CURRENT STATUS OF EMERGENCY OBSTETRIC AND ESSENTIAL NEWBORN CARE IN MONGOLIA

Needs assessment of EmOC and ENC facilities in the city Ulaanbaatar and Western region (Zavkhan, Gobi-Altai, Khovd aimags)

Mongolian Federation of Obstetrics and Gynecology

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The assessment was implemented by Mongolian Federation of Obstetrics and Gynecology and Wellspring NGO and the conclusions, intentions and recommendations reflected in the assessment are only suggesting the view of the authors.

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ACRONYMS AND ABBREVIATIONS

ADB	Asian Development Bank
AHC	Aimag Hospital Center
AMDD	Averting Maternal Death and Disability Program
AVD	Assisted vaginal delivery
BD	Bayangol District
BT	Blood Transfusion
BZD	Bayanzurkh District
CD	Chingeltei District
CS	Cesarean Section
BEmOC	Basic Emergency Obstetric Care
CEmOC	Comprehensive Emergency Obstetric Care
EmOC	Emergency Obstetric Care
BENC	Basic Essential Neonatal Care
CENC	Comprehensive Essential Neonatal Care
ENC	Essential Neonatal Care
FIGO	International Federation of Gynecology and Obstetrics
FP	Family Planning
GTZ	German Technical Cooperation
HSUM	Health Sciences University of Mongolia
IMR	Infant Mortality Rate
KUD	Khan-Uul District
MCHRC	Maternal and Child Health Research Center
MDGs	Millennium Development Goals
MMR	Maternal Mortality Ratio
MoH	Ministry of Health
MRP	Manual Removal of Placenta
MRRP	Manual Removal of Retained Products
NGO	Non-Governmental Organization
NHDC	National Health Development Center
NUM	National University of Mongolia
ObGyns	Obstetrics Gynecology
PAB	Parenteral Antibiotics
PAC	Parenteral Anticonvulsants
PHD	Public Health Department
PO	Parenteral Oxytocics
RDTC	Regional Diagnostic and Treatment Center
RGH	Rural General Hospital
RH	Reproductive health
SBD	Sukhbaatar District
SD	Songinokhairkhan District
STI	Sexually Transmitted Infection
STD	Sexually Transmitted Disease
TB	Tuberculosis
UB	Ulaanbaatar
UN	United Nations
UNFPA	United National Population Fund
UNICEF	United National Children's Fund
WHO	World Health Organization

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Special thanks to all professionals, researchers and lecturers, who contributed their efforts, and fulfilled their commitments providing valuable insights during the development of the report and its finalization.

Our expression of gratitude would be incomplete without mentioning the vital cooperation of the female respondents and their families, who participated in the survey. We wish to humbly acknowledge the honesty and frankness with which they answered the questions as it greatly enhanced the team's understandings contributing to the richness of the study.

We hope that this report will contribute towards improving the well-being of mothers and children, who are the foundation of the future development and prominence of Mongolia, and specifically, to help make a comprehensive effort to apply the criteria for providing quality delivery services bring them closer to the standards followed in developed countries and helping mothers and newborn children, especially at the primary health care levels.

Team members

PREFACE

The Government of Mongolia has set national Millenium Development Goals (MDGs) of reducing maternal mortality to 50 per 100,000 live births, under 5 child mortality to 21 per 1,000 live births, and infant mortality to 15 per 1,000 live births by 2015.

The 3rd National Reproductive Health Program (2007-2011) and the Maternal Mortality Reduction Strategy (2005-2010) aligned with the Health Sector Strategic Master Plan 2006-2015 have strategized the improvement of management, logistics and human resources for the provision of maternal and newborn care as vital elements for achieving these targets.

The essential prerequisite for reducing maternal and infant mortality is to improve the quality of Emergency Obstetric Care (EmOC) and Essential Newborn Care (ENC) that is delivered at the soum hospitals that provide primary health care, maternity wards at district and aimag general hospitals, and tertiary hospitals that provide specialized comprehensive maternal health services. Therefore, assessing the present status of EmOC and ENC at all referral levels, identifying existing problems and issues, and resolving them have become increasingly important.

The meta analysis of studies on maternal and newborn health conducted by the Mongolian Federation of Obstetrics and Gynecology with the technical and financial support from UNICEF in 2008 indicated the further need to conduct an in-depth assessment of the present status of EmOC and ENC in the country.

In response an assessment of the present status of EmOC and ENC was conducted by the Mongolian Federation of Obstetrics and Gynecology and the Wellspring NGO. The study was undertaken with technical and financial support from UNICEF, UNFPA and WHO covering a multi-referral level representation of health care in a number of soum and general hospitals in Gobi-Altai, Zavkhan and Khovd aimags, the Western Regional Diagnostic and Treatment Center, a Ulaanbaatar (UB) district general hospital, maternity homes in UB and the Maternal and Child Health Research Center.

The study methodology included assessing the overall infrastructure, human resource capabilities, implementation of standards and guidelines on obstetric and essential newborn care, and safeguarding the patients' rights at each level of the services. Based on the findings, evidence-based recommendations were developed. Our profound gratitude goes to the assessment team members, various respondents in the selected facilities including community members, clients and consultants from the Averting Maternal Death and Disability (AMDD) Center of the Columbia University, USA, for their technical support.

It is our belief that the evidence-based recommendations from this assessment of the status of EmOC and ENC will form the basis of the key resource allocation and capacity building decisions by the concerned decision-makers and the senior management of hospitals to strengthen the health system, to plan and allocate human and financial resources, to ensure sustained, responsive and effective emergency services, safeguarding the clients' rights, and improving the quality of emergency services at all the levels of the health sector.

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SUMMARY OF OVERALL FINDINGS

Despite a consistently decreasing trend, maternal and infant mortality rates still remain relatively high in Mongolia. This shows that there is need for constant efforts to improve accessibility and quality of maternal and child care and implement what is reflected in recent policy documents, issued by the government, which is reinforced by a number of related surveys and research studies.

The goal of the assessment and its findings, which are presented in this report, is to examine the current situation and needs of emergency obstetric and essential newborn care in Mongolia by establishing a baseline of the availability, utilization and quality of maternal and neonatal health care services. This is the first time to attempt to identify gaps in EmOC and ENC service delivery and it is anticipated that the results from this assessment will contribute to an evidence based refinement and planning of even more effective strategies for further reducing maternal and neonatal mortality.

Methods of the study

The assessment was a cross-sectional population based survey of health facilities in UB and in the western region of Mongolia. The total sample size of hospitals was 21 and this included the MCHRC, the three maternity homes, and the Nalaikh district hospital of the city of Ulaanbaatar; the general hospitals in Zavkhan, Gobi-Altai and Khovd aimags' along with 4-5 soum and inter-soum hospitals in each of the selected aimags from the Western region. The UB city emergency ambulance service center was also included in the study with the intention to gather more detailed information related with EmOC and ENC. The actual survey of the public medical facilities in Ulaanbaatar took place between January 29 and February 4, 2009 and the assessment in the three provinces of the western region was carried out during the period of March 11 to 25, 2009.

Data were collected through a combination of qualitative and quantitative methods to obtain information on the capacity of the selected facilities, their human resources, EmOC, ENC signal functions, and availability of equipment and supplies and drugs necessary for the delivery of the maternal and neonatal services. Interviews were conducted with health providers and health managers of the selected facilities along with observation of the equipment and supplies. The focus group discussions were undertaken to elicit client and community perceptions of the health services. Overall, 16 survey tools and instruments such as interview forms, questionnaires, observation checklists, and knowledge performance checklists were used during the study.

The process indicators developed by AMDD, UNICEF, WHO, UNFPA were used to assess EmOC and ENC situation and needs in Mongolia.

General information about health facilities

Out of total women delivered in the health facilities selected for the study, 73% delivered in Ulaanbaatar health facilities, aimag general hospitals and rural general hospitals, and 27% - at soum hospitals.

A total of 8,785 obstetric complications were recorded in the selected 21 EmOC facilities against an estimated 4,117 expected complications, which was 2.1-fold higher than the standard estimate. This indicates that, at the selected facilities, general maternal newborn outcomes are poorer than they can be.

Postpartum Hemorrhage accounted for 1-4%, sepsis for 0.1%, rupture of the uterus for 0.2%, and eclampsia for 3-27% of the main complications that occurred in the surveyed health facilities.

In 2008, among the health facilities covered by the assessment, there were 10 maternal deaths - 8 due to direct causes, and 2 due to indirect causes.

Of the 21 hospitals assessed, neonatal mortality cases were registered in 11 (52%) hospitals. The causes of early neonatal mortality at the hospitals assessed were asphyxia - 43%, respiratory distress syndrome - 17% and congenital defects - 10%.

Infrastructure of health facilities

Of 21 facilities assessed, 52% had centralized 24 hours electricity supply, 75% of soum hospitals had separate generator-based electricity supply and usually used electricity after sunset.

Overall, 38% of health facilities were connected to a central water supply, while the other 62% were not connected. All soum hospitals, including the rural general hospital in Bulgan soum, used water from protected wells, springs or ice.

Of all the facilities, 43% were connected to central heating; 11 soum hospitals and the rural general hospital used low pressure boilers for heating purposes. Moreover, 67% of health facilities needed additional heaters during cold season.

Cars, motorcycles and carts were mentioned as responses to the question on what kind of transportation is used for provision of medical services. Most of the facilities had a car. In the case of overlapping emergency, a car from local soum government is usually mobilized. Seventy six percent of health facilities did not have financial resources for maintenance and repair of vehicles; 43% were capable in some cases. Out of 21 facilities assessed, 52% used line telephone for communication; and 14% of facilities used a functioning radio communication.

Eighty six percent of all health facilities used incinerators for treating hospital waste. Some of the soum hospitals were connected with a centralized sewage system. But since pipes freeze and do not function during cold season, or they require significant volume of carrying water, they only get used during summer. Sixty two percent of soum hospitals have toilets (pit latrines) located outside of the building which caused problems for patients and medical personnel in regard to hygiene.

Preparedness of health facilities

In order to assess preparedness of health facilities for provision of EmOC and ENC, most important criteria, such as infrastructure, medical equipment and supplies, and availability of drugs for emergencies were evaluated in greater detail. The overall preparedness in the hospitals that were assessed, including the availability of drugs, supplies, newborn care kits and equipment, was not at the required level.

Maternity homes in Ulaanbaatar city and MCHRC did not have adult Ambu bags, masks, and oropharyngeal airways. District hospitals did not have thermometers, soap or sterile gloves. The provision of the items described above in soum hospitals was in the range of 10-91%. Hydralazine, a drug which is used for urgently lowering blood pressure, was not available in the emergency care units of all hospitals.

One third of facilities did not have the list of emergency drugs used in labor and delivery rooms. The proportion of drugs from the list, which were available during the assessment, varied between 19-100%. Fetal monitors were not available in district, rural general and soum hospitals. Nasal oxygen catheter, suction and intubation tubes with suitable sizes for newborn were lacking everywhere.

Operating theaters in all the hospitals assessed did not have neonatal resuscitation stations. Wall clocks, room thermometers, scissors, needles and patient monitors were mostly unavailable at all sites.

Provision and availability of newborn incubators, equipment for phototherapy, newborn pulse-oxymeters, fetal monitors and oxygen bags were insufficient in the postpartum sections.

During assessment it was found that not all hospital pharmacies work 24 hours and the pharmacist was called in case of need. Sixty one percent of hospitals properly protect drugs from exposure to moisture and heat.

The sterilization section was evaluated in terms of the flow of tasks including receiving, washing, disinfecting, sterilizing, storing and distributing instruments and supplies, and 12 of the facilities, (except 3) did not have correct flow.

Provision of blood and blood products in UB hospitals was adequate. However, some hospitals lacked the necessary tests to identify blood groups, which limited the assistance.

Laboratories maternity hospitals in UB lacked centrifuges, microscopes and cell counters, while soum hospitals did not have laboratory refrigerators, cell counting slides and microscopes, indicating that the quality of blood, urine and biochemistry analysis is being affected.

Lack of funds at the end and beginning of financial year was the main reason for out-of pocket spendings of clients. Alarmingly, health workers requested clients to buy even uterotonics and other medicines needed for emergency care.

Provision of emergency referral care

All assessed health facilities provided emergency maternal and newborn care. From 5 to 7 percent of all emergency calls to aimag centers were related to deliveries, and 8-52% of all emergency calls to soums were long distance (ranging from 25 km to 400 km) requests. Up to 60% of the emergency requests from long distances were related to obstetrics. Aimag, district and soum hospitals had ambulance vehicles; oxytocin and magnesium sulphate, which are used for EmOC were available in 78-100% of ambulances. Umbilical cord clamps were available in 50%, and Guedel airways - in 33% of emergency sets of soum hospitals.

The City Ambulance of Ulaanbaatar provided services for 24 hours a day. Emergency sets that are taken into ambulances were prepared and made ready for the each doctor. Eleven percent of total emergency calls in 2008 were related to obstetrics and 0.1% related to home deliveries.

Human resources

The current status of human resources at hospitals showed that not all vacancies approved by the Ministry of Health are filled up.

While the hospital management posts were more likely to be occupied by the same person over the years, the directors of city hospitals changed too often. Knowledge and awareness of managers on EmOC and ENC was not sufficient; the lack of financial resources was the main barrier for the management to enroll workers in training.

Out of 1,107 health workers involved in EmOC and ENC and received in-service trainings, 19% were nurses, 53% were doctors of different specialties, and only 22% and 7% were obstetricians and neonatologists respectively.

According to the Resolution No.9 of the Government, issued in 2001, personnel in rural medical facilities should get additional incentives equal to 10% of the salary. Also they should get incentives for gaining additional skills, professional degrees, honors such as clinical professor, as well as allowances for food, transport and an incentive for working in hazardous conditions. But in practice, the figures for these incentives and allowances were different at different locations.

Based on responses from interviewees in regard to provision of EmOC and ENC as teams, the teams at soum hospitals consisted of a soum doctor, midwife, nurse and caregiver, each responsible for own tasks. In the hospitals in Ulaanbaatar city, obstetricians, neonatologists, midwives, nurses and caregivers work as a team during delivery and, when necessary, mobilized the anesthesiologist as a team member.

Emergency obstetric care and implementation of clinical guidelines

The implementation of clinical standards and guidelines on EmOC has been evaluated by conducting 78 interviews and observing 34 procedures. It emerged that knowledge about different components of EmOC varied by site and by specialist. ObGyns and midwives have knowledge on active management of the third stage of labor, use of anticonvulsants and oxytocin administration. But knowledge about those procedures among soum doctors was insufficient.

The majority of the interviewees new the magnesium sulphate (100%), but only 43% stated the correct loading dose of magnesium sulphate. Half knew the correct way of administration, and 21% stated the dose and the route of administering the drug accurately if convulsion recurs.

Knowledge about the use of the main antibiotics indicated in the clinical guidelines among doctors and health professionals was relatively good. However, knowledge about route of administration and dosage of prophylactic antibiotics and that on antibiotic use during severe infection was inadequate. Sixty five percent responded correctly about the use of ampicillin and 41% correctly about the use of cefazolin.

The correct responses related to the steps of manual removal of placenta ranged between 54-87% among all physicians and 81-100% among ObGyns.

There was variable use of manual vacuum aspiration for removal of retained parts of placenta. The coverage of the staff with in-service training on MVA is insufficient.

Knowledge about each step of EmOC procedure recorded from observation was lower comparing with that from the interviews. Knowledge about blood transfusion was poor.

Implementation of standards and guidelines on essential newborn care

Knowledge on essential newborn care was assessed through 105 interviews with doctors and health professionals providing care for newborns in delivery rooms and 37 observations made during provision of newborn care in delivery rooms.

From 88 to 94% of the interviewees mentioned hand washing prior to management of labor, use of sterile gloves and use of sterile instruments and surfaces for newborns. However, lesser percentage of doctors and midwives washed their hands before delivery, used gloves when they managed labor and washed their hands with gloves on and did not dry them thoroughly before the start of the cord procedure.

Knowledge about basic essential newborn care such as prevention of hypothermia including keeping the delivery room warm, putting on a hat, replacing wet clothes, transporting in warm conditions, delaying to weigh the newborn, keeping skin-to-skin contact with mother and breastfeeding as long as possible was insufficient and the guidelines were not implemented. From observation, only in 22% of all the health facilities, the temperature in the delivery room was above 25°C. Skin-to-skin contact was maintained during the initiation of breastfeeding in only 33%. Putting a hat on covering the fontanels of babies was done only in 40% of cases.

Ninety one percent of all interviewed service providers responded that the initiation of breastfeeding should start within an hour after delivery. However, it was observed that only 77% initiated the breastfeeding within an hour. Not every newborn was given eye infection prevention within one hour after birth although care providers had sufficient knowledge about eye care of newborn.

A friendly environment for mothers and newborns was not set up, because it is very rare that family members were present during delivery, and mothers and newborns were left in the delivery room alone without supervision.

Knowledge about resuscitation care was inadequate among all health professionals except the neonatologists. Eighty seven percent of neonatologists responded correctly to the question on the use of Ambu bag and mask for ventilation of a newborn who is not breathing, but only 25% of ObGyns, and 19% of midwives could answer these questions. Knowledge on indications, methods and proper rate of chest compression (Step C), and treatment through the cord vessel of newborn was inadequate among all health professionals.

Client's rights and attitudes

With purpose of assessing how client's rights have been protected at health facilities, 134 people were interviewed, and 43% and 57% were respectively from the city of Ulaanbaatar, and from the aimags and soums.

Seventy five percent of clients involved in survey waited less than 30 minutes for hospital admission and this indicated good access to inpatient care.

At some point clients felt limited to discuss freely and to obtain counselling during the doctor's examination.

As medical facilities provided services to clients in their catchment areas and soum had only one doctor, clients had limited choice of service providers.

Clients complained about availability of drugs, poor communication skills of doctors and staff, and of perceptions that doctors lacked a sense of responsibility. This shows that clients are still looking for satisfying and equally accessible services. At 71% of assessed health facilities, staff members responded that they do not ask family members to buy drugs and medical devices, whereas at 29% they responded affirmatively.

Compared to rural areas, counselling on danger signs of newborn, postpartum hygiene, family planning and newborn care for parturient mothers and public was poorer in city facilities.
Training on maternal and child health topics for pregnant and parturient women were irregular at the sites that were selected for this evaluation, especially in UB. IEC materials on maternal and child health designed for public and women were used insufficiently at health facilities.

Key recommendations

- Increase the availability of human resources in terms of doctors, midwives and nurses who provide care for mothers and infants in hospitals in response to the increased number of deliveries and workload.
- Legally regulate the existing fee for service in maternal and newborn care and adjust the health insurance scheme to cover maternal and child care.
- Review and revise, on a regular basis, the clinical and performance standards for hospitals that provide obstetric care and clinical guidelines taking into account the available evidence.
- Include EmOC and ENC into training curricula at each level of medical schools which would enable graduates to become well equipped with the minimum required knowledge and skills.
- Ensure readiness for EmOC and ENC at all hospitals through “Room-to-room” approach (admission room, delivery room, operating theatre) and revise the list of necessary drugs and equipment and ensure their continuous supply.
- Create an enabling environment for the clinicians and specialists to facilitate them to respect client rights, ensure confidentiality, and permit clients to choose their service providers, which shall improve comfort and satisfaction.

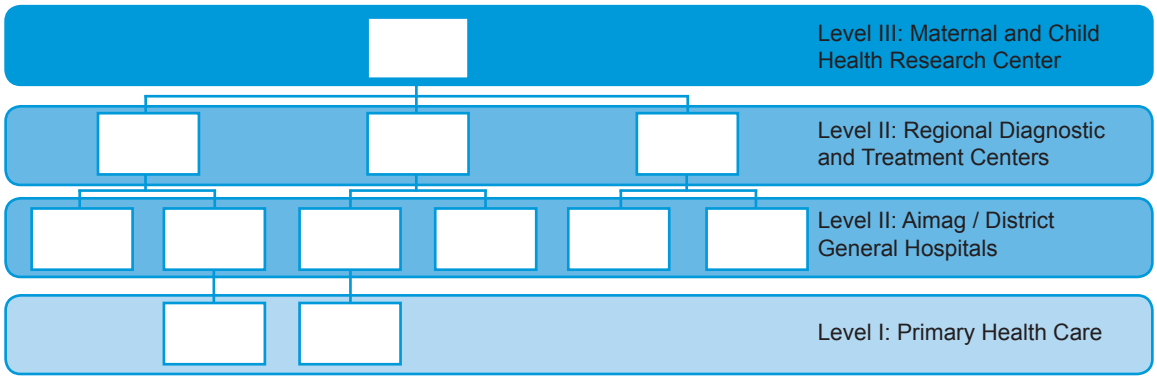
CHAPTER 1. INTRODUCTION

Background

Mongolia has an estimated population of 2.7 million [1] and it is a developing country with 16.3% of its population living on below $1 per day and ranking position 114 out of 177 countries with a human development index of 0.7 [2]. The life expectancy at birth is estimated at 65.9 years [2].

The maternal and child health system (Figure 1) is organized according to administrative divisions: soum and inter-soum, aimag. Primary health care is provided at the smallest administrative units – soums, inter-soums (323 in total) [1]. Specialized maternal and child health care is delivered in the 18 aimags through rural general hospitals and Regional Diagnostic and Treatment Centers (RDTC) located in three regions – Western Region Khovd, Eastern Region Dornod and Khangai Region Uvurkhangai, 3 maternity homes and the district general hospitals of Ulaanbaatar. Tertiary level services are provided by Maternal and Child Health Research Center (MCHRC) (Table 1).

Figure 1. Organizational structure of the maternal and child health system in Mongolia



At the national level, the Ministry of Health (MoH) is responsible for health policy formulation, planning, funding, regulation and supervision of the implementation of maternal and child health-related activities and standards through the aimag and city health departments. In 2005, the Mongolian MoH developed the Health Sector Strategic Master Plan based on a situation analysis of the health sector. Direction and actions for the development of Mongolia's health sector over the next 10 years had been identified. The overall goal of Mongolia's Health Sector Strategic Master Plan is "to improve the health status of all the people of Mongolia, especially mothers and children, through implementing a sector wide approach and providing responsive and equitable, pro-poor, client-centered and quality services" [3].

Table 1. Distribution of hospitals providing EmOC and ENC services in Mongolia

№	Type of hospitals	Number of hospitals
1	Soum hospitals	288
2	Inter-soum hospitals	35
3	District general hospitals	3
4	Rural general hospitals	4
5	Aimag general hospitals	18
6	Regional diagnostic and treatment centers	3
7	MCHRC	1
8	Maternity homes	3
Total		355

Mongolia is a signatory to the Millennium Development Goals (MDGs) and one of its targets is "to reduce maternal mortality rate to 50 per 100 000 live births by the year 2015"[4]. In order to achieve MDGs the "Maternal Mortality reduction strategy 2005-2010" and "Reproductive health program of Mongolia 2007-2010" were developed with the objectives "to upgrade management, organization, logistics, human resource management capacity of health services providing maternal and newborn care" and "to improve quality and accessibility to maternal and neonatal services"[3] and these were consistent with the Health Sector Master Plan.

Table 2. The millennium development goal to improve maternal health

Goal 5	Improve maternal health			
Target 6	Reduce by three-quarters between 1990 and 2015 the maternal mortality ratio			
Indicators	Maternal mortality ratio (per 100,000 live births)	1990	2000	2015
		200[a]	158[a]	50[c]
	Proportion of births attended by skilled health personnel	1990	2000	2015
		99.9[b]	99.7[b]	99.8[c]

[a] Health indicators 1992, MoH, 2000
[b] Health indicators 1990, MoH, 2000
[c] MDG Target

Current situation of maternal and newborn care in Mongolia

Mongolia's maternal mortality ratio (MMR) decreased from 176.1 per 100,000 live births in 1999 to 69.7 per 100,000 live births in 2006 but increased slightly to 89.6 per 100,000 live births in 2007[5]. 30.3% of the maternal deaths occurred in the capital city, 36.5% in the aimags, 23.0 % in the soums, 9.6% at home and 0.6% in other places. Direct causes of maternal death accounted for 67.3% of maternal deaths and indirect causes were 30.8%. Direct causes of maternal mortality Hemorrhage (31%), hypertensive disorders (25%), sepsis (16%), uterine rupture (5%), abortion (7%), and other direct causes (11%). Among associated diseases, cardiovascular diseases were the most common and accounted for 20%; postpartum Hemorrhage constituted 80.5% of the maternal deaths caused by Hemorrhage. Maternal mortality ratio was higher in the rural than in the urban areas and it was higher than the national average in western mountainous region in comparison with the other regions. Although 28-30% of all births occurred among herdswomen, they constituted 45.2% of maternal deaths [6,7].

Infant mortality rate has also continued to show a steady decline from 31.2 per 1,000 live births in 2000 to 19.6 per 1,000 live births[5,8]. Perinatal mortality and neonatal mortality rates, which were 18.5 per 1000 births and 8.1 per 1000 live births in 1999 respectively, were 17.8 and 12.1 in 2008 showing a mixed picture with an increase in the Neonatal Mortality rate. In 2008, perinatal pathologies constituted 51.9% of the causes of infant mortality[5]. Most neonatal deaths (75%) occurred within first week of life. Main causes of neonatal deaths were asphyxia (53%), infections (18.5%) and congenital abnormalities (12.2%).

Policies implemented in Mongolia to improve maternal and neonatal care

In order to implement decisions of the International Conference on Population and Development, held in Cairo in 1994, Mongolia developed a state policy on population, which was approved in 1996 and has been implemented since then. The document was renewed and approved by the State Great Khural (the Parliament) in April 2004 under the name State Policy on Population and Development for 2004-2015. Implementation of the policy was tied to the MDGs and therefore it will be implemented till 2015. There are many goals for improving reproductive health and to implement the main goal, "to improve access to and quality of prenatal and postpartum health services and social welfare to raise children and to increase social benefits", several objectives were formulated. These include: decreasing maternal

mortality to 50 per 100,000 live births by 2015, and the under 5 child mortality to 29.2 per 1,000 live births as reflected in MDGs[6]. MDGs 5 and 4 are directly related to maternal and child health, which is a clear indication of the great importance given by the state to these goals and objectives.

Goal 4

Reduce under 5 child mortality by two third between 1990 and 2015.

Table 3. Newborn, infant and under 5 child mortality ratios (per 1000 live births), selected years[5]

Indicator	1999	2000	2004	2005	2006	2007	2008
Neonatal mortality rate							
Country average	8.16	10.0	13.0	11.0	12.4	10.9	12.7
Ulaanbaatar	9.49	11.7	17.1	13.3	14.2	10.7	13.6
Aimag average	7.65	9.4	10.6	9.6	11.2	11.2	12.1
Infant mortality							
Country average	36.07	31.23	22.82	20.77	19.8	17.8	19.6
Ulaanbaatar	37.68	32.17	23.73	18.09	19.0	14.7	17.5
Aimag average	35.46	30.85	22.29	22.49	20.3	20.3	21.2
Under 5 mortality							
Country average	49.03	42.44	29.11	26.06	24.0	22.1	23.4
Ulaanbaatar	49.15	42.37	28.93	21.7	21.8	18.8	20.8
Aimag average	48.98	42.46	29.21	28.87	25.6	24.6	25.3

Goal 5

Provide access to required reproductive health services for all individuals of appropriate ages, and reduce maternal mortality by three fourth between 1990 and 2015.

Table 4. Maternal mortality ratio (per 100,000 live births), selected years[5]

Indicator	1999	2000	2003	2004	2005	2006	2007	2008
Maternal mortality								
Country average	176.1	158.5	109.5	98.7	93.0	69.7	89.6	49.0
Ulaanbaatar	162.9	171.1	138.0	79.8	73.3	71.8	73.7	55.2
Aimag average	181.2	153.4	93.7	109.6	105.7	68.2	102.0	44.3

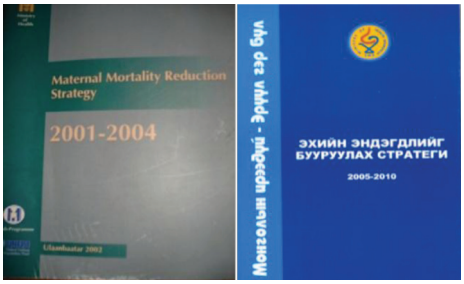
In 1990-2000, among countries of the region, Mongolia was regarded as a country with relatively high rates of maternal mortality. However, between 2004 and 2006 ratio of maternal mortality did not increase and remained stable.

The Third Reproductive Health Program of Mongolia for 2007-2010 was approved by the resolution No.52 of the government. The goal of the program was to support sustainable population growth and achieve the MDGs by the means of improving reproductive health and social services, based on reproductive rights and free choice, in an equitable, accessible and reliable manner, by providing high quality services.

The program has six objectives, including improving the provision of appropriate diagnostic and treatment equipment, drugs and commodities for health facilities that provide reproductive health services, strengthening human resource capacity and its distribution, improving availability and provision of required medical professionals and allied personnel[11].

Maternal Mortality Reduction Strategy, 2001-2004, 2005-2010

As prescribed in the National Reproductive Health Program, Maternal Mortality Reduction Strategies



(2001-2004, 2005-2010) were developed, approved and implemented. The main objectives of the strategies were to obtain the support of the community and promote its participation to reduce maternal mortality; to improve the quality of comprehensive and client friendly maternal and child care; to review, revise and apply the clinical guidelines in reproductive health; to further improve the knowledge attitudes and practices of the community members through expanding IEC/BCC campaigns targeted towards families and communities; and to improve reproductive health care and counselling services.

The role of all health service providers at every service level in the provision of pregnancy, delivery and postpartum care was defined in these strategies. Addtionally, early detection of pregnancy and delivery related complications, referral systems to aimag and city general hospitals with capacity for the provision of specialized services and the pre-delivery stay of rural women in maternity rest homes were reflected in these strategies. Likewise, schemes for monitoring healthy and vulnerable pregnant women were also defined.

The goal of the Maternal Mortality Reduction Strategy for 2005-2010 was to reduce maternal mortality ratio from 98.8 per 100,000 live births in 2004 to 75.0 and below by 2010.

The strategic goal was to reach the MGDs and their targets through the sustainable provision of a rights based, accessible, affordable and quality reproductive health services for the population of Mongolia, specifically for vulnerable women, men and adolescents and consequently to significantly decrease pregnancy, delivery and postpartum complications, and maternal and child mortality. The following five objectives were formulated under the Maternal Mortality Reduction Strategy:

1. To increase the participation of governmental and non-governmental organizations and donors in addressing reproductive health issues and improve collaboration and linkages between various allied and participating sectors
2. To improve the management, the logistics and the human resource capabilities of maternal and child care program and services
3. To improve the quality and accessibility of care and services provided by intensifying efforts to introduce effective, internationally recognized approaches and best practices, adapted to the national context
4. To increase the accessibility to quality reproductive health and delivery services by the population especially in the remote areas and by the migrants, the poor and vulnerable groups
5. To increase the participation and contribution of community, families and individuals in timely provision of care and services aimed at preventing pregnancy, delivery and postpartum complications.

There are still many needs pertaining to provision of maternal and child care within the framework of activities under each objective that should to be addressed. These include the following:

- Provision and better utilization of most of the essential equipment, tests and drugs prescribed in the standard procedures and strengthening the diagnostic and treatment capabilities
- Training of human resources based on the service and community needs of each level of health care
- Coordination of the management of financial resources, to create favourable conditions to retain trained medical staff
- Improving the extent and quality of the efforts aimed at the provision of EmOC through specialized teams
- Raising awareness and knowledge of individuals and community about the dangerous signs during pregnancy and about delivery related complications, and for the actions that need to be taken for obtaining the required aid and help.

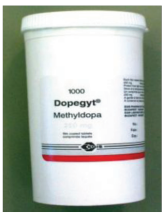
In 1992, Mongolia changed the definition of maternal mortality in order to conform to WHO's definition of maternal mortality to improve the provision of quality maternal health care, to stop under-reporting of maternal mortality and to increase the responsibility of local community, governmental and health institutions. Before 1992, deaths associated with early and late abortions, miscarriages, extra uterine pregnancies and other pathologies concurrent with pregnancy occurring before 28th week of the pregnancy, were not regarded as cases of maternal mortality. The maternal mortality ratio, which was 124 per 100,000 live births in 1991, rose to 204 in 1992, as result of applying the new definition of maternal mortality.

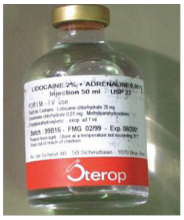
Strengthening reproductive health commodities logistics management and information system (LMIS)

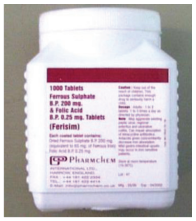
The UNFPA was the main provider of contraceptives and drugs, such as oxytocin, methylergometrin for treatment of the main cause of maternal mortality, postpartum Hemorrhage; iron and iron dextran for treatment of anemia; magnesium sulphate for treatment of pre- eclampsia and eclampsia; antibiotics for treatment of sepsis; and pain-killers used after delivery.

The LMIS was established, based on these needs, however its performance is not yet stabilized to be self sustaining and the current provision of contraceptives and most of the essential RH drugs is still dependent on international organizations support and logistics. Currently, the Mongolian Government is responsible for provision of a few of the drugs for RH.

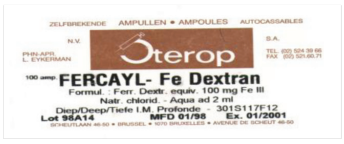
Most essential obstetric drugs









The main objective of comprehensive RH services program is to ensure the delivery of timely and quality obstetric services. The RH Survey conducted in 2008 revealed that the following are the most common weaknesses[12]:

- Clients wait for a long time to see a doctor
- Soum hospitals lack the capacity to diagnose obstetric pathologies and STIs, as well as make available the needed drugs in various dosage forms
- Soum hospitals lack the capacity to provide EmOC
- Health service providers have insufficient knowledge and competencies about some methods of contraception
- There is no enabling environment (attitudes, guidelines and procedures) to ensure confidentiality of client information
- RH services for men are not available
- Adolescent units do not provide services and counselling that appeal to young people and do not guarantee confidentiality of personal and private information

- Post abortion counselling on family planning is not yet at the required level
- Infection prevention and provision of sterile latex gloves is below the required infection control standards
- There is a lack of diagnostic and treatment standards and guidelines.

Restoration of maternity rest homes

Restoration of maternity rest homes created conditions for countryside women with pregnancy related complications and delivery risks to be closer to rural and urban hospitals capable of providing some form of specialized obstetric care and to deliver in a safe environment. In general, the introduction of this system to refer and transport women from the soum (60-80%) to the aimag and city maternity homes before due date has contributed to the reduction in maternal mortality.

The stay and rest of pregnant mothers from the countryside for 14 days before the expected delivery date increased their accessibility to obstetric care, improved the possibility of early detection of potential delivery related complications, and improved the chances of having a safe delivery including the provision of follow up counselling in family planning and newborn care. Midwives monitor the health status of the pregnant mothers during their stay in maternity rest homes and report to doctors if they observe any signs of complications and also provide counselling on healthy nutrition, dressing, and importance of delivering at hospital, recognition of the symptoms and signs of potential complications, preparation for delivery, newborn care and family planning. Services for rural mothers staying in maternity rest homes are provided free, and costs are covered by local government and health organizations.

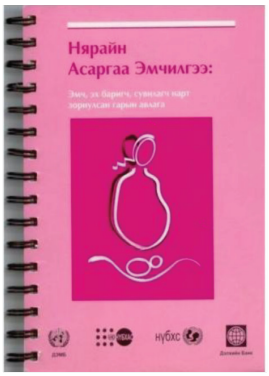
System to refer mothers with pregnancy and delivery related complications

Soum and family doctors refer mothers who are at high risks for pregnancy related complications to secondary level aimag and district general hospitals and maternity homes in the capital city, where they are delivered under the care of obstetricians. In a country like Mongolia, with a vast territory, long distances to get to services, insufficiently developed roads and infrastructure and the harsh climate, these factors serve as barriers to safe delivery for the women. Currently, about 50-70 percent of pregnant mothers from the soums deliver in the above-mentioned hospitals shows the relative efficiency of the referral system[13].

Clinical guidelines on maternal and newborn care and services

Since beginning of 1990s there was a real need to translate and adapt the clinical guidelines on maternal and newborn care whose effectiveness has been proven internationally, and recommended for use by WHO, and to train the specialists to use them. Key guidelines such as Managing Pregnancy and Delivery Complications, WHO; Pregnancy, Delivery, Postpartum and Newborn Care, WHO; Managing Newborn Problems, produced by WHO, UNFPA, UNICEF and World Bank for medical doctors, midwives and nurses; Essential Newborn Care and Breastfeeding, WHO and UNICEF; and Newborn Resuscitation, textbooks produced by American Heart Association, were translated and specifically adapted to the Mongolian context and published and distributed to service providers at all levels. Training events on how to use these resources were also conducted and overall the efforts contributed in improving the quality of care.

Manuals and guidelines on newborn care



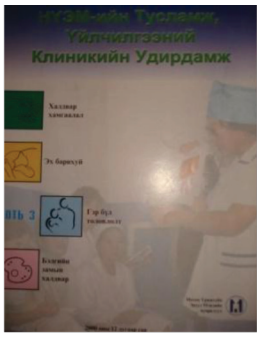
Adapting to the country context included integrating the treatment of pre-eclampsia and eclampsia, the main causes of pregnancy and delivery complications and maternal mortality, using magnesium sulphate, the introduction of the diazepam administration schedule; the treatment of early post-delivery Hemorrhage using oxytocin; the methods for proactive management of the third stage of delivery; monitoring delivery, early detection and treatment of complications using a partogram. These were incorporated into the most important clinical guidelines on infection prevention, management of pregnancy and delivery complications, family planning and STIs that had been used since the beginning of 1990s in line with WHO best practice. Such adaptations had the required effect.

The RH coordinators, chief ObGyns and selected ObGyns, and STI specialists of each aimag and city were trained as trainers in the use of these adapted guidelines and upon their return to their posts, trained other STI specialists, soum and family doctors, midwives and bagh feldshers.

Clinical Guidelines on RH Care and Services

WHO Guideline (for soum doctors and ObGyns)

Obstetrics



Family Planning

Sexually Transmitted Infections

Infection Prevention

Obstetric care and services (clinical guidelines for ObGyns)

Pregnancy and delivery care and services for mothers at risk (for soum and family doctors)

Training

There are 9 medical schools in Mongolia, out of which 4 are state owned, and 5 are private (Table 5).

There are 3 organizations that conduct postgraduate training on obstetrics and gynecology, and newborn care. The duration of residency is 1.5 years, similar for all training institutions (Table 6).

Table 5. Medical education institutions in Mongolia

University/college	Specialty	Duration/ years	Number of graduated, 2009	Pediatrics, neonatology	RH
HSUM	General medical doctor	6	275	6 credits +neonatology	
Gobi-Altai medical college	General medical doctor	6	33	12 credits+ Pediatrics management	12 credits
	Midwife	3	41	1 credit + Pediatrics management	5 credits
Dornogobi medical college	General medical doctor	6	76	12 credits +Pediatrics management	12 credits
	Midwife	3	26	1 credit + Pediatrics management	5 credits
	Feldsher	3	19	1 credit + Pediatrics management	5 credits
Darkhan-Uul medical college	Midwife	3	53	1 credit + Pediatrics management	5 credits
“Ach” medical institute	General medical doctor	6	89	2 credits	7 credits
“Monos” institute	Medical doctor	5.5	22	4.5 credits	5 credits
“Etugen” institute	General medical doctor	6	23		6 credits +neonatology
“Mambadatsan” institute	General medical doctor	5	35	3 credits	3 credits
“Enerel” college	Midwife	3	15	Total 90 credits 60% RH + neonatology	

Table 6. Medical doctors who specialized in obstetrics and gynecology within last 3 years

	Number of graduated medical doctors		
	2007 year	2008 year	2009 year
HSUM	15	15	5
MCHRC	12	9	5
Maternity Home I	17	9	1

Programs and projects on maternal and newborn care

There are many programs and projects on maternal and newborn care, implemented in Mongolia. These programs and projects are funded and managed by UNFPA, WHO, UNICEF, GTZ and ADB and cover a number of areas such as infrastructure development, provision of equipment, capacity building, BCC and other activities, and provide specific contribution for improvement of maternal and newborn care and services (Table 7).

Table 7. Programmes and projects implemented recently

№	Programs and projects	Sponsors
1	RH Program IV	UNFPA
2	Telemedicine	UNFPA
3	Making pregnancy safer	WHO
4	Reproductive health	WHO
5	Integrated management of childhood illnesses	WHO
6	Maternal and child health program	UNICEF
7	Community based social service	UNICEF
8	Revolving drugs fund RDF	UNICEF
9	RH sector support program	GTZ
10	Health sector development - 2	ADB
11	Health sector development - 3	ADB
12	Maternal mortality reduction	ADB

Job Descriptions of RH service providers

Specific job descriptions that identify the routine tasks of doctors and specialists at each level of health services, and their linkage with training programs, is most important. Accordingly, job descriptions for bagh feldshers, soum and family doctors and ObGyns were developed consistent with the Guidelines on RH Care and Services (MOH, UNFPA, 2000), the Standards on Hospital Structure and Function (National Standardization Agency, 2001) and Maternal Mortality Reduction Strategy (2001-2004). The job descriptions for health services providers were also developed (Order of the Minister of Health, No.138, dated 31 May 2004) and served as the basis for the development of training programs for health care providers.

The order of the Minister of Health on Improving Quality of Newborn Care (No.2, 2008) specified the newborn care that should be provided at each level of the health services, as well as the requirements for essential equipment and adequate human resources.

Provision of bags by UNFPA suitable for carrying on a horse or motorcycle and, equipped with BCC materials, contraceptives, examination instruments, stethoscopes, sphygmomanometers, pregnancy tests and rapid tests for identifying protein and sugar in urine, they were appreciated by bagh feldshers, who serve rural population.

Implementing the clinical guidelines greatly increased the need for oxytocin as the uterine contractor. After the introduction of the active management of the 3rd stage of labour, the incidence of postpartum Hemorrhage, the main cause of maternal mortality, decreased. Therefore, pregnancy associated diseases became the main cause of maternal mortality. Innovative approaches in treating severe cases of pre-eclampsia with magnesium sulphate and hydralazine, syndromic diagnosis and treatment of STIs, and active management of the 3rd stage of labor were then systematically integrated into routine clinical practice.

Table 8. Results of introducing referral maternal services in last 10 years

Referral system		
Place of birth/delivery	% of birth, 1998	% of birth, 2007
Aimag, city	55.3%	85.5%
Soum	43.4%	14.8%
Private clinic	0%	0.25%
At home	1.3%	0.4%

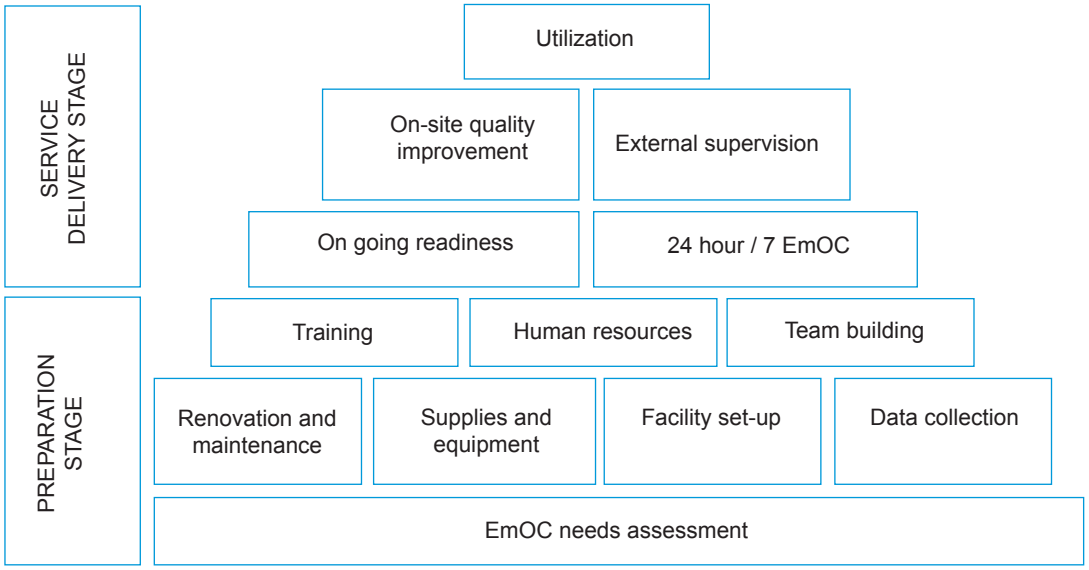
Conclusions

A steady decrease in maternal and child mortalities since 2000s, over a 10-years period appears to be the result of implementing these long term policies, strategies and action plans and the dedicated efforts of people that worked at the different levels of RH management, planning, funding and delivery of services. On the other hand, it is also a direct consequence of implementing the Plan of Action principles approved at the ICPD held in 1994 in Cairo focusing on adapting to a country's needs and context and using WHO's policies, regional strategies and plans on maternal mortality reduction as well as the application of clinical guidelines that have been tested in many countries and have proven effective when implementing RH programs and projects funded by UNFPA, WHO, UNICEF, GTZ and ADB.

Literature review: Emergency obstetric care (EmOC) and essential newborn care (ENC)

Emergency obstetric care and essential newborn care have made significant contributions to the reduction in maternal and neonatal mortality and morbidity. Facility infrastructure, on-going readiness, adequate human resources, supplies and equipment and on-going quality improvement are important components of the EmOC and ENC framework (Figure 2).

Figure 2. Emoc building blocks framework model†



†AMDD Program

Quality EmOC involves a state of readiness that will enable the services to respond appropriately to obstetric emergencies in a way that fulfils the needs and rights of clients.

Readiness: Achieving and maintaining a state of preparedness in the facility to provide quality EmOC. This includes staff available with requisite skills and a willingness to respond to clients 24 hours a day, 7 days a week, available and functional equipment and supplies, and adequate infrastructure.

Response: Providing prompt, appropriate care when emergencies arise, according to accepted clinical standards and protocols.

Rights: Providing services in a non-discriminatory manner corresponding to the rights and needs of all clients[14].

To measure the availability, use and quality of EmOC, the UN process indicators have been developed by Columbia's School of Public Health in collaboration with colleagues at UNICEF, WHO and UNFPA (Table 9):

- Amount of emergency obstetric care (EmOC) services available
- Geographical distribution of EmOC facilities
- Proportion of all births in EmOC facilities
- Meeting the need for EmOC services
- Cesarean sections as a percentage of all births in the population
- Case fatality rate

The indicators address the following questions:

- Are there sufficient facilities providing EmoC?
- Are they well distributed?
- Are enough women using them?
- Are the right women using them?

- Are enough critical services being provided?
- Is the quality of the services adequate?

Table 9. The UN process indicators and recommended levels

UN Process Indicator	Definition	Recommended Level
1. Amount of emergency obstetric care (EmOC) services available	Number of facilities that provide EmOC	Minimum: for every 500,000 population, 5 EmoC facilities, at least one of which provides comprehensive care
2. Geographical distribution of EmOC facilities	Facilities providing EmOC well-distributed at sub-national level	100% of subnational areas should have the minimum acceptable numbers of EmOC facilities or at least five facilities (including at least one comprehensive facility) per 500 000 population
3. Proportion of all births in EmOC facilities	Proportion of all births in the population that take place in EmOC facilities	No minimum acceptable level is proposed
4. Met need for EmOC Services	Proportion of women with obstetric complications treated in EmOC facilities	The minimum acceptable level is 100%
5. Cesarean sections as a percentage of all births in the population	Cesarean deliveries as a proportion of all births in the population	The minimum acceptable level is 5%, the maximum - 15%
6. Direct obstetric case fatality rate	Proportion of women with obstetric complications admitted to a facility who die	The maximum acceptable level is less than 1%

The eight crucial procedures listed in table 10 known as “signal functions” distinguish facilities that provide EmOC from those that do not, and between those that provide BEmOC or CEmOC. If a facility has provided the first six functions in the past 3 months, it provides BEmOC. If it has provided all eight of the functions, it qualifies as a provider of comprehensive EmOC.

Table 10. Criteria for basic and comprehensive essential obstetric care

Basic EmOC	Comprehensive EmOC
Parenteral administration of antibiotics	Parenteral administration of antibiotics
Parenteral administration of oxytocin	Parenteral administration of oxytocin
Parenteral administration of anticonvulsants for pre-eclampsia or eclampsia	Parenteral administration of anticonvulsants for pre-eclampsia or eclampsia
Manual removal of the placenta	Manual removal of the placenta
Removal of retained products (manual exploration of uterine cavity, manual vacuum aspiration)	Removal of retained products (manual exploration of uterine cavity, manual vacuum aspiration)
Assisted vaginal delivery (including obstetric forceps and vacuum extraction)	Assisted vaginal delivery (including obstetric forceps and vacuum extraction)
	Surgery (Cesarean sections)
	Blood transfusion

In other words, substantial reductions in maternal mortality can only be achieved by prompt access to good quality emergency obstetric care that includes prompt access to these signal functions. Analogously, substantial reduction in neonatal mortality requires that newborns have access to the following services listed below (Table 11).

Table 11. Criteria for basic and comprehensive essential newborn care

Basic ENC	Comprehensive ENC
Creating friendly environment for mother and newborn Prevention of infections Preservation of warmth and prevention of hypothermia Early initiation of breast-feeding Initiation of breathing by resuscitation when needed Immunization	Creating friendly environment for mother and newborn Prevention of infections Preservation of warmth and prevention of hypothermia Early initiation of breast-feeding Initiation of breathing by resuscitation when needed Immunization Management of sick newborns Preterm and/or low birth weight (LBW) newborn care

Mongolia has its own national definitions for obstetric complications, which have been harmonized with the international ones developed by FIGO and WHO. The table below presents the major, direct obstetric complications that staff of EmoC facility must respond to with a life-saving procedure or by referral to another facility.

Table 12. Types of direct obstetric complications

Direct Obstetric Complication	Definitions derived from WHO and International Federation of Gynecology and Obstetrics "Save the Mothers" Projects
Hemorrhage Antepartum Postpartum	Any bleeding before labor and during labor: placenta previa, abruptio placenta. ▪ Bleeding that requires treatment (provision of intravenous fluids and/or blood transfusion); ▪ Retained placenta; ▪ Severe bleeding from lacerations (vaginal or cervical)
Prolonged / Obstructed labor	This is dystocia (abnormal labor) and will include: ▪ prolonged, established, first stage of labor (>12 hours) ▪ prolonged second stage of labor (>1 hour) ▪ CPD (cephalo-pelvic disproportion), transverse lie, brow/face presentation. If a women with a previous cesarean section has had a failed trial of scar and again she requires a C-section, then the complication is CPD. If a woman has a C-section for fetal distress, she is registered as a C-section case, but has no maternal complication.
Postpartum sepsis	A woman has a fever (temperature 38 degrees Centigrade or more) occurring more than 24 hours after delivery (with at least two readings because labor alone can cause some fever). Other signs and symptoms that can be present: lower abdominal pain, purulent, offensive vaginal discharge (lochia), tender uterus. (Rule out malaria)
Complications of abortion	▪ Hemorrhage due to abortion, which requires resuscitation with IV fluids and/or blood transfusion. ▪ Sepsis due to abortion (this includes perforation and pelvic abscess) Note: abortion may be spontaneous or induced.

Direct Obstetric Complication	Definitions derived from WHO and International Federation of Gynecology and Obstetrics "Save the Mothers" Projects
Severe Pre-eclampsia	Diastolic blood pressure >110mm HG and proteinuria >3+ after 20 weeks gestation. Various signs and symptoms: headache, hyperflexia, blurred vision, oliguria, epigastric pain, pulmonary oedema.
Eclampsia	Convulsions. Diastolic blood pressure 90mmHG or more after 20 weeks gestation. Proteinuria 2+ or more. Various signs and symptoms: coma and other signs and symptoms of severe pre-eclampsia.
Ectopic Pregnancy	Internal bleeding from a pregnancy outside the uterus. Lower abdominal pain and shock possible from internal bleeding. History of pregnancy.
Ruptured Uterus	Uterine rupture with a history of prolonged/ obstructed labor when uterine contractions suddenly stopped. Painful abdomen. Patient may be in shock from internal and/or vaginal bleeding.

Technical terms and definitions used in the report

Maternal mortality – the total number of maternal deaths (deaths in women while pregnant or within 42 days of the end of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes) per 100,000 live births during a given period of time.

Perinatal mortality – the total number of perinatal deaths (perinatal period commences at 22 completed weeks or 154 days of gestation and ends seven completed days after birth) per 1000 births during a given period of time.

Neonatal mortality – the number of deaths of newborn infants below 28 days of age per 1000 live births during a given period of time.

Early neonatal mortality **-** the number of deaths of newborn infants occuring during the first 7 days of life (per 1000 live births) during a given period of time.

Stillbirth – the birth of baby after 22 weeks gestation and no less that 500g in weight that shows no signs of life (no breathing, no heart beat, umbilical cord with no pulse, whether or not the umbilical cord has been cut off from the attached placenta and no definite movement of the voluntary muscles).

CHAPTER 2. STUDY METHODOLOGY

Goal and objectives of the study

The purpose of the study was to identify areas in the EmOC and ENC service delivery that need to be strengthened so as to reduce maternal and newborn mortality in Mongolia. The specific objectives were:

1. To assess the current situation of emergency obstetric and essential newborn care in UB and western region of Mongolia and identify needs;
2. To establish a baseline on the availability, utilization and quality of maternal and neonatal health services;
3. Make recommendations based on the evidence generated.

This was the first systematic attempt to identify gaps in EmOC and ENC service delivery and it is expected that results from this assessment will contribute to evidence based designing and planning of effective strategies for maternal and neonatal mortality reduction.

Assessment tools

To assess the availability, utilization and quality of maternal and neonatal health services data were collected through a combination of qualitative and quantitative methods. EmOC and ENC situation and needs were assessed using 16 tools which were adapted from the AMDD/UNICEF/WHO/UNFPA Guidelines for monitoring the availability and use of obstetric services and accepted standards and guidelines of care in Mongolia. The assessment tools included interview forms, questionnaires, observation checklists, knowledge and performance checklists (Table 13).

Table 13. List of tools used in the assessment[†]

Tool 1	National Information	Tool 9	ENC Standard
Tool 2	Background of Hospital	Tool 10	Interview Leadership
Tool 3	Facility Case Summary	Tool 11	Interview Doctors
Tool 4	Human Resources Information	Tool 12	Interview Midwives/Nurses
Tool 5	Facilities Supply and Readiness	Tool 13	Other Staff Interview
Tool 6	EmOC Signal Functions	Tool 14	Women (who delivered in past 12 months) Personal Interview
Tool 7	Health Provider Knowledge	Tool 15	Pregnant and Delivered In-patient Women Questionnaire on Client Rights
Tool 8	EmOC Standard	Tool 16	Community Member FGDs Guide

[†]All the tools are attached in Volume 3 of the report

The health facility observation tool had five sections for the collection of data on the availability, utilization and quality of EmOC and ENC care. The five sections were as follows:

1. Background information on the facility (including size/capacity, overall infrastructure, transport, communication and cost of services) (tool 2);
2. Facility statistics (facility registers and records) (tool 3);
3. Human resources (including staffing and training) (tool 4);
4. Equipment, supplies and essential drugs (used to evaluate by room the availability, supply, and functionality of the basic infrastructure, equipment, supplies and drugs necessary for the delivery of EmOC and newborn services) (tool 5);

5. EmOC signal functions and other essential services (looked at how facilities actually functioned and whether they offered all, some or none of the services necessary to treat and save women with obstetric and newborn complications; also looked at why services were not available) (tools 6, 8 and 9).

Interviews (tools 10-13) were designed to be conducted with health providers (doctors, midwives/ nurses, other staff) and health managers of the targeted facilities along with observation of equipment, supplies.

The health provider knowledge tool (7) was used to assess the knowledge of health providers about diagnosis and management of common maternal and newborn conditions. The team administered the questionnaire to any health care provider who took charge of a woman in labor if one was present on the day of the visit by the assessment team.

The focus group discussion guide was developed to elicit client and community perceptions of the health services. The data from the FGDs (tool 16), patient interviews (tools 14-15) and observations from the assessment team members were designed to help to develop a robust description of the maternal and newborn health care in Mongolia from the perspective of the community and the health service providers.

In addition, a form was designed to collect information at the national level (tool 1). The National information tool helped the research team gather information such as: province populations, lists of health facilities, national drug lists, scope of work for nurses, information about referral policies and staffing levels. This information was used to supplement what was found in the facilities and was essential for the analysis and report writing phases.

Overall, interviews and focus group discussions were designed to last no more than 90 minutes and administered by a trained interviewer/facilitator to health providers and health managers of the targeted facilities who consented to participate in the survey.

Sampling for the EmOC and ENC current situation and needs assessment

Sample population and methodology

The survey had multiple target populations – medical facilities which provided obstetric and newborn care services, staff at those facilities and their clients (both current and past). From a sampling standpoint, the prime target population was the facility. Therefore, the hospitals were sampled first; whereas staff and clients were selected from already chosen hospitals. The overall sample size and methodology of sampling are presented in the Annex 2.

Hospital sample size

Zavkhan, Gobi-Altai and Khovd aimags' general hospitals, Tosontsengel rural general hospital along with the certain number of soum and inter-soum hospitals in those selected aimags from Western region; MCHRC, three maternity homes of Ulaanbaatar, and Nalaikh district general hospital were selected for the study (Table 14). Soum and inter-soum hospitals were chosen from selected aimags based in the criteria of remoteness from the respective aimag center (Table 15). Therefore, the total sample size of hospitals of the survey for Western region and Ulaanbaatar was 21. UB city emergency ambulance service center was also included in the study with the intention to gather even more detailed information related with EmOC and ENC.

Table 14. Sampling frame and selected study sites in UB

Study site	Total number of hospitals	Total number of selected hospitals
MCHRC	1	**1**
Maternity Home I Maternity Home II Maternity Home III	3	**3**
District general hospitals **Nalaikh** Baganuur Bagahangai	3	**1**
Total	7	**5**

‡Bolded sites represent selected sites

Table 15. Sampling frame and selected aimags and soum hospitals of Western region (by remoteness)

Aimags general hospitals	Soums general hospitals by remoteness			Total number of hospitals	Total number of selected hospitals
	Near (km)	Far (km)	Considerably far (km)		
Zavkhan	**Aldarkhaan** (30) Tsagaan- khairkhan (40) Yaruu (58) **Ider** (79) Tsagaan chuluut (92)	Erdenekhairkhan (108) **Telmen** (124) Otgon (126) Shiluustei (133) Durvuljin (148) Zavkhanmandal (158) Numrug (164) Tudevtei (167) Tsetsen-Uul (181) **Tosontsengel**† (185)	Bayankhairkhan (210) Santmargad (216) Urgamal (226) **Ikh-Uul** (228) Songino (230) Asgat (233) Bayantes (258) Tes (271)	24	6
Gobi-Altai	**Taishir** (47) Jargalan (79) Sharga (83) Guulin (86) **Khaliun** (88) Delger (93)	Biger (108) Tseel (135) Tugrug (141) Bayan-Uul (145) Tsogt (185) Chandmani (190 **)** **Bugat** (191)	Darvi (196) Tonkhil (202) Khukhmorit (214) Erdene (224) **Altai** (324)	19	5
Khovd†	**Buyant** (23) Khovd (32) Myangad (36) Erdeneburen (61) Duut (61) Manhan (86) Durgun (98)	Chandmani (144 **)** **Zereg** (146) Munkhkhair-khan (146) **Must** (187)	Darvi (213) **Tsetseg** (233) Altai (318) Uyench (340) Bulgan (383)	17	5
Bayan-Ulgii	not selected				
Uvs	not selected				
Total				60	16

†Rural general hospital ‡Western regional diagnostic and treatment center ‡Bolded sites represent selected sites

Staff sample size

For first level/small medical facilities such as soum and inter-soum hospitals, one from each category of staff: (1) administrative officers/statisticians; (2) medical doctors; (3) midwives; (4) nurses; and (5) admission nurse/operation room cleaner were to be randomly selected and interviewed. Therefore, it was estimated that there would be 5 persons interviewed from each sampled soum and inter-soum hospitals. Total sub-sample size was estimated to be 60 (12x5).

With regards to the aimag general hospitals, rural general hospitals and Ulaanbaatar district general hospitals, two from each following staff categories: (1) an administrative officer/statistician/human resource manager; (2) medical doctors; (3) other medical doctors managing deliveries, anesthesiologist; (4) neonatologist; (5) ambulance service doctor; (6) midwives; (7) nurses; and (8) general admission nurse/operation room cleaner were to be randomly selected and interviewed. Total sub-sample size was estimated to be 85 (5+5x2x8).

For maternity homes 2 and 3 of Ulaanbaatar city, three from each following staff categories administrative officer/statistician/human resource manager; (2) medical doctors; (3) anesthesiologist/other doctors; (4) neonatologist; (5) midwives and nurses; (6) general admission nurse/operation room cleaner) were to be randomly selected and interviewed. Total sub-sample size was estimated to be 38 (2+2x3x6).

For MCHRC and Maternity Home I, four from each following staff categories; (1) administrative officer/statistician/human resource manager; (2) medical doctors; (3) anesthesiologist/other doctors; (4) neonatologist; (5) midwives and nurses; (6) general admission nurse/operation room cleaner were to be randomly selected and interviewed. Total sub-sample size was estimated to be 50 (2+2x4x6).

The total sample size of staff from all the selected hospitals was estimated at 233. Anticipating a level of 5 percent non-responses, the sample size was increased to 245.

Client sample size

Questionnaire on client rights (interview with pregnant and delivered in-patient women)

The number of clients to be selected for interviews was as follows: 4 clients from each chosen soum/inter-soum medical facilities were selected, giving a sub-sample size of 48 (12x4) clients in total. 6 clients from each chosen second level hospitals were selected giving a sub-sample size of 30 (5x6) in total), 10 clients from each of the third level medical facilities were selected giving a sub-sample size of 20 (2x10 clients) in total and 15 clients from each of the fourth level medical facilities were selected giving a sub-sample size of 30 (2x15). Thus, a total sample size of 128 clients were to be interviewed. Anticipating a level of 5 percent non-responses, the sample size was increased to 134.

Individual interview (women delivered in past 12 months)

The number of clients to be selected for interviews was as follows: 3 individuals from each chosen soum/inter-soum medical facilities were selected, giving a sub-sample size of 36 (12x3) clients in total. 5 clients from each chosen second level hospitals were selected giving a sub-sample size of 25 (5x5) clients in total, 8 clients from each third level medical facilities were selected giving a sub-sample size of 16 (2x8) clients in total and 10 clients from the fourth level medical facilities were selected giving a sub-sample size of 20 (2x10) clients in total. Thus, total sample size of clients who would be interviewed was 97.

Focus group discussions with community members (family members and/or relatives of delivered in-patient or delivered in past 12 months women, their friends, volunteers)

Focus group discussions (FGDs) with community members were conducted in each of the following sites: soum/inter-soum medical facilities, aimag and UB Nalaikh general hospitals and maternity homes 2, 3 and 1. 1 FGD each was conducted for the maternity home and MCRHC, and for each of the rest of medical facilities 2 FGDs were conducted. Thus, the total number of focus group discussions was 23. For each of the focus group discussions, it was assumed that 8 persons would participate, so the total number of FGD participants was 184.

Logistics for carrying out the assessment activities

Three field teams consisting of four members each were recruited for the study. The team members were composed of ObGyn and neonatologists working at MCHRC and maternity homes in UB. Supervisors of the teams were the study team members, who were responsible for close monitoring and oversight of the work of the assessors. They checked the completeness of the tools, the accuracy and the consistency of the gathered information. In order to avoid biases while assessing medical facilities in the city, each team member was assigned to facilities other their own facilities.

The orientation and training of assessors, the 12 medical professionals who were going to take a part in the study, was conducted over a 4 day period (January 14-17, 2009). It was an intensive, day-long, structured training/orientation program which was designed to provide instructions and learn the skills required in conducting these assessments. The rationale for the study, an understanding of the core scientific principles of EmOC, ENC as well as the use of the study tools were the objectives of the orientation and training. The topics covered included: sampling methods and design, study instruments and tools, how to conduct individual interviews and focus group discussion, awareness of the nature and extent of the biases that might occur during the assessment exercises and practice sessions on how to use each of questionnaires of the study. The assessors were also instructed in coding as well as on safety issues and ethics.

The field test prior to the study placed emphasis on testing and adapting the questionnaires to ensure that the designed surveys were realistic and applicable for the actual assessment. It was conducted at three sites: general hospital of Zuun mod (Central aimag), Batsumber soum of Central aimag, and Maternity Home II of Ulaanbaatar city. A combined approach was employed utilizing both quantitative and qualitative assessment techniques in accordance with the study design. Therefore, all the assessors who participated in the training had a chance to practice the questions on EmOC and ENC contained in the survey instruments/tools and to conduct group discussions with the clients at the medical facilities. Several important comments on the assessment tools and study logistics were identified during the field testing stage. Consequently, the tools were modified and tailored to suit local realities.

Permission for the survey was obtained from the Scientific Board and Ethical Committee of the MCHRC. The maternity homes, Nalaikh district general hospital, western region aimags and selected soum hospital leaders were informed through the MoH, so they supported the execution of the survey. At the beginning of facility assessment and the interviews all health care providers were informed about the purpose of the survey and their verbal informed consent was obtained.

Data entry and analysis

CSPro version 3.3 was used for data entry with the intention to minimize data entry errors. Data was then analyzed and tabulated using SPSS version 17.0. Qualitative data were transcribed into MSExcel 2007 workbooks and ENVivo. The quantitative results were stratified where necessary and presented as frequencies and cross tabulations (proportions for nominal variables and means for continuous variables).

Calculation of the UN EmOC indicators

As proposed by UNICEF, WHO and UNFPA, these indicators were used to identify the availability, use and, to some extent, quality of EmOC.

Indicators 1 and 2: Coverage of EmOC services

To determine the population size in a given area (i.e. national, regional, district, catchment area, etc.), the most recent census should be used.

Indicator 3: Proportion of all births in EmOC facilities

This indicator shows how many women give birth in EmOC facilities (numerator) as a proportion of the number of expected births in the population (denominator). The total expected number of births in an area calculated by multiplying the total population of the area by the crude birth rate.

Indicator 4: Met need for EmOC

This indicator is calculated by dividing the number of women with complications treated in a facility or facilities in a region (numerator), by the number of complications that would be expected to occur in the population and was estimated as 15% of expected births (denominator).

Indicator 5: Cesarean sections as a percentage of all births in the population

This indicator on cesarean sections shows you what proportion of women giving birth in the population gave birth by C-section in emergency obstetric care facilities. The number of C-sections (numerator) is divided by expected births in the population (denominator).

Indicator 6: Case Fatality Rate

The numerator for the case fatality rate is the number of direct obstetric deaths in EmOC facilities and the denominator is the number of complicated cases seen in EmOC facilities.

Timeframe of the study

The EmOC and ENC needs assessment survey is a cross sectional population based survey of health facilities in UB and those in the western region of Mongolia. Initially, all the public hospitals providing maternal and child health services in the country were designated to be included in the study. However, due to budgetary constraints, only a sample survey for the stand-alone public health facilities at the capital city and the western region was conducted. The actual survey of the public medical facilities in Ulaanbaatar took place between January 29 to February 4 and assessment in three provinces of the western region - between March 11 and March 25 of the year 2009. It took approximately 5-6 days the interviewers to complete MCHRC, Maternity Home I, 3-4 days - maternity homes II and III, 1-2 days - Nalaikh district general hospital, Emergency (ambulance) care center, 1-2 days in soums and 3-4 days in aimags general hospitals).

CHAPTER 3. RESULTS OF THE STUDY

General information about health facilities

The assessment covered the following 5 health facilities in Ulaanbaatar, and 16 rural health facilities:

In Ulaanbaatar:

- Maternal and Child Health Research Center (MCHRC)
- Maternity Home I
- Maternity Home II
- Maternity Home III
- Delivery ward of the Nalaikh district general hospital

In countryside:

- Khovd aimag Regional Diagnostic and Treatment Center (RDTC)
- Zavkhan aimag general hospital
- Gobi-Altai aimag general hospital
- Tosontsengel rural general hospital
- Four soums hospitals in each aimag

The Ambulance Center of Ulaanbaatar was specially included for a more in-depth study of EmOC and ENC.

Brief information on Ulaanbaatar and aimags, and health facilities covered by the assessment has been collected through meetings with administrators and statisticians. Some information was obtained from official information bulletins and books. Consistently, Maternity Home I and MCHRC were conducted most deliveries (Table 16).

Table 16. Information about hospitals assessed in Ulaanbaatar

Study site	Type of service	Scope of service	Population size†	Total number of births (2008)	Additional information
MCHRC	The country's tertiary level of maternal and child health care	Bayangol district + referral from other districts of the city and countryside	169 278 + patients from aimags	8 125	Established in 1987
Maternity Home I	Obstetric and neonatal care	Khan-Uul, Sukhbaatar, Chingeltei districts	371 942	9 572	Established in 1928, the first maternity home
Maternity Home II	Obstetric and neonatal care	Songinokhairkhan district	232 326	4 430	Established in 1959
Maternity Home III	Obstetric and neonatal care	Bayanzurkh district	235 192	3 540	Established in 1966
Nalaikh district general hospital	Obstetric and neonatal care	Nalaikh district	29 115	557	Distance between Nalaikh and UB - 35 km

† NSO, Statistical Yearbook, 2008

With reference to the size of aimags and their population, Gobi-Altai aimag is the largest in terms of territory, Khovd aimag is most populated and Zavkhan aimag has highest number of soums among aimags assessed. Distances between aimag and soum centers ranged between 25-318 kilometers (Table 17).

Table 17. Territory, population and number of births per aimags and soums assessed, and distances between aimag and soum centers

	Area† (km^2)	Estimated population†	Total number of births (2008)	Total number of births at the local facility	Total number of mothers referred	Additional information
Zavkhan aimag						
Uliastai	2 800	16 198	832	832	0	Distance between the aimag and UB - 1000 km
Tosontsengel	5 323	8 679	526	526	0	Distance between soum to the aimag – 180 km
Ider	3 708	2 734	68	16	52	Distance between soum to the aimag – 79 km
Telmen	3 446	2 778	79	31	48	Distance between soum to the aimag – 135 km
Ikh-Uul	3 775	6 040	148	109	39	Distance between soum to the aimag – 225 km
Aldarkhaan	7 158	3 227	61	5	56	Distance between soum to the aimag – 32 km
Khovd aimag						
Khovd	2 830	26 466	1 430	1 430	n/a	Distance between the aimag and UB - 1425 km
Buyant	3 759	2 948	69	4	65	Distance between soum to the aimag – 25 km
Must	3 927	3 608	113	75	38	Distance between soum to the aimag – 180 km
Tsetseg	3 493	2 476	46	30	16	Distance between soum to the aimag – 230 km
Zereg	2 503	3 038	69	52	17	Distance between soum to the aimag – 141 km
Gobi-Altai aimag						
Altai city	2 161	14 850	980	980	n/a	Distance between the aimag and UB - 1037 km
Altai	20 256	2 285	49	26	23	Distance between soum to the aimag – 318 km
Bugat	9 921	2 262	41	12	29	Distance between soum to the aimag – 167 km
Khaliun	4 214	2 463	46	4	42	Distance between soum to the aimag – 87 km
Taishir	3 913	1 557	27	4	23	Distance between soum to the aimag – 43 km

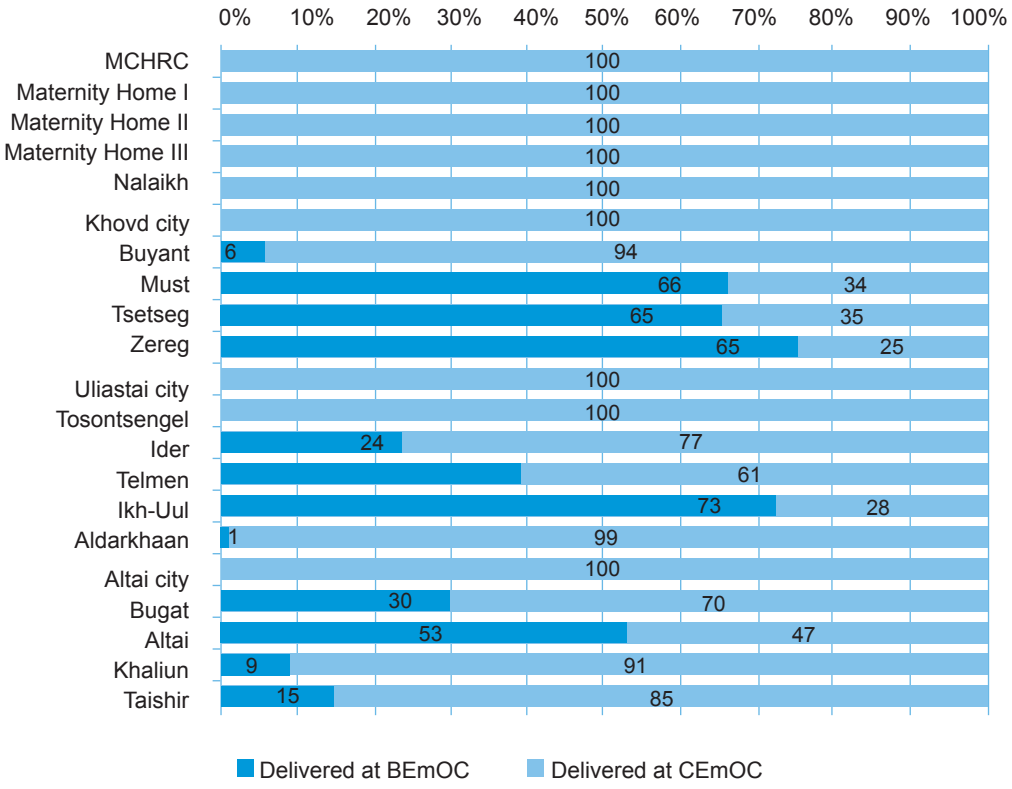
† NSO, Statistical Yearbook, 2008

Births

Of the total number of women who delivered at facilities under assessment, 73% delivered in the Ulaanbaatar health facilities, aimag general hospitals and rural general hospitals and 27% delivered at

soum hospitals. Provision of the most essential, comprehensive emergency obstetric and newborn care was assessed based on the WHO definitions. District, aimag and rural general hospitals and one inter-soum hospital were considered as providers of comprehensive care. Figure 3 shows the percentage of mothers who delivered in hospitals providing basic and comprehensive obstetric care by location.

Figure 3. Percentage of mothers who delivered at hospitals providing basic or comprehensive obstetric care (by location)



In 2008 in the 15 assessed hospitals, 7 576 Cesarean sections were performed accounting for 25% of all births. Cesarean section rate at the tertiary level MCHRC was 30%, while that at the RDTCs and aimag general hospitals ranged between 10-28% (Table 18).

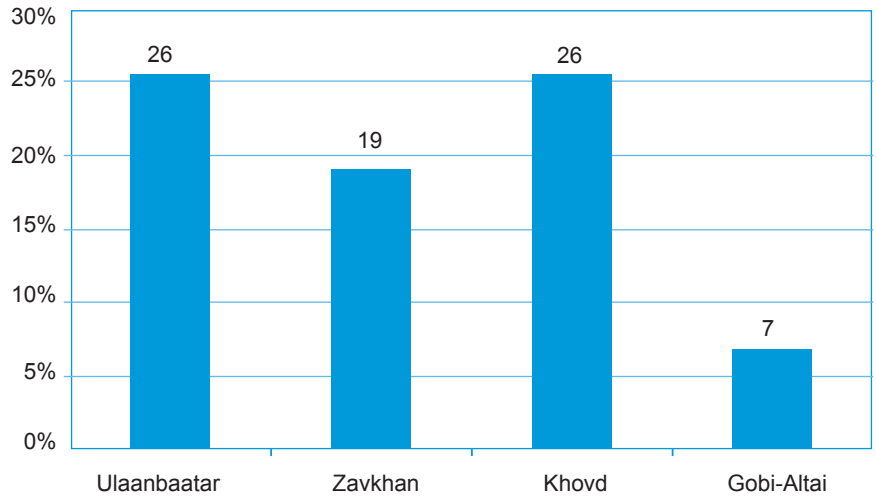
Table 18. Institutional cesarian section rates (by study sites)

№	Facility	Total number of institutional births	Number of Cesarean sections	Cesarean sections as a percentage of all institutional births
Ulaanbaatar				
1	MCHRC	8 125	2 403	30
2	Maternity Home I	9 572	2 574	27
3	Maternity Home II	4 430	872	20
4	Maternity Home III	3 540	923	26
5	Nalaikh district general hospital	557	78	14
Zavkhan aimag				
6	Zavkhan aimag general hospital	832	166	20
7	Tosontsengel	526	56	11

8	Ider	16	1	6
9	Telmen	31	0	0
10	Ikh-Uul	109	0	0
11	Aldarkhaan	5	0	0
Khovd aimag				
12	Khovd aimag general hospital	1 430	404	28
13	Tsetseg	30	1	3
14	Must	75	1	1
15	Zereg	52	1	2
16	Buyant	4	0	0
Gobi-Altai aimag				
17	Gobi-Altai aimag general hospital	980	94	10
18	Bugat	12	1	8
19	Altai	26	1	4
20	Khaliun	4	0	0
21	Taishir	4	0	0

With reference to location, the percentage of institutional deliveries by Cesarean section was 26% in Ulaanbaatar, 26% in Khovd aimag, 19% in Zavkhan aimag, and 7% in Gobi-Altai aimag (Figure 4).

Figure 4. Cesarean sections as a proportion of the total number of institutional births (by location)

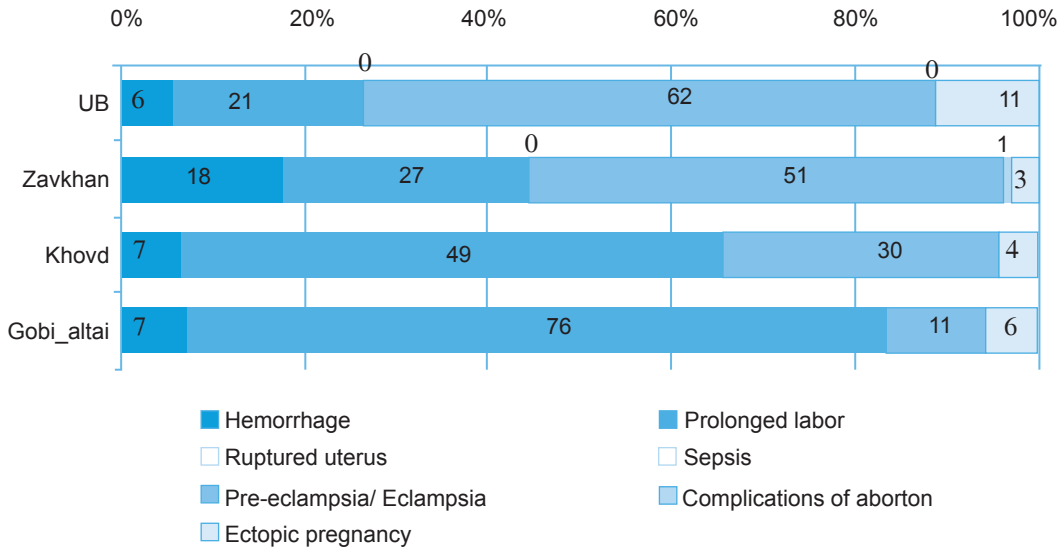


Postpartum hemorrhage 1-4%, sepsis 0% (0-0.1%), rupture of the uterus 0% (0.02-0.2%), and eclampsia 3-27% were the main complications that occurred in Ulaanbaatar city facilities and prolonged labor prevailed in facilities in Khovd and Govi-Altai aimags (Table 19).

Table 19. Main complications as a proportion of the total number of births (by hospitals)

Obstetric direct complications						
Facility	Hemorrhage	Prolonged labor	Ruptured uterus	Sepsis	Pre-eclampsia/ Eclampsia	Ectopic pregnancy
UB						
MCHRC	0.8/69	1.4/110	0.1/4	0	9/735	4.2/339
Maternity Home I	1.2/116	0.4/38	0.03/3	0.1/6	26.8/2566	2.5/241
Maternity Home II	2.9/130	15.6/692	0.02/1	0	19.7/871	2.8/122
Maternity Home III	3.1/109	19.7/705	0	0	13.2/467	3.5/123
Nalaikh	2.9/16	2.5/14	0.2/1	0	3.1/17	0.7/4
Total	1.7/440	5.9/1559	0.03/9	0.02/6	17.8/4656	3.2/829
Zavkhan aimag						
Uliastai	3.7/31	3.8/32	0	0	7.9/66	0.5/4
Tosontsengel	1.1/6	5.3/28	0	0	8.7/46	0.6/3
Ider	6.3/1	-	0	0	25.0/4	0
Aldarkhaan	-	0	0	0	0	0
Ikh-Uul	2.8/3	0.9/1	0	0.9/1	0	0
Telmen	3.2/1	9.7/3	0	0	19.4/6	0
Total	2.8/42	4.2/64	0	0.1/1	8.0/122	0.5/7
Khovd aimag						
Khovd city	2.3/33	22.7/325	0	0	11.2/160	1.7/24
Must	1.3/1	0	0	0	1.3/1	0
Zereg	1.9/1	3.8/2	0	-	0	0
Tsetseg	6.7/2	6.7/2	0	0	13.3/4	0
Buyant	0	0	0	0	25.0/1	0
Total	2.3/37	20.7/329	0	0	10.4/166	1.5/24
Gobi-Altai aimag						
Altai city	3.1/30	36.9/362	0	0	5.2/51	2.8/27
Bugat	16.7/2	16.7/2	0	0	0	0
Khaliun	0	0	0	0	0	0
Taishir	0	0	0	0	0	0
Altai	7.7/2	0	0	0	0	0
Total	3.3/34	35.5/364	0	0	5.0/51	2.6/27

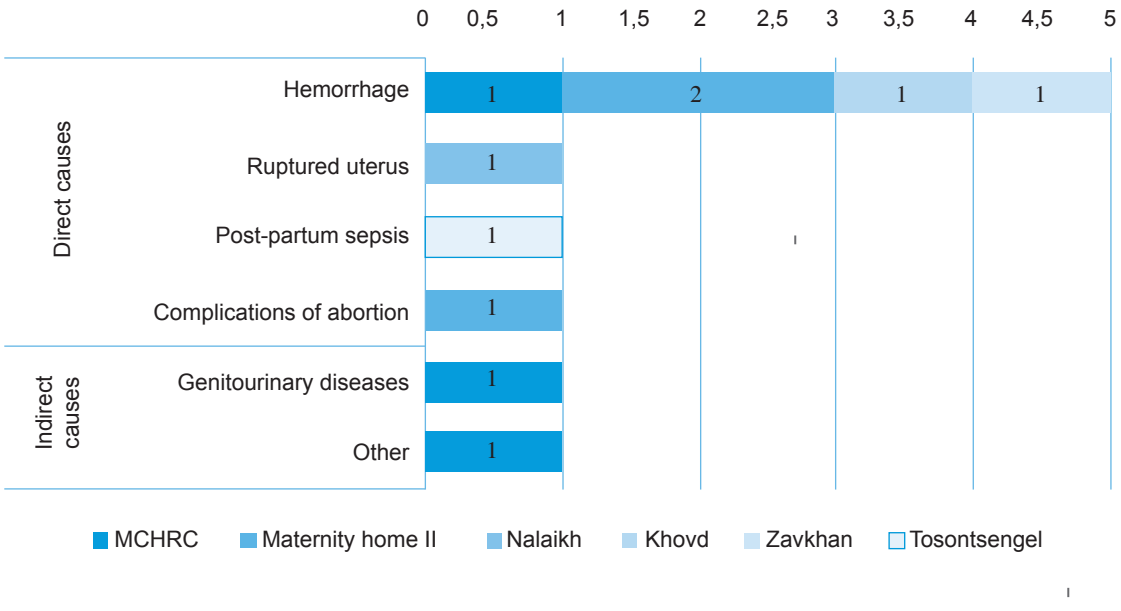
Figure 5. Main obstetric complications as proportion of the total number of complications (by location)



Maternal mortality

In 2008, in the health facilities covered by this assessment, there were 10 maternal deaths (8 due to direct causes, 2 due to indirect causes) at 6 facilities. Causes of maternal deaths by location are shown in Figure 6.

Figure 6. Causes of maternal deaths by location (absolute numbers)



Perinatal and neonatal mortality

Data on perinatal and neonatal mortality was obtained from the annual statistical reports of the respective hospitals.

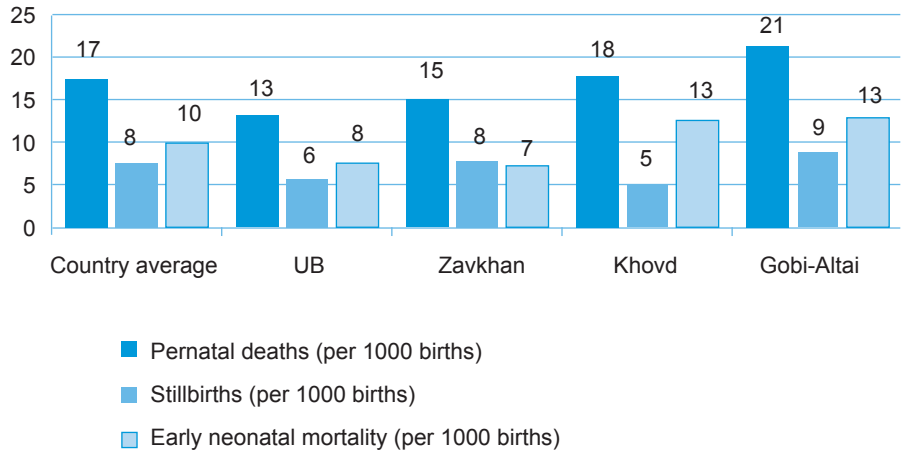
Of the 21 hospitals assessed, neonatal deaths were registered in 11 (52%) hospitals (Table 20). Perinatal mortality rate per 1,000 births was 25 at the MCHRC where a high number of births occur, however, the high perinatal mortality rates at the Khovd, Zavkhan and Gobi-Altai aimag general hospitals and the Tosontsengel soum hospital deserve additional attention. Nevertheless, a perinatal mortality per 1,000 births is low (8) at the Maternity Home I despite a relatively high number of births.

Table 20. Perinatal mortality, still births, early neonatal mortality in 2008 (by respective hospitals)

Facility	Number of perinatal deaths (absolute number)	Number of stillbirths (absolute number)	Number of neonatal deaths (absolute number)	Perinatal mortality (per 1,000 births)
MCHRC	201	76	125	25
Maternity Home I	79	38	41	8
Maternity Home II	25	17	8	6
Maternity Home III	35	14	21	10
Nalaikh district general hospital	6	2	4	11
Khovd regional diagnostic and treatment center	25	7	18	18
Tsetseg soum	3	1	2	100
Zavkhan aimag general hospital	16	7	9	19
Tosontsengel rural general hospital	6	4	2	19
Ikh-Uul soum	1	1	-	9
Gobi-Altai aimag general hospital	20	8	12	20
Bugat soum	2	1	1	167

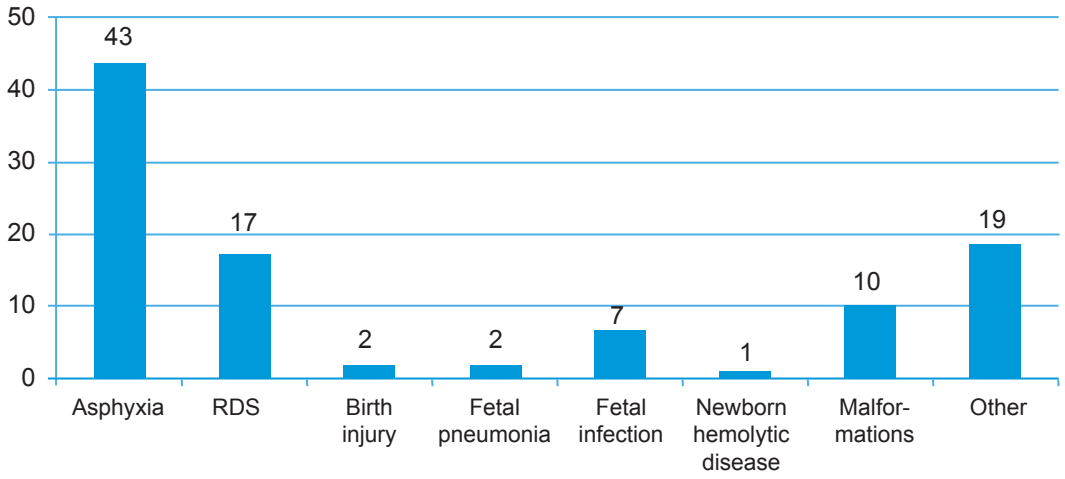
When the mortality rates in 2008 at hospitals covered by the assessment (Ulaanbaatar n=5, Zavkhan n=6, Khovd n=5, Gobi-Altai n=5) were compared with the country average, perinatal mortality rates were higher in Gobi-Altai aimag (21), and lower in Ulaanbaatar (13) and Zavkhan aimag (15). Early neonatal mortality per 1,000 live births was higher in Gobi-Altai (13) and Khovd (13) aimags, when compared with the country average and lower in Ulaanbaatar (8) and Zavkhan aimag (7.3). Still births per 1,000 births were higher in Gobi-Altai (9) and Zavkhan (8) aimags, and lower in Ulaanbaatar (6) and Khovd aimag (5), when compared with the country average (Figure 7).

Figure 7. Perinatal mortality ratio in Ulaanbaatar and 3 selected western aimags



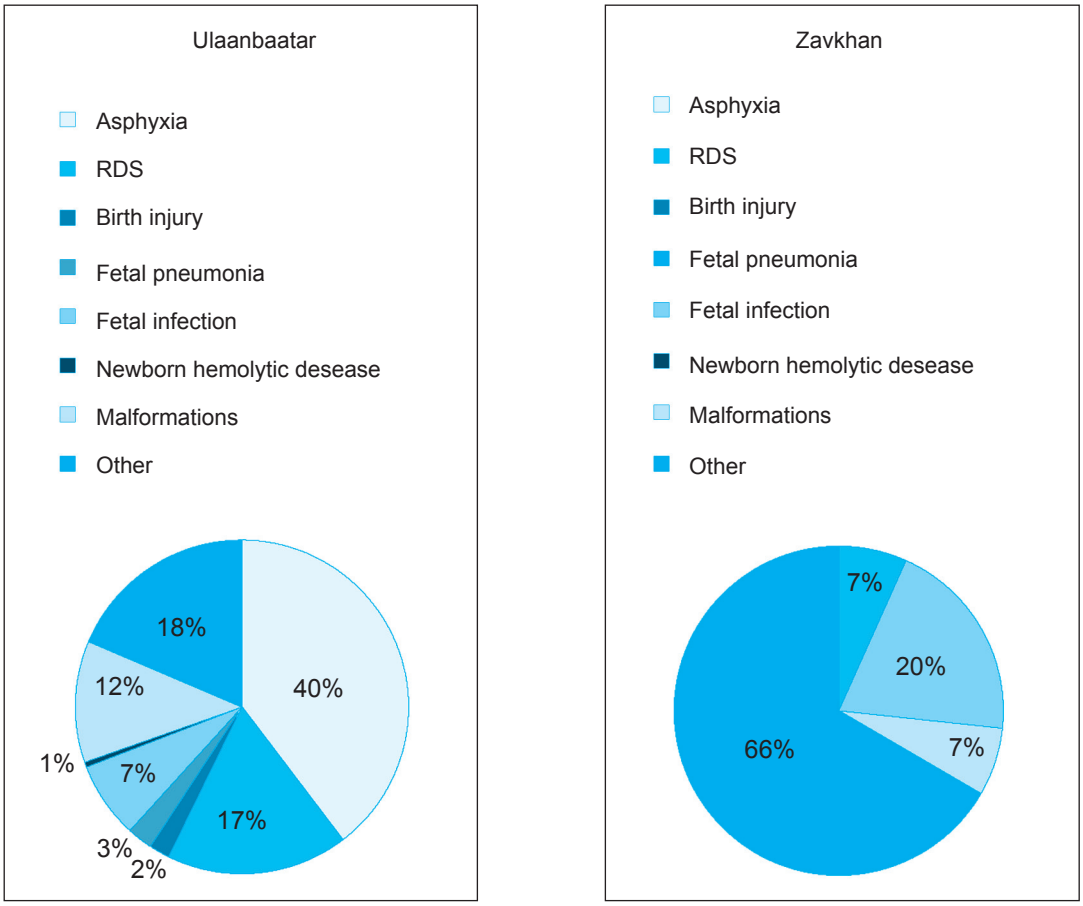
When the causes of early neonatal mortality at the hospitals assessed were analyzed further,, asphyxia caused 119 (43%) deaths, respiratory distress syndrome - 48 (17%) deaths and birth defects - 27 (10%) deaths (Figure 8). Among the other causes of early neonatal mortality registered, fetal pneumonia resulted in 5 (2%) deaths and fetal infection caused 18 (7%) deaths.

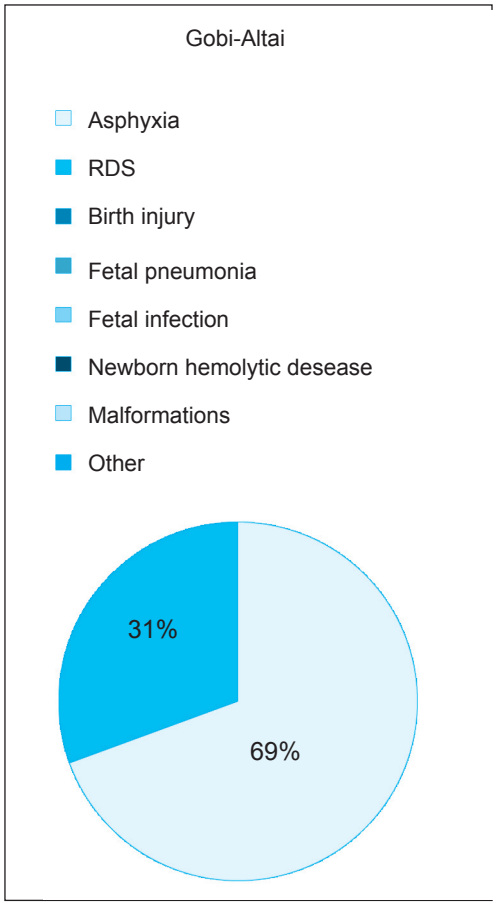
Figure 8. Causes of early neonatal deaths (percent distribution)

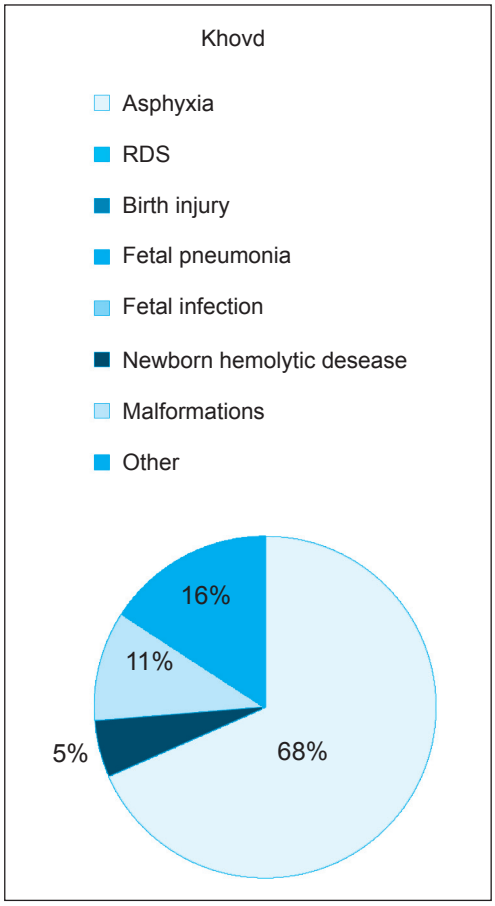


When the causes of infant mortality in 2008 were analyzed by location, there were some variations observed. Asphyxia accounted for 68% of all the deaths in Khovd aimag, while in Zavkhan no neonatal deaths due to asphyxia were registered (Figure 9).

Figure 9. Causes of infant mortality (by location)







Conclusions

- Direct, obstetric causes, including hemorrhage, are more prevalent than indirect causes of maternal deaths. Among the obstetric complications, pre-eclampsia and prolonged labour were the most common causes of maternal deaths.
- Perinatal mortality was high in the aimag and soum hospitals.
- Asphyxia, respiratory distress syndrome, birth defects and fetal sepsis were the most prevalent causes of early neonatal mortality.
- Among all the causes of neonatal deaths, the proportion of asphyxia varies considerably, when Ulaanbaatar city and 3 selected aimags are compared.

UN INDICATORS ON EmOC

EmOC accessibility and geographic distrition of facilities

The survey shows that number of facilities delivering basic and comprehensive EmOC is relatively high according to the UN process indicators (Figure 3). For instance, there is at least one basic EmOC facility for the soum population of 1550 minimum and 6040 maximum. As for aimags there is at least one comprehensive EmOC facility for the population of 60000-80000 which is far exceeding minimum recommended levels by UN. The establishment of health facilities at every administrative unit in order to increase access to primary and secondary health care in a vast but sparsely populated country explains this situation.

On the other hand, the vastness of land also hampers the delivery of emergency care to remote locations which requires long distances and hours to cover. In this survey, for example, 58% of all soums were located at more than 120 km from aimag centers, a distance that makes it difficult, if not impossible, the delivery of emergency care within 2 hours.

Among the 21 facilities surveyed, 2 were classified as CEmOC facilities, 7 - as “CEmOC minus one”, 5 facilities as “BEmOC minus one” and none as “BEmOC”. The key service recommended by UN, namely “assisted vaginal delivery” was not available for Mongolian women in the surveyed 19 medical facilities, including tertiary level of care facility. The hospitals were not capable of performing assisted vaginal deliveries primarily because of lack of forceps and/or vacuum extractors.

Stratifying the facilities by location, it was found that only one facility in UB provided CEmOC, whereas the other four specialized hospitals (MCHRC, maternity homes II, III, Nalaikh) provided “CEmOC minus one”. In the Western region of the country only one facility (Khovd aimag general hospital) provided CEmOC. Three out of sixteen (19%) of the surveyed facilities provided “CEmOC minus one” (Khovd general hospital in Khovd aimag; Uliastai general hospital and Tosontsengel rural general hospital in Zavkhan aimag; Altai general hospital and Altai soum hospital in Gobi-Altai); five out of 16 (31%) facilities surveyed (Ider soum hospital in Zavkhan aimag; Tsetseg and Must in Khovd, Taishir and Altai soum hospitals in Govi-Altai aimag) provided “BEmOC-1” (Table 21, 22).

Table 21. EmOC signal functions in the study health facilities

EmOC Signal Functions		PAB	PO	PAC	MRP	MRRP	AVD	BT	CS
UB	MCHRC (n=1)	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
	Maternity homes (n=3)	3/3	3/3	3/3	3/3	3/3	1/3	3/3	3/3
	Nalaikh district general hospital (n=1)	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
Sub-total		5/5	5/5	5/5	5/5	5/5	1/5	5/5	5/5
Province	Khovd (n=5)	5/5	5/5	4/5	4/5	4/5	0/5	4/5	1/5
	Zavkhan (n=6)	6/6	6/6	6/6	5/6	3/6	0/6	2/6	2/6
	Gobi-Altai (n=5)	5/5	5/5	5/5	3/5	4/5	1/5	2/5	2/5
Sub-total		16/16	16/16	15/16	12/16	11/16	1/16	8/16	5/16
Total		21/21	21/21	20/21	17/21	16/21	2/21	13/21	10/21

PAB - parenteral antibiotics; PO - parenteral oxytocics; PAC - parenteral anticonvulsants; MRP - manual removal of placenta; MRRP – manual removal of retained products; AVD – assisted vaginal delivery; BT – blood transfusion; CS – cesarean section

Manual removal of placenta and assissted vaginal delivery were not performed in three study sites in Zavkhan aimag, two soum hospitals in Govi-Altai and in Khovd respectively due to no cases in past 3 and 12 months, shortage in equipment and/or non trained personnel. Fourty four percent of these 7 health facilities of three aimags were unable to perform the signal functions because of lack of human resources, equipment and/or drugs (Table 21, 22).

Table 22. Baseline status of EmOC facilities

Study sites	Number of surveyed facilities	Baseline status of facilities			
		CEmOC	CEmOC-1	BEmOC	BEmOC-1
UB	5	1	4	-	-
Khovd	5	0	1	0	2
Zavkhan	6	0	2	0	1
Gobi-Altai	5	1	0	0	2
Total	21	2	7	0	5

The staff of the most surveyed facilities responded that they did not perform assisted vaginal delivery using vacuum or forceps within last 3 months because there were no cases requiring such assistance. On the other hand, the number of women delivering at soum hospitals and, thus, number of emergency cases decreased due to the improved implementation of the referral guidelines. The procedures of assisted vaginal delivery using forceps or vacuum are not reflected in the job descriptions of soum doctors and midwifes, which may also be an influencing factor. Replacing of assisted vaginal delivery in some cases by Cesarian section may also lead to diminished use of forceps or vacuum at secondary and tertiary level hospitals. It shows that the proportion of Cesarian section in total number of births is high (Ulaanbaatar 26%, Khovd aimag 26%, Zavkhan aimag 19%, Table 18, page 44).

Considering that the number of births at soum hospitals which are located in areas remote from aimag centers is still high, there is a need to improve equipment and supply for these hospitals, as well as their staff's-skills and knowledge to deliver EmOC.

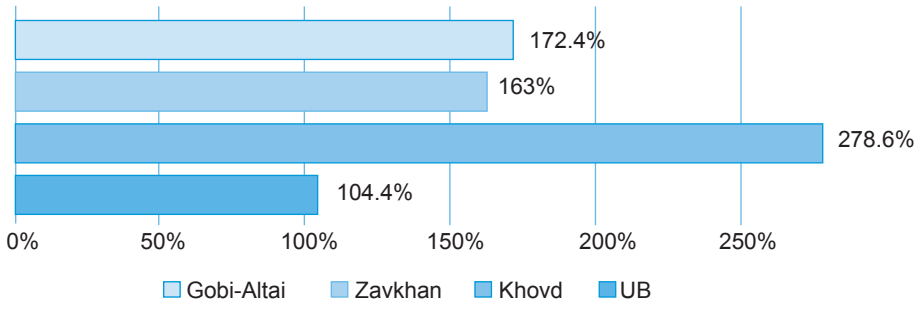
To establish the level for availability and distribution of EmOC services relative to the catchment population and annual number of births in each aimag was a cumbersome task for the team members due to a scattered and small catchment population. The distribution of facilities in Mongolia, including the Western region, has been based on existing administrative/jurisdictional divisions. According to MoH regulations, there should be one BEmOC facility per soum. Existence of only 4 BEmOC services in three aimags of Western region indicates that women have to travel long distances to obtain basic care.

During the study it was also defined that all CEmOC facilities were available within 12 hours (as an average time interval from onset to death for the major obstetric complications) and BEmOC facilities were within three hours of travel for women in need provided that weather allowed travelling.

Percentage of births in EmOC facilities

The needs assessment found a relatively high percentage of women who gave birth in emergency obstetric facilities – 104.4% in UB, 278.6% in Khovd, 163% in Zavkhan and 172.4% in Gobi-Altai (Figure 10). A summary of data used for the EmOC indicators are presented in Annex III.

Figure 10. Percentage of births in EmOC facilities



† Estimation of a number of women delivering in the facility come from outside the area – n/a
‡ Calculation is based on all the facilities surveyed by location

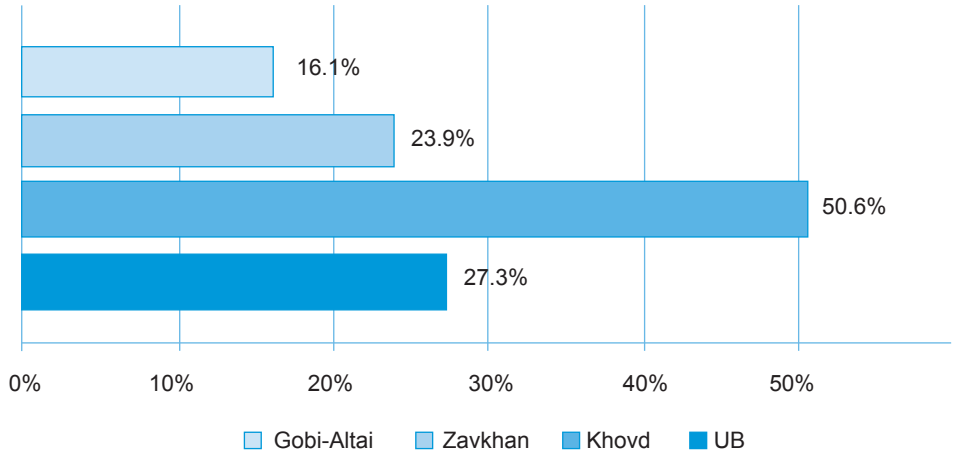
Met need for EmOC services

A total of 8,785 obstetric complications were recorded in the selected 21 EmOC facilities. Calculation of the indicator on met need for EmOC services could not be performed due to discrepancies in data related with number of complications in overall and women treated for direct obstetric complications.

Cesarean sections as a percentage of all births

The number of cesarean deliveries overall at all sites exceeded the recommended 5-15%. (Figure 11): In Gobi-Altai it was 16.1%, Zavkhan aimag, 23.9%, UB 27.3% and Khovd aimag it was 50.6%. In UB the level of C-sections at MCHRC was 58.7%, Maternity Home I – 28.6%, Maternity Home II – 15.5% and Maternity Home III – 16.2% (Annex III). The high percentage at MCHRC, was explained by the fact of its tertiary referral level characterized by the high volume of complicated cases it has to deal with. The number of C-sections is below the recommended levels in Nalaikh district of UB and all soum hospitals of Western region.

Figure 11. Cesarean deliveries as a percentage of all births



*Estimation of a number of women delivering in the facility come from outside the area – n/a

Case fatality for the facilities studied

Only 10 maternal deaths occurred. 8 of these deaths were due to direct obstetric complications that were recorded in the study EmOC facilities. The calculated case fatality rates were below recommended UN levels: In UB the rates were 0.06%, in Khovd 0.02%, Zavkhan 0.8%.

Table 23. Availability, utilization and quality of maternal and neonatal care in UB and three aimags of western region of Mongolia (Khovd, Zavkhan, Gobi-Altai) over a one year period

(Jan–Dec, 2008)

Variables	Recommended	UB	Khovd	Zavkhan	Gobi-Altai
Case fatality rate	less than1%	0.06%	0.2%	0.8%	0%

ASSESSMENT OF THE INFRASTRUCTURE OF THE HEALTH FACILITIES

Infrastructure, such as heating, water and electricity supply, hygiene and communication systems, and vehicles at the facilities were evaluated from the point of view of meeting the requirements for provision of EmOC and ENC.

Number of beds for obstetric care

Of the 21 hospitals assessed, 12 (57%) soum hospitals had, on average, less than 5 beds for obstetric care. Three aimag (including RDTC), rural and district general hospitals, Maternity Home III (29%) had a range of 10-50 beds, Maternity Home II (5%) had 75 beds, and MCHRC and Maternity Home I each had more than a 100 beds (Table 24).

Table 24. Number of obstetric beds, number of births per bed (by location)

Study sites	№	Facility	Total number of births (2008)	Total number of beds	Total number of obstetric beds
Ulaanbaatar	1	MCHRC	8 125	256	183
	2	Maternity Home I	9 572	240	175
	3	Maternity Home II	4 430	75	75
	4	Maternity Home III	3 540	45	45
	5	Nalaikh	557	135	21
Zavkhan	6	Uliastai	832	217	17
	7	Tosontsengel	526	80	25
	8	Ider	16	10	2
	9	Aldarkhaan	5	10	2
	10	Ikh-Uul	109	20	3
	11	Telmen	31	15	4
Khovd	12	Khovd city	1 430	253	34
	13	Must	75	15	3
	14	Zereg	52	15	3
	15	Tsetseg	30	15	3
	16	Buyant	4	10	1
Gobi-Altai	17	Altai city	980	205	35
	18	Bugat	12	10	2
	19	Khaliun	4	15	2
	20	Taishir	4	5	2
	21	Altai	26	8	2

Electricity supply at the facilities

Of the 21 facilities assessed, 11 (52%) had continuous 24 hours electricity supply from the national electricity grid and these included city and aimag general hospitals and 3 soum hospitals. 9 soum hospitals (75%), and one rural general hospital had standalone electricity supply and also connected to the national electricity grid but received electricity mostly in the evening and night, usually between 18:00 to 22:00 hours. Although 3 of 5 facilities in Khovd aimag, 2 of 5 facilities in Gobi-Altai aimag, and 1 of 6 facilities in Zavkhan aimag, had 24 hour electricity supply from the central grid (Table 25), there were frequent blackouts and these were seen as common events.

Table 25. 24 hours electricity supply (by types of facilities)

Study sites	Electricity supply		Electricity generators	
	Continuous, 24 hours has electricity	Generator, diesel, solar battery, 24 hours has not electricity	Available generator	Not available generator
Ulaanbaatar	5/5	-	4/5	1
Zavkhan	1/6	5/6	6/6	-
Khovd	3/5	2/5	2/5	3
Gobi-Altai	2/5	3/5	5/5	-
Total	11/21 (52%)	10/21 (48%)	17/21 (81%)	4/21 (19%)

Of the 21 facilities, 17 (81%) had their standalone generator, which used gasoline or diesel fuel, and they used it in case of electricity blackouts. Proportions of the assessed facilities that had their own generators were as follows: 40% in Khovd aimag, 80% in Ulaanbaatar, and 100% in Gobi-Altai and Zavkhan aimags (Table 25).

Water supply, waste management systems of facilities

Among the facilities assessed, 8 (38%) were connected to a central mains water supply source, while the other 14 (62%) were not connected to a central mains water supply source. Of the aimag and soum hospitals that were not connected to central mains water supply, 4 obtained their water supply from local springs, and 9 obtained their water supply from protected wells (Table 26). One facility obtained its water supply from a local spring but also melted ice to obtain water. At the time of evaluation, only one facility did not have access to clean running water. In the rural areas, since water in the pipes freezes and they do not function during the winter or they require a large volume of constantly flowing water to prevent them from freezing, these pipes tend to get used only during summer.

Table 26. Water supply at study sites (by location)

Study sites	Water supply			
	Centralized supply	Outdoor protected well	Local spring/underground water	Water from snow and ice
Ulaanbaatar	5/5	-	-	-
Zavkhan	1/6	1/6	4/6	-
Khovd	1/5	1/5	3/5	-
Gobi-Altai†	1/5	2/5	2/5	1/5
Total	8/21 (38%)	4/21 (19%)	9/21 (43%)	1/21 (5%)

†The hospital of Khaliun soum of Gobi-Altai aimag uses local spring, as well as snow and ice for water supply

There were 8 (38%) hospitals that are connected to a centralized sewage system, 11 (62%) hospitals had pit laterines located outside of the building, and 2 (10%) hospitals had their own, self contained sewage systems such as septic tanks. Only one facility each in Zavkhan, Gobi-Altai and Khovd aimags had a connection to a centralized, public sewage system. There are 5 facilities in Zavkhan, 4 in Gobi-Altai, and 2 in Khovd aimags that only had pit latrines, located outside of the building (Table 27).

Photo 1. Outdoor protected well in rural area

Table 27. Hygiene facilities (by location)

Study sites	Centralized	Outdoor latrines	Local for facility
Ulaanbaatar	5/5	-	-
Zavkhan	1/6	5/6	-
Khovd	1/5	2/5	2/5
Gobi-Altai	1/5	4/5	-
Total	8/21 (38%)	11/21 (52%)	2/21 (10%)

Box 1

Since pipes freeze in winter they are only used during summer and the waste from postpartum women carried out of the facility by personnel.

Because a lot of water is needed, we cannot operate a septic tank type sewage system.

Head of soum hospital

Handling of infectious and hazardous waste

Of the 21 facilities, 18 (86%) used incinerators for treating medical waste, and 2 facilities that did not have incinerators, removed and treated the medical waste through the public waste disposal points. 5 (24%) of the facilities assessed (1 in Ulaanbaatar, 4 in Gobi-Altai) threw their infectious/hazardous medical waste in other places (such as containers for keeping coal, septic tanks for sewage water, or incinerate it in public waste disposal points along with the ordinary garbage). Despite having incinerators, 8 (38%) facilities still buried placenta and blood derived waste probably for cultural reasons (Table 28).

Photo 2. Incinerators for medical waste in rural area

Box 2

We do not bury placenta at special disposal places anymore as these are given to the family for disposal in accordance with their traditions. We built an incinerator using bricks, however it doesn't work and now we use a metal container as our incinerator.

Head of soum hospital

Table 28. Handling of infectious and hazardous waste (by location)

Study sites	Incineration	Deep hole with lid	Other
Ulaanbaatar	4/5	-	1/5
Zavkhan	5/6	1/6	-
Khovd	5/5	3/5	-
Gobi-Altai	4/5	4/5	4/5
Total	18/21 (86%)	8/21 (38%)	5/21 (24%)

Types of heating

Of all the assessed facilities, 9 (43%) were connected to centralized heating and this included all city and aimag hospitals and 1 soum hospital. 11 soum and a rural general hospital (57%) used low pressure boilers for heating purposes (Table 29). 17 (81%) facilities had full time heating during winter, however 14 (67%) responded that they needed additional heaters. Maternity Home II, Nalaikh district general hospital, 2 aimag general hospitals and 10 soum hospitals responded that they needed additional heating. For example temperature in the delivery room of the Nalaikh district general hospital was only +11 Celsius.

Table 29. Types of heating (by location)

Types of heating Study sites	Centralized	Low pressure heating oven
Ulaanbaatar	5/5	-
Zavkhan	1/6	5/6
Khovd	1/5	4/5
Gobi-Altai	2/5	3/5
Total	9/21 (43%)	12/21 (57%)

Box 3

Because heat is not distributed equally, some rooms and sections are colder and require additional heaters.

Head of soum hospital

Communication, transportation

Of the 21 facilities assessed, 11 (52%) (Khovd and Gobi-Altai aimags 20% each respectively, Zavkhan aimag 67%) use a facility based landline telephone (Table 30). Nine soum hospitals do not have landline telephones. Despite these constraints all aimag and soum facilities use mobile phones. However, 5 (23%) responded that these mobile phones are not adequate for use in the provision of routine services.

Table 30. Use of permanent and mobile phones (by location)

Study sites	Land telephone			Mobile telephone		
	Available & functional	Available but not functional	Not available	Available & functional	Available but not functional	Not available
Ulaanbaatar	5/5	-	-	4/5	-	1/5
Zavkhan	4/6	-	2/6	6/6	-	-
Khovd	1/5	-	4/5	5/5	-	-
Gobi-Altai	1/5	1/5	3/5	5/5	-	-
Total	11/21(52%)	1/21 (5%)	9/21 (43%)	20/21 (95%)	-	1/21 (5%)

Two other health facilities, including 1 in Ulaanbaatar, and 1 in Gobi-Altai had radio communication facilities that did not work (Figure 5). Among the 16 facilities (76% of all hospitals) that did not have radio communications, 12 (75%) were soum hospitals. Hospitals in Zavkhan and Khovd aimags did not have radio communications (Table 31).

Table 31. Use of radio communication (by location)

Study sites	Radio communication		
	Available & functional	Available but not functional	Not available
Ulaanbaatar	2/5	1/5	2/5
Zavkhan	-	-	6/6
Khovd	-	-	5/5
Gobi-Altai	1/5	1/5	3/5
Total	3/21 (14%)	2/21 (10%)	16/21 (76%)

Cars, motorcycles and carts were mentioned as a response to the question on what kind of transportation is used for providing health care services. Of the 21 facilities assessed, all except one had a car, 13 (62%) had a motorcycle and 3 (14%) also used horses or camels as transport means. Motorcycles and horses were used by bagh feldshers for providing health services.

Each soum hospital had a car, and in the case of overlapping emergency calls, a car from local government soum administration could also be mobilized. Each rural, aimag and district hospital had a range of 5-10 cars. However, out of 5 non city facilities, 3 responded that some of the cars had broken down. For example General Hospital of Zavkhan aimag had 10 cars, but only 6 were in use (Table 32). Eight (38%) facilities responded that the existing number of cars they had were not sufficient for their daily needs which were not defined.

Soum hospitals with a range of 2-8 motorcycles and hospitals with 4 motorcycles were most common (33%). However, because of shortage of spare parts for these Chinese made motorcycles were not in use. For example in 4 soum hospitals of Khovd aimag, of the 16 motorcycles available, 6 (37%) were not in use (Table 27). Of the total number of soum hospitals that had motorcycles, 7 (54%) responded that they were not sufficient for their daily needs which were not defined.

Table 32. Number of cars and motorcycles (by types of organizations)

Study sites/Facility		Number of cars/ Number of running cars	Number of motorcycles/ Number of running motorcycles
Ulaanbaatar	MCHRC	1/1	0
	Maternity Home I	1/1	0
	Maternity Home II	0/0	0
	Maternity Home III	2/1	0
	Nalaikh district general hospital	8/8	0

Zavkhan	Uliastai	10/6	0
	Tosontsengel	5/3	5/4
	Soums (n=4)	4/4	21/19
Khovd	Khovd	9/9	0
	Soums (n=4)	4/4	16/10
Gobi-Altai	Altai	10/8	0
	Soums (n=4)	4/4	12/12
Total		58/49	54/45

Facilities were responsible for the maintenance and repair of their vehicles. Among facilities assessed, 11 (52%) were capable for doing their own maintenance and repairs. If the need arose, 9 (43%) were capable in some cases and 1 (5%) did not have such a capacity (Table 33). 16 (76%) facilities responded that do not have the financial resources for the maintenance and repairs of their vehicles.

Table 33. Ability to conduct repairs of vehicles as needed (by location)

Study sites	Ability to conduct repairs of vehicles		
	Yes	No	Sometimes
Ulaanbaatar	3/5	-	2/5
Zavkhan	3/6	-	3/6
Khovd	3/5	-	2/5
Gobi-Altai	2/5	1/5	2/5
Total	11/21 (52%)	1/21(5%)	9/21 (43%)

Of all the facilities assessed, 12 (57%) responded that they had sufficient budget for gasoline, and 9 (43%) responded that they did not have sufficient funding for gasoline. Among the causes for this insufficient budget, 4 facilities mentioned rising prices of gasoline, 6 mentioned insufficient budget, 3 pointed out that the snow and dzud (natural disaster) made supplies unavailable for long periods, and 1 facility mentioned the long distance to get to a gasoline station.

Box 4

In some months, when we lack budget for gasoline, we ask clients to pay for gasoline that needed for our services. But we always try to reimburse them during the next month.

Head of soum hospital

Conclusions

- Majority of the soum hospitals (75%), and the rural general hospital, did not have uninterrupted 24 hours supply of electricity.
- There were a few hospitals that obtained water from unreliable sources for drinking and for services.
- Most of the non-city hospitals did not have sufficient heating and needed additional heaters during the winter.
- Soum hospitals did not have connections with a central sewage system and those that did have, did not use it all the time. Soum hospitals used toilets (pit latrines) located outside of the building, and these caused difficulties for mothers and medical personnel, and in maintaining hygienic conditions in the hospital.
- There was a lack of incinerators at the countryside facilities and, in some places, guidelines on handling and disposing placentas were not followed because of local customs and traditions.
- Problems with maintenance and repair of vehicles, and provision of gasoline used for providing services were related to insufficient allocation and, sometimes, poor management of the limited financial resources.

PREPAREDNESS OF HEALTH FACILITIES

In order to assess the preparedness of the health facilities for the provision of EmOC and ENC, the most important criteria namely infrastructure, medical equipment and supplies, availability of drugs during emergency care, pre-delivery and delivery rooms, maternity wards, surgery sections and pharmacies were evaluated in greater detail. Detailed information about logistics and preparedness of all hospitals is summarized and attached in Volume 2 of the report.

Emergency care (reception) section

Maternity homes in Ulaanbaatar city and the MCHRC did not have respiratory adult Ambu bags, Guedel airways and lacked thermometers (range 0-33%). Emergency drugs such as hydralazine and ringer lactate were also out of stock. Also, district hospitals did not have fetal stethoscopes, thermometers, soap, sterile gloves and among drugs; ampicillin and hydralazine. Hospitals in the Western Region also did not have fetal stethoscopes (RDTC), adult Ambu bags and Guedel airways (in the General Hospital of Khovd aimag), soap (RDTC), sterile gloves and ampicillin (AGHs) and ringer lactate solution (RDTC, aimag general hospitals). Availability of these items at soum hospitals was variable (range 10-91%). Hydralazine, which is used for urgently decreasing blood pressure during severe pre-eclampsia and eclampsia, was not available in the emergency care units of the hospitals at all levels (Table 34).

Table 34. Medical equipment, supplies, drugs availability at emergency care unit and selected items (by sites)

Item	Facility	Ulaanbaatar			Western Aimags			
		MCHRC	Maternity homes	District general hospital	Regional diagnostic and treatment center	Aimag general hospitals	Rural general hospital	Soum hospitals
Equipment and supplies	BP cuff	Yes	Yes	Yes	Yes	Yes	Yes	9/11
	Stethoscope	Yes	Yes	Yes	Yes	Yes	Yes	10/11
	Fetal stethoscope	Yes	Yes	No	No	1/2	Yes	6/11
	Clinical thermometer	No	1/3	No	Yes	Yes	Yes	6/11
	Adult Ambu bag and mask	No	No	Yes	Yes	Yes	No	3/11
	Guedel airways	No	No	Yes	Yes	Yes	No	6/11
	Patient transport (wheelchair, gurney, hammock)	Yes	2/3	Yes	Yes	Yes	Yes	2/11
	Examination table with privacy	Yes	2/3	Yes	No	No	Yes	4/11
Infection prevention	Soap	Yes	Yes	No	No	1/2	Yes	4/11
	Sterile gloves	Yes	Yes	No	Yes	No	Yes	3/11
	Non-sterile gloves	Yes	Yes	Yes	Yes	Yes	Yes	9/11
Drugs	Ampicillin	Yes	1/3	No	No	1/2	Yes	Yes
	Magnesium sulphate	Yes	Yes	Yes	Yes	Yes	Yes	7/10
	Diazepam	No	2/3	Yes	Yes	Yes	Yes	6/10
	Hydralazine	No	No	No	No	No	No	No
	Nifedipine	Yes	Yes	Yes	Yes	Yes	Yes	2/10
	Adrenaline	Yes	2/3	Yes	Yes	Yes	Yes	7/10
	Ringer's lactate	No	No	Yes	No	No	Yes	3/10

Labour and delivery rooms

It was observed that all hospitals in Ulaanbaatar city did not have special containers with lids for the treatment and disposal of infectious/hazardous medical waste. Also district hospitals did not have thermometers, fetal monitors, newborn scales and height meters, diapers for newborn, sets for newborn resuscitation, electric vacuum aspirators and obstetric forceps. Fetal monitors were also not available in district hospitals, rural general hospitals and soum hospitals. One soum hospital did not have a newborn weighing scale and delivery rooms of all soum hospitals were lacking other provisions (25-92%). Delivery rooms of all hospitals, except rural general hospital, did not have newborn incubators. The proportion of hospitals, (except district hospitals and RDTC) that had adult Ambu bags and masks, and airways varied between 0-55% (Table 35). In the process of evaluating sets for neonatal resuscitation, it was found that masks, oxygen supply pipes, mucus suction tubes, tubes for endotracheal intubation with suitable sizes for newborn were lacking. Specifically, newborn masks were unavailable in 76%, nasal tubes in 33%, tubes for intubation in 14%, and baby warmers in 38% of the facilities assessed. In terms of all hospitals, availability of emergency drugs that must be present in labor and delivery rooms was also variable. Provision and availability of metronidazole, misoprostol, ketamine and vitamin A were less adequate when compared with other drugs. Naloxone was not available in all hospitals; also some hospitals did not have hydralazine and tetracycline suspension for eyes, both essential in the provision of EmOC and ENC.

Table 35. Availability of medical equipment, supplies, drugs at pre-delivery and delivery rooms and selected items (by sites)

Item	Facility	Ulaanbaatar			Western Aimags			
		MCHRC	Maternity homes	District general hospital	Regional diagnostic and treatment center	Aimag general hospitals	Rural general hospital	Soum hospitals
Equipment and supplies	BP cuff	Yes	Yes	Yes	Yes	Yes	Yes	9/11
	Stethoscope	Yes	Yes	Yes	Yes	Yes	Yes	10/11
	Fetal stethoscope	Yes	Yes	No	No	1/2	Yes	6/11
	Clinical thermometer	No	1/3	No	Yes	Yes	Yes	6/11
	Adult Ambu bag and mask	No	No	Yes	Yes	Yes	No	3/11
	Guedel airways	No	No	Yes	Yes	Yes	No	6/11
	Patient transport (wheelchair, gurney, hammock)	Yes	2/3	Yes	Yes	Yes	Yes	2/11
	Examination table with privacy	Yes	2/3	Yes	No	No	Yes	4/11
Infection prevention	Soap	Yes	Yes	No	No	1/2	Yes	4/11
	Sterile gloves	Yes	Yes	No	Yes	No	Yes	3/11
	Non-sterile gloves	Yes	Yes	Yes	Yes	Yes	Yes	9/11

Item		Facility	Ulaanbaatar			Western Aimags			
			MCHRC	Maternity homes	District general hospital	Regional diagnostic and treatment center	Aimag general hospitals	Rural general hospital	Soum hospitals
Drugs	Ampicillin		Yes	1/3	No	No	1/2	Yes	1/10
	Cefazolin		No	1/3	No	Yes	1/2	Yes	3/12
	Gentamicin		Yes	1/3	No	Yes	Yes	Yes	5/12
	Metronidazole		No	No	No	No	Yes	No	3/12
	Magnesium sulphate		Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Diazepam		Yes	Yes	Yes	Yes	Yes	Yes	10/12
	Hydralazine		Yes	1/3	No	Yes	No	No	5/12
	Nifedipine		Yes	Yes	Yes	Yes	Yes	Yes	7/12
	Methylergometrine		No	2/3	No	Yes	1/2	Yes	9/12
	Misoprostol		No	No	No	No	1/2	No	No
	Oxytocin		Yes	Yes	Yes	Yes	Yes	Yes	11/12
	Naloxone		No	No	No	No	No	No	No
	Ketamine		No	No	No	No	No	Yes	1/12
	Lignocaine 2% or 1%		Yes	1/3	No	No	1/2	Yes	8/12
	Dexamethasone		Yes	2/3	Yes	Yes	Yes	Yes	4/12
	Normal saline		0	2/3	Yes	Yes	Yes	Yes	9/12
	Tetracycline or erythromycin ointment or solution $AgNO_3$		Yes	2/3	No	Yes	No	No	7/12
	Vitamin A		No	No	No	No	No	No	4/12

The presence of the list of emergency drugs was assessed and 7 (33%) facilities (1 AGH, 5 district and soum hospitals) did not have such lists. The proportion of drugs from the list, which were available at the time of the assessment, ranged between 19-100%. These drugs are essential for EmOC and ENC should be available 24 hours a day, every day. Number of drugs from the list, which were available at the time of the assessment at the each facility, is shown in Table 36.

At one hospital, sets of instruments for delivery were not prepared for use and not sterilized, and subsequently the assessment team members provided guidance on how to prepare and sterilize the instruments.

Table 36. Availability of drugs essential for EmOC and ENC in the delivery rooms (by location)

Facility		Number of drugs from the essential list needed for labor/delivery room	Number of drugs available during the assessment	Number of drugs available during the assessment
Ulaanbaatar	Maternity I	21	16	76%
	Maternity II	26	26	100%
	Maternity III	35	19	54%
	MCHRC	30	28	93%
	Nalaikh	-	-	-

Zavkhan aimag	**Uliastai**	80	28	35%
	Ider	33	28	85%
	Telmen	-	-	-
	Aldarkhaan	21	16	76%
	Ikh-Uul	-	-	-
	Tosontsengel	76	47	62%
Gobi-Altai aimag	**Altai**	-	-	-
	Taishir	19	12	64%
	Khaliun	-	-	-
	Bugat	30	19	64%
	Altai	-	-	-
Khovd aimag	**Khovd**	35	29	83%
	Buyant	62	12	19%
	Zereg	43	39	91%
	Must	33	29	88%
	Tsetseg	-	-	-

Surgical unit

The general condition of surgical units was assessed using on agreed criteria namely infrastructure, infection prevention, equipment and related supplies (sets of instruments for obstetric laparotomy/ Cesarean section, equipment for anesthesia, etc). Two soum hospitals had surgical units/rooms and one of them had only few instruments for small, emergency operations (appendectomy, cleaning wounds, etc). Table 37 shows the situation at the time of assessing the availability of the items that should be present at all times in a surgical unit. Also, wall clocks, room thermometers, scissors, needles and patient monitors were mostly lacking at all sites. Surgical units of soum hospitals also did not have any equipment for anaesthesia. Additionally, operating theaters in all the hospitals assessed did not have stations for resuscitation of the newborn.

Table 37. Availability of medical equipment, supplies, drugs at surgical units and selected items (by sites)

Item	Facility	Ulaanbaatar			Western aimags			
		MCHRC	Maternity homes	District general hospital	Regional diagnostic and treatment center	Aimag general hospitals	Rural general hospital	Soum hospitals
Equipment and supplies	Wall clock	Yes	2/3	Yes	Yes	No	No	No
	Room thermometer	No	1/3	Yes	No	1/2	No	No
	Surgical knife blades/knife	Yes	Yes	Yes	Yes	Yes	Yes	4/10
	Scissors straight, 23 cm	No	1/3	No	Yes	1/2	Yes	No
	Suction nozzle	Yes	2/3	Yes	Yes	Yes	Yes	2/10
	Spinal needles	Yes	2/3	No	No	Yes	No	2/10
	Suction apparatus: Foot-operated	Yes	1/3	No	Yes	No	n/a	No
	Suction apparatus: electrical	Yes	Yes	No	Yes	1/2	No	No
	Patient monitor	No	2/3	No	Yes	Yes	Yes	No
	Anesthesia apparatus	Yes	Yes	Yes	Yes	Yes	Yes	No

Postpartum section

Provision and availability of newborn incubators, equipment for phototherapy, newborn pulse oximeters, fetal monitors, oxygen bags and Guedel airways were insufficient at the puerperal sections. Compared with the other hospitals, the provision and availability of medical equipment and supplies was at a much lower level and this indicator ranged between 0-36% at soum hospitals. However, the provision of drugs and vaccines was relatively better. Hospitals, except one soum hospital, were providing meals for patients. It was found during the assessment that 50% of city hospitals, RDTC and AGHs did not have unoccupied beds for the next client (Table 38).

Table 38. Availability of medical equipment, supplies, drugs at post-delivery section and selected items (by sites)

Item	Facility	Ulaanbaatar			Western Aimags			
		MCHRC	Maternity homes	District general hospital	Regional diagnostic and treatment center	Aimag general hospitals	Rural general hospital	Soum hospitals
Equipment and supplies	Beds suitable for mother and newborn together	Yes	2/3	Yes	Yes	12	No	3/11
	BP cuff	Yes	Yes	Yes	Yes	1/2	No	4/11
	Stethoscope	No	2/3	Yes	Yes	Yes	No	3/10
	Baby gastric tube	n/a	n/a	n/a	Yes	No	Yes	2/12
	Baby weighing scale	No	2/3	Yes	No	1/2	No	2/11
	Incubator	No	1/3	Yes	Yes	1/2	No	No
	Phototherapy unit	No	1/3	No	Yes	1/2	No	2/12
	Pulseoxymeter for newborn	No	No	No	Yes	1/2	No	No
	Neonate monitor	No	No	No	No	No	No	No
	Oxygen bag	No	1/3	Yes	No	No	No	1/11
	Guedel airways	No	No	Yes	No	1/2	No	1/11
Drugs	Ampicillin	No	2/3	Yes	Yes	Yes	Yes	4/10
	Gentamicin	Yes	Yes	Yes	Yes	Yes	No	4/10
	Adrenaline	Yes	Yes	Yes	Yes	Yes	Yes	8/10
	Vitamin K	Yes	Yes	Yes	Yes	Yes	Yes	10/12
	Vaccine for B hepatitis	Yes	1/3	Yes	Yes	Yes	Yes	11/12
	BCG vaccine	Yes	1/3	Yes	Yes	Yes	Yes	11/12
	Polio vaccine	Yes	1/3	Yes	Yes	Yes	Yes	11/12
Other services	Is food provided by the hospital to patients?	Yes	Yes	Yes	Yes	Yes	Yes	11/12
	Are there empty beds for the next patients?	No	No	No	No	1/2	Yes	11/12
	If yes, are the empty beds clean and ready to receive new patients?	No	No	No	No	1/2	Yes	7/12

Laboratory

Using specially selected indicators, laboratories of soum hospitals did not have special refrigerators, and there was a lack of 37 degree Celsius water warmers, and cell counters at RDTC and cell counters at maternal hospitals (Table 39). Please see Volume 2 for the detailed report on the laboratory assessment.

Table 39. Availability of medical equipment, supplies at laboratory units and selected items (by sites)

Item	Facility	Ulaanbaatar			Western Aimags			
		MCHRC	Maternity homes	District general hospital	Regional diagnostic and treatment center	Aimag general hospitals	Rural general hospital	Soum hospitals
Equipment and supplies	Refrigerator	Yes	Yes	Yes	Yes	Yes	Yes	No
	Centrifuge	Yes	2/3	Yes	Yes	Yes	Yes	Yes
	37° Water bath (or incubator)	Yes	Yes	No	Yes	Yes	Yes	Yes
	Microscope	Yes	1/3	Yes	Yes	Yes	Yes	10/12
	Counting chamber (Neubauer)	Yes	1/2	Yes	No	Yes	Yes	8/12
	Tally counter, differential if possible	Yes	No	Yes	Yes	Yes	Yes	Yes

Pharmacy

During the survey it was found that not all the pharmacies of all health institutions that were assessed work 24 hours every day, but the pharmacist is on call if the need arises. One aimag hospital responded that even though their pharmacy doesn't work 24 hours, they did not call a pharmacist. Of all the hospitals assessed, 61% protected drugs from humidity, heat and exposure. As shown in the table 34, there were more than 90% reserves of ampicillin, cefazoline, nifedipine, diazepam, oxytocin, adrenaline, furosemide, ketamin, lignocain, dexamethazone, dextran 40 and 70, salt solution and ringer lactate solution in most of pharmacies in these facilities. On the other hand, the provision of hydralazine, erythromycin, misoprostol and folic acid was poor. Naloxone and sodium citrate were available at soum hospitals only. At soum hospitals, all selected drugs, except misoprostol, were available; however availability of certain drugs was variable (range between 9-100%, Table 40).

Table 40. Availability of drugs at pharmacy and selected items (by sites)

Item		Facility	Ulaanbaatar			Western Aimags			
			MCHRC	Maternity homes	District general hospital	Regional diagnostic and treatment center	Aimag general hospitals	Rural general hospital	Soum hospitals
Drugs	Ampicillin		Yes	Yes	Yes	Yes	Yes	Yes	10/11
	Cefazolin		Yes	1/2	Yes	Yes	Yes	Yes	10/11
	Erythromicin		Yes	No	No	No	Yes	No	9/11
	Metronidazole		No	Yes	Yes	No	1/2	Yes	10/11
	Magnesium sulphate		No	1/2	No	Yes	Yes	Yes	Yes
	Diazepam		Yes	Yes	Yes	Yes	Yes	Yes	9/11
	Hydralazine		No	No	No	Yes	No	No	No
	Nifedipine		Yes	Yes	Yes	Yes	Yes	Yes	10/11
	Methylergometrine		No	Yes	No	Yes	Yes	No	6/11
	Misoprostol		No	No	No	Yes	1/2	No	No
	Oxytocin		Yes	Yes	Yes	Yes	Yes	Yes	8/11
	Adrenaline		Yes	Yes	Yes	Yes	Yes	Yes	10/11
	Calcium gluconate		Yes	Yes	Yes	No	Yes	Yes	10/11
	Furosemide		Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Naloxone		No	No	No	No	No	No	1/11
	Ketamine		Yes	Yes	Yes	Yes	Yes	Yes	1/11
	Lignocaine		Yes	Yes	Yes	Yes	Yes	Yes	8/11
	Morphine		n/a	Yes	Yes	Yes	Yes	Yes	9/11
	Paracetamol		No	Yes	Yes	n/a	1/2	Yes	Yes
	Dexamethasone		Yes	Yes	Yes	Yes	Yes	Yes	10/11
	Dextran 40, 70		Yes	Yes	Yes	Yes	Yes	Yes	9/11
	Normal saline		Yes	1/2	Yes	Yes	Yes	Yes	Yes
	Ringer's lactate		Yes	Yes	Yes	Yes	Yes	Yes	8/11
	Ferrous sulphate		Yes	1/2	Yes	No	No	No	4/11
	Folic acid		No	1/2	No	No	No	No	2/11
	Sodium citrate		No	No	No	No	No	No	2/11

Sterilization section

The sterilization section was evaluated in terms of the flow of activities aimed at receiving, washing, disinfecting, sterilizing, storing and distributing instruments and supplies, and 12 facilities that were assessed, except the 3 (RDTC, aimag general hospitals), did not have the correct flow. Thirty eight percent of soum hospitals assessed lacked autoclaves with scales indicating temperature and pressure, 50% of aimag general hospitals and 88% of soum hospitals lacked tests for checking remnants of blood on the instruments and the rural general hospital in Khovd did not have any tests at all (Table 41).

Table 41. Availability of medical equipment at sterilization section and selected items (by sites)

Item		Facility: Ulaanbaatar			Western Aimags			
		MCHRC	Maternity homes	District general hospital	Regional diagnostic and treatment center	Aimag general hospitals	Rural general hospital	Soum hospitals
Equipment and supplies	Autoclave with temperature and pressure indicator	Yes	Yes	Yes	Yes	Yes	Yes	5/8
	Test for revealing blood on instruments	Yes	Yes	Yes	Yes	1/2	No	1/8

Blood bank

UB hospitals collect and maintain long term storage of blood and blood products, so they received and temporarily stored blood from the blood bank, and therefore did not have tests for the detection of blood-borne diseases, including HIV tests and anti-D tests (Rh negative). Rooms for donors' registration, waiting, examination and blood collection and storage did not exist at the RDTC. Twenty percent of soum hospitals had blood collection rooms and 40% had tests for identifying ABO blood groups only (Table 42).

Table 42. Availability of equipment and supplies at blood bank and selected items (by sites)

Item		Facility: Ulaanbaatar			Western Aimags			
		MCHRC	Maternity homes	District general hospital	Regional diagnostic and treatment center	Aimag general hospitals	Rural general hospital	Soum hospitals
Equipment and supplies	Serum for ABO testing	Yes	Yes	Yes	Yes	Yes	Yes	4/10
	Reagent for Rh testing	No	No	No	Yes	Yes	No	No
	Blood infusion set	Yes	1/3	No	Yes	1/2	No	No
	Hepatitis B test	No	No	No	Yes	1/2	Yes	6/10
	Hepatitis C test	No	No	No	Yes	1/2	Yes	8/10
	HIV test	No	No	No	Yes	No	Yes	Yes
	Syphilis test	No	No	No	Yes	No	Yes	n/a
	Hemoglobin measuring reagent	No	No	No	Yes	1/2	No	Yes

As concluded from interviews with doctors, midwives and nurses, the RDTC and AGHs had reserves of blood and blood products, and if they did not have them, they had to get them from blood banks. General Hospital of Khovd aimag, and soum hospitals did not have readily available reserves of blood and blood products, and in case of urgent transfusions, they collected blood from donors. City hospitals did not produce blood and blood products, but, in most cases, they temporarily stored reserves at intensive care departments or got blood from the blood bank.

When the lack of drugs, equipment and facts of requesting families of clients to buy drugs were investigated, the following issues emerged:

- Equipment and supplies were not available; donated equipment did not match one with another, and if one part was available, another was not; there was a lack maintenance and proper use of equipment; surgical instruments did not meet the quality criteria; specially equipped ambulance cars were not available; delivery beds, incubators, scissors were lacking; portable equipment for anaesthesia was not available; venopuncture sets, patient monitors, laryngoscopes, umbilical catheters and pulseoxymeters were also not available; sphygmomanometers were frequently broken and gave false readings; standard safety boxes were not provided, they were replaced by hand-made boxes; laryngoscopes did not have functioning lights; respiratory ventilators were also not available
- There was a lack of drugs and supplies: lack of diapers; provision of drugs and injections were regularly interrupted, therefore patients are frequently requested to buy the drugs on their own. Lack of syringe pumps, oxygen, oxygen pipes and masks and latex gloves, and absence of oxygen bags lead to a deterioration of quality and standards of care
- At the end of month, semester or year things were lacking due to budget constraints; drugs that were requested through tenders were not supplied; additional drugs then had to be requested to provide services
- Every pregnant woman had to provide for her own needs. For planned operations, everything except gloves were requested to be purchased by client or her family. Frequently, during delivery, even needles, antibiotics, urine catheters and oxytocin are requested by the hospital staff to be purchased by the client and her family including adult diapers.

Of the 84 doctors from the urban and rural sites, 54 (64%) responded that they invariably ask their clients to purchase all the medicines using their private financial sources and bring them to the hospital because there is a lack of drugs available at the facility. Drugs and supplies that are most frequently purchased by clients from outside the hospital with personal funds are shown in Table 43.

Table 43. Drugs and supplies that are most frequently purchased privately (by the clients)

Urban area	Remote/rural area
Drugs	*Drugs*
Oxytocin	No-spa
Actovegin	Dexamethasone
Infusions: sodium chloridium	Antibiotic: cefazolin
Antibiotic: cefazolin, metrogel	Infusions: dextran 40, dextran 70, normal saline
Ephedrine	Misoprostol
Droperydol	Actovegin
Dophamine	Prednisolone
Anesthetic suppository: dyclodenc	EAAK
Misoprostol	Ephedrine
Giniprale	
Immunoglobulin	
Mifeprestone	
Gydralazin	
Synestrol	
Supply	*Supply*
Intravenous catheter	Intravenous catheter
Sutures (Johnson suture)	Infusion set, blood set
Bandage	Suction tubes, mask

Conclusions

- At the hospitals that were assessed, the provision of drugs, supplies, newborn care kits and equipment was not at the required level.
- Provision of blood and blood products at urban hospitals was adequate, however some hospitals lacked the necessary tests to identify blood groups and this limited the possibility for providing assistance, especially for blood transfusion in case of bleeding.
- There was a lack of centrifuges, microscopes and cell counters at maternity homes along with the lack of refrigerators, cell counters and microscopes at soum hospitals which showed insufficient capacity for performing blood, urine and biochemistry tests.
- Lack of financial resources and their management at the end and beginning of (financial) reporting periods was the main reason for requesting the clients to purchase the required drugs from their personal financial resources.
- Health workers in facilities had to frequently request that uterotonics and other medicines needed for emergency care to be purchased by the clients and their families. This issue requires urgent attention.
- The regular, timely provision and availability of RH emergency drugs at maternity and other health facilities, (that clients and their families have to purchase because they are not available in the health facilities), needs to be urgently and specifically addressed for providing comprehensive or basic EmOC.

PROVISION OF EMERGENCY REFERRAL AND AMBULANCE CARE FOR EmOC and ENC

Ambulance

Regional diagnostic and treatment centers, aimag general hospitals and soum hospitals receive calls and provide emergency maternal and newborn care. Only Nalaikh district general hospital in Ulaanbaatar city, and all aimag and soum hospitals provide ambulance services upon request. The Ambulance Center of Ulaanbaatar is responsible for provision of ambulance services related to pregnancy and delivery within the metropolitan Ulaanbaatar city.

From 5 to 7 percent of all emergency requests to the aimag centers were related to childbirth, and 8-52% of all emergency requests to the soums hospitals were long distance (ranging from 25 to 400 kilometres) requests. From 5 to 60 percent of the long distance emergency requests were related to obstetrics. Forty seven percent of the long distance emergency requests to the rural general hospital were calls for emergency obstetric care requiring urgent intervention (Table 44).

Table 44. Types of emergency calls to aimag, district and soum hospitals (number, percentage)

Item / Study site	Number of total calls	Calls related to maternity care	Number of remote calls	Remote calls related to maternal care
Ulaanbaatar				
Nalaikh	8 215	454 (6%)	327	56 (17%)
Zavkhan aimag				
Uliastai	5 992	363 (6%)	207	38 (18%)
Tosontsengel	3 626	314 (9%)	387	181 (47%)
Ider	296	133 (45%)	133	7 (5%)
Telmen	624	67 (11%)	224	31 (14%)
Ikh-Uul	574	137 (24%)	310	81 (26%)
Aldarkhaan	497	46 (9%)	213	23 (11%)
Khovd aimag				
Khovd	13 784	617 (5%)	393	48 (12%)
Buyant	395	32 (8%)	277	28 (10%)
Must	385	69 (18%)	332	63 (19%)
Tsetseg	245	33 (14%)	203	30 (15%)
Zereg	473	37 (8%)	159	25 (16%)
Gobi-Altai aimag				
Altai city	1 888	139 (7%)	66	16 (24%)
Taishir	134	70 (52%)	64	2 (3%)
Khaliun	73	28 (38%)	10	6 (60%)
Bugat	48	7 (15%)	39	3 (8%)
Altai	77	6 (8%)	34	6 (18%)

Aimag, district and soum hospitals have their own ambulance services. Ambulance services at the aimag, district and rural general hospitals have on average 5-8 vehicles and each soum hospital has at least one vehicle.

Drugs, instruments and supplies in containers (drums) for emergency care were assessed using an approved checklist. Because a feldsher from one soum hospital was absent due to emergency call, and as her return to the hospital was delayed because of snow, her container (drum) for emergency care was not assessed.

Photo 3. Ambulance (emergency) kits, rural area

Oxytocin and magnesium sulphate, which are in use for EmOC, were present in 100% of the emergency containers (drums) for providing emergency care at the aimag and district hospitals, and 78-89% at the soum hospitals. Umbilical cord clamps were also available in 50% of the containers and face masks in 33% of containers for providing emergency care at soum hospitals. Availability of main antibiotics in the emergency containers for provision of emergency care was insufficient (0-50%). Sterile cloth for newborn was lacking at most hospitals (0-37%), except at the district general hospitals (Table 45).

Table 45. Provision of drugs, supplies and equipment for ambulance (by each type of health facility)

Item	Facility	Ulaanbaatar	Western Aimags			
		District general hospital	Regional diagnostic and treatment center	Aimag general hospitals	Rural general hospital	Soum hospitals
Infection prevention	Infected waste trash bin	No	Yes	1/2	No	No
	Safety box	Yes	Yes	No	Yes	No
Equipment and supplies	Kidney basins	Yes	Yes	1/2	Yes	4/11
	Clinical thermometer	No	Yes	1/2	Yes	4/11
	Urine catheter	No	No	1/2	Yes	2/11
	Guedel airway	Yes	Yes	Yes	Yes	4/11
	Forceps for cord clamping 2 pieces	Yes	Yes	Yes	Yes	6/11
	Cord ties/clamps	No	Yes	Yes	No	9/11
	Cloth for drying newborn (2 pieces)	Yes	No	No	No	4/11
	Cloth for wrapping newborn (2 pieces)	Yes	No	No	No	-
	Neonatal Ambu bag and mask	No	No	No	No	2/11
Drugs and supplies	Ampicilin	No	No	No	No	2/9
	Gentamicin	No	No	1/2	No	1/11
	Metronidazole	No	No	No	No	3/11
	Nifedipine	No	Yes	1/2	No	9/11
	Magnesium sulphate	Yes	Yes	Yes	Yes	Yes
	Metylergometrine	No	No	1/2	Yes	5/9
	Oxytocin	Yes	Yes	Yes	Yes	9/11
	Syringe and needle (single use)	Yes	Yes	Yes	Yes	Yes
	Infusion set	No	Yes	Yes	Yes	3/11
	Ampoule cutting item	Yes	No	No	No	3/11
	Intravenous catheter	No	No	No	No	3/8

The Ambulance Center of Ulaanbaatar

The Ambulance Center of Ulaanbaatar is located in the center of the city, and provides services within a radius of 30 kilometers, for all people above 16 years old. The center serves children under 16 only in the case of an accident. (Ambulance units of district general hospitals serve children under 16, including newborns, but they were not included in the study).
The Ambulance Center has its own building and provides emergency transportation services for EmOC and ENC 24 hours a day, every day. The total number of emergency call requests in 2008 were 129,643, including 14,060 (11%) related to obstetric care and 104 (0.1%) related to home deliveries.

Infrastructure

In terms of infrastructure of the center: it consisted of an emergency call request reception area, sterilization area, drug storage, training room, rest rooms for emergency doctors and drivers, and an administrative section. Electricity, water supply, and heating were functioning normally.

Health registration and information

Forms, specifically designed for the needs of the Ambulance Center, were used. These included: ST -18 form for requests, and ST – 19 form for tracking working time of doctors and both were used routinely. Information about emergency call requests were categorized and kept in the statistics section. Home deliveries were registered in greater detail on a special form and discussed as a team the next morning.

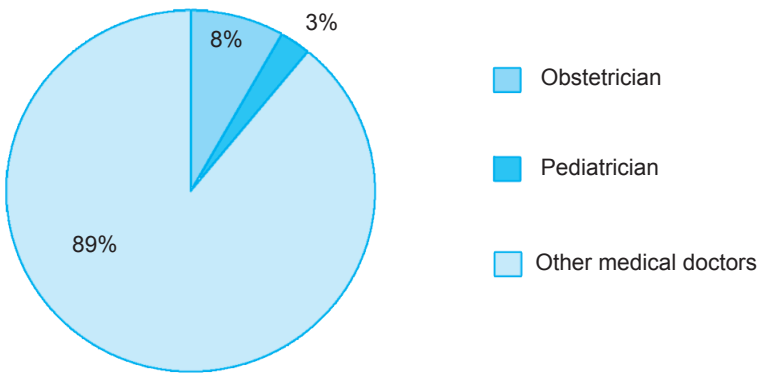
Human resources

The Ambulance Center had, at the time of the survey, a total of 235 staff, including 73 doctors, 3 midwives, 3 medical assistants, 11 nurses and 56 drivers. Others included administrative and support staff. Doctors worked in 3 shifts. Each shift had 15 doctors and some additional doctors were mobilized if case of need. All doctors were required to assist pregnant women. However each shift also had 2 ObGyns.

There were the following categories and number of specialists at the center:

- General practitioners – 17 (23%)
- Internists - 16 (22%)
- Neurologists - 10 (14%)
- ObGyns - 6 (8%)
- Surgeons - 6 (8%)
- Pediatricians - 2 (3%)
- Anesthesiologists - 2 (3%)
- Other (infection specialists, ophtalmologists, orthopedists, etc) - 14 (19%) (Figure 12).

Figure 12. Doctors, by specialization, at the ambulance center (percent)



In terms of participation in training events on EmOC and ENC, 35 doctors attended training called Providing Emergency Obstetric Care, based on clinical guidelines Managing Complications of Pregnancy and Childbirth adapted jointly by MoH and WHO. However, some of these doctors who were trained have left their jobs. There was no training conducted on newborn care. Some sessions were conducted at the workplace according to the in-service training plan.

Box 5

Our organization doesn't have guidelines on maternal and newborn care.

Neurologist, worked for 3 years

Preparedness

Emergency containers (drums) that are taken into ambulance vehicles were prepared and made ready for the each doctor. The doctor, who ends a shift, leaves the emergency container in the sterilizing section, where it is replenished with sterile supplies as well as emergency drugs. Every doctor has an emergency container assigned to him/her with a unique identification number. During the assessment, the doctors that were present were interviewed and their emergency containers were also checked using an approved checklist.

The inspection showed the following items in the drums: With regard to infection prevention; the following items were available. These were: sterile gloves in 88%, non sterile protection dresses in 38%, bottles with disinfectant solution in 50%, chloramine in 38%, ordinary containers for waste disposal in 50%, containers for hazardous waste disposal with lid in 50%, and containers for disposal of used sharps (special safety boxes) in 75%. Also, doctors reported that sometimes that all medical and other waste is disposed of in regular plastic bags.

In terms of medical equipment and instruments, sphygmomanometers, stethoscopes, thermometers and tongue depressors were available in 100% in the emergency containers. Fetal stethoscopes in 38%, urinary catheters in 88%, adult respiratory balloons (Ambu) and masks in 88%, umbilical clamps, 2 pieces, scissors to cut umbilical cord and gloves in 100%. Following items were not present during the inspection: umbilical clamps in 50%, plastic apron in 25%, diapers (2 pcs) in 38%, suction bulbs for aspirating mucus 100%, respiratory bags in 13%, and mucus aspiration tubes in 63%. Magnesium sulphate and oxytocin were available in 100%. Newborn masks, nasal tubes and kits for tracheotomy were not available at all.

Drugs available in these emergency containers were: nifedipine in 88%, dextrin 70 in 25%, calcium gluconate in 88%, prednisolone in 88 %, furosemide in 88%, propanolol in 25%, alcohol in 63%, forceps in 63%, iodine in 88 %, and flexible needles in 63% of the emergency containers.

Knowledge of the health service providers about the standard clinical management guidelines for EmOC

Knowledge on the basics of EmOC was assessed through a group discussion with 5 doctors. Out of all doctors interviewed, the proportion of doctors that knew about the following issues were:

- Active management of the 3rd stage of delivery – 3/5
- Massage lower abdomen every 15 minutes for 2 hours following delivery – 1/5
- Use of oxytocin as soon as head or shoulder of the newborn is born– 1/4
- Use of oxytocin for hypotonic uterus - 3/5
- Amount of the magnesium sulphate required for the loading dose – 1/5
- Contraindications for the use of magnesium sulphate – 3/5
- Named ampicillin and gentamycin among most commonly used antibiotics – 4/5, metronida zole – 3/5
- Knowledge of the manual removal of placenta - 1/5.

All five respondents did not know about and were not trained to use vacuum aspiration of the uterine cavity. Findings on whether these procedures were performed during last 3 months, or on trainings on how to perform these procedures are presented in the chapter Human Resources.

Knowledge of service providers about ENC

The following is the proportion of interviewed doctors who demonstrated the following knowledge on newborn care related issues (based on the WHO and UNICEF guidelines):

- Infection prevention - 1/5
- Do not apply any medicine on umbilical cord - 1/5
- Umbilical cord should be kept clean and dried without bandaging - 2/5
- At least 2 cloths should be used for drying the newborn - 3/5
- Put on a hat - 4/5
- Infant should be transported in warm conditions - 0/5
- 1% tetracycline ointment should be applied to the eyes within 1 hour of birth to prevent con junctivitis - 2/5
- Vitamin K to be administered - 2/5.

About resuscitation of the newborn:

- Initial steps (step A) - 2/5
- Evaluation of newborn with asphyxia - 1/5
- Provide bag and mask ventilation (step B) - 2/5
- Conduct chest compression (step C) - 1/5.

The Ambulance Center is regularly providing maternal and newborn care. However, doctors and personnel responded that they often experienced problems.

Box 6

The main problem for doctors is that when we come with the pregnant mother, the doors of some maternity homes are locked and we have to spend a lot of time running around hospitals that have two reception areas. Some maternity homes refuse to admit mothers saying labor has not yet started, however, these mothers deliver at home later on.

Internist with 10 years of working experience

Box 7

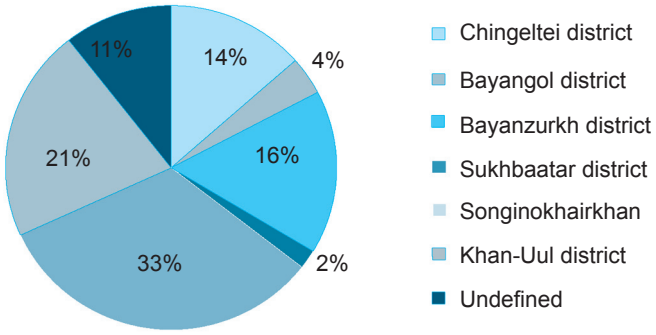
Quality of services will improve only if we allocate an ObGyn specialist for every shift. Newborn Ambu bags and masks and portable incubators are essential. There is need for guidelines for care covering the pre-hospital ambulance services. Systematized capacity building on EmOC and ENC for all doctors is needed. Also a network for sharing information with maternity homes is very important. For example: to inform them in advance about mothers with eclampsia so everything could be ready upon the client's arrival.

ObGyn occupying a managerial position,
with 23 years of working experience, including 3 years with the ambulance services

Home deliveries

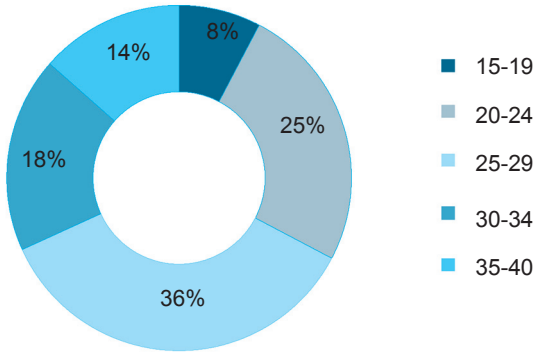
In 2008, 104 mothers delivered at home in Ulaanbaatar†. The proportions of home deliveries by district is as follows: Songinokhairkhan district 33% (34), Khan-Uul district 21% (22), Bayanzurkh district 16% (17), Chingeltei district 14% (14), Bayangol district 4% (4), Sukhbaatar district 2% (2), and home deliveries with no exact address 11% (11) (Figure 13).

Figure 13. Locality of mothers delivered at home (percent)



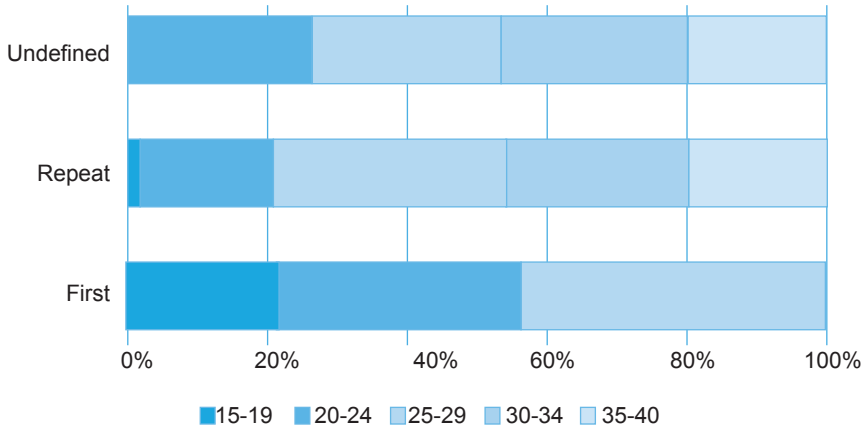
The age structure of women who delivered at home was as follows: 15-19 years old 8% (8), 20-24 years old 25% (26), 25-29 years old 36% (37), 30-34 years old 18% (19), 35-40 years old 14% (14) (Figure 14).

Figure 14. Age distribution of the women who delivered at home (percent)



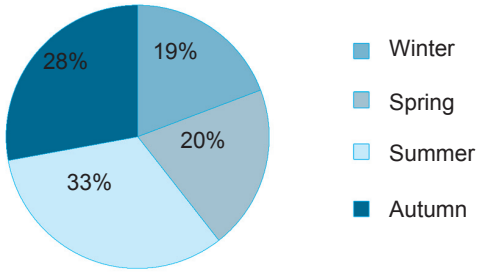
Primiparas were 31% (32) among home deliveries and 8% among adolescents aged 15-19 years old (Figure 15).

Figure 15 Age distribution of mothers by the number of pregnancies (absolute numbers)



With regards to number of home delivery births by season, the findings were as follow: winter - 20 (19%), spring - 21 (20%), summer - 34 (33%), autumn - 29 (28%) (Figure 16).

Figure 16. Home deliveries, by seasons (percent)



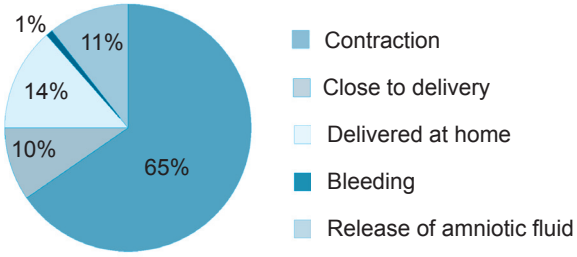
Of the 104 women who delivered at home, 7 (7%) did not receive any antenatal care. Women that delivered at home despite sending ambulance requests had the following reasons to call ambulance: having frequent contractions - 68 (65%), close to delivery - 10 (10%), vaginal bleeding - 1 (1%), leaking amniotic fluid - 11 (11%) (Figure 17).

Box 8

Requests due to labor and delivery are a priority and an ambulance team is sent within a maximum of 10 minutes. The traffic jam is a big problem. Some mothers call very late. Sometimes the address is not clear. There are some people with difficult living condition, and they do not know the exact address of the place where they live.

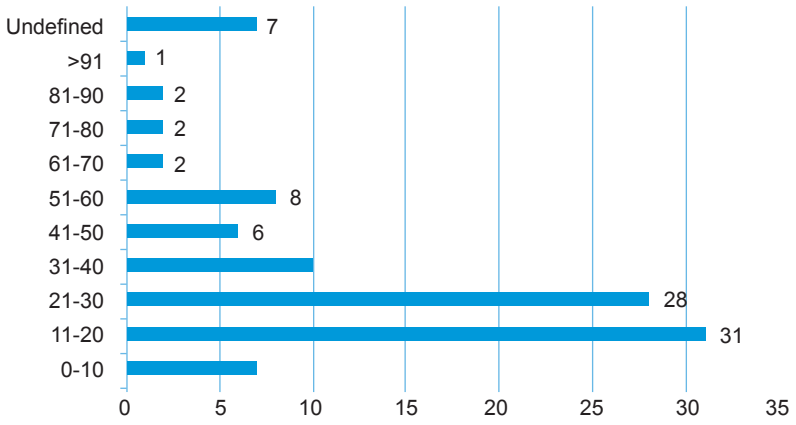
Nurse, with 27 years of working experience,
including 9 years in the ambulance service

Figure 17. Home deliveries; Reasons for requesting ambulance services (percent), Ulaanbaatar



From the moment of receiving an emergency call request till provision of the service, the time of response ranged from 7-125 minutes and, 63% of the emergency call requests received help within 30 minutes of making the call (Figure 18).

Figure 18. Time required for reaching the client following a emergency call request (number in minutes)



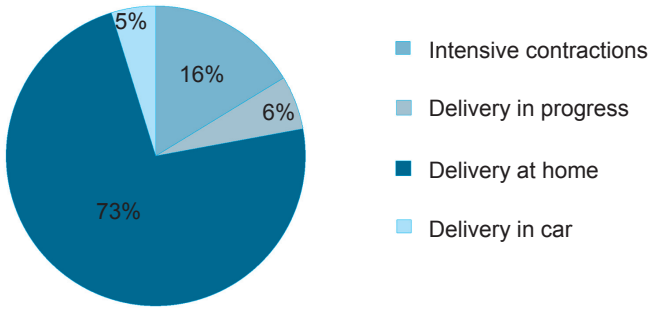
If one compares the reasons for requesting help with the time taken till the help actually arrived, 31% of emergency call requests for help were due to the reason of “have contractions” and the help arrived after than 30 minutes or more. However, help arrived within 30 minutes in a majority of the cases when the emergency call request for help was due to bleeding, release of amniotic fluid and home delivery (Table 46).

Table 46. Time between call and arrival of help (by reason of call)

Duration of service received	Reason of calls					Total
	Contraction	Delivery	Delivered at home	Bleeding	Leakage of amniotic fluid	
0-10 minutes	5	1	1	0	0	7 (7%)
11-20 minutes	18	4	7	0	2	31 (29%)
21-30 minutes	19	1	1	1	6	28 (26%)
31-40 minutes	5	2	2	0	1	10 (10%)
41-50 minutes	4	0	1	0	1	6 (6%)
51-60 minutes	6	0	1	0	1	8 (8%)
61-70 minutes	2	0	0	0	0	2 (2%)
71-80 minutes	2	0	0	0	0	2 (2%)
81-90 minutes	1	1	0	0	0	2 (2%)
91 up minutes	1	0	0	0	0	1 (1%)
Undefined	5	1	1	0	0	7 (7%)
Total	68 (65%)	10 (10%)	14 (13%)	1 (1%)	11 (11%)	104 (100%)

On the average 11-30 minutes were spent to reach the client and after arriving, it was found that 76 (73%) had already delivered at home, in 6 (6%) delivery was in progress and 17 (16%) had intensive contractions. 5 (5%) mothers delivered on the way in the ambulance itself (Figure 19).

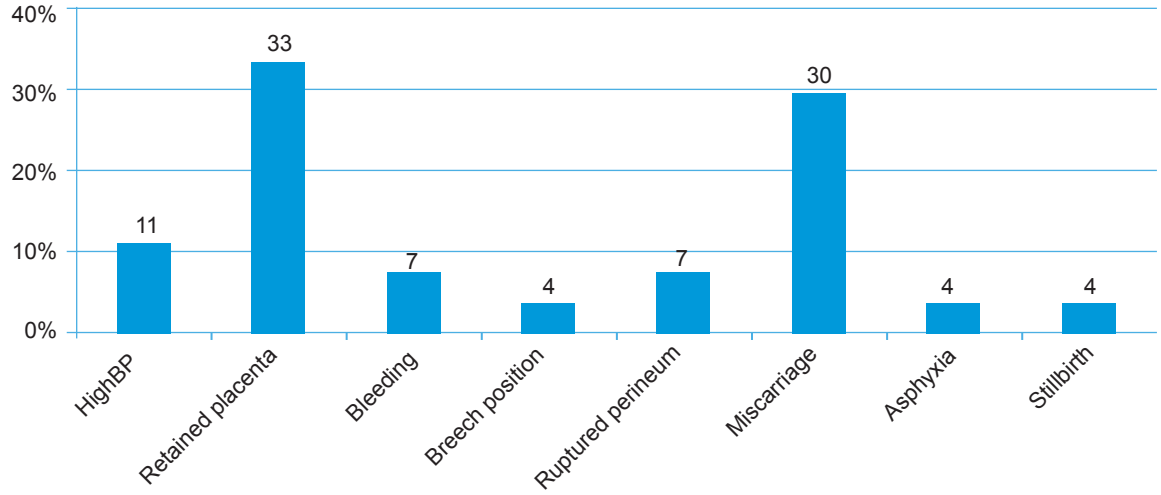
Figure 19. Status of labor at the time of doctor’s arrival (percent distribution)



Delivery complications

Of the 104 mothers that delivered at home or in the ambulance, 27 (26%) had complications. Of these complications, 3 (11%) had high blood pressure, 9 (33%) had retained placenta, 2 (7%) had hemorrhage, 1 (4%) had a breech presentation, 2 (7%) had ruptured perineum, 8 (30%) had preterm delivery, 1 (4%) had asphyxia of newborn, and 1 (4%) had a stillbirth (Figure 20).

Figure 20. Delivery complications (percent)



Of the above 104 mothers, 81 (78%) delivered at home due to undefined reasons, 6 (6%) because the hospital sent them back home saying delivery had not yet started, 5 (5%) concealed the fact that they were pregnant, 4 (4%) went to see a family doctor as soon as contractions started and returned home to make some preparations and then called the ambulance, 3 (3%) did not have the ability to make a call because they were at home alone, 2 (2%) had a very precipitate labor and delivery, 1 (1%) because the home address was not clear and 1 (1%) because of traffic jam (Table 47).

Table 47. Reason of home deliveries (number, percent)

Reason for delivering at home	Number	Percentage
Were examined by family doctor	4	4%
Did think it was too early to call	1	1%
Concealed pregnancy from family members	5	5%
Was alone at home	3	3%
Traffic jam	1	1%
Wrong or incomplete home address	1	1%
Precipitate delivery	2	2%
Was sent back home from maternity facility	6	6%
Undefined	81	78%
Total	104	100%

Conclusions

- The situation with the provision of drugs and supplies for EmOC was variable at the different hospitals at the various levels. Drugs and supplies for ambulance services were lacking especially at level of the soum hospitals.
- Ambulances from all hospitals lacked the set up and medical supplies for providing ENC.
- The Ambulance Center of Ulaanbaatar city provided basic EmOC and ENC, especially in the cases of home delivery.
- Doctors and personnel that provided ambulance services regularly participated in provision of EmOC, however they were not trained and lacked capability in effectively delivering these services. Preparedness for provision of care for home deliveries was very insufficient.
- All organizations were lacking infection prevention measures that should be taken in every case of providing requested care at client's home.
- Knowledge and awareness of mothers and their family members about the early signs of childbirth are poor.

HUMAN RESOURCES

General information

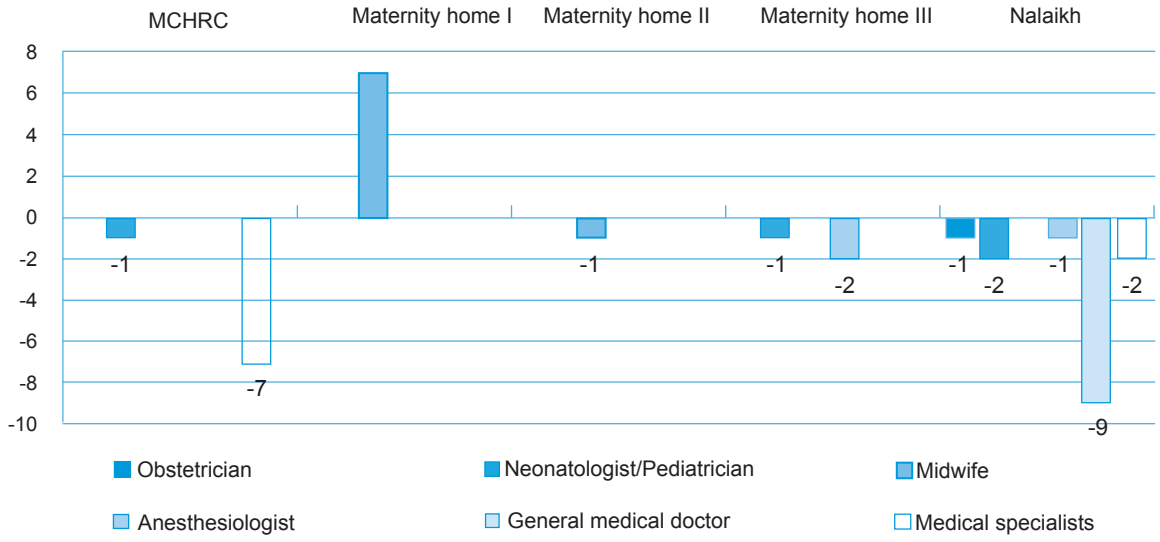
This section presents a background about human resource training, management, salaries and incentives, workload, knowledge, as well as competence and abilities and how these might affect the actual provision of EmOC and ENC.

Specialized hospitals that provide maternity and delivery services in Ulaanbaatar (MCHRC, maternity homes I, II and III, Nalaikh district general hospital), as of December 2008, had 100 ObGyn specialists, 29 neonatologists (including 3 pediatricians), 101 midwives, 30 medical assistants, 320 nurses and 23 anesthesiologists.

Of all the doctors that work in the two aimag general hospitals and the RDTC, covered by the assessment, 21 (11%) were ObGyns specialists and 16 (2%) were neonatologists and pediatricians. 83% of soums did not have ObGyn specialists, and there were no positions for a neonatologist at soum level facilities. Every facility covered by survey had midviwes and the soum hospitals had at least 1 midwife to assist during deliveries.

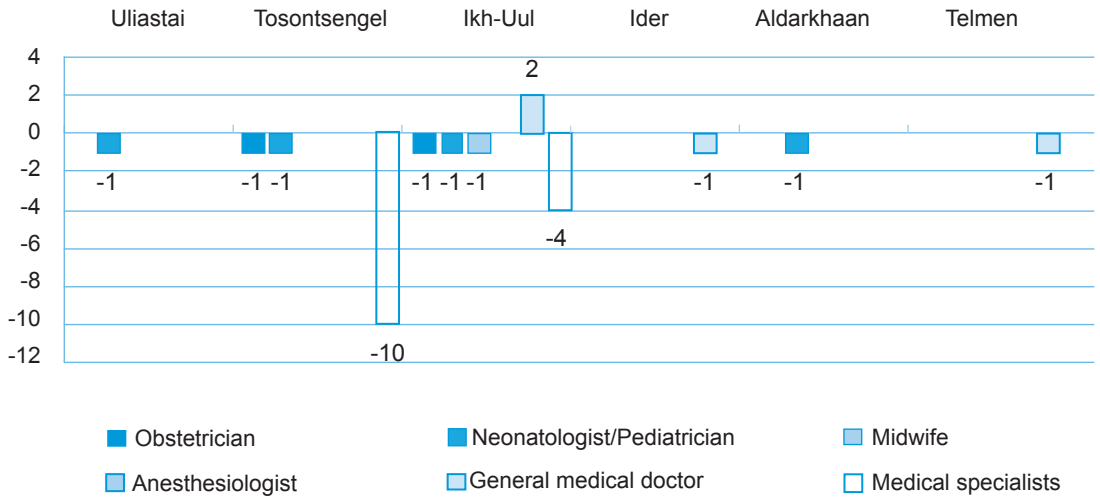
In the case of Ulaanbaatar (Figure 21), MCHRC did not have a sufficient number of neonatologists and nurses, Maternity Home II was lacking midwives, Maternity Home III had fewer number of neonatologists and anesthesiologists, Nalaikh district general hospital had inadequate numbers of ObGyns, neonatologists, anesthesiologists, general practitioners and nurses.

Figure 21. Number of staff above or below the authorized number (by facility), Ulaanbaatar city



Zavkhan aimag had inadequate numbers of ObGyns, neonatologists, midwives, general practitioners, nurses and only Ikh-Uul soum exceeded number of approved general practitioners (Figure 22).

Figure 22. Total number of staff (current numbers), Zavkhan aimag



The general hospital of Gobi-Altai aimag also exceeded the approved number of obstetricians, midwives and anesthesiologists. There were inadequate numbers of general practitioners at the aimag center and with inadequate numbers of midwives, general practitioners and nurses at the soum facilities (Figure 23).

Figure 23. Total number of staff (current numbers), Gobi-Altai aimag

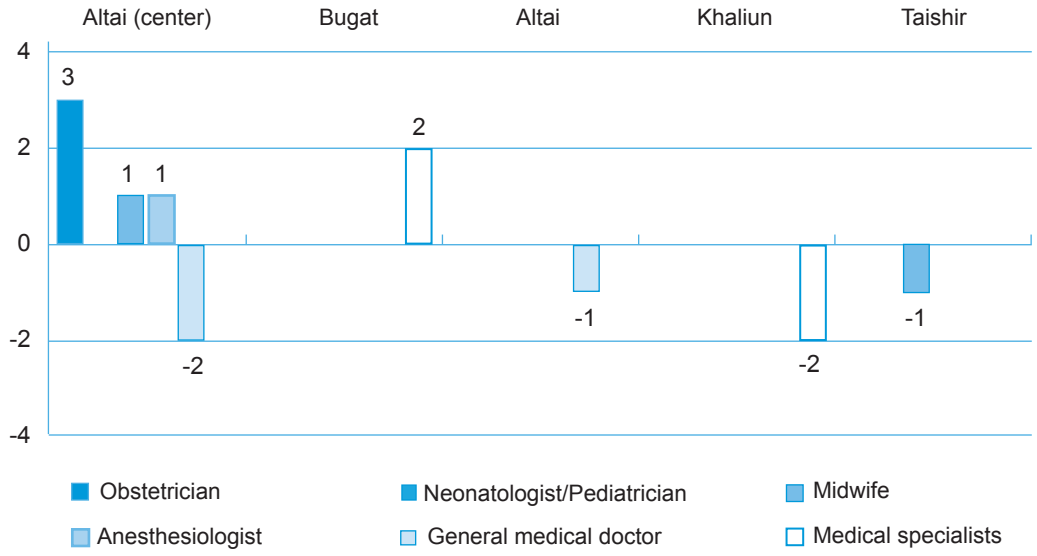
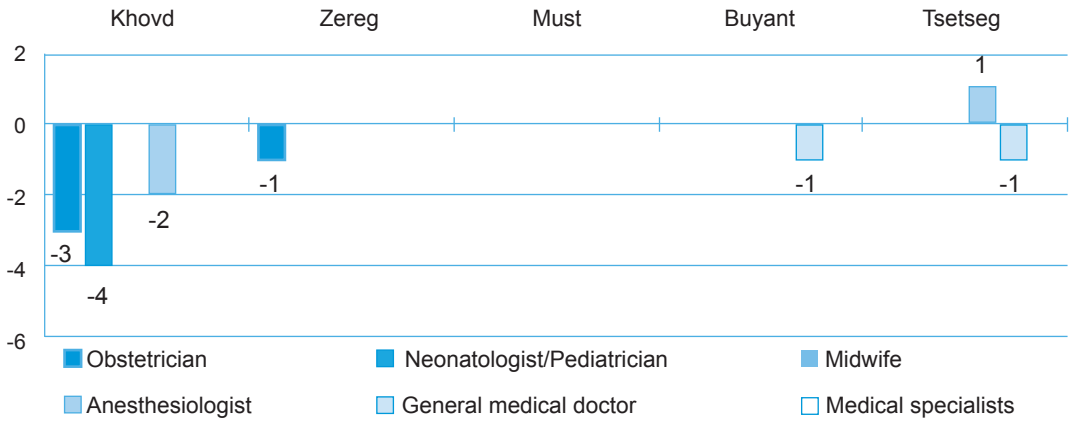


Figure 24. Total number of staff (current numbers), Khovd aimag



Human resources management

If the health workers, at the management level, are categorized by their professional and medical specializations, 11(48%) were ObGyns, 3 (13%) were neonatologists, 3 (13%) were surgeons, 2 (9%) were epidemiologists and 4 (17%) were doctors with other specializations (1 internist, 1 general practitioner, 1 dentist and 1 radiologist).

In terms of their working experience in the management area:

6 (26%) had worked less than 1 year
7 (30%) had worked 1-5 years
3 (13%) had worked 6-10 years
4 (17%) had worked 11-15 years
3 (13%) had worked more than 16 years.

Each of the heads of the 5 hospitals of Ulaanbaatar city have worked in their position for less than 5 years. However, 50% of soum doctors have worked in their position for more than 10 years.

The areas of support provided by managers for the rural doctors included the opportunity to attend training and seminars, provision of equipment, supplies and drugs. On the other hand, areas in which support was not provided included provision of knowledge on the management of EmOC and ENC, support to individual initiative, refusal to give permission to relevant staff to attend training events, provide backstopping during their absence, and, in general, lack of financial resources for service delivery activities. From the midwives and nurses perspective, support had been forthcoming in the form of increasing opportunity to attend trainings, and improving provision of equipment and drugs. Other areas that lacked management support included provision of in-service training, improving availability of drugs, equipment and supplies, and reduction of excessive work load.

Box 9

When human resources management issues were discussed with managers, the following key issues emerged:

Human resources management was difficult. Each soum should have 2 doctors. Each of three inter-soum hospitals should have an ObGyn. In total there is a shortage of 50 doctors.

Tosontsengel and Ikh-Uul soums lacked ObGyns and paediatricians, 10 people were still studying and had contracts with the Health Department. Managers changed frequently, new managers neglected what had been done before and made working difficult. Things that were planned earlier were not implemented resulting in a loss of continuity.

Specialists refused to work in countryside. Those that did work, did not have appropriate incentives. Specialists were overloaded with work, their salaries were small, and their work was not appreciated.

Training of human resources

When the training conducted for medical personnel that participated in delivery management was examined, of the 1,107 medical personnel working in the selected facilities 21% participated in Training on Methods of Managing Complications of Pregnancy and Childbirth based on the standard clinical guidelines, 25% participated in Training on Pregnancy, Childbirth, Postpartum and Newborn Care and 34% participated in training on Essential newborn care, breastfeeding, and Neonatal resuscitation. Consequently it can be seen that capacity building of medical personnel that provide delivery services was not sufficient (See Volume 2 of the report for more detailed information about training).

When the medical personnel that attended training were categorised by their professions, 19% were nurses, 53% were doctors with a variety of different specializations participated in delivery management and only 22% and 7% were ObGyns and neonatologists respectively, which clearly showed the need to involve more ObGyns and neonatologists in training who play the main role in delivery management.

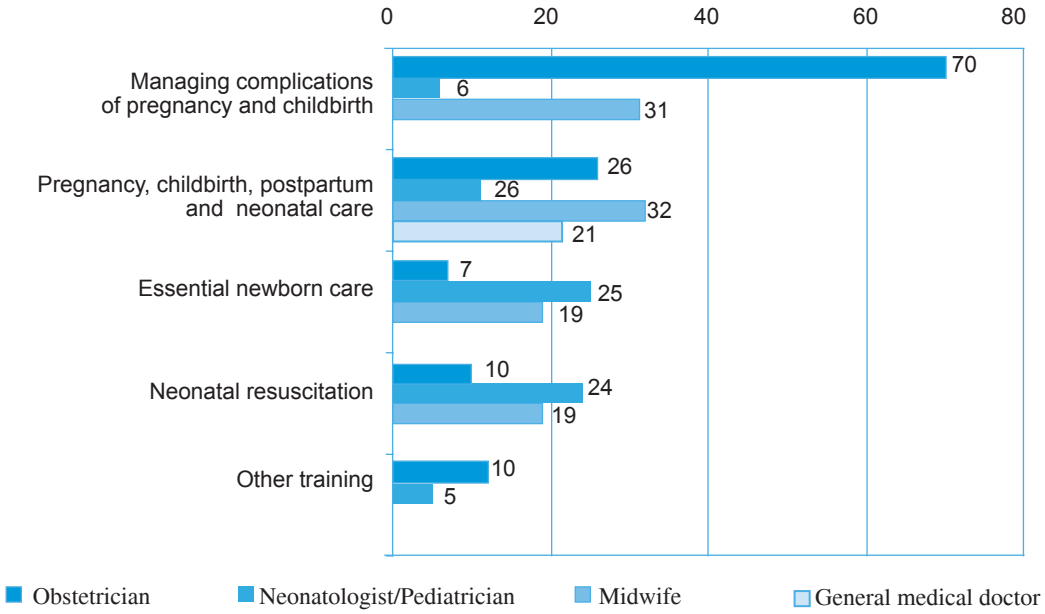
Of the 1,107 people that attended various training events conducted in the capital city and aimags, a majority had participated in trainings on pregnancy, delivery and newborn care. ObGyn doctors attended the training on newborn care almost at the same level with neonatologists, and the participation of general practitioners in training on above-mentioned topics in general was also at the same level. Among medical personnel, nurses attended more training events when compared with medical assistants (feldshers) (Table 48).

Table 48. Attendance of training events (by medical personnel)

Training / Health worker		Managing complications of pregnancy and childbirth	Pregnancy, childbirth, postpartum and neonatal care	Essential newborn care	Neonatal resuscitation	Other training
Obstetrician		90 (39%)	51 (19%)	26 (14%)	28 (15%)	52 (23%)
Medical specialists	Neonatologist	5 (2%)	16 (6%)	15 (8%)	12 (6%)	12 (5%)
	Pediatrician	8 (3%)	13 (5%)	25 (13%)	27 (14%)	7 (3%)
	Anesthesiologist	11 (5%)	23 (9%)	2 (1%)	4 (2%)	20 (9%)
	General medical doctor	29 (12%)	34 (12%)	30 (16%)	29 (16%)	55 (24%)
	Midwife	61 (26%)	78 (29%)	50 (27%)	51 (27%)	29 (13%)
	Feldsher	10 (4%)	17 (6%)	6 (3%)	6 (3%)	25 (11%)
	Nurse	20 (9%)	39 (14%)	33 (18%)	29 (16%)	18 (8%)
	Other		1 (0%)		1 (1%)	9 (4%)
Total		234	272	187	187	227

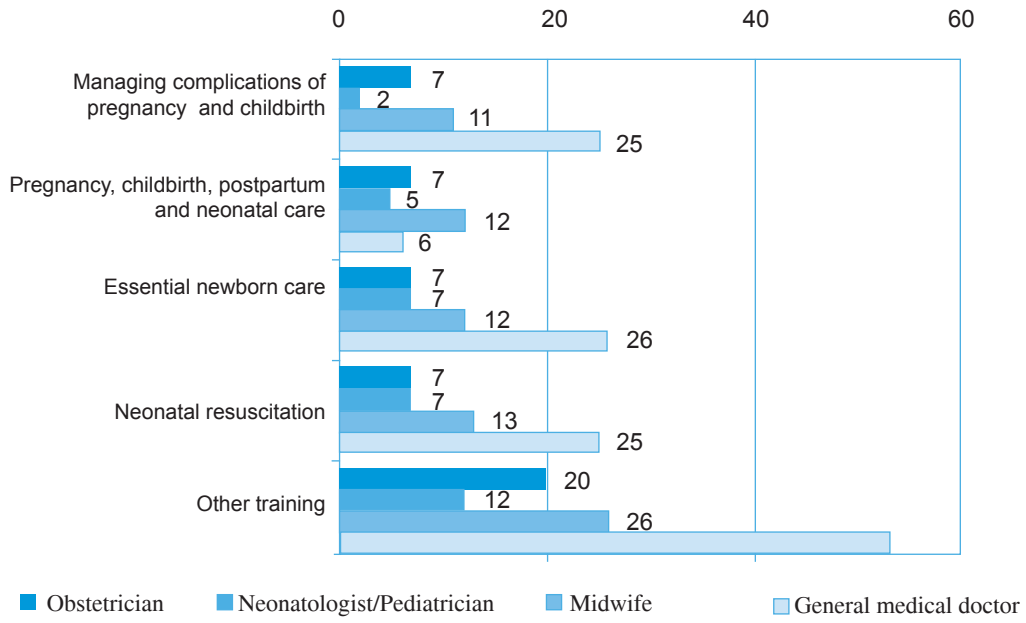
When the attendance of training events by a medical professional based in Ulaanbaatar was analyzed, ObGyns had attended more trainings on managing complications of pregnancy and childbirth, while the neonatologists attended more training events on essential newborn care, breastfeeding and neonatal resuscitation. Midwives also participated in all these trainings (Figure 25).

Figure 25. Trained specialists by type of training and specialization (absolute numbers), Ulaanbaatar city



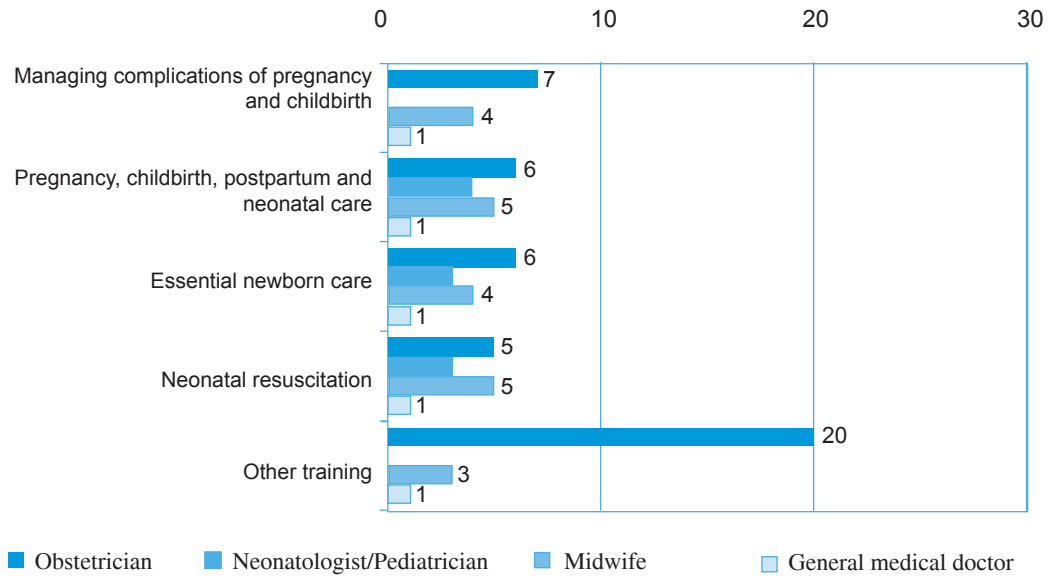
In Zavkhan aimag about the same number of ObGyns, midwives and general practitioners attended the different trainings. Very few neonatologists attended the training on Managing Complications of Pregnancy and Childbirth (Figure 26).

Figure 26. Trained specialists by each type of training and specialization (absolute numbers), Zavkhan aimag



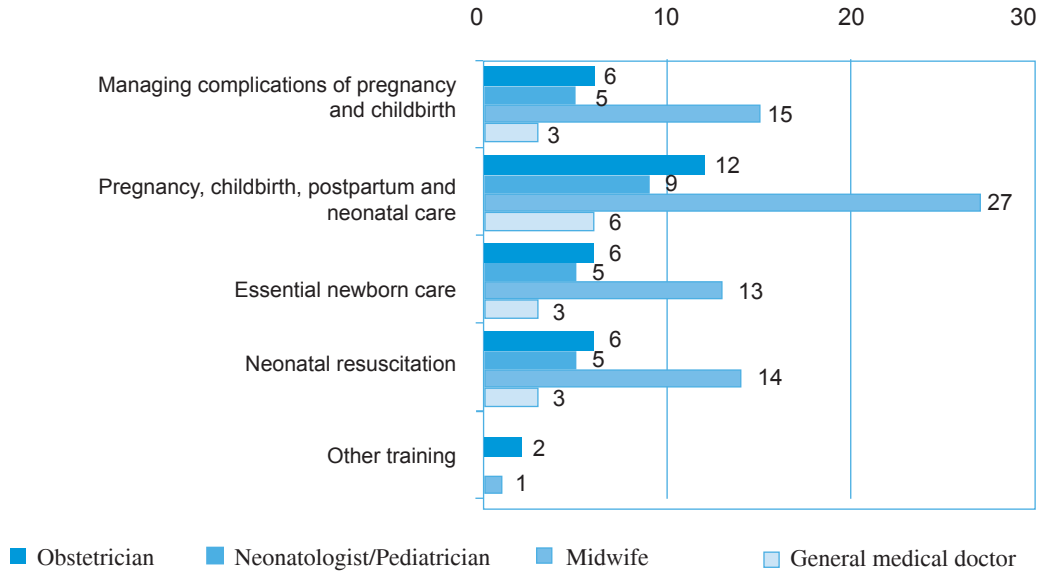
In the case of Khovd aimag, ObGyns, midwives and general practitioners equally attended the training, however no neonatologists participated in the Training on Managing Complications of Pregnancy and Childbirth (Figure 27).

Figure 27. Trained specialists, by type of training and specialization (absolute numbers), Khovd aimag



As shown in figure 28, in Gobi-Altai aimag, the midwives were involved in maternal and newborn care training more often than other cadres.

Figure 28. Trained specialists, by type of training and specialization (absolute numbers), Gobi-Altai aimag



Box 10

When the interviews conducted with medical personnel on training and related matters were analysed the following comments and issues were highlighted:

Number of training events is not sufficient. I have been working for 11 years, but attended training only once.

Training events are poorly organized. We used to have periodic in-service sessions, but the methodologist is on pregnancy leave and there is no one to organize the training.

We lacked specialized nurses for providing emergency newborn care. Nurses were not provided with opportunity to attend training and seminars. It would be useful to learn and gain experience abroad.

We have a need to study regularly and collect training credits. The facility should provide opportunity for regular training and for obtaining required credits

Box 11

Some training content contradicts other content. For example: during some training it was taught that airways of newborn must be cleaned in all cases, while during another training it was taught that it should be cleaned only when necessary and not in all cases. Therefore people in charge should periodically revise and update standards so that the content is consistent.

Midwife, with 11 years of working experience

Salaries and incentives for human resources

When the situation about the salaries and incentives for different types of health workers as set by the Government was assessed, the types and size of incentives varied considerably among the assessed health facilities. The salary and incentives scale set by the Government is shown in Table 49.

Table 49. Salaries set by the government

Category of health worker	Range of Government salaries per month (tugrug)
Obstetrician	229500-269351
Paediatrician/Neonatologist	229500-269351
General medical doctor	229500-269351
Anesthesiologist	229500-269351
Midwife	208691-244865
Feldsher	208691-244865
Nurse	181470-212926

According to the Resolution No.9 of the Government, issued in 2001, personnel in rural medical facilities would get additional incentives, equal to 10% of their salary. Also they would get incentives for gaining additional skills, professional degrees, honors such as clinical professor, additional duties such as head of department, as well as allowances for food, transport and for working in hazardous conditions, but the amounts for these incentives and allowances were different and varied considerably by facility.

Thus, it can be concluded from what was said during interviews-that medical personnel in Ulaanbaatar get all the incentives and allowances for working in hazardous conditions, for heads of departments, for professional degrees, for ObGyns, for working extra hours, for backstopping for another person and for food and transportation. Aimag general hospitals give incentives and allowances for skills, backstopping for other doctors, for senior midwives, for working in hazardous conditions, for having contact with blood and for working extra hours. There were also other incentives provided by local government or hospital administrations, such as provision of housing and fuel for doctors, provision of housing for all doctors, provision of 1 cow per winter for a doctor as food supply, provision of fuel, and allowances for drivers for

working in countryside, as well provision of uniforms. Also there was a practice at one hospital namely the provision of a performance bonus equal to 20% of monthly salaries for members of the team that provided successful EmOC and this incentive would increase till it equalled the amount of the monthly salary when it involved the revival of clients in critical conditions or successfully performing emergency operations at client's homes. It was also stated that in some places there were no other additional incentives, except an overtime allowance.

Provision of EmOC and ENC in teams

When observing the situation regarding the provision of EmOC and ENC as teams, based on responses from interviewees, the teams at soum hospitals consisted of a soum doctor, midwife, nurse and medical assistant, each responsible for their own tasks. However, the situation was different at the higher levels. For example in the case of the two aimags, if they received an emergency request from soum, they would send 2 ObGyns, 1 anesthesiologist, 1 nurse as surgery assistant, 1 nurse as anesthesiology assistant, and a driver. If need arose, they form a team capable of providing specialized ophthalmology, nephrology, neuropathology or surgical care, etc.. Rural general hospitals and district hospitals do not have teams that provide emergency care. Anesthesiologist, ObGyn, surgeon (as assistant), and nurses as surgical and anesthesiology assistants perform emergency operations, and the pediatrician, midwife, neonatal nurse and medical assistant that were on shift provide support as well. In the day time ObGyn, midwife, pediatric nurse and medical assistants were present at delivery. During the night shift the care was provided by the doctor on the duty that could be specialist of any type. Midwives and medical assistants were present. If the need arose an ObGyn specialist was called. It was common that the pediatrician on the duty was also providing care for the newborn.

Sometimes care, provided as a team was insufficient. ObGyns and neonatologists, that should have provided delivery services were usually absent at night time. Mostly the neonatologist and midwife worked as a team to provide emergency neonatal care. However, in the one aimag, after the midwife had cut the umbilical cord, the neonatologist and pediatric nurse performed further procedures such as clamping the umbilical cord, wrapping, measuring weight and initial breastfeeding of the newborn.

In the hospitals in Ulaanbaatar city, ObGyns, neonatologists, midwives, nurses and medical assistants worked as a team during delivery, and when necessary, mobilized the anesthesiologist as a team member. Everyone took responsibility for their own tasks; however the midwives participated very little in the care of the newborn. In the opinion of some doctors, the number of staff was enough, but they did not work as a team and that was because the maternal and newborn care protocols were not integrated and there was, may be, too much sub-specialisation.

Comments from the notes of interviews:

Box 12

I am not quite sure about establishing a team. Since it causes financial losses, the team doesn't work with its full composition. Since we lack doctors, the team is incomplete. Antenatal care could not even be imagined without an internist. To decrease incidence of and treat diseases of other systems, internist should be included as a team member, and work as a consultant for the delivery section. We do not work in a team. For example, we do not have neonatologist and neonatology nurse. Car, provided by the team, is poor; the ObGyn is just watching, or just calls the midwife. Even many ObGyns doctors have attended relevant training but only the neonatologists resuscitate the newborn. Midwives participate in wrapping, stimulating and cleaning airways of newborn. Anesthesiologists are not familiar with newborn care, and they are called only if intubation is needed.

Medical personnel

Status of the provision of EmOC and ENC

All city and selected aimag general hospitals provided care for normal deliveries and basic newborn care for 24 hours. City maternity homes provided basic obstetric care for 24 hours, 67% of aimag and district general hospitals for 24 hours and the remaining 33% upon request. However resuscitation (intensive care) of newborn was provided 24 hours at all the maternity homes in the capital city, and upon request, at 67% of aimag and district hospitals.

Preparedness for 24 hour 7 days a week (24/7) provision of EmOC and ENC was evaluated at all selected facilities. In Ulaanbaatar, 100% of the facilities provide 24 hour care for normal deliveries, 80% of facilities provided basic EmOC, 60% provide comprehensive EmOC, newborn resuscitation and drugs, 40% conducted lab tests, and 20% provided basic ENC for 24 hours. 20% of facilities did not conduct lab tests and did not provide newborn resuscitation services (Table 50).

Table 50. 24 hour preparedness, Ulaanbaatar

Service		Facility	MCHRC	Maternity Home I	Maternity Home II	Maternity Home III	Nalaikh
Normal deliveries	Working day	Day					
		Night					
	Weekends / holidays	Day					
		Night					
Basic EmOC	Working day	Day					
		Night					
	Weekends / holidays	Day					
		Night					
Comprehensive EmOC	Working day	Day					
		Night					
	Weekends / holidays	Day					
		Night					
Basic ENC	Working day	Day					
		Night					
	Weekends / holidays	Day					
		Night					
Neonatal resuscitation	Working day	Day					
		Night					
	Weekends / holidays	Day					
		Night					
Laboratory functions	Working day	Day					
		Night					
	Weekends / holidays	Day					
		Night					
Access EmOC related medications	Working day	Day					
		Night					
	Weekends / holidays	Day					
		Night					
Anesthesia	Working day	Day					
		Night					
	Weekends / holidays	Day					
		Night					
Repair equipment	Working day	Day					
		Night					
	Weekends / holidays	Day					
		Night					

Service available Service not available Service on calls

In Zavkhan aimag, out of the 6 facilities assessed, 4 provided basic ENC, newborn resuscitation, basic EmOC and 24 hour management of normal deliveries, but did not provide drugs related to EmOC around the clock. They provided drugs only during normal working hours and upon special request at night time. Only one facility had an engineer to repair equipment. Comprehensive EmOC was provided during normal working hours and upon request at night (Table 51).

Table 51. 24 hours round the clock service provision, Zavkhan aimag

Service		Facility	Uliastai	Ider	Telmen	Aldar-khaan	Ikh-Uul	Toson-tsengel
Normal deliveries	Working day	Day						
		Night						
	Weekends/ holidays	Day						
		Night						
Basic EmOC	Working day	Day						
		Night						
	Weekends / holidays	Day						
		Night						
Comprehensive EmOC	Working day	Day						
		Night				n/a		
	Weekends / holidays	Day				n/a		
		Night				n/a		
Basic ENC	Working day	Day						
		Night						
	Weekends / holidays	Day						
		Night						
Neonatal resuscitation	Working day	Day						
		Night				n/a		
	Weekends / holidays	Day				n/a		
		Night				n/a		
Laboratory functions	Working day	Day						
		Night						
	Weekends / holidays	Day						
		Night						
Access EmOC related medications	Working day	Day						
		Night						
	Weekends / holidays	Day						
		Night						
Anesthesia	Working day	Day						
		Night				n/a		
	Weekends / holidays	Day				n/a		
		Night				n/a		
Repair equipment	Working day	Day						
		Night				n/a		
	Weekends / holidays	Day				n/a		
		Night				n/a		

Service available Service not available Service on calls

In Gobi-Altai aimag, out of the 5 facilities assessed, 2 provided basic ENC, basic EmOC, comprehensive EmOC and 24 hour management of normal deliveries, but did not provide 24 hour drugs for EmOC. Availability of drugs 24/7 was offered during normal working hours and upon request at night. An equipment engineer, anesthesiologist and lab assistant worked at three facilities during normal working hours and upon request at night (Figure 52).

Table 52. 24 hours round the clock service provision, Gobi-Altai aimag

Service		Facility	Altai	Taishir	Khaliun	Bugat	Altai
Normal deliveries	Working day	Day					
		Night					
	Weekends / holidays	Day					
		Night					
Basic EmOC	Working day	Day					
		Night					
	Weekends/ holidays	Day					
		Night					
Comprehensive EmOC	Working day	Day					
		Night					
	Weekends / holidays	Day					
		Night					
Basic ENC	Working day	Day					
		Night					
	Weekends / holidays	Day					
		Night					
Neonatal resuscitation	Working day	Day					
		Night					
	Weekends / holidays	Day					
		Night					
Laboratory functions	Working day	Day					
		Night					
	Weekends / holidays	Day					
		Night					
Access EmOC related medications	Working day	Day					
		Night					
	Weekends / holidays	Day					
		Night					
Anesthesia	Working day	Day					
		Night					
	Weekends / holidays	Day					
		Night					
Repair equipment	Working day	Day					
		Night					
	Weekends / holidays	Day					
		Night					

Service available Service not available Service on calls

In Khovd aimag, out of the 5 facilities assessed, 1-2 provided basic ENC, newborn resuscitation services, basic EmOC, comprehensive EmOC, management of normal deliveries, as well as anesthesiology services 24/7. None provided 24/7 drugs for EmOC but only during normal working hours and upon request at night. Some facilities had no equipment engineers, anesthesiologists or lab technicians at all (Figure 53).

Table 53. 24 hours round the clock service provision, Khovd aimag

Service		Facility	Khovd	Buyant	Zereg	Must	Tsetseg
Normal deliveries	Working day	Day					
		Night					
	Weekends / holidays	Day					
		Night					
Basic EmOC	Working day	Day					
		Night					
	Weekends / holidays	Day					
		Night					
Comprehensive EmOC	Working day	Day					
		Night					
	Weekends / holidays	Day					
		Night					
Basic ENC	Working day	Day					
		Night					
	Weekends / holidays	Day					
		Night					
Neonatal resuscitation	Working day	Day					
		Night					
	Weekends / holidays	Day					
		Night					
Laboratory functions	Working day	Day					
		Night					
	Weekends / holidays	Day					
		Night					
Access EmOC related medications	Working day	Day					
		Night					
	Weekends / holidays	Day					
		Night					
Anesthesia	Working day	Day					
		Night					
	Weekends / holidays	Day					
		Night					
Repair equipment	Working day	Day					
		Night					
	Weekends / holidays	Day					
		Night					

Service available Service not available Service on calls

Performance of procedures

The research team, using the tool called “EmOC and other important services” identified the frequency and performance status of EmOC procedures and other important services. Of the 92 specialists interviewed 27 (29%) were ObGyns, 9 (10%) were soum doctors, 10 (11%) were doctors that provided delivery services, 37 (40%) were midwives and 9 (10%) were ambulance doctors (Table 54).

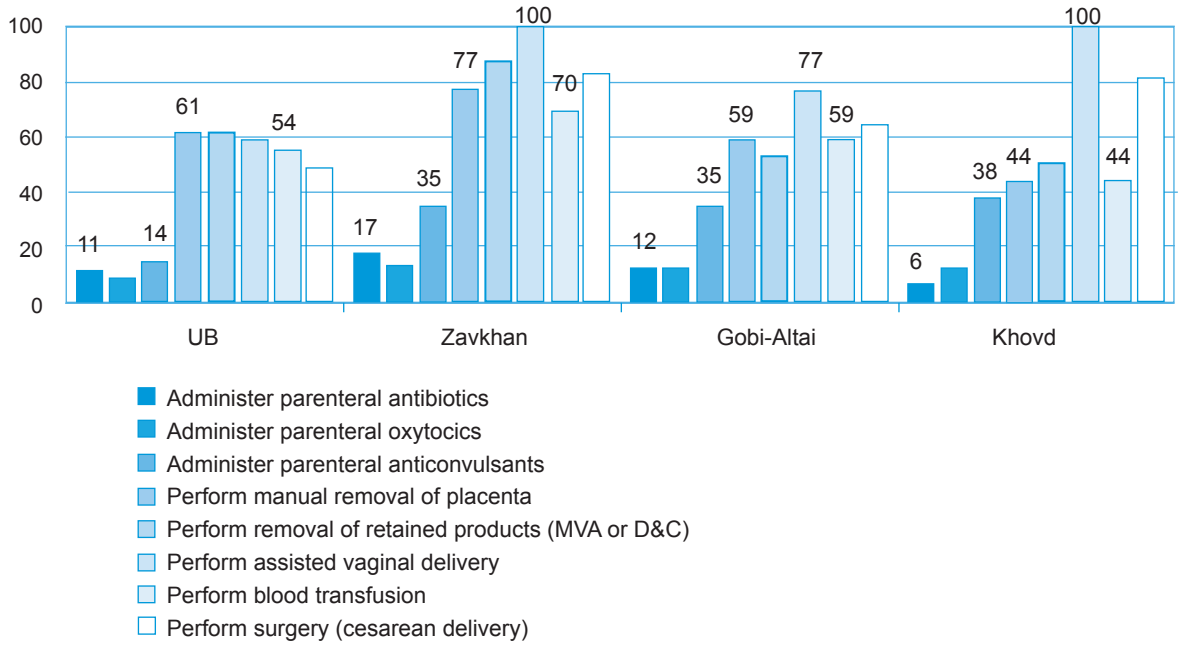
Table 54. Specialists interviewed in relation to EmOC and other important services

Study site / Health worker	Ulaanbaatar	Zavkhan	Gobi-Altai	Khovd	Total
Obstetrician	16 59% 44%	3 11% 13%	3 11% 18%	5 19% 31%	27 100% 29%
Soum doctor	0	4 44% 17%	4 44% 24%	1 11% 6%	9 100% 10%
Doctor participated in maternity care	3 30% 8%	4 40% 17%	2 20% 12%	1 10% 6%	10 100% 11%
Midwife	16 43% 44%	8 22% 35%	6 16% 35%	7 19% 44%	37 100% 40%
Doctor of emergency care	1 11% 3%	4 44% 17%	2 22% 12%	2 22% 13%	9 100% 10%
Total	36 39% 100%	23 25% 100%	17 19% 100%	16 17% 100%	92 100% 100%

Emergency obstetric care

Of all the medical specialists interviewed, 6-17% did not give antibiotics, 8-13% did not give uterine contractors (oxytocics) , 14-38% did not provide anticonvulsants, 50-87% did not conduct curettage of the uterus, 61-100% did not assist in deliveries, 44-70% did not transfuse blood, and 50-83% did not perform Cesarean section within the last 3 months. The situation at each place assessed, is shown on Figure 29.

Figure 29. Emergency obstetric care: procedures not performed by interviewed professionals within last 3 months



Performance of procedures: The reasons for not performing these procedures and the situation with regards to the performance of these procedures during last 12 months by specialists was assessed using the questionnaire on performance of the eight emergency obstetric care procedures. 11-100% did not perform all the procedures due to lack of cases, and 2-6% did not manage assisted vaginal delivery or did not perform a Cesarean section because of unavailability of equipment.

Of the 11 (100%) specialists that did not provide antibiotics because there was no case, 3 (27%) were ObGyns, 1 (9%) was a soum doctor, 3 (27%) were midwives, and 4 (36%) were ambulance doctors, 1 (10%) soum doctor, 2 (20%) doctors who participated in delivery care, 10 (70%) ambulance doctors and in total 13 (100%) medical specialists did not provide uterine contractors because there was no need.

In terms of placenta removal, 5 specialists did not perform the procedure because they were not trained, 21 because they were not authorised, and 30 because there was no case. A soum doctor, a doctor that provided delivery services, and an ambulance doctor (20%) respectively did not perform placenta removal because they were not trained, a doctor that provided delivery services and a ambulance doctor (9%), as well as 19 (91%) midwives did not perform it because they were not allowed. 4 (13%) ObGyns, 4 (13%) soum doctors, 3 (10%) doctors that provided delivery services, 12 (40%) midwives, and 7 (23%) ambulance doctors did not perform the procedure because there was no need.

In terms of removing the remaining tissue from the uterus using a vacuum aspirator or dilation and curettage, 2 (25%) soum and ambulance doctors respectively, 1 (13%) doctor that provided delivery services, 3 (38%) midwives, and in total 8 (100%) medical specialists responded that they did not perform the procedure because they were not trained. In total, 34 (100%) specialists, including 2 (6%) soum doctors, 3 (9%) doctors that provided delivery services, and 1 (3%) ambulance doctor did not perform the procedure because they were not authorised. Seventeen (100%) medical specialists, including 4 (24%) ObGyns, 1 (6%) soum doctor, 9 (15%) ambulance doctors, and 3 (18%) doctors and midwives that provided delivery services respectively did not perform the procedure because there was no need.

Nine (100%) specialists, including 1 (11%) soum doctor and midwife each, and 7 (78%) ambulance doctors did not manage normal vaginal delivery because there was no need.

In terms of assisted vaginal deliveries, 4 (25%) soum and ambulance doctors each, 2 (13%) doctors that provided delivery services, 6 (38%) midwives, in total 16 (100%) specialists did not perform the procedure because they were not trained; 3 (75%) ObGyns, 1 (25%) midwife, and in total 4 (100%) specialists did not perform the procedure because they lacked equipment/provisions; 2 (11%) soum doctors, 15 (79%) midwives, 1 (5%) doctor and ambulance doctor each that provided delivery services, in total 19 (100%) specialists did not perform the procedure because they were not authorized; 8 (31%) ObGyns, 3 (12%) soum doctors, 6 (23%) midwives, 5 (19%) doctors that provided delivery services, 4 (15%) ambulance doctors, and in total 26 (100%) specialists did not perform the procedure because there was no need.

Two specialists, including 1 (50%) soum and ambulance doctors respectively, did not transfuse blood because they were not trained; 5 (100%) midwives, did not transfuse blood because they are not authorised; 45 specialists, including 9 (20%) ObGyns, 6 (13%) soum doctors, 4 (9%) doctors that provide delivery services, 21 (47%) midwives, and 5 (11%) ambulance doctors did not transfuse blood because there was no need.

In the case of cesarean section, 6 (27%) soum doctors, 2 (9%) doctors that provided delivery services, 8 (35%) midwives, 7 (36%) ambulance doctors, in total 22 (100%) specialists did not perform it because they were not trained; and one ObGyn did not perform because the person did not have the needed equipments/provisions. 2 (6%) soum and ambulance doctors each, 4 (11%) doctors that provided delivery services, 27 (77%) midwives, and in total 35 (100%) specialists did not perform cesarean section because they are not authorised; and 1(33%) ObGyn, 1 (33%) midwife, 1 (33%) ambulance doctor, and in total 3 (100%) specialists did not perform a cesarean section because there was no need.

The reasons why medical specialists did not perform procedures at facilities assessed, are shown in Figure 30.

Figure 30. Reasons why medical specialists dis not perform procedures within last 3 months (by percentage)

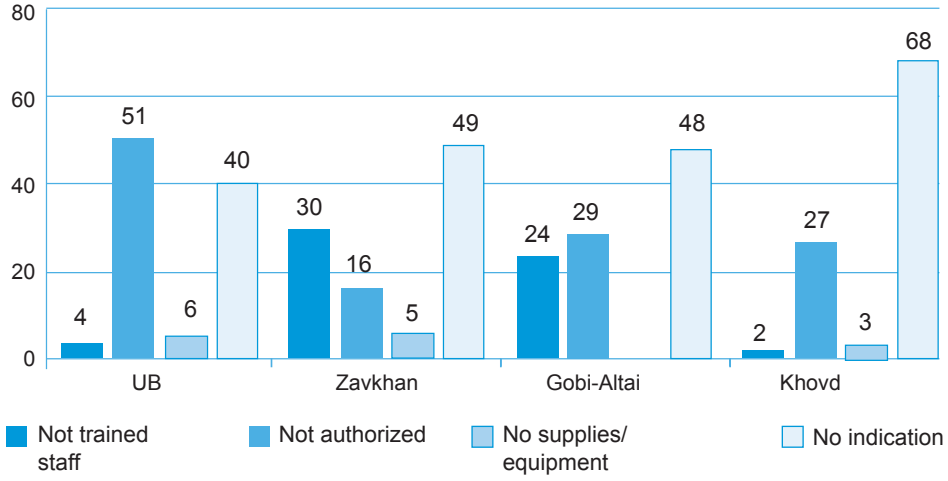


Table 55. Reasons why medical specialists did not perform EmOC procedures within last 3 months (by specialty)

Reasons	Signal function	Administer parenteral antibiotics	Administer parenteral oxytocics	Administer parenteral anticonvulsants	Perform manual removal of placenta	Perform removal of retained products (MVA or D&C)	Perform assisted vaginal delivery	Perform blood transfusion	Perform surgery (cesarean delivery)
Obstetrician (n=27)	Not trained	0	0	0	0	0	0	0	0
	Not authorized	0	0	0	0	0	0	0	0
	No supplies/equipment	0	0	0	0	0	3	0	1
	No indication	3	1	5	4	4	8	8	1
	Subtotal	3	1	5	4	4	11	8	2
Soum doctor (n=9)	Not trained	0	0	0	1	2	4	1	6
	Not authorized	0	0	0	0	2	2	0	2
	No supplies/equipment	0	0	0	0	0	0	0	0
	No indication	1	0	4	4	1	3	6	0
	Subtotal	1	0	4	5	5	9	7	8
Doctor participated in maternity care (n=10)	Not trained	0	0	0	1	1	2	0	2
	Not authorized	0	0	0	1	3	1	0	4
	No supplies/equipment	0	0	0	0	0	0	0	0
	No indication	0	2	2	3	3	5	4	0
	Subtotal	0	2	2	5	7	8	4	6
Idwife (n=37)	Not trained	0	0	0	2	3	6	0	8
	Not authorized	0	0	0	19	28	15	5	27
	No supplies/equipment	0	0	0	0	0	1	0	0
	No indication	3	0	11	12	3	6	21	1
	Subtotal	3	0	11	33	34	28	26	36
Doctor of emergency care (n=9)	Not trained	0	0	0	1	2	4	1	6
	Not authorized	0	0	0	1	1	1	0	2
	No supplies/equipment	0	0	0	0	0	0	0	0
	No indication	4	7	3	7	6	4	5	1
	Subtotal	4	7	3	9	9	9	6	9
Total (n=92)		11	10	25	56	59	65	52	61

Of the specialists that filled in the questionnaire, 61-70% did not manage a breech position, 42-76% did not conduct bag and mask resuscitation, 38-59% did not perform cardiac compressions (CPR) within last 3 months. The situation at each of the facility assessed is shown in Figure 31.

Figure 31. Percentage of interviewed specialists who did not perform other important procedures within last 3 months (by location)

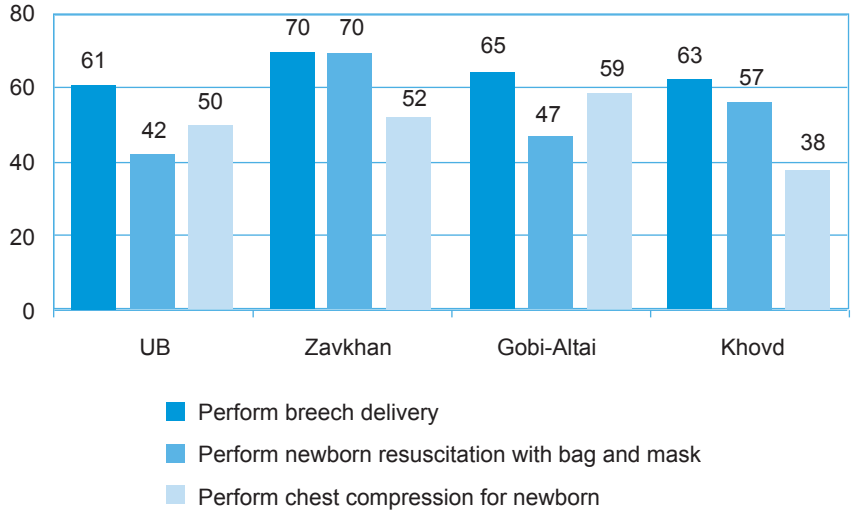


Table 56. Reasons why medical specialists did not perform other procedures within last 3 months (by specialty)

Reasons	Procedure	Perform breech delivery	Perform newborn resuscitation with bag and mask	Perform chest compression for newborn
Obstetrician (n=27)	Not trained	1	0	0
	Not authorized	1	0	1
	No supplies/ equipment	0	0	0
	No indication	5	12	12
	Subtotal	7	12	13
Soum doctor (n=9)	Not trained	1	1	0
	Not authorized	0	0	0
	No supplies/ equipment	0	0	0
	No indication	7	3	5
	Subtotal	8	4	5
Doctor participated in maternity care (n=10)	Not trained	2	1	0
	Not authorized	2	0	0
	No supplies/ equipment	0	0	0
	No indication	3	3	3
	Subtotal	7	4	3

Reasons	Procedure	Perform breech delivery	Perform newborn resuscitation with bag and mask	Perform chest compression for newborn
Midwife (n=37)	Not trained	1	1	2
	Not authorized	7	1	2
	No supplies/equipment	0	0	0
	No indication	20	18	15
	Subtotal	28	20	19
Doctor of emergency care (n=9)	Not trained	2	2	1
	Not authorized	1	0	0
	No supplies/ equipment	0	0	0
	No indication	6	6	5
	Subtotal	9	8	6
Total (n=92)		59	48	46

One ObGyn, soum doctor and midwife each, 2 ObGyns and ambulance doctors each, in total 7 professionals did not manage breech position because they were not trained. One ObGyn and ambulance doctor each, 2 doctors that provided delivery services, 7 midwives, in total 11 professionals did not perform a breech delivery because they are not authorised; and 5 ObGyns, 7 soum doctors, 3 doctors that provided delivery services, 20 midwives, 6 ambulance doctors, in total 41 professionals did not perform a breech delivery because there was no need.

In terms of newborn resuscitation using respiratory bag and mask, 1 soum doctor, 1 doctor that provided delivery services and 1 midwife each, 2 ambulance doctors, did not perform these breathing procedures because they were not trained; 1 midwife did not perform the procedure because s/he was not authorised; and 12 ObGyns, 3 soum doctors and doctors that provided delivery services, 18 (midwives, and 6 ambulance doctors, did not perform the newborn breathing procedures because there was no need.

Two midwives, 1 ambulance doctor, in total 3 professionals did not conduct cardiac resuscitation because they were not trained; 1 ObGyn, 2 midwives, in total 3 professionals because they were not authorised; and 12 ObGyns, 5 soum doctors, 3 doctors that provided delivery services, 15 midwives, 5 ambulance doctors, in total 40 professionals did not perform cardiac resuscitation because there was no need.

Performance of procedures on emergency obstetric care within last three months by categories of professionals interviewed is shown on Table 57, 58.

Table 57. Performance of procedures (by specialization)

Signal function / Health worker	Administer parenteral antibiotics		Administer parenteral oxytocics		Administer parenteral anticonvulsants		Perform manual removal of placenta		Perform removal of retained products (MVA or D&C)		Perform assisted vaginal delivery		Perform blood transfusion		Perform surgery (cesarean delivery)	
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
Obstetrician (n=27)	24	3	27	0	22	5	23	4	23	4	9	12	18	9	25	2
	89%	11%	100%		82%	18%	85%	15%	85%	15%	43%	57%	67%	33%	93%	7%
	30%	27%	33%		33%	20%	66%	7%	70%	9%	69%	18%	46%	17%	81%	3%
Soum doctor (n=9)	8	1	8	1	5	4	4	5	4	5	0	9	2	7	1	8
	89%	11%	89%	11%	56%	44%	44%	56%	44%	56%		100%	22%	78%	11%	89%
	10%	9%	10%	10%	8%	16%	11%	9%	12%	9%		14%	5%	13%	3%	13%
Doctor participated in maternity care (n=10)	10	0	8	2	8	2	4	6	3	7	1	8	6	4	4	6
	100%		80%	20%	80%	20%	40%	60%	30%	70%	11%	89%	60%	40%	40%	60%
	12%		10%	20%	12%	8%	11%	11%	9%	12%	8%	12%	15%	8%	13%	10%
Midwife (n=37)	34	3	37	0	26	11	4	33	3	34	3	28	11	26	0	37
	92%	8%	100%		70%	30%	11%	89%	8%	92%	10%	90%	30%	70%		100%
	42%	27%	45%		39%	44%	11%	58%	9%	58%	23%	42%	28%	49%		61%
Doctor of emergency care (n=9)	5	4	2	7	6	3	0	9	0	9	0	9	2	7	1	8
	56%	44%	22%	78%	67%	33%		100%		100%		100%	22%	78%	11%	89%
	6%	36%	2%	70%	9%	12%		16%		15%		14%	5%	13%	3%	13%
Total (n=92)	81	11	82	10	67	25	35	57	33	59	13	66	39	53	31	61
	88%	12%	89%	11%	73%	27%	38%	62%	36%	64%	17%	83%	42%	58%	34%	66%
	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Table 58. Performance of procedures (by specialization)

Procedure / Health worker	Perform breech delivery		Perform neonatal resuscitation with bag and mask		Perform chest pressure for newborn	
	Yes	No	Yes	No	Yes	No
Obstetrician (n=27)	20 74% 61%	7 30% 11.9%	14 52% 33%	13 48% 27%	14 52% 31%	13 48% 28%
Soum doctor (n=9)	1 11% 3%	8 89% 14%	5 56% 12%	4 44% 8%	4 44% 10%	5 56% 11%
Doctor participated in maternity care (n=10)	3 30% 9%	7 70% 12%	6 60% 14.0%	4 40% 8%	7 70% 16%	3 30% 6%
Midwife (n=37)	9 24% 27%	28 76% 48%	17 46% 40%	20 54% 41%	17 46% 37.8%	20 54% 43%
Doctor of emergency care (n=9)	0	9 100% 15%	1 11% 2%	8 89% 16%	3 33% 7%	6 67% 13%
Total (n=92)	33 36% 100%	59 64% 100%	43 47% 100%	49 53% 100%	45 49% 100%	47 51% 100%

When 163 answers from the 92 specialists about the use of uterus contractors were analyzed, 82 (50%) responded that they used oxytocin, 49 (30%) used ergometrine, 15 (9%) said both, 19 (12%) did not use any, and 8 (5%) used other drugs such as methylergometrin, misoprostol. 1 (11%) ObGyn responded that they do not use uterotonics. Among the uterotonics used, oxytocin and ergometrine were used most frequently. Ambulance doctors did not use ergometrine.

Out of 147 answers related to the use of anticonvulsants, magnesium sulphate was mentioned in 80 (54%) responses, diazepam in 53 (36%), and 10 (7%) said that they did not use anticonvulsants, and 4 (3%) indicated that they used other drugs. Magnesium sulphate and diazepam were used most frequently as anticonvulsants.

Regarding the methods used for removal of tissue from the uterus there were 96 answers, and manual aspiration was mentioned in 13 (14%), dilation and curettage in 26 (27%), both methods in 8 (8%) responses, and in 53 (56%) answers, no method was mentioned. Manual aspiration method was used by ObGyns only and dilation and curettage was used by all, except the ambulance doctor. ObGyns used both vacuum aspiration and dilation and curettage, and 53 specialists including ObGyn did not use any method.

When 89 answers about methods used for assisted vaginal births were analyzed, 17 (19%) responses indicated the use of vacuum extractor, 6 (7%) used obstetric forceps, 2 (2%) use both, and 64 (72%) did not use any method. Soum and ambulance doctors did not use any method. In answers saying “did not use this method” proportion of ObGyns is 19%.

Ninety eight answers were received in relation to the question about where you would obtain blood to transfuse. The analysis showed that 35 (36%) received blood from the Blood Transfusion Center, 20 (20%) from the blood banks of their respective hospitals, 6 (6%) from friends and family members if the

need arose (in other words direct transfusions were conducted), and 18 (18%) use other methods.

There were 200 answers in relation to the delivery of anesthesiology services of the hospitals, and 60 (30%) said that general anesthesia was administered, 68 (34%) stated spinal anesthesia was administered, 17 (9%) used ketamin anesthesia, 16 (8%) responded that they either used epidural anesthesia or anesthesia was not administered, and finally 28 (14%) indicated that another method of anesthesia was used (local anesthesia). Spinal and general anesthesia was used most frequently.

Information about maternal and newborn care

"Maximal top level" skills and experiences of health services providers that participate often in delivery was checked using the tool called "Knowledge of health service providers on maternal and newborn health". Ninety eight health service providers, including 44 (45%) in Ulaanbaatar, 21 (21%) in Zavkhan, 17 (17%) in Gobi-Altai aimag and 16 (16%) in Khovd aimag participated. These included 28 (29%) ObGyns, 10 (10%) neonatologists, 10 (10%) pediatricians, 2 (2%) anesthesiologist, 4 (4%) general practitioners, 33 (34%) midwives, 1 (1%) medical assistant and nurse each, and 9 (9%) others that were responsible for childbirth care during their night duty (general medical doctor, surgeon, endoscopist, dentist, epidemiologists, and oncologist). Eleven (11%) were male, and 87 (89%) were female. Out of 98 people, 7 responded that they had never managed deliveries, therefore only answers of 91 respondents were analyzed.

Answers to questions, selected from the questionnaire to evaluate knowledge of obstetric care, are reflected by each knowledge area assessed, in following tables (59, 60, 61 and 62). The highest level of knowledge was among the respondents in Ulaanbaatar and Gobi-Altai with regards to where to register for observation, while for respondents from Zavkhan and Khovd aimag the highest level of knowledge was identifying the signs of whether delivery had started. The least level of knowledge was found in Ulaanbaatar, Zavkhan, Gobi-Altai and Khovd aimags and it was about the signs of severe bleeding.

Table 59. Knowledge about obstetric care, Ulaanbaatar city

		How did you establish the patient was in labour?	What observations or monitoring do you normally carry out	Where do you normally record these observations?	Last time you attended to a delivery, what was the immediate care you gave to the newborn?	When a woman comes with or develops heavy bleeding after delivery, what signs do you look for?	When a woman comes with or develops heavy bleeding after delivery, what action do you take?	When a woman you have just delivered has a retained placenta what actions do you take	When a woman comes with general malaise 48 hours after delivery, what signs do you look for?
Obstetrician (n=16)	All essential responses are mentioned	10	9	9	3	3	7	4	3
	Some essential responses are mentioned	6	7	7	13	13	9	12	13
Pediatrician (n=3)	All essential responses are mentioned	0	0	3	0	0	0	0	0
	Some essential responses are mentioned	3	3	0	3	3	3	3	3
Neonatologist (n=5)	All essential responses are mentioned	2	3	4	5	1	3	3	3
	Some essential responses are mentioned	3	2	1	0	4	2	2	2
General physisian (n=1)	All essential responses are mentioned	0	1	0	0	0	0	0	0
	Some essential responses are mentioned	1	0	1	0	1	1	1	1
Feldsher (n=14)	All essential responses are mentioned	5	3	4	4	4	3	2	2
	Some essential responses are mentioned	9	11	10	10	10	11	12	12
Other (n=1)	All essential responses are mentioned	0	0	0	0	0	0	0	0
	Some essential responses are mentioned	1	1	1	1	1	1	1	1

Table 60. Knowledge about obstetric care, Zavkhan aimag

		How did you establish the patient was in labour?	What observations or monitoring do you normally carry out	Where do you normally record these observations?	Last time you attended to a delivery, what was the immediate care you gave to the newborn?	When a woman comes with or develops heavy bleeding after delivery, what signs do you look for?	When a woman comes with or develops heavy bleeding after delivery, what action do you take?	When a woman you have just delivered has a retained placenta what actions do you take	When a woman comes with general malaise 48 hours after delivery, what signs do you look for?
Obstetrician (n=3)	All essential responses are mentioned	3	2	3	1	1	1	2	1
	Some essential responses are mentioned	0	1	0	2	2	2	1	2
Pediatrician (n=2)	All essential responses are mentioned	2	1	2	1	0	0	0	0
	Some essential responses are mentioned	0	1	0	1	2	2	2	2
Neonatologist (n=1)	All essential responses are mentioned	1	0	0	0	0	0	0	0
	Some essential responses are mentioned	0	0	0	0	0	0	0	0
Anestesiologist (n=1)	All essential responses are mentioned	1	0	0	0	0	0	0	0
	Some essential responses are mentioned	0	1	1	1	1	1	1	1
General physisian (n=2)	All essential responses are mentioned	2	0	2	1	0	1	0	0
	Some essential responses are mentioned	0	2	0	1	2	1	2	2
Feldsher (m=8)	All essential responses are mentioned	8	5	6	4	3	7	2	5
	Some essential responses are mentioned	0	3	2	4	5	1	6	3
Other (n=4)	All essential responses are mentioned	4	0	1	0	1	1	1	1
	Some essential responses are mentioned	0	4	3	4	3	3	3	3

Table 61. Knowledge about obstetric care, Gobi-Altai aimag

		How did you establish the patient was in labour?	What observations or monitoring do you normally carry out	Where do you normally record these observations?	Last time you attended to a delivery, what was the immediate care you gave to the newborn?	When a woman comes with or develops heavy bleeding after delivery, what signs do you look for?	When a woman comes with or develops heavy bleeding after delivery, what action do you take?	When a woman you have just delivered has a retained placenta what actions do you take	When a woman comes with general malaise 48 hours after delivery, what signs do you look for?
Obstetrician (n=5)	All essential responses are mentioned	5	3	5	2	1	2		2
	Some essential responses are mentioned	0	2	0	3	4	3		3
Pediatrician (n=2)	All essential responses are mentioned	1	1	2	1	0	0		1
	Some essential responses are mentioned	1	1	0	1	2	2		1
Neonatologist (n=1)	All essential responses are mentioned	1	1	1	1	0	0		0
	Some essential responses are mentioned	0	0	0	0	1	1		1
General physisian (n=1)	All essential responses are mentioned	1	1	1	0	0	0		1
	Some essential responses are mentioned	0	0	0	1	1	1		0
Feldsher (n=5)	All essential responses are mentioned	4	0	5	1	0	2		1
	Some essential responses are mentioned	1	5	0	4	5	3		4
Nurse (n=1)	All essential responses are mentioned	1	0	0	0	0	0		0
	Some essential responses are mentioned	0	1	1	1	1	1		1
Other (n=2)	All essential responses are mentioned	2	0	2	0	0	0		0
	Some essential responses are mentioned	0	2	0	2	2	2		2

Table 62. Knowledge about obstetric care, Khovd aimag

		How did you establish the patient was in labour?	What observations or monitoring do you normally carry out	Where do you normally record these observations?	Last time you attended to a delivery, what was the immediate care you gave to the newborn?	When a woman comes with or develops heavy bleeding after delivery, what signs do you look for?	When a woman comes with or develops heavy bleeding after delivery, what action do you take?	When a woman you have just delivered has a retained placenta what actions do you take	When a woman comes with general malaise 48 hours after delivery, what signs do you look for?
Obstetrician (n=4)	All essential responses are mentioned	4	1	4	1	0	2	1	0
	Some essential responses are mentioned	0	3	0	3	4	2	3	4
Pediatrician (n=2)	All essential responses are mentioned	0	0	0	0	0	0	0	0
	Some essential responses are mentioned	0	0	0	0	0	0	0	0
Anestesiologist (n=1)	All essential responses are mentioned	1	1	0	0	0	0	0	0
	Some essential responses are mentioned	0	0	1	1	1	1	1	1
Feldsher (n=6)	All essential responses are mentioned	5	0	6	1	1	3	0	0
	Some essential responses are mentioned	1	6	0	5	5	3	6	6
Midwife (n=1)	All essential responses are mentioned	1	0	1	0	0	0	1	1
	Some essential responses are mentioned	0	1	0	1	1	1	0	0
Other (n=2)	All essential responses are mentioned	2	0	1	0	0	0	0	1
	Some essential responses are mentioned	0	2	1	2	2	2	2	1

In summary, it is clear that the question about identifying the signs of the beginning of labor was answered most accurately, and 65 (71%) answered all questions correctly, and 26 (29%) answered insufficiently. The question about the signs of severe bleeding was answered with the least accuracy: 15 (17%) answered correctly all questions, and 76 (84%) answered some of the questions. This may explain, to some extent, why severe bleeding is listed as the primary cause of maternal deaths.

Regarding questions on ENC in all areas of knowledge that were assessed, the question on what measures were taken to prevent loss of warmth was answered most accurately. Only 52 (53%) answered all the questions, and 46 (47%) answered only a few questions; the question on signs for identifying newborn sepsis was answered least accurately. Only 11 (11%) answered all the questions, and 87 (89%) answered only a few. Knowledge of the professionals on maternal and newborn procedures that were not routinely used was poor. (11 (11%) answered all questions, 87 (89%) answered a few questions) (Tables 63, 64, 65 and 66).

Table 63. Knowledge about newborn care, Ulaanbaatar city

		What are the signs for asphyxia neonatorum	If a newborn fails to breath at birth what action do you take?	What are the signs and symptoms of infection in the newborn (sepsis)?	When a newborn is presented with signs of infection what action do you take?	When a newborn is less 2.5 kgs what extra care do you provide?	What procedures are no longer carried out routinely during labour and delivery?	What actions should you take for thermal protection	What actions should you take for cord care
Obstetrician (n=16)	All essential responses are mentioned	2	5	2	3	2	3	8	6
	Some essential responses are mentioned	14	11	14	13	13	13	8	10
Pediatrician (n=3)	All essential responses are mentioned	3	1	0	0	0	0	3	0
	Some essential responses are mentioned	0	2	3	3	3	3	0	3
Neonatologist (n=9)	All essential responses are mentioned	8	7	3	5	5	1	5	7
	Some essential responses are mentioned	1	2	6	4	4	8	4	2
General physisian (n=1)	All essential responses are mentioned	0	0	0	0	0	0	0	1
	Some essential responses are mentioned	1	1	1	1	1	1	1	0
Feldsher (n=14)	All essential responses are mentioned	3	4	0	1	0	4	5	6
	Some essential responses are mentioned	11	10	14	13	14	10	9	8
Nurse (n=1)	All essential responses are mentioned	1	0	0	0	0	0	0	0
	Some essential responses are mentioned	0	1	1	1	1	1	1	1

Table 64. Knowledge about newborn care, Zavkhan aimag

		What are the signs for asphyxia neonatorum	If a newborn fails to breath at birth what action do you take?	What are the signs and symptoms of infection in the newborn (sepsis)?	When a newborn is presented with signs of infection what action do you take?	When a newborn is less 2.5 kgs what extra care do you provide?	What procedures are no longer carried out routinely during labour and delivery?	What actions should you take for thermal protection	What actions should you take for cord care
Obstetrician (n=3)	All essential responses are mentioned	0	1	0	0	0	0	1	1
	Some essential responses are mentioned	3	2	3	3	3	3	2	2
Pediatrician (n=3)	All essential responses are mentioned	0	0	0	0	0	0	1	1
	Some essential responses are mentioned	3	3	3	3	3	3	2	2
Anestesiologist (n=1)	All essential responses are mentioned	1	0	0	0	0	0	0	0
	Some essential responses are mentioned	0	1	1	1	1	1	1	1
General physisian (n=2)	All essential responses are mentioned	1	0	0	0	0	0	1	1
	Some essential responses are mentioned	1	2	2	2	2	2	1	1
Feldsher (n=8)	All essential responses are mentioned	2	5	1	2	1	0	4	4
	Some essential responses are mentioned	6	3	7	6	7	8	4	4
Other (n=4)	All essential responses are mentioned	1	2	0	0	1	0	3	3
	Some essential responses are mentioned	3	2	4	4	3	4	1	1

Table 65. Knowledge about newborn care, Gobi-Altai aimag

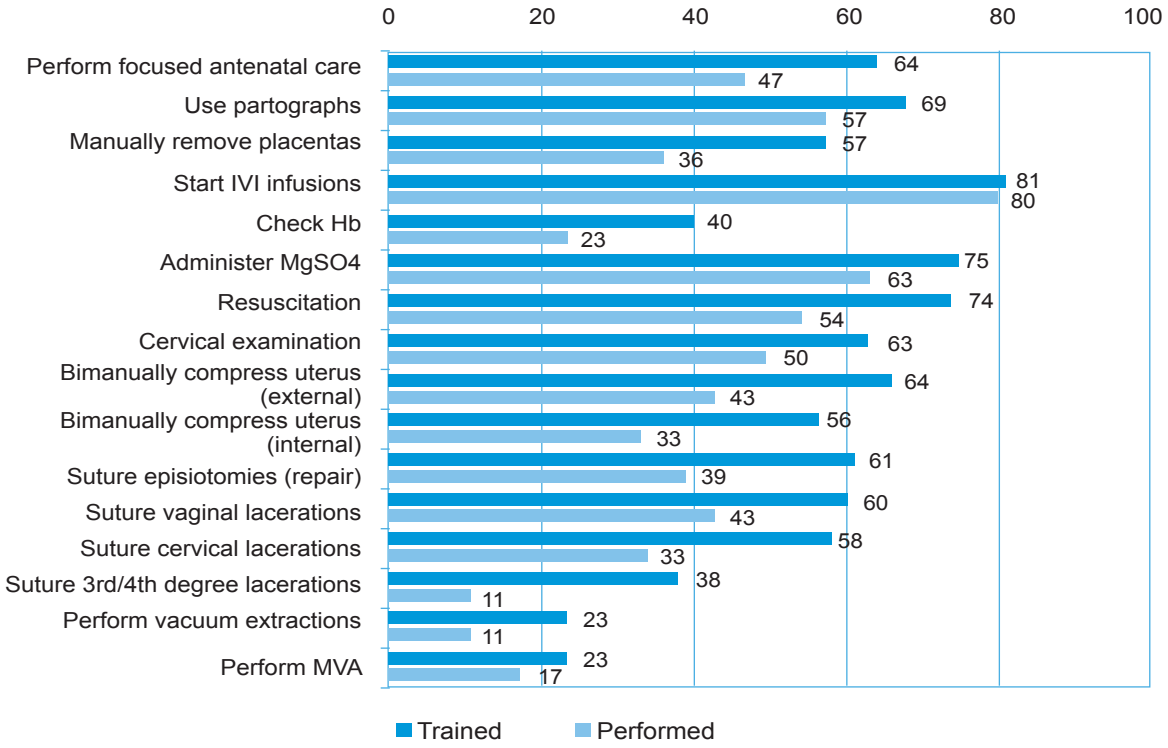
		What are the signs for asphyxia neonatorum	If a newborn fails to breath at birth what action do you take?	What are the signs and symptoms of infection in the newborn (sepsis)?	When a newborn is presented with signs of infection what action do you take?	When a newborn is less 2.5 kgs what extra care do you provide?	What procedures are no longer carried out routinely during labour and delivery?	What actions should you take for thermal protection	What actions should you take for cord care
Obstetrician (n=5)	All essential responses are mentioned	1	1	1	1	2	1	5	5
	Some essential responses are mentioned	4	4	4	4	3	4	0	0
Pediatrician (n=2)	All essential responses are mentioned	1	2	0	1	1	1	1	1
	Some essential responses are mentioned	1	0	2	1	1	1	1	1
Neonatologist (n=1)	All essential responses are mentioned	1	1	1	0	1	1	1	1
	Some essential responses are mentioned	0	0	0	1	0	0	0	0
General physisian (n=1)	All essential responses are mentioned	1	1	0	0	0	0	1	1
	Some essential responses are mentioned	0	0	1	1	1	1	0	0
Feldsher (n=5)	All essential responses are mentioned	1	0	1	0	1	0	2	2
	Some essential responses are mentioned	4	5	4	5	4	5	3	3
Nurse (n=1)	All essential responses are mentioned	0	0	0	0	0	0	0	0
	Some essential responses are mentioned	1	1	1	1	1	1	1	1
Other (n=2)	All essential responses are mentioned	0	0	0	0	0	0	1	1
	Some essential responses are mentioned	2	2	2	2	2	2	1	1

Table 66. knowledge about newborn care, Khovd aimag

		What are the signs for asphyxia neonatorum	If a newborn fails to breath at birth what action do you take?	What are the signs and symptoms of infection in the newborn (sepsis)?	When a newborn is presented with signs of infection what action do you take?	When a newborn is less 2.5 kg what extra care do you provide?	What procedures are no longer carried out routinely during labour and delivery?	What actions should you take for thermal protection	What actions should you take for cord care
Obstetrician (n=4)	All essential responses are mentioned	1	2	1	0	0	0	3	2
	Some essential responses are mentioned	3	2	3	4	4	4	1	2
Pediatrician (n=2)	All essential responses are mentioned	1	2	1	0	1	0	1	1
	Some essential responses are mentioned	1	0	1	2	1	2	1	1
Anestesiologist (n=1)	All essential responses are mentioned	0	0	0	0	0	0	0	0
	Some essential responses are mentioned	1	1	1	1	1	1	1	1
Feldsher (n=6)	All essential responses are mentioned	0	0	0	0	1	0	4	1
	Some essential responses are mentioned	6	6	6	6	5	6	2	5
Midwife (n=1)	All essential responses are mentioned	1	1	0	0	0	0	1	0
	Some essential responses are mentioned	0	0	1	1	1	1	0	1
Other (n=2)	All essential responses are mentioned	1	1	0	0	0	0	1	0
	Some essential responses are mentioned	1	1	2	2	2	2	1	2

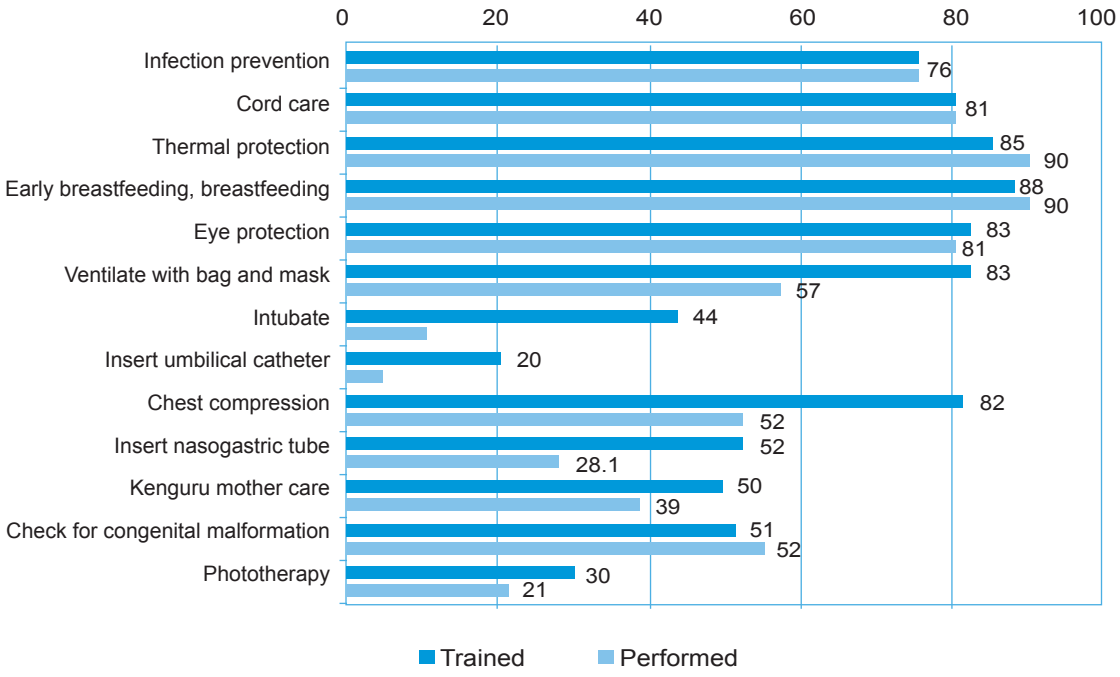
When examining the situation about the training provided and the relationship with the performance of maternal and newborn care procedures, intravenous transfusion of solutions was the procedure they trained for and performed most often; and suturing 3rd and 4th degree tears of the perineum was the procedure they had been trained for, but performed the least (Figure 32).

Figure 32. Training on obstetric care and performance of procedures within last 3 months (all professionals)



Related to newborn care, advising about how to breastfeed was the procedure they performed most frequently, and catheterization of umbilical vessel and intubation of trachea were performed least often (Figure 33).

Figure 33. Training on newborn care and performance of procedures within last 3 months (all professionals)



Workload of medical personnel

Some specialists have responsibility for many tasks, and as observed, this caused difficulties for provision of EmOC when the need arose or when there was a complication. For example, at one hospital when a nurse in the delivery section was working combining duties of midwife and anesthesiology nurse, a mother who had been delivered required emergency care due to bleeding, and only then the lack of adequate staffing was recognised. Also, at one soum, there was a single person responsible for vaccination, sterilization, laboratory, blood banking and distribution of vitamin A.

From the notes of interviews:

Box 13

Regarding doctors

There is serious lack of human resources, and workload is heavy; 20 ObGyns deliver 9700 mothers in one year. At post-delivery ward 1 nurse looks after 6 mothers, and in section for pregnancy related pathologies 1 nurse looks after 50 mothers. According to the standard 1 nurse should look after 15 healthy newborn, however 1 nurse is responsible for 80 healthy newborn. For every 3-4 ill newborn there should have 1 nurse, however we lack these numbers.

We have night duties 8-9 times per month and do not have possibility to rest next day. In the delivery section, we have on average 25 deliveries and only 2 doctors. There is lack of anesthesiologists.

Clients should be regarded as a king, however comfort for clients is not provided. ObGyns and administration prioritize mother and newborn. Mother first, and newborn second.

Big rural hospitals such as aimag general hospital lack human resources, and workload is heavy. Soum hospitals lack specialized doctors. Doctors are not satisfied with salary and it affects their work commitment and initiative negatively. It is visible from answers of respondents (compare with city doctors).

There is lack of neonatologists and neonatology nurses, as well as specialized doctors (otorynolaryngologists serve requests for obstetric care), anesthesiologist are not available.

Box 14

Medical personnel

Responsible for receiving clients. Monitor mothers on contraction and deliveries, assisting procedures; receive the child after cesarean section. Conduct hourly treatment. Conduct training, lecturers and sessions. Fill forms.

Number of children allocated per nurse is many, heavy workload causes problems. At peak times one nurse often looks after 13-20 newborn.

Deliver newborn to neonatologist. Necessity to call neonatologist to provide initial care was difficult. If there is permanently stationed neonatologist at delivery section there wouldn't be such a problem.

We can't monitor mothers carefully after delivery. Post partum monitoring and care is poor, workload is heavy.

The delivery section of the Maternity Department No.1 has only one nurse, who is also responsible for the reception section. It's difficult, especially when workload is heavy, but we still deal with it.

Giving injection to 30-35 people every day and then cleaning up post operation and post delivery rooms, and distribute oxygen cocktail.

Because number of births has increased, workload during working hours is heavy. Midwives can't cope with the workload, delivery of mother and the need to take care of the newborns after delivery/operation are overlapping and causing difficulties.

More midwives should work, and number of posts should be increased.

Human resources are lacking. In my opinion there is lack of nurses and midwives. It seems like all vacancies are filled, but number of patients per staff is too high, additional medical assistants should be trained. Usually person, without proper training just hired as a medical assistant.

Human resources provision is poor. Training is not regular. The hospital has only one ambulance car, therefore ambulance requests experience delays.

Currently number of births has increased and there are times when 2 mothers share a bed. People sent by administration also increase pressure. If there is a common place to receive requests of non residents, it would be easier to distribute them equally.

Number of staff is in accordance with approved quantities, however workload is heavy, and equipment is lacking. Nurses are lacking to provide ENC, and 1 nurse is serving more than 50 newborn.

Equipment and drugs are lacking, uniform is not provided, no medical assistants, training is not sufficient.

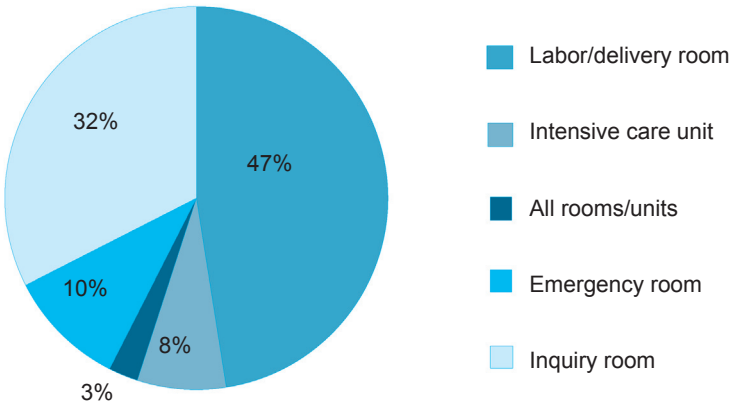
It is advised to do spinal anesthesia for delivering mother. If mother agrees she should sign and pay money. It creates additional workload within hospital.

Information about interviews conducted with other medical personnel

Forty support staff from the selected medical facilities also filled in the questionnaire and when categorised by their respective roles, the distribution was as follows, 78% were assistants, 13% were cleaners, and 10% were receptionists and other support staff. Out of these workers 80% are above 36 years of age; 33% had 6-10 and 53% had more than 11 years of working experience.

Regarding role they played, even though that is not reflected in their job descriptions, 83% were undertaking duties related to EmOC and ENC, 47% worked in the delivery section, 32% worked for all sections of the hospital and 92% were also responsible for cleaning, care and services, which also showed that they need appropriate level of training in obstetric and newborn care.

Figure 34. Main sections where medical assistants and support staffs work



Conclusions

- While the hospital management in rural areas showed greater tendency for retention of staff, however situation in the city was very unsatisfactory, which had negative effect on stability of the management staff and continuity of work.
- Knowledge and awareness of the management about EmOC and ENC was insufficient, also the lack of financial resources was the main barrier for the management to enrol qualified and experienced doctors and support personnel.
- The management was not trained enough on the issues related to the management of obstetric care, clinical guidelines and commodities provision and therefore they were not able or willing to provide required support.
- Hospitals at all levels that provided delivery services, lack doctors and midwives and this may lead to increased workload and have negative effect on the quality of services.
- Staff of hospitals that provided delivery services were not sufficiently trained in EmOC and ENC and especially about newborn resuscitation.
- EmOC and ENC standards and clinical guidelines of facilities that provided delivery services were not revised and updated.
- Lack of neonatologists at aimag general hospitals and lack of internists at secondary level hospitals was also a barrier for team work and caused difficulties in providing comprehensive care.
- Insufficient salaries weakened work commitment of doctors and personnel, and had a negative influence on their initiative.
- Workplaces for the provision of obstetric care were not comfortable for the medical personnel.

EMERGENCY OBSTETRIC CARE AND IMPLEMENTATION OF THE CLINICAL GUIDELINES

The implementation of clinical standards and guidelines on Emergency obstetric care has been evaluated by conducting interviews and observing the procedures. In particular, 78 interviews and 34 observations were carried out. Interview questions and observation checklists have been developed on the basis of guidelines and manuals used in the field of obstetrics and components of both basic and comprehensive emergency obstetric care have been incorporated. ObGyns and midwives of the selected hospitals have been interviewed. 41%of interviewees were from UB, 23% from Zavkhan aimag, 18% from Gobi-Altai and 33% was from Khovd aimag. ObGyns represented 33% of interviewees and midwives comprised 46% of the respondents (Table 67).

Table 67. Specialties of interviewees by sites (by absolute number and percentage)

	Ulaanbaatar	Zavkhan	Gobi-Altai	Khovd	Total
Obstetrician	15	3	4	4	26
	47%	17%	29%	29%	33%
	58%	12%	15%	15%	100%
Paediatrician	0	0	1	0	1
			7%		1%
			100%		100%
General medical doctor	0	2	1	0	3
		11%	7%		4%
		67%	33%		100%
Midwife	15	8	6	7	36
	47%	44%	43%	50%	46%
	42%	22%	17%	19%	100%
Anesthesiologist	0	1	0	1	2
		6%		7%	3%
		50%		50%	100%
Dentist†	0	1	0	0	1
		6%			1%
		100%			100%
Epidemiologists†	0	1	0	0	1
		6%			1%
		100%			100%
Surgeon†	2	1	2	0	5
	6%	6%	14%		6%
	40%	20%	40%		100%
Internist	0	1	0	0	1
		6%			1%
		100%			100%
Oncologist†	0	0	0	1	1
				7%	1%
				100%	100%
Endoscopist†	0	0	0	1	1
				7%	1%
				100%	100%
Total	32	18	14	14	78
	100%	100%	100%	100%	100%
	41%	23%	18%	18%	100%

†Dentists, surgeons, epidemiologists, endoscopists and oncologists do provide services in deliveries during their night shifts at aimag and soum hospitals

Topics covered during the interview on emergency obstetric care:

- Management of labor
- Oxytocin administration
- Provision of anticonvulsants
- Provision of antibiotics
- Manual removal of placenta
- Removal of the retained parts
- Blood transfusion

Management of Labor

The interview questions about the management of labor included issues about preparation for labor, infection prevention, managing the second stage of labor and active management of the third stage of labor. The respondents' feedback was as follows.

Regarding preparation for labor and infection prevention

Regarding the infection prevention procedures before managing the labor, 62% of the respondents answered that they washed hands with soap and water, 78% said they cleaned the external genital organs with an antiseptic solution, and 92% answered about wearing sterile gloves. When above mentioned answers on infection prevention during managing labor, were compared to their actual performance, there was a significant discrepancy between knowledge and practice. For example 94% of interviewees answered on question 'Put on clean apron and slippers', but they did not actually do this in practice when they were observed.

Table 68. Knowledge about infection prevention (interview vs. observation)

Steps to the procedure	Answered correctly	Performed
Prepare necessary equipment	94%	75%
Greet the woman with kindness and introduce yourself	42%	57%
Tell the woman and her support person what the provider is going to do	51%	46%
Put on clean apron and slippers	94%	-
Wash hands thoroughly with soap and water and dry them or wipe with towel	63%	50%
Clean external genital organs with an antiseptic solution	78%	86%
Put on high-level disinfected gloves	92%	89%

Regarding the management of the second stage of labor

Comparing the responses to the interview answers on steps of managing second stage of labor were low than their performance on most of steps. But the answer to question 'Note the time of delivery and announce loudly, scored higher than it was actually practiced (Table 69).

Table 69. Steps to manage the second stage of labour (interview vs. observation)

Steps to the procedure	Answered correctly	Performed
Slacken the cord at birth of head if the cord was around neck	65%	61%
Allow and help external rotation of the head to occur according to position	46%	79%
Downward traction on the head	74%	82%
Allow the posterior shoulder to escape over the perineum	62%	82%
Grasp the baby around the chest to aid the birth of the trunk and lift it toward the woman's abdomen	77%	86%
Note the time of delivery and tell loudly	94%	79%
Note all information about delivery on delivery record	40%	39%

The management of the second stage of labor was also observed in 32 cases. In general, most of the steps were performed better in practice when compared to the interview responses. In particular, 82% allowed and helped external rotation of the head to occur according to position, 79% applied gentle downward traction on the head to allow anterior shoulder to slip beneath the symphysis pubis and 85% put the newborn on the mother's abdomen after labor.

It was also noted that the main steps of the second stage of labor were performed correctly in all locations namely to help external rotation of the head to occur according to position - 80-100% and to allow anterior shoulder to slip beneath the symphysis pubis – above 75%.

Regarding the active management of the third stage of labor

The interviews were conducted on the basis of questions for each step in accordance with the guidelines and steps included oxytocin administration, use of hands to pull on the cord and massaging the uterus were extensively indicated. 80% of all the respondents knew about oxytocin administration and 76% knew about the removal of placenta correctly by pulling on the cord. When we observed the performances that included the following: applying gentle downward traction on the head to allow anterior shoulder to slip beneath the symphysis pubis, administering oxytocin, placing the other hand above the level of symphysis pubis, with the palm facing the mother's umbilicus, uterine massage being performed every 15 minutes during the first two hours after delivery; showed that knowledge of these steps scored higher than their actual practice (Table 70).

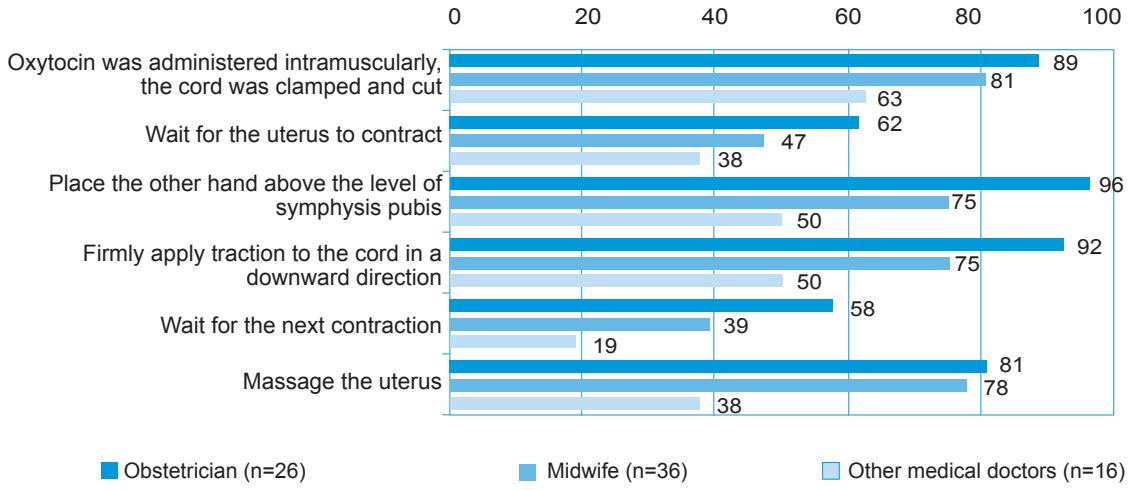
Table 70. Knowledge about active management of the third stage of labour (interview vs. observation)

Steps to the procedure	Answered correctly	Performed
Apply gentle downward traction on the head to allow anterior shoulder to slip beneath the symphysis pubis. Administer oxytocin	80%	75%
Wait for the uterus to contract	50%	68%
Place the other hand above the level of symphysis pubis, with the palm facing the mother's umbilicus	77%	68%
At the same time, firmly apply traction to the cord in a downward direction, using the hand that is grasping the forceps	76%	93%
If the maneuver is not immediately successful, stop pulling and wait for the next contraction	41%	54%
Uterine massage should be performed every 15 minutes during first two hours after delivery	71%	54%

Observations that were carried out in addition to the interviews conducted on the active management of the third stage of labor found that most of the steps had been performed properly in more than 60% of all cases as shown below.

When professional difference on the knowledge about the active management of the third stage of labor was examined, 92% of ObGyns knew about pulling on the cord, 89% knew about the administration of oxytocin and 81% knew about when to massage the uterus, while more than 75% of midwives knew all the above mentioned procedures. Knowledge of doctors of other specialties was relatively low, 63% or less for each step of the procedure (Figure 35).

Figure 35. Knowledge about active management of the third stage of labour, by specialties (percentage)



Use of partogram during labor

The use of partogram during labor was investigated from the delivery records of last 10 cases at each facility - MCHRC, maternity homes, RDTC, Aimag General Hospital, rural and soum hospitals (n=200 in total). All used partograms at the soum hospitals were studied where a lesser number of deliveries took place. 95% of all 20 hospitals used partograms. From the analysis of issues reflected in the partograms at 19 hospitals, 89% recorded the cervix dilation correctly, 79% recorded the downward movement of fetal head, 53% recorded contraction of uterus and 63% recorded strength of the contractions accurately in the partograms. However, blood pressure and pulse were recorded in the partograms only in 16% of all cases, because there was no designated space for recording blood pressure and pulse in the partogram forms currently in use (Table 71).

Table 71. Assessment of the use of partograms during labour (by facility)

Facility		Filling partogram in	Complete filling	Registering cervix dilation	Registering downward movement of fetus head	Contraction registering	Registering contraction strength correctly	Registration of BP, pulse
Ulaanbaatar (n=50)	MCHRC	Yes	No	Yes	Yes	Yes	Yes	Yes
	Maternity Home I	Yes	No	Yes	Yes	No	No	No
	Maternity Home II	Yes	No	Yes	Yes	No	No	No
	Maternity Home III	Yes	No	Yes	Yes	No	Yes	No
	Nalaikh	Yes	No	Yes	Yes	Yes	Yes	No
Khovd (n=40)	Khovd	Yes	No	Yes	Yes	No	Yes	No
	Must	Yes	No	Yes	Yes	Yes	No	No
	Tsetseg	Yes	No	Yes	Yes	Yes	No	No
	Zereg	Yes	No	Yes	Yes	No	Yes	No

Zavkhan (n=60)	Uliastai	Yes	No	No	No	No	Yes	No
	Tosontsengel	Yes	Yes	Yes	No	Yes	Yes	Yes
	Ider	Yes	No	Yes	Yes	Yes	Yes	Yes
	Telmen	No						
	Ikh-Uul	Yes	No	Yes	No	Yes	Yes	No
	Aldarkhaan	Yes	No	No	No	No	No	No
Gobi-Altai (n=50)	Altai city	Yes	No	Yes	Yes	Yes	Yes	No
	Altai	Yes	No	Yes	Yes	No	No	No
	Bugat	Yes	No	Yes	Yes	Yes	Yes	No
	Khaliun	Yes	No	Yes	Yes	Yes	Yes	No
	Taishir	Yes	No	Yes	Yes	No	No	No
Total		95%	5%	89%	79%	53%	63%	16%

Oxytocin administration for augmentation

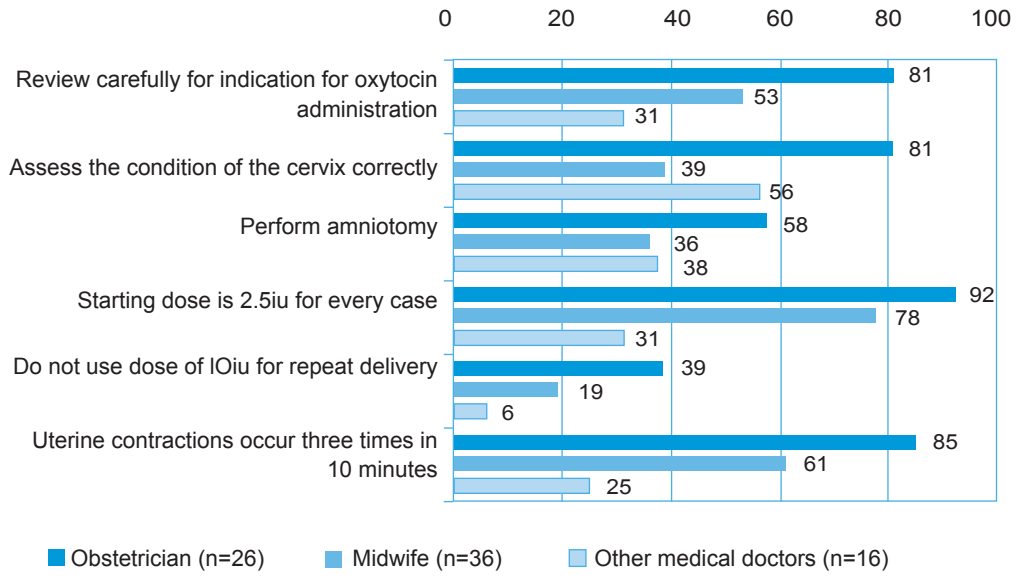
When doctors and health professionals were asked about the timing of oxytocin administration, 83% responded that it was during the management of the third stage of labor and 75% said when contraction of uterus had weakened and during bleeding after the delivery. If the responses are categorized by specialties, 96% of the ObGyns, 76% of the midwives and 80% of the doctors with other specialties said that oxytocin is administered during the management of the third stage of labor.

Table 72. Procedure for oxytocin administration for labour augmentation (interview vs. observation)

Steps to the procedure	Answered correctly	Performed
Review carefully for indication for oxytocin	58%	32%
Assess the condition of the cervix correctly	56%	44%
Perform amniotomy	44%	59%
Administer oxytocin only intravenously IV fluids	76%	50%
Use in drops in IV fluids	83%	56%
Starting dose is 2.5IU for every case	73%	59%
Do not use of 10 IU for repeat delivery	23%	24%
(Start maintenance dose of parenteral oxytocin for augmentation of labor when) Uterine contractions occur three times 10 minutes	62%	50%
(Start maintenance dose of parenteral oxytocin for augmentation of labor when) Uterine contractions last more than 40 seconds	56%	44%

Assessment of the knowledge about the steps of how oxytocin administration is done by various specialists for the augmentation of labor showed that accurate knowledge about the starting dose of oxytocin administration was 73%, about the maintenance dose was 62% and about the non-use of oxytocin administration for multiparas was 23% of all health professionals (Table 64). ObGyn doctors' knowledge about oxytocin administration for augmentation of labour (more than 80%) was better than their non ObGyn colleagues (Figure 36).

Figure 36. Knowledge about oxytocin administration for augmentation of labour, by specialties (by percentage)



Oxytocin administration for augmentation of labor was observed in 15 cases and findings are summarised as follows:

- Indication for oxytocin administration was carefully reviewed – 32%
- Correctly assessed the cervix - 44%
- Amniotomy was done - 59%
- The starting dose for everyone was 2.5 IU - 59%
- Uterine contractions three times in every 10 minutes - 50%
- When oxytocin 2.5 IU was used for infusion, the rate was10 drops per minute - 47%
- Increase infusion rate by 10 drops per minute every 30 minutes - 44%
- Women receiving oxytocin should never be left alone - 32%.

Injecting anticonvulsive drugs

The majority of the interviewees (n=78 in total) named that magnesium sulphate (100%) and diazepam (93%) were used for anticonvulsive therapy. 43% stated the correct loading dose of magnesium sulphate, 50% answered the right way of injection, and 21% stated the dose and the route of administering the drug accurately, if convulsions recur. From the interview responses, it was demonstrated that ObGyns and midwives were more knowledgeable when compared to other professionals about the procedures for injecting the magnesium sulphate (Table 73).

Table 73. Steps to inject magnesium sulphate against convulsion, correct answers, by specialties (by absolute numbers and percentage)

Facility		Magnesium sulphate	Diazepam	14 g as a total loading dose	Initially 4 g magnesium sulphate IV slowly over 5 minutes	Follow with 5 g in each buttocks as deep IM injection,	If convulsion recur after 15 minutes, give 2 g IV over 5 minutes	5 g into alternate buttocks every 4 hours
UB	Obstetrician (n=15)	14	13	6	10	6	4	10
	Midwife (n=15)	11	9	8	10	9	2	11
	Other medical doctor† (n=2)	1	0	0	0	0	0	0
	Total (n=32)	26 81%	22 69%	14 44%	20 63%	15 47%	6 19%	21 66%
Zavkhan	Obstetrician (n=3)	3	3	1	1	1	0	0
	Midwife (n=8)	8	8	8	8	8	4	5
	Other medical doctor† (n=7)	6	6	5	5	5	1	2
	Total (n=18)	17 94%	17 94%	14 78%	14 78%	14 78%	5 28%	7 39%
Gobi-Altai	Obstetrician (n=4)	4	4	4	4	4	1	4
	Midwife (n=6)	6	5	3	4	4	0	2
	Other medical doctor† (n=4)	4	4	2	2	2	0	2
	Total (n=14)	14 100%	13 93%	9 64%	10 71%	10 71%	1 7%	8 57%
Khovd	Obstetrician (n=4)	4	4	2	3	4	0	0
	Midwife (n=7)	7	6	3	3	4	2	2
	Other medical doctor† (n=3)	3	3	1	1	1	1	1
	Total (n=15)	14 100%	13 93%	6 (43%)	7 50%	9 64%	3 21%	3 21%

†Other medical doctors (at district, aimag and soum hospitals), including dentists, epidemiologists, endoscopist and oncologists, do provide the service in deliveries during their night shifts.

Knowledge about the contraindications of magnesium sulphate was low among midwives and doctors of other specialties. But knowledge among health professionals in rural areas was better than those in Ulaanbaatar city (Table 74).

Table 74. Knowledge about the contraindications of magnesium sulphate (by absolute numbers and percentage)

Study sites		Respiratory rate falls below 14 per minute	Patellar reflexes are absent	Urinary output falls below 30ml per hour
UB	Obstetrician (n=15)	9	12	7
	Midwife (n=15)	3	4	2
	Other medical doctor† (n=2)	0	0	0
	Total (n=32)	12 (38%)	16 (50%)	9 (28%)
Zavkhan	Obstetrician (n=3)	1	2	2
	Midwife (n=8)	6	6	4
	Other medical doctor† (n=7)	2	3	2
	Total (n=18)	9 (50%)	11 (61%)	8 (44%)
Gobi-Altai	Obstetrician (n=4)	4	4	4
	Midwife (n=6)	1	3	1
	Other medical doctor† (n=4)	3	3	3
	Total (n=14)	8 (57%)	10 (71%)	8 (57%)
Khovd	Obstetrician (n=4)	1	3	2
	Midwife (n=7)	3	3	1
	Other medical doctor† (n=3)	1	2	1
	Total (n=14)	5 (36%)	8 (57%)	4 (29%)

†Other medical doctors (at district, aimag and soum hospitals), including dentists, epidemiologists, endoscopist and oncologists, do provide the service in deliveries during their night shifts.

Thirty three percent did not answer when magnesium sulphate was not to be used. 56% said it should not be used if the respiratory rate falls below 14 per minute, 42% said if the patellar reflex is weak and 63% answered that if the urinary output falls below 30ml per hour (as all of these indicators are stated in guidelines).

Fifty five percent provided the correct answer about indications, how to inject and how to continue the use of magnesium sulphate after delivery. Sixty nine percent correctly mentioned therapeutic measures needed if there was toxicity due to magnesium sulphate.

Administering antibiotics

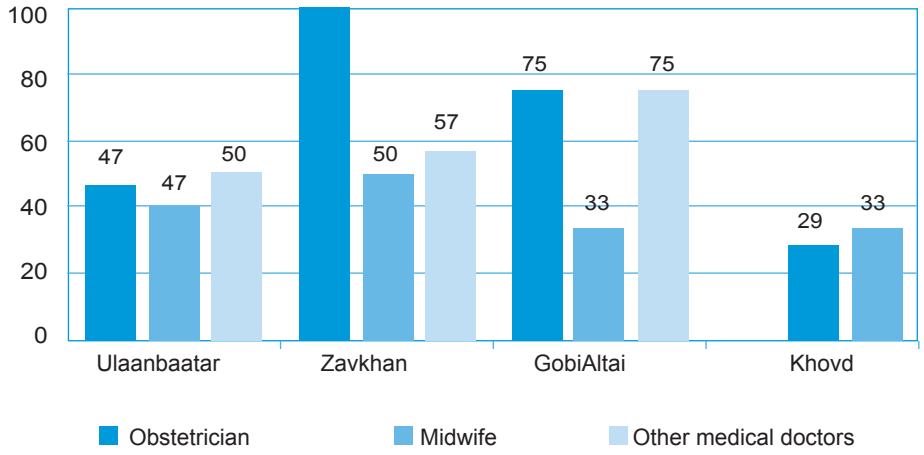
There were some differences observed in the knowledge about the use and administration of antibiotics among professionals in cities and aimags and 96% knew about ampicillin. The number of accurate responses about antibiotics like metronidazole and cefazolin were lower in Gobi-Altai and Khovd aimags (Table 75).

Table 75. Accurate responses on naming of antibiotics (by absolute number and percentage)

Study sites	Ampicillin	Gentamicin	Metronidazole	Cefazolin
Ulaanbaatar (n=32)	30 (94%)	22 (69%)	16 (50%)	26 (81%)
Zavkhan (n=18)	17 (94%)	16 (89%)	13 (72%)	17 (94%)
Gobi-Altai (n=14)	14 (100%)	13 (93%)	5 (36%)	12 (86%)
Khovd (n=14)	14 (100%)	14 (100%)	10 (29%)	13 (7%)
Total (n=78)	75 (96%)	65 (83%)	44 (56%)	68 (87%)

When the knowledge about the prophylactic doses of the above antibiotics was assessed, 65% responded correctly about the use of ampicillin and 41% correctly about the use of cefazolin. Only 11% mentioned cloxacillin and 3% mentioned vancomycin that could be used for serious infections. Knowledge about the dosage and route of administration prophylactic antibiotics (ampicillin, gentamycin) was analyzed by each facility as well as by various specialties (Figure 37).

Figure 37. Correct responses about the dose of prophylactic antibiotics, by specialties and by sites (percentage)



Manual removal of placenta

From the analysis of the feedback on the questionnaire about the preparation and infection prevention prior to the manual removal of placenta, 78% mentioned giving anesthesia and 91% answered about using sterile gloves. However, the responses were relatively inadequate about the other steps of the preparation (for example, to give emotional support 34% and to empty a woman's bladder 36%, Table 76).

Table 76. Knowledge about preparation and infection prevention before manual removal of placenta

Steps of the manual removal of placenta	Total number of health professionals (n=78)	Obstetrician (n=26)	Midwife (n=36)	Other medical doctor (n=16)
Tell the woman what is going to do and encourage her to ask question	51%	54%	58%	31%
Provide emotional support	35%	31%	39%	31%
Give anesthesia	78%	100%	69%	63%
Have the woman empty her bladder or insert a catheter if necessary	36%	35%	42%	25%
Give single dose of prophylactic antibiotics	35%	35%	33%	38%
Put on high-level disinfected gloves (elbow length gloves should be used)	91%	96%	86%	94%

The correct response related to the steps of manual removal of placenta from all clinicians ranged between 54-87% and from Ob/Gyns the range was 81-100% (Table 77).

Table 77. Steps of the manual removal of placenta

Steps of the manual removal of placenta	Total number of health professionals (n=78)	Obstetrician (n=26)	Midwife (n=36)	Other medical doctor (n=16)
Place the fingers of one hand into the vagina and into the uterine cavity, following the direction of the cord until the placenta is located	83%	100%	67%	94%
When the placenta has been located let go of the cord and move that hand onto the abdomen to support the fundus abdominally and provide counter traction to prevent uterine inversion	56%	81%	44%	44%
Move the fingers of the hand in the uterus laterally until the edge of the placenta is located	54%	81%	36%	45%
Keeping the fingers tightly together, ease the edge of the hand gently between the placenta and uterine wall, with the palm facing the placenta	87%	100%	72%	100%
Administer parenteral oxytocin and perform uterine massage	77%	81%	72%	82%

Examining the responses at the different study sites about manual removal of placenta, it was determined that more than 72% of the respondents in Zavkhan aimag mentioned the main steps accurately. Responses were lower among professionals in Gobi-Altai and Khovd aimags.

Observation of the manual removal of placenta

During one case that was observed, it was noticed that doctor and midwife were following all steps of the procedure in sequence like preparing for the procedure, giving emotional support to a mother and putting on sterile gloves. However, it was observed that they did not explain the procedure to the mother, nor did they use prophylactic antibiotics or examine the surface of the placenta.

Removal of the retained parts

Forty three percent of professionals listed all three methods of removal of retained parts of the placenta in the uterus including dilatation and curettage, manual vacuum aspiration (MVA) and manual exploration of uterine cavity. 63% of ObGyns, 36% of midwives and 30% of doctors of other specialties mentioned all three methods.

Knowledge about each step of manual vacuum aspiration procedure was correct in 12-39% of all professionals. Out of ObGyns, 27-81% responded accurately for each step (some doctors and midwives were not trained, Table 78).

Table 78. Accurate responses about manual vacuum aspiration to remove the retained parts in the uterus among health professionals

Steps of MVA	Obstetrician (n=26)
Give anesthesia	62%
Measure uterine cavity with sound	42%
Close the valve on the syringe and check air	81%
Insert cannula into uterine cavity and connect to the syringe	77%
Open the valve on the syringe evacuate the uterine contents by gently rotating motion	65%

Close the valve on the syringe before withdrawing cannula	50%
No curettage	27%
Tissue inspection	73%

Nine percent of all interviewees and 23% of ObGyns attended training on manual vacuum aspiration to remove the retained parts in the uterus. Midwives and other doctors generally are not trained.

Observation of removal of retained parts (Case 1)

Removal of retained parts was observed only once. Dilatation and curettage was done to remove the retained parts in the uterus. Steps of infection prevention, explaining the procedure to a woman, vaginal examination, giving analgesics and examining the removed retained parts were carried out accurately and in sequence.

Cesarean section

As mentioned in the previous chapter, the institutional Cesarean section rate at hospitals that provide comprehensive EmOC, ranged between 7-30%.

One hundred obstetric records (from last few months of 2008) of mothers who had C-sections at MCHRC and three maternity homes of Ulaanbaatar were analyzed and evaluated. It was found out that 32-53% of the C-Sections were planned and 47-68% were emergency C-sections. 30-41% of mothers had had repeated C-sections (second or the third time). For 96-100% cases of C-sections, regional anesthesia was used and general anesthesia was only used in 4%. The use of the "Consent form to undertake surgery" in accordance with the Order #135 of the Minister for Health, was used 18% of the cases at the Maternity Home II and 98% of the cases at the MCHRC (Table 79). Cases of bleeding during the C-sections above 1000ml were between 1-4% at those hospitals.

Table 79. Information about Cesarean section (by each hospital)

Facility / Item	MCHRC	Maternity Home I	Maternity Home II	Maternity Home III
Number of patients records used	100	100	100	100
C-sections planned	46%	53%	37%	32%
Emergency C-sections	54%	47%	63%	68%
Percentage of having C-section for the first time	59%	70%	65%	72%
Percentage of having C-section for the second time	33%	28%	28%	38%
Percentage of having C-section for the third time	8%	2%	7%	-
Consent of having surgery	98%	35%	18%	47%
Regional anesthesia	100%	100%	96%	100%
General anesthesia	-	-	4%	-

Blood transfusion

Assessment of the knowledge about blood transfusion among doctors and health professionals included essential steps for preparation (reagents, instruments) and steps of the procedure. Eighty seven percent of doctors and health professionals responded that they checked date of expiration and the blood product prior to blood transfusion and 78% named the standard serum to determine the blood types. The proportion of the responses to the other questions was below 49%.

Table 80. Knowledge about preparation for and steps of blood transfusion (by specialties)

Steps of the procedure	Total number of health professionals (n=78)	Obstetrician (n=26)	Midwife (n=36)	Other medical doctors (n=16)
Review indication for blood transfusion	49%	65%	36%	50%
Conduct and check compatibility test	87%	85%	86%	94%
Verify with the patient whether the patient who planned to transfuse	21%	23%	22%	13%
Do not infuse other drugs through infusion set used for blood transfusion	41%	42%	42%	38%
Observe urine output and urine color	33%	39%	28%	38%
Keep blood bag, and infusion set for 24 hours together residual of blood and blood products	32%	50%	25%	19%
O(I), A(II), B(III) standard serum for ABO blood typing	78%	77%	78%	81%
Normal saline solution is needed	22%	31%	17%	19%
1% chloramine solution is needed	13%	12%	17%	6%

There was no variance observed in knowledge about checking the individual compatibility before blood transfusion among professionals working at different sites.

Knowledge about each step of blood typing with standard serum was 51% among all doctors and other professionals including midwives and nurses (Table 81). Professionals in Zavkhan aimags responded better than their peers (72%) in other settings about determining the blood types comparing with the standard serum.

Table 81. Knowledge about determining the blood types (by specialties)

Steps of the manual	Total number of health professionals (n=78)	Obstetrician (n=26)	Midwife (n=36)	Other medical doctors (n=16)
Write name or number of person whose blood typing to be performed	35%	39%	33%	31%
Take three separate small drops of blood (from capillars or veins) on plate	55%	58%	50%	63%
Add 3-4 large drops of O(I) group serum on the first drop, A(II) group serum on the second drop and B(III) group serum on the third drop	51%	39%	53%	69%
Mix each drop with separate stick	53%	54%	53%	50%
Observe 5 minutes under good light at room temperature	55%	54%	53%	63%
Determine occurred agglutination on plate and read result	51%	54%	42%	69%

Obstetric complication occurred during the assessment (observation)

Box 15

Women E, 23 years old, first pregnancy. Admitted to the hospital at 6 o'clock on 19 March 2009 when the first stage of labor had started at 39th week of pregnancy.

At 18.30, a boy weighing 3400g was born, Apgar score 2. After intensive care measures, the newborn's condition became better.

The mother lost 1200 ml blood in 50 minutes immediately after the labor and manual exploration of uterine cavity was done. It was estimated that the total amount of blood loss was 2200 ml, however a 22G needle was the only one available in the hospital and liquid could not be infused because of fragile vessels. The mother lost already 3000ml of blood and had shock before to undergo surgery to stop bleeding.

Anesthesiologist was called. There were no oxygen and big size flexible needles during the preparation of surgery. The surgery started at 20.30 after 2 hours of the labor.

The mother's heart had failed and her condition became very critical.

Donors were called from her family members and 3.5 liters of blood was transfused.

The mother is alive.

Advantages of the case:

- *Blood donors were sufficient in the local community.*
- *All preparations were ready for blood transfusion.*

Issues to consider:

- *Lack of human resources because the midwife of the shift was working at the same time as methodologist of the ward and nurse for anesthesia.*
- *There was a delay in transfusing the fluid due to lack of big size flexible needles.*
- *There was no anesthesiologist (doctor) in the hospital.*
- *There was not enough oxygen for general anesthesia.*

There was no 24 hour supply of power and the power was provided after reaching the management of the hospital.

Observation

Conclusions

- It emerged from the interviews with and from the observations of professional staff that knowledge about different components of EmOC varied by site and specialist.
- ObGyns and midwives had solid knowledge on active management of the third stage of labor, use of anticonvulsants and oxytocin administration. But knowledge about these procedures among soum doctors was insufficient.
- Knowledge on use of main antibiotics indicated in the clinical guidelines among doctors and health professionals was relatively good. However, knowledge on route of administration and dosage of prophylactic antibiotics and antibiotic use during severe infection was inadequate.
- There was variable usage of manual vacuum aspiration for removal of retained parts and coverage of the staff as in-service training on MVA has been insufficient.
- Knowledge about blood transfusion was poor.

IMPLEMENTATION OF STANDARDS AND GUIDELINES ON ESSENTIAL NEWBORN CARE

Knowledge and skills (competence in practice) of doctors and health workers are important to provide essential newborn care in addition to the availability of equipment supplies. Questionnaires were developed on the basis of guidelines and manuals on essential newborn care and neonatal resuscitation. Interviews were carried out with doctors and health professionals and observations were made during newborn care being given in delivery rooms. Knowledge about essential newborn care was assessed through 105 interviews with doctors and health professionals providing care for newborns in delivery rooms and 37 observations were made during provision of newborn care in delivery rooms.

Essential newborn care was assessed in the following components:

Basic essential newborn care (BENC)

- Infection prevention
- Prevention from hypothermia
- Clean cord care
- Early initiation of breastfeeding
- Prevention of eye infection
- Creating a friendly environment
- Vaccination
- Initiation of breathing by resuscitation

Comprehensive essential newborn care (CENC)

- Care for low birth weight newborns
- Care for sick newborns

Brief information about the interviewees

A total of 105 health professionals were interviewed of which 47 were from Ulaanbaatar city, 22 were from Zavkhan, 18 were from Gobi-Altai and 18 were from Khovd aimag. There were 36 midwives, 24 ObGyns, 15 neonatologists, 6 pediatricians, 4 nurses and 20 other health professionals including epidemiologist, othorhynolaryngologist, surgeon and others who participate in maternal and newborn care during night shifts at aimag and district hospitals (Table 82).

Table 82. Specialties and professions of the interviewees

Study site / Specialty	Ulaanbaatar	Zavkhan	Gobi-Altai	Khovd	Total
Obstetrician	13 54% 28%	3 13% 14%	4 17% 22%	4 17% 22%	24 100% 23%
Pediatrician	0	3 50% 14%	1 17% 6%	2 33% 11%	6 100% 6%
Neonatologist	14 93% 30%	0	1 7% 6%	0	15 100% 14%
General medical doctor	0	2 40% 9%	3 60% 17%	0	5 100% 5%
Nurse	1 25% 2%	0	2 50% 11%	1 25% 6%	4 100% 4%

Study site / Specialty	Ulaanbaatar	Zavkhan	Gobi-Altai	Khovd	Total
Midwife	15 42% 32%	8 22% 36%	6 17% 33%	7 19% 39%	36 100% 34%
Feldsher	0	0	0	1 100% 6%	1 100% 1%
Anesthesiologist	0	1 33% 5%	0	2 67% 11%	3 100% 3%
Surgeon	0	2 67% 9%	1 33% 6%	0	3 100% 3%
Ultrasound diagnostic doctor	0	0	0	1 100% 6%	1 100% 1%
Othorhynolaryngologist	0	1 100% 5%	0	0	1 100% 1%
Epidemiologists	0	1 100% 5%	0	0	1 100% 1%
Undefined	4 80% 9%	1 20% 5%	0	0	5 100% 5%
Total	47 45% 100%	22 21% 100%	18 17% 100%	18 17% 100%	105 100% 100%

Implementatio.n of basic essential newborn care (BENC)

Infection prevention of newborns

Most of the interviewees (88%-94%) mentioned washing hands prior to management of labor, the use of sterile gloves and use of sterile instruments and surfaces for newborns. However, only 32% of the respondents said that they will not put more than 1 newborn in an incubator for prevention of infection prevention purposes, 46% stated about the non-use of aspiration equipment when unnecessary and 56% responded about washing hands prior to each procedure carried out on newborns (Table 83). No mention was made about occasional lack of water, during the cold season, for repeated hand washing.

Table 83. Responses of all professionals on infection prevention for newborns (interview vs. observation)

Question	Answered correctly	Performed
Wash hands before delivery	85%	78%
Put sterile gloves on during delivery	94%	100%
Use sterile instruments during delivery	88%	94%
Disinfect neonatal masks and catheters are	82%	83%
Do not use suction if unnecessary	46%	64%
Put newborn on clean surface	79%	100%
Cover the mother and newborn with clean blanket	52%	72%
Wash hands before every procedure	56%	not observed
Do not place more then 1 newborn in incubator or cot	32%	not observed

During the observations, all doctors and midwives put on sterile gloves, 94% used sterile instruments and all placed newborns on clean surfaces. However, only 78% of doctors and midwives washed their hands before delivery and 64% did not use any aspiration equipment when unnecessary (Table 83).

Clean cord care

Seventy five percent of the interviewees responded that they cut the cord after pulsation stopped, 76% stated that they put on sterile gloves before the start of the cord procedure, 89% indicated the use of disposable clamps and 73% indicated that will not apply various substances to the cord stamp (Table 84).

Table 84. Responses by all professionals on the clean cord care (interview vs. observation)

Question	Answered correctly	Performed
Cut the cord after beating stopped	75%	69%
Put sterile gloves on	76%	81%
Cut the umbilical cord using clean instruments	85%	95%
Tie/clamp the cord using disposable clamp or rubber	89%	89%
Nothing applied to the stump	73%	84%
Put nothing on the stamp, keep the stump dry	73%	92%

It can be reported from an analysis of the observations on the clean cord care that the cord was cut clean in 69% of all cases, disposable clamps were used in 89% and no medicine/substance was applied in 84% of the cases. But cutting the cord when there was no pulse (after 1 minute) was implemented inadequately, (69%) compared to the other steps (Table 84). Eighty one percent of midwives used sterile gloves when they were doing the cord procedure, although there were some other inappropriate practices observed like using the same gloves when they managed labor and just washing the hands with the gloves on and not drying them thoroughly before the start of the cord procedure.

Prevention from hypothermia

During the interview with 105 health professionals about prevention of hypothermia of newborns, 90% responded about wrapping newborns in a warm and dry cloth for immediate drying, 85% indicated about the preparation of not less than two clothes for drying, 81% indicated about preparing a table with a radiant heater, 75% mentioned about putting on a hat covering the openings, 72% stated the need to cover mother and baby with a warm blanket and 70% stated that the delivery room needed to be kept free of windy draughts. But only 59% of the interviewees responded that temperature in the delivery room should not be less than 25°C and 57% indicated the need to replace wet cloth with another one when placing the baby on a warm surface. 84% of the respondents mentioned swaddling the baby to keep it warm, while only 58% mentioned skin-to-skin contact with mother. In addition, 33% responded about delaying to check birth weight, 31% said about ensuring the baby is warm during transportation and 51% stated not to bathe the baby within the first 6 hours (Table 85).

Table 85. Responses of all professionals about prevention of hypothermia (interview vs. observation)

Question	Answered correctly	Performed
Delivery room temperature 25^{0}C or more	59%	22%
Delivery room is free from draught	70%	83%
Prepare table with radiant heater	81%	76%
Prepare not less than two sheets of clothes for drying	85%	70%
Wrap newborns by warm cloth for drying	90%	97%

Question	Answered correctly	Performed
Replace wet cloth with another one placing the baby on warm surface	57%	67%
Put on hat covering the openings	75%	40%
Swaddle the baby warmly	84%	89%
Allow skin-to-skin contact with mother	58%	33%
Cover mother and baby with warm blanket	72%	61%
Delay weighing of the baby	33%	42%
Transport baby in warm condition	31%	47%
Delay bathing the baby until 6 hours after birth	51%	65%

From the 37 observations about the prevention of hypothermia in newborns, only in 22% of all cases, the temperature of the delivery room was above 25°C, and checking the birth weight was delayed until the baby was warm enough. These practices were observed in 42% of the observation events. In most of the cases, the baby was swaddled and given to mother (89%) and skin-to-skin contact was maintained during the initiation of breastfeeding in only 33%. It was disturbing to note that putting on the hat covering the openings was only 40% of the responses and transporting babies in warm condition from the delivery room was 47% of the responses (Table 85). In 97% of the events, newborns were wrapped by warm and dry cloth, however, in some cases clothes were not warmed and sometimes clothes were too small to wrap the babies.

Box 16

There are enough dry clothes in the maternity ward but those clothes are very small so that whole body could not be covered and swaddled.

There is no instrument to warmly carry babies. We are afraid to carry swaddled newborns after C-sections because there is a cold draught near the elevator.

Neonatologist

Initiation of breastfeeding

Even though, 91% of all interviewed service providers responded that the initiation of breastfeeding should start within an hour after delivery, only 59% mentioned to the mother and staff there to keep mother and baby together as long as possible until the baby is breastfed. Seventy four percent of the interviewees mentioned about helping mothers to initiate breastfeeding and providing counselling on breastfeeding (Table 86).

Table 86. Responses of all professionals about the initiation of breastfeeding (interview vs. observation)

Question	Answered correctly	Performed
Initiate breastfeeding within 1 hour after birth	91%	77%
Keep mother and baby together as long as possible until the baby is breastfed	59%	51%
Help the mother during initiation of breastfeeding	78%	83%
Provide counselling to mothers on breastfeeding	74%	60%

During all the observations that were made in the delivery rooms, it was found that 77% of the carers initiated the breastfeeding within an hour, 51% kept babies longer till after the breastfeeding was finished and 83% helped mothers during the initiation of breastfeeding. Counselling on breastfeeding was provided to mothers in 60% of all cases (Table 86).

Prevention of eye infection

The majority of the service providers (91%) responded about the application of 1% tetracycline ointment to prevent eye infection. But, 74% mentioned that the ointment should be applied within an hour of birth for effective prevention, and 57% responded to apply the rice grain amount of the ointment into the inner corner of both eyes (Table 87).

It was also noticed during the observations that 74% applied tetracycline ointment within an hour and 63% applied rice-grain amount ointment into the inner corner of the eye (Table 87).

Table 87. Responses of professionals about prevention of eye inflammation (level of performance)

Question	Answered correctly	Performed
Use tetracycline 1% ointment for eye prophylaxis	91%	74%
Perform eye prophylaxis within 1 hour after birth	74%	74%
Apply small amount of eye ointment into the inner corner of the eye	57%	63%

Other preventive measures

Among 105 of health professionals 86% responded about the need to inject vitamin K in order to prevent neonatal hemorrhagic syndrome and 73% mentioned about oral administration of Vitamin A 200,000 IU to mothers. It was observed that, in 76% of all cases observed, vicasol was injected to prevent neonatal hemorrhagic syndrome. Fifty seven percent administered Vitamin A orally to mothers.

Table 88. Responses of all professionals about vitamin A and Vitamin K administration

Question	Answered correctly	Performed
Administer vitamin K 1-2 mg or vicasol 1 mg/kg	86%	76%
Administer oral vitamin A 200 000 IU for mother	73%	57%

Immunization

It was concluded from the interviews that 91% mentioned administration of BCG vaccine within 24 hours after birth, 91% mentioned administering hepatitis B vaccine and 84% mentioned polio vaccine when the question was asked. However, this was not observed.

Creating a friendly environment for mothers and newborns

When questions were asked about creating a friendly environment for mothers and newborns, 43% of all health professionals responded about the importance of allowing a family member to stay with mother during delivery, 49% said not to leave mother and baby alone in delivery room and 47% said to give complete information about the baby to a mother. This was quite different from the actual practice during observations

It was also determined that in only 14% of the observations, the husband or other family members attended the birth; in 27% the mothers were not left alone with babies in delivery room and in 46% full information about babies was given to mothers.

Newborn resuscitation

Knowledge about resuscitation of newborns was assessed using the following steps:

- Check readiness of resuscitation equipment
- Evaluate the newborn during resuscitation
- Step A: Perform initial steps of resuscitation if the newborn is not breathing and help to initiate breathing

- Step B: If the baby is not breathing after the initial step, give positive-pressure ventilation using the bag and mask
- Step C: Support heart function of the baby by chest compression if heart rate is below 60 per min while administering positive-pressure ventilation
- Step D: Administer drugs to support circulation when the above measures are ineffective.

Knowledge about newborn resuscitation among all interviewed service providers

Among 105 care providers interviewed using the approved questionnaire 71% of the respondents stated the need to check whether the Ambu bag and mask were working, 83% indicated the need to check readiness of the aspiration equipment and 50% responded about the need to check readiness of the oxygen supply when they were interviewed about checking the readiness of equipments for resuscitation of newborns (Table 89).

Sixty eight percent of the interview respondents accurately stated the steps for clearing the airway, while 79% mentioned all the methods for stimulating the baby and another 64% correctly stated about proper positioning during the initial steps for the resuscitation of newborns with asphyxia.

Eighty five percent of the respondents stated the need to ventilate a baby with the bag and mask if the baby was not breathing after the initial steps, 69% mentioned the correct positioning of the mask, 36% correctly stated about the proper rate of ventilation and 45% of service providers said that the timing of re-evaluation should be in accordance with the guidelines on neonatal resuscitation care.

Many of the service providers did not properly know about the administration of chest compression in newborns (only 29-30% answered correctly). There were a few correct answers (44-52%) about indications, methods and proper rates of chest compression in accordance with the resuscitation guidelines for newborns.

Fifty one percent mentioned when to administer drugs via the umbilical cord during resuscitation of newborns, 42% responded about the correct dilution and adjusting the dosage of epinephrine to support the circulation and 28% stated the indications and dosage for normal saline or Ringer solution in accordance with the clinical guidelines.

Table 89. Responses of all health providers interviewed on resuscitation of newborn

Question		Answered correctly
Preparedness	Assembling and checking the bag and mask	71%
	Assembling and checking the equipment for oxygen supply	50%
	Assembling and checking the suction equipment	83%
Evaluate the newborn	Evaluate breathing (crying or chest movement)	65%
	Evaluate heat rate (count for 6 seconds and multiple by 10)	43%
Step A	Clear airway if necessary (mouth- pharynx-nose)	68%
	Dry stimulation (rub the back, flick the soles of foot)	79%
	Position	64%
Step B	Baby is not breathing/crying or heart rate is below 100 per min after initial steps	85%
	Proper application of mask	69%
	Proper rhythm of ventilation (40 per minute)	36%
	Ventilate for 30 seconds and evaluate again	45%

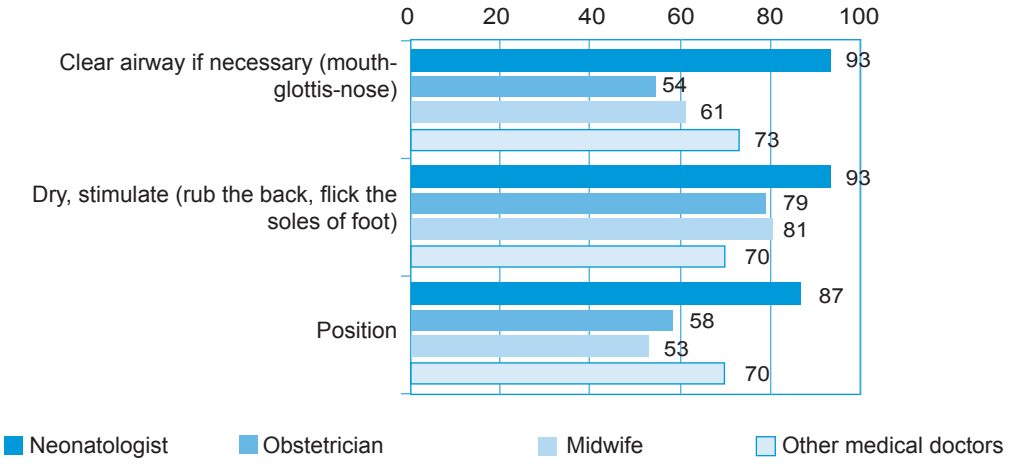
Step C	Administer chest compression with positive-pressure ventilation if heart rate is below 60 per min, not breathing/crying after 30 sec positive pressure ventilation	54%
	Conduct chest compression with positive-pressure ventilation (rate of ventilation 30 per min, rate of compression 90 per min)	44%
	Administer chest compression through two finger and thumb method	52%
	Place fingers in proper position	30%
	Proper depth of compression (1/3 in relation to antero-posterior diameter of the chest)	29%
Step D	Administer epinephrine if heart rate is below 60 per min after administering chest compression with positive pressure ventilation	51%
	Administer 0.1-0.3 ml/kg epinephrine (1:10 000 solution) IV rapid	42%
	Administer 5-10 ml/kg normal saline or Ringer IV slow	28%

Comparison of the knowledge of the newborn resuscitation procedures among professionals by different specialties

Knowledge about resuscitation care of newborns was assessed through interviews conducted with ObGyns, neonatologists, midwives and doctors with other specialties who took part in deliveries. Doctors with other specialties, who were interviewed included surgeons, general practitioners, anesthesiologists, ENT doctors and doctors of imaging diagnostics as they were involved in the provision of care for mothers and newborns in delivery rooms.

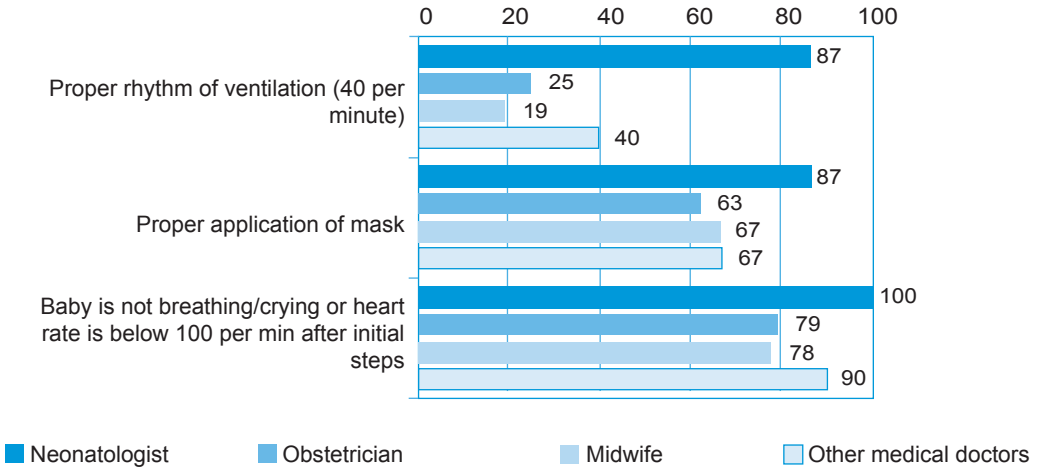
Ninety three percent of neonatologists, 54% of ObGyns, 61% of midwives and 73% of other doctors accurately responded about clearing the airway during the initial steps (Step A) for dealing with newborn asphyxia. Proper stimulation methods of newborns were listed by 93% by neonatologists, 79% by ObGyns, 81% by midwives and 70% by other specialists. Also 87% of neonatologists, 58% of ObGyns, 53% of midwives and 70% of other specialists answered correctly about the positioning of newborns for clearing the airways (Figure 38).

Figure 38. Knowledge about Step A (by specialties)



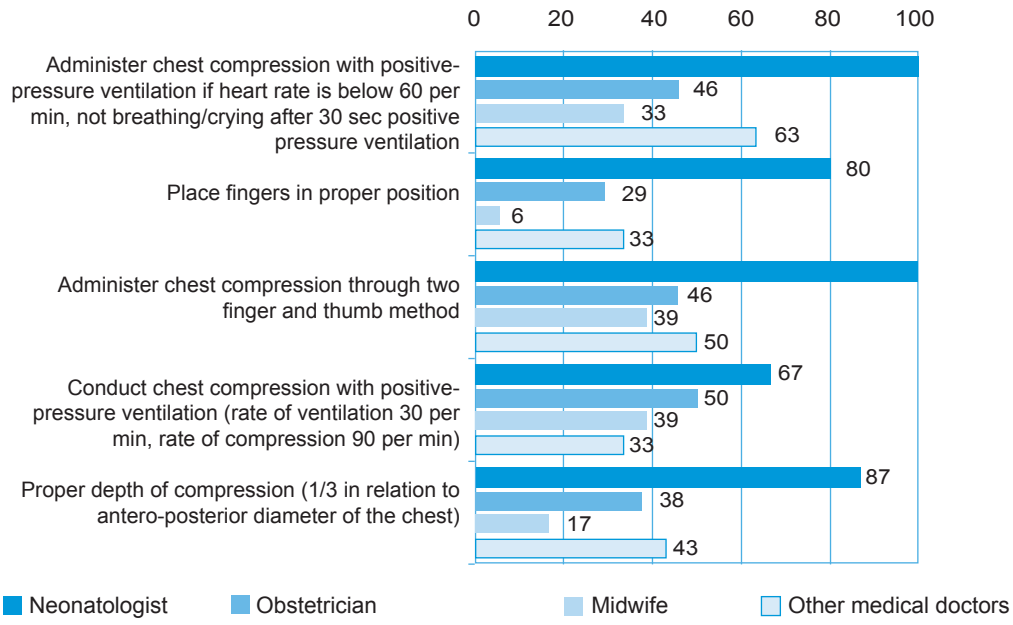
It was determined from the analysis of the interviews about Step B, namely, the use of the bag and mask for the ventilation of a newborn who was not breathing, 87% of neonatologists, 25% of ObGyns, 19% of midwives and 40% of other doctors responded correctly. From 63 to 87% of all respondents accurately stated how to place the mask (Figure 39).

Figure 39. Knowledge about Step B (by specialties)



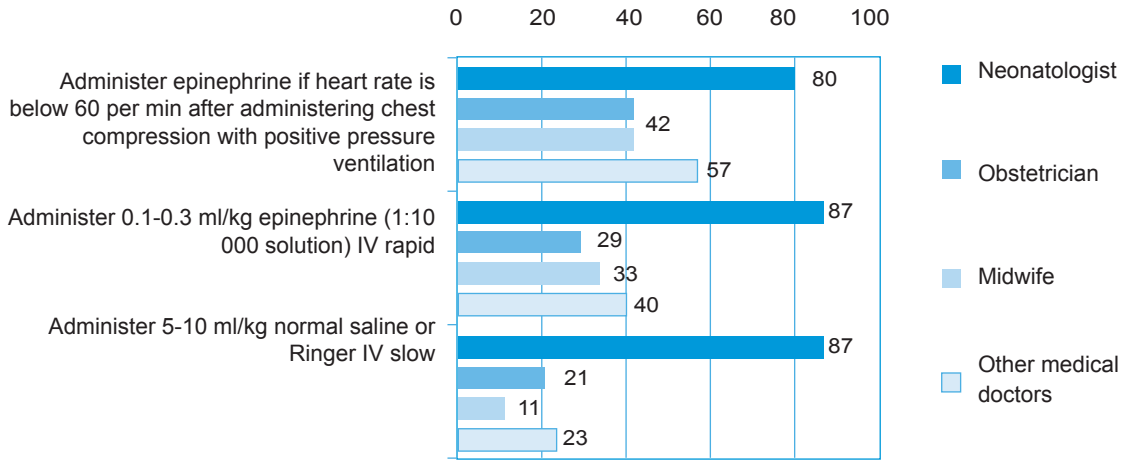
Knowledge about indications, methods and proper rate of chest compression (Step C) for newborns with asphyxia was insufficient among health professionals except neonatologists (Figure 40). For example, only 6% of midwives and 29% of ObGyns knew about proper positioning of fingers during chest compression.

Figure 40. Knowledge about Step C, (by specialties)



Accurate knowledge about Step D namely, the indications for treatment through the cord vessel of newborns with asphyxia, was correctly given by 80% among neonatologists, 42% among ObGyns and midwives and 57% among other doctors. 87% of neonatologists, 29% of ObGyns, 33% of midwives and 40% of other doctors also responded correctly about dosage and dilution of epinephrine to support the cardiovascular system. 87% of neonatologists, 21% of ObGyns, 11% of midwives and 23% of other doctors also correctly knew about IV infusion of normal saline and Ringer Solution.

Figure 41. Knowledge about Step D (by specialties)



Observation of the newborn resuscitation procedures

During the observations for checking the readiness of the resuscitation equipment for newborns, it was seen that the Ambu bag and mask were checked in 43% of all cases, oxygen concentrator was checked in 71% of all cases and checking the readiness of aspiration equipments was done in 38% of all cases.

From the observation of the initial steps for resuscitation (Step A, n=13), it was noted that in 11 cases airways were correctly cleared, in 9 cases properly dried and stimulated and in 6 cases positioned correctly.

6 cases were observed where newborns with asphyxia were ventilated by Ambu bag and mask. It was observed that the Ambu bag and mask were used correctly and with appropriate respiratory rate in 5 cases and the Ambu mask was properly positioned in 4 cases.

The following problems were faced in providing resuscitation care for two newborns with asphyxia during the assessment at the Rural General Hospital, Tosontsengel soum, Zavkhan aimag: the table with heater was available but could not work due to electric power restrictions, the delivery room was cold, there was no aspiration equipment available in the delivery room as it was only in the operating theatre, Ambu bag and mask were unsatisfactory, the mask was too old and could not be placed properly, new mask was not available; it was difficult to take the initial steps of resuscitation for newborns, no laryngoscopy or intubation tubes were available, oxygen double tube for newborns was also not available, the aspiration tube was soft and old because it has been disinfected so many times, there were only 1-2 of these left, and there was no specialist who was trained in neonatology.

*This note has been quoted from the observation made by the neonatologist of the assessment team during the reanimation procedure for newborns at Zavkhan aimag.

Comprehensive neonatal care

Knowledge about comprehensive neonatal care was assessed in the following topics through interviews with 21 neonatologists and pediatricians:

- Administration of end tracheal intubation
- Care for immature and low weight newborns
- Care for sick newborns

Knowledge about endotracheal intubation

The majority of neonatologists and pediatricians (71-76%) knew about the indications for doing an

endotracheal intubation (Table 90). But knowledge among the other professionals was insufficient (32-37%) even though they were team members in providing emergency care for newborns.

Table 90. Responses of neonatologists and pediatricians about indications for doing an endotracheal intubation

Indications for doing an endotracheal intubation	Answered correctly
Do an endotracheal intubation to clear airway if amniotic fluid is stained with thick me conium, baby is not active and heart rate is below 100	76%
Do an endotracheal intubation if heart rate is below 60 per min after positive-pressure ventilation and continue ventilation with bag	71%
Perform endotracheal intubation within 20 seconds	76%

Care for premature and low birth weight newborns

It was determined from the analysis of the interviews with neonatologists and pediatricians that answers for most of the questions were sufficient, although knowledge about observing closely the body temperature (67%), counselling on kangaroo-mother care (62%) and testing of hypoglycemia in newborns (62%) was inadequate (Table 91).

Table 91. Interview responses by neonatologists and pediatricians about care for immature and low birth weigth newborns

		Answered correctly
Keep them warm	Use incubator, mattress filled with preheated water and other methods to keep the baby warm	95%
	Observe closely body temperature	67%
	Immediately re-warm if baby is hypothermic	76%
	Advise Kangaroo-mother care to mother	62%
Feeding, prevent from hypoglycaemia	Use syringe, small cup, spoon for feeding if baby has poor sucking	100%
	Use tube feeding if baby has difficulty to suck and swallow	95%
	Place the tube properly	86%
	Check blood sugar if necessary	62%

Care for sick newborns

Knowledge about care during TB infection was insufficient among neonatologists and pediatricians based on the responses to the questionnaire about caring for sick babies. For instance, 38% mentioned administration of izoniazid to the newborns of mothers with TB and 48% mentioned the need to delay administration of BCG vaccine for 6 months. Many of the respondents correctly answered about management of newborn with infection (90%) and almost all respondents (95%) mentioned about phototherapy for babies with jaundice. However, for example, not all doctors answered about early detection of neonatal infection and checking for congenital malformations (81%).

Table 92. Responses by neonatologists and pediatricians about care for sick newborns

Indications for doing an endotracheal intubation	Answered correctly
Administer IV antibiotics in combination in case of severe infection (ampicillin and gentamycin)	90%
Early detection of neonatal infection	81%
Administer benzatine penicillin in case of congenital syphilis	81%
Administer izoniazid if the mother was diagnosed and treated with tuberculosis	38%
Advise to have BCG vaccine after 6 months if the mother was diagnosed and treated with tuberculosis	48%
Check for imperforate anus, choanal atresia and other congenital malformation	81%
Check for cleft lips and palate	86%
Advise specific methods of feeding in case of cleft palate	86%
Administration of eye antibiotics	90%
Prevention and treatment of omphalitis	95%
Check blood for bilirubin level	81%
Administer phototherapy	95%
Use mask or nasal prongs to administer oxygen	95%
Monitor oxygen supply (saturation)	81%

Conclusions

- Knowledge about basic essential newborn care such as prevention of hypothermia including keeping the delivery room warm, putting on hat, replacing wet clothes, carrying the baby warmly, delaying to weigh the newborn, keeping skin-to-skin contact of a normal baby with its mother and breastfeeding as long as possible was insufficient and the guidelines were not being implemented at the hospitals covered by the assessment especially about keeping the delivery room warm, putting on hat, providing skin-to-skin contact with mother and transporting in warm condition.
- There were some problems identified during observations of newborn care in the delivery room like the obstetric service providers do not always wash their hands before management of labor, nor did they use sterile gloves all the time or changed their gloves prior to initiating clean cord care.
- Not every newborn was given eye infection prevention within one hour after birth although care providers had sufficient knowledge about eye care in newborn.
- A friendly environment for mothers and newborns was not set up because it was very rare that family members were allowed to be present during delivery and mothers and newborns were mostly left alone without supervision in the delivery room.
- Knowledge about resuscitation care, especially chest compression, proper application of steps of resuscitation and use of medicines and injections during newborn resuscitation was inadequate among all health professionals except the neonatologists.
- It was challenging to conduct newborn resuscitation as a team since the doctors besides neonatologists were not familiar about when to carry out endotracheal intubation.
- Neonatologists who are mainly responsible for newborn care had inadequate knowledge about early detection of hypoglycemia for immature and low birth weight newborns and about measures to be taken during a TB infection in the mother and there was no counselling on kangaroo-mother care.

CLIENT RIGHTS AND APPROPRIATE ATTITUDE

With purpose of assessing how client rights were being safeguarded and upheld at health care institutions, a structured interview was developed (Volume 3, tool 15). It was decided to survey 128 clients, but a total of 134 people participated in this survey, and 58 (43%) and 76 (57%) were from the city of Ulaanbaatar and from the aimag and soums respectively. ensuring as much as possible equal representation from each level of service delivery. Interviews were conducted with mothers who had delivered during the last 12 months at the surveyed health facilities and clients at these surveyed facilities. The types of services such as ANC, delivery and postnatal care that had been utilized by clients were also investigated. Among participants, who participated in the interviews conducted at maternity homes of Ulaanbaatar city, 15 out of 19 respondents stated that they received services that they wanted for the treatment for pregnancy related complications, 29 out of 34 stated that they received care connected with delivery and all respondents received postnatal care. Among the participants in rural areas, 72 out of 76 respondents stated that they too could receive the services they wanted (Table 93).

Table 93. Services delivered to clients (by sites)

		Complication of pregnancy	Childbirth	After delivery	Other	Total
Ulaanbaatar city	Can receive service wanted	15	29	3	2	49
	Cannot receive service wanted	4	5	0	0	9
	Total	19	34	3	2	58
Rural areas	Can receive service wanted	14	22	0	36	72
	Cannot receive service wanted	1	1	0	2	4
	Total	15	23	0	38	76

Eighty two percent of clients in the 3 selected aimags agreed that soum hospital and 50% of clients in Ulaanbaatar city called family clinics as their closest medical facility. Seventy five percent of clients selected doctors and medical workers by themselves. However, 30% of clients were given services in accordance with their residency and 52% of clients only had access to the soum hospital since there was only one doctor illustrating the limitation of right to free choice of service providers.

Out of the total number of clients involved in survey, 101 waited less than 30 minutes for hospital admission and this indicated good access to inpatient care. In contrast, 10 and 6 out of total clients in Ulaanbaatar city and Zavkhan aimag respectively waited much longer than 30 minutes. Only 3 out of the total number of clients waited for more than 3 hours for hospital admission (Table 94). In addition, 21% of clients who wanted to be admitted to hospitals went back home and of these 71% were sent back due to the lack of hospital beds.

Table 94. Waiting time of clients' for hospital admission

Study sites	Less than 30 minutes	More than 30 minutes and less than 1 hour	More than 1 hour and less than 3 hours	More than 3 hour	Total
Ulaanbaatar	36	10	10	2	58
Zavkhan	21	6	1	0	28
Gobi-Altai	22	1	0	1	24
Khovd	22	0	1	1	24
Total	101	17	12	4	134

Service payment

Fifteen of the facilities in the assessment answered that they did not levy any charges, while six reported that they did levy charges for some of obstetric-gynecological services. 2 health facilities charged clients coming from outside of the catchment area and 4 facilities charged for setting up patient records for admission to the facility (Table 95).

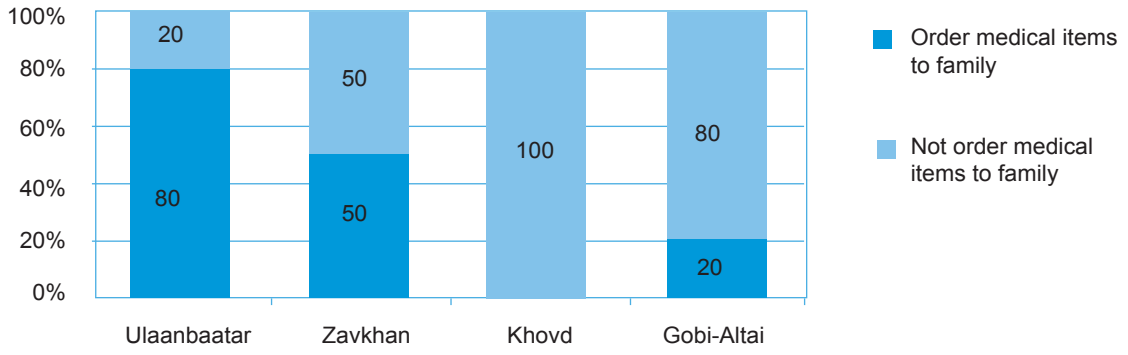
Table 95. Payment requested from clients

Payment from clients	Study sites				Total (n=21)
	Ulaanbaatar (n=5)	Zavkhan (n=6)	Khovd (n=5)	Gobi-Altai (n=5)	
Out of catchment area	2	0	0	0	2
Charge for patient record at the admission to the facility	1	3	0	0	4
Total	3	3	0	0	6

Clients from non-catchment areas are charged 30,000-50,000 tugrugs for admission to a particular hospital. In some soum hospitals, women were asked to pay 500 tugrugs for setting up patient records for admission to the facility. Clients responded that 1 hospital (5%) requested prior payment for providing services and 3 hospitals (14%) asked for donations from the clients.

Ten of the 21 hospitals (48%) responded that they asked the family members to buy drugs and medical devices. Seventy five percent of soum hospitals responded that they did not ask family members to buy drugs and medical devices. All maternity homes in UB, MCHRC and aimag general hospitals said that they asked family members to buy drugs and medical devices when there was a stock-out of these medicines for providing emergency care for complicated cases and when these were required by the doctor for drugs that were not on the essential drug list. Eighty percent of hospitals in UB, 50% in Zavkhan, 20% in Gobi-Altai and 0% in Khovd aimag asked family members to buy drugs and medical devices (Figure 42).

Figure 42. Whether hospitals ask family members to buy drugs and medical devices (by sites)



Forty two percent of inpatient clients paid fee-for-service and 38% of them paid for setting up a patient record for admission into the facility, 38% paid for the required treatment drugs and injections, 9% paid for coming from a non-catchment area, 11% paid for hospital admission days and 5% paid for other diagnostic services (ultrasound diagnosis, booklet for child growth monitoring). This meant that the application of Health law on delivering free of charge maternal and child health services was not being enforced.

From the interviews with community about paying fee-for-service

It was found that community representatives that participated in focus group discussions conducted at each site involved 6-8 persons in rural areas responded firmly that they do not pay for maternal and newborn care. Some interviewees said that they sometimes paid to get drugs from aimag centre, paid for fuel to fill the back-up generator or for transportation by ambulance car.

Community representatives interviewed in urban areas said that they did not pay for maternal and newborn care in some cases, but some of them responded that they were asked to buy drugs and medical devices. It was also mentioned that at times they paid the doctors and nurses after C-section, a fee for not being from the catchment areas, registering with the facility and for obtaining ANC cards, a baby's health record, ultrasound diagnosis and pain killers. These answers are integrated in the below box.

Table 96. Interview responses of mothers on payment for maternal, newborn service (by urban and rural areas)

Urban area	Remote area
▪ No payment Case of payment: ▪ Pay 600-1,000 tug for cleansing enema ▪ After cesarean section, depending on their capability people give from 20,000 to 30,000 tugrugs as appreciation to medical workers ▪ Paid fees for paid room ▪ 2,000 tug for sterile gown, hat and slippers for family to accompany delivering mother in the delivery room ▪ Asked cash for donation (gave) ▪ Paid when not a resident of the catchment area ▪ 1,000 tugrugs to register for personal medical record ▪ Card for ANC costs 500 tug ▪ Card for baby's health record costs 1,500 tug ▪ 3,000 tugrugs ultrasound screening ▪ When had birth at night they sent for medicine ▪ 15,000 tugrugs was charged for anesthesia (injection) ▪ 1,500 tug for intravenous catheter ▪ Bought 0.9% saline infusion. ▪ Service improves after giving things (cash, chocolate etc)	▪ In case of giving birth by C section, voluntarily gave money to doctor, nurse and assistant as appreciation ▪ Never paid fees ▪ Do not pay any fees at soum. ▪ Not asked to bring medicine from home. Hospital itself supplies. ▪ No fees asked for treatment and services at soum. Sometimes petrol was requested for car when women give birth during night. ▪ Card for personal registration with the facility costs 500 tugrugs. ▪ In general, we do not make any payment at soum. Travel by car to aimag center. Petrol for car provided by soum hospital.

Some clients were not satisfied with the quality of health services because 3% of the interview respondents complained of a lack of drug supply, another 3% said about poor responsibility of doctors and another 2% answered about inadequate communication of health care workers.

Access to information

Clients have the right to accurate, clear, and true information related to health services. Education materials for clients should be available in sufficient numbers at each health service delivery point. 81% of the respondents said that had they received enough information and 77% said they had spent sufficient time to consult with service providers. This demonstrated that there was a wider opportunity for clients to have accurate and clear information. Clients have the right to make their own decisions

based on information and their understanding. Informed choice is a continuous process and people get information within community before they come to hospitals. Service providers are obliged to create an enabling environment for clients to make an informed choice.

However, 22% of clients responded that they could not express their opinions and 52% had no possibility to consult. On the other hand, it showed that there was a limited chance for clients to consult freely and get counselling. This may also be connected with high workload of the service providers.

Information, education and communication on maternal and newborn health

Mothers who gave birth during the last 12 months were asked about the sources from which they receive information on maternal and newborn health. Most of the mothers in the city got information from TV and radio (22%) and from parents and relatives (21%). While the majority of mothers in rural areas responded that they received information from health workers (20%) 15% of urban mothers got information from family doctors, 13% from newspapers and magazines, 13% from friends and 11% from books. 16% of mothers in rural areas received information from TV and radio, 11% from newspapers and magazines and 11% from friends. The response on getting information from distributed IEC materials about maternal and newborn health was 4% in the city and 4% in rural areas.

It became clear from the analysis of the interviews with community representatives on information, education and communication about maternal and newborn health that in the city, it was rare to get information and counselling from doctors. People usually received information from their elders and from their own experience. It was also mentioned that clients in rural areas got information from doctors, midwives and bagh feldshers and read leaflets and handbooks. From the interview with community members, it was mentioned that there was no formal health education available and dangerous signs of newborns were not told.

Table 97. Interview responses of mothers about sources of information on maternal, newborn health (by urban and rural areas)

Urban area		Remote area	
Newspapers, magazines	13%	Newspapers, magazines	11%
Internet	1%	Internet	0
Family doctor	15%	Health worker	20%
Book	11%	Book	5%
Parents and relatives	21%	Parents and relatives	8%
Friend	13%	Friend	11%
TV, radio	22%	TV, radio	16%
Brochure	4%	Brochure	4%

In total, 100 women (57 women from aimags and 42 – from Ulaanbaatar) were interviewed to clarify what kinds of sources of information on maternal and newborn health they used.

Table 98. Delivered mothers interview responses about sources of information on maternal and newborn health (by urban and rural areas)

Personal interview responses, Ulaanbaatar city	Personal interview responses, rural areas
▪ On TV-9, C-1 ▪ Books such as "You became mom", "Mammy Poko" ▪ Newspaper, journals ▪ From Family Clinic and family doctors. ▪ From other mothers ▪ From older people, relatives ▪ Friends ▪ Women who gave birth at the same time ▪ Take ads from Cosmetic companies Important answers: ▪ Did not attend ANC consulting ▪ Did not listen to or read about danger signs in newborns ▪ Doctors talk less and provide incomplete info. ▪ Generally do not get information, mostly learn through personal experiences ▪ Most of handouts about AIDS and tuberculosis. Materials on newborns are rare	▪ Get from soum midwives ▪ Various booklets, guidebooks given to us to read during the first ANC examination ▪ Maternity ward gave baby's growth chart when we discharged and read relevant info on it ▪ From friends and from others with whom I was at maternity home ▪ From close relatives ▪ Leaflets given during visits. Handbooks provided ▪ TV-"Education" channel ▪ TV channel "Education" is good, get information because we have 24 hour power supply. "Shuuder" program is very informative (nutrition) ▪ Read health newspaper ▪ Doctor has provided advice ▪ From mother, rare friends ▪ TV ▪ Family doctors and pediatricians ▪ Friends, people who had a baby ▪ Obtained information about newborns from a book "You became mom". ▪ There was no resource to get information Important answers: ▪ There was no resource to get information ▪ Dis not get information from others Sometimes had TV at home, but did not have time to watch ▪ Handbooks were given to few people. ▪ If sky was clear, watched TV using solar panel. ▪ Never got information about danger signs newborns ▪ Not covered during official training, ▪ Medical workers did not give advice in postpartum period

Clients were asked about where they got information on the danger signs and newborn care in urban and rural area. The answers showed that people in rural area got the information from more sources than in the urban area. But most people answered that they did not get the information about danger signs of newborns. It is summarised in the following table.

Table 99. Responses during FGDs about sources of information on dangerous signs of maternal, newborn health (by urban and rural areas)

FGD responses, Ulaanbaatar	FGD responses, rural areas
▪ Did not listen to or read about danger signs of ill health in newborns ▪ Wife has a book, but I did not know what was written in it. It cost 5,000 tug ▪ Doctors talked less and provided incomplete info. ▪ In general, did not receive information, relied on personal experiences ▪ Acquired experience and counselling from elders ▪ Took training and advertisement materials during open days at Health Center and hospitals, but most of them about AIDS and tuberculosis, and materials on newborns were rare ▪ Took ads from Cosmetic companies ▪ Received information from doctor, nurse, "family doctor" and family clinic, in the evening from TV and newspapers ▪ Maternity ward presented one book, took ads ▪ Watched C1, and TV9 channel programs on newborns.	▪ Obtained advice from family doctor and pediatrician. Also from friends, others who had newborn babies, and TV. Did not receive any specific info about danger signs of ill health in newborns. No application needed for taking care of cord only keeping it dry ▪ Information related to mother and newborn obtained from medical workers, and materials, guide book distributed by medical institutions ▪ Traditional methods were learnt from parents and friends. Information about mother and newborns' care given by doctor who examines during pregnancy, by obstetrician and bagh feldshers after delivery ▪ Related information provided by obstetrician. Also from friends. Obtained information about newborns from a book "You became mom". Various booklets, guidebooks given to us to read during the first ANC examination ▪ Soum is divided into khoroos. Provision of advice and conducting of training done by khoroo doctors during home visits and during examination at hospital. Leaflets and pamphlets were distributed. Receive information from TV, radio, newspapers and magazines. Book on safe motherhood had been distributed ▪ Various types of information on maternal and newborn health had been obtained from different materials and handbooks. In addition, as said by doctors and health workers that they got the information from TV, radio, newspapers, magazines and sometimes from friends, parents and mothers who had babies ▪ Not covered during training, got the information from handbook on health issues, health workers did not provide counselling, and got the information from posters in hospitals ▪ Obtained from soum midwives. From posters. Leaflets that were given during visits. Handbooks provided. No formal training. Looked at materials brought by other women. TV channel "Education" is good, got the information because we have 24 hour power supply. "Shuuder" program is very informative (nutrition) ▪ Besides postpartum visits, there was no counselling during postpartum period. Perhaps, counselling was only given to mothers who had their first babies.

Comfort for health service delivery

Clients have the right to receive services in a dignified and comfortable environment. Service providers should ensure that clients are served in a reasonably comfortable environment. Though service providers did not agree with opinions of clients, they should respect and encourage their clients to express themselves.

Table 100. Clients' opinions about service delivery

	Ulaanbaatar	Zavkhan	Gobi-Altai	Khovd	Total
Was the service room clean?					
Yes	53 (91%)	27 (96%)	24 (100%)	24 (100%)	128 (96%)
No	5 (9%)	1 (4%)	0	0	6 (4%)
Total	58	28	24	24	134
Was the service room comfortable?					
Yes	40 (69%)	20 (71%)	21 (88%)	21 (88%)	102 (76%)
No	18 (31%)	8 (29%)	3 (12%)	3 (12%)	32 (24%)
Total	58	28	24	24	134
Was the service room separated/providing client privacy?					
Yes	24 (41%)	22 (79%)	21 (88%)	21 (88%)	88 (66%)
No	34 (59%)	6 (21%)	3 (12%)	3 (12%)	46 (34%)
Total	58	28	24	24	134

96% of clients stated that the rooms were clean and 76% mentioned that the rooms were comfortable also (Table 100). 90% of them said that service providers were kind to them (Table 101).

Box 17

I was thinking of giving birth in the soum hospital but a doctor said to go to the aimag after ultrasound examination. It is difficult for me to stay in aimag center, to stay with another family. I would need more money, though I was asked to be in Maternity rest room. Need to bring food. It will run out quickly.

Pregnant mother, in rural area

Clients have the right to confidentiality and privacy during the provision of services such as during counselling, undergoing surgical procedures, registering and opening an outpatient health record and medical record. But 34% of clients thought that there was no environment for confidentiality (Table 101). Also 39% of them felt that there was discrimination in the service delivery and 40% of this group said it was because of social class (Table 102). It also showed the inequity in the delivery of health services.

Table 101. Clients communication, attitude

	Study sites				Total
	Ulaanbaatar	Zavkhan	Gobi-Altai	Khovd	
In your opinion did the service provider show you kindness?					
Yes	49 (85%)	26 (93%)	23 (96%)	23 (96%)	121 (90%)
No	9 (15%)	2 (7%)	1 (4%)	1 (4%)	13 (10%)
Total	58	28	24	24	134
Did you feel any signs of discrimination by sex, family welfare ethnicity, and social status?					
Yes	4 (44%)	0	0	1 (100%)	5 (39%)
No	5 (56%)	2 (100%)	1 (100%)	0	8 (61%)
Total	9	2	1	1	13

Sixteen percent of respondents in Ulaanbaatar marked an option of rude communication and it was higher in the city when compared with other areas (data not shown).

Table 102. Forms of discrimination during service delivery (responses by clients)

	City/Aimag		Total
	Ulaanbaatar	Khovd	
Age	1	0	1
Family condition	0	1	1
Social group, social status	2	0	2
Other	1	0	1
Total	4	1	5

Availability of services

Services need to be accessible and provided in a comfortable setting. Apart from that client has the right to receive services with no restrictions and barriers no matter what is their age, sex, marital status, number of deliveries, ethnicity, social status, religion or sexual orientation.

Table 103. Accessibility to health services in comfortable settings

	Ulaanbaatar	Zavkhan	Gobi-Altai	Khovd	Total
Did you think your comfort was ensured?					
Yes	36 (62%)	25 (89%)	23 (96%)	20 (83%)	104 (78%)
No	22 (38%)	3 (11%)	1 (4%)	4 (17%)	30 (22%)
Total	58	28	24	24	134
What was the opinion of your family and neighbourhoods about this hospital?					
Good	35 (61%)	17 (61%)	20 (83%)	21 (88%)	93 (69%)
Fair	8 (14%)	10 (36%)	3 (13%)	1 (4%)	22 (16%)
Bad	8 (14%)	1 (3%)	1 (4%)	0	10 (8%)
Do not know	6 (11%)	0	0	2 (8%)	8 (7%)
Total	57	28	24	24	133
What do you think are kind of changes that have occurred in the quality of service provided in this facility when compared with your first visit?					
Improved	15 (27%)	13 (46%)	11 (46%)	13 (54%)	52 (39%)
Worsened	3 (5%)	1 (4%)	1 (4%)	0	5 (4%)
Not changed	11 (19%)	1 (4%)	2 (8%)	3 (13%)	17 (13%)
Do not know	28 (49%)	13 (46%)	10 (42%)	8 (33%)	59 (44%)
Total	58	28	24	24	133
Did they keep confidentiality about the information related to your privacy and health?					
Yes	40 (70%)	27 (96%)	23 (96%)	24 (100%)	114 (86%)
No	10 (18%)	1 (4%)	1 (4%)	0	12 (9%)
Do not know	7 (12%)	0	0	0	7 (5%)
Total	57	28	24	24	133

Clients' opinions about improving services

The majority or 79% (data not shown) of clients thought that there was nothing to complain about health care and 69% of their family members and neighbours viewed hospitals' services as good (Table 103).

Also 12% thought that environment, condition and comfort had improved (data not shown). Twenty six percent of clients suggested improving the comfort and condition of the hospitals, 9% suggested to make services more responsive and quicker, 16% indicated the need to improve the ethics and attitudes of the health workers and 9% of clients proposed to increase the supply of drugs, medical devices and equipments. Four percent of all clients stated that they would not come to hospitals for service again. Of this proportion 20% said hospitals' comfort is poor, 20% complained about the lack of provision of information, and 60% said they have decided not to have any more children. Ten percent of clients mentioned that the rooms were cold, 11% stated that the comfort was unsatisfactory, 2% stated that there was lack of attention to the clients and 2% said that the number of personnel had decreased.

Box 18

Next time I am not going to deliver here. Because it was clear that they care more for whom they know. For me they did not pay attention and I was too late for examination, since they did not take timely measures, I asked someone who knows consultant doctor to call; and then consultant doctor examined me. In that time I was so tired and weak, they decided to deliver thru Cesarean section. My family went for another 30-40 minutes to buy required medicines and injection. Then I was delivered by Cesarean section. If they paid attention, examined me earlier, and took correct measures, I would not get too tired and might have been able to deliver by myself. If they already knew that I will deliver with Cesarean section, why did they not operate on me earlier? It was also not clear who was going to deliver me. Even though we paid a lot of money, I think, I was not satisfied with service.

Delivered mother, Ulaanbaatar

Clients asked the question whether quality of care has changed since their admission. Forty four percent responded "do not know", 13% said unchanged, 12% said quality of care had improved and 12% said health workers were kinder.

In addition, responses from the individual interviews and focus group discussions with community representatives and the interviews with mothers who delivered during the last 12 months, were analyzed in terms of health education in the community, their understanding about pregnancy and delivery and their opinions and views about service provider facilities as well as health workers as follows:

Antenatal care

Eighty six percent of 58 women who were selected for the interview in the western region said they knew about ANC while 14% said they did not know. Thirty six women were interviewed from Ulaanbaatar and 6 mothers or 16% did not respond, the other 30 said that they were covered by ANC. The response on timing of their first ANC visit is presented in Table 104.

Table 104. Timing of the first ANC visit

Timing of the ANC visit	Urban area	Remote area	Total
1 month	-	2 (3%)	2 (2%)
2 months	1 (3%)	4 (7%)	5 (5%)
3 months	2 (6%)	7 (12%)	9 (10%)
4 months	-	3 (5%)	3 (3%)
5 months	-	3 (5%)	3 (3%)
6-7 months	-	1 (2%)	1 (1%)
Did not recall the time	27 (75%)	38 (66%)	65 (69%)
Did not answer	6 (16%)	-	6 (7%)
Total	36 (100%)	58 (100%)	94 (100%)

The responses on the importance of ANC can be grouped as follows:

- Getting counselling on complications and preventing complications
- Knowing about health condition by taking various diagnostic tests, so any diseases can be detected early
- Reducing maternal and newborn mortality
- Providing vitamins to babies to have healthier babies
- Preventing from dystosis and late toxemia of pregnancy
- Obtaining social welfare benefits.

Challenges that were identified are as follows:

- Difficulty in going for ANC visits many times at the soum level and not every pregnant women could go to aimag centers for lab testing because of lack of money
- Soum doctors spent very little time at the clinic which makes it hard to provide quality ANC
- There were many practicing doctors in the FGPs and there were different doctors for each ANC visit. Effects of prescribed drugs were not evaluated.

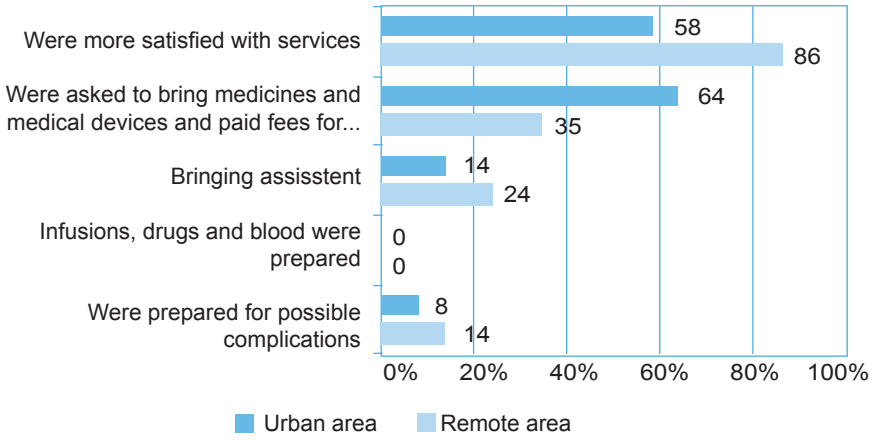
Clients were informed about the various danger signs by family doctors, midwives, nurses and bagh feldshers and they also read books and handouts. Common responses provided by people about dangerous signs of mothers and newborns are presented in Table 105.

Table 105. Clients' knowledge of dangerous symptoms occur to mother and newborn

Danger signs that might occur in a mother	Danger signs that might occur in a new born
▪ Bleeding ▪ Edema ▪ Hypertension ▪ Headache or nausea ▪ Collapse, vomiting ▪ Cramps on lower abdominal part ▪ Outflow of amniotic fluids ▪ Epigastric burning ▪ Blurring of vision ▪ High fever ▪ Vomiting ▪ Anemia ▪ Danger of still birth ▪ Placental abruption ▪ Miscarriage ▪ No weight gain or Excessive weight gain ▪ Fetus movement slows down or stops to move ▪ Fever, blurred vision	▪ Jaundice stays ▪ Defecation with color ▪ Coughing, sneezing, stuffiness in the nose ▪ Fever ▪ Change of skin color ▪ Does not suck breast ▪ Crying, disturbed ▪ Drum belly , diarrhea ▪ Excessive regurgitation ▪ Hyperpnoea ▪ Convulsions ▪ Rash ▪ Oligouria ▪ Fontanel bulges ▪ Bleeding or discharging belly button ▪ Sweating ▪ Pyogenic rash on skin ▪ No weight gain

From the interviews about prenatal and postnatal care with mothers who gave birth during the last 12 months, it was seen that pregnant mothers were less likely (8-14% of total respondents) (data not shown) to be prepared for possible complications than non-pregnant women. In rural areas, there was a tendency to bring family assistants (24%) with the mothers and thus the clients were more satisfied with services (86%). While, in urban areas, clients were asked to bring medicines and medical devices and pay fees for services (64%) making them unsatisfied with the services provided (Figure 43).

Figure 43. Clients' opinions about health services during delivery



Box 19

Following prepared things such as asking someone (parent-in-laws) or neighbour to look after our livestock and 2 kids; saved a total of 80,000 tugrugs or 20,000 tug each month for 4 months; filled motorcycle with petrol; moved to other place and put additional cover to make it warmer.

Washed and prepared cloth wraps to be used by sister's baby.

Only prepared wrapping cloths, nothing else. Did not ask for support person during delivery. Here no such consulting about this matter. It would be nice if someone stays when I have pain and rubs my back, feet and hands.

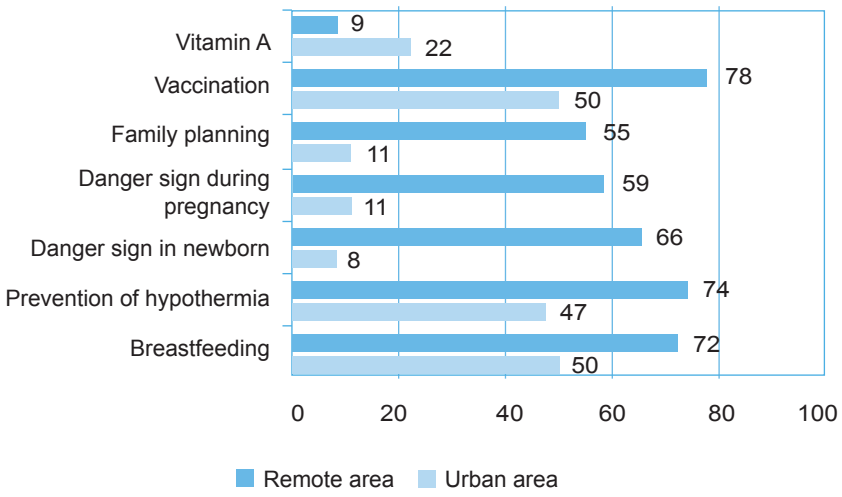
Collected some money when delivery time approached. Asked lama. As he suggested nothing to prepare, so we did not prepare.

Mothers from countryside

Clients' counselling

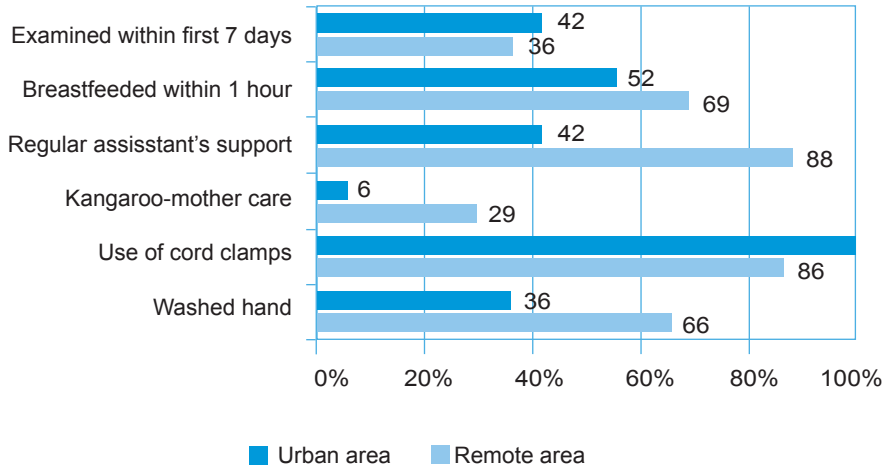
Counselling provided to pregnant women and mothers was better in rural areas than in urban areas. Counselling about immunization, prevention of hypothermia of newborns and breastfeeding were the main topics (Figure 44). Sixty two percent of 36 women interviewed from Ulaanbaatar city said that doctors and nurses did not give any counselling (data not shown).

Figure 44. Counselling for pregnant women and mothers



When delivery services and postpartum care were investigated using selected indicators, all the indicators except the use of cord clamps and newborn examination within the first of week after delivery were higher in the rural than in the urban hospitals (Figure 45).

Figure 45. Care for newborns



During the interviews about care for newborns, it was found out that the understanding about care for newborns was insufficient and it was very much confused with care of children under 1 year old. Mothers did not know much about care for healthy babies and they mentioned some traditional and outdated methods that they were practicing. For example, insert burnt hair into the cord and cleanse with hydrogen perioxide solution. Though mothers were counselled on prevention of hypothermia, they had not heard about skin-to-skin care and kangaroo-mother care.

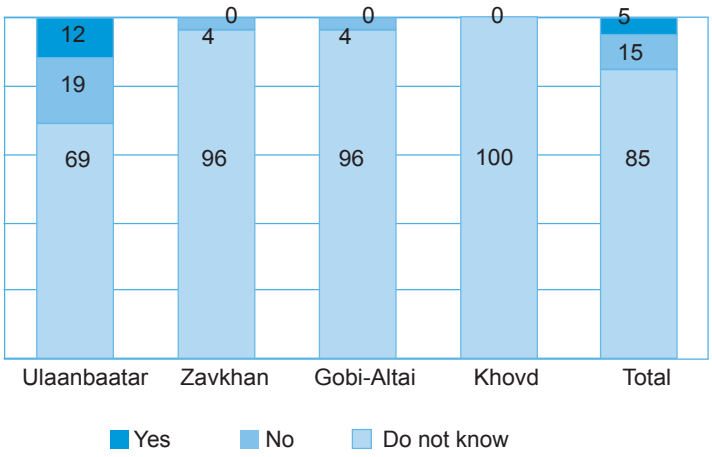
The following comments about newborn care were made by clients:

- Breastfeed the baby whenever the baby wanted, check whether baby can suck, breastfeeding alone should continue till 5-6 months old, and do not breastfeed between 0-6 am
- Give warm water with sugar if a baby has jaundice
- Keep babies warm (home should be warm, put on hat in order not to get cold, feet of the babies should be kept warm)
- Clean cord care (not touching the cord, keeping the cord dry, cleaning it with cooled boiled water, not using tamidine and hydrogen peroxide solution, or inserting burnt hair into the cord)
- Bathe babies everyday (sometimes have bath with tea, soup) and put on fish oil and fat oil to prevent skin to get dry and apply some powder and keep skin clean
- Keep the nose clean
- Let babies go out regularly, but put on hat to protect the openings, raise babies in clean environment
- Swaddling is convenient for babies and dry, many, soft cloths for wrapping are good and swaddle babies frequently
- Immunize babies in accordance with vaccination schedule and be under family doctors' monitoring.

Confidentiality among doctors and health worker that provide maternal and newborn care

Confidentiality is an important aspect of safety and security for the clients. Clients think that health workers are obliged to keep confidentiality because it is one of the ethical issues. Ten percent of the total 134 responses on confidentiality from individual interviews and focus group discussions said keeping confidentiality was poor, 85% said good and 5% answered "do not know". Clients' views about confidentiality at different sites are shown in Figure 46.

Figure 46. Clients' views about confidentiality kept by doctors and health workers



The responses about poor confidentiality could be summarized as follows:

- No confidentiality possible in soum hospitals because everyone knew each other
- Poor confidentiality when being examined by doctors as people and health workers disturbed a lot by coming in and going out of the examination room
- Some nurses and doctors discussed some cases in presence of other people which showed poor confidentiality, in particular, people heard when mid level personnel openly discussed different cases
- Health workers said "your baby will be sick because you are sick" in the presence of many other people
- Due to poor confidentiality there were a lot rumours.

The responses on good confidentiality can be summarized as follows:

- Confidentiality was good, everyone maintained confidentiality and information was not easily spread
- Thought that confidentiality was OK, but sometimes nurses and midwives discussed some cases with each other
- Usually had a private discussion with other people
- Did not hear anything, no information, so I thought that confidentiality was good
- Thought that health worker kept confidentiality
- Perhaps health workers kept confidentiality well, never heard that health workers did not keep confidentiality as it was on of their ethical functions
- Confidentiality in hospitals was good. Usually had private consultation with doctors.

Clients' opinions to improve mother and newborn care

Opinions of participants involved in the focus group discussions and individual interviews, to improve mother and newborn care mainly pointed to improving doctor's responsibilities, communication and attitude of health workers; training and enriching the experiences of health personnel; increasing the supply of equipment and medicines; and improving training and advocacy.

Summary of opinions:

- Improving the open communication skills of health care workers with clients, training them how to provide ethically consistent counselling, improving soum health care workers communication skills (not obtained even after studying medicine for 6 years)
- Enabling soum doctors retention at their posts, improving responsibility, providing obstetric services at soum hospital; filling vacancies as there was lack of bagh feldshers, improving bagh

feldsher's responsibility because when they worked long hours then they very rarely did routine check-ups unless they were not on call. It would be better if they did routine examinations more frequently and helped to diagnose diseases earlier, did good routine preventive check-ups for designated households, and improved their training related to it; increasing Family doctors responsibility, improving their knowledge about treating newborns since they did not know this well, doctors visited rarely after the baby was born, only nurses visited them, it was preferable that doctors should examine by him//herself; there was a lack of neonatologists at the family clinics

- At soum, it was hard to get info about when mothers were giving birth and only assistant nurses could provide this information
- Utilizing the many newly arrived equipment and instruments, training and preparing the personnel who would operate them or inviting doctors for training and improving the skills and knowledge of the resident doctor and workers.

Clients opinions and suggestions for increase and renovate equipment, instruments:

- Supply ambulance car, one car was not sufficient to bring pregnant mother from bagh in cases of many calls or a long distance call, keep hospital building warm, it was advisable to have incubator for premature newborns, apparatus for oxygen
- Springs of the bed for mother were stretched and mattresses were in a bad condition; unable to to have a bath at the maternity ward
- Need to add to the number of beds; many people on waiting list; because of budget limitation soum hospital poorly equipped. Thus equipments and instruments should be improved, increased supply of list of new rare and essential drugs and petrol for the ambulance car
- During admission the treatment was interrupted for 2-3 days, thus had to buy drugs many times, possible reasons were tendering, would come at the end of this year; need to increase state budget; it was pleasant when there was no charge for treatment and expense required at soum hospital. It was costly to go to aimag, city as fees were required
- Improved ambulance car and communication (number for emergency calls have changed, after many calls a new number was found, to update new number to directory service). To make maternal rest home comfortable, it was cold from July and would need heating, thus additional heating was required
- Conduct sessions with pregnant mothers at soum to determine if there was a, tendency towards an increase in premature births, to study reasons for weak term babies and to establish why ectopic pregnancy was increasing.
- Consider the fact of the inconsistency of having taken all laboratory testing and incompleteness of treatment, and family members were not allowed to enter
- Improve training and advocacy for bagh feldshers, to provide counselling on how to breast feed and bathe babies to mothers, to disseminate paper materials on counselling topics , especially to provide enough information to young people

At city hospital levels, the practice of sending mothers who want to be admitted back to their homes, was common and 88.2 percent of 34 respondents who participated in discussions with midwives and nurses answered that many mothers returned home frequently. In their opinions, main reasons for sending mothers back to their homes were the shortage of beds, not being resident in the catchment area; mothers lacked knowledge about danger signs; did not have laboratory testing done, and did not know anyone at hospital. This explained the reasons for sending clients back home. This also added coordinating the occupancy of the beds and making space for new clients/patients to staff's basic work load.

Conclusions

Based on our findings from personal interviews and FGDs related to activities of hospitals, and the health workers, the following conclusions were made: doctor and medical workers' counselling related to mother and newborn health to parturient mothers was insufficient in city when compared with the counselling provided in rural areas.

- In aimags where the survey was conducted, more attention was paid to care of pregnancy and during labor; while post natal services were not sufficient.
- At some point, clients felt restricted in that ability to discuss freely and get counselling during a doctor's examination.
- As medical facilities provided services to clients in their catchment areas and soum has only one doctor, clients had a limited choice of service providers.
- It was noticed that there was significant discrimination because of social class and groups.
- Some clients complained about drug supply; poor communication skills of doctors, and staff; perceptions that doctors lacked responsibility. Such evidence showed that some clients were still look for satisfying and equally accessible services.
- There were a few cases of active follow-up visits of newborn during the first week in a primary health care setting. This contributed to not identifying ill newborns earlier thus preventing the occurrence of complications.
- In comparison with rural areas, doctor and health workers' counselling on danger signs of newborn, post natal hygiene, family planning and newborn care for parturient mothers and public were poor in the city facilities.
- Health Education on mother and child health related topics for pregnant, parturient mothers were irregular at the sites that were selected for this evaluation, especially at the city sites.
- Mother and child health related information that should be delivered to public and mothers rarely covered issues of danger signs of newborns and when the newborn should be taken to which hospital.
- Use of materials distributed, advocacy papers, and displays was not sufficient or adequate for helth education and interventions for mother and child health.

OTHER ISSUES OF EmOC AND ENC

During the assessment, we also interviewed doctors and other health staff (managers, ObGyns, doctors on duty for delivery, midwives, neonatologists, anesthesiologists, nurses and assistant workers) and discussed issues and problems in the provision of EmOC and ENC, the main delays affecting the detection and treatment of maternal and infant complications and sought their opinions on how to improve the quality of care. From these discussions, the issues and problems that emerged were very similar in urban and rural settings (Table 106). Please refer to Human resource chapter for issues related to lack of human resources.

Table 106. Issues and problems in provision of EmOC and ENC (as reported by doctors)

UB city	Rural areas
▪ Lack of equipment, insufficient number of beds, incompatibility between donated equipment and spare parts, major lack of equipment and instruments for infant care, lack of surgical instruments for obstetric care, insufficient drying cloths and clothes for newborns ▪ Had to ask families to bring some medicines and devices including antibiotics, flexible needles etc especially during the end of month, quarter and year due to insufficient or poorly managed budget ▪ Early Discharge from maternity home after delivery makes it impossible to monitor neonatal jaundice and vaccines have to be administered all at once. ▪ Limited opportunities for doctors and nurses to upgrade their professional competencies negatively affects their work performance and was one of the reasons contributing to these delayed responses to clients ▪ Lack of incubators and tables with radiant heater so in some places used a self-made table with a light heater ▪ Women who need to be admitted were rejected due to lack of beds. Unregistered and non-insured clients were difficult to manage ▪ There was only 1 patient monitor and s/he must work between operation and delivery rooms. Low salary, financial deficit due to increased price of commodities ▪ Had to ask pregnant women for payments for additional lab tests, last year subsidized 840 000 tugrugs from state budget for the clients' inability to pay. Even though legally, pregnant women are to be treated and cared for free of charge, in practice they are always asked to pay for some additional examinations for example 15,000 tugs for EKG, 8,000 tugs for X ray etc ▪ Emergency care: There was no ambulance equipped with respiratory balloons, infant laryngoscope and others, so difficult to carry infant born at home to maternity home. Roads were poorly managed and organized with a lot of traffic, poor identification of addresses had seriously affected the provision of ambulance care. Poor communication between hospitals and excessive bureaucracy.	▪ People did not like to come to maternity rest home many days before delivery ▪ Inadequate health education among population, RH planning was not enough, insufficient supply of contraceptives ▪ Widespread inappropriate attitudes among adolescents with increased tendency to self medication and coming very late for treatment and attention ▪ Having a child was becoming one of the ways of obtaining a livelihood as one got welfare benefits ▪ Although it was less, domestic violence still existed. How does this affect EmOC and ENC? ▪ Inadequate routine maintenance of equipments, lack of availability of infant resuscitation equipment ▪ Lack of human resources, no specialized nurses for infant care ▪ Natural disasters like a zud ▪ Funding deficits ▪ Political discrimination of doctors still exists in rural areas. Key issue: Does the system discriminate against doctors and do doctors discriminate among their patients? ▪ Facilities are cold during winter ▪ Inadequate number and quality of delivery beds and rooms ▪ There was no room after delivery especially equipped to care of mother and child ▪ There was no ambulance car equipped for remote emergency calls and petrol was extremely limited ▪ No electricity

Issues and problems identified during interviews with midwives and nurses

This section includes issues and problems in the provisions of EmOC and ENC stated by midwives and nurses working in urban and rural hospitals during their interviews. The issues and problems are grouped as the following.

About suppies: Lack of equipment, inadequate supply of medicines and injections and always requiring for these to be purchased from outside of hospital during the end and beginning of the month.

Shortage of syringes PUMP and Oxygen tubes; disposable suction catheters are always insufficient, gastric tube (small size), thermometer and neonatal sheets and blankets which are imported from outside are often in short supply. Example: Facility did not have neonatal suction catheter, also unsuitable sizes and shortages of basic equipment. According to the guidelines, newborns should be transported with oxygen but there was a shortage of oxygen containers. Due to the absence of central line oxygen, only one balloon oxygen was available for 4-5 infants.

About health facility: Difficult to refer infant with birth defects. When a child with severe complications was referred after 5 days, it required 10-12 days waiting because of the unavailability of beds in the MCHRC. Only emergency surgical cases were admitted.

ANC doctors referred all women to hospital and some of these referrals were not necessary to be hospitalized and this caused additional burden on people. Due to lack of beds some women hadto be rejected for admission and some had to be regulated. It required good communication skills dealing with different variety of characters. Although there was a high workload, health staff tried to provide all required services. It was really difficult that 1 nurse was expected to provide services for 30 female clients. Sometimes the increased workload was due to shortage of assistant workers. One nurse worked on infant duty and it affected the workload. Health staff had to explain this to clients but regulation still remained difficult.

Few respondents replied that there were no problems and that they had been adequately taught to perform all procedures.

Hospital staff's comments on improving quality of care

All comments and suggestions that were given by managers, doctors, midwives and nurses on improving EMOC and ENC are collated and presented as follows.

Managers: Comments and suggestions from rural and urban managers were similar and thus comments are divided by rural and urban locations.

Managers of rural hospitals: If the capacity of units is increased and human resources improved, then they can conduct deliveries at their facilities. An inter-soum hospital would be the closest to clients to conduct deliveries. Specialists did not work in rural settings. People working in the rural areas had few incentives, as workload was high, salary was low and emotional satisfaction was poor in the rural areas. For communities, it was vital to sensitize them health is important and to focus more on their rights. Family or children's remittances were becoming the main source of livelihoods.

Managers of urban hospitals: Although, there were lot of IEC materials, these needed to focus more on infant care and to improve citizens' and society's involvement in the provision of infant care, to improve health education in the schools in order to educate individuals and community. Also there was a need to improve laboratory capacity, improve equipments, to provide ultrasound with Doppler and to establish maternity rest homes in the urban maternity homes. Moreover, there was a need to teach doctors more about obstetrics and improve capacity of FGP and provide more specialized doctors.

Doctors: Comments given by respondents on improving the work are grouped and listed below.

Rural doctors: To conduct ongoing training, share experiences, increase number of beds and funding, increase provision of instruments and equipment for infant care, increase human resources especially

doctors and nurses to care for infants, keep rooms warm, improve soum hospitals' ANC, provide with electricity and have normal deliveries at soum hospitals.

Urban doctors: To have more trainings, increase human resources, coordinate workload and salary, upgrade equipment, uninterruptedly supply medicines, medical devices and injections, to establish a new maternity home, increase the number of doctors and nurses for caring for infants, to have more qualified lab equipments and implement team work approach in real terms.

Midwives and nurses: To improve supply of equipment and instruments, to pay more attention to human resources policy, improve quality of training, provide more counselling to pregnant women and mothers, upgrade doctors skills and knowledge, improve the supply of medicine and injections, decrease workload, resolve issues of referring infants with birth defects, improve the ethics of doctors, eliminate overlaps of duties and responsibilities and allow professionals to work in their professional areas.

Infant and maternal complications and factors affecting to mortalities

WHO defines the factors that act as barriers to the provision of infant and maternal care and that lead to maternal and infant morbidity and mortality as "delays". Removing these delays will improve quality of care. During the interviews with managers, doctors, nurses and communities, their views about the 3 types of "delays" were assessed and are presented below.

Table 107. Reasons for the delays affecting infant and maternal morbidities and mortalities (managers)

Type 1 Delays	Type 2 Delays	Type 3 Delays
▪ One mother did not see hospital for 14 days, had an excess oedema, broke the door to get out of her home, partner was not paying attention, did not go to maternity rest home upon advice of FGP ▪ Pregnant woman living in underground shelter had excessive vaginal bleeding, placenta was removed and she had a stillbirth. ▪ Uneducated and poor women had more complications. ▪ There were many pregnant women with no civil documents and were not able to access the hospital ▪ Some women did not know the expected date of delivery ▪ One woman came from hotel and had an ectopic pregnancy and seizure. ▪ Most of home deliveries were in women with less education and were from poor households. ▪ Pregnant women who attended ANC during the later stage of their pregnancy had more complications ▪ Nowadays increasing number of women take some Chinese pills and get infection ▪ Herdswomen have more complications due to attending ANC in later stages of their pregnancies	▪ Woman living in underground shelter wanted to stay in hospital as long as they could because they had no place to go ▪ Hospital workers bought clothes and gave to poor women ▪ Women with no mobile phones tended to deliver at home ▪ Homeless and non-catchment area resident pregnant women went late to hospitals ▪ Pregnant women refused to go referral hospitals because of lack of money	▪ Misused misoprostol and had uterine rupture and died ▪ Intestines were damaged during Cesarean section ▪ Hysterectomy was not done as waited for specialist from the city ▪ Complications were more likely to occur when doctor had not done a complete evaluation of mother and did not fully follow approved procedures ▪ Insufficient skills to manage breech presentations led to fetal complications

Rural doctors assumed that the type 1 delay occurred due to poor financial status, no coverage by ANC, late attendance to hospital irrespective of knowing danger signs of pregnancy, lack of conscious recognition of the pregnancy by the women, Kazakh customs, hiding pregnancy from families and doctors. 2/3 of all respondents said the type 2 delay caused complications. Half of them thought that there were no type 2 delays, 1/3 mentioned some examples of the type 3 delay, and 1/4 named complications that resulted from these type 3 delays. Most of them considered that these type 3 delays happened due to lack of knowledge and inexperience of doctors, inadequate quality of care, insufficient supply of equipment and doctors.

For urban doctors, 55% of all respondents named cases of these types of delays and 27% of them named cases due to type 2 delays. Frequent named type 2 delays were traffic jam, remote living, unclear addresses contributing to increase of home deliveries and risks to mother and infant. Main causes of type 3 delays were lack of doctors' knowledge and experiences, poor quality of doctor's examination, irresponsibility of doctors and nurses, overwork due to excessive work load, inadequate supply of equipment, care provided that was not evidence based.

Responses of midwives and nurses of UB city hospitals summarized below in table 108.

Table 108. Responses of midwives and nurses of UB city hospitals on delays

	Delays did have a place	No delays	Do not know
Type 1 Delays	27	2	6
Type 2 Delays	19	4	11
Type 3 Delays	22	7	5

Examples given by respondents are summarised in the following boxes:

Type 1 Delays

Box 20

Pregnant woman with TB died in last year due to delivery complication resulting from her carelessness and poor ANC. There were many cases of stillbirths. Many cases of complications came with edema.

During night duty, a nurse indentified an infant with cyanosis and called the doctor and took the necessary actions but the baby died due to delayed care. The mother was not aware of the problem and did not seek help even though she had given birth many times. Some mothers did not recognize their infants' high temperature. Also some of them were slow to learn to care for their breasts and infant's umbilicus despite frequent teaching.

Some cases of birth complications and home deliveries occured because family members had a lack of knowledge.

Some pregnant women had complications because of unawareness of symptoms of pregnancy, chronic conditions and had a fever that continued for many days. Some did not recognize symptoms of ectopic pregnancy and lost time. One pregnant woman stayed at home and took care of her two children even though she had eclampsia.

Caledl emergency very late and the addresses given were unclear. Some had difficult life conditions. Ger sub-districts of Bayanzurkh district have no addresses.

Some pregnant women were careless about themselves and family members had a lack of knowledge and have bad ethical and moral communications.

Medical personnel

Type 2 Delays

Box 21

There was a case of delivery on the way to hospital because of being stuck in a traffic jam. Delays can occur resulting from traffic. Few home deliveries occurred due to absence of any phone. People in ger (Mongolian traditional yurt) districts had unclear addresses and experienced delays in obtaining ambulance services. Ambulance had a lack of vehicles and insufficient supply of petrol which also contributed to complications. One woman had a seizure on the way to bus stop as she had no money to use other transportation.

Medical personnel

Type 3 Delays

Box 22

There is a lack of knowledge of doctors. In last year, pregnant women had used misoprostol and had bleeding but doctor made an improper assessment that she had eclamptic shock. One woman had excessive vaginal bleeding and this was not diagnosed as rupture of uterus before starting the cesarean section.

There were repeated surgeries due to lack of doctor's skills and non-compliance of standards.

There were problems related with doctors, but we do not know. It is a secret how many of repeated surgeries and maternal and infant mortalities occur due to our mistakes.

In last year there were normal twins delivered who died the next morning. Laboratory exam revealed that they had cardiac defects. I am doubtful whether both of them had cardiac defects. Often doctors cover up their mistakes amongst themselves.

When an infant condition become worse, then doctors tended to pay more attention to prevent the occurrence of diagnostic discrepancies and made notes in the patient records. There were many mothers who complained about treatments done in the hospital when their infants died or become worse after hospital discharge. The Infant division after cesarean section was cold and there was no table with a heating system. There were frequent cases of burns on infant feet during the procedures of heating using bottles with hot water by nurses.

In 2002, I had a delivery. That day was celebration of one holiday. I had late care due to difficulty in finding a doctor and ended up with surgery. I was admitted in hospital the previous night and had a cesarean section the next morning. It was clear how they approach the needs of ordinary people. Even though they were colleagues of mine, I still had to experience such delays in getting treatment.

Delays of care occured due to insufficient supply of medicines and injections. Woman in her third delivery had obstructed placenta and had bleeding and died due to non availability of blood.

Medical personnel

We have also collated community's views and thoughts about delays.

Type 1 Delays

Box 23

There were cases of complications and home deliveries due to unawareness of the leakage of amniotic fluid.

Unawareness of late pregnancy complications.

Complications due to self treatment.

People did not know whom to approach when they were sick because of low health education, being uninformed, lack of knowledge, and unawareness of symptoms of disease. IEC materials were less accessible and were not widely distributed and mostly kept in doctors' rooms.

Some families living in remote districts had geographical related access difficulties.

People in rural areas were too lazy and sometimes refused to come to hospital. Some goods were expensive including swaddling cloth. 70% of families were poor in our soum.

Community members

Type 2 Delays

Box 24

There were delays when there was no mobile phone. Now it is becoming less of a problem

During disasters, some elder people had late medical care. Have not heard about delays with pregnant women.

In rural area sometimes we had to find transportations ourselves or to pay for it.

Few cars, road obstacles and remoteness of location required additional time to reach the client.

Emergency care 103 comes late when there is traffic.

Delays occurred because people with lower income levels had financial difficulties and were not ready to reach the doctor.

Ambulances had poor maintenance and lost time to reach the client. Sometimes during the night they did not have petrol and asked people to come to the hospital on their own.

Sometimes maternity rest home of aimag hospital was crowded and it was difficult to stay.

Community members

Type 3 Delays

Box 25

Soum has one doctor and if she was on remote emergency duty then there would be a delay.

When I came to hospital they put an enema in me and left. During their absence I went to bathroom and my baby's head came out and I gave birth on the way to delivery bed. Baby was treated in incubator for 2 days.

Doctor told me that delivery would be late and then later on I had a stillbirth.

When I came to the maternity home they said I was not ready and sent me back to home and there I gave birth and had a complication.

Delays occurred when diagnosis was wrong. Example: delays occurred with different diagnoses such as ectopic pregnancy, appendicitis and abdominal obstruction.

Doctors and medical workers helped as much as they can. But sometimes they could not help enough. One of my relative's initial diagnosis was wrong and had complication and surgery.

I had to wait 2 hours because there were no beds available.

Community members

Box 26

Had birth at home, 60 km from soum hospital, started pain 10 am morning, husband was away for animal husbandry, at home was with my 3 children /10 yrs, 6 yrs, 3 yrs/, man of neighbour family knew and called my husband and he came around 4-5 pm and went out back to find a vehicle, meanwhile I had given birth at 6.30 pm at home and could not wait for an ambulance car. Cut umbilicus with scissors by myself and tied it with sewing string. Placenta came out by itself, baby was 3 kg. 2-3 days ago soum doctor and midwife had an examination and told me to wait, so I did not expect them to come. Next morning soum doctor came by car.

Mother given birth at home (in rural setting)

Changes in the EmOC and ENC practices

Two out of five doctors based in city responded that EmOC and ENC have improved during the last 5 years. Improved aspects were: supply of equipment increased, decreased maternal mortality, first contact infant medical care improved in terms of its quality, warming technique for infant introduced (newborn hat, wrapping with warm cloth), provided laryngoscopic and intubation tubes, improved knowledge of doctors, introduced new methods for infant with asphyxia by using intubation and other resuscitation methods instead of relying on medicines and injections. Factors for improvement were the provision and supply of instruments and equipment improved including respiratory ambu, oxygen sack, pump-syringe etc. If there were no basic equipment, medical staff cannot do anything even with sufficient knowledge. Two doctors thought that there had been no improvement; despite new equipment as the practices remained the same.

Respondents from urban setting, especially midwives and nurses, reported some improvements including the working environment, equipment supply and training coverage. Clients were happy that all windows were replaced by vacuum windows and all beds were changed. Also primary medical care became more prompt, cabinet for cardio-vascular diseases was established and a paediatrician worked for 24 hours, team work approach during the delivery were considered to be positive changes.

The supply of equipment, the provision of incubators, warming blankets and sheets, oxygen table, oxygen concentrator, suction apparatus, narcosis apparatus, phototherapy apparatus and utilization of pump syringes, using disposable forceps for umbilicus and use of flexible needle in the therapy were considered to be most progressive.

Moreover trainings became more effective, all midwives were trained, new methods such as using warming hat for infants, suckling infants directly or within 24 hours were introduced quickly. Also cases of pregnancy complications and eclampsia decreased.

From above, it can be concluded that positive changes were:

- Improved supply of instruments and equipment
- Comfort and environment of facility improved
- Provision of primary medical care became more prompt
- Reduction in pregnancy related complications
- Improved supply of medicines in different dosage forms
- Improved infant care.

Negative or unchanged things:

- Human resources were not keeping up with the increased birth rate. Workloads had increased. In 1991, there were 2 midwives who worked in the delivery room when the birth rate was low but now in 2009 there are still only 2 midwives and yet the birth rate increased significantly.
- No instruments and utilities for use for home delivery.

CHAPTER 4. DISCUSSION

The UN lists a number of signal functions (or life-saving services) that can be grouped into a basic set and another group with basic plus additional signal functions (i.e., comprehensive or a complete set of signal functions) It is the performance of the services in the last 3 months that confers a status on the health facility. Each country is required to move as many services as is possible nearer the people (PHC principle). So, basic signal functions to be made available at health center level and comprehensive at hospital level. In view of these are recommendations, emergency obstetric basic care is delivered at soum hospitals and comprehensive emergency obstetric care is delivered at district and local general hospitals, maternal homes in Ulaanbaatar and MCHRC. Therefore these facilities were covered by the assessment.

The UN Indicators for Emergency obstetric care indicated that there was a need for one comprehensive and 4 basic emergency obstetric care facilities for a population of 500,000. In our assessment, at the soum level, a basic obstetric care facility served a population that ranged from 1550 to 6040 and at aimag level, a comprehensive emergency obstetric care facility delivered services for a population of 60-80 thousand within their catchment area. The number of basic and comprehensive EmOC facilities exceeded the minimum acceptable levels put forward by these indicators.

However, it is a unique feature of Mongolia that there are long distances and it takes time to deliver emergency care to remotely located aimags and soums in a wide territory. For example, if emergency care is supposed to be given within 2 hours, it would be quite challenging to have greater accessibility to EmOC because 58.3% (7) of selected soums in the assessment are located 120 km away from aimag center.

During the implementation of the strategy to reduce maternal mortality, a referral policy to ensure skilled birth attendance and 24 hour availability of comprehensive emergency obstetric care was implemented for high risk pregnant mothers and pregnant women with complications. However, 75% of total pregnant women were from remote areas and 25% of total pregnant women from soums close to aimag centres gave birth at soum hospitals. Therefore, it was essential to focus more on remote soum hospitals far from comprehensive emergency obstetric care.

The referral guidelines of pregnant women at high risk or with complications to comprehensive EmOC facilities are implemented in accordance with maternal mortality reduction strategy. However, 75% of women in remote soums are still delivering at local hospitals compared to 25% in soums located near aimag centers. Therefore, it is important to improve equipment and supply for remote soum hospitals, as well as the skills and knowledge of their staff to deliver EmOC.

The number of women delivering at soum hospitals and, thus, the number of emergency cases decreased due to the implementation of the referral guidelines. Replacing the assisted vaginal delivery in some cases by Cesarian section may have also lead to diminished use of forceps and vacuum at secondary and tertiary level hospitals. In addition, the Cesarian section rates are high compared to recommended levels by UN organizations (Ulaanbaatar 26%, Khovd aimag 26%, Zavkhan aimag 19%).There are many challenges that affect provision of quality EmOC and ENC such as most of soum hospitals (first contact facilities) do not have 24/7 electric power. Although hospitals receive water from improved wells, its transportation is still difficult, and there is still inappropriate heating system. It is not a secret that basic hygiene and sanitation conditions for newly delivered mothers and health care workers are poor because of the facts such as improper water treatment systems, some facilities had no regular waste water sewage system and still used pit latrines.

All of the hospitals had been supplied with vehicles to provide EmOC, however some common problems were observed like lack of funding for repair, maintenance and fuel. It is an advantage to provide timely maternal and newborn care, so all hospitals now use mobile phones for communication.

The Joint Ministerial order of Health and Environment of 2002, N249/201 has not been implemented. For instance, the assessment found that medical waste (ex placenta) was given to a women's family members. Health care workers were not following health care waste safety guidelines (no covers of

waste containers of maternity homes in the city) which indicated possible infection to them and risk of spread of infection inside the hospital.

Since 2001, several training events have been conducted nationwide on the implementation of clinical standards and guidelines on emergency obstetric care and management of complications during pregnancy and delivery. As per the guidelines, new methods like active management of the third stage of labour, oxytocin administration and injection of anti-convulsants were incorporated. Since 2005, training on manual vacuum aspiration was also started. The use of MVA at different hospitals varied and all health professionals were not yet been trained. Knowledge among health professionals also varied considerably, steps of procedures were not been properly applied though they were saying that they were implementing the guidelines. Especially, knowledge of other professionals was not sufficient. At the soum level, due to less number of deliveries, some procedures could not be done and this led to a deterioration of the technical skills of the professionals.

In order to actively manage the third stage of labour, sometimes vacuum extraction and obstetric forceps have to be used. However, most hospitals covered by the assessment had no equipment, staff were not trained, or had not practiced. It is essential to have equipment and practice to improve knowledge and capacity of health professionals working at different levels on components of emergency obstetric basic care and blood transfusion issues.

There is an ongoing need to upgrade knowledge and skills of health professionals and to ensure supply of medicine since the need to deliver EmOC on call is still very high. Especially at soum level, medicines and equipment for EmOC were not sufficient which made it difficult to provide care. It was important to prepare admission rooms with efficient services at all hospitals with obstetric care and to provide effective communication between ambulance doctors and maternity homes, so that care could be provided in a timely manner.

Currently, printed copies of clinical standards and guidelines were already not sufficient in number which affected the quality of care and should be taken into consideration.

It is important to implement clinical standards and guidelines consistently in order to prevent complications and to reduce morbidity and mortality of newborns. According to the WHO recommendation, the first training on essential newborn care was conducted in 2001 in Mongolia. Since 2003, the programme has begun functioning and from 2008, the Ministerial order #02 for improving essential newborn care was issued. As result of those activities, ENC and clinical guidelines were implemented and health professionals have actively participated in trainings. However, in order to reduce morbidity and mortality of newborns, it is essential to prepare delivery rooms and ensure the supply of essential drugs, implement clinical guidelines and improve the capacity and skills of the health professionals.

The key principles of ENC that includes maintaining the thermo-chain (keep the delivery room warm, put on hat, skin-to-skin contact between mother and newborn, etc.), clean hands (hand washing, changing gloves, est.), and the prevention of eye infection could not be implemented at hospitals that provided obstetric care and the clinical care guidelines were not implemented accordingly. These factors affected and increased the number of complications and increased morbidity and mortality among newborns. It should also be considered that insufficient implementation of clinical care guidelines was due to the increased number of deliveries and higher workload, especially in Ulaanbaatar city as explained by health professionals.

Some of the challenges of ENC were due to lack of understanding and support from hospital managers and lack of funding. For instance, sometimes managers did not purchase some of the items of the ENC kit, no supply of heating tables, newborn monitoring apparatus, incubators and it was also difficult to organise training.

Knowledge about resuscitation of newborns was inadequate among other doctors and health professionals who provided EmOC. It was also challenging to provide care as a team in emergency cases. It demonstrated that there was no training system that has been set up and also knowledge and skills of doctors and health professionals providing care in the delivery rooms needed to be upgraded on a regular basis.

Supply of necessary medicine and equipment for EmOC and ENC was insufficient as was the preparedness for delivering care, in hospitals covered by the assessment. For instance, the temperature of the delivery room was found to be lower than the standard level (11^0C in some hospitals) and soum hospitals had no table with heating.

It is important to ensure complete obstetric kits in soum hospitals where there were few deliveries. Essential items in operating theatre were missing: wall clocks, thermometers, scissors, spinal needles, and patient monitors. The supply of essential medicines for EmOC and ENC was mostly adequate at hospitals of different levels. But there was a shortage of some essential drugs like hydralizin, erythromycin, misoprostol, and naloksin. None of the hospitals covered by the assessment had hydralizin which made it very difficult to reduce blood pressure during pre-eclampsia and eclampsia. As mentioned above, there was a lack of supply of medicines and medical devices, human resources and funding and hospitals usually asked family members to buy drugs for uterine contraction, surgical sutures and flexible needles. At the same time, it demonstrated that hospitals were not fully prepared to provide EmOC and ENC. It should be n oted that hospitals were most likely to ask family members to purchase necessary drugs and medical devices, especially in the beginning and at the end of the financial month and year.

The lack of essential lab equipment observed at soum hospitals and maternity homes could lead to the deterioration of diagnostic capacity. Notably the supply of screening tests for HIV, Hepatits, Syphilis, and hemoglobin were sufficient in the selected aimag and soum hospitals when compared with the hospitals in Ulaanbaatar city. This could be attributed to programmes and activities that were carried out by international partners. Supply of blood and blood products was normal in Ulaanbaatar city. However, it was difficult to provide care during bleeding in some hospitals due to the lack of blood typing tests and serum.

The following factors also prevented the delivery of EmOC and ENC: frequent turnover of hospital managers, inadequate knowledge of medical personnel, health professionals insufficiently trained in clinical guidelines and logistics management of drug supply and lack of financial and human resources. The frequent staff turnover, workload of the staff, lack of team work and lack of knowledge and skills of medical personnel significantly affected the practice of the delivery of EmOC and ENC when compared with the approved clinical care guidelines. The Governmental support, such as additional incentives, professional ranks, housing and food supply to health professionals working in remote places has to be maintained and continued. However, there were many complaints about the amount of salary paid to health workers.

In Mongolia, maternal and child care is fully subsidized by the Government. Nevertheless, article #35.2 of Health law, was violated because mothers were asked to pay fees when they bypass the referral chain, for ANC registration, and ultrasound diagnosis. It was also revealed during the assessment that health professionals had limited opportunity to give information and counselling about maternal and child health and to openly talk to the clients even though they tried to provide information to clients. Carrying out IEC activities and counselling on issues related to maternal and newborn health, by health care workers for mothers and public were insufficient in urban areas when compared with the rural areas.

In rural areas, attendance by trained personnel during labour and counselling and clients' satisfaction was higher than in urban areas. But, in urban areas, bringing medicines and medical devices from home and family members and other extra payments were higher than in the rural areas. This last sentence is unclear, but it showed the differences in the service delivery patterns in urban and rural areas. Most of the mothers were not familiar with providing care for newborns and they mentioned about traditional or outdated practices like putting burnt hair into the cord and the use of hydrogen peroxide solution. In addition, many mothers were not aware of skin-to-skin contact (kangaroo-mother care). Perhaps, it indicated a lack of health education and counselling for mothers. In urban hospitals, due to lack of number of beds, bypassing the referral system, lack of awareness about danger signs, unnecessary admissions and lack of lab tests, pregnant mothers were often sent home when they came to the hospitals for admission. Having to explain why the hospital failed to admit a woman and sending her home, and having to arrange for beds were just two tasks that added to the normal workload of health personnel.

CHAPTER 5. RECOMMENDATIONS

The following recommendations were developed on the basis of the assessment findings on emergency obstetric care and essential newborn care at hospitals.

At decision-making level:

- Increase the supply of human resources of doctors, midwives and nurses who provide care for mothers and infants in hospitals in response to the increased number of deliveries and workload
- Legally regulate the existing fee for service in maternal and newborn care needs and introduce health insurance scheme to cover maternal and child care
- Provide a sufficient number of health professionals and enable the readiness of equipment according to the Order #02 of the Minister for Health on “Improving quality of newborn care” dated 4 January 2008
- Add doctors of internal medicine into the given number of personnel of hospitals that provide obstetric care in order to improve care for mothers with non-obstetric pathologies using a team approach
- Review and revise, on a regular basis the clinical and performance standards for hospitals that provide obstetric care and clinical guidelines taking into account the latest evidence and international standards available
- Provide training for managers on management, clinical guidelines and supply of drugs and medical devices of EmOC and ENC
- Include EmOC and ENC into the training curricula of all medical schools at each level and for all cadre of workers which would enable graduates to be equipped with the required knowledge and skills
- Supply and maintain the necessary equipment including manual vacuum aspiration, vacuum extractors and obstetric forceps to all hospitals at every level that provide obstetric care
- Supply and maintain the necessary equipment and instruments for ENC (incubator, heating table, aspiration equipment, ventilation bag and mask, etc.) to the all hospitals at every levels that provide obstetric care
- Ensure uninterrupted Supply of essential reagents and tests for diagnostic investigations and lab equipments to health facilities that provide for maternal and newborn care
- Revise the renumeration and incentive system for doctors and health professionals, especially of those working in the field of obstetrics.

Hospitals at all levels:

- Ensure readiness for EmOC and ENC at all hospitals through “Room-to-room” approach (admission room, delivery room, operating theatre) and revise the list of necessary drugs and equipment and ensure their uninterrupted supply
- Prepare hospitals at different levels to test for blood types and rhesus factor in pregnant mothers during early ANC visits and make hospitals ready for blood transfusion as and when necessary
- Improve the knowledge and capacity of health professionals about basic emergency obstetric care, ENC and blood transfusion and reinforce the implementation of the approved clinical and practice standards and guidelines at all levels of service delivery
- Arrange one-way flow of activities at the sterilization section to receive infected instruments, and then properly wash, disinfect, sterilize, store and distribute back to prevent cross infection
- Stop asking family members to bring necessary medicines and medical devices and include those specifically in the list of supplies for hospitals and maternity homes
- Develop short- and long-term training plan on EmOC and ENC and organize refresher, on-the-job and practice training for doctors and health professionals based on institutional needs and allocate budget for training
- Conduct training on EmOC for health professionals at hospitals where obstetric care is provided, in particular, ObGyns need to be trained on defining the level of hemoglobin, pressing the uterus

with both hands, repair of uterine, cervical and perineal tears of 3rd and 4th grade, vacuum extraction and manual vacuum aspiration
- Organize training, on a regular basis, for neonatologists on endotracheal intubation, inserting tube into the cord vessel, inserting stomach tube, counselling on kangaroo-mother care (skin-to-skin care) and detection of anomalies
- Carry out training, on an ongoing basis, for all health professionals that provide maternal and newborn care on neweborn resuscitation and upgrade their skills
- Conduct regular in-service training on EmOC and ENC for health professionals who provide maternal and newborn care on call and enable them to practice the clinical guidelines, and provide necessary equipment, medicine, medical devices and instruments
- Enforce the implementation of maternal and newborn care clinical guidelines at each hospital through strengthening internal monitoring (use of checklists) and criteria based audit.
- Ensure preparedness in the delivery room taking into consideration of the 5 cleanliness principles, thermo-chain, infection prevention and newborn resuscitation
- Supply the necessary equipment and increase funding for the proper management of hospital waste
- Create an enabling environment to encourage doctors and health workers to respect client rights and confidentiality and enable clients to choose their service providers without their being discriminated against for making such a choice by the doctors and health staff thus improving their comfort and satisfaction by increasing their choice of service providers
- Develop and implement a system to enable accessible, responsive and non-discriminative services for clients
- Carry out community health education to support attendance of family members, explaining the services available for the clients and provide open access to full information to mothers about their babies
- Organize regular community and hospital events for delivering information, education, communication interventions on danger signs in pregnant and breastfeeding mothers and newborns at the FGPs, maternity homes, aimag and district general hospitals, and monitor the implementation of these events and community education processes

In the capital city:
- Have a number of fully equipped ambulances that can provide service during home deliveries in Ulaanbaatar city
- Prepare admission rooms with efficient services at all hospitals providing obstetric care and ensure effective communication between ambulance doctors and maternity homes

At soum hospitals and FGPs:
- Make decisions to provide a sustainable supply of electricity, clean water and heat 24 hours 7 days a week at soum hospitals to enable the provision of EmOC and ENC
- Pay particular attention to and undertake organizational measures for supporting selected remote soum hospitals where a number of deliveries are routinely conducted to ensure the provision of comprehensive emergency care for mothers and newborns
- Estimate the cost for equipment maintenance and fuel for delivering maternal and newborn emergency care taking into account local needs and include that estimated costs into the next year's budget
- Set up small scale incinerators at all hospitals in rural areas in a phased manner
- Supply reliable means of communication to soum and bagh hospitals and support their maintenance
- Provide soum and inter-soum hospitals with doctors and midwives who can provide maternal and newborn care and devise a mechanism for health professionals to be retained at these facilities
- Establish a system to enable increased attention that should be provided by the soum hospitals and FGPs during the postpartum period by raising the doctors' involvement in and the frequency of home visits

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ANNEX I. Assessment team members and list of personnel involved in the study

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ANNEX II. Sampling methodology of the study

The EmOC and ENC needs assessment survey is a cross sectional population based survey of health facilities in UB and those of western region of Mongolia. Initially, all the public hospitals providing maternal and child health services in the country were designed to be included into the study. However, due to the budget constraints, a sample survey for stand-alone public health facilities at the capital city and the western region only was conducted.

Hospital sampling

Multi-stage stratified sampling technique was used for the sampling of hospitals that provided obstetric care services.

The large hospitals (based on hospital size, the total number of birth associated to each hospital was accounted for the identification of every hospital), namely maternity homes and MCHRC in Ulaanbaatar, general hospitals of Darkhan-Uul and Orkhon aimags, were selected with probability of 1.0.
Since the obstetric care services were going to be assessed by regions, at the first stage of sampling aimag general hospitals and regional diagnostic and treatment centers were listed by regions and total birth sizes, then representative aimags from each region were selected. Representatives of district general hospitals and rural general hospitals were assumed to be included in the survey. Consequently, sample size of soum and inter-soum hospitals was derived from extracting the total number of district and rural general hospitals from the total sample size.

At the second stage of sampling, soum and inter-soum hospitals were chosen from selected aimags according to their remoteness from respective aimag centers.

Staff sampling

Staff at medical facility was stratified by type, and 1 to 4 of those was randomly selected (depending on the level of a hospital) from each stratum.

Client sampling

The sample size for the client sample was difficult to determine in advance due to the lack of information of client volume. However, according to the recommendation given by the *Sampling manual for facility surveys for population, maternal health, child health and STD programs in developing countries* [4], a sample size with a range of 4 to 15 clients per hospital depending on its' size was agreed as a reasonable target to consider.

Representatives of both current and past clients were considered to be covered: women who had delivered baby within last 12 months and women staying at the hospital (at the moment of conducting the survey), including pregnant women, women in postpartum ward and others. Women were selected randomly for the questioning and women who had delivered baby within last 12 months were selected randomly and interviewed. In addition to these two groups of clients, representatives of public were considered for participation in focus group discussions.

Study Population Parameter

The number of parameters such as maternal mortality rate, infant mortality rate, total number of birth, and remoteness of a soum from associated aimag centers were primarily identified as population parameters for the sampling of hospitals providing obstetric and newborn care services. But only infant mortality rate out of these parameters was selected as a main population parameter for the determination of representative sample size. According to the Mongolian statistical Yearbook 2007, the infant mortality rate of the country was 17.6 per 1000 live births. The number of total births was used for the selection

of aimags from each region, while remoteness of a soum from a respective aimag center was used for the selection of soum hospitals from chosen aimags.

Type of staff and size of hospital, period during which the service would be covered, and size of hospital were considered as main population parameters for staff and client sampling respectively.

Sample Size

Sample Size for Facilities

The representative sample size of hospitals that provide obstetric and essential newborn care services was defined according to the following formula for unrepeated sampling:

$$n = \frac{t^2 p(1-p)N}{Ne^2 + t^2 p(1-p)}$$

where, n is the sample size

t is the level of reliability

p is the infant mortality rate

N is the population size

E is the sampling error

The sampling error of 0.05 percentage points and significance level of 0.05 were set up. Using the formula and the specified information above, the representative sample of hospital size was calculated as 25. Considering the design effect (regarding to the practical experiences of sample survey the coefficient of typical design effect is equal to 2.5), an actual sample size was determined as 62 of medical facilities.

Staff sample size

In order to determine the sample sizes of staff and clients of hospitals, all hospitals were divided into 4 levels in accordance with their annual average birth number and general framework of activities.

For small medical facilities such as soum and inter-soum hospitals, one from each stratum of staff (administrative officers/statisticians, medical doctors, midwives, nurses, and emergency room nurse/operation room cleaner) were randomly interviewed. It was determined to interview 5 persons from each sampled soum and inter-soum hospitals; total sub-sample size was estimated as 215 (43x5).

For the second level hospitals (which were aimag general hospitals, regional diagnostic and treatment centers, rural general hospitals and Ulaanbaatar district general hospitals), an administrative officer/statistician/human resource manager and 2 from each stratum of medical doctors, other medical doctors managing deliveries, anesthesiologist, neonatologist, ambulance service doctor, midwives, nurses, and general admission nurse/operational room cleaner were randomly selected, so an estimated total 221 (13+13x2x8) people were to be surveyed.

For the third level hospitals (Maternity Home no.2 and 3 of Ulaanbaatar), an administrative officer/statistician/human resource manager and 3 from 6 stratums (medical doctors, anesthesiologist/other doctors, neonatologist, midwives, nurses, general admission nurse/operational room cleaner) were chosen; therefore 38 (2+2x3x6) of medical staff were randomly selected.

For the fourth level hospitals (MCHRC and Maternity Home no.1 of Ulaanbaatar), an administrative officer/statistician/human resource manager and 4 from 6 stratums (medical doctors, anesthesiologist/other doctors, neonatologist, midwives, nurses, general admission nurse/operational room cleaner) were chosen; therefore 50 (2+2x4x6) of medical staff were randomly selected.

The total sample size of staff of chosen medical hospitals was 524. Considering 5 percent non-response level, the actual sample size had been increased up to 550.

Client sample size

Questionnaire

For soum/inter-soum medical facilities, 4 clients from each sampled hospitals were questioned, which was 172 (43x4) clients in total. 6 clients from each chosen second level hospitals (overall 78=13x6 respondents), 10 clients from the third level medical facilities (20=2x10 clients) and 15 clients from the fourth level medical facilities (30=2x15) were identified. Thus, total sample size of clients was 300. Considering 5 percent non-response level, the actual sample size had been increased up to 315.

Individual interview

For soum/inter-soum medical facilities, 3 clients from each sampled hospitals were interviewed, which was 129 (43x3) clients in total. 5 clients from each chosen second level hospitals (overall 65=13x5), 8 clients from the third level medical facilities (16=2x8 clients) and 10 clients from the fourth level medical facilities (20=2x10) were interviewed respectively. Thus, total sample size of clients interviewed was 230.

Focus group discussion

For soum/inter-soum medical facilities, 1 focus group - in total 43 (43x1), 1 for each chosen second level hospitals (overall 13=13x1), 2 for each of the third level medical facilities (4=2x2) and 2 for the each of the fourth level medical facilities (4=2x2) were planned to have for discussion. Thus, total number of focus group discussions' was 64. For each of the focus group discussions it was assumed that 6-10 persons would participate, so the total number of participants was estimated to be approximately 384-640.

Allocation

Hospital sample allocation

Optimum allocation of sample through stratification was employed for the sampling of hospitals.

Hospitals with relatively high level of the numbers of birth (MCHRC, maternity homes of Ulaanbaatar, general hospitals of Darkhan-Uul and Orkhon aimags) were sampled with probability 1.0 (Table 5), while Nalaikh district general hospital, Tosontsengel rural general hospital and Khovd regional diagnostic and treatment center were randomly selected from the list of those three groups of hospitals.

The number of all selected aimag general hospitals, regional diagnostic and treatment centers, rural general hospitals, district general hospitals, MCHRC, maternity homes of Ulaanbaatar and general hospitals of Orkhon and Darkhan-Uul aimags were subtracted from the total number of 62 medical facilities, where remaining number indicated the sample size of soum and inter-soum hospitals. The Table 109 shows the allocation of sample of hospitals.

Table 109. Allocation of sample of hospitals

№	Type of hospital	Sub-sample size
1	Aimag general hospitals	10
2	Regional diagnostic and treatment centers (Khovd)	1
3	Rural general hospitals (Tosontsengel)	1
4	MCHRC, Maternity homes and general hospitals of Orkhon and Darkhan-Uul aimags	6
5	District general hospitals (Nalaikh)	1
6	Soum and inter-soum hospitals	43
Total sample size		62

In order to identify aimag general hospitals that need to be selected for proposed sample, each region's aimag general hospitals were grouped into three groups according to their absolute number of births (2007), and one hospital was selected from each group (Table 110, 111). The use of stratification of aimags by region was also used to ensure fair representation in the sample for subgroups that may differ in different ways.

Table 110. Grouping of absolute number of birth (2007) of aimags' general hospitals (by region)

Region	Birth level		
	Low	Medium	High
West	≤645	646-1175	1176≥
Khangai	≤774	775-1300	1301≥
Central	≤748	749-777	778≥
East	≤857	857-915	916≥

Table 111. Selected aimags' general hospitals (by region)

Region	Birth level			Total
	Low	Medium	High	
West	Zavkhan	Gobi-Altai	Khovd	3
Khangai	Bulgan	Arkhangai	Khuvsgul	3
Central	Gobi-Sumber	Selenge	Dornogobi	3
East			Khentii	1
Total				10

Allocation of staff and client samples

For the allocation of samples of staff and clients in UB and Western region an optimum allocation method was used as well.

Advantages and disadvantages of the sampling design

The maternal mortality rate is the most important parameter for this kind of surveys. However, in case of Mongolia this rate cannot be used for the calculation of representative sample size of the medical facilities which provide obstetric and essential newborn care services due to the statistically insignificant value.

Challenges faced during sampling procedure

Lists of public medical facilities collected from MoH, City Health Department, and Health Statistical Office by type, number of births, maternal and infant mortality rate/ratio, together with figures on client load and staffing did not often match with each other and were incomplete, if any existed.

ANNEX III. UN process indicators

Location	Population size	Total number of births	Crude birth rate (per 1000 population)	Total number of maternal deaths	Total number of direct obstetric complications	Number of cesarean sections	Total number of expected births	Total number of expected direct obstetric complications	UN indicators			
									Proportion of all births in EmOC facilities	Met need	Cesarean sections as a percentage of al births	Case fatality rate
UB (n=5)	1 037 853	26 224	24.2	5	7 515	6 850	25 116	3 767	104.4	199.5	27.3	0.06
MCHRC	169 278	8 125		1	1 257	2 403	4 097	615	198.3	204.4	58.7	0.08
Maternity Home I	371 942	9 572		0	2 970	2 574	9 001	1350	106.3	220.0	28.6	0
Maternity Home II	232 326	4 430		3	1 832	872	5 622	843	78.8	217.3	15.5	0.2
Maternity Home III	235 192	3 540		0	1 404	923	5 692	854	62.2	164.4	16.2	0
Nalaikh district general hospital	29 115	557		1	52	78	705	106	79.0	49.1	11.1	1.9
Zavkhan aimag (n=6)	39 656	1 519	23.5	2	238	223	932	140	163.0	170.0	23.9	0.8
Uliastai city	16 198	832		1	135	166	381	57	218.4	236.8	43.6	0.7
Tosontsengel	8 679	526		1	83	56	204	31	257.8	267.7	27.5	1.2
Ider	2 734	16		0	5	1	64	10	25.0	50.0	1.6	0
Telmen	2 778	31		0	10	0	65	10	47.7	100	0	0
Ikh-Uul	6 040	109		0	5	0	142	21	76.8	23.8	0	0
Aldarkhaan	3 227	5		0	n/a	0	76	11	6.6	n/a	0	n/a

Location	Population size	Total number of births	Crude birth rate (per 1000 population)	Total number of maternal deaths	Total number of direct obstetric complications	Number of cesarean sections	Total number of expected births	Total number of expected direct obstetric complications	UN indicators			
									Proportion of all births in EmOC facilities	Met need	Cesarean sections as a percentage of al births	Case fatality rate
Khovd aimag (n=5)	38 536	2 243	20.9	1	556	407	805	121	278.6	459.5	50.6	0.2
Khovd city	26 466	1 430		1	542	404	553	83	258.6	653.0	73.1	0.2
Buyant	2 948	4		0	1	0	62	9	6.5	11.1	0	0
Must	3 608	75		0	2	1	75	11	100	18.2	1.3	0
Tsetseg	2 476	30		0	8	1	52	8	57.7	100	1.9	0
Zereg	3 038	52		0	3	1	63	9	82.5	33.3	1.6	0
Govi-Altai aimag (n=5)	23 417	1 026	25.4	0	476	96	595	89	172.4	534.8	16.1	0
Altai city	14 850	980		0	470	94	377	57	259.9	824.6	24.9	0
Altai	2 285	26		0	2	1	58	9	44.8	22.2	1.7	0
Bugat	2 262	12		0	4	1	57	9	21.0	44.4	1.8	0
Khaliun	2 463	4		0	n/a	0	63	9	6.3	n/a	0	0
Taishir	1 557	4		0	0	0	40	6	10.0	0	0	0