented} = \frac{N \times I \times (P_1 - P_0)}{(1 - I \times P_0)}$$

where
N = number of deaths prior to intervention
I = percentage by which intervention reduces deaths
P_0 = existing coverage of intervention
P_1 = target coverage for intervention

For each intervention the number of deaths due to a given cause and prevented by that intervention was then subtracted from the current number of deaths, before calculating the impact of the next intervention. We estimated impacts based on two approaches: estimation of impacts at universal coverage (99 per cent) and a "pragmatic" scale up of interventions to levels which we consider feasible within PHC systems in the short term calculated as follows; targeting 30 per cent coverage where current coverage of interventions is <=15 per cent, 50 per cent where current coverage is 16-30 per cent, 70 per cent from current coverage rates of 30-50 per cent and 90 per cent or 99 per cent where current coverage rates of interventions are 50-80 per cent and >80 per cent, respectively.

Table 1.20: Impact of PHC interventions on neonatal causes of death for Kyrgyzstan

Causes of death	NN deaths (%)	Preventable NN deaths at pragmatic coverage (%)	Preventable NN deaths at universal coverage (%)
Preterm	27.4%	16.9%	37.6%
Birth asphyxia	48.7%	15.9%	37.2%
Congenital	14.3%	1.7%	3.3%
Infections	6.2%	39.2%	70.2%
Delivery related traumas	4.0%	--	
Other causes	8.0%	--	
Total		13.8%	30.4%

Interventions	Preventable NN deaths at pragmatic coverage (%)	Preventable NN deaths at universal coverage (%)
Immediate breastfeeding	0.2%	0.2%
Exclusive breastfeeding	0.1%	0.2%
Periconceptual folic acid suppl.	0.2%	0.4%
Routine postnatal care and care of LBW infants	1.0%	2.9%
Antibiotics for PPROM	0.1%	0.2%
Cord care and clean delivery KIt	0.1%	0.2%
Antenatal steroids	1.8%	4.5%
Neonatal resuscitation	4.6%	10.0%
Emergency obstetric care	3.0%	9.0%
Emergency neonatal care (for prematurity, post asphyxial care)	1.7%	3.7%
Oral AB:pneumonia	0.6%	1.6%
Injectible AB:sepsis	1.4%	2.7%

To meet MDG-4 targets, a substantial reduction in the NMR is needed, and reducing deaths in the first week of life will be essential for progress. During the past decade, some regions of the world have made great progress in reducing their NMR with the introduction of free antenatal care, improved childbirth care, and the availability of antibiotics. A significant number of these deaths are preventable by interventions with proven efficacy (implementation under ideal conditions) for neonatal survival combined into packages for scaling up in health systems, according to three service delivery modes (outreach, family-community, and facility-based clinical care). Many of the key interventions to prevent maternal, neonatal and child deaths can be delivered to whole populations through community based approaches and outreach programmes. These interventions include breastfeeding, (immediate and exclusive) folic acid supplementation, care of low birth weight infants, cord care, and antibiotics for PPROM. However, the most important is neonatal resuscitation and emergency obstetrics care. Just by providing adequate neonatal resuscitation at pragmatic coverage and universal coverage 4.6 per cent (n=157) and 10 per cent (n=346) respectively of neonatal lives can be saved. The other important intervention, emergency obstetric care, can save around 3.0 per cent at pragmatic level and 9.0 per cent at universal level coverage.

Universal (99 per cent) coverage of the above mentioned interventions could avert an estimated 34 per cent of neonatal deaths in Kyrgyzstan. The model predicts that including a repertoire of evidence-based interventions in MCH programmes at pragmatic levels of coverage in PHC settings could prevent up to 13.8 per cent of all neonatal deaths.

In Chui province the major causes of neonatal death are birth asphyxia (46.5 per cent) and prematurity (21.9 per cent) which is similar to the figures for the whole of Kyrgyzstan. Most of these causes of neonatal deaths are preventable and with the help of the below-mentioned interventions we can reduce neonatal mortality by around 32 per cent at universal coverage.

Table 1.21: Impact of PHC interventions on neonatal causes of death for Chui Oblast

Causes of death	NN deaths (%)	Preventable NN deaths at pragmatic coverage (%)	Preventable NN deaths at universal coverage (%)
Preterm	21.9%	17.2%	34.1%
Birth Asphyxia	46.5%	16.3%	33.3%
Congenital	15.2%	1.7%	2.0%
Infections	12.1%	40.1%	66.2%
Delivery related traumas	1.4%	--	--
Other causes	3.0%	--	--
Total		**16.5%**	**31.3%**

Interventions	Preventable NN deaths at pragmatic coverage (%)	Preventable NN deaths at universal coverage (%)
Immediate breastfeeding	0.3%	0.4%
Exclusive breastfeeding	0.2%	0.2%
Periconceptual folic acid suppl.	0.3%	0.3%
Routine postnatal care and care of LBW infants	1.1%	2.7%
Antibiotics for PPROM	0.2%	0.3%
Cord care and clean delivery KIt	0.2%	0.3%
Antenatal steroids	1.6%	3.6%
Neonatal resuscitation	4.8%	9.3%
Emergency Obstetric care	3.3%	8.0%
Emergency neonatal care (for prematurity, post asphyxial care)	1.5%	3.0%
Oral AB:pneumonia	1.3%	3.4%
Injectible AB:sepsis	3.1%	5.3%

Maternal health and health care are important determinants of neonatal survival. Neonatal outcomes are affected by health throughout the life cycle, starting with the girl child, through adolescence and pregnancy. Complications during labour are an important determinant of foetal and neonatal survival and health. Intrapartum risk factors are associated with greater increases in risk of neonatal death than those identified during pregnancy, which are in turn associated with greater increases in risk than pre-pregnancy factors. Obstructed labour and malpresentation carry the highest risk and require skilled intervention. The death of a mother substantially increases the risk of death for her newborn child.

Table 1.22: Impact of PHC interventions on maternal causes of death for Kyrgyzstan

Causes of death	Maternal deaths, %	Preventable maternal deaths at pragmatic coverage (%)	Preventable maternal deaths at universal coverage (%)
Haemorrhage	47.6%	24.0%	48.0%
Hypertensive disorders	25.0%	30.0%	75.0%
Infections	0.1%	30.0%	64.2%
Uterine Rupture	3.2%	--	--
Other	15.1%	--	--
All cause mortality (prevented alone by family planning)		7.0%	21.0%
Total	100%	27.1%	62.2%

Interventions	Coverage	Preventable maternal deaths at pragmatic coverage (%)	Preventable maternal deaths at universal coverage (%)
Promotion of reproductive health and family planning	35.9%	6.7%	21.2%
Screening of UTI and UTI management	81.0% *	0.7%	1.3%
Hypertension screening and treatment for severe hypertension	40.0% **	4.2%	12.4%
Low dose aspirin in pregnancy for at-risk women	5.0%	0.9%	4.0%
Calcium supplementation for PIH	30.0%	1.6%	5.7%
Antibiotics for preterm rupture of membranes and suspected chorioamnionitis and post abortion care	40.0%	1.0%	3.1%
Basic obstetric care (clean delivery)	80.0%	1.5%	2.9%
Basic obstetric care (active management of third stage of labour, including misoprostol, oxytocics, ergotamine and manual removal of the placenta) also included D&C for post abortion care	55.0%	7.5%	16.4%
Basic obstetric care for eclampsia (Magnesium Sulphate)	30.0% ***	1.6%	5.7%
Emergency Obstetric care (including blood transfusion and LSCS)	40.0%	4.2%	12.4%

Note: Yellow highlighted interventions were not included in the list of interventions provided earlier. As 25 per cent of maternal deaths in Kyrgyzstan are caused by hypertension, these interventions have included the model from the latest Lancet paper.

*-Approximated from ANC at least 4 or more visits]

-50 per cent of ANC 4+ visits *-Same as calcium for PIH

Universal coverage with the above mentioned interventions at PHC level has the potential to prevent 62.2 per cent of all maternal deaths while at pragmatic coverage it is estimated that around 27.1 per cent of maternal deaths can be prevented. There is strong evidence of the benefits of magnesium sulphate for the prevention and management of eclampsia and this intervention should be included in the repertoire of management strategies in initial level health facilities and can reduce maternal deaths at both pragmatic and universal coverage. The supervised use of oxytocics in health facilities as part of the active management of the third stage of labour reduces the risk of post-partum haemorrhage and thus can also decrease maternal mortality rates.

Our review reaffirms that interventions delivered at PHC level can make a significant difference to MCH and mortality outcomes. It also shows that even without delivering care through secondary care hospitals, there could be a considerable impact if interventions were made available through PHC (service availability at household and community level and first level facilities). To be successful in delivering high coverage of key MCH interventions, any strategy must take the above mentioned realities into account and work with providers to ensure the delivery of effective and appropriate interventions. The key is to implement what we know works through all available channels while building robust monitoring and evaluation mechanisms. Focusing on addressing maternal, newborn and child health and survival at PHC level is both feasible and a priority for Kyrgyzstan to reach its Millennium Development Goal targets for reducing maternal and child mortality.

REFERENCES:

1. Sources for data: Multiple databases and reports for Kyrgystan [WHO, DHS, UNICEF MICS].

2. MDG Achievement in the Kyrgyz Republic: Status, Challenges, Policies Roman Mogilevsky Center for Social and Economic Research CASE-Kyrgyzstan.

3. The Kyrgyz Republic: Millennium Development Goals Report 2003.

4. Establishment of the Regionalization System in the Kyrgyz Republic within the framework of the developing Perinatal Program, Ministry of Health of the Kyrgyz Republic.

5. Multi-indicator cluster survey, NSC, UNICEF, 2006.

6. Regional Child Mortality, 2001 Source: NSC, M inistry of Health, Kyrgyzstan.

7. Source: National Statistical Committee, Ministry of Health, Kyrgyzstan.

8. Ensuring safe pregnancy. National Workshop – What is behind the figures? in Kyrgyzstan, Bishkek, the Kyrgyz Republic, November 14-17, 2006, p. 1.

9. World Health Organization. http://www.who.int/countries/kgz/en/

10. European Health for All database [online database]. Copenhagen, WHO Regional Office for Europe, 2006 (http://data.euro.who.int/hfadb/ accessed July 2006).

11. Summary of Trends in Social Indicators – Kyrgyz Republic, 1996-2006 Bishkek, December 2007 Dirk Westhof.

12. Matrix generated from meeting with MOH, SRC, UNICEF, UNFPA, WHO, ADB, KFW, WB, USAID, ZP – October 3, 2007.

13. Bhutta Z.A., Ali S., Cousens S., Ali T.M., Haider B.A., Rizvi A., Okong P., Bhutta S.Z., Black R.E.: Interventions to address maternal, newborn and child survival: What difference can integrated primary health care strategies make? Lancet 2008; 372:972-89.

14. Bhutta Z.A., Memon Z.A., Soofi S., Salat M.S., Cousens S., Martines J.: Implementing community-based perinatal care: results from a pilot study in rural Pakistan. Bulletin of the World Health Organization 2008; 86 (e publication).

15. Thwaites C.L., Yen L.M., Nga N.T., Parry J., Binh N.T., Loan H.T., Thuy T.T., Bethell D., Parry C.M., White N.J., Day N.P., Farrar J.J. Impact of improved vaccination programme and intensive care facilities on incidence and outcome of tetanus in southern Vietnam, 1993-2002. Trans R Soc Trop Med Hyg. 2004 Nov; 98(11):671-7.

16. Smaill F., Vazquez J.C. Antibiotics for asymptomatic bacteriuria in pregnancy. Cochrane Database of Systematic Reviews 2007, Issue 2. Art. No.: CD000490. DOI: 10.1002/14651858. CD000490. pub2.

17. Pena-Rosas J.P., Viteri F.E. Effects of routine oral iron supplementation with or without folic acid for women during pregnancy. Cochrane Database of Systematic Reviews 2006, Issue 3. Art. No.: CD004736. DOI: 10.1002/14651858. CD004736. pub2.

18. Bhutta Z.A., Ahmed T., Black R.E., Cousens S., Dewey K., Giugliani E., Haider B.A., Kirkwood B., Morris S.S., Sachdev H.P., Shekar M. Maternal and Child Undernutrition Study Group. What works? Interventions for maternal and child undernutrition and survival. Lancet. 2008; 371:417-40.

19. Conde-Agudelo A., Anyeli Rosas-Bermuez A., Kafury-Goeta A.C. Birth Spacing and Risk of Adverse Perinatal Outcomes. A Meta-analysis. JAMA 2006; 295: 1809-23.

20. Bique Osman N., Challis K., E. Folgosa, M. Cotiro, and S. Bergström. An intervention study to reduce adverse pregnancy outcomes as a result of syphilis in Mozambique Sex. Transm. Inf., Jun 2000; 76: 203 - 207.

21. Rotchford K., Lombard C., Zuma K., Wilkinson D. Impact on perinatal mortality of missed opportunities to treat maternal syphilis in rural South Africa: baseline results from a clinic randomized controlled trial. Trop Med Int Health. 2000 Nov; 5(11): 800-4.

22. Myer L., Wilkinson D., Lombard C., Zuma K., Rotchford K., Karim S.S. Impact of on-site testing for maternal syphilis on treatment delays, treatment rates, and perinatal mortality in rural South Africa: a randomised controlled trial. Sex Transm Infect. 2003 Jun; 79(3): 208-13.

23. Sangani P., Rutherford G., Wilkinson D. Population-based interventions for reducing sexually transmitted infections, including HIV infection. Cochrane Database Syst Rev. 2004; (2): CD001220.

24. Dabis F., Bequet L., Ekouevi D.K., Viho I., Rouet F., Horo A., Sakarovitch C., Becquet R., Fassinou P., Dequae-Merchadou L., Welffens-Ekra C., Rouzioux C., Leroy V. ANRS 1201/1202 DITRAME PLUS Study Group. Field efficacy of zidovudine, lamivudine and single-dose nevirapine to prevent peripartum HIV transmission. AIDS. 2005 Feb 18; 19(3): 309-18.

25. Wiktor S.Z., Ekpini E., Karon J.M., Nkengasong J., Maurice C., Severin S.T., Roels T.H., Kouassi M.K., Lackritz E.M., Coulibaly I.M., Greenberg A.E. Short-course oral zidovudine for prevention of mother-to-child transmission of HIV-1 in Abidjan, Côte d'Ivoire: a randomised trial. Lancet. 1999 Mar 6; 353(9155):781-5.

26. Kramer M.S., Kakuma R. Energy and protein intake in pregnancy. Cochrane Database of Systematic Reviews 2003, Issue 4. Art. No.: CD000032.

27. Gamble C., Ekwaru J.P., ter Kuile F.O. Insecticide-treated nets for preventing malaria in pregnancy. Cochrane Database of Systematic Reviews 2006, Issue 2. Art. No.: CD003755.

28. Kuile F.O., van Eijk A.M., Filler S.J. Effect of sulfadoxine-pyrimethamine resistance on the efficacy of intermittent preventive therapy for malaria control during pregnancy: (a systematic review). JAMA. 2007; 297:2603-16.

29. Schultz L., Steketee R., Macheso A., Kazembe P., Chitsulo L., Wirima J. The efficacy of antimalarial regimens containing sulfadoxine-pyrimethamine and/or chloroquine in preventing peripheral and placental Plasmodium falciparum infection among pregnant women in Malawi. Am J Trop Med Hyg. 1994;51:515-522.

30. Kayentao K., Kodio M., Newman R.D., et al. Comparison of intermittent preventive treatment with chemoprophylaxis for the prevention of malaria during pregnancy in Mali. J Infect Dis. 2005; 191:109-116.

31. Newell K.W., Duenas Lehmann A., LeBlanc D.R., Garces Osorio N. The use of toxoid for the prevention of tetanus neonatorum. Final report of a double-blind controlled field trial. Bulletin of the World Health Organization 1966; 35(6): 863-71.

32. Koenig M.A., Roy N.C., McElrath T., Shahidullah M., Wojtyniak B. Duration of protective immunity conferred by maternal tetanus toxoid immunization: further evidence from Matlab, Bangladesh. Am J Public Health. 1998 Jun;88(6): 903-7.

33. Jones G., Steketee R.W., Black R.E., Bhutta Z.A., Morris S.S. Bellagio Child Survival Study Group. How many child deaths can we prevent this year? Lancet. 2003; 362: 65-71.

34. Britton C., McCormick F.M., Renfrew M.J., Wade A., King S.E. Support for breastfeeding mothers. Cochrane Database of Systematic Reviews 2007, Issue 1. Art. No.: CD001141.

35. Aggarwal R., Sentz J., Miller M.A. Role of zinc administration in prevention of childhood diarrhea and respiratory illnesses: a meta-analysis. Pediatrics. 2007 Jun; 119(6):1120-30.

36. Brown K.H., Peerson J.M., Rivera J., Allen L.H. Effect of supplemental zinc on the growth and serum zinc concentrations of prepubertal children: a meta-analysis of randomized controlled trials. Am J Clin Nutr 2002; 75:1062-71 replace with IZiNCG.

37. Bryce J., Gouws E., Adam T., Black R.E., Schellenberg J.A., Manzi F., Victora C.G., Habicht J.P. Improving quality and efficiency of facility-based child health care through Integrated Management of Childhood Illness in Tanzania. Health Policy Plan. 2005; 20 Suppl 1:i69-i76.

38. Schellenberg J.A., Victora C.G., Mushi A., de Savigny D., Schellenberg D., Mshinda H., Bryce J. Tanzania Integrated Management of Childhood Illness MCE Baseline Household Survey Study Group. Inequities among the very poor: health care for children in rural southern Tanzania. Lancet. 2003; 361:561-6.

39. Victora C.G., Schellenberg J.A., Huicho L., Amaral J., El Arifeen S., Pariyo G., Manzi F., Scherpbier R.W., Bryce J., Habicht J.P. Context matters: interpreting impact findings in child survival evaluations. Health Policy Plan. 2005; 20 Suppl 1:i18-i31.

40. El Arifeen S., Blum L.S., Hoque D.M., Chowdhury E.K., Khan R., Black R.E., Victora C.G., Bryce J. Integrated Man-agement of Childhood Illness (IMCI) in Bangladesh: early findings from a cluster-randomised study. Lancet. 2004; 364:1595-602.

41. Adam T., Manzi F., Schellenberg J.A., Mgalula L., de Savigny D., Evans D.B. Does the Integrated Management of Childhood Illness cost more than routine care? Results from the United Republic of Tanzania. Bull World Health Organ. 2005; 83:369-77.

42. Armstrong Schellenberg J.R., Adam T., Mshinda H., Masanja H., Kabadi G., Mukasa O., John T., Charles S., Nathan R., Wilczynska K., Mgalula L., Mbuya C., Mswia R., Manzi F., de Savigny D., Schellenberg D., Victora C. Effectiveness and cost of facility-based Integrated Management of Childhood Illness (IMCI) in Tanzania. Lancet. 2004; 364:1583-94.

43. Sazawal S., Black R.E. Pneumonia Case Management Trials Group. Effect of pneumonia case management on mortality in neonates, infants, and preschool children: a meta-analysis of community-based trials. Lancet Infect Dis. 2003; 3:547-56.

44. Kabra S.K., Lodha R., Pandey R.M. Antibiotics for community acquired pneumonia in children. Cochrane Database of Systematic Reviews 2006, Issue 3. Art. No.: CD004874. DOI: 10.1002/14651858. CD004874. pub2.

45. Haider B.A. and Bhutta Z.A. The effect of therapeutic zinc supplementation among young children with selected infections: a review of the evidence. Food and Nutrition Bulletin 2009; 30(1): S41-S59.

46. Taylor-Robinson D.C., Jones A.P., Garner P. Deworming drugs for treating soil-transmitted intestinal worms in children: effects on growth and school performance. Cochrane Database of Systematic Reviews 2007, Issue 4. Art. No.: CD000371. DOI: 10.1002/14651858. CD000371. pub3.

47. Hall A., Hewitt G., Tuffrey V., de Silva N. A review and meta-analysis of the impact of intestinal worms on child growth and nutrition. Matern Child Nutr. 2008 Apr; 4 Suppl 1:118-236.

48. UNICEF State of the world 2009. http://www.unicef.org/sowc09