Ministry of Health

Review of the Cambodian Emergency Obstetric and Newborn CARE Improvement Plan 2016-2020

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Conducted by: University of Health Sciences

Preparation of this report

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Forward

Sexual Reproductive Maternal and Newborn (SRMNH) health is one of four key programme priorities of the Ministry of Health. Sustained efforts and commitments from the Government and development partners have resulted in impressive gains in expanding quality SRMNH services across the country. Cambodia is globally recognized its sustained commitment that lead to the achievement of the Millennium Development Goals, particularly MDG5. The achievement of SDG 5 could not be made without significant contribution from this lifesaving intervention Emergency Obstetric and Newborn Care (EmONC). However, the maternal and neonatal mortalities remain high and a challenge for the country to achieve its SDG 2030 target.

To understand the root causes of maternal and newborn deaths, the Ministry of Health undertook the first National Emergency Obstetric and New Care Study in 2009, and subsequently developed the first Cambodia Emergency Obstetric and Newborn Care Improvement Plan 2010-2015. The second same review and development were made in 2014. This is the third study of this type in Cambodia. The evidence generated through the review will further provide key data indicators for monitoring and evaluating EmONC across Cambodia and the development of a new EmONC Improvement Plan 2021 - 2025.

It is now 10 years since the Baseline EmONC Assessment in Cambodia 2009, and the first EmONC Improvement Plan 2009-2014, and 5 years since the second EmONC Improvement Plan 2016-2020. EmONC facilities have been substantially rolled out across the country with gradual quality improvement and assurance. The findings in this report will help the Ministry of Health to review progress made since the implementation of the last two Improvement Plans and assist policy makers and programme managers to design more effective plans, services, and strategies for accelerating the improvement of SRMNH and hence reduction the maternal and newborn mortalities in Cambodia.

We would like to take this opportunity to thank the University of Health Sciences and all people involved in the implementation of this review. Finally, we would like to express our sincere thanks to UNFPA, KOICA, and KOFIH for providing financial support, and UNFPA Cambodia Country Office for on-going technical support and oversight to the Review of Cambodia EmONC Improvement Plan 2016-2020.

Date: 26 Aug 2020

Professor Eng Huot
Secretary of State, Ministry of Health

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Phnom Penh, Date: _____2020

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Disclaimer
The authors' views expressed in this publication do not necessarily reflect the views of the Ministry of Health, UNFPA and Donor Partners. The report was written by and independent team of researchers

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LIST OF ACRONYMS AND ABBREVIATIONS

AOP	Annual Operational Plan
AMDD	Averting Maternal Death and Disability
ANC	Antenatal Care
AVD	Assisted Vaginal Delivery
BEmONC	Basic Emergency Obstetric and Newborn Care
CBA	Criterion Based Audit
CBR	Crude Birth Rate
CBT	Competency Based Training
CCs	Community Councils
CDHS	Cambodia Demographic and Health Survey
CFR	Case Fatality Rates
CMDG	Cambodia Millennium Development Goals
CEmONC	Comprehensive Emergency Obstetric and Newborn Care
CPA	Complementary Package of Activities
CPAP	Continuous Positive Airways Pressure
CTS	Clinical Training Site
DOCFR	Direct Obstetric Case Fatality Rate
EENC	Early Essential Newborn Care
EmOC	Emergency Obstetric Care
EmNC	Emergency Newborn Care
EmONC	Emergency Obstetric and Newborn Care
FTIRM	Fast Track Initiative Road for Reducing Maternal and Newborn Mortality
HC	Health Centre
HCMC	Health Centre Management Committee
HEF	Health Equity Fund
HIS	Health Information System
HSP2	Second Health Sector Strategic Plan 2008-2014
INC	Immediate Newborn Care
KMC	Kangaroo Mother Care
KOIFH	Korea Foundation for International Healthcare
KOICA	Korea International Cooperation Agency
LBW	Low Birth Weight
MCH	Maternal and Child Health
MCH Sub-TWG	Maternal and Child Health Sub-Technical Working Group
MDA	Maternal Death Audit
MDGs	Millennium Development Goals
MoH	Ministry of Health
NMCHC	National Maternal and Child Health Centre
MPA	Minimum Package of Activities
NECHR	National Ethics Committee for Health Research
NGO	Non-Government Organization
NRH	National Reproductive Health
NRHP	National Reproductive Health Program
OD	Operational District
PHDs	Provincial Health Departments
PMTCT	Prevention of Mother to Child Transmission
PNC	Post-Natal Care
PPH	Postpartum Haemorrhage
PRoM	Premature Rupture of Membranes
QA	Quality Assurance

SBA	Skilled Birth Attendant
SDGs	Sustainable Development Goals
TFR	Total Fertility Rate
TOR	Terms of Reference
TBA	Traditional Birth Attendant
UN	United Nations
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
URC	University Research Company
USAID	US Agency for International Development
WCCC	Woman and Child Commune Council

EXECUTIVE SUMMARY

Background

This document presents the findings of a review of a network of EmONC facilities across Cambodia and the implementation of an EmONC Improvement Plan (2016-2020). The review builds on a country wide EmONC baseline assessment undertaken in 2009, the development of the first EmONC Improvement Plan in 2010-2015 and a review of this Improvement Plan in 2014-2015. The evidence generated through the current review will be used to further strengthen EmONC across Cambodia.

Objectives

The overall objective of the EmONC review was *"To assess all 181 health facilities (48 planned CEmONC and 133 planned BEmONC) against signal functions of either CEmONC or BEmONC"* and an additional 29[1] health facilities in Ratanak Kiri and Mondul Kiri provinces.

Specific objectives are:

- To determine the current status of upgraded facilities, designated to become fully functioning EmONC facilities as planned by each province
- To identify availability of staff, EmONC training/skills and medical equipment and medicines
- To identify barriers to ensure availability, functioning and utilisation of EmONC services based on types and levels of health facilities such as referral hospitals (CPA3, CPA2, CPA1) and health centres, and develop appropriate strategies and recommendations to address these problems
- To serve as a baseline for Korea International Cooperation Agency (KOICA) – Maternal and Child Health (MCH) project in Ratanak Kiri and Mondul Kiri provinces.

Methodology:

A cross-sectional study was used to give a picture of the current status of EmONC across Cambodia and progress made in implementing the 2016-2020 EmONC Improvement Plan. In total, 210 MOH health facilities have been reviewed as two sub-sets of data. The first sub-set was a purposeful selection of 181 health facilities identified as functioning EmONC facilities or recommended for upgrade CEmONC or BEmONC status in the 2016-2020 EmONC Improvement Plan. The second subset of 37 health facilities were assessed to establish a baseline for a KOICA MCH project in Ratanak Kiri and Mondul Kiri provinces. The subset included 8 facilities which were common to both subsets.

Four (4) data collection teams were selected and trained, based on their experience in supporting previous EmONC reviews. Each team included a supervisor and 4 data collectors. Global Averting Maternal Death and Disability (AMDD) tools were used to assess the functional status of the designated EmONC facilities, by reviewing registers and records, observation, and interviewing health facility staff and managers. The tools were adapted to the local context and field-tested before use.

Stata 12 Software was used for data analysis to compute means and proportions of relevant variables. An Excel program spreadsheet, developed by an international consultant, based on AMDD guidelines, was used to compute UN EmONC Indicators.

Progress against UN standards and norms

As with previous studies, UN EmONC norms and standards have been applied to the review of facilities, to determine the availability, functioning and utilisation of EmONC across Cambodia. Table 1 summarises changes in UN indicators between 2009 and 2020. It also identifies gaps in data collection due to insufficient quality of recording, therefore rendering some indicators less reliable.

1 In total 37 facilities were assessed in Ratanak Kiri and Mundul Kiri provinces. Eight (8) facilities (2 Hospitals in Ratanak Kiri, 2 hospitals in Mundul Kiri, 2 health centres in Ratanak Kiri and 2 health centres in Mundul Kiri) are included in the 181 facilities as either EmONC facilities and /or designated facilities for upgrade to EmONC status.

Table 1: Summary of the main progress in EmONC between 2009 and 2020 (In grey: less-reliable data)					
Indicator	**Baseline (May 2009)**	**Progress (December 2014)**	**Progress (April 2020)**	**UN Standard**	**Remarks**
Indictor 1: Availability of EmONC facilities	▪ **3-month prior to the assessment:** 1.64 EmONC facilities per 500,000 population ▪ **12-month prior to the assessment:** 1.90 EmONC facilities per 500,000 population	▪ **3-month prior to the assessment:** 2.35 EmONC facilities per 500,000 population ▪ **12-month prior to the assessment:** 2.62 EmONC facilities per 500,000 population	▪ **3-month prior to the assessment:** 2.62 EmONC facilities per 500,000 population ▪ **12-month prior to the assessment:** 3.63 EmONC facilities per 500,000 population	***At least five Functional EmONC facilities*** per 500,000 population. One should be a ***functional*** CEmONC facility	The gap in BEmONC coverage could be reduced by using a 12-month reference period (instead of 3-months) to measure performance of the 7 BEmONC signal functions
Availability of CEmONC facilities	▪ **3-month prior to the assessment:** 0.93 CEmONC facilities per 500,000 population ▪ **12-month prior to the assessment:** 1.01CEmONC facilities per 500,000 population	▪ **3-month prior to the assessment:** 1.31 CEmONC facilities per 500,000 population ▪ **12-month prior to the assessment:** 1.21 CEmONC facilities per 500,000 population	▪ **3-month prior to the assessment:** 1.14 CEmONC facilities per 500,000 population ▪ **12-month prior to the assessment:** 1.31 CEmONC facilities per 500,000 population		
Indictor 2: Geographical distribution of EmONC facilities	Does not meet the UN standard: • 5 provinces had no facilities surveyed • No health centres functional • EmONC clustered in and around urban areas	Improved, but does not yet meet the UN Standard: • 1 province has no EmONC facility • Only 2 health centres assigned as functional for BEmONC indicating coverage does not reach the lower levels. • EmONC is still clustered in	EmONC remains clustered in and around urban areas. Facilities are poorly distributed. There are gaps in coverage. • 73 facilities report there are families and villages > 2 hours from facilities. • 20 facilities report that it takes more than > 2 hours to reach the nearest higher-level facility.	100% of sub-national areas have the minimum acceptable numbers of EmONC facilities	Every woman in Cambodia should be able to reach an EmONC facility within 2 hours of birth In 2016, WHO undertook a GIS mapping of EmONC. The report would help inform the distribution of EmONC facilities

Table 1: Summary of the main progress in EmONC between 2009 and 2020 (In grey: less-reliable data)					
Indicator	**Baseline (May 2009)**	**Progress (December 2014)**	**Progress (April 2020)**	**UN Standard**	**Remarks**
		urban areas			
Indictor 3: Proportion of all births in EmONC facilities	Does not meet UN Standard: **Functional EmONC facilities** • 11.4% of all expected live births in Cambodia occurred in functional EmONC facilities **All facilities surveyed** • 17.8% of all expected live births in Cambodia occurred in all facilities surveyed	Meets the UN Standard for the country as a whole. 8/25 provinces still do not meet the UN standard: **Functional EmONC facilities** • 23.5% of all expected live births in Cambodia occurred in functional EmONC facilities **All facilities surveyed** • 35% of all expected live births in Cambodia occurred in all facilities surveyed	Except for Siem Reap, all provinces meet the standard. Siem Reap would meet the standard if private facilities were included. **Functional EmONC facilities** • 29.7% of all expected live births in Cambodia occurred in functional EmONC facilities **All facilities surveyed** 37.9% of all expected live births in Cambodia occurred all facilities surveyed	**Minimum: 15%** 15% of births should occur in all facilities surveyed[2]. The optimum percentage would be 100% in all births take place in facilities.	Cambodia meets the 15% benchmark with has been in place since 2004. This benchmark is no longer used. Countries are setting their own benchmark. It is recommended that the benchmark be lifted to 50 or even 100 at the discretion of the MoH
Indictor 4: Met need for EmONC	Does not meet the UN Standard: **Functional EmONC facilities** • 12.7% of the expected number of women who will develop complications were treated in functional EmONC facilities **All facilities surveyed** • 14.5% of the expected number of women who will develop complications were treated in all facilities surveyed	Improved, but does not yet meet UN standard: **Functional EmONC facilities** • 23.6% of the expected number of women who will develop complications were treated in functional EmONC facilities **All facilities surveyed** • 30.0% of the expected number of women who will develop complications were treated in all facilities surveyed	Improved, but does not yet meet UN standard: **Functional EmONC facilities** • 31.6% of the expected number of women who will develop complications were treated in functional EmONC facilities **All facilities surveyed** • 38.7% of the expected number of women who will develop complications were treated in all facilities surveyed	100% of estimated complications from all EmONC health facilities (public and private) which is 15% of all births should be treated.	Indicator not built on reliable definitions of DOC (Direct Obstetric Complications). A definition needs to be accepted. Although improved the are women and babies dying in childbirth from preventable complications

2 WHO, UNFPA, UNICEF and AMDD., Monitoring emergency obstetric care: A handbook, WHO, 2009

Table 1: Summary of the main progress in EmONC between 2009 and 2020 (In grey: less-reliable data)					
Indicator	**Baseline (May 2009)**	**Progress (December 2014)**	**Progress (April 2020)**	**UN Standard**	**Remarks**
Indictor 5: Caesarean sections as a percentage of all births	Does not meet the UN Standard: **Functional EmONC facilities** • In Functional EmONC facilities, 1.3% of all births were by Caesarean section **All facilities surveyed** • In all surveyed facilities, 1.4% of all births were by Caesarean section.	Improved, but does not yet meet UN standard: **Functional EmONC facilities** • In Functional EmONC facilities, 3.9% of all births were by Caesarean section **All facilities surveyed** • In all surveyed facilities, 3.9% of all births were by Caesarean section. • Caesarean section in Phnom Penh 20%???	Improved, just below the minimum UN standard. **Functional EmONC facilities** • In Functional EmONC facilities, 4.9% of all births were by Caesarean section **All facilities surveyed** In all surveyed facilities, 4.9% of all births were by Caesarean section Caesarean section in Phnom Penh remained 15.9 %	Minimum 5% Maximum 15%	This indicator would be higher if private facilities were included; e.g., the indicator for Siem Reap was 1.7%. There is a large private facility in the province providing CS at no cost. The review did not capture any private hospitals.
Indictor 6: Direct Obstetric Case Fatality Rate (DOCFR)	Data quality is questionable: **Functional EmONC facilities** • 0.75% of women treated with obstetric complications in functional EmONC facilities died **All facilities surveyed** • 0.74% of women treated with obstetric complications in all facilities surveyed died	Data quality is questionable: **Functional EmONC facilities** • 0.19% of women treated with obstetric complications in functional EmONC facilities died **All facilities surveyed** • 0.16% of women treated with obstetric complications in all facilities surveyed died	Meets the UN benchmark, however data quality is questionable: **Functional EmONC facilities** • 0.44% of women treated with obstetric complications in functional EmONC facilities died **All facilities surveyed** 0.36% of women treated with obstetric complications in all facilities surveyed died	Maximum 1% (When reported correctly this is a proxy indicator for maternal quality of care)	The quality of these data is questionable as maternal deaths are being under-reported in some facilities. This indicator is not built on reliable definitions of DOC (Direct Obstetric Complications). A definition needs to be accepted. The main cause of maternal death was ante and postpartum death followed by eclampsia
Indictor 7: Intrapartum and very early neonatal death rate	UN standard not set: • 1.2% of births in all facilities surveyed died as fresh stillbirth or very early neonatal death	UN standard not set: • 1.53% of births in all facilities surveyed died as fresh stillbirth or very early neonatal death	UN standard not set: 1.2% of births in all facilities surveyed died as fresh stillbirth or very early neonatal death	No standard set (When reported correctly this is a proxy indicator for intrapartum and	Indicator not built on reliable definitions of intrapartum stillbirths and very early newborn death. A definition needs to be accepted.

Table 1: Summary of the main progress in EmONC between 2009 and 2020 (In grey: less-reliable data)					
Indicator	**Baseline (May 2009)**	**Progress (December 2014)**	**Progress (April 2020)**	**UN Standard**	**Remarks**
				newborn quality of care).	
Indictor 8: Proportion of maternal deaths due to indirect causes	UN standard not set: • 29% of total deaths from all causes in all facilities surveyed are attributed to indirect causes	UN standard not set: • 16.7% of total deaths from all causes in all facilities surveyed are attributed to indirect causes	UN standard not set: 7.3% of total deaths from all causes in all facilities surveyed are attributed to indirect causes	No standard has been set. Possibly underestimated, as some deaths do not occur in maternity wards.	Indicator not built on reliable definitions of Direct and Indirect Obstetric Complications. A definition needs to be accepted.

QUESTIONS ANSWERED BY THE UN PROCESS INDICATORS

Norms and standards for each of the eight indicators in table 1 help answer the following questions:

Indicator 1: Are there sufficient facilities providing EmONC?

To meet the UN standards of coverage there should be at ***least five functional EmONC facilities, one of which should be a functional CEmONC facility per 500,000 population***. In Cambodia there are 2.62 EmONC facilities per 500,000 population (data 3-month prior to the assessment) and 3.63 EmONC facilities per 500,000 population (data 12-month prior to the assessment) . The number of CEmONC facilities meets the UN standard (at least 1 per 500,000 of population). There has been a small increase in functional BEmONC facilities (1.48 BEmONC facilities per 500,000 population - data from 3-months; and 2.32 BEmONC facilities – data from 12 months). This does not meet the UN standard of at least 4 BEmONC facilities per 500,000 of population. There is still a shortfall of at least 74 BEmONC facilities across Cambodia for the 3-month data and 43 BEmONC for the 12-month data. This can be explained in part, by the exclusion of private facilities providing maternity services. The gap could be reduced by allowing CPA 1 referral hospitals and health centres to perform the 7 BEmONC signal functions over a 12-month timeframe (rather than a 3-month time-frame)

Indicator 2: Are facilities well distributed?

Distribution of EmONC across Cambodia needs attention. The majority (almost 100%) of functional EmONC facilities are National Hospitals, CPA 3 and CPA 2 referral hospitals at the top levels of the health system. At lower levels, it is a different picture: 22 out of 57 CPA 3 referral hospitals and 1 out of 66 of health centres surveyed, are functional for BEmONC. The distribution of EmONC facilities at a sub-national level is a concern. There are women who are unable to reach an EmONC facility within 2 hours of birth. This is the time-frame when many maternal and neonatal deaths occur, especially among women who develop haemorrhage or if a newborn suffers from breathing problems.

Indicator 3: Are enough Cambodian women using EmONC facilities?

From January 2019 –December 2019, 29.7% of all expected births took place in a functional EmONC facility and less than 10% took place in non-EmONC facilities.[3] Since the 2009 EmONC baseline study the number of women giving birth in health facilities has almost doubled for both EmONC and non-EmONC facilities. The UN benchmark of 15% was removed in 2009. Since that time countries have been setting their own targets. Most countries raise this indicator slowly until they reach 100%. Therefore the benchmark could be lifted at the discretion of the MOH.

Indicator 4: Are the right women using EmONC facilities?

To meet the UN standard, 100% of all women with complications of childbirth should be treated in EmONC facilities. Since 2009 there has been a significant increase in meeting this need. The current review found that the management of complications of childbirth has increased from 12.7% in 2009 to 31.6% in functional EmONC facilities. This indicator would improve if private facilities were included in the EmONC network.

Indicator 5: Are enough critical services being provided?

To save women's lives it is crucial they have access to lifesaving interventions such as Caesarean sections provided in CEmONC facilities. In a 12-month timeframe preceding the review, 4.9% of all deliveries in CEmONC facilities were by Caesarean section. This rate is just below the minimum UN standard of 5% to 15% but is an improvement since 2014 review. This indicator would be higher if private facilities were included in the EmONC network. The Caesarean section rate in Siem Reap was

[3] Functional EmONC facilities and designated facilities for strengthening and upgrade to EmONC status)

1.7%. This is due to the fact that there is a large facility Siem Reap providing Caesarean sections at no cost. The review did not capture this health facility.

Indicators 6 and 7: Is the quality of services adequate?

Two indicators can be used to assess quality of EmONC services. These are: Direct Obstetric Case Fatality Rate (DOCFR) and the intrapartum and very early neonatal death rate. Data related to these indicators are under reported, and/or difficult to interpret because they are not built on reliable definitions of direct and indirect obstetric complications, intrapartum stillbirths and very early newborn death. Improving the quality of such data is paramount.

Indicator 8: Are other services besides EmONC needed?

Where malaria and HIV infections are serious problems, other services in addition to EmONC are needed to improve maternal and newborn survival. Elsewhere, an increasing percentage of indirect maternal deaths is a sign of the obstetric transition, when maternal deaths due to direct causes decline and deaths due to non-communicable diseases increases. The data quality for this indicator is not reliable.

EmONC IMPROVEMENT PLAN

Maternal and newborn mortality is a top priority of the Cambodian Government. Following a National EmONC Assessment in 2009, Cambodia developed and implemented its first EmONC Plan (2010-2015). A review of this plan was undertaken in 2014. In order to address issues raised by the review a second EmONC Improvement Plan was developed for the period 2016 - 2020. This report reviews the progress made since the implementation of this second plan.

The implementation of the current Improvement Plan has resulted in notable gains in the availability and utilisation EmONC across Cambodia. Success can be attributed to a number of factors including political commitment by the Government of Cambodia to EmONC and strong local leadership and ownership. Progress made towards achieving the EmONC Improvement Plan targets. Not all targets have been reached. See annex 1. A summary of progress in each of the seven (outputs) in the EmONC Improvement Plan (2016-2020) is in section 2 of this report.

This success in achieving some outputs can be attributed to a number of factors, including: political commitment by the Government of Cambodia, strong local leadership and ownership, a strong technical working group and a shared commitment of key players to making a difference.

BARRIERS/CHALLENGES

Despite improvements in EmONC coverage and UN indicators, significant challenges remain as Cambodia moves towards universal health coverage; which are addressed in more detail in the last section of 14 of this report. Expanding coverage of BEmONC facilities should be a priority when addressing the following barriers/challenges

- BEmONC coverage is half of what is required to meet the UN standard of availability. Not enough facilities provide all the lifesaving signal functions. This figure improves to two-third with the 12-month data prior to the assessment.
- CEmONC facilities are clustered around large urban populations. The distribution of CEmONC at a subnational level is poor. There are women who are more than 2 hours from help
- EmONC services are still under-utilized and there is a strong unmet need for these services.
- The needs of newborns with complications are being insufficiently met and deserve particular attention moving forward

- A reason why Cambodia is not meeting standards is that this assessment excluded private maternity facilities. The case load in the government system is not enough to meet UN standards.
- The quality of EmONC services is improving but requires more training, coaching and skills development, as well as significant and continued supportive supervision
- The referral system has improved, primarily due to improved infrastructure, but many patients in need still suffer delays in referral and treatment.
- Standards for EmONC procedures, although published and available, are not universally followed
- The capacity of PHDs and lower level administrative structures to plan, manage, monitor, and support EmONC services need strengthening
- The quality of recording and reporting of data needs improving. (including setting standard definitions of obstetric complications, classifying stillbirths and coding causes of death).

KEY RECOMMENDATIONS

Key recommendations are summarised under the seven (7) outputs of the 2016-2020 EmONC Improvement Plan.

Output 1: Policies and strategies are in place for a supportive and enabling environment

- There is still a gap between the current status of EmONC indicators in Cambodia and UN global norms and standards. Revise the EmONC Improvement Plan (2016-2020) in view of the progress made. Maintain the vision of a network of > 160 functional EmONC facilities across Cambodia, supported by regional clinical training sites, but focus on:
  - improving coverage and distribution of EmONC. Pay attention to the distribution of CEmONC. Ensure EmONC lifesaving interventions are available and accessible at all health system levels;
  - strengthening the capacity of PHDs and lower level administrative structures to plan, manage, monitor, and support EmONC service;
  - improve the quality of data collection and reporting and
  - Continue to focus on improving the quality of EmONC services.

Output 2: Ensure adequate coverage of EmONC (availability and accessibility) across Cambodia.

- With increased utilisation of EmONC services the national MoH could be more flexible when classifying BEmONC facilities. Flexibility can only be applied for Basic EmONC facilities and not for Comprehensive EmONC facilities. CEmONC facilities must always meet the benchmark of 9 signal functions in a 3-month period. Consider the following:
  - Extending the timeframe to perform the seven signal functions from 3 to 12 months for BEmONC facilities at a CPA 1 and health centre level. This would increase the coverage from 45 to 71 BEmONC facilities.
  - Allow selected lower level facilities to perform a minimum EmONC package, i.e. all signal functions minus e.g. the administration of parenteral anticonvulsants for pre-eclampsia and eclampsia (magnesium sulphate, diazepam). The make-up of the package should be determined in consultation the MOH
  - Consider a different package of interventions such as obstetric-first aid. Where mothers and babies are stabilised and referred on.
- To perform a minimum number of EmONC signal functions, a facility must have full technical potential and properly demonstrated skills necessary to perform the required functions. There would also need to be strict technical guidelines to support implementation of signal functions and timely referral.
- In provinces where there are large private facilities providing maternity services, the MoH should

invite these facilities to join the EmONC network. For example, Siem Reap has a large hospital (Jay Varman Hospital) that provides free maternity services. Inclusion of the private facilities would make a significant difference to EmONC indicators in the provinces. However, the concern remains with the distribution as the private facilities are concentrated in urban areas only.

Output 3: Technical and managerial capacity strengthened to ensure high quality care.

- It is difficult to obtain a good picture of the different trainings that have been undertaken to support EmONC. There is need for improvement on the record of training at a provincial level and there is no consistency across provinces. Consider working with the training unit at the National Maternal and Child Health Centre (NMCHC) to undertake a baseline training needs assessment of all EmONC training and put in place a regular reporting system which is overseen by the MoH.
- Continue and expand supporting in-service training and on-site coaching to increase competencies of staff in EmONC facilities to perform the core signal functions and improve quality of care provided at EmONC facilities. Medical staff, mainly midwives, surgeons and anaesthetists, should be trained to enable 24 hour/7-day availability of quality EmONC services, including Caesarean section, other emergency surgical procedures, and safe blood transfusion in CEmONC facilities.
- EmONC should become an essential part of pre-service education for midwives, and medical doctors, and Obstetrician/ Gynaecologist, so that freshly certified midwives and physicians have been exposed to the concept before starting their duties. Existing curricular should be reviewed to ensure this is the case.

Quality of data and charting

- Sound monitoring and evaluation require reliable data and reporting. Recording of maternal and newborn deaths (including stillbirths) and obstetric and newborn complications and their outcomes needs to be improved at all health facilities. Facility managers should be encouraged and coached by provincial and national managers to improve recording and reporting of obstetric and newborn complications.
- The participation of all concerned EmONC staff at Maternal Death Audits and Audits of Near-Miss cases is strongly encouraged and should be formalised, in view of the powerful training benefits of these procedures.
- Consider working with a national or provincial hospital performing selected EmONC signal functions regularly to develop and trial a system of newborn recording and reporting (forms and registers). In time, the system could be scaled up and monitored across Cambodia

Output 4: Increased utilisation of EmONC services to reduce unmet needs

- There is a number of midwifery procedures which complement EmONC signal functions and should be part of clinical coaching/mentoring and regular supervision and monitoring. These procedures should be performed according to standards in all EmONC facilities – they include the partograph, repair of tears, foetal monitoring during labour, dexamethasone for prematurity, antibiotics for premature rupture of membranes, Kangaroo Mother Care, Newborn Corners, PMTCT, etc.
- The current review found that only 35% of all facilities had a work surface for resuscitation of newborn near delivery bed(s) or newborn corner (Newborn resuscitation table) and there was limited equipment and supplies to resuscitate a newborn. Each facility needs to have a newborn corner (resuscitation area) with emergency trolley/box for 24/7 responses to emergencies (drugs, gloves, syringes, IV) and health workers should be trained to identify asphyxia in newborns and how to resuscitate

- The current review found neonatal resuscitation, assisted vaginal deliveries (using MVE), administration of anticonvulsants and manual removal of placenta are signal functions that are less practices and need additional strengthening. So equipment and supplies and training of staff to support implementation of these signal function should be a priority. These are the most commonly missing signal functions in designated EmONC facilities at this point in time.
- The quality of partograph completion is poor. Consider developing criterion-based audits of partograph and outcomes; this will build more accountability into recording on the tool and allow the review of processes and procedures and show why so many health facilities are not referring women on for more advanced lifesaving interventions.

Output 5: Referral system in place and operational throughout the country

- All health facilities should record EmONC referrals in and out, and collect information concerning each woman who is referred on: facility of origin and destination, purpose/indication of the referral, treatment or stabilization provided, partograph if started, and patient outcomes.
- Referrals into the hospitals are less than the sum of referrals out of health centres. An explanation might be poor record keeping or lack of a standard recording system, referral procedures are not followed or well understood, or the referral chain needs strengthening. Neonatal complications are referred less frequently than maternal complications. Data are not being collected that show where neonates were referred. This needs further investigation.

Output 6: Provincial EmONC plans developed, operational and monitored

- More attention and resources are needed to develop the capacity of PHDs to support EmONC more effectively. Where PHDs are performing well they could be a model for other provinces. An award system and/or cross-provincial learning visits could be used to encourage provincial innovation and learning.
- Consideration could be given to making better use of the established regional clinical training sites. Besides clinical support, these sites could be strengthened to support capacity building of PHDs and regional integrated management and clinical teams, who are able to work together to strengthen EmONC through annual work plans, reporting, supervisory visit and other supportive activities.
- PHDs, in consultation with facility managers, should ensure standardised lists of equipment, drugs and supplies be available in all EmONC facilities and PHDs; and hospital management should ensure that all equipment provided is installed, used and well maintained and that supplies are managed effectively.

Output 7: Community participation strengthened to increase utilisation

- Local entities (such as Health Centre Management Committees and Woman and Child Commune Council) should be encouraged to participate in meetings for planning, construction, rehabilitation, identifying equipment needs and discussion of referral needs at EmONC facilities. They may also be encouraged to participate in quality assessment and monitoring.

Barriers and recommendation are discussed further in the last section of this report

1. INTRODUCTION

1.1 Background

With financial and technical support from UNFPA/AusAID, Cambodia's first national EmONC assessment was conducted in 2009. The findings of the study provided a baseline for improving EmONC across Cambodia and helped the Government of Cambodia understand the EmONC situation and actions required to reduce maternal and neonatal mortality. Subsequently, the first EmONC Improvement Plan (2010–2015) was developed and implemented across Cambodia. The plan supported the upgrade of a network of 178 EmONC facilities across the country. These facilities are the basis of a countrywide network of EmONC that have been shown, through best practice, to save the lives of mothers and newborns.

Following the implementation of the 2010-2015 EmONC Improvement Plan, the first review of EmONC the Improvement Plan was undertaken in 2014-2015 with support from UNFPA and URC—Cambodia. The findings of this review were used to develop a second EmONC Improvement Plan for implementation across Cambodia from 2016–2020.

Five years have passed and the 2016—2020 EmONC Improvement Plan has now been implemented. It is again time to review the implementation of the second Improvement Plan and the current status of EmONC services across Cambodia. An updated analysis of the situation will inform future Government plans, policies and best practices.

1.2 Objectives of the review

The overall objective of the EmONC review was *"To assess all 181 health facilities (48 planned CEmONC and 133 planned BEmONC) against signal functions of either CEmONC or BEmONC"* and an additional 29[4] health facilities in Ratanak Kiri and Mondul Kiri provinces.

Specific objectives are:

- To determine the current status of upgraded facilities, designated to become fully functioning EmONC facilities as planned by each province
- To identify availability of staff, EmONC training/skills and medical equipment and medicines
- To identify barriers to ensure availability, functioning and utilization of EmONC services based on types and levels of health facilities such as referral hospitals (CPA3, CPA2, CPA1) and health centres, and develop appropriate strategies and recommendations to address these problems
- To serve as a baseline for Korea International Cooperation Agency (KOICA) – Maternal and Child Health (MCH) project in Ratanak Kiri and Mondul Kiri provinces.

1.3 Political context

The Cambodian Government, especially the Ministry of Health/National Maternal and Child Health Centre, is committed to addressing issues related to maternal and neonatal mortality and morbidity and has worked hard to improve EmONC since the first EmONC assessment was undertaken in 2009.

This commitment of the MoH has contributed to reducing maternal and neonatal mortality and the "almost" achievement of the Millennium Development Goal (MDGs) in 2015 and current progress being made towards the achievement of the Sustainable Development Goals (SDGs). Key policies,

4 In total 37 facilities were assessed in Ratanak Kiri and Mundul Kiri provinces. Eight (8) facilities (2 Hospitals in Ratanak Kiri, 2 hospitals in Mundul Kiri, 2 health centres in Ratanak Kiri and 2 health centres in Mundul Kiri) are included in the 181 facilities as either EmONC facilities and /or designated facilities for upgrade to EmONC status.

strategies and plans include: the National Strategic Development Plan 2014–2018, the Health Strategic Plan 2016–2020, the Fast Track Initiative 2016-2020 (Fast Track Initiative), the EmONC Improvement Plan 2016–2020 and the National Strategy for Reproductive and Sexual Health in Cambodia 2017–2020.

EmONC reviews and plans are high level documents that have been nested between MoH Strategic Health Plans and aligned with sub-sectoral strategies. To this end, EmONC is one of 5 core components of the Fast Track Initiative. The EmONC component aims to improve availability, accessibility, utilization and quality of EmONC services. So, findings of this review will also inform sub-sectoral strategies, such as the Fast Track Initiative, which are aligned with EmONC.

The commitment of the Government of Cambodia to EmONC goes beyond strategies and plans. The policy environment for EmONC is enabling. The MoH encourages institutional delivery, offers a financial incentive for each birth in a public health facility, and proposes a reasonable midwifery staffing standard for facilities, including at least two secondary midwives per health centre.

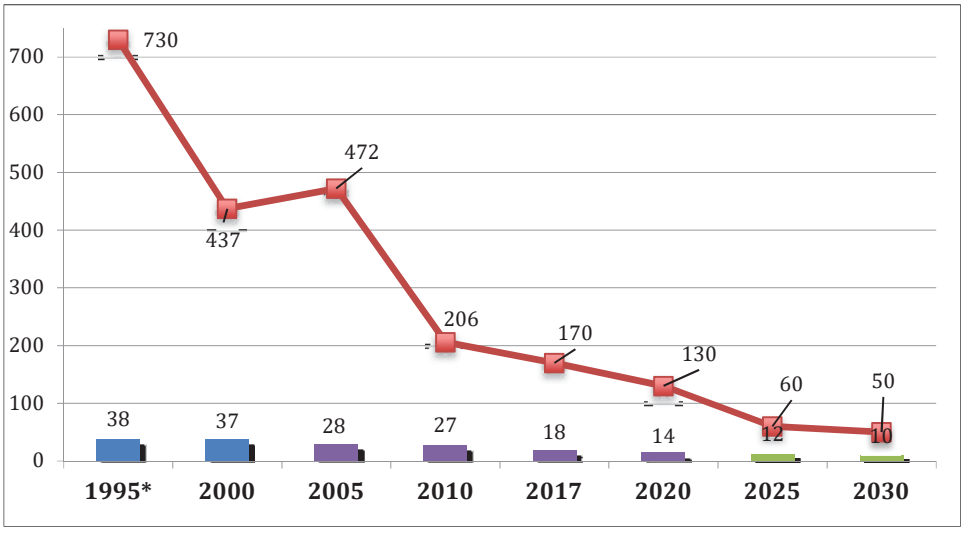
1.4 Status of maternal and neonatal health in Cambodia

Maternal mortality and other related indicators

Cambodia has enjoyed great success in improving outcomes for pregnant mothers and newborns this decade, especially a significant reduction in maternal mortality. Figure 1-1 below shows the trend in maternal mortality across Cambodia from 1995-2017 and projected values if the trend continue through to 2030, when the SDGs are to be achieved. All values have wide confidence intervals.

As can be seen from figure 1-1, the maternal mortality ratio per 100,000 live births decreased from 730 in 1995 to 170 in 2017. The FTIRM target for MMR is 130 per 100,000 live births by 2020. The achievement of this target will not be known until the results of the Cambodia Demographic Health Survey is available to the public in November 2020. Given the current trend, it is expected Cambodia will come close to achieving this target and other indicators will show continued improvement such as skilled birth attendance, deliveries in health facilities, Antenatal Care (ANC2+), deliveries by Caesarean section, and referral covered by health equity funds (HEFs).

Figure 1-1: Maternal and Neonatal Mortality in Cambodia[5]



5 Sources: *1990 and 1995: Trends in MMR 1990 to 2015 – WHO, UNICEF, UNFPA, the WB Group and United Nations Population Division 2015; 2000, 2005, 2010, and 2014: CDHS; 2020, 2025, and 2030: estimates based on SDG target

Cambodia's hard work has paid off. A recent report[6] identifies Cambodia as one of five countries globally that has achieved a reduction in maternal mortality of at least 66% between 2000 and 2017. The effort that has gone into achieving this success is to be commended.

Neonatal mortality

Neonatal mortality rates have dropped in recent years, from 38 neonatal deaths per 1000 live births in 1995 to 18 per 1000 live births in 2017 (see figure 1-1); sepsis and complications of delayed care-seeking have been important factors contributing to newborn mortality. The trend in neonatal mortality (newborn deaths in the first 28 days per 1,000 live births) covers the period between 1995 and 2020, and extends with a projected value until the end of the SDG era (2030). Newborn deaths have not, and are not expected to continue to decrease as fast as maternal deaths over time.

Regionally, the newborn mortality rate varies significantly from province to province. In Mondul Kiri and Ratank Kiri provinces neonatal mortality is high (36 neonatal deaths per 1000 live births), while in Battambang and Pailin neonatal mortality is lower (12 per 1000 live births)[7]. Nonetheless the national rate is still nearly three times higher than the World Health Organization Western Pacific regional average of 6.5, and a child born in Cambodia is still significantly more likely to die than one born in a high-income country[8.]

1.5 EmONC Improvement Plan 2016-2020

This section is an overview of the EmONC Improvement Plan (2016-2020). It includes goals and objectives, interventions and progress achieved under each output. See annex 1 for progress made towards achieving the EmONC Improvement Plan targets and other indicators.

Goal and objectives

The goal of the 2016-2020 EmONC Improvement Plan was to reduce maternal and newborn deaths and contribute to the EmONC component of the Government of Cambodia 2016-2020 Fast Track Initiative Road Map for Reducing Maternal and Newborn Mortality. Objectives and targets are below:

- Improve EmONC **availability** so that there are at least 5 EmONC (CEmONC and BEmONC) facilities per 500,000 population, including at least 1 CEmONC and at least 4 BEmONC facilities per 500,000 population (UN Process Indicator #1). This translates into a target of at least 160 EmONC facilities, including at least 35 CEmONC (> 1 per 500,000 population) and at least 125 BEmONC facilities (> 4 per 500,000 population) by 2020. To ensure that this target was reached, a total of 180 facilities were identified for upgrading or maintenance, with the priority on expanding coverage of BEmONC, (145 facilities), while maintaining progress in the availability of CEmONC, (35 facilities),
- Ensure greater **accessibility** to EmONC through improved geographic distribution of EmONC facilities throughout the country and a more functional referral system,
- Ensure effective **utilisation** of EmONC services in order to meet at least 90% of need, through improved communications, effective referrals, delivery of quality services (the 3 delays), continued reductions in financial barriers, and community participation,
- Improve the **quality** of care by strengthening the competencies of staff in designated EmONC facilities to perform key signal functions. Cambodia should reach or exceed UN standards for EmONC process indicators on proportion of births in EmONC facilities, met need, Caesarean

6 Trends in Maternal Mortality 2000 to 2017. Estimates by WHO, UNICEF, UNFPA, World Bank Group and the UN Population Division (2019)

7 National Institute of Statistics, Directorate General for HC, International ICF. Cambodia Demographic and Health Survey 2014. Phnom Penh, Cambodia: National Institute of Statistics/Cambodia, Directorate General for Health/Cambodia, and ICF International; 2015.

8 Hug L, Sharrow D, Danzhen Y. Levels & trends in child mortality, report 2017: estimates developed by the UN Inter-agency Group for Child Mortality Estimation. United Nations Children Fund; 2017

delivery, and direct obstetric case fatality rate (See section 3 for UN Process Indicators). Specifically, Caesarean deliveries should be at 10 percent (10%) of expected births nationally by 2020, with no province below 3.5% and Phnom Penh not above 17%,

- Strengthen the **capacity** of PHDs and lower level administrative structures to plan, manage, monitor, and support EmONC services and ensure high quality of care,
- Reduce remaining **financial barriers** to EmONC services. Ensure that all women in reproductive age have access to full package of key reproductive maternal and newborn health services without financial hardship, when needed.

Key interventions

Key interventions supported by the Improvement Plan included: upgrading facilities and staffing, GIS mapping of EmONC facilities to ensure geographic coverage, reducing gaps in basic drugs and equipment, increasing staff competencies through training and on-site coaching, enabling availability of 24/7 EmONC services, improving management coordination, monitoring and evaluation by the National Program and Provincial Health Departments, and improving the recording and reporting of obstetric and newborn complications and deaths at health facilities. Interventions were to be implemented at both national and provincial levels, according to phased annual plans.

Interventions have been focussed to achieve the following seven outputs:

1. Policies and strategies are in place for a supportive and enabling environment
2. Adequate coverage of EmONC facilities (availability, and accessibility) assured throughout the country
3. Technical and managerial capacity strengthened to ensure high quality care.
4. Increased utilisation of EmONC services to reduce unmet needs
5. Referral system in place and operation
6. Provincial EmONC plans developed, operational and monitored
7. Community participation strengthened to increase utilisation

Progress made

The implementation of the 2016-2020 EmONC Improvement Plan has resulted in impressive gains in the availability and utilisation EmONC across Cambodia. Progress made towards achieving the targets in both the EmONC Improvement Plan (2016-2020) and Fast Track Initiative (2016-2020) are in annex 1. A summary of progress in each of the seven (7) outputs in the EmONC Improvement Plan (2016-2020) are in table 1-1 below.

Table 1-1: Progress against EmONC Improvement Plan (2016-2020) outputs	
Outputs	**Progress**
Output 1: Policy and strategies in place for a supportive and enabling environment	Under this output policies and strategies were to be put place to support EmONC at all levels of service delivery. The Government of Cambodia and the MCH sub-TWG at a central level continue to provide high level advocacy and ongoing support for the implementation of EmONC which is priority of the Government of Cambodia. Standards and protocols for staffing, equipment and case management have been upgraded as needed and have been distributed to EmONC facilities. Efforts have been made to strengthen blood/depots and banks in all EmONC facilities with limited success. Standards for equipment, supplies and drugs needs strengthening and PHDs need to be mobilised to taking a leading role in in planning, supervision and monitoring.
Output 2: Adequate coverage of EmONC facilities (availability, and accessibility, including financial accessibility) assured throughout the country	The coverage of EmONC facilities across Cambodia has improved. There is now a network of 80 functional facilities providing EmONC (35 CEmONC and 45 BEmONC facilities). There is still a shortage of 74 -88 BEmONC facilities. However data suggests there is a significant gap in coverage of BEmONC at the lower levels of the health system (CPA 1 referral hospitals and health centres). With increased utilisation of EmONC services it would be timely for the national MoH to allow more flexibility when classifying BEmONC facilities. Flexibility can only be applied for Basic EmONC facilities and not for Comprehensive EmONC facilities. CEmONC facilities must always meet the benchmark of 9 signal functions in a 3-month period.
Output 3: Technical and managerial capacity strengthened to ensure high quality care	Skilled birth attendance at all deliveries is improving, competent and qualified midwives and the concept of a team approach are becoming more the norm in EmONC facilities. Quality of care has improved through a team approach, training skills development and coaching in selected EmONC facilities. Efforts in this area should be commended. The quality of data and reporting is slowly improving. More effort is needed in in areas like referral and newborn care and recording of charts such as partographs. There is a maternal and newborn audit in place but the processes audit need strengthening. Staff levels and workloads need to be reviewed, pre-service should become an essential part of education for health professionals and in-service training needs need regular review and training. Regional training sites need strengthening to support clinical training and management.
Output 4: Increased utilisation of EmONC services to reduce unmet needs	This output is cross-cutting. Utilisation of EmONC increases the coverage of services making EmONC more accessible to women of reproductive age. Likewise, better identification of obstetric and newborn complications and the availability of 24/7 quality EmONC services supported by competent staff and referral will also reduce unmet need related to EmONC. While the number of CEmONC facilities meets UN coverage standards and there is a shortfall of at least 74 BEmONC facilities, a clearer picture of the distribution of EmONC facilities is needed. Also, as the network of EmONC facilities across Cambodia is strengthened, the low caseload at lower level facilities becomes a barrier to perform seven(7) BEmONC signal functions. A decision is needed on how facilities providing a limited number of signal functions should be classified.

Table 1-1: Progress against EmONC Improvement Plan (2016-2020) outputs	
Outputs	**Progress**
Output 5: Referral system in place and operational throughout the country	Referral has been strengthened through improved communication, improved roads and availability of transport around the clock. As a result the minimum travel time of 2 hours from any point in the country, to a health facility, has been assured in the great majority of villages. There are still areas which need significant attention. Important gaps remain in identification of complications necessitating referral, compliance with referral procedures, competency of accompanying personnel, availability of emergency kits in ambulances, patient comfort, first aid or stabilization training of ambulance staff, reception and rapid access to appropriate care at the end point, maintenance of ambulances and reporting of referrals.
Output 6: Provincial EmONC plans developed, operational and monitored	PHDs were to have an important role to play in planning, developing partnerships, mobilizing resources, managing, supervising monitoring, supporting and evaluating provincial EmONC plans. Activities under this output were to support regular supervision, monitoring and capacity building of PHDs and ODs to support management improvement. Once the capacity was developed within PHDs then they were to be encouraged to support planning, supervision and monitoring within a province. At a provincial level, Provincial Health Departments (PHDs) were to support supervision, planning and scale-up of EmONC at a provincial level. They were also to have a key role in facilitating; certification of EmONC facilities, provincial partnerships to support resource mobilisation, expanding the supply of blood through CEmONC facilities and more. The extent to which this was achieved and the capacity of individual provinces to show such leadership varies from province to province.
Output 7: Community participation strengthened to increase utilisation	Activities under this output need attention. Community participation and engagement through the Health Centre Management Committee (HCMC) and Commune Councils (CCs), need to be strengthened. This output was in both the first and current EmONC Improvement Plans. However, the link to the community to support EmONC has not been achieved. Communities are likely to be strongly interested in the performance of EmONC facilities. Local entities such HCHCs and CCs should be encouraged to participate in meeting the planning, construction, rehabilitation, equipment and referral needs of EmONC facilities. They may also be encouraged to participate in quality assessment and monitoring. It is recommended that under the next EmONC Plan more emphasis should be given to engagement and participation of the community.

1.6 Rationale for the current review

It is now 10 years since the Baseline EmONC Assessment in Cambodia 2009, and the first EmONC Improvement Plan 2009-2014, and 5 years since the second EmONC Improvement Plan 2016-2020. EmONC facilities have been substantially rolled out across the country with gradual quality improvement and assurance. The findings in this report will help the Ministry of Health to review progress made since the implementation of the last two Improvement Plans and assist policy makers and programme managers to design more effective plans, services, and strategies for accelerating the improvement of EmONC and hence reduction the maternal and newborn morbidity and mortality in Cambodia.

1.7 Organisation of this report

There are 14 sections in this report:

- Sections 1 and 2 provide contextual information relevant to the review and the methodology,
- Sections 3 and 4 assess the status of EmONC in Cambodia against UN Indicators and EmONC signal functions,
- Section 5 focus on other vital/essential maternity services which complement EmONC,
- Section 6 reviews the status of early newborn care and how it can be strengthened in Cambodia and the feasibility of introducing additional signal functions for Emergency Newborn Care (EmNC) into Cambodia,
- Sections 7 and 8 focus on availability of basic infrastructure, services and essential drugs, equipment and supplies to support EmONC,
- Section 9 addresses the findings in relation to referral and communications,
- Sections 10 and 11 focus on human resources and their capacity to provide EmONC,
- Section 12 reviews partograph as a case study,
- Section 13 is dedicated to Ratanak Kiri and Mondul Kiri Provinces. These two provinces in the North East of Cambodia are more remote,
- Section 14: contains the final section that includes barriers and recommendations,
- Section 15: is a collection of annexes to be used as a resource of additional information.

2. APPROACH AND METHODOLOGY

2.1 Study design and selection of facilities

A cross-sectional study design was used to give a picture of the current status of EmONC across Cambodia, and the progress made in implementing the 2016-2020 EmONC Improvement Plan. One hundred and eighty one (181) facilities across Cambodia were purposely selected for inclusion into the study. These health facilities were identified during the 2014-2015 EmONC Review and were targeted in the 2016-2020 EmONC Improvement Plan for upgrade and strengthening to provide EmONC[9].

Note: Based on UN standards of availability and distribution the 2009 EmONC assessment recommended an EmONC network of 34 CEmONC and 105 BEmONC facilities (139 facilities) for Cambodia. Since the baseline, the network has been increased to 181 facilities because of an increase in population, the need to address distribution issues, and recommendations of the MoH. **The 181 facility network builds off of the 2009 EmONC baseline network.**

Additionally, 37 health facilities have been assessed in Ratanak Kiri and Mondul Kiri Provinces and are a separate sub-set of data. KOICA is undertaking an MCH project in these provinces and requires a baseline to inform implementation of EmONC and other MCH interventions in their project. The 37 facilities assessed are all health facilities in the two provinces which have potential to provide, or are already providing, EmONC. Eight of the 37 facilities assessed were also included in the 181 facilities in the EmONC network.

There were two subsets of data analysed; the 181 facilities in the EmONC network and the 37 health facilities in Ratanak Kiri and Mondul Kiri Provinces which have the potential to provide EmONC. There were 8 facilities included in **both** sub-sets[10]. In total, 210 facilities were surveyed.

Table 2-1 shows the total number of facilities surveyed in the current and previous EmONC assessments/reviews. The 2020 study total includes the two sub-sets of data.

Table 2-1: Number of facilities surveyed for current study and previous EmONC assessments/reviews **

Health facilities*	2009 EmONC Baseline assessment	2014 Review of EmONC Improvement Plan	2020 EmONC Review		
			EmONC Improvement Plan	Additional health facilities for Mundul Kiri and Ratanak Kiri	Study total
Total national hospitals	4	4	5	0	5
Total referral hospitals	73	87	110	0	110
Private facilities	40	0	0	0	-
Total health centres	230	89	66	29	95
Total facilities	**347**	**180**	**181**	**29**	**210**

* Facilities capable of providing maternity services

** The current review includes two subsets of data. See table 2-3.

9 A network of 180 facilities were identified during the 2014-2015 review. An additional facility was added to the EmONC Improvement Plan (2016-2020) by the MoH. So, by 2010 the total EmONC network is 181 health facilities.

10 In total 37 facilities were assessed in Ratanak Kiri and Mundul Kiri provinces. Eight (8) facilities (2 Hospitals in Ratanak Kiri, 2 hospitals in Mundul Kiri, 2 health centres in Ratanak Kiri and 2 health centres in Mundul Kiri) are included in the 181 facilities as either EmONC facilities and /or designated facilities for upgrade to EmONC status.

Table 2-2 shows the distribution of hospitals and health centres assessed by province for the EmONC network (facilities in the EmONC Improvement Plan 2016-2020). In total there are 181 EmONC facilities divided into 2 categories. 80 functional EmONC facilities and 101 designated EmONC facilities for upgrade and/or strengthening.

Table 2-2: All health facilities assessed by province in the 2016-2020 EmONC Improvement Plan review*

Provinces	Hospitals	Health centres	Total assessed
Banteay Meanchey	9	2	11
Battambang	6	8	14
Kampong Cham	7	3	10
Kampong Chhnang	3	4	7
Kampong Speu	4	5	9
Kampong Thom	3	5	8
Kampot	5	2	7
Kandal	8	4	12
Koh Kong	2	0	2
Kratie	3	2	5
Mondul Kiri	2	2	4
Phnom Penh	14	5	19
Preah Vihear	2	3	5
Prey Veng	11	0	11
Pursat	4	1	5
Rattank Kiri	2	2	4
Siem Reap	5	3	8
Preah Sihanouk	1	2	3
Stoeung Treng	1	2	3
Svay Rieng	6	2	8
Takeo	7	2	9
Oddar Mean Chey	2	2	4
Kep	1	1	2
Pailin	1	0	1
Tbong Khmum	6	4	10
Total	**115**	**66**	**181**

* No private facilities were reviewed.

** The current review includes two subsets of data. See table 2-3.

2.2 Research ethics

The study protocol was approved by the National Ethics Committee for Health Research (NECHR) in October 2019. There were no issues with the approval process. Data collectors were trained on the principles of confidentiality during pre-test training and pre-test field-work, between the 3rd and 7th February 2020. No person's name was included in the data analysis. Informed consent was obtained from the officer in-charge of each facility to visit and from interviewed staff. Data have been stored safely and will only be retrieved according to the study protocol.

2.3 Data collection tool

Data collection for the review made use of eight (8) modules developed by the Averting Maternal Death and Disability (AMDD) Program at Columbia University. The modules are standard tools that

have been used in many countries worldwide. The baseline and previous reviews used the same core modules but in 2019 modules were updated to accommodate global changes and local needs.

Table 2-3 provides, a summary of each module in the global AMDD tool and a description of how data were collected; which modules were used for each study since 2009; and how the eight (8) modules were adapted for use by the 2019-2020 Review. Adaptions included changing the modules to:

1. Align with the latest global AMDD modules[11]
2. Align with the Cambodia Safe Motherhood and Clinical Management Protocols
3. Collect data to assess progress towards Cambodia EmONC Improvement Plan targets and outputs
4. Strengthen referral and early newborn/neonatal care in selected modules
5 Include potential Emergency Neonatal Care (EmNC) signal functions to assess their feasibility in the Cambodian context

In updating the tools, the National Maternal and Child Health Centre (NMCHC)/National Reproductive Health Program (NRHP), Professor Tung Rathavy, the sub technical working group for MCH and local stakeholders were consulted for feedback on compliance with the local norms, standards and appropriateness to the Cambodian context. Once updated, reviewed and refined, the tools were translated into Khmer ready for training, pre-testing and final revision before wide-scale data collection. While changes have been made to the modules, the original 2009-2010 baseline was maintained.

11 The most recent global tools used in other countries, for example in Ethiopia, are more extensive and take more time to complete. Given the limited timeframe for the 2020 Assessment, a judicious review of these modules was undertaken to inform how the core modules could be maintained but improved.

Table 2-3: The Global AMDD Tool showing how selected modules have been adapted for use in Cambodia

	Information collected with the Global Tool**	How data are collected	Use by Cambodia	Adaptions for use in Cambodia (2019-2020)
Module 1	**Identification of Facility and Infrastructure:** Size or capacity, overall infrastructure, summary of services provided, cost of services, policies in place at the facility, and HIS reporting	Photographing and taking the GPS coordinates of the facility, interviewing a person of authority at the facility	Baseline 2009-2010 Review 2014-2015 Review 2019-2020	GPS coordinates will not be taken. In 2016 A study was undertaken by WHO to review EmONC coverage using GPS Coordinates. The following has been added to the module: • Questions to guide decision-making about coverage of EmONC (time to reach a health facility and nearest EmONC facilities) • A Payment for Services and Financial Barriers section • Questions on PNC, management support, the HIS and community engagement through the HCMC. These questions are linked to EmONC Improvement Plan Outcomes
Module 2	**Human Resources:** Staffing patterns of health care workers providing obstetric and newborn care at the facility and which signal functions and essential services the staff provide. It also covers the staffing situation 24 hours 7 days a week in that facility	Interviewing one or more persons with excellent knowledge of staffing patterns for obstetric and newborn care.	Baseline 2009-2010 Review 2014-2015 Review 2019-2020	The following changes have been made to this module: • Newborn signal functions and the availability of MOH Infection Control Guidelines have been added to this module • EmONC training has been updated to include onsite clinical coaching and mentoring • Training questions now include EoC, ENC and other EmONC related short courses and in-service. (Training related to each individual signal function will also be asked)
Module 3	**Identification of Facility and Infrastructure:** Size or capacity, overall infrastructure, summary of services provided, cost of services, policies in place at the facility, and HIS reporting	Photographing and taking the GPS coordinates of the facility, interviewing a person of authority at the facility	Baseline 2009-2010 Review 2014-2015 Review 2019-2020	GPS coordinates will not be taken. In 2016 A study was undertaken by WHO to review EmONC coverage using GPS Coordinates. The following has been added to the module: • Questions to guide decision-making about coverage of EmONC (time to reach a health facility and nearest EmONC facilities) • A Payment for Services and Financial Barriers section • Questions on PNC, management support, the HIS and community engagement through the HCMC. These questions are linked to EmONC Improvement Plan Outcomes
Module 4	**Human Resources:** Staffing patterns of health care workers providing obstetric and newborn care at the facility and which signal functions and essential services the staff provide. It also covers the staffing situation 24 hours 7 days a week in that facility.	Interviewing one or more persons with excellent knowledge of staffing patterns for obstetric and newborn care	Baseline 2009-2010 Review 2014-2015 Review 2019-2020	The following changes have been made to this module: • Newborn signal functions and the availability of MOH Infection Control Guidelines has been added to this module. • EmONC training has been updated to include onsite clinical coaching and mentoring. • Training questions now include EoC, ENC and other EmONC related short courses and in-service. (Training related to each individual signal function will also be asked)

	Information collected with the Global Tool**	How data are collected	Use by Cambodia	Adaptions for use in Cambodia (2019-2020)
Module 5	**Essential Drugs, Equipment, and Supplies:** examines the availability of medications, equipment, supplies; laboratory services; and clinical management guidelines and protocols necessary for the delivery of EmONC and routine maternal and newborn services.	Primarily interview and observation	Baseline 2009-2010 Review 2014-2015 Review 2019-2020	In this module, equipment, supplies and drugs have been: • Updated to align with changes to the latest Global module and the Cambodia Safe Motherhood Protocols • Newborn care has been added as a separate section • The question on protocols is now in module 2
Module 6A and 6B	**Facility Case Summary:** Used to collect the necessary data from facility registers and records to calculate the EmONC Indicators. Data includes the number of deliveries, obstetric complications, caesarean deliveries, maternal deaths, stillbirths and neonatal deaths	Data is collected from facility registers and records for a 12-month time-period	Baseline 2009-2010 Review 2014-2015 Review 2019-2020	In previous studies quality of e.g. newborn data in facility registers was poor. Data collected in this module has been updated based on a review of CPA 3, CPA 2, CPA 1 and health centre registers. • Additional data will be collected to support newborn, teenage pregnancy and maternal death indicators. • The list of registers reviewed have been expanded to include newborn care and the availability of relevant form and records
	EmONC and EmNC Signal Functions and Other Essential Services looks at how facilities actually function and whether they offer all, some, or none of the services necessary to treat and save newborns and women with obstetric complications and why these services are not available.	Performance information is determined through interview and validation from the registers	Baseline 2009-2010 Review 2014-2015 Review 2019-2020	This module has been: • Updated to align with changes to the latest Global module and Safe Motherhood Clinical Management Protocols. • Newborn signal functions have been added to determine the feasibility of adopting them to the Cambodian context. • Additional question have been added to relating to referral and the storage of oxytocin
Module 7	**6A: Provider Knowledge** for Maternal and Newborn Care is used to assess provider knowledge and self-reported practice of the diagnosis and management of common maternal and newborn conditions; it also reviews specific training for and performance of key services.	Interviews with providers	Baseline 2009-2010 Review 2014-2015 Review 2019-2020	Changes in this module include: • Updating to align with changes to the latest global module and Cambodia Safe Motherhood Clinical Management Protocols. • Additional knowledge questions relating to PNC, Newborn Care and Referral have been added in addition to a question on simulation and clinical skills training.
Module 8:	**6B: Health Provider Supervisory Support** and Motivation assesses the provider's motivation and attitudes about her or his work environment, opportunities, and supervision	Self-administered module	Not used. Needs extensive field testing	
Modules 9A and 9B	**Partograph Review** is used to determine how many facilities use the partograph and to assess the completion of the partograph and to the extent possible, the quality of case management.	Review of 2-3 partographs	Review 2014-2015 Review 2019-2020	This module has been: • Updated to align with changes to the latest Global module and Safe Motherhood Clinical Management Protocols. • A question on referral has been added
	Caesarean Delivery Review evaluates the record-keeping for caesareans, indications for c-sections,	Review of facility registers and records	Not used.	

	Information collected with the Global Tool**	How data are collected	Use by Cambodia	Adaptions for use in Cambodia (2019-2020)
	foetal well-being, and maternal outcome of the procedure		Needs extensive field testing	
Module 10	**9A: Case Reviews of Women who Survived Obstetric Complications** is designed to elicit information on the management of women with major obstetric complications such as postpartum haemorrhage, severe pre-eclampsia or eclampsia, and peri-partum infection	Chart reviews; including client history, status on admission, antecedents and treatment, and newborn outcomes	Needs extensive field testing	
Module 11	**9B: Maternal Death Review** is designed to collect detailed information on the last two women who died from direct or indirect obstetric complications in health facilities as well as information on contributory factors associated with maternal deaths.	Data collectors pull information from charts identified through the registries or from staff.	Cambodia has a Maternal Death Review Process	
Module 12	**Chart Reviews of Newborn Complications** has been designed to collect information on two cases each of the following morbidities: difficulties breathing at birth, preterm birth <2,000 grams, and infections among young infants (<60 days). The module asks about the status on admission and treatment	Information is pulled from charts identified through the registries or from staff.	Needs extensive field testing and quality of newborn care data and reporting is poor	
Module 13	**Referral for Obstetric and Newborn Clients** assesses the availability of services for emergencies, indications or reasons for referral, transportation, communication, management and policies for referral out and in. This module is conducted by interview	Filled in by interviewing a person of some authority at the facility	Review 2014-2015 Review 2019-2020	This module has been: • Updated in line with changes to the latest Global module and Cambodia Safe Motherhood Clinical Management Protocols. • Clinical protocols have been taken out as they are in Module 2. • Questions on referral have been revised to try and improve the quality of data collected.
Module 14	**Maternity Waiting Homes** includes information on the existence and status of maternity waiting homes (MWH) or rooms at health facilities. It also includes a brief set of questions targeted at women who are staying at the MWH at the time of the visit	This module is conducted by interview	The MoH has limited resources to support Maternity Waiting Homes	

** Adapted from Ethiopian Emergency Obstetric and Newborn Care (EmONC) Assessment 2016

2.4 Organisation of fieldwork and data collection

Data collectors were oriented to the methodology and trained in the use of the tools before fieldwork started. Four teams collected the data. Each team had a supervisor and four data collectors. Teams were mainly midwives or doctors who had previous experience in EmONC data collection. These teams used the global tools to assess the functional status of EmONC facilities in the 3-month and 12-month period preceding the survey. Methods used included reviewing registers and records, observation, and interviewing staff and managers of the health facilities.

Facilities were then assessed for the availability of supplies, equipment, staff and basic infrastructure to support EmONC facilities referral and user fees. In total, 210 public health facilities in all 25 provinces of Cambodia and 37 public health facilities in Ratanak Kiri and Mondul Kiri Provinces were visited (table 2-3).

To assess the availability, functioning, and utilization of EmONC facilities and the services provided, persons responsible for the facility and gynaeco-obstetric were interviewed and relevant records (registers, logbooks, delivery book, patient files, etc.) were reviewed. A walk-through of EmONC facilities helped validate the availability and functioning of necessary equipment, materials, medicines/drugs, general hygiene, cleanliness, etc.

2.5 Data entry and analysis

Data management was undertaken by four data entry experts, supervised by a survey coordinator. Stata 12 Software was used for data analysis to compute means and proportions of relevant variables. An Excel program spreadsheet, developed by the international consultant, based on AMDD guidelines, was used to compute UN EmONC Indicators such as: estimated number of EmONC facilities required; number of women giving birth; number of women with obstetric complications; number of Caesarean sections; number of maternal deaths from direct and indirect obstetric causes; etc.

Data sub-sets:

As already discussed, two main data subsets were analysed; the 181 facilities in the EmONC network and the 37 health facilities in Ratanak Kiri and Mondul Kiri Provinces which have the potential to provide EmONC. There were 8 facilities common to **both** sub-sets[12].

EmONC network or sub-set 1

The 181 facility network builds off of the 2009 EmONC baseline network. Since the baseline, the network has been increased to 181 facilities because of an increase in population, the need to address distribution issues, and recommendations of the MoH. For health facilities in sub-set 1, data have been analysed for two groups of facilities – those that were identified as fully functional EmONC facilities and ALL facilities surveyed, which includes the functional EmONC and the facilities identified for strengthening.

12 In total 37 facilities were assessed in Ratanak Kiri and Mundul Kiri provinces. Eight (8) facilities (2 Hospitals in Ratanak Kiri, 2 hospitals in Mundul Kiri, 2 health centres in Ratanak Kiri and 2 health centres in Mundul Kiri) are included in the 181 facilities as either EmONC facilities and /or designated facilities for upgrade to EmONC status.

Ratanak Kiri and Mondul Kiri or sub-set 2

The second sub-set comprises the two north east provinces of Ratanak Kiri and Mondul Kiri which are the most remote and marginalised areas in Cambodia. There are 37 facilities in this subset. The subset includes 8 facilities from the EmONC network.

Table 2-4 shows the sub-sets and overlap between them. In total, 210 facilities have been surveyed.

Table 2-4: Number of facilities surveyed showing the two sub-sets reviewed and overlap between sub-sets

	Sub-set 1	Sub-set 2	Facilities in both sub-sets	
Health facilities*	**Network of facilities**	**Ratanak Kiri/ Mundul Kiri Provinces**	**Facilities in Ratanak Kiri/ Mundul Kiri included in both subsets**	**Study total (considering overlap between the 2 subsets)**
Total national hospitals	5	0	0	5
Total referral hospitals	110	4	4	110
Total health centres	66	33	4	95
Totals	181	37**	8	210

* Facilities capable of providing maternity services ** 8 of these facilities were also common sub-set 1.

2.6 Data quality assurance

To ensure data quality, the following procedures and activities were applied before training, during training, data collection and data processing:

Before training: To assure high quality data, data collectors and supervisors will be selected based on their experiences as data collectors/supervisors in the last two Cambodia EmONC studies and other health related surveys, such as the Cambodia Demographic and Health Survey (CDHS), Medical Abortion Study, the recent 2018 Hepatitis B Seroprevalence Survey, etc.

During training: Training of data collectors was centralized in PP. All members of the survey team received a 4-day training including field practice, to clearly understand the survey protocol, data collection tools (all modules), data quality check in the field, and the process of keeping collected data in a safe and secure place before transferring to headquarters at the UHS.

The trainers discussed module by module, question by question; what persons to interview; places to gather and extract the data; and how to do this. Role-play and mock interviews were conducted for both data collectors and field supervisors.

During data collection: At the end of the day, before leaving the facility, data collectors and field supervisors checked all the modules for completeness-all required information was complete; and internal consistency across modules-all connected values of the same variables had to be the same. In addition, field supervisors ensured that all data collectors followed the instructions and protocol given during the training.

During data processing (Entry and Cleaning): The data interface was similar to data collection forms and standardized for the 4 data entry experts. A double data entry process was used. The second data entry expert entered the same data that the first data entry expert had already entered. If the values were outside of the set range or restricted field, or were 'unusual' values, the data entry expert would immediately note this in the logbook provided and inform the supervisor who in turn would clarify with the field supervisor and data collector.

2.7 Limitations of the review

- The current review includes public health facilities only, all managed by the MoH. Less than half (43.9%) of all deliveries take place in public health facilities, while 9.9%[13] deliver in private facilities. Data from the latest CDHS is not available. As the maternity hospitals are popular in Cambodia and births in MoH facilities are less than 40% of expected deliveries (see indicator 3), facility-based births are likely to be underestimated, as is the Caesarean section rate. The exclusion of the private maternity facilities is a serious limitation of this review.
- The baseline identified a network of facilities that were either functioning as EmONC facilities and/or had the potential to be strengthened to provide EmONC. For the 2014 and current review, only the network of functional and designated EmONC facilities has been reviewed. This calls into question the sampling method and the extent to which reviews can be compared with the baseline, which included the private sector. As a similar sampling method is being used for the reviews the "review" data are reasonably comparable. In time, Cambodia will need to consider a census of all health facilities to determine the status of EmONC across the country.
- The 2009 EmONC assessment recommended an EmONC network of 34 CEmONC and 105 BEmONC facilities (139 facilities) for Cambodia. Since the baseline, the network has been increased to 181 facilities to take account of an increase in population, the need to address distribution issues, and recommendations of the MoH. As more facilities are added to the network this undermines the comparability to previous assessments and reviews.
- The KOICA MCH sub-set includes 8 facilities, common to both subsets. The baseline is for two provinces and can only be applied to Ratanak Kiri and Mondul Kiri provinces and not generalized to the network of 181 provinces. Generalising the data to a wider population will undermine the integrity of the findings of both datasets.
- The outbreak of the Coronavirus (Covid-19) in the early stages of the review provided challenges. Field and team-work proved difficult as "lock-down" laws were introduced. Travel restrictions meant international consultants had to work remotely. This was less than ideal. At a local level, team members were asked to work from home and/or work in offices under social distancing rules. This impacted negatively on the time-line for the review.
- The sources of data for generating UN EmONC process Indicators are based on various registers maintained in the health facilities. Significant gaps were present in the availability and the quality of data, which has been a challenge and constraint for the review.

13 National Institute of Statistics, Directorate General for Health, and ICF International, 2015. Cambodia Demographic and Health Survey 2014. Phnom Penh, Cambodia, and Rockville, Maryland, USA: National Institute of Statistics, Directorate General for Health, and ICF International. The 2020 CDHS will be released in November 2020 CDHS 2014.

- Given the limited timeframe and resources, the study is ambitious. The full potential for reviewing the status of EmONC across Cambodia was constrained. Case reviews or audits (of Caesarean deliveries, obstetric and newborn morbidities or deaths) and areas such as financial accessibility, were not explored adequately. Although GIS mapping has been undertaken in Cambodia by WHO the resources were not available to build on this work. Likewise, training of data collectors was constrained by the limited resources and restrictive timeline.

3. FINDINGS: EMERGENCY OBSTETRIC AND NEWBORN CARE INDICATORS

This section reports on progress made against the eight (8) UN global EmONC standards[14] which have served as an EmONC baseline for Cambodia since the 2009 assessment. Baseline Indicators have been used to monitor the availability, functioning and utilisation of a network of 139 EmONC facilities across Cambodia. Since the baseline, the network has been increased to 181 facilities because of an increase in population, distribution issues, and recommendations of the MoH.

3.1 UN EmONC indicators

UN EmONC standards have been applied to the current review data to determine if the status of EmONC across Cambodia has improved since 2009 and if the goals and targets of the 2016-2020 EmONC Improvement Plan have been met. Indicators are:

- Indicator 1: Availability of basic and comprehensive emergency obstetric care
- Indicator 2: Geographic distribution of emergency obstetric care facilities
- Indicator 3: Proportion of all births in emergency obstetric care facilities
- Indicator 4: Met need for emergency obstetric care
- Indicator 5: Caesarean sections as a proportion of all births
- Indicator 6: Direct Obstetric case fatality rate
- Indicator 7: Intrapartum and very early neonatal death rate
- Indicator 8: Proportion of maternal deaths due to indirect causes in emergency obstetric care facilities

The UN EmONC Indicators help answer the following questions:

- Are there sufficient facilities providing EmONC?
- Are they well distributed?
- Are enough women using them? What obstacles hinder access to services?
- Are the right women using them?
- Are enough critical services being provided?
- Is the quality of the services adequate?
- Are there any referral systems in place? Are they functioning?

The calculation of indicators made use of guidelines developed by UNICEF/WHO/UNFPA[15] and facility data collected retrospectively during the current review for a for twelve (12) month period (January 2019 – December 2019). Table 3-1 lists each of the indicators and describes how the indicators were calculated.

14 WHO, UNFPA, UNICEF and AMDD., Monitoring emergency obstetric care: A handbook, WHO, 2009
15 Ibid

Table 3-1: A Summary of the UN EmONC indicators and method of calculation					
	Indicator	**Description**	**Numerator**	**Denominator**	**Acceptable Level**
1&2*	Availability of EmONC (national or sub-national)	Ratio of facilities providing EmONC to population and geographical distribution of EmONC facilities	No. of facilities in Cambodia providing Basic or Comprehensive EmONC	Population of area divided by 500,000	≥ 5 EmONC facilities per 500 000 population
			No. of facilities in Cambodia providing Comprehensive EmONC	Population of area divided by 500,000	≥ 1 Comprehensive per 500 000 population
3	Proportion of all births in EmONC facilities	Proportion of all births in population in EmONC and all facilities	No. of women giving birth in EmONC facilities in specified time period	Expected no. of births in Cambodia in same time period	15%
4	Met Need for EmONC	Proportion of women with major direct obstetric complications treated at EmONC facilities and all facilities	No. of women with major direct obstetric complications treated in EmONC facilities in specified time period	Expected no. of women with severe direct obstetric complications in area in same time period**	100%
5	Caesarean sections as a proportion of all births	Proportion of all births by Caesarean section taking place in EmONC and all facilities in the population	No. of Caesarean sections in EmONC facilities in specified time period	Expected no. of births in area in same time period	5% – 15%
6	Direct obstetric case fatality rate (DOCFR)	Proportion of women with major direct obstetric complications who die in an EmONC and all facilities	No. of maternal deaths due to direct obstetric causes in EmONC facilities in specified time period	No. of women treated for direct obstetric complications in EmONC facilities in same time period	< 1%
7	Intrapartum and very early neonatal death rate	Proportion of births that result in an intrapartum death or a very early neonatal death occurring within the first 24-hours in EmONC and all facilities	No. of intrapartum deaths (fresh stillbirths; > 2.5 kg) and very early neonatal deaths (≤24-hours; > 2.5 kg) in EmONC facilities in specified time period	No. of women giving birth in EmONC facilities in same time period	To be decided (new indicator being tested)
8	Proportion of maternal deaths due to indirect causes	Out of all maternal deaths in EmONC facilities, what % are due to indirect causes in EmONC and all facilities	No. of maternal deaths due to indirect causes in EmONC facilities in specified time period	All maternal deaths (from direct and indirect causes) in EmONC facilities in same time period	None set (new indicator being tested)

3.2 Indicator 1: Availability of EmONC facilities

Recommended Level: For every 500,000 of population there should be ***at least*** five EmONC facilities (including ***at least*** one Comprehensive EmONC facility)

Are there enough facilities providing EmONC?

The availability of EmONC is determined by the number of facilities that perform a complete set of signal functions in relation to the size of the population. For Cambodia a functional EmONC facility has been determined by the performance of 9 or 7 signal functions in the **3-months** prior to the assessment. These signal functions are discussed in the next section of this report.

IMPORTANT: To be considered a functional EmONC facility; the facility needs to meet global UN standards. These standards include the provision of **ALL** (7) Basic and/or **ALL** (9) Comprehensive signal functions in the three months prior to an assessment.

The review found that there are 2.62 EmONC facilities per 500,000 per population and 1.48 BEmONC facilities per 500,000 population (see table 3-2). Although the number of CEmONC facilities are adequate in terms of coverage and there has been a small increase in functional BEmONC, the gap in BEmONC does not meet the 2020 target (4 BEmONC facilities per 500,000 of population).

Table 3-2: EmONC coverage and targets in the EmONC Improvement Plan 2016-2020

	2009	Late 2014-2015	Target for 2020	Status 2020		Remarks
	7 and 9 signal functions performed in the last 3-months	7 and 9 signal functions performed in the last 3-months		7 and 9 signal functions performed in the last 3-months	7 and 9 signal functions performed in the last 12-months	
# EmONC facilities per 500,000 population	1.64	2.35	At least 5 (>160 facilities)[16]	2.62 (80 facilities)	3.63 (111 facilities)	Gap in coverage of BEmONC Does not met targets
# of BEmONC facilities per 500,000 population	0.71	1.04	At least 4 (> 133)	1.48 (45 facilities)	2.32 (71 facilities)	
# of CEmONC facilities per 500,000 population	0.93	1.31	At least 1 (>48)	1.14 (35 facilities)	1.31 (40 facilities)	Met

From tables 3-2 and 3-3 it can be see that if the time-frame for the performance of the seven (7) BEmONC signal functions were extended to twelve (12) months then the number of functional BEmONC facilities would increase from forty-five (45) to seventy-one (71) and the EmONC coverage would increase from 2.62 to 3.63 EmONC facilities per 500,000 population. Given private facilities are excluded from the EmONC network, a 12-month time-frame for BEmONC facilities to perform the 7 BEmONC signal functions would be a more realistic target.

16 EmONC Improvement Plan "Designated CEmONC and BEmONC facilities will be upgraded or maintained at their previous level, so that by the end of 2020, between 160 and 181 facilities will be able to provide the 9 or 7 signal function for CEmONC and BEmONC respectively".

Table 3-3: Number of functional*EmONC facilities surveyed (Progress since the 2009 baseline EmONC assessment)						
EmONC classification	**Number of facilities performing signal functions in last 3-months**			**Number of facilities performing signal functions in last 12-months**		
	2009	**2014**	**2020**	**2009**	**2014**	**2020**
CEmONC	25	35	35	31	37	40
BEmONC	19	28	45	27	43	71
Total	**44**	**63**	**80**	**58**	**80**	**111**

* Functional means has performed a full package of signal functions in the 3-months prior to the review. If a facility was not functional in the 3-months before the review, data collectors reviewed registers to see if signal functions were performed 12-months before the review.

Figure 3-1 and 3-2 showed the coverage of functioning CEmONC and BEmONC facilities 3-months and 12-months prior the EmONC review 2020 by province.

Figure 3-1: Coverage of functioning EmONC facilities 3-months prior the EmONC review 2020

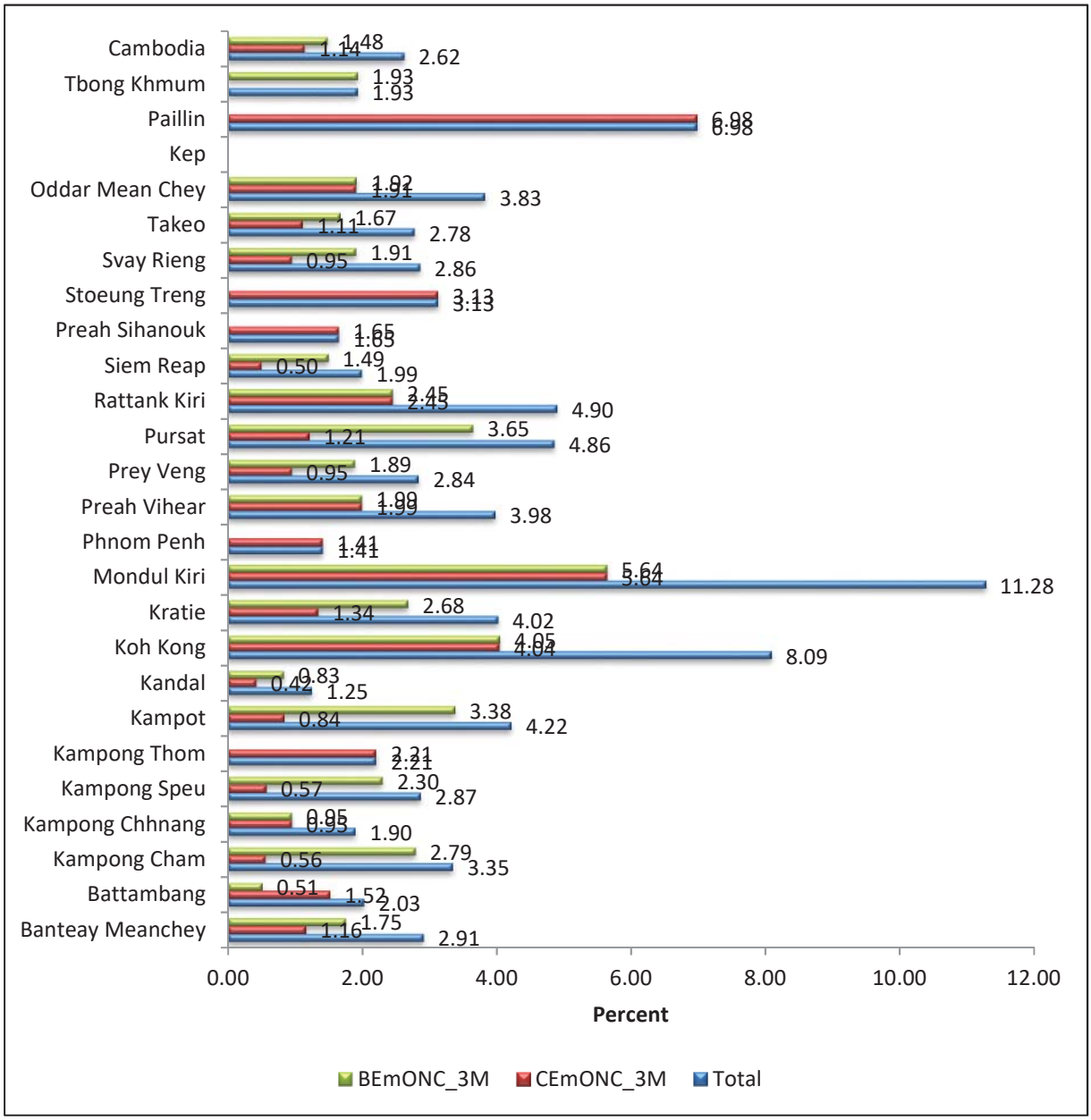
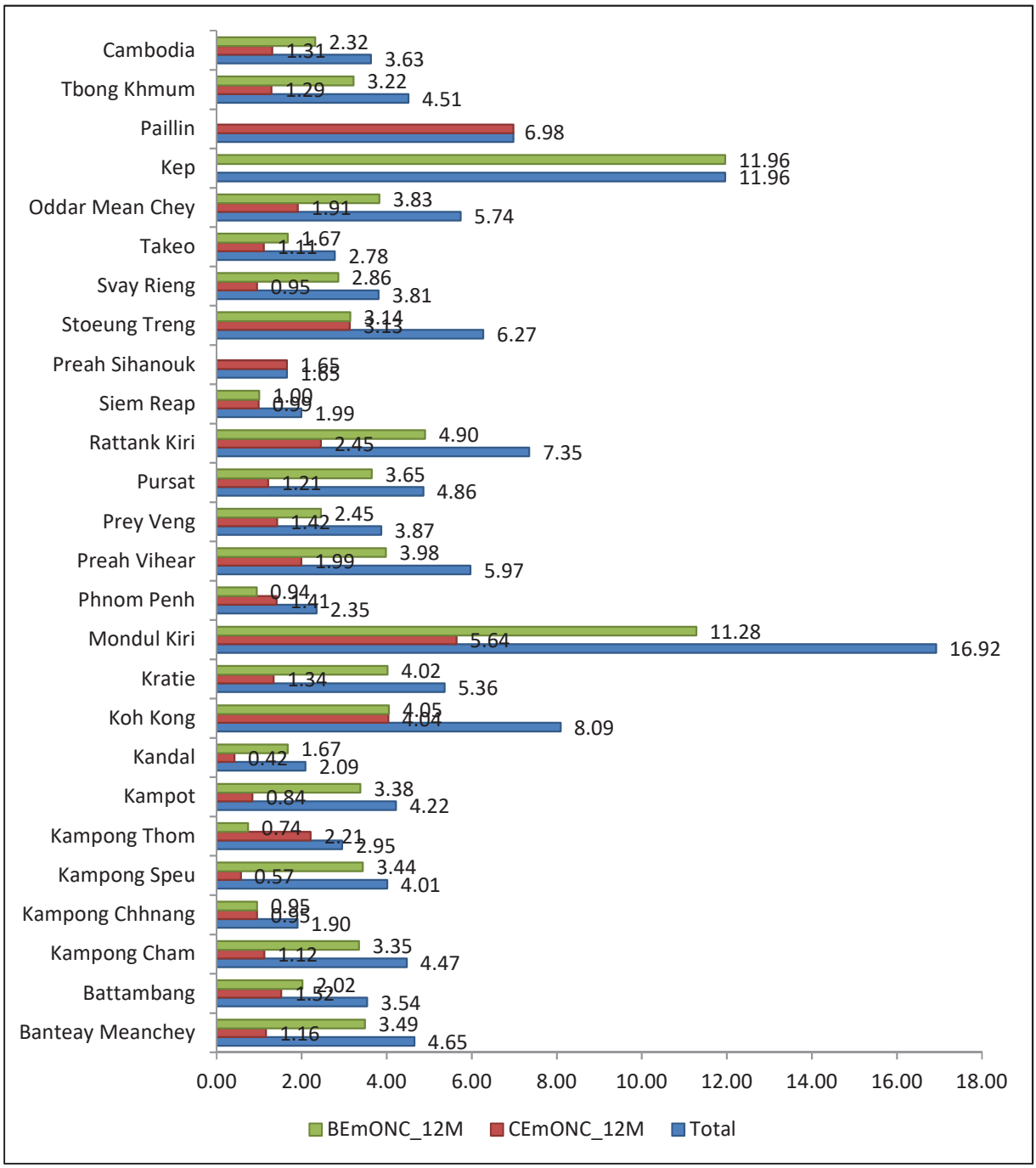


Figure 3-2: Coverage of functioning EmONC facilities 12-months prior the EmONC review 2020



Most functional EmONC facilities are national and referral hospitals. Out of the 80 functional EmONC facilities, 35 national or referral hospitals are providing CEmONC, a further 44 referral hospitals are providing BEmONC and only one (1) health centre out of 66 surveyed is functional for BEmONC. See table 3-34 below.

Table 3-4: Availability of EmONC facilities by facility type in 2009 and 2014 compared to 2020
(Showing numbers of facilities surveyed and % of facilities functional for EmONC)

	National hospitals						Referral hospitals						Health centres					
	2009		2014		2020		2009		2014		2020		2009		2014		2020	
	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
CEmONC	4	100	4	100	5	100	21	29	31	36	30	27	-	-	-	-	-	
BEmONC	-	-	-	-	-	-	19	26	26	29	44	40	-	-	2	2	1	1.5
Non-EmONC*	-	-	-	-	-	-	33	45	30	35	36	33	230	100	86	98	65	98.5
Total	4	100	4	100	5	100	73	100	86	100	110	100	230	100	88	100	66	100

*Facilities surveyed that were not providing a full package of EmONC (Severn (7) or nine (9) signal functions)

Table 3-5 summarises the availability of EmONC facilities across Cambodia and gaps in coverage when compared with 2016-2020 EmONC Improvement Plan benchmarks and UN standards. The table shows that when Improvement Plan benchmarks are applied there is a gap in coverage of 101 facilities (13 CEmONC and 88 BEmONC facilities). When UN standards are applied, there is no gap in CEmONC coverage. There is a shortfall of 74 BEmONC facilities. This shortfall could be further reduced to 48 facilities, by extending the time-frame for performance of BEmONC signal functions to 12-months. If the time-frame is extended to 12-months this could undermine provider confidence and ability to perform signal functions. Frequent practice would be needed to ensure skill retention and provider confidence.

Table 3-5: Current availability of EmONC facilities and gap in coverage
(when compared with EmONC Improvement Plan benchmarks and UN standards)

	2016-2020 EmONC Improvement Plan recommendations			UN EmONC standards based on latest population data		
Province	**EmONC Plan benchmarks**	**Availability based on the 2020 Review**	**Gap in coverage**	**Coverage based on UN standards****	**Availability based on the 2020 Review**	**Gap in coverage**
Comprehensive EmONC	**48**	35	13	35	35	**0**
Basic EmONC	**133**	45	88	119	45	**74**
Total	**181**	80	101	154	80	**74**

* 2019 Cambodia Population Census

** UN standard: for every 500,000 people there should be ***at least*** five (5) EmONC facilities including; ***at least*** one (1) CEmONC facility.

Availability in all facilities surveyed (EmONC and designated EmONC facilities)

Table 3-6 shows the current availability of functional EmONC facilities by province. There is one province (Kep) with no EmONC facility. Kep is small province with a population of 41,798 Kep. EmONC facilities can be accessed readily in neighbouring provinces, therefore, the allocation of and EmONC facility to Kep is possibly not needed. A list of all EmONC facilities across Cambodia is in annex 2. If Phnom Penh is excluded, the biggest gaps in coverage are Banteay Meanchey, Battambang, Kampong Thom, Prey Veng and Siem Reap. If private facilities were included these gaps would be reduced.

Table 3-6: Availability of designated EmONC facilities by province* and gap in coverage when compared with UN Standard and Improvement Plan Benchmarks											
Province	**Population[17]**	**Improvement Plan**		**UN Standard**		**Availability 2020**		**Shortfall (GAP) Improvement Plan**		**Shortfall (GAP) UN Standard**	
		CEmONC	BEmONC	CEmONC	BEmONC	CEmONC	BEmONC	CEmONC	BEmONC	CEmONC	BEmONC
Banteay Meanchey	859,545	3	8	2	8	2	3	1	5	0	5
Battambang	987,400	3	11	2	8	3	1	0	10	-1	7
Kampong Cham	895,763	3	7	2	8	1	5	2	2	1	3
Kampong Chhnang	525,932	1	6	1	4	1	1	0	5	0	3
Kampong Speu	872,219	2	7	2	6	1	4	1	3	1	2
Kampong Thom	677,260	3	5	1	5	3	0	0	5	-2	5
Kampot	592,845	1	6	1	5	1	4	0	2	0	1
Kandal	1,195,547	2	10	2	11	1	2	1	8	1	9
Koh Kong	123,618	1	1	1	1	1	1	0	0	0	0
Kratie	372,825	1	4	1	2	1	2	0	2	0	0
Mondul Kiri	88,649	1	3	1	0	1	1	0	2	0	-1
Phnom Penh	2,129,371	6	13	4	17	6	0	0	13	-2	17
Preah Vihear	251,352	1	4	1	1	1	1	0	3	0	0
Prey Veng	1,057,428	4	7	2	8	2	4	2	3	0	4
Pursat	411,759	1	4	1	4	1	3	0	1	0	1
Ratanak Kiri	204,027	1	3	1	2	1	1	0	2	0	1
Siem Reap	1,006,512	2	6	2	8	1	3	1	3	1	5
Preah Sihanouk	302,887	1	2	1	2	1	0	0	2	0	2
Steung Treng	159,565	1	2	1	1	1	0	0	2	0	1
Svay Rieng	524,554	2	6	1	4	1	2	1	4	0	2
Takeo	899,485	2	7	2	6	2	3	0	4	0	3
Oddor Meanchey	261,252	2	2	1	1	1	1	1	1	0	0
Kep	41,798	0	2	0	1	0	0	0	2	0	1
Pailin	71,600	1	0	1	0	1	0	0	0	0	0
Thbong Khmom	775,296	3	7	1	6	0	3	3	4	1	3
Total	**15,288,489**	48	133	35	119	35	45	13	88	0	74

*This does not include private facilities.

[17] National Institute of Public Health and National Institute of Statistics, (2019) General Population Census of Cambodia

3.3 Indicator 2: Geographic distribution of EmONC facilities

Recommended Level: All sub-national areas have at least 5 EmONC facilities (including at least one Comprehensive EmONC facility) for every 500,000 of population

Are the facilities well distributed?

This indicator highlights the spatial inequalities in the distribution of EmONC services. The standard underpinning of the indicator helps program managers and planners to gather information about equity, in access to services at district level. This indicator is calculated as the first indicator, but considers geographical distribution and accessibility of facilities.

Distribution considers barriers such as transport, geography and population growth. Every woman in Cambodia should be able to reach an EmONC facility within 2 hours. This is the time-frame when most maternal and neonatal deaths occur. It is also a principle which underpins the catchment areas of Cambodia's CPA referral hospitals.

The EmONC baseline assessment in 2009 and 2014 EmONC review found that the UN standard for distribution of facilities at a sub-national level was not being met. EmONC facilities were clustered around urban areas. This has not changed. Table 3-7 shows the different levels of facilities from national level to health centres. The majority of functional EmONC facilities are at higher levels of the health system. The distribution of hospitals according to the MoH classification, shows that all National Hospitals (n=5) and CPA 3 RHs (n=19) are all functional for EmONC and 33 out of 34 CPA 2 RHs (97%) are also functional for EmONC. At lower levels of the health system only 22 out of 57 of CPA 3 (39%) facilities (which tend to be more rural) and 1 health centre (1.5%) are functional for EmONC.

Table 3-7: Distribution of functional# EmONC facilities by MOH classification#
(Comparison between 2009 EmONC Baseline and 2014 and 2020 EmONC reviews)

MoH Classification of Health Facilities	No. surveyed			Number of functioning EmONC facilities			Percent functioning as an EmONC facilities		
	2009	2014	2020	2009	2014	2020	2009	2014	2020
National Hospitals	4	4	5	4	4	5	100%	100%	100%
Referral Hospital CPA 3	17	18	19	13	18	19	76%	100%	100%
Referral Hospital CPA 2	28	29	34	19	26	33	68%	90%	97%
Referral Hospital CPA 1	28	39	57	8	13	22	29%	33%	39%
Health Centres	230	88	66	0	2	Reap	0%	2%	1.5%
Total	**307**	**178**	**181**	**44**	**63**	**80**	**14%**	**35%**	**44.2%**

Functional means all basic or comprehensive signal functions delivered in the 3-months prior to the survey

GIS mapping was undertaken by WHO in 2016. The report has information that would inform the distribution of EmONC facilities across Cambodia[18]. Findings need to be reviewed and accepted by the MoH. As GIS was not available, each facility surveyed was asked how long it took to reach the facility from the furthest point and how long it took to reach the closest higher level facility by common transport. Table 8 shows that 73 facilities surveyed reported there were families and villages in facility catchment areas more 2 hours from the nearest health facility. This suggests gaps in coverage.

18 https://www.healthgeolab.net/KNOW_REP/WHO-HIS-HGF-GIS-2016.2-eng.pdf

Table 3-8: Provincial data supporting assessment of the distribution of EmONC across Cambodia (feedback from all facilities surveyed [n=181])								
Provinces	**Facility has a catchment area**		**Are there families living > than 2 hours from a facility**		**Are there villages that are > than 2 hours from a facility**		**Facilities > 2 hours from higher level facility by common transport**	
	YES	**NO**	**YES**	**NO**	**YES**	**NO**	**YES**	**NO**
Banteay Meanchey	10	1	2	9	2	9	1	10
Battambang	13	1	9	5	8	6	3	11
Kampong Cham	9	1			3	7	1	9
Kampong Chhnang	6	1	3	4	3	4	0	7
Kampong Speu	8	1	1	8	1	8	0	9
Kampong Thom	7	1	3	5	2	6	1	7
Kampot	6	1	3	4	3	4	2	5
Kandal	11	1	3	9	3	9	0	12
Koh Kong	1	1	2	0	2	0	1	1
Kratie	4	1	1	4	1	4	1	4
Mondul Kiri	3	1	3	1	3	1	1	3
Phnom Penh	13	6	0	19	0	19	0	19
Preah Vihear	4	1	3	2	3	2	0	5
Prey Veng	10	1	4	7	4	7	0	11
Pursat	4	1	3	2	3	2	2	3
Rattank Kiri	3	1	3	1	3	1	1	3
Siem Reap	7	1	5	3	5	3	2	6
Preah Sihanouk	2	1	0	3	0	3	1	2
Stoeung Treng	2	1	2	1	2	1	1	2
Svay Rieng	7	1	1	7	1	7	1	7
Takeo	8	1	3	6	3	6	1	8
Oddar Mean Chey	3	1	3	1	3	1	0	4
Kep	1	1	0	2	0	2	0	2
Pailin	0	1	1	0	1	0	0	1
Thbong Khnom**	10	0	1	9	1	9	0	10
All Cambodia	**152**	**29**	**63**	**118**	**60**	**121**	**20**	**161**

Figures 3-3 to 3-7 are maps showing geographical distribution of EmONC facilities across Cambodia.

Figure 3-3: Distribution of designated EmONC facilities for the EmONC review 2020

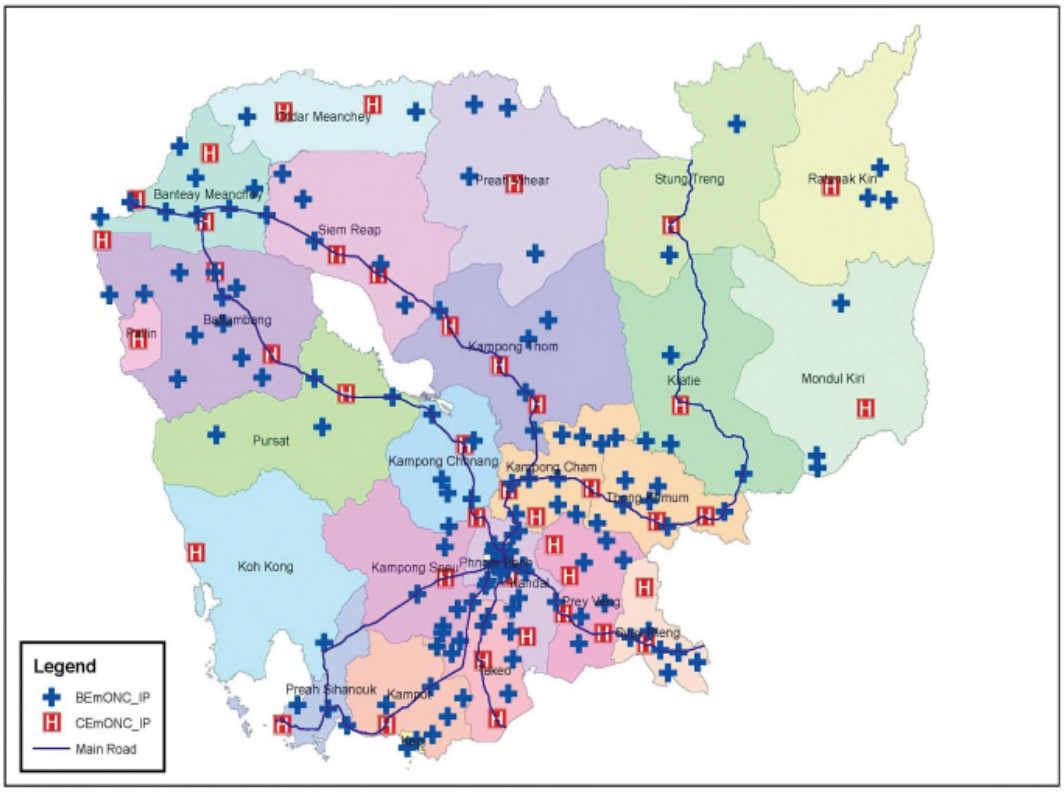


Figure 3-4: Distribution of functioning EmONC facilities and non-functioning EmONC facilities for 3-months prior the EmONC review 2020

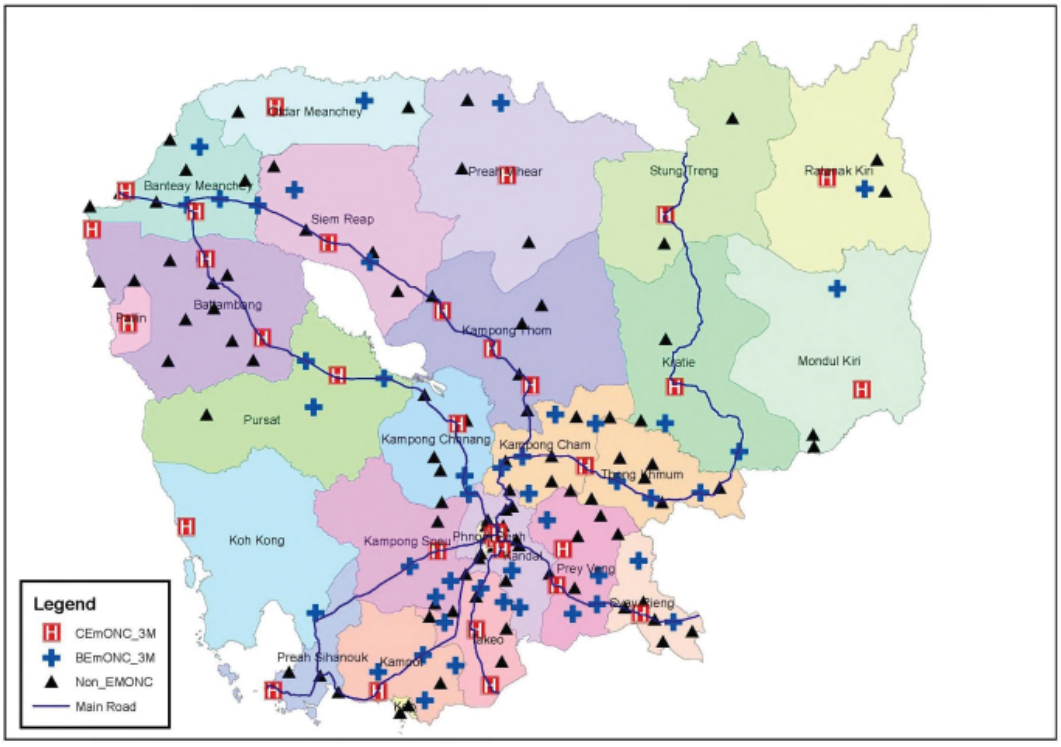


Figure 3-5: Distribution of functioning CEmONC and BEmONC facilities 3-months prior the EmONC review 2020

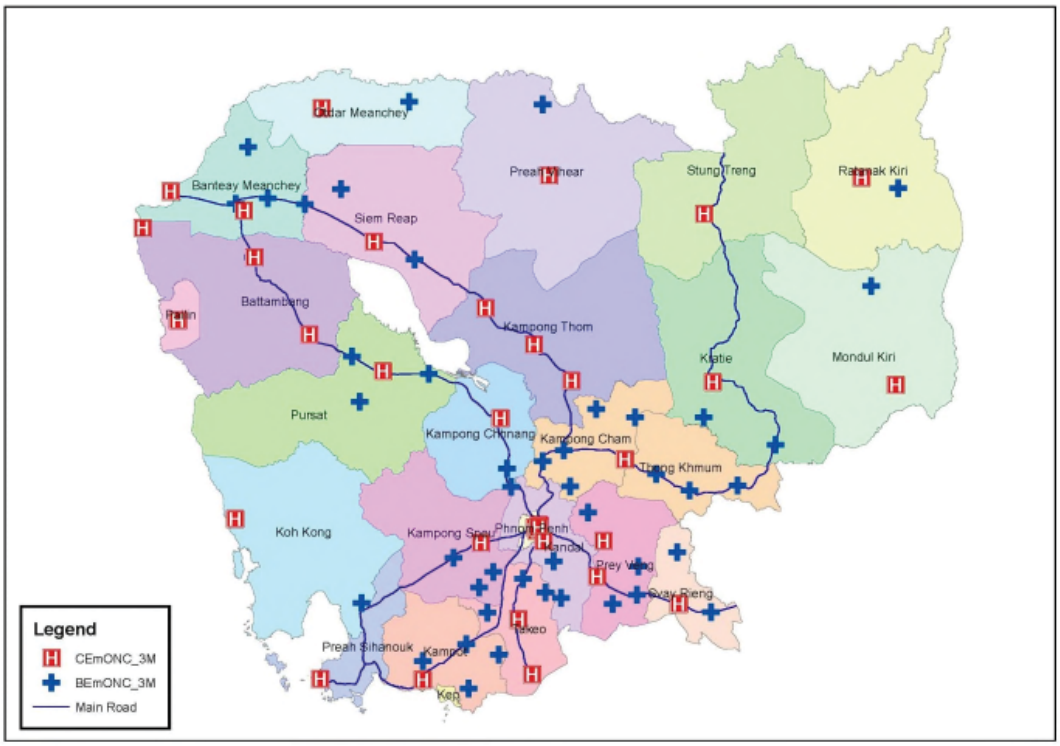


Figure 3-6: Distribution of functioning CEmONC and BEmONC facilities 12-months prior the EmONC review 2020

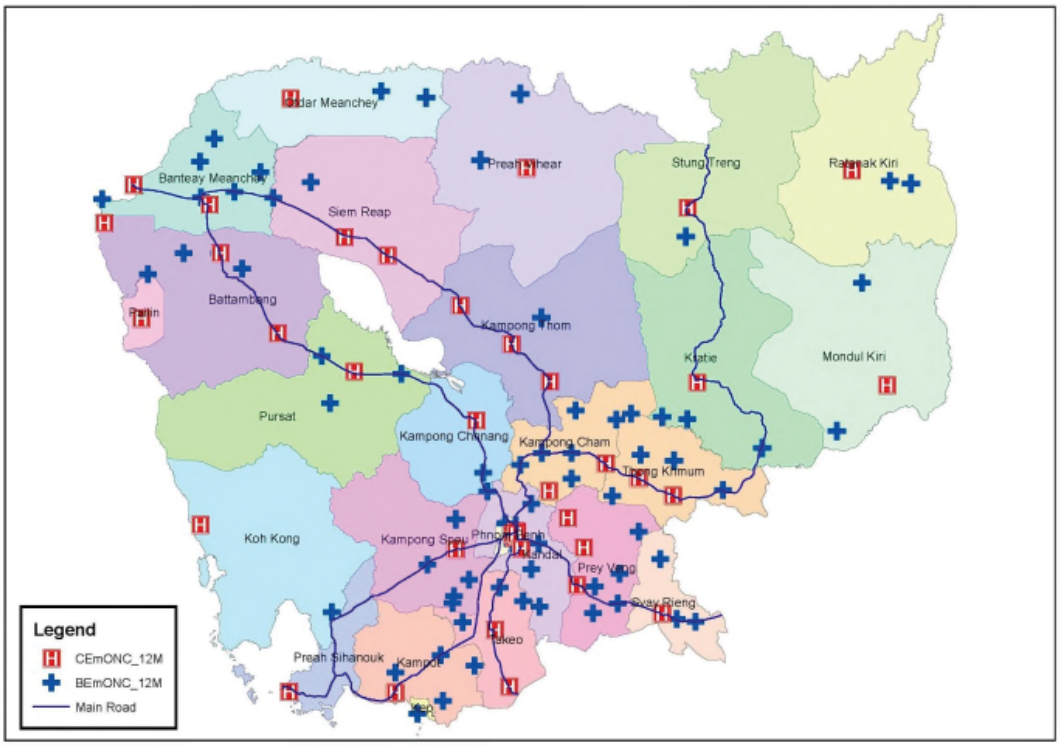
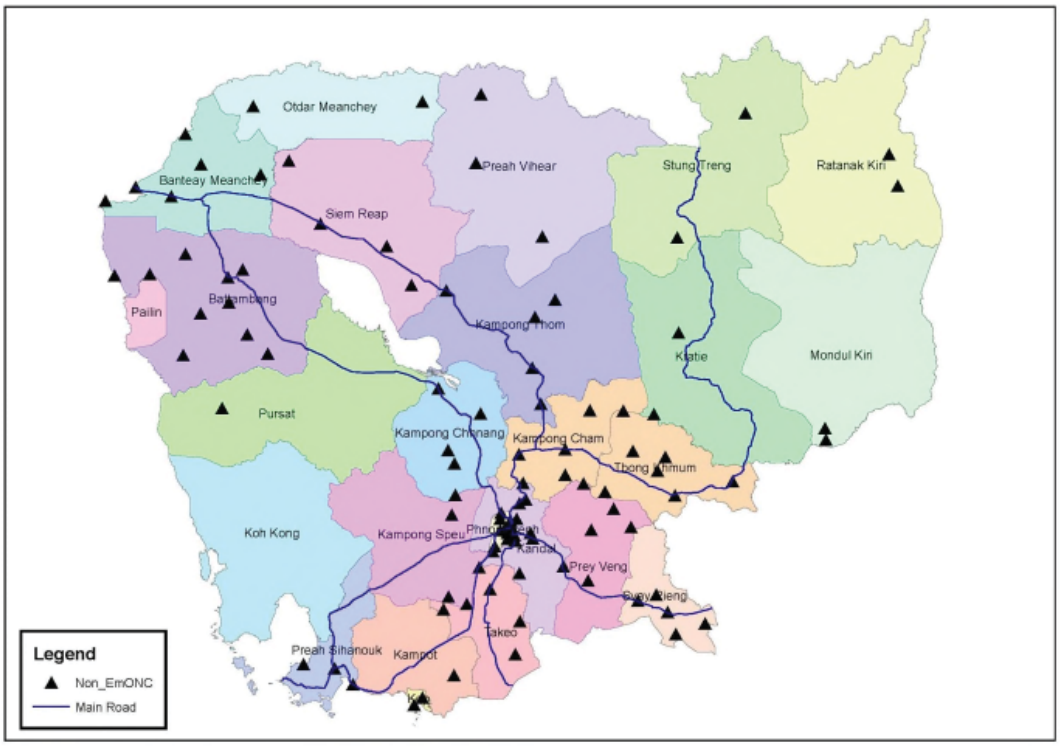


Figure 3-7: Distribution of non-functioning EmONC facilities 3-months prior the EmONC review 2020



3.4 Indicator 3: Proportion of all births in EmONC facilities

Recommended Level: ***At least*** 15% of all births are in EmONC facilities. This was the standard until 2009. The standard is now set by each country.

Are enough women using EmONC facilities?

The proportion of all births in an area (e.g. a province) that takes place in EmONC facilities, is an indication of the utilisation of services by expectant women. The standard is now set by each country. The optimum percentage would be for 100% of all births to take place in EmONC facilities. So, many countries raise the standard slowly until it reaches 100% of all births are in EmONC facilities.

The 2020 EmONC review found that 29.7% of all expected births took place in a functional EmONC facility and less than 10% took place in non-EmONC facilities[19]. Since the 2009 EmONC baseline study, the number of women giving birth in health facilities has almost doubled for both EmONC and non-EmONC facilities. See table 3-9.

Table 3-9: Proportion of births in functional EmONC facilities and all facilities surveyed (Progress since the 2009 EmONC baseline assessment)

Facility type	Total No. women giving birth in facilities			Expected births#	Proportion of births			Recommended level %
	2009	2014	2020	368,453 in all Cambodia	2009	2014	2020	15%
Functional EmONC facilities	38,981	80,379	109,516		11.4%	23.5%	29.7%	
All facilities surveyed	60,948	119,931	139,659		17.8%	35.0%	37.9%	

* Private facilities are not included in the 2014 and 2020 reviews

Expected birth is calculated using inter-census data and 2019 Census Report for Cambodia.

Proportion of births in EmONC facilities by province

Table 3-10 (over the page) shows that all provinces met the old 15% standard for the proportion of births in EmONC facilities, assessed with the exception of Kandal (13.5%). Kep is 0% because there is no EmONC facility in Kep. Kep is a small province. Most women go to neighbouring provinces to deliver. Phnom Penh has the highest proportion of births in the country (50.6%). Overall the results are encouraging as it indicates that more and more women are delivering in EmONC facilities.

19 Functional EmONC facilities and designated facilities for strengthening and upgrade to EmONC status)

Table 3-10: Proportion of births in EmONC facilities surveyed by province (n=80) * (Progress since the 2009 EmONC baseline assessment)								
Provinces	**Total No. women giving birth**			**Expected births (2019) #**	**Proportion of births**			**Recommended level %**
	2009	**2014**	**2020**		**2009**	**2014**	**2020**	
Banteay Meanchey	1,003	3,875	4,254	21,489	4.9%	19.1%	19.8%	**15%**
Battambang	2,649	5,940	6,977	23,401	8.6%	19.3%	29.8%	
Kampong Cham	3,449	5,205	8,280	22,842	6.8%	18.7%	36.3%	
Kampong Chhnang	1,687	2,451	3,208	11,518	10.5%	15.3%	27.9%	
Kampong Speu	NA	2,358	5,208	20,235	0.0%	10.6%	25.7%	
Kampong Thom	1,162	3,416	3,517	16,457	6.1%	18.1%	21.4%	
Kampot	261	3,006	5,386	13,932	1.6%	18.4%	38.7%	
Kandal	NA	3,731	3,654	27,019	0.0%	11.3%	13.5%	
Koh Kong	513	1,192	1,796	2,596	12.7%	29.4%	69.2%	
Kratie	709	2,883	4,137	10,290	7.0%	28.3%	40.2%	
Mondul Kiri	0	322	916	2,119	0.0%	13.2%	43.2%	
Phnom Penh	19,351	21,482	24,048	47,485	73.0%	81.0%	50.6%	
Preah Vihear	368	1,099	1,539	7,440	7.0%	20.8%	20.7%	
Prey Veng	1,231	3,040	4,540	25,484	4.8%	11.9%	17.8%	
Pursat	801	1,736	4,078	11,735	6.3%	13.7%	34.8%	
Rattank Kiri	529	1,696	2,222	5,366	8.6%	27.6%	41.4%	
Siem Reap	373	2,271	3,060	23,955	1.3%	7.9%	12.8%	
Preah Sihanouk	1,078	1,270	3,378	7,693	18.6%	21.9%	43.9%	
Stoeung Treng	495	1,372	1,681	4,548	14.3%	39.6%	37.0%	
Svay Rieng	1,201	3,500	6,067	12,222	10.0%	29.0%	49.6%	
Takeo	1,672	3,892	6,379	19,969	7.1%	16.5%	32.0%	
Oddar Mean Chey	0	1,417	1,633	6,740	0.0%	26.4%	24.2%	
Kep	0	0	0	940	0.0%	0.0%	0.0%	
Pailin	449	1,030	1,106	1,797	22.8%	52.2%	61.5%	
Thbong Khnom**	-	2195	2,452	21,011	-	9.7%	11.7%	
All Cambodia#	**38,981**	**80,379**	**109,516**	**368,283**	**11.4%**	**23.5%**	**29.7%**	

* Private facilities were not included in 2014 and 2020 reviews ** New province

Variations between total provincial and total summary data is due to rounding up and differences between provinces

3.5 Indicator 4: Met need for EmONC[20]

Recommended Level: 100% of women with complicated pregnancies should be attended to in EmONC facilities

Are the right women using the EmONC facilities?

This is an indicator of the utilisation of health services by expectant mothers, who develop complications during pregnancy, labour and delivery. It is estimated that 15% of pregnancies have complications [21]. To meet the UN standard, 100% of all women with complications such as haemorrhage (ante-partum and postpartum), prolonged and obstructed labour, postpartum sepsis, complications of abortion, severe pre-eclampsia and eclampsia, ectopic pregnancy and ruptured uterus should be treated in EmONC facilities.

Table 3-11 shows that in 2009 only 12.7% of women in Cambodia, who developed obstetric complications, were treated in EmONC facilities. Since 2009 there has been a steady increase in met need for EmONC. The current review found the met need in EmoNC facilities was 31.6% and, in all facilities, surveyed 38.7%. Despite the improvement there are still women with complications whose needs are not being met of 100% as indicated in UN indicator. This indicator would improve much more if private facilities were included in the EmONC network.

Table 3-11: Met need for EmONC in functional EmONC facilities and all facilities surveyed* (Progress since the 2009 EmONC baseline assessment)

Facility Type	No. of women treated with complications			Expected births (2019)#	Expected complications (2019)#	% Met need			Recommended level %
	2009	2014	2020			2009	2014	2020	100%
Functional EmONC facilities	6,517	11,845	17,459	368,284 in all Cambodia	55,268 in all Cambodia	12.7%	23.6%	31.6%	
All facilities surveyed	7,442	15,349	21,367			14.5%	30.0%	38.7%	

* Private facilities were not included in 2014 and 2020 reviews

Expected births and complications calculated using inter-census data and 2019 Census Report for Cambodia.

Met need for EmONC in all identified EmONC facilities by province

Since the 2009 EmONC baseline study, the met needs for women with complications of pregnancy have improved but there is considerable variation between provinces (table 3-12). The met need for Phnom Penh has slowly increased since 2009 (66.1% in 2009, 70.4% in 2014 and 72.1% in 2020). Stoeung Treng was the best performing facility with a met need of 88.5%. This represents a three-fold increase since the baseline in 2009. Two (2) out of 24 provinces had a met need less than 10% (Kandal and Prey Veng). This could be explained by women by passing referral hospitals and going directly to a national hospital, or using private facilities.

20 Indicator not built on reliable definitions of DOC (Direct Obstetric Complications). A definition needs to be accepted

21 WHO/UNICEF/UNFPA (2008) The Indicators for Monitoring the Availability and Use of Obstetric Services: (Draft document)

Table 3-12: Met need for EmONC in all EmONC facilities by province (n=80)* (Progress since the 2009 EmONC baseline assessment)									
	No. of women treated with complications			Expected births (2019)#	Expected complications (2019) #	% Met need in EmONC facilities			Recommended level %
	2009	2014	2020			2009	2014	2020	
Banteay Meanchey	176	238	743	21,489	3,223	5.8%	7.8%	23.1%	100%
Battambang	327	821	1,247	23,401	3,510	7.1%	17.8%	35.5%	
Kampong Cham	991	1,555	863	22,842	3,426	13.1%	37.3%	25.2%	
Kampong Chhnang	245	577	647	11,518	1,728	10.2%	24.0%	37.5%	
Kampong Speu	0	322	762	20,235	3,035	0.0%	9.7%	25.1%	
Kampong Thom	233	641	418	16,457	2,469	8.2%	22.6%	16.9%	
Kampot	26	225	959	13,932	2,090	1.1%	9.2%	45.9%	
Kandal	0	279	175	27,019	4,053	0.0%	5.7%	4.3%	
Koh Kong	20	174	82	2,596	389	3.3%	28.6%	21.1%	
Kratie	174	583	968	10,290	1,543	11.4%	38.1%	62.7%	
Mondul Kiri	0	23	89	2,119	318	0.0%	6.3%	28.0%	
Phnom Penh	2,629	2801	5,134	47,485	7,123	66.1%	70.4%	72.1%	
Preah Vihear	45	167	529	7,440	1,116	5.7%	20.7	47.4%	
Prey Veng	450	363	378	25,484	3,823	11.7%	9.5%	9.9%	
Pursat	240	161	637	11,735	1,760	12.6%	8.5%	36.2%	
Rattank Kiri	95	305	199	5,366	805	10.3%	33.1%	24.7%	
Siem Reap	91	219	738	23,955	3,593	2.1%	5.1%	20.5%	
Preah Sihanouk	38	237	248	7,693	1,154	4.4%	27.3%	21.5%	
Stoeung Treng	145	118	337	4,548	682	27.9%	22.7%	49.4%	
Svay Rieng	487	775	530	12,222	1,833	26.9%	42.8%	28.9%	
Takeo	51	150	415	19,969	2,995	1.4%	4.2%	13.9%	
Oddar Mean Chey	0	384	516	6,740	1,011	0.0%	47.6%	51.0%	
Kep	0	0	0	940	141	0.0%	0.0%	0.0%	
Pailin++	54	50	138	1,797	270	18.2%	16.9%	51.2%	
Thbong Khnom**	-	677	707	21,011	3,152	-	20.0%	22.4%	
Cambodia#	**6,517**	**11845**	**17,459**	**368,283**	**55,243**	**12.7%**	**23.0%**	**31.6%**	

* Private facilities were not included in 2014 and 2020 reviews ** New province in 2014

++No facilities surveyed in Kep

Variations between the numbers of women expected to develop complications and the provincial sum of women expected to develop complications in table 3.12is the result of rounding up and differences between provinces

3.6 Indicator 5: Caesarean sections as a percentage of all births

Recommended Level: The proportion of estimated births in the population that are by Caesarean section is ***not less than*** 5% or ***more than*** 15%

Are enough critical services (Caesarean sections) being provided by EmONC facilities?

To save women's lives it is crucial they have access to Caesarean sections in CEmONC facilities and other lifesaving interventions. The indicator is a measure of access to, and use of, a common obstetric intervention for averting maternal and neonatal deaths and for treating obstetric complications such as uterine rupture.

The review found that in a 12-month time-frame preceding the study, 4.9% of all expected births were delivered in CEmONC facilities by Caesarean section. This rate is just below the lower level of the UN standard of 5-15% but is more than the 2009 EmONC baseline assessment and 2014 EmONC review. See table 3-13.

Table 3-13: Caesarean sections as a proportion of all expected births in CEmONC facilities (n=58)* (Progress since the 2009 EmONC Baseline Assessment)

Facility Type	No. of Caesarean sections			Expected births (2019)#	Proportion of C/S performed			Recommended level %
	2009	2014	2020		2009	2014	2020	
Functional CEmONC facilities	4,496	13,297	18,128	368,284 in all Cambodia	1.3%*	3.9%	4.9%	5%-15%
All hospitals surveyed	4,881	13,297	18,128		1.4%**	3.9%	4.9%	

* Private facilities were not included in 2014 and 2020 reviews

Expected births calculated using inter-census data and 2019 Census Report for Cambodia.

Caesarean sections in CEmONC facilities by province

In 2009 there were no provinces in Cambodia that met the UN benchmark for Caesarean sections. In 2014 Phnom Penh was above the benchmark; 22.6% of all deliveries in Phnom Penh were by Caesarean section. This decreased to 15.9% in 2020 (table 3-14).

As Phnom Penh is the national capital with 5 CEmONC facilities receiving referrals from across Cambodia, an increase from 9.3% in 2009 to the 2014 Caesarean rate was not surprising. However, the decrease in 2020 is surprising. Possibly more women are accessing private facilities for maternity services in Phnom Penh, and/or the regional hospitals have been strengthened so they are handling more cases, rather than referring them to the national level.

Twenty-four (24) out of 25 provinces have CEmONC facilities. When Phnom Penh is excluded, the remaining 23 provinces have Caesarean section rates between 0.6% and 4.8%. There are 6 provinces with a Caesarean section rate over 5%: Pailin (8.6%), Preah Sihanouk (7.6%), Kampong Cham (7.5%), Battambang (5.3%), Kampot and Svay Rieng 5%, with most provinces having improved since the 2009 EmONC baseline assessment. See table 3-14. In 2009 there was a recommendation to strengthen three regional hospitals as EmONC Clinical Training Sites (CTS); sites include Kampong Cham Provincial Hospital, Battambang Provincial Hospital and Takeo Provincial Hospital. Two of these sites now meet this standard.

Table 3-14: Proportion of all births delivered by Caesarean section in CEmONC facilities by province (n=58) * (Progress since the 2009 EmONC assessment baseline)								
Provinces	**No. of Caesarean sections**			**Expected# births (2019)**	**Proportion of C/S performed**			**Recommended level %**
	2009	**2014**	**2020**		**2009**	**2014**	**2020**	
Banteay Meanchey	66	227	431	21,489	0.3%	**1.1%**	**2.0%**	**5%-15%**
Battambang	297	884	1,227	23,401	1.0%	**2.9%**	**5.2%**	
Kampong Cham	454	1,186	1,717	22,842	0.9%	**4.3%**	**7.5%**	
Kampong Chhnang	210	445	555	11,518	1.3%	**2.8%**	**4.8%**	
Kampong Speu	0	189	265	20,235	0.0%	**0.9%**	**1.3%**	
Kampong Thom	91	274	300	16,457	0.5%	**1.5%**	**1.8%**	
Kampot	0	505	691	13,932	0.0%	**3.1%**	**5.0%**	
Kandal	0	786	734	27,019	0.0%	**2.4%**	**2.7%**	
Koh Kong	8	25	73	2,596	0.2%	**0.6%**	**2.8%**	
Kratie	102	284	349	10,290	1.0%	**2.8%**	**3.4%**	
Mondul Kiri	0	21	54	2,119	0.0%	**0.9%**	**2.6%**	
Phnom Penh	2,461	5996	7,534	47,485	9.3%	**22.6%**	**15.9%**	
Preah Vihear	21	150	129	7,440	0.4%	**2.8%**	**1.7%**	
Prey Veng	184	247	373	25,484	0.7%	**1.0%**	**1.5%**	
Pursat	155	306	498	11,735	1.2%	2.4%	4.2%	
Rattank Kiri	38	91	159	5,366	0.6%	1.5%	3.0%	
Siem Reap	10	256	447	23,955	0.0%	0.9%	1.9%	
Preah Sihanouk	102	255	586	7,693	1.8%	4.4%	7.6%	
Stoeung Treng	26	86	117	4,548	0.8%	2.5%	2.6%	
Svay Rieng	88	360	609	12,222	0.7%	3.0%	5.0%	
Takeo	166	492	731	19,969	0.7%	2.1%	3.7%	
Oddar Mean Chey	0	59	40	6,740	0.0%	1.1%	0.6%	
Kep	0	0	0	940	0.0%	0.0%	0.0%	
Pailin	17	43	154	1,797	0.9%	2.2%	8.6%	
Thbong Khnom**	-	130	355	21,011	-	0.6%	1.7%	
Cambodia	**4,496**	**13,297**	**18,128**	**368,283**	**1.3%**	**3.9%**	**4.9%**	

* Private facilities were not included in the 2014 and 2020 reviews – these skews the data ** New province in 2014

Variations between the total expected births and the sum of provincial expected births in table 3.14 is the result of rounding up and differences between provinces

The impact of private facilities

Private facilities have been excluded from the review. In Cambodia the private sector is unregulated, and cases go unreported. This limitation impacts negatively on this indicator. For example, in Siem Reap there is a large private hospital (Jay Varman Hospital) that provides free maternity services. In provinces where large private maternity facilities have been excluded, the solution might be to invite them to join the network.

3.7 Indicator 6: Direct Obstetric Case Fatality Rate (DOCFR)

Recommended Level: The maximum acceptable level is 1% of the total deaths from direct complications (as a proportion of the direct complications on record).

IMPORTANT: Care must be taken when interpreting this indicator. The indicator needs to be interpreted in the context of the previous indicators, which show that women are not utilizing EmONC facilities in the public sector and their need for EmONC is not being met.

DOCFR depends on correct diagnosis, on the quality and completeness of record keeping and reporting of maternal deaths and obstetric complications. If very few maternal deaths are recorded, the quality of care may falsely appear to be good and conversely, if few complications are recorded, the DOCFR may be artificially high.

Furthermore, the DOCFR may not be an accurate measure of quality of care. For instance, owing to various delays, some women arrive at a health facility in such poor condition that no matter how good obstetric services are, their lives cannot be saved.

Is the quality of services adequate?

This is a proxy indicator for the quality of services provided to women with complications of pregnancy and childbirth in EmONC facilities. It is defined as the total number of direct obstetric deaths on record in EmONC facilities, divided by the total number of direct obstetric complications on record.

In a 12-month period prior to the review (January 2019 to December 2019), 76 maternal deaths were recorded in all functional EmONC facilities and 78 deaths in all facilities surveyed. The DOCFR for all identified functional EmONC facilities and all facilities surveyed was 0.44% and 0.36% respectively (table 3-15). This suggests that the DOCFR has decreased slightly since the 2009 baseline, and meets the UN standard of 1% or less. However, no maternal death is desirable.

Table 3-15: Direct Obstetric Case Fatality Rate for EmONC facilities and all facilities surveyed * (Progress since 2009 EmONC assessment baseline)

Facility type	No. of obstetric deaths due to direct causes			No. of women with complications			DOCFR			Recommended level %
	2009	2014	2020	2009	2014	2020	2009	2014	2020	
Functional EmONC facilities	49	30	76	6517	12,146	17,459	0.8%#	0.2%	0.44%	≤ 1
All facilities surveyed	55	32	777	7622	15,650	21,367	0.74%#	0.2%	0.36%	

* Private facilities were not included in the 2014 and 2020 EmONC reviews

Complications reported are in MoH facilities. As the estimated number of women expected to develop complications for 2019 is 55,268, data suggests that complicated cases in facilities are underreported (which also means that Met Need is underestimated).

Based on the total expected births in 2019 (368,284 in all Cambodia), and total expected complications in the same year (55,268), the data suggests maternal deaths and complications are underreported. Table 3 - 15 shows that in 2020 there were 17,459 complicated cases in all functional EmONC facilities and 21,367 in all facilities surveyed. This is well below the calculated expected complications (55,268). Furthermore, without knowing what's happening in private maternity facilities, this statistic must be interpreted with caution.

DOCFR in all EmONC facilities by province

Data to support the calculation of the DOCFR indicator for all EmONC facilities surveyed by province is presented in Table 3-16. At provincial level, Koh Kong (2.4%), Preah Sihanouk (1.2%) and Banteay Meanchey (1.4%) have DOCFRs above the UN standard (≥ 1). Nine (9) provinces have a DOCFR of 0% while 15 provinces were between (0.1%-0.9%), which means they met the UN standard of ≤ 1%

Table 3-16: Direct obstetric case fatality rate in all EmONC facilities by province* (Progress since 2009 EmONC assessment baseline)

Provinces	No. of obstetric deaths due to direct causes			No. of complicated cases#			DOCFR			Recommended level %
	2009	2014	2020	2009	2014	2020	2009	2014	2020	
Banteay Meanchey	3	11	10	176	238	743	1.7%	4.6%	1.4%	≤ 1
Battambang	3	0	1	327	821	1,247	0.9%	0.0%	0.1%	
Kampong Cham	1	2	1	991	1555	863	0.1%	0.1%	0.1%	
Kampong Chhnang	1	0	1	245	577	647	0.4%	0.0%	0.2%	
Kampong Speu	0	0	1	0	322	762	0.0%	0.0%	0.1%	
Kampong Thom	2	0	0	233	641	418	0.9%	0.2%	0.0%	
Kampot	0	1	2	26	225	959	0.0%	0.4%	0.2%	
Kandal	0	0	0	0	164	175	0.0%	0.0%	0.0%	
Koh Kong	0	1	2	20	174	82	0.0%	0.6%	2.4%	
Kratie	7	0	1	174	583	968	4.0%	0.0%	0.1%	
Mondul Kiri	0	0	0	0	23	89	0.0%	0.0%	0.0%	
Phnom Penh	14	4	38	2,629	2801	5,134	0.5%	0.2%	0.7%	
Preah Vihear	1	0	4	45	583	529	2.2%	0.0%	0.8%	
Prey Veng	2	0	0	450	363	378	0.4%	0.0%	0.0%	
Pursat	4	1	1	240	67	637	1.7%	6.0%	0.2%	
Rattank Kiri	0	0	1	95	305	199	0.0%	0.0%	0.5%	
Siem Reap	1	3	3	91	219	738	1.1%	1.4%	0.4%	
Preah Sihanouk	0	0	3	38	237	248	0.0%	0.0%	1.2%	
Stoeung Treng	0	0	2	145	118	337	0.0%	0.0%	0.6%	
Svay Rieng	6	0	1	487	775	530	1.2%	0.0%	0.2%	
Takeo	4	0	2	51	150	415	7.8%	0.0%	0.5%	
Oddar Mean Chey	0	0	2	0	384	516	0.0%	0.0%	0.4%	
Kep	0	0	0	0	0	0	0.0%	0.0%	0.0%	
Pailin	0	0	0	54	50	138	0.0%	0.0%	0.0%	
Thbong Khnom**	-	0	0	-	677	707	-	0.0%	0.0%	
Cambodia	**49**	**23**	**76**	**6,517**	**12,052**	17,459	**0.8%**	**0.2%**	**0.44%**	

* Private facilities were not included in 2014 and 2020 reviews. ** New province 2014

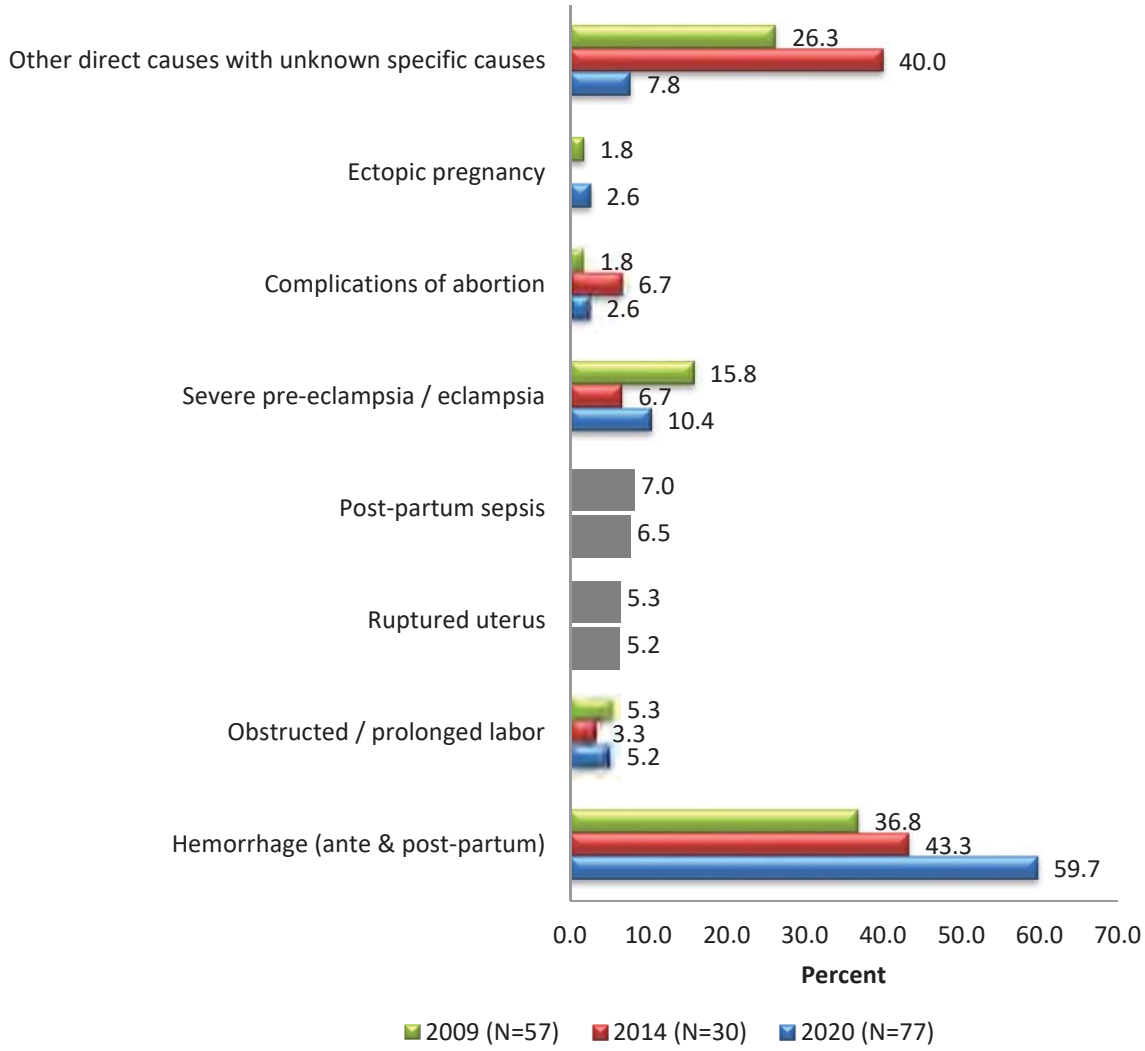
Total expected complications for 2019 are 55,268, therefore, data suggest that complicated cases in facilities are underreported.

Causes of facility-based maternal deaths from direct causes

Direct complications of maternal death include: ante-partum and post-partum haemorrhage, obstructed/prolonged labour, ectopic pregnancy, severe abortion complications, retained placenta, ruptured uterus, postpartum sepsis, severe pre-eclampsia/eclampsia.

Figure 3-8 shows the common direct causes and other unknown causes of maternal death. The most common direct cause of facility maternal deaths in 2009 was ante and post-partum haemorrhage (36.8 %) followed by eclampsia (15.8%). This is still the case, in 2020 maternal haemorrhage has increased by nearly 33% . Death from unknown causes have fluctuated but overall has decreased to 7.8% of cases. All reported maternal deaths occurred in hospitals. The increase in the number of cases is possibly due to improved reporting. Nonetheless data quality is a concern.

Figure 3-8: Common direct and unknown causes of maternal deaths (Percent)
(Comparison between 2009 EmONC baseline, the 2014 review and 2020 review)



3.8 Indicator 7: Intrapartum and very early neonatal death rate

No standard has been set; a maximum level to be determined.

Is the quality of neonatal services adequate?

Stillbirths and very early neonatal deaths can be linked to the quality of antenatal and obstetric care. The numerator is the sum of intrapartum deaths and very early neonatal deaths that occur in the first 24-hours of life, among newborns weighing ≥2.5 kg taking place in the facility, during a specific time-frame. The denominator is all women giving birth to newborns ≥ 2.5kg in the facility during the same time period. This indicator has no agreed Standard.

Table 3-17 shows that in 2014 the number of intrapartum and early newborn deaths were almost triple the baseline in 2009. In 2020 the total number of stillbirths and early neonatal deaths increased again to 1,627 in all functional EmONC facilities and 1,683 in all facilities surveyed. The increase can be explained in part by the increase in the number of women giving birth in health facilities. When the increased number of births are taken into account it can be seen from table 3-17 that the intrapartum and early neonatal deaths rates have remained fairly static since 2009.

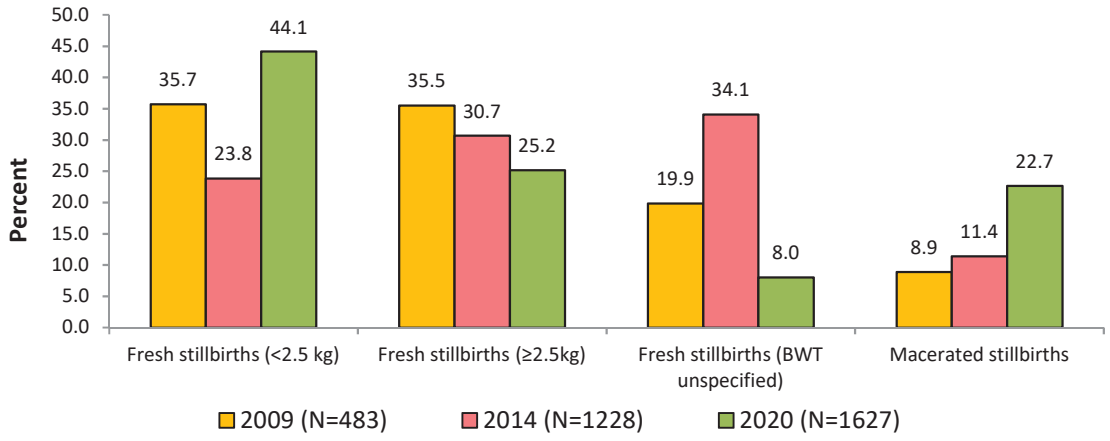
Table 3-17: Intrapartum and very early neonatal death rate in EmONC and all facilities surveyed* (Progress since 2009 EmONC assessment baseline)

	Fresh stillbirths ≥ 2.5kg + early neonatal deaths in the first 24-hours ≥ 2.5kg			No. of women giving birth ≥ to newborns ≥ 2.5kg			Intrapartum and very early neonatal death rate#		
Type of facility	**2009**	**2014**	**2020**	**2009**	**2014**	**2020**	**2009**	**2014**	**2020**
Functional EmONC facilities	483	1,228	1,627	38,981	80,379	109,516	1.2%	1.5%	1.5%
All facilities surveyed	590	1,286	1,683	83,708	119,931	139,659	1.0 %	1.1%	1.2%

* Private facilities not included in the 2014 and 2020 EmONC reviews.

Data from MoH facilities. Private facilities did not collect this data in 2009. Data quality has improved since 2009; but is still questionable.

Figure 3-9: Percent distribution of stillbirths in EmONC facilities since the 2009 EmONC Baseline



From figure 3-9 it can be seen that since the 2009 EmONC baseline the percentage of macerated stillbirths increased from 8.9% to 22.7% in 2020 and the current review (2020) found there were more stillbirths < 2.5 Kg than fresh stillbirths ≥ 2.5kgs (25.2%), and finally, only 8% of fresh stillbirths were reported as having no documented birthweight, suggesting an improvement in record-keeping.

Nevertheless, challenges exist in data quality related to the classification, recording and reporting of the intrapartum and very early neonatal death rate in many countries. In Cambodia the indicator is not built on reliable definitions of fresh stillbirths or very early newborn deaths, and the recording and reporting of both intrapartum stillbirths and newborn deaths is an ongoing problem.

3.9 Indicator 8: Proportion of maternal deaths due to indirect causes

This indicator does not lend itself to a recommended level; instead it highlights the larger social and medical context of a country or region. It has implications for intervention strategies, especially interventions in addition to EmONC, where indirect causes kill many women of reproductive age.[22]

Indirect causes of maternal death result from previous existing disease, or a disease that developed during pregnancy which was not due to direct obstetric causes, but was aggravated by the pregnancy. This indicator is still being tested and there is no agreed upon UN standard at this time. Examples of indirect causes are infections (e.g. malaria, HIV, hepatitis), tuberculosis, cardiovascular diseases, psychiatric illnesses (e.g. suicide and violence), epilepsy, diabetes.

Table 3-18 shows that when the baseline was undertaken in 2009 the proportion of maternal deaths from indirect causes was 29% in functional EmONC facilities and 27.6% in all facilities surveyed. Since 2009, maternal deaths from indirect causes in both functional EmONC facilities and all facilities surveyed decreased to 7.3% and 8.3%, respectively. As the number of deaths attributable to indirect causes decreased, the number of all maternal deaths in facilities increased.

Table 3-18: Proportion of maternal deaths from indirect causes in all EmONC-facilities surveyed (Since the 2009 EmONC assessment baseline)

	No of deaths due of indirect causes			All maternal deaths			Proportion of maternal deaths from indirect causes		
	2009	2014	2020	2009	2014	2020	2009	2014	2020
Functional EmONC facilities	20	6	6	69	36	82	29.0%	16.7%	7.3%
All facilities surveyed	21	25	7	76	57	84	27.6%	NA	8.3%

* Private facilities were not included in the 2014 and 2020 reviews

As the numbers are small and the indicator is not built on reliable definitions of indirect obstetric complications, care must be taken when interpreting this indicator.

The proportion of maternal deaths due to Indirect causes is underestimated, owing to the fact that these deaths are not likely to be found in obstetric or gynaecology wards but rather in medical wards and therefore are more difficult to identify.

3.10 EmONC data and reporting

Sound monitoring and evaluation is dependent on reliable data recording: in particular, recording of maternal and newborn deaths (including stillbirths) and obstetric and newborn complications and their

22 Direct quote from Monitoring emergency obstetric care: a handbook, p. 36

outcomes. In many health facilities, EmONC data are under reported, and/or difficult to interpret because data collection and systems need improving.

There are also no reliable definitions of direct and indirect obstetric complications, intrapartum stillbirths and very early newborn deaths. Newborn care registers and forms need to be standardised and approved by the MoH and staff trained and supervised to use them correctly. The usefulness of some of the UN indicators is limited due to poor quality data. There is a system of maternal death and audits of "near-misses" in place. The extent to which this is formalised at provincial level is questionable. Regular supervision and monitoring to reinforce quality recording and reporting needs to improve.

Table 3-19 shows that less than one third of hospitals (30 out of 115) and only 4 health centres had reported a maternal death by cause in the previous 12-months. The survey included a question related to Maternal Death Audits and review; however, the responses showed review and audit processes are possibly not in place at a health centre level.

Most hospitals (98.3%) and health centres (97%) reported having a data manager and/or HIS staff to support the collection of EmONC data. However, only 60.9% of hospitals and 47% of health centres reported having a system in place to collect EmONC data.

Fifty-three percent (53%) of hospitals and 42.1% of health centres reported calculating indicators monthly. Indicators compiled include: institutional delivery, Caesarean, stillbirth and low birth rates. So, there are systems in place and resources which could be strengthened to support the collection of quality data.

Table 3-19: Data collection to support EmONC in all facilities surveyed (n=181) (2020)

	Hospitals (n=115)		Health centres (n=66)		Total (n=181	
Facility feedback	**n**	**%**	**n**	**%**	**n**	**%**
Reporting of maternal deaths						
Maternal deaths registered with cause of death in the last 12-months	30	26.1	4	4.2	34	16.2
Data collection systems and support						
Systems support regular collection of EmONC data	70	60.9	47	49.5	117	55.7
Regularly compile and report EmONC data	70	60.9	47	49.5	117	55.7
Data manager/ HIS staff are available to support EmONC data collection	113	98.3	93	97.9	206	98.1
Calculation of Indicators						
Monthly	61	53.0	40	42.1	101	48.1
Quarterly	8	7.0	7	7.4	15	7.1
Other	1	0.9	0	0.0	1	0.5
Compilation of indicators						
Institutional delivery	66	57.4	42	44.2	108	51.4
Institutional caesarean rate	33	28.7	1	1.1	34	16.2

See Table 3-20 for a summary of UN EmONC indicators for Cambodia

Table 3-20: UN EmONC Indicators by Province showing progress since the 2009 EmONC assessment baseline*

	Current availability of EmONC facilities								Proportion of births in EmONC facilities			Met need			CS as a proportion of all births			Direct Obstetric Case Fatality Rate (DOCFR)		
	Minimum 1 CEmONC and 4 BEmONC per 500,000 population								Minimum 15%			At least 100% of 15% of expected births			Minimum 5% Maximum 15%			Minimum 1%		
Province	**2009**		**2014**		**2020**		**GAP 2020**		**2009**	**20014**	**2020**	**2009**	**20014**	**2020**	**2009**	**20014**	**2020**	**2009**	**2014**	**2020**
	CEmONC	BEmONC	CEmONC	BEmONC	CEmONC	BEmONC	CEmONC	BEmONC												
Banteay Meanchey	1	2	2	4	2	3	1	5	4.9%	19.1%	19.8%	5.8%	7.8%	23.1%	0.3%	1.1%	2.0%	1.7%	4.6%	1.4%
Battambang	2	1	3	1	3	1	0	10	8.6%	19.3%	29.8%	7.1%	17.8%	35.5%	1.0%	2.9%	5.2%	0.9%	0.0%	0.1%
Kampong Cham	1	6	2	1	1	5	2	2	6.8%	18.7%	36.3%	13.1%	37.3%	25.2%	0.9%	4.3%	7.5%	0.1%	0.1%	0.1%
Kampong Chhnang	1	1	1	1	1	1	0	5	10.5%	15.3%	27.9%	10.2%	24.0%	37.5%	1.3%	2.8%	4.8%	0.4%	0.0%	0.2%
Kampong Speu	0	0	1	1	1	4	1	3	0.0%	10.6%	25.7%	0.0%	9.7%	25.1%	0.0%	0.9%	1.3%	0.0%	0.0%	0.1%
Kampong Thom	2	1	2	1	3	0	0	5	6.1%	18.1%	21.4%	8.3%	22.6%	16.9%	0.5%	1.5%	1.8%	0.9%	0.2%	0.0%
Kampot	0	1	1	2	1	4	0	2	1.6%	18.4%	38.7%	1.1%	9.2%	45.9%	0.0%	3.1%	5.0%	0.0%	0.4%	0.2%
Kandal	0	0	1	2	1	2	1	8	0.0%	11.3%	13.5%	0.0%	5.7%	4.3%	0.0%	2.4%	2.7%	0.0%	0.0%	0.0%
Koh Kong	1	0	1	1	1	1	0	0	12.7%	29.4%	69.2%	3.3%	28.6%	21.1%	0.2%	0.6%	2.8%	0.0%	0.6%	2.4%
Kratie	1	0	1	2	1	2	0	2	7.0%	28.3%	40.2%	11.4%	38.1%	62.7%	1.0%	2.8%	3.4%	4.0%	0.0%	0.1%
Mondul Kiri	0	0	1	0	1	1	0	2	0.0%	13.2%	43.2%	0.0%	6.3%	28.0%	0.0%	0.9%	2.6%	0.0%	0.0%	0.0%
Phnom Penh	5	1	5	0	6	0	0	13	73.0%	81.0%	50.6%	66.1%	70.4%	72.1%	9.3%	22.6%	15.9%	0.5%	0.2%	0.7%
Preah Vihear	1	0	1	0	1	1	0	3	7.0%	20.8%	20.7%	5.7%	20.7	47.4%	0.4%	2.8%	1.7%	2.2%	0.0%	0.8%
Prey Veng	2	3	2	3	2	4	2	3	4.8%	11.9%	17.8%	11.7%	9.5%	9.9%	0.7%	1.0%	1.5%	0.4%	0.0%	0.0%
Pursat	1	0	1	1	1	3	0	1	6.3%	13.7%	34.8%	12.6%	8.5%	36.2%	1.2%	2.4%	4.2%	1.7%	6.0%	0.2%
Rattank Kiri	1	0	1	1	1	1	0	2	8.6%	27.6%	41.4%	10.3%	33.1%	24.7%	0.6%	1.5%	3.0%	0.0%	0.0%	0.5%
Siem Reap	0	2	2	1	1	3	1	3	1.3%	7.9%	12.8%	2.1%	5.1%	20.5%	0.0%	0.9%	1.9%	1.1%	1.4%	0.4%
Preah Sihanouk	1	0	1	0	1	0	0	2	18.6%	21.9%	43.9%	4.4%	27.3%	21.5%	1.8%	4.4%	7.6%	0.0%	0.0%	1.2%
Stoeung Treng	1	0	1	0	1	0	0	2	14.3%	39.6%	37.0%	27.9%	22.7%	49.4%	0.8%	2.5%	2.6%	0.0%	0.0%	0.6%
Svay Rieng	1	1	1	1	1	2	1	4	10.0%	29.0%	49.6%	26.9%	42.8%	28.9%	0.7%	3.0%	5.0%	1.2%	0.0%	0.2%
Takeo	2	0	2	1	2	3	0	4	7.1%	16.5%	32.0%	1.4%	4.2%	13.9%	0.7%	2.1%	3.7%	7.8%	0.0%	0.5%
Oddar Mean Chey	0	0	1	1	1	1	1	1	0.0%	26.4%	24.2%	0.0%	47.6%	51.0%	0.0%	1.1%	0.6%	0.0%	0.0%	0.4%
Kep	0	0	0	0	0	0	0	2	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Pailin	1	0	1	0	1	0	0	0	22.8%	52.2%	61.5%	18.2%	16.9%	51.2%	0.9%	2.2%	8.6%	0.0%	0.0%	0.0%
Thbong Khnom**			0	3	0	3	3	4	-	9.7%	11.7%	-	20.0%	22.4%	-	0.6%	1.7%	-	0.0%	0.0%
All Cambodia	25	19	35	28	**35**	**45**	**13**	**88**	11.4%	23.5%	29.7%	12.7%	23.0%	**31.6%**	1.3%	3.9%	**4.9%**	**0.8%**	**0.2%**	**0.44**

* Private facilities were not included in the 2014 and 2020 reviews ** New province

4. FINDINGS: PERFORMANCE OF SIGNAL FUNCTIONS

This section looks more closely at the performance of EmONC signal. Also included is the readiness of facilities to perform lifesaving signal functions in terms of the availability of specific lifesaving drugs, blood and equipment.

4.1 Signal functions used to identify EmONC facilities

As discussed in section 3 of this report, the availability of EmONC is determined by the number of facilities that perform a complete set of signal functions, in a given time-frame in relation to the size of the population. All EmONC signal functions are lifesaving.

Facilities that perform all seven basic signal functions shown in table 4-1 are considered to be functional BEmONC facilities, while those that perform all nine signal functions are classified as a functioning CEmONC facility. If a facility fails to perform the first seven signal functions, it is considered a non-functional EmONC facility.

Table 4-1: Signal functions used to identify functional EmONC facilities[23]

Basic EmONC facilities	Comprehensive EmONC facilities
1. Administer parenteral** antibiotics	Perform signal functions 1-7, plus:
2. Administer uterotonic drugs (parenteral oxytocin, parenteral ergometrine, misoprostol)[24]	8 Perform surgery (Caesarean section)
3. Administer parenteral anticonvulsants for pre-eclampsia and eclampsia (magnesium sulphate, diazepam)	9. Perform blood transfusion
4. Perform manual removal of placenta	
5. Perform removal of retained products (MVA, misoprostol, dilatation and curettage)	
6. Perform assisted vaginal delivery (vacuum extractor, forceps)	
7. Perform neonatal resuscitation (bag and mask)	
A Basic EmONC facility is one that performs all functions 1-7. **A Comprehensive EmONC facility is one that performs all functions 1-9.**	

** Parenteral administration of drugs means by injection or intravenous infusion.

4.2 Performance of EmONC signal functions

EmONC guidelines specify that for every 500,000 of population there is a need for at least 1 CEmONC facility and 4 BEmONC facilities. To be classified as a CEmONC or BEmONC facility 9 or 7 signal functions respectively need to be performed within 3-months' timeframe prior to the study.

EmONC signal functions performed by all facilities designated as BEmONC since 2009

Figure 4-1 shows signal functions performed by designated BEmONC facilities in the 3-months prior to the 2020 and 2014 EmONC reviews and baseline assessment (2009). The figures show the

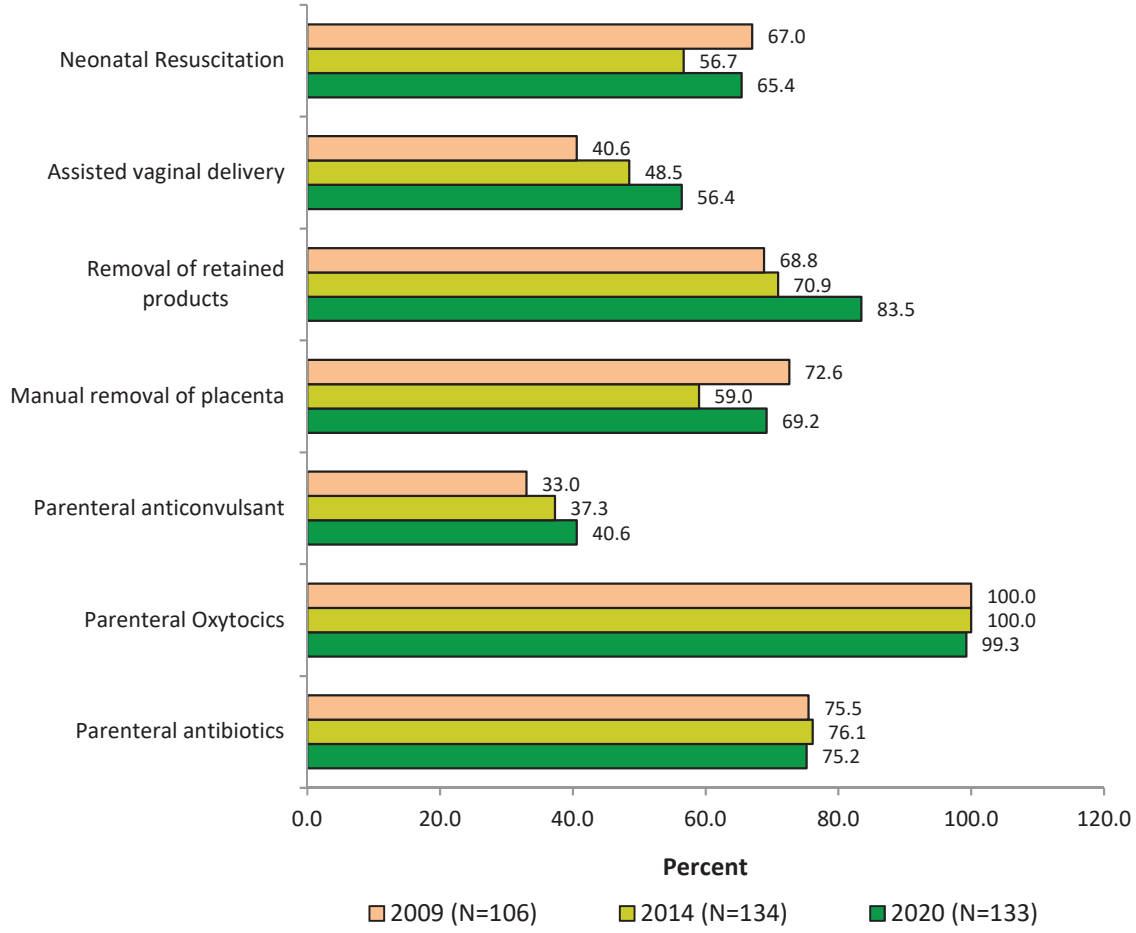
23 Monitoring emergency obstetric care: A Handbook, WHO, UNFPA, UNICEF and AMDD, 2009.

24 Hofmeyr, G.J., et al., Misoprostol to treat postpartum haemorrhage: a systematic review. BJOG: An Internal Journal of Obs Gyn, (2005). 112(5): p. 547-553.

administration of parenteral oxytocics and antibiotics are the most frequently performed signal functions; almost 100% of designated BEmONC facilities have administered oxytocin since 2009. Neonatal resuscitation and manual removal of the placenta have remained fairly static (57% to 73 %.) in BEmONC facilities. Assisted vaginal delivery, removal of retained products and administration of anticonvulsants have increased over time. The least frequently performed signal function I parenteral anticonvulsants (< 40.6%). The reason for such low usage of anticonvulsants needs investigation.

Figure 4-1: Signal functions performed by designated BEmONC facilities over a 3-month period

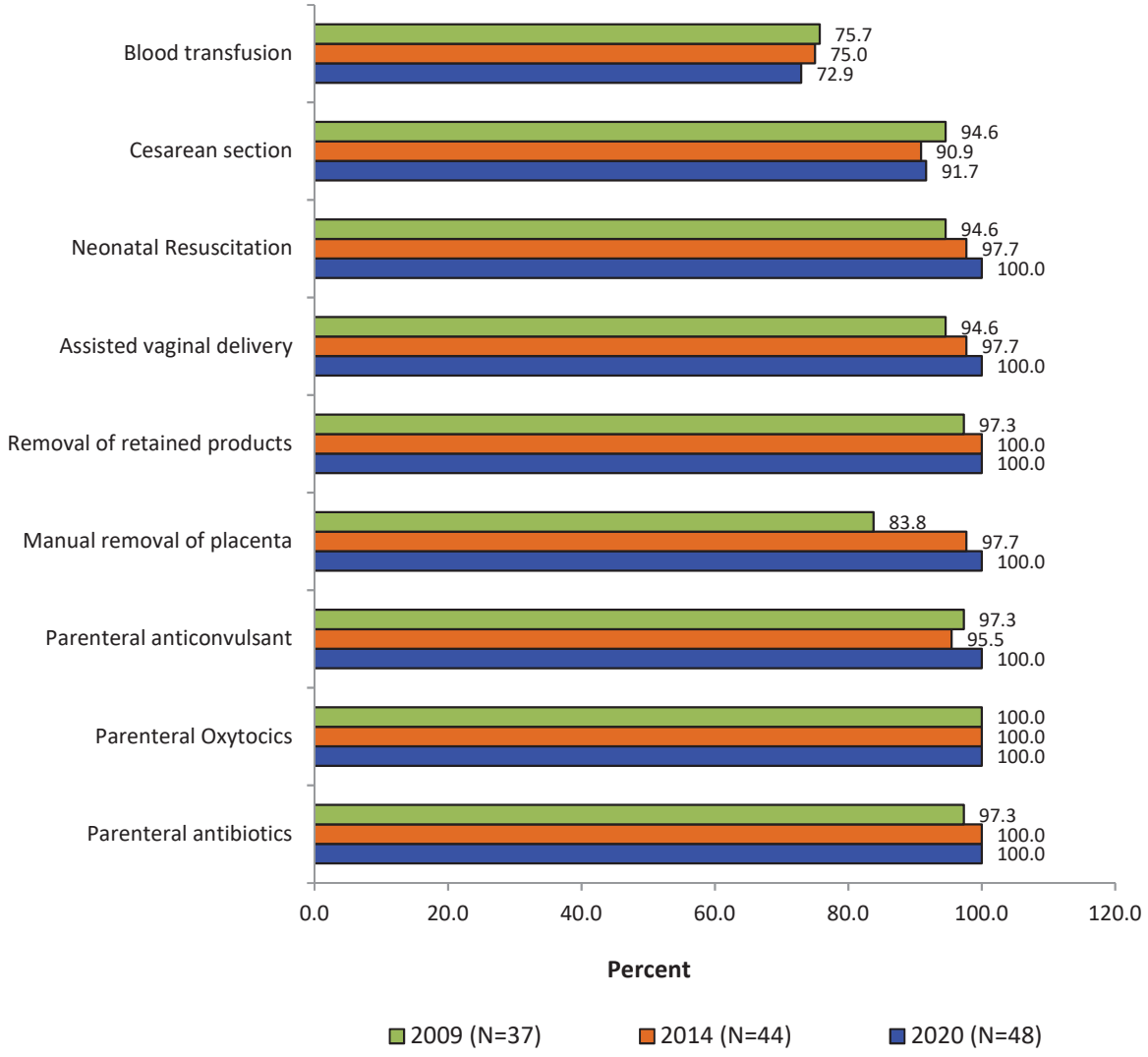
(3-months prior to the 2020 EmONC review compared to the 2009 baseline and 2014 review)



EmONC Signal functions performed by designated CEmONC facilities since 2009

Figure 4-2 shows signal functions performed by designated CEmONC facilities in the 3-months prior to the 2020 and 2014 EmONC reviews and the 2009 baseline assessment. Performance of all signal functions by hospitals has been encouraging. With the exception of blood transfusions, all other signal functions have been consistently performed by hospitals more than 80% of the time. Some signal functions such as the administration of oxytocics and antibiotics are being provided by hospitals almost 100% of the time. Since 2009 75% by hospitals have performed blood transfusion. The signal function requires improvement; why more designated CEmONC facilities have not transfused blood requires better understanding.

Figure 4-2: Signal functions performed by designated CEmONC facilities over a 3-month period (3-months prior to the 2020 EmONC review compared to the 2009 baseline and 2014 review)



Current performance of signal functions

Table 4-2 shows the percent of health facilities in the EmONC network (n=181) in 2020 that provided a life-saving procedure (signal function) 3 and 12-months before the review. The table also shows the number of facilities that did not perform a signal function and the reason given for not performing a particular intervention. To validate performance, all entries in relevant maternity registers from January 2019 to December 2019, were reviewed for evidence of performance of each signal function.

The extension of the time period from 3 to 12-months had the greatest impact on the reporting of neonatal resuscitation (19.5 percentage point increase), parenteral anticonvulsants (15.2 point increase) and manual removal of placenta (13.4 point increase). The most frequently performed signal function was the administration of parenteral oxytocics (99.5% -100% over both time periods) followed by Caesarean section (79.3%-81%), removal of retained products (76.7%-82.9%), and the administration of parenteral antibiotics (71.4%-77.6%) with little difference (5-7 percentage points) between 3 and 12-months.

Table 4-2: Percent of facilities across Cambodia providing EmONC signal functions in the last 3 and 12-months and reasons for not providing the signal functions (n=181)															
Signal Function	**Percentage of facilities (n=181) that provided the procedure in the last:**		**Number of facilities that did not perform the procedure in the last 12-months**	**The percent and number of health facilities that reported that the procedure was not provided in the last 12-months (multiple responses allowed)**											
	3-months	**12-months**		**availability of human resources**		**training issues**		**supplies/ equipment/ drugs**		**management issues**		**policy issues**		**no indication**	
	%	%	n	n	%	n	%	n	%	n	%	n	%	n	%
Parenteral antibiotics	71.4	77.6	33	0	0.0	0	0.0	0	0.0	0	0.0	10	45.5	12	54.5
Parenteral oxytocics	99.5	100.0	1	-	-		-		-		-		-		-
Parenteral anticonvulsants	48.6	63.8	79	1	2.1	0	0.0	4	8.3	8	16.7	0	0.0	37	77.1
Manual removal of placenta	69.0	82.4	41	0	0.0	0	0.0	0	0.0	1	6.3	1	6.3	15	93.8
Removal of retained products	76.7	82.9	22	4	36.4	3	27.3	1	9.1	2	18.2	0	0.0	4	36.4
Assisted vaginal delivery	58.6	67.6	58	5	12.8	7	17.9	11	28.2	8	20.5	3	7.7	15	38.5
Neonatal resuscitation	65.7	85.2	46	0	0.0	0	0.0	1	7.7	1	7.7	0	0.0	12	92.3
Blood transfusion[1]	60.3	69.0	23	0	0.0	3	16.7	3	16.7	1	5.6	0	0.0	12	66.7
Surgery (Caesarean)[1]	79.3	81.0	12	3	27.3	3	27.3	0	0.0	2	18.2	0	0.0	6	54.5
[1] Only national hospitals, and CPA2 and CPA3 hospitals are included (n = 58)															

The least performed signal function was the administration of parenteral anticonvulsants. In a 3-month period before the review less than half (48.6%) of all facilities performed this signal function. When the 12-month period was applied the performance of the signal functional increased to 63.8%. One hundred and eight (108) facilities reported not performing this signal function at all. This is of concern as eclampsia is the second most common cause of maternal death from direct causes in Cambodia

All other signal functions were performed by 55-65% of facilities with a relatively small variation in the performance between the 3 and 12-month period.

Reasons for non-performance of signal functions

When a particular signal function was not performed, the person being interviewed at a facility was asked the reason why. For each signal functions, a large number of the staff interviewed was unable to give a reason. Where there was reason given, staff tended to suggest either they had had no patient for which the signal function would have been indicated or "policy issues or the non-availability of equipment, supplies and drugs".

Addressing gap in BEmONC

Table 4-3 shows different levels of health facilities from national hospitals to health centres. Most functional EmONC levels are at higher levels of the health system. At the lower levels, it is a different picture. A closer look at the distribution of hospitals according to the MoH classification, shows that all National Hospitals (n=5) and CPA 3 Referral Hospitals (n=19) are all functional for EmONC and 33 out of 34 CPA 2 Referral Hospitals (97%) are also functional for EmONC. At the lower level of the health system only 22 out of 57 of CPA 3 (39%) facilities and 1 health centre (1.5%) are functional for EmONC.

Table 4-3: Distribution of functional# EmONC facilities by MOH classification#
(Comparison between 2009 EmONC Baseline and 2014 and 2020 EmONC reviews)

MoH Classification of Health Facilities	No. surveyed			Number of functioning EmONC facilities			Percent functioning as an EmONC facilities		
	2009	2014	2020	2009	2014	2020	2009	2014	2020
National Hospitals	4	4	5	4	4	5	100%	100%	100%
Referral Hospital CPA 3	17	18	19	13	18	19	76%	100%	100%
Referral Hospital CPA 2	28	29	34	19	26	33	68%	90%	97%
Referral Hospital CPA 1	28	39	57	8	13	22	29%	33%	39%
Health Centres	230	88	66	0	2	1	0%	2%	1.5%
Total	**307**	**178**	**181**	**44**	**63**	**80**	**14%**	**35%**	**44.2%**

Functional means all basic or comprehensive signal functions delivered in the 3-months prior to the survey

To better understand the functioning of CPA 1 referral hospitals and health centres, signal functions were analysed for performance of each type of facility, 3 and 12-months prior to the 2020 review. Table 4-4 shows that with the exception of the administration of parenteral anticonvulsants, all BEmONC signal functions were performed by more than 70% of CPA 1 referral hospitals. If the time-line was extended to 12-months, then more than 84% of CPA 1 referral hospitals performed all (7) BEmONC facilities.

The only signal function performed frequently by health centres was the administration of parenteral oxytocic (100% of health centres). All other signal functions were performed less frequently. The administration of anticonvulsants by health centres (14.7%) was the least performed signal function.

Table 4-4: Signal functions performed by health centres and CPA 1 referral hospitals in the last 3 and 12-months (2020)*

Signal Function	Percentage of CPA 1 referral Hospitals (n=57) that provided the procedure in the last:		Percentage of Health centres (n=66) that provided the procedure in the last:	
	3-months	12-months	3-months	12-months
	%	%	%	%
Parenteral antibiotics	98.3	100.0	37.9	50.5
Parenteral oxytocics	98.3	100.0	100.0	100.0
Parenteral anticonvulsants	54.4	84.2	14.7	30.5
Manual removal of placenta	86.0	94.7	40.0	64.2
Removal of retained products	94.7	96.5	51.6	64.2
Assisted vaginal delivery	71.9	84.2	26.3	37.9
Neonatal resuscitation	77.2	96.5	37.9	69.5

* All lower level facilities surveyed

The gap in BEmONC could be reduced by allowing CPA 1 hospitals and health centres to perform 7 BEmONC signal functions over a 12-month period. There could be an increase in BEmONC coverage by 26 facilities (see table 4-5). For health centres where caseloads are low there will be some that never provide a full package of BEmONC. Health centres could be certified to provide a minimum package of BEmONC signal functions and/or provide obstetric first aid before referring on. In which case they would not be designated as BEmONC facilities. This would require the MoH to make policy decisions on the classification of facilities proving a minimum package of signal functions, how they would function and what would be the human resource implications.

Table 4-5: Number of functional*EmONC facilities surveyed (Progress since the 2009 baseline EmONC assessment)

EmONC classification	Number of facilities performing signal functions in last 3-months			Number of facilities performing signal functions in last 12-months		
	2009	2014	2020	2009	2014	2020
CEmONC	25	35	35	31	37	40
BEmONC	19	28	45	27	43	71
Total	**44**	**63**	**80**	**58**	**80**	**111**

* Functional means has performed a full package of signal functions in the 3-months prior to the review. If a facility was not functional in the 3-months before the review, data collectors reviewed registers to see if signal functions were performed 12-months before the review.

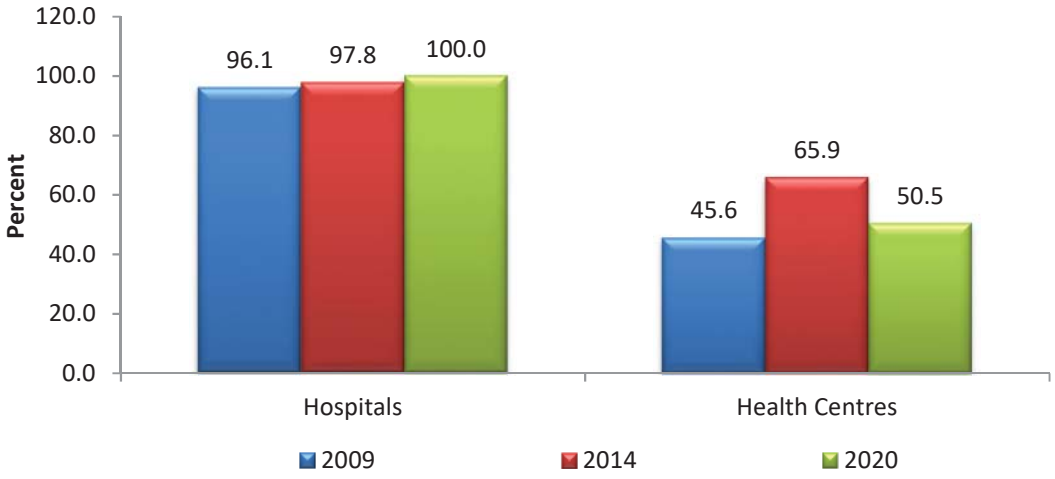
4.3 Practices supporting the implementation of EmONC signal functions

Availability of drugs, supplies, equipment underpins the ability of an EmONC facility to perform signal functions. To better understand why selected signal functions are poorly performed, a further analysis of drugs, supplies, equipment and procedures was undertaken.

Use of parenteral antibiotics over time

The review found that there was little difference in the use of antibiotics in hospitals over time. Over 95% of hospitals have provided parenteral antibiotics since 2009. Health centres have used parenteral antibiotics less frequently. Figure 4-3 shows that 50.5% of health centres reported having provided parenteral antibiotics in 2020, an incremental increase over 2009.

Figure 4-3: Percent of hospitals and health centres that reported administration of parenteral antibiotics over a 12-month period
(Comparison of use since the 2009 EmONC baseline)

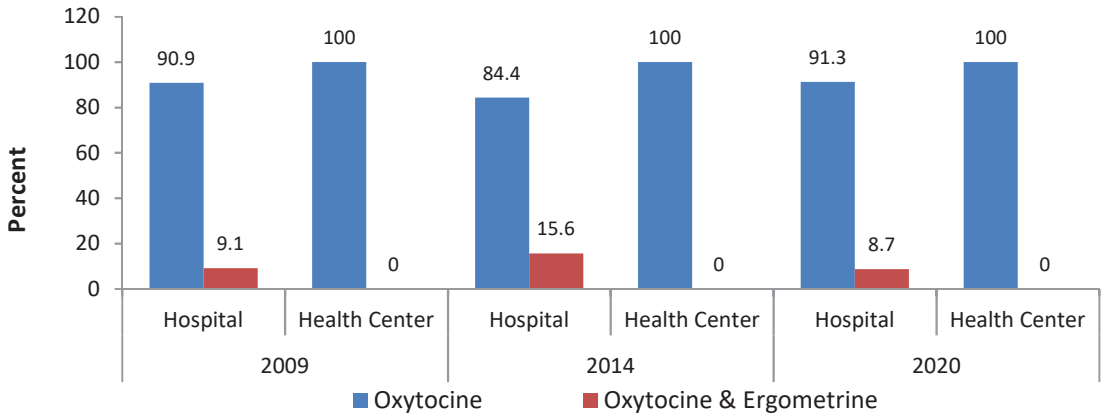


(N for Hospital: 2009=77, 2014=91, and 2020=115) (N for Health Centres: 2009=230, 2014=88, and 2020=66)

Use of oxytocics

The administration of uterotonic drugs (parenteral oxytocin, parenteral ergometrine, misoprostol) is the most frequently implemented signal function in Cambodia (see figure 4-4). All health centres (100%) and most hospitals (>90%) report using oxytocin regularly. The use of combined oxytocin and ergometrine is rarely used by hospitals. (< 9% in 2020).

Figure 4-4: Percent of hospitals and health centres using different types of oxytocics over a 12-month period
(Comparison of use since the 2009 EmONC baseline)

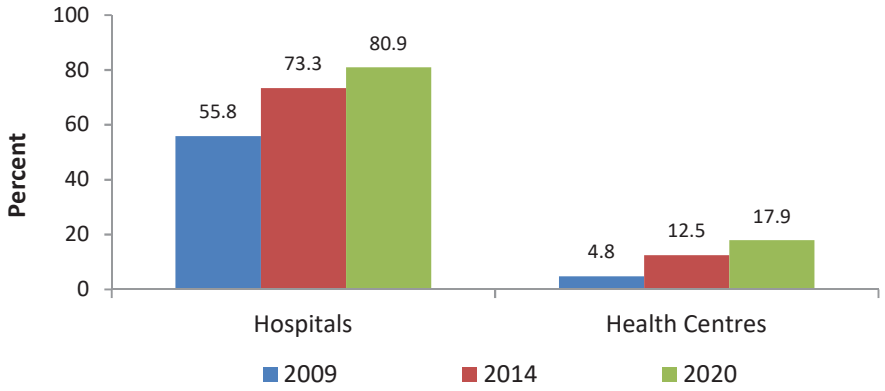


(N for Hospital: 2009=77, 2014=91, and 2020=115) (N for Health Centre: 2009=230, 2014=88, and 2020=66)

Use of misoprostol

Medical abortion is readily avilable and legal in Cambodia. At the time of the EmONC baseline assessment (2009) the use of misoprostol was controversial. The drug has since been approved by WHO, so the use of the drug has slowly increased, particularly in hospitals. The current review found that 80.9% of hospitals and 17.9% of health centres are now using the drug (figure 4-5).

Figure 4-5: Percent of hospitals and health centres using misoprostol over a 12-month period (Comparison of use since the 2009 EmONC baseline)

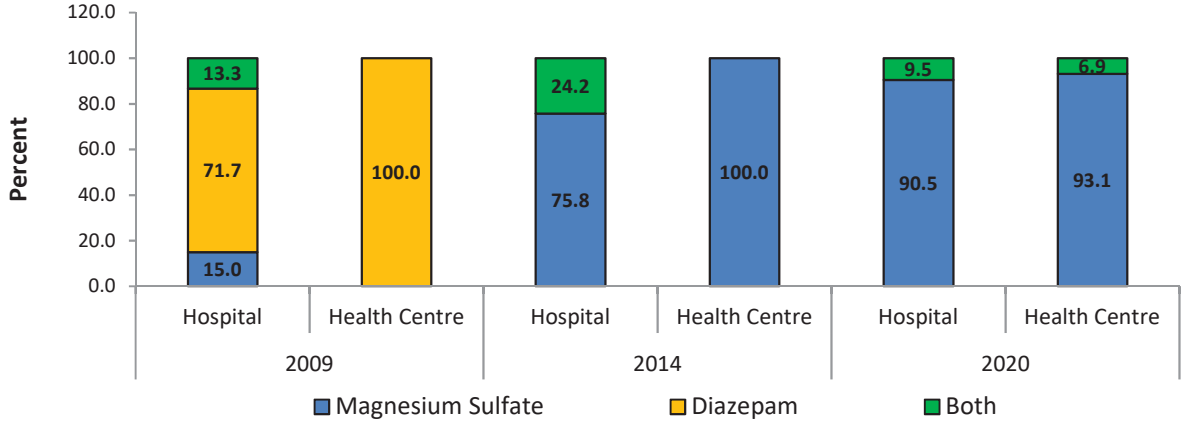


(N for Hospital: 2009=77, 2014=91, and 2020=115) (N for Health Centres: 2009=230, 2014=88, and 2020=66)

Use of anticonvulsants

The least performed signal function in any health facility in Cambodia is the administration of anticonvulsants. This is a concern as the second main cause of maternal death from direct causes in the country is eclampsia. Figure 4-6 shows that diazepam was the most popular anticonvulsant for hospitals (71.7%) and health centres (100%) in 2009. Magnesium sulphate, which has been shown[25] to be superior to diazepam, is now given more frequently (> 90%) by both hospitals and health centres. Diazepam is no longer used exclusively. A combination of diazepam and magnesium sulphate is now used infrequently (< 10%) by both hospitals and health centres.

Figure 4-6: Percent of hospitals and health centres using anticonvulsants over a 12-month period (Comparison of use since the 2009 EmONC baseline)



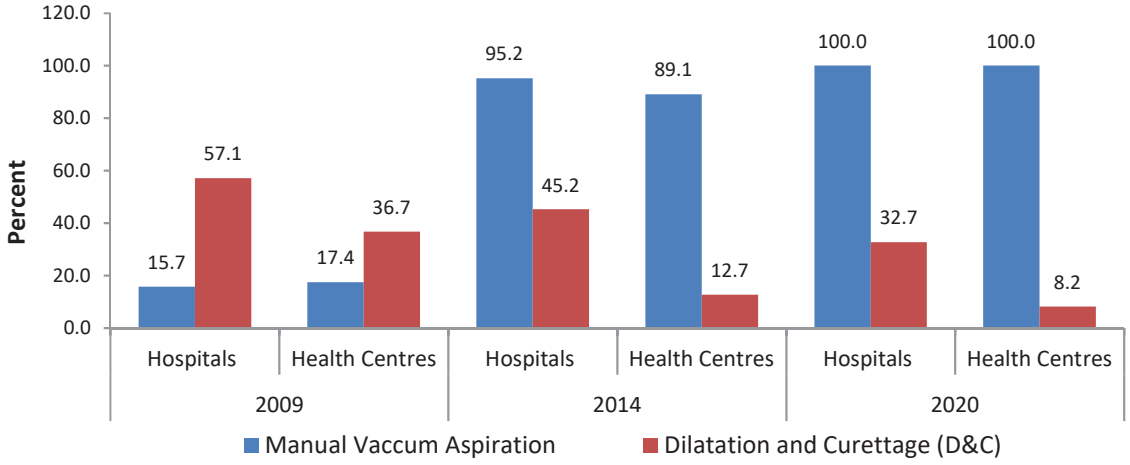
(N for Hospital: 2009=77, 2014=91, and 2020=115) (N for Health Centres: 2009=230, 2014=88, and 2020=66)

25 Chien PFW, Khan KS, Arnott N. (1996), Magnesium sulphate in the treatment of eclampsia and preeclampsia: an overview of the evidence from randomised trials BJOG: An International Journal of Obstetrics & Gynaecology (1996) V103: 11 pg.1085-1091

Methods used to remove products of conception

After the administration of oxytocics Manual Vacuum Aspiration (MVA) is one of the most performed signal functions in hospitals and health centres. Figure 4-7 shows that in 2009, dilatation & curettage was the most popular method for removal of products of conception for both hospitals (57.1%) and health centres (36.7%). Since 2009 the use dilatation & curettage has decreased and MVA is now the method of choice in all (100%) of hospitals and health centres. Dilatation & curettage is only used by 32.7% of hospitals and < than 10% of health centres.

Figure 4-7: Percentage of hospitals and health centres that used D&C and MVA to remove retained products of conception over a 12-month period
(Comparison of use since the 2009 EmONC baseline)

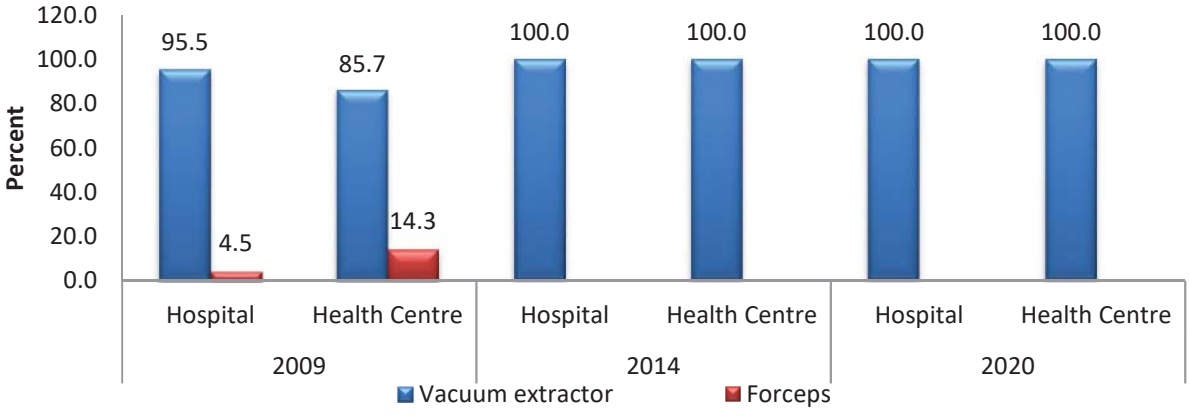


(N for Hospitals: 2009=77, 2014=91, and 2020=115) (N for Health Centres: 2009=230, 2014=88, and 2020=66)

Type of instruments used for assisted delivery

In 2009, the instrument of choice for assisted delivery was a vacuum extractor in both hospitals (95.4%) and health centres (85.7%). Forceps were rarely used. The same trend exists; except MVA is exclusively used (100%) in both hospitals and health centres while forceps are never used (figure 4-8). It seems the use of forceps is becoming a method of the past.

Figure 4-8: Percent of hospitals and health centres that used instruments for assisted delivery over a 12-months period
(Comparison of use since the 2009 EmONC baseline)



(N for Hospital: 2009=77, 2014=91, and 2020=115) (N for Health Centres: 2009=230, 2014=88, and 2020=66)

Source of blood supply

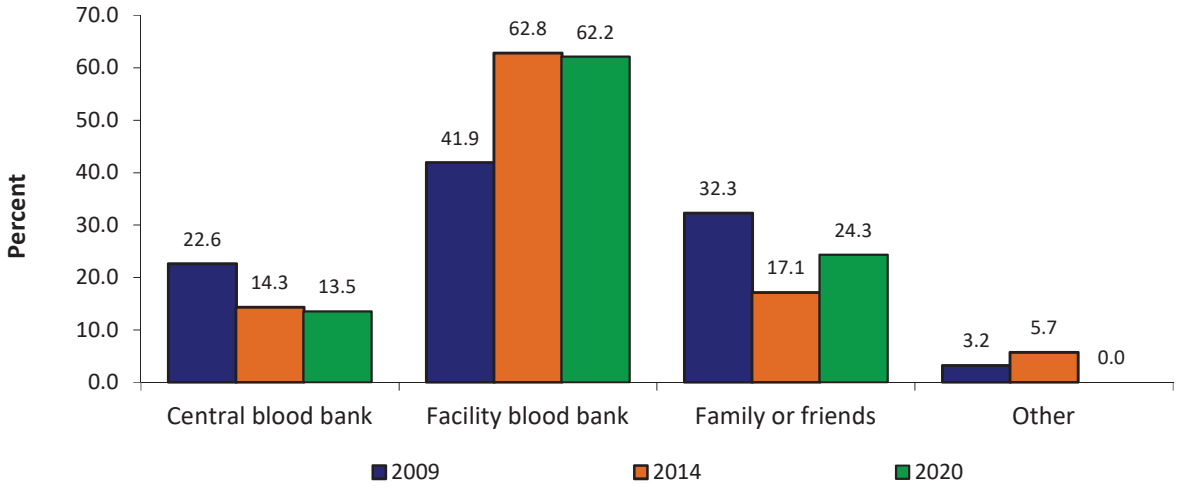
Blood Transfusion[26]

As a principle and when indicated, blood should be transfused within one hour of a request at CEmONC facilities and 2 hours of a request at BEmONC facility. The National Blood Bank is responsible for policies and procedures for collecting blood, testing, grouping, cross matching and transfusing. Blood should be available at provincial hospitals (provincial blood banks) and in all CEmONC facilities in Blood Depots, e.g. fridges that can safely keep a small provision of bags of each blood group for immediate use. Monitoring and replenishment of Blood Depots and inter-facility mobility of supplies also need to be ensured.

Blood for obstetric emergencies comes from various sources including: the central bank supply, facility blood bank, family and friends and other sources. Figure 4-9 shows that in 2009 the main source of blood for public hospitals was facilities' blood bank (41.9%) followed by family and friends (32.3%) then the central blood bank. Since then the trend has changed. In 2020 facility blood banks are now the main supply of blood (62.2%) followed by family and friends (24.3%). The central blood bank is being used less frequently. Ensuring a safe blood supply should be a priority.

Figure 4-9: Percent of hospitals using different sources of supply for blood transfusions over a 12 month period

(Comparison of use since the 2009 EmONC baseline)



(N for Hospital: 2009=77, 2014=91, and 2020=115)

Type of anaesthesia

Figure 4-10 shows that in 2009 the most frequently used form of anaesthesia for Caesarean sections in public hospitals was a general, i.e. gas and ventilator (95.3%). The same percentage of hospitals reported the use of spinal (95.3%). Since 2014 hospitals have used spinal anaesthesia almost exclusively (100%) but almost half (46.8%) of hospitals continue to use general anaesthetics. Twenty-three percent (23%) of hospitals also used Ketamine in 2020, which seems to be falling out of favour.

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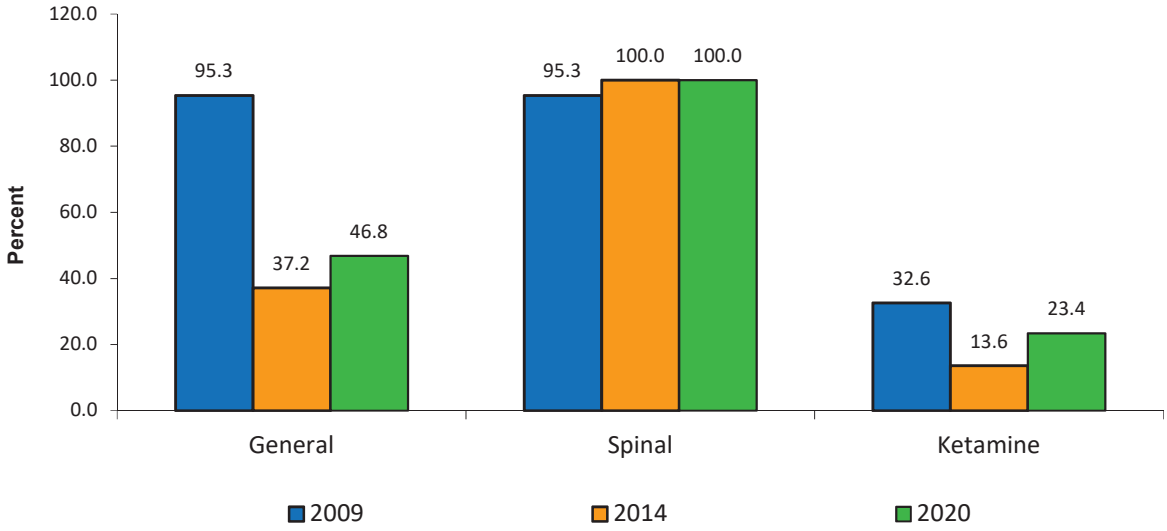
Figure 4-10: Percent of hospitals using different types of anaesthesia for Caesarean sections over a 12-month period

(Comparison of use since the 2009 EmONC baseline)



(N for Hospital: 2009=77, 2014=91, and 2020=115)

5. FINDINGS: MATERNITY PROCEDURES AND SERVICES COMPLEMENTING EmONC

This section looks at the availability and cost of selected maternity procedures and services which are essential complementary elements of EmONC and should be performed according to standards in all EmONC facilities. Facilities surveyed were asked about the availability of specific procedures and services vital to the outcomes of mothers and babies. The list of interventions are not comprehensive. Procedures such as repair of tears, foetal monitoring during labor, dexamethasone for prematurity, antibiotics for premature rupture of membranes is beyond the scope of this review.

5.1 Vital maternity procedures and services provided to mother and newborns

Selected vital maternity procedures and services

Table 5-1 and 5-2 show selected maternity services, considered vital to the outcome of mothers and babies. These include: the use of a partograph, management of breech deliveries, administration of parenteral antibiotics to newborns, intubation and ventilation of a newborn, HIV testing of mothers, and the administration of ARV for mothers and babies.

In most cases, the head of the maternity department was asked about the performance of these vital functions in the health facility being reviewed. The head of maternity was asked if the interventions or services had been performed in the 3-months prior to the review. When a service had not been performed, the head of maternity was asked if the service had been performed in the last 12 months. If the head of maternity was not available, then the health facility manager was asked to delegate a health worker to respond to the questions. Almost all responses were from the head of maternity.

Table 5-1 shows there has been some improvement in the performance of selected vital functions in EmONC facilities (n=181) since 2009. The percent of partographs completed by functional and designated EmONC facilities has decreased since 2009 by 10%. Improvement occurred in only for antibiotics for newborns and HIV rapid testing for mothers

The high use of partograph can be partly explained by an incentive payment for deliveries, linked to a completed partograph. In 2009 there were concerns the payment would undermine the quality of partograph completion. So, partograph case studies have been undertaken in this review. See section 12 of this report. A general observation is that partograph completion has deteriorated since 2009.

Table 5-1: Vital functions provided in EmONC facilities 3-months prior to the 2020 survey (Progress since 2009 EmONC assessment baseline)						
Vital functions	**2009 (n=143)**		**2014 (n=178)**		**2020 (n=181)**	
	No	**%**	**No**	**%**	**No**	**%**
Partograph	134	93.7	177	99.4	152	84.0
Breech Delivery	75	52.4	115	64.6	106	58.6
Parenteral antibiotics to newborn	11	7.7	24	17.9	53	29.3
Newborn intubation & ventilation	13	9.1	48	27	12	6.6
Rapid HIV test for mother	46	32.2	132	74.2	132	72.9
ARV to mothers	15	10.5	29	16.3	19	10.5
ARV to newborns	23	16.1	49	27.5	31	17.1

Table 5.2 shows that all vital functions performed in EmONC facilities increased when the time-line for the implementation by health facilities was extended to 12 months. With the exception of breech delivery and newborn intubation & ventilation the performance of all vital function have increased since 2009. Rapid HIV tests for mothers increased from 35.7% to 84.09%. The increase in ARV given to mothers and newborn and breech delivery has also increased by less than 10% in all EmONC facilities since 2009.

Table 5-2: Vital functions provided in EmONC facilities in 12-months before the 2020 survey (Progress since 2009 EmONC assessment baseline)						
Vital functions	**2009 (n=143)**		**2014 (n=178)**		**2020 (n=181)**	
	No	%	No	%	No	%
Partograph	134	93.7	177	99.4	180	99.4
Breech Delivery	109	76.2	144	80.9	152	84.0
Parenteral antibiotics to newborn	15	10.5	72	40.5	67	37.0
Newborn intubation & ventilation	15	10.5	51	28.7	16	8.8
Rapid HIV test for mother	51	35.7	141	79.2	152	84.0
ARV to mothers	18	12.6	39	21.9	34	18.8
ARV to newborns	26	18.2	53	29.8	53	29.3

Performance of vital function performed by mothers and newborns

Table 5-3 shows the performance of selected vital maternity services being delivered across Cambodia in all hospitals (n=115) and health centres (n=95) reviewed in 2020. The most frequently performed vital maternity service in both hospital and health centres was the partograph. As expected, emergency and more specialised procedures such as breech delivery (93.0%), the administration of parenteral antibiotics (56.5%) to newborns and newborn intubation & ventilation (13.9%) were performed more frequently by hospitals. Rapid HIV testing of mothers was provided by both hospitals and health centres about 75% or more of the time. However, the administration of *antiretroviral* therapy to mother and babies did not occur at health centres and not all hospitals provided the therapy to mothers (28.7%) and newborns (45.2%).

Reasons for non-performance of vital services provided to mothers and newborns

Twenty six (26) respondents were unable to provide a reason for not performing a specific signal function. See table 5-3. Where reasons were given, issues around newborn care was the area of greatest concern. “Policy issues” followed by “supplies, equipment and drugs” then “training issues”

were the main reasons given for not administering parenteral antibiotics or for not intubating and ventilating a new newborn for 10.5%-64.9% and 9.1%-63.6% of respondents, respectively.

Policy issues was also the main reason given for not giving ARVs to mothers (53.1%) and newborns (62.5%). This suggests a lack of awareness or poor dissemination of policy updates for newborn care and the treatment of HIV. However, as responses were low (similar to the questions regarding the non-performance of the signal function), in most cases care should be taken when interpreting these findings.

Table 5-3: Percent of facilities providing selected vital maternity services across Cambodia in the last 12-months and reasons given for not providing the service (n=181)															
Signal Function	Percentage of facilities (n=181) that provided service		Number of facilities that did not perform the services (n=181)	Percentage of facilities that responded that the procedure was not provided in the last 12-months and the reason for not providing the service (multiple responses allowed):											
	Hospitals (n=115)	Health Centres (n=66)		availability of human resources		training issues		supplies/ equipment/ drugs		management issues		policy issues		no indication	
	%	%	n	n	%	n	%	n	%	n	%	n	%	n	%
Partograph	100.0	98.5	1	0	0.0	0	0.0	0	0.0	0	0.0	1	100.0	0	0.0
Breech Delivery	93.0	68.2	29	0	0.0	1	3.4	0	0.0	0	0.0	7	24.1	19	65.5
Parenteral antibiotics to newborn	56.5	3.0	114	7	6.1	18	15.8	12	10.5	3	2.6	74	64.9	22	19.3
Newborn intubation & ventilation	13.9	0.0	165	9	5.5	15	9.1	43	26.1	4	2.4	105	63.6	13	7.9
Rapid HIV test for mother	90.4	72.7	29	0	0.0	0	0.0	2	6.9	3	10.3	5	17.2	14	48.3
ARV to mothers	28.7	0.0	147	0	0.0	0	0.0	29	19.7	4	2.7	78	53.1	32	21.8
ARV to newborns	45.2	0.0	128	0	0.0	1	0.8	28	21.9	1	0.8	80	62.5	26	20.3
[1] Only national hospitals, and CPA2 and CPA3 hospitals are included (n = 58)			613												

Services around delivery/childbirth.

Figures 5-1 and 5-2 show selected maternity services provided around childbirth by functional and designated EmONC facilities. As expected, 100% of the two categories of facilities provide delivery/childbirth services. The figures also show that since 2009 the provision of focussed antenatal care has progressively increased in facilities. Most (99%-100%) facilities have provided post-natal care since 2014. Care of a newborn with complications has been slowly increasing since 2009 in functional and non-functional EmONC facilities. The number cases managed by designated (non-functional) EmONC facilities is low.

Figure 5-1: Percent of functional EmONC facilities providing of selected maternity services around childbirth (2020)

(Progress since the 2009 EmONC assessment baseline)

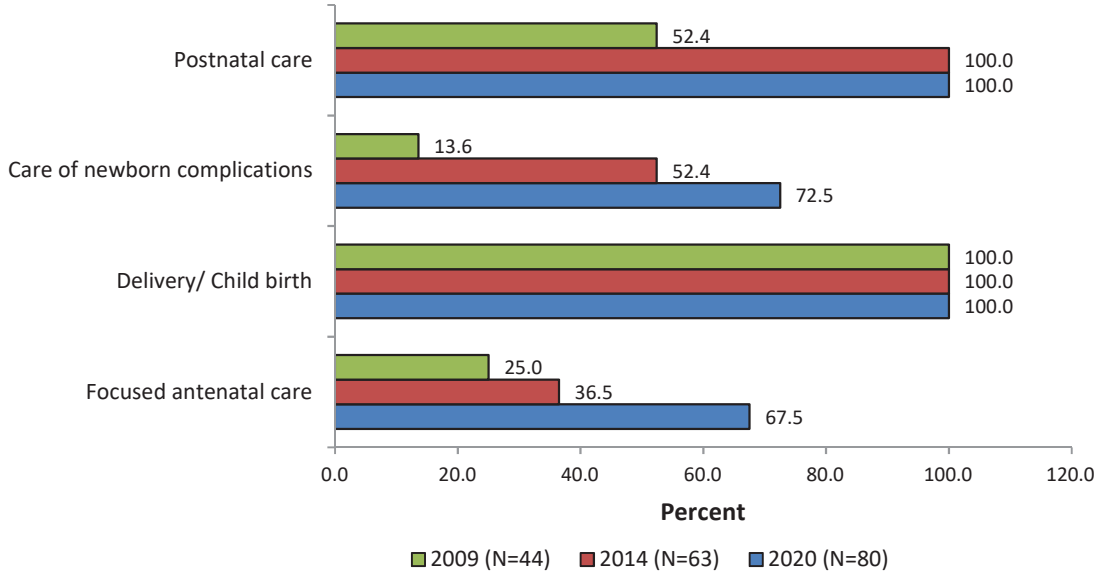
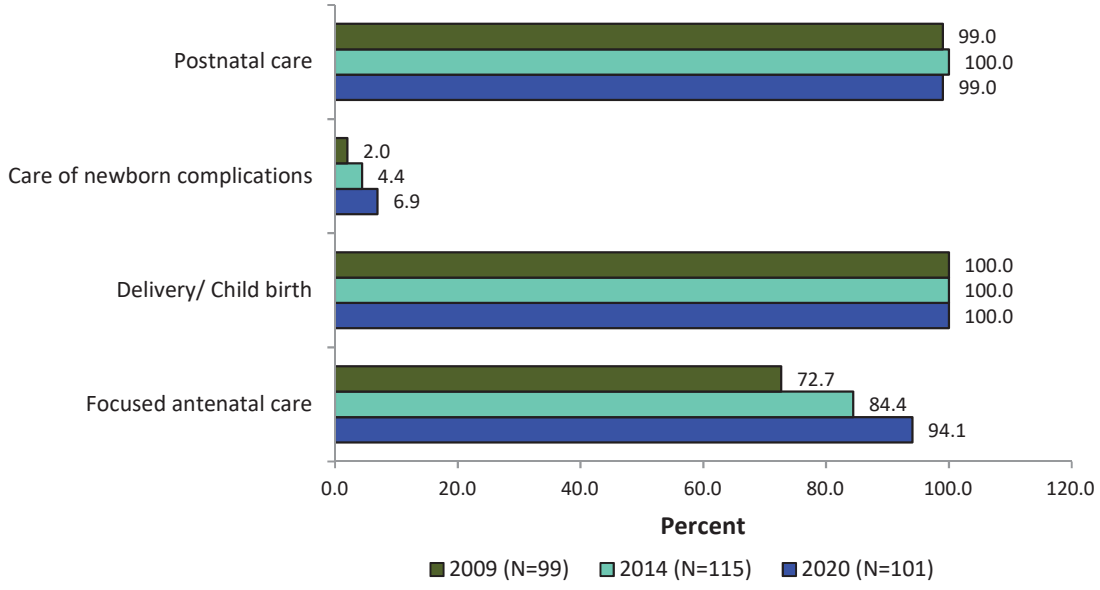


Figure 5-2: Percent of designated EmONC facilities providing selected maternity services around childbirth (2020)

(Progress since the 2009 EmONC assessment baseline)



Post Natal Care

Post Natal Care (PNC) was not addressed adequately in the EmONC baseline assessment (2009) or in the previous review (2014). So, it is an area which has been added to vital maternity services for mothers and babies for monitoring and review.

According to safe motherhood policy and guidelines, PNC should be provided to mothers and babies on discharge from a health facility 48 hours after birth. Table 5-4 shows that with the exception of 1 health centre PNC was provided to all mothers and babies within 24 hours of birth. Around 84% of health facilities provided PNC to mothers and newborns within 24 hours. It is unclear when these facilities routinely discharged their mothers and babies. As mothers are being encouraged to stay in hospitals for 48 hours and most PNC was provided within 24 hours it could be the case that women are leaving soon after delivery.

Table 5-4: Post Natal Care (PNC) for mothers and newborns in hospital and health centres (2020 review)*

	Hospitals (n=115)		Health centres (n=66)		Total (n=181)	
	No	%	No	%	No	%
PNC for mothers						
PNC for mothers is provided	115	100.0	66	100.0	181	100.0
Within 24 hours of birth	99	86.1	52	78.8	151	83.4
Within 48 hours of birth	15	13.0	10	15.2	25	13.8
> 48 hours after birth	1	0.9	4	6.1	5	2.8
PNC for newborns						
PNC for newborns is provided	115	100.0	66	100.0	181	100.0
Within 24 hours of birth	99	86.1	53	80.3	152	84.0
Within 48 hours of birth	15	13.0	9	13.6	24	13.3
> 24 hours after birth	1	0.9	4	6.1	5	2.8

*Data is only available for the 2020 EmONC Review

Other services and procedure performed by hospitals since 2009

Figure 5-3 shows selected maternity and newborn services and procedures performed by hospitals in a 3-month period prior to the 2009 EmONC baseline assessment and the two EmONC reviews (2014 and 2020).

The most frequently performed vital functions in hospitals are the partograph, breech delivery and a rapid HIV test for the mothers. More than 80% of hospitals surveyed since 2009 have provided these services. As many of these hospitals are CEmONC facilities, this is to be expected. Conversely, administration of parenteral antibiotics and intubation and ventilation of newborns in emergency situations are performed less frequently (< 57%) in hospitals, possibly suggesting the infrequency in need.

Surgical methods of contraception and administration of ARVs to mothers and babies are also performed less frequently (< 58%) by hospitals. This can be explained in part by the increase in provision of temporary family planning methods (89.6%) and the fact that the latter services are available through community clinics which are not attached to hospitals. To investigate this further, a question was asked about the availability of competent staff, who are able to perform surgical methods of contraception.

Figure 5-3: Percent of hospitals providing maternity procedure and services over a three month period[27]

(Comparison between 2009 EmONC baseline, 2014 and current EmONC review)

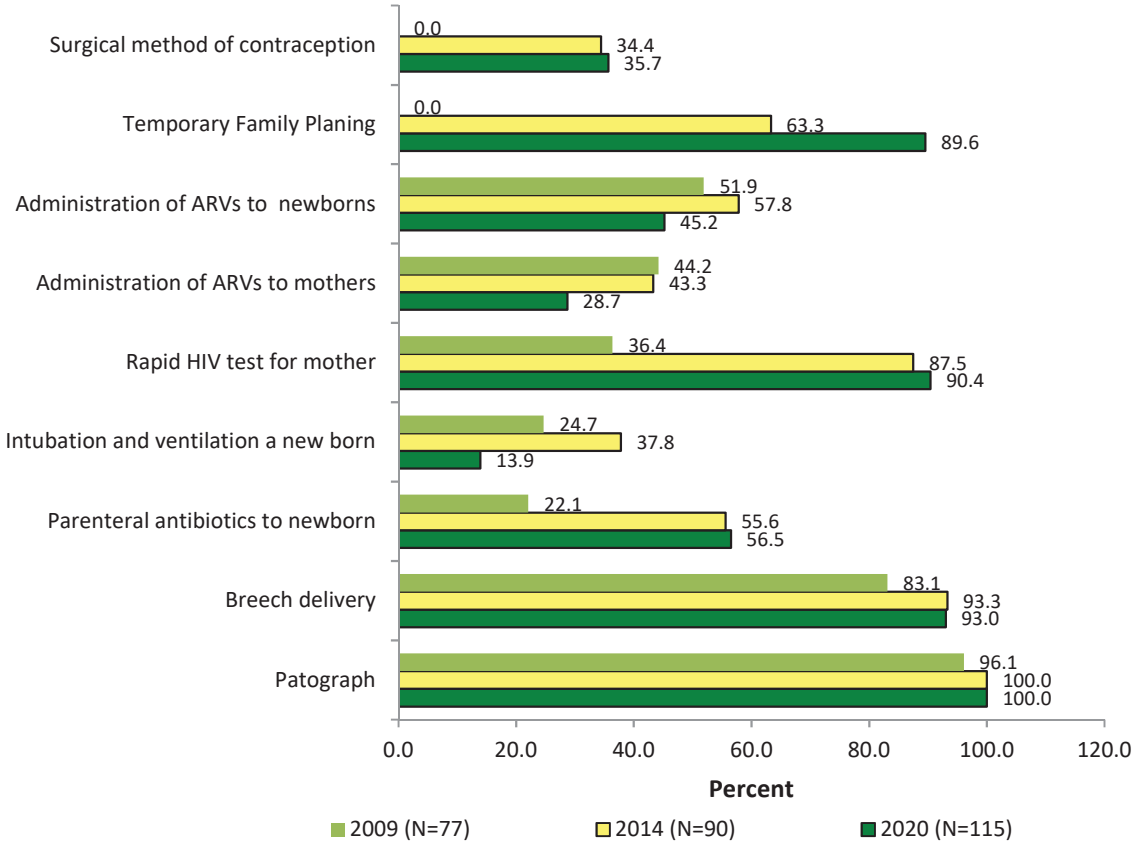


Table 5-5 shows that in 2020 over ninety of the CPA2, CPA3, and National hospitals surveyed (93.1%) and around three quarter (74.1%) had competent staff available to perform tubal ligation and/or vasectomy, respectively. This situation had improved since 2014.

Table 5-5: Percent of competent hospital staff able to perform surgical methods of contraception (2014 and current EmONC Review 2020)

Availability of staff	2014 (n=51)				2020 (n=58)			
	Have		No available		Have		Not available	
	n	%	n	%	n	%	n	%
Staff can do tubal ligation	42	82.4	9	17.6	54	93.1	4	6.9
Staff can do vasectomy	32	62.7	19	37.3	43	74.1	15	25.9

27 Family planning services data was not collected for the 2009 baseline study

Other maternity procedures and services performed by health centres

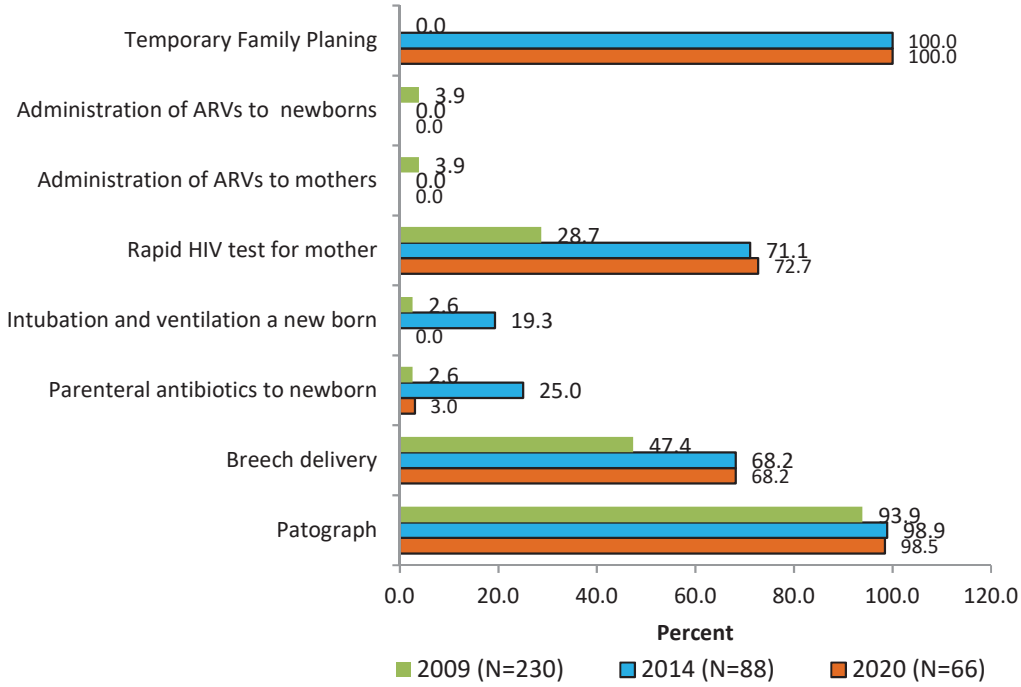
Figure 5-4 shows selected maternity and newborn services performed in health centres in the 3-month period prior to the 2009 EmONC baseline assessment and the two EmONC reviews (2014 and 2020).

The most frequently performed vital function reported by health centres was the provision of temporary family planning methods (100%) and the partograph (≥94%). For family planning, lower level facilities have community clinics where temporary family planning methods are actively promoted. So the result of 100% of health centres for health centres was to be expected.

The low performance of other vital maternity services, such as the administration of parenteral antibiotics and intubation and ventilation of newborns, could be explained by the different roles health centres and hospitals play along with the levels of competence of health facility staff. Also, maternity patients presenting at health centres in emergencies are often referred on, or clients choose to go straight to a hospital, bypassing a health centre.

Figure 5-4: Percent of health centres providing maternity procedure and services over a three month period[28]

(Comparison between 2009 EmONC baseline, 2014 and current EmONC review)



5.2 Guidelines and protocols to support maternity services

The delivery of EmONC and associated services and procedures should be performed according to protocols, standards guidelines. The MoH has issued and distributed protocols, standards and guidelines to manage all possible cases: these protocols are taught in clinical training sessions, but they must be available in all units, at all times for consultation. For the EmONC baseline assessment in 2009 and review in 2014 there were long lists of guidelines and protocols. They were not all approved by the MoH. It caused confusion with collecting data and reporting results.

28 Family planning services data was not collected for the 2009 baseline study

For this review, guidelines and protocols have focused on 3 key documents which have been approved by the national MoH. Specifically: safe motherhood clinical management protocols; infection control guidelines; and early newborn care guidelines or protocols.

Table 5-6 shows that safe motherhood protocols are available in most (95.74%) health facilities surveyed, while infection control guidelines were available in 82% of health facilities. Early newborn care guidelines or protocols are in 23.4% of facilities but have increased from 5% in 2014. Guidelines are more available in hospitals than health centres. When staff were asked if they knew about the existence of the protocols and guidelines, < 7% of health centres had staff that knew about the newborn care guidelines and protocols. The Early newborn care guidelines or protocols is a relatively new document.

Table 5-6: Availability and knowledge of safe motherhood and other protocols and guidelines In hospitals and health centres

	Hospitals (n=115)		Health centres (n=66)		Total (n=181)	
	n	%	n	%	n	%
Availability of clinical management guidelines and protocols						
Safe motherhood clinical management protocols	112	97.4	64	97.0	176	97.2
Infection control guidelines are available	106	92.2	49	74.2	155	85.6
Early newborn care guidelines or protocols (EENC Guidelines)	45	39.1	4	6.1	49	27.1
Availability of clinical management guidelines and protocols						
Safe motherhood clinical management protocols are used	112	97.4	64	97.0	176	97.2
Infection control guideline are available	106	92.2	49	74.2	155	85.6
Early newborn care guidelines or protocols (EENC Guidelines)	44	38.3	4	6.1	49	27.1

5.3 Cost of Services

Cost of maternity services may deter women from prompt and timely use of health services for themselves and their newborns. To better understand if costs are a barrier to maternity care, especially for the poor and vulnerable data was collected on cost of services and payment systems.

Cost of services in EmONC facilities

Health services are not free in Cambodia; there is a national social health protection scheme (HEF or SUBO- Prakas 809) that covers the poor (about 25-30% of the population). This social health protection scheme has expanded significantly in coverage since the 2009 EmONC assessment. The current cost of maternity care has had a positive impact on access on maternity care.

Table 5-7 shows that in 2014 before general maternity services were provided, payment was required before treatment by 24 % of functional and 43% of non-functional EmONC facilities. For maternal and newborn care, payment was required by about 9% of EmONC facilities. In addition, there was a fee for supplies and medicines. The current review found that the fee for general maternity services still exits. There has been an increase of about 10% in facilities requesting this upfront payment. For maternal and newborn emergencies the fee has decreased.

Table 5-7: Payment of general and emergency services, supplies and medicines for paying clients (2014 and 2020 EmONC reviews)								
Payments	**Functional EmONC facilities**				**Non-functional EmONC facilities**			
	20014 (n=63)		**2020 (n=80)**		**20014 (n=115)**		**2020 (n=101)**	
	No	**%**	**No**	**%**	**No**	**%**	**No**	**%**
General maternity services								
Formal payment required before treatment	15	23.8	31	38.8	49	42.6	40	39.6
Service fee plus fee for supplies/medicines	15	23.8	0	0.0	34	29.6	0	0.0
Maternal and newborn emergencies								
Payment required before treatment	8	12.7	0	0.0	6	5.2	2	2.0
Medicine/supplies paid before treatment	3	4.8	2	2.5	8	7.0	5	5.0
Schedule for services in a visible public place	59	93.7	77	96.3	101	87.8	97	96.0

Table 5—7 also shows that 96% of health facilities surveyed, have a fee schedule in a visible public place. This represent about 10% increase since 2014.

Formal and informal payment systems in place for maternity services

Formal payment systems that improve access services should be encouraged. Informal payment systems can also fill gaps but should not be counted on to reduce barriers to health services.
Table 5-8 shows there has been a slight increase (91.3%-100%) in formal systems waiving fees for maternity services. Non-formal systems have decreased from 100% to 85% in functional EmONC facilities and have remained static (around 91%) in non-functional EmONC facilities.

Table 5-8: EmONC facilities with payment systems to cover costs/ exempt the poor from payment for services								
Items charged separately for (in addition to user fee)	**Functional EmONC facilities**				**Non-functional EmONC facilities**			
	2014 (n=63)		**2020 (n=80)**		**2014 (n=115)**		**2020 (n=101)**	
	No	**%**	**No**	**%**	**No**	**%**	**No**	**%**
Formal system in place to waive fees for maternity services and poor women (exemption scheme of the government)	61	96.8	80	100.0	105	91.3	101	100.0
Non-formal system in place to waive fees for maternity services and poor women	63	100.0	68	85.0	105	91.3	93	92.1

The health equity fund is the best known and the most used formal system. Since 2009 the fund has increased from to the current review where the fund is available in 179 out of 181 health facilities surveyed. See table 5-9

Table 5-9: Facilities surveyed where poor women have access to health equity funds (Progress since 2009 EmONC assessment baseline)												
2009				**20014**				**2020**			
Hospital (n=77)		**Health Centre (n=66)**		**Hospital (n=90)**		**Health Centre (n=88)**		**Hospital n=115)**		**Health Centre (n=66)**	
n	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
51	66.2	25	37.9	67	74.4	56	63.6	115	100.0	64	97.0

6. FINDINGS: STRENGTHENING THE "N" IN EmONC

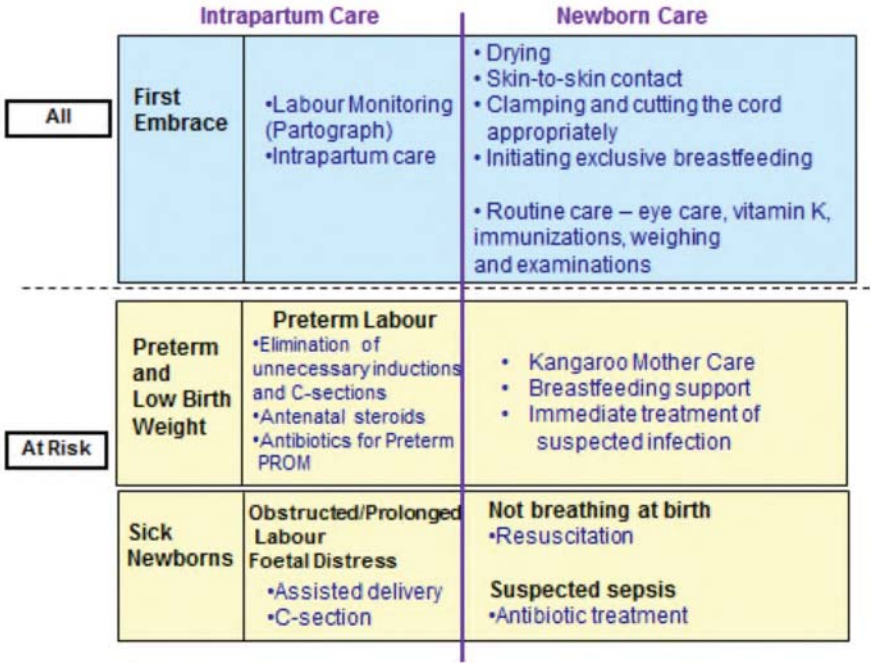
This section focuses on reviewing and assessing the feasibility of adopting signal functions for Emergency Newborn Care (EmNC) across Cambodia. Also addressed, is the capacity of the health system to support human resources, equipment and supplies for early newborn care.

6.1 Background to strengthening the "N" in EmONC

The 2016-2020 Cambodia EmONC Improvement Plan quite rightly points out that newborn care is often a neglected element of EmONC. Newborn resuscitation was added to the signal functions being monitored by Cambodia in 2014 and there has been much discussion about strengthening the Cambodian neonatal signal function to align with Immediate Newborn Care (INC) and Early Essential Newborn Care (EENC).

EENC is a package of interventions delivered to the mother and the newborn between delivery and the first 3 days after birth (see figure 6-1). These interventions are also part of the Five Year Action Plan for Newborn Care in Cambodia 2016-2020[29].

Figure 6-1: Priority Interventions of Early Essential Newborn Care (EENC)[30]



29 Ministry of Health. Royal Government of Cambodia, Five Year Action Plan for Newborn Care in Cambodia 2016-2020, December 2015.
30 WHO/WPRO, UNICEF. Action Plan Towards Healthy Newborns in the Western Pacific Region (2014-2020). April 2013. WHO/WPRO.

Elements of the EENC package shown above.

The First Embrace - for all mothers and newborns. Interventions include immediate and thorough drying; immediate skin-to-skin contact; appropriately timed cord clamping; and non-separation of mother and newborn for early exclusive breastfeeding.

Prevention and management of prematurity – for preterm and low birth weight babies (5-7% of all newborns). Interventions include preventing unnecessary inductions and C-sections; antibiotics for premature pre-labour rupture of membranes; antenatal steroids; tocolytics when indicated; and Kangaroo Mother Care (KMC).

Care for Sick Newborns – for babies with birth asphyxia, neonatal sepsis and complications of delivery (10-15% of all newborns). Interventions include management of asphyxia using bag and mask ventilation, identification of babies at high risk, and management of sepsis and other common problems.

6.2 Emergency Newborn Care (EmNC) Signal Functions

Signal functions are a representative shortlist of key interventions and activities that address major causes of morbidity or mortality and that are indicative of a certain type and level of care. For instance, signal functions indicative of "basic emergency obstetric care (EmOC)" could be provided by midwives at the level of a health centre, while "comprehensive EmOC" signal functions indicate a higher level of care, usually at a hospital. Despite a growing body of literature there is no global consensus on signal functions for EmNC. Based on work undertaken in 2012[31] table 6-1 was adapted for use to explore the feasibility of introducing a small number of EmNC functions into Cambodia.

Table 6-1: Newborn and Obstetric Signal Functions for Health Facilities, 2012[32]

Dimensions of maternity care	Obstetric	Newborn
General requirements for facility	• Service availability 24/7 • Skilled providers in sufficient numbers • Referral service to higher level care, communication tools • Reliable electricity and water supply, clean and functional toilets	
Routine care – all mothers and babies	• Monitoring and management of labour using the Partograph • Infection prevention measures (hand-washing, gloves) including non-separation, limiting admissions to NICU or "observation areas" • AMSTL	• Thermal protection [a] • Immediate and exclusive breastfeeding • Infection prevention including hygienic cord care [c] • Routine care- eye case, vitamin k, immunizations, weighing and examinations
Basic emergency care – mothers and babies with complications	• Parenteral magnesium sulphate for pre-eclampsia • Assisted vaginal delivery • Parenteral antibiotics for maternal infection • Parenteral oxytocic drugs for haemorrhage • Manual removal of placenta for retained placenta • Removal of retained products of conception	**Preterm and low birth weight babies** • Antibiotics for preterm or prolonged PROM to prevent infection • Corticosteroids (antenatal steroids and tocolytics) in preterm labour • KMC for premature/very small babies • Alternative feeding if baby unable to breastfeed (breast feeding support) [d] **Care of sick early newborns** • Resuscitation with bag and mask for non-breathing baby • Injectable antibiotics for neonatal sepsis and other newborn problems

31 Gabrysch S, Civitelli G, Edmond KM, Mathai M, Ali M, et al. (2012) New signal functions to measure the ability of health facilities to provide routine and emergency newborn care. PLoS Med 9(11): 01340.doi: 10.1371/journal.pmed. 1001340

32 Gabrysch S, Civitelli G, Edmond KM, Mathai M, Ali M, et al. (2012) New signal functions to measure the ability of health facilities to provide routine and emergency newborn care. PLoS Med 9(11): 01340.doi: 10.1371/journal.pmed. 1001340

Dimensions of maternity care	Obstetric	Newborn
		(pneumonia, meningitis, other injections, jaundice, malformations) • PMTCT if mother HIV positive (antiretrovirals for HIV and penicillin for syphilis exposed infants
Comprehensive emergency care – in addition to basic	• Surgery (e.g. C-section) including anaesthesia (common to both) • Blood transfusion (common to both)	• Intravenous fluids • Safe administration of oxygen (oxygen and/or CPAP) for respiratory distress

a - Thermal protection: The first embrace: drying baby immediately after birth, skin-to-skin with mother, wrapping, no bath in first 24 hours, or where culturally unacceptable, no earlier than 6 hours
b - AMTSL: oxytocin injection within 1 minute of delivery of baby, controlled cord traction, uterine massage after placenta delivered
c- Hygienic cord care: cutting with sterile blade, clean and dry care in settings with low neonatal mortality and infection risk and no application of harmful substances (or application of 4% chlorhexidine on tip of the cord and stump in settings with high neonatal mortality).
d- Breastmilk expression and cup/spoon feeding.

6.3 Challenges for strengthening the "N" in EmONC

The perinatal period, which would be the focus of EmNC signal functions refers to the period between 22 completed weeks (154 days) of pregnancy and seven completed days after birth. Perinatal death includes both late foetal deaths and early neonatal deaths[33]. The WHO has estimated perinatal mortality rate in Cambodia at 66 in 2000 with 32,000 perinatal deaths. There are two key issues with monitoring EmNC signal functions in Cambodia:

1. Neonatal care units are primarily only available at big national hospitals such as Calmette, NMCHC, National Paediatric Hospital, and Preah Sihanouk Hospital. These services are poorly available across the health system at sub-national levels. Challenges include limited capacity of health staff to provide neonatal services, unavailability of neonatal care units, and lack of appropriate equipment.
2. Updated data on perinatal mortality is limited and neonatal care in the perinatal period remains one of the most challenging issues in most countries, Cambodia included. The ideal situation would be to have data on early newborn mortality, which is closely linked with available maternal mortality data. Early newborn deaths (in the first days and weeks) are less measured and reported than later newborn deaths (up to 28 days post-delivery) in Cambodia, as in many developing countries. When the first EmONC assessment was undertaken, data around the perinatal period was not being collected. This has improved, but still has a long way to go.

6.4 Problems with data to support Emergency Neonatal Care (EmNC)

The strength of an EmOC assessment is the methodology which makes use of available data in health facilities. Collection of data involves going back in registers for 6 or 12-months and reviewing records to ensure the data collected is valid. Where data is available, there is a problem of underreporting of Early Newborn Mortality (deaths during the first 6 days of life), very early newborn mortality (deaths during the first 24 hours), and stillbirth mortality, particularly late stillbirth or Intra-partum mortality. This is closely correlated to maternal mortality, sharing the same epidemiologic conditions case management, both of which are related to EmONC. Few developing countries report on early, very

33 ARROW. (2012). An Advocate's Guide: Strategic Indicators for Universal Access to Sexual and Reproductive Health and Rights. Retrieved on 31 May 2014 from http://www.arrow.org. my/publications/AdvocateGuide_Final_RN_ Web.20131127.pdf

early or stillbirth mortality, making the construction of UN EmONC Process Indicator N° 7 Intrapartum and Early Newborn Death Rate difficult.

6.5 Steps taken to identify early newborn signal functions

To explore the feasibility of collecting data on EmNC signal functions around the peri-natal period, the head of the research unit from the University of Health Sciences (Cambodia), an international consultant and the UNFPA EmONC coordinator visited four health facilities at different levels to review registers and data sources being used for EmNC. The general consensus of the team was that the data was mostly not available. Where data was available it would need to be collected from different sources, including: the paediatric, gynaecological and labour wards, emergency department and/or maternity unit.

Data for resuscitation with bag and mask for non-breathing baby is currently being collected. So based on the team visit and feedback the following signal functions which fit into two sub-groups: (1) pre-term and low-birth weight babies and (2) care of sick early newborns; were identified form table 6-1 as feasible to assess:

1. Antenatal corticosteroids
2. Antibiotics for premature rupture of membranes (PRoM)
3. Injectable antibiotics for neonatal infections
4. Kangaroo Mother Care (KMC) for premature very small babies
5. Alternative feeding if baby unable to breast feed (breast feeding support)
6. Administration of Oxygen CPAP for newborns with respiratory distress
7. Special of intensive care for newborn baby
8. Intubation and ventilation of a newborn
9. Administration of IV fluids to a neonatal newborn

6.6 Performance of EmNC signal functions

Data relating to the performance of EmNC signal functions was collected from all hospitals and health centres surveyed. Tables 6-2 and 6-3 show the analysis of signal functions performed by facility type, performance of EmNC signal functions in the last 3 and 12-months before the review; facilities not performing the signal functions; and reasons for not providing a particular signal function.

EmNC signal functions performed by facility type

Table 6-2 shows that hospitals are more likely to perform EmNC signal function than health centres. The signal function performed the most was the administration of antibiotics for premature rupture of membranes (pRoM). Eighty five percent (85%) of hospitals and 41% of health centres performed this signal function 3-months before the review. Hospitals (67% and 60.7% respectively) also reported giving antenatal corticosteroids and providing breast feeding support in the 3-months prior to the review. Other EmNC signal functions were performed less frequently, particularly by health centres.

EmNC signal functions performed in the last 3 and 12-months before the review

There was a 5-15% difference between hospitals and health centres, in the performance of EmNC signal functions when the time-period was extended to 12-months the number of signal functions performed increase by 5—15%. See table 6-2 and table 6-3.

Facilities that did not perform the EmNC signal functions in the last 3-months

Table 6-3 shows that for each signal function, there were health facilities that did not perform that signal function at all in the 3 months before the view. Of the 181 health facilities surveyed between 56 and 163 health facilities reported not performing a particular signal function at all. This demonstrates there are EmNC functions that are hardly scarcely performed by health facilities.

Reponses health facilities gave for not having provided the signal function in the last 12-months

Health facilities found it hard to articulate a reason for not performing a signal function. This is reflected in table 6-3 where the main response was “no indication” and overall response rates were low. Where a reason was given, the response was either “supplies/equipment/drugs” related to the administration of CPAP and intubation and ventilation of a newborn baby. “Training issues” were linked to the administration of neonatal antibiotics and intubation and ventilation of a newborn baby.

Table 6-2: Percent of facilities providing EmNC signal functions to early newborns/neonates and small sick babies within the last 3 and 12-months of the EmONC review (n=181)												
Potential signal functions for early newborn/neonatal care	Percentage of facilities that provided the procedure in the last 3-months in:						Percentage of facilities that provided the procedure in the last 12-months in::					
	Hospital (n=115)		Health centre (n=66)		Total (n=181)		Hospital (n=115)		Health centre (n=66)		Total (n=181)	
	n	%	n	%	n	%	n	%	n	%	n	%
Antenatal corticosteroids	77	67.0	8	12.1	85	47.0	92	80.0	15	22.7	107	59.1
Antibiotics for premature rupture of membranes (pROM)	98	85.2	27	40.9	125	69.1	110	95.7	40	60.6	150	82.9
Injectable antibiotics for neonatal infections	51	44.3	2	3.0	53	29.3	65	56.5	2	3.0	67	37.0
Kangaroo Mother Care (KMC) for premature very small babies	53	46.1	16	24.2	69	38.1	63	54.8	29	43.9	92	50.8
Alternative feeding if baby unable to breast feed (breast feeding support)	70	60.9	18	27.3	88	48.6	78	67.8	28	42.4	106	58.6
Administration of Oxygen CPAP for newborns with respiratory distress	18	15.7	0	0.0	18	9.9	22	19.1	1	1.5	23	12.7
Special of intensive care for newborn baby	44	38.3	3	4.5	47	26.0	54	47.0	12	18.2	66	36.5
Intubation and ventilation of a newborn baby	12	10.4	0	0.0	12	6.6	16	13.9	0	0.0	16	8.8
Administration of IV fluids to a neonatal newborn	41	35.7	1	1.5	42	23.2	51	44.3	1	1.5	52	28.7

Table 6-3: Percent of facilities that provided EmNC signal functions to newborns/neonates and small sick babies in 3 or 12-months prior to the 2020 EmONC review and reasons for not providing the signal function (n=181)															
Potential signal functions for early newborn/neonatal care	Percentage of facilities (n=181) that provided the procedure in the last:		Number of facilities that did not perform the procedure in the last 12-months	Percentage and number of health facilities that reported that the signal function was not provided in the last 12-months due to lack of (multiple responses allowed):											
	3-months	12-months		availability of human resources		training issues		supplies/ equipment/ drugs		management issues		policy issues		no indication	
	%	%	n	n	%	n	%	n	%	n	%	n	%	n	%
Antenatal corticosteroids	47.0	59.1	96	3	4.1	6	8.1	5	6.8	16	21.6	11	14.9	41	55.4
Antibiotics for premature rupture of membranes (pROM)	69.1	82.9	56	1	3.2	1	3.2	0	0.0	3	9.7	4	12.9	22	71.0
Injectable antibiotics for neonatal infections	29.3	37.0	128	7	6.1	18	15.8	12	10.5	3	2.6	74	64.9	22	19.3
Kangaroo Mother Care (KMC) for premature very small babies	38.1	50.8	112	3	3.4	12	13.5	0	0.0	15	16.9	4	4.5	54	60.7
Alternative feeding if baby unable to breast feed (breast feeding support)	48.6	58.6	93	2	2.7	3	4.0	0	0.0	2	2.7	5	6.7	61	81.3
Administration of Oxygen CPAP for newborns with respiratory distress	9.9	12.7	163	4	2.5	8	5.1	60	38.0	2	1.3	97	61.4	1	0.6
Special of intensive care for newborn baby	26.0	36.5	134	4	3.5	6	5.2	7	6.1	1	0.9	80	69.6	20	17.4
Intubation and ventilation of a newborn baby	6.6	8.8	169	9	5.5	15	9.1	43	26.1	4	2.4	105	63.6	13	7.9
Administration of IV fluids to a neonatal newborn	23.2	28.7	139	10	7.8	11	8.5	15	11.6	0	0.0	100	77.5	14	10.9

6.7 Equipment and supplies for newborns/neonates and small sick babies

General essential equipment

General essential newborn care supports a clean birth process, immediate assessment of breathing, provision of warmth, support for early initiation and exclusiveness of breast feeding. Equipment and supplies are basic, low cost and should be readily available in all health facilities. Figure 6-4 shows that all facilities surveyed had weight scales and cord ties/clips but equipment to support the provision of warmth was lacking. Five percent (5%) of facilities had no thermometer, 34% had no caps to keep babies warm and a further 18% of facilities had no towels, blankets or cloth for receiving babies.

Table 6-4: Number and % of facilities with general essential equipment and supplies for early newborn/neonatal care (2020)

	EmoNC facilities (n=80)		Facilities for upgrade (n=101)		Total (n=181)	
	n	%	n	%	n	%
Baby weighing scale	80	100.0	101	100.0	181	100.0
Cord ties / clips	80	100.0	101	100.0	181	100.0
Thermometer for newborn	76	95.0	96	95.0	172	95.0
Caps or hats for keeping baby warm	57	71.3	62	61.4	119	65.7
Towels / blanket or cloth for newborn	66	82.5	82	81.2	148	81.8

Newborn/neonatal resuscitation equipment and supplies

The readiness of a maternity birthing unit to receive a newborn/neonate who is not breathing at birth is paramount. The Cambodia Safe Motherhood guidelines and protocols have lists of equipment and supplies which should be available to resuscitate a newborn/neonate. Table 6-5 shows that of the 181 facilities surveyed no facility had the full complement of a basic package of equipment and supplies to support newborn/neonatal resuscitation.

Table 6-5: Number and % of facilities with newborn/neonate resuscitation equipment and supplies (2020)

	EmoNC facilities (n=80)		Facilities for upgrade (n=101)		Total (n=181)	
	n	%	n	%	n	%
Work surface for resuscitation of newborn near delivery bed(s) or newborn corner (Newborn resuscitation table)	38	47.5	25	24.8	63	34.8
Mucus extractor/simple suction	54	67.5	29	28.7	83	45.9
Neonatal face mask	79	98.75	100	99.0	179	98.9
Neonatal size ambu (ventilatory) bag	78	97.5	99	98.0	177	97.8
Suction catheter	62	77.5	29	28.7	91	50.3
Infant laryngoscope with spare bulb and batteries	32	40	6	5.9	38	21.0
Endotracheal tubes	45	56.25	16	15.8	61	33.7
Disposable uncuffed tracheal tubes	43	53.75	14	13.9	57	31.5
Suction aspirator (operated by foot or electrically)	59	73.75	25	24.8	84	46.4
Mucus trap for suction	80	100	96	95.0	176	97.2
Anatomical mannequin to practice newborn resuscitation	52	65	25	24.8	77	42.5
Equipment for resuscitation accessible in delivery area	77	96.25	97	96.0	174	96.1
Decontamination supplies for bag and mask are available	64	80	68	67.3	132	72.9

More than 95% of all facilities surveyed had neonatal face masks, ambu bags, mucous traps for suction and an accessible resuscitation area. For most of the other Items shown in table 6-5, less than 50% of the facilities did not have the resuscitation equipment and supplies available. Of particular concern is that only 34.9% of facilities had a work surface for resuscitation of newborn near delivery bed(s) or newborn corner (newborn resuscitation table).

Equipment and supplies for sick, pre-term and very early newborns/neonates

The availability of essential drugs, equipment, and supplies plays a major role in delivering EmNC interventions and saving the lives of sick pre-term and very early newborn/neonates. Despite this, lifesaving equipment and supplies were deficient. Table 6-6 shows that of the 181 EmONC facilities surveyed, there was no item which was available in all (100%) of facilities. There were only two items where the availability was above 50%: small syringes (83.4%) and a functional oxygen sources (65.7%). All other items were only available in 7-37% of the 181 EmONC facilities surveyed.

Table 6-6: Percent of facilities with equipment and supplies for pre-term, sick and early newborn/neonates (2020)

	EmoNC facilities (n=80)		Facilities for upgrade (n=101)		Total (n=181)	
	n	%	n	%	n	%
Register for sick babies	45	56.3	22	21.8	67	37.0
Daily early newborn care chart	26	32.5	10	9.9	36	19.9
IV fluid (neonatal giving) set	40	50.0	4	4.0	44	24.3
Exchange transfusion set for removing and replace blood or plasma in a neonate	10	12.5	0	0.0	10	5.5
Umbilical catheter	11	13.8	7	6.9	18	9.9
Syringes (0.5, 1.0 ml)	72	90.0	79	78.2	151	83.4
Radiant warmer	27	33.8	9	8.9	36	19.9
Incubator	21	26.3	1	1.0	22	12.2
Designated space or beds for kangaroo mother care for low birth weight babies	18	22.5	1	1.0	19	10.5
KMC register	19	23.8	3	3.0	22	12.2
Nasogastric feeding tube for neonate	35	43.8	14	13.9	49	27.1
Cup and spoon for infant feeding	11	13.8	2	2.0	13	7.2
Cup for breast milk expression	14	17.5	0	0.0	14	7.7
Icterometer	14	17.5	0	0.0	14	7.7
Fluorescent tubes for phototherapy to treat jaundice	22	27.5	0	0.0	22	12.2
Apnoea monitor	14	17.5	4	4.0	18	9.9
Functional oxygen source (wall or cylinder full of gas)	64	80.0	55	54.5	119	65.7
Laryngoscope newborn size	41	51.3	16	15.8	57	31.5
Respirator for neonates	11	13.8	6	5.9	17	9.4
CPAP (continuous positive airway pressure) machine	9	11.3	4	4.0	13	7.2
4% Chlorhexidine gel (cord care)	3	3.8	6	5.9	9	5.0

Reporting and lack of equipment and supplies for sick babies

There is no system of registers and forms in place to support monitoring of EmNC signal functions and there is basic equipment that would need to be in place to support the signal function. Table 6-7 shows that 37% of facilities surveyed had a register for sick babies and less than 20% of facilities had daily newborn care charts and KMC registers. The EmONC methodology for monitoring signal functions requires a 12-month review of data to validate signal functions. This kind of system is not available.

There is also basic and more advanced equipment needed to support implementation of the signal function. Table 6-7 also shows that less than 10% of the facilities has as a cup for breast milk expression and a cup and spoon for infant feeding and/or a CPAP machine. Equipment needed to be able to perform a specific signal function.

Table 6-7: Percent of facilities with a reporting system and equipment/supplies for sick newborns/neonates (2020)

	EmoNC Facilities (n=80)		Facilities for upgrade (n=101)		Total (n=181)	
	n	%	n	%	n	%
Register for sick babies	45	56.3	22	21.8	67	37.0
Daily early newborn care chart	26	32.5	10	9.9	36	19.9
Designated space or beds for kangaroo mother care for low birth weight babies	18	22.5	1	1.0	19	10.5
KMC register	19	23.8	3	3.0	22	12.2
Cup and spoon for infant feeding	11	13.8	2	2.0	13	7.2
Cup for breast milk expression	14	17.5	0	0.0	14	7.7
CPAP (continuous positive airway pressure) machine	9	11.3	4	4.0	13	7.2

6.8 Knowledge and skills to support EmNC

All staff need training in basic neonatal resuscitation and need regular drills to ensure the skills are maintained. The training and experience in section six (6) of this report addresses training and experience in newborn and neonatal resuscitation. Knowledge tests show primary and secondary midwives have a good understanding of birth asphyxia, immediate newborn care and the post-natal check of a baby. There is a deficit in knowledge on: cord care (50%), care of the infected newborn (60.0%); care if low birth weight and pre-term babies (55.0%) and signs of critical illness in newborns requiring referral (70%). The main mode of training was in-service (65.4%) followed by pre-service (22.9%) then a combination of both kinds of training (11.7%). Midwives reported having resuscitated a baby and provided immediate newborn care and had resuscitated a baby in the last 2 years.

6.9 Is the monitoring of EmNC signal functions feasible?

The 2016-2020 EmONC Improvement Plan quite rightly points out that newborn care is often a neglected element of EmONC. Newborn resuscitation was added to the signal functions being monitored by Cambodia in 2014. Since then, there has been much discussion about the readiness of facilities to support newborn care.

At the time of the 2009 EmONC baseline assessment, the research team struggled with this as there was no valid data available to support newborn care. There have been improvements, but there is a long way to go in terms of readiness of facilities and staff to deal with lifesaving intervention. No facility was fully ready to resuscitate a newborn/neonate or care for sick pre-term and very early newborn/neonates. Equipment, supplies, staff knowledge, skills and competence are lacking.

After reviewing 9 potential EmNC signal functions in 181 EmONC facilities, the two EmNC signal functions that might be feasible were the administration of antibiotics for Premature Rupture of Membranes (pRoM) and the giving antenatal corticosteroids. Eighty five percent (85%) of hospitals performed pROM in the 3-months before the review and (67%) of hospitals reported giving antenatal corticosteroids.

The number of facilities that did not perform a particular signal function in 3-months before current review ranged from 56-163. There was not one EmNC signal function in the list of nine (9) that all facilities surveyed were able to perform. Lower level facilities (CPA 1 and health centres) rarely provide EmNC signal functions at all. In this case monitoring EmNC signal functions om EmONC facilities would not be feasible at this time.

The researchers then decided to focus their analysis on national and provincial hospitals only. Table 6-8 shows that all five national hospitals (100%) and 97% of the 25 provincial hospitals performed the administration of antenatal corticosteroids and antibiotics for premature rupture of membranes (pROM) in the 3-months prior to the EmONC review. So, it would be feasible to monitor selected EmNC signal functions in these higher level facilities (national and provincial hospitals).

The other possibility would be to work with one national or provincial hospital performing selected EmNC signal functions regularly to develop and trial a system of newborn recording and reporting (forms and registers). In time, the system could be scaled up and monitored across Cambodia.

Table 6-8: Percent of national and provincial hospitals that providing EmNC signal functions to early newborns and small sick babies in the last 3 and 12-months prior to the EmONC review (n=30)												
Potential signal functions for early newborn/neonatal care	Percentage of facilities that provided the procedure in the last 3-months						Percentage of facilities that provided the procedure in the last 12-months					
	National hospitals (n=5)		Provincial hospitals (n=25)		Total (n=30)		National hospitals (n=5)		Provincial hospitals (n=25)		Total (n=30)	
	n	%	n	%	n	%	n	%	n	%	n	%
Antenatal corticosteroids	5	100.0	24	96.0	29	96.7	5	100.0	25	100.0	30	100.0
Antibiotics for premature rupture of membranes (pROM)	5	100.0	24	96.0	29	96.7	5	100.0	25	100.0	30	100.0
Injectable antibiotics for neonatal infections	4	80.0	22	88.0	26	86.7	4	80.0	22	88.0	26	86.7
Kangaroo Mother Care (KMC) for premature very small babies	2	40.0	18	72.0	20	66.7	2	40.0	19	76.0	21	70.0
Alternative feeding if baby unable to breast feed (breast feeding support)	2	40.0	21	84.0	23	76.7	2	40.0	22	88.0	24	80.0
Administration of Oxygen CPAP for newborns with respiratory distress	3	60.0	11	44.0	14	46.7	3	60.0	12	48.0	15	50.0
Special of intensive care for newborn baby	3	60.0	18	72.0	21	70.0	3	60.0	18	72.0	21	70.0
Intubation and ventilation of a newborn baby	3	60.0	6	24.0	9	30.0	4	80.0	8	32.0	12	40.0
Administration of IV fluids to a neonatal newborn	4	80.0	19	76.0	23	76.7	4	80.0	20	80.0	24	80.0

7. FINDINGS: "24-HOUR" VITAL SERVICES & BASIC INFRASTRUCTURE

The availability of "around-the-clock" vital services and basic infrastructure is required for effective delivery of EmONC services. It is difficult for health care providers to offer quality services without physical space (rooms), beds for mothers and baby and a source of electricity and running water. The EmONC Improvement Plan (2016-2020) supported the strengthening of services and infrastructure in selected EmONC facilities based on need. This section reviews the progress made in achieving this.

7.1 Availability of "around-the-clock" vital services to support EmONC

"Around-the-clock" vital services are essential elements of EmONC. Health mangers were asked about the availability of selected24-hour services (figures 7-1 and 7-2) which are required to support EmONC

At the time of the current review most (90-100%) functional EmONC facilities had access to a range of vital 24 hour services to support EmONC. Gaps in these services, at the time of the 2009 baseline assessment, have been mostly been filled; 90-100% EmONC facilities now have access to vital services "around-the-clock".

Figure 7-1: Percent of functional EmONC facilities with vital services available 24 hours a day (Progress since the 2009 EmONC assessment baseline to current 2020 review)

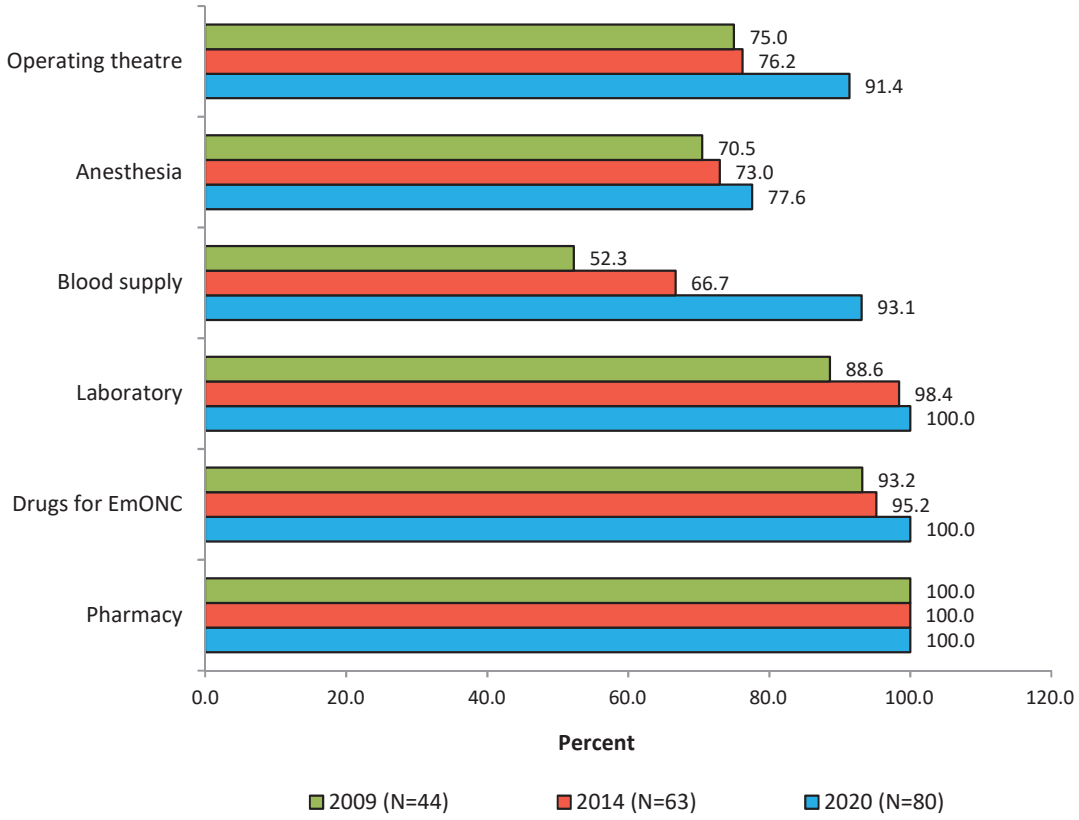
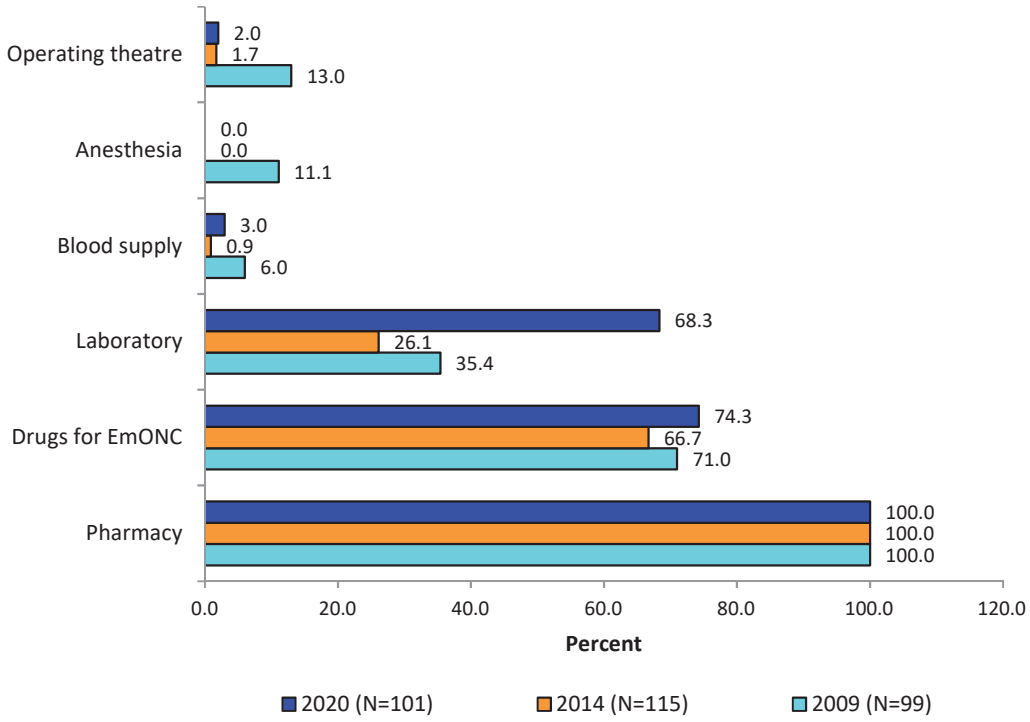


Figure 7-2 shows that in non-functional EmONC facilities, only 24-hour Pharmacy services were available in all (100%) of these facilities. At the time of the current review, only 60-80 % of laboratories

had drugs for EmONC "around-the-clock". Other 24-hour services were available in less than 13% of facilities.

Figure 7-2: Percent of non-functional EmONC facilities with vital services available 24 hours a day (Progress since the 2009 EmONC assessment baseline)



7.2 Availability of specific rooms to support EmONC

Table 7-2 shows > 90% of all facilities surveyed had post-partum, delivery rooms and labour wards. Rooms available for EmONC services have increased in most functioning EmONC facilities. Whereas, the availability of rooms in non-functional EmONC has been mostly static.

One of the targets for the EmONC Improvement Plan was to expand operational blood depots/banks in all CEmONC facilities, a 90% target was set. There are 35 CEmONC facilities. Table 7-1 shows that there are 31 Blood bank/blood depots and 19 blood banks and laboratory together. So in the 80 functional EmONC facilities surveyed half (40) of the facilities had a source of blood.

Table 7-1: Proportion of rooms in functional and designated EmONC facilities available to support services in EmONC facilities* (2014 and 2020 EmONC reviews)								
	Functional EmONC Facilities				Non-functional EmONC facilities			
	2014 (n=63)		2020 (n=80)		2014 (n=115)		2020 (n=101)	
	n	%	n	%	n	%	n	%
Antenatal care	-	-	45	56.3	-	-	87	86.1
Labour	55	87.3	75	93.8	92	80.0	91	90.1
Delivery	60	95.2	79	98.8	110	95.7	98	97.0
Labour and delivery together**	3	4.8	1	1.3	5	4.3	3	3.0
Postpartum ward	63	100.0	80	100.0	110	95.7	100	99.0
Operating theatre	47	74.6	54	67.5	3	2.6	4	4.0
Newborn care unit	27	42.9	55	68.8	0	0.0	4	4.0
Blood bank/blood depot	14	22.2	31	38.8	0	0.0	0	0.0
Blood bank and laboratory together**	14	22.2	19	23.8	0	0.0	0	0.0
Laboratory	62	98.4	80	100.0	47	40.9	65	64.4

* Private facilities were not included in 2014 and 2020 reviews **Together

7.3 Bed capacity and length of stay

For each facility surveyed the following information was recorded: the total number of beds available in the health facility; the number of dedicated beds for maternity services; cribs for neonates with complications and the average stay for services; summary findings follow.

General bed capacity: all facilities surveyed

Table 7-2 shows (with the exception of CPA 1 referral hospitals) the average bed capacity of health facilities has increased since 2009. For national hospitals, the increase has been from 350 to 450 beds and for health centres the capacity has almost doubled (6-11 beds).

Table 7-2: Distribution of bed capacity in all health facilities surveyed (Progress since 2009 EmONC assessment baseline)				
Health facility classification		2009	2014	2020
CPA 1	Average	55	48	53
	Range	25-112	12-100	15-120
CPA 2	Average	72	73	81
	Range	25-120	40-130	40-130
CPA 3	Average	174	176	190
	Range	87-270	90-300	90-370
National hospital	Average	350	349	449
	Range	150-500	150-500	154-680
Health centres	Average	6	13	11
	Range	0-70	1-73	2-40

Maternity bed capacity: dedicated space for maternity cases

Table 7-3 shows that the number of dedicated beds for maternity cases in functional EmONC facilities has increased by 2-4% since 2009; except in EmONC facilities where space for 6-10 cases has

decreased. For non-functional EmONC facilities dedicated maternity beds have increased marginally or remained static except for 1—5 maternity cases. This has decreased.

Table 7-3: Distribution of space available for maternity beds in EmONC facilities (Progress since 2009 EmONC assessment baseline)

Number of beds for Maternity Cases	Functional EmONC facilities						Non-functional EmONC facilities					
	2009 (n=44)		2014 (n=63)		2020 (n=80)		2009 (n=99)		2014 (n=115)		2020 (n=101)	
	n	%	n	%	n	%	n	%	n	%	n	%
0	-	-	-	-	-	-	3	3.0	-	-	-	-
1-5	2	4.6	3	4.8	5	6.3	64	64.7	71	61.7	50	49.5
6-10	18	40.9	25	39.7	26	32.5	24	24.3	34	29.6	41	40.6
11-15	7	15.9	13	20.6	16	20.0	4	4.0	7	6.1	5	5.0
> 15	17	38.6	22	34.9	33	41.3	4	4.0	3	2.6	5	5.0

Ratio of beds to 1000 deliveries

WHO international standards stipulate 30 to 32 maternity and delivery beds are needed for every 1,000 deliveries for a first-level referral facility, such as a district hospital[34.] Table 7-4 shows that in 2014 an additional 1,488 beds maternity and delivery beds were needed to meet the WHO standard. In 2020 this has increased to 2024. The bed ratio was not applied to health centres, as less dedicated maternity beds are needed at the lower levels of the health system.

Table 7-4: Ratio of beds to 1000 deliveries in EmONC facility by facility type (2014 and 2020 EmONC reviews)

Type of health facility	Dedicated Maternity beds		Number of Deliveries		Additional maternity and delivery beds needed to meet WHO standards*	
	2014	2020	2014	2020	2014	2020
National Hospitals	385	419	19,212	22,317	255	324
Referral Hospital CPA 3	465	610	34,270	46,872	677	952
Referral Hospital CPA 2	331	448	19,481	28,121	318	489
Referral Hospital CPA 1	328	543	16,989	24,018	238	257
Total	1509	2020	89,952	121,328	1,488	2024
Health Centres	437	353	29,743	18,331	-	-

* 30 to 32 maternity and delivery beds for every 1000 deliveries for a first-level referral facility (30 used in calculations)

Length of stay

Table 7-5 shows that the length of stay for selected maternity services varies between functional and non-functional EmONC facilities. In 2014 the mean length of stay for a normal delivery or post-partum haemorrhage in a functional EmONC facility was about 2 days shorter than a in a non-functional EmONC facility. The current review found that in 2020, the length of stay is similar.

[34] Essential elements of obstetric care at first referral level. Geneva, Switzerland: World Health Organization, 1991.

Table 7-5: Length of stay in days for selected services in EmONC facilities* (Progress since 2009 EmONC assessment baseline)							
Selected maternity services		Functional EmONC facility			Non-functional EmONC facilities		
		2009 (n=44)	2014 (n=63)	2020 (n=80)	2009 (n=99)	2014 (n=115)	2020 (n=101)
Normal delivery	Range	1-7	1-5	1-3	0-5	0-5	1-3
	Mean	3.5	2.5	2.5	1	1.5	2.5
	Mode	3	3	3	1	2	3
Post-partum haemorrhage	Range	2-7	3-7	2-7	0-7	2-7	1-7
	Mean	5	4.5	4.5	2	3.5	4
	Mode	3	5	5	1	3	5

* Private facilities were not included in 2014 and 2020 reviews

For caesarean section In CEmONC facilities the mean length of stay for a Caesarean section has remained unchanged between 2009 and 2020. See table 7-6

Table 7-6: Length of stay in days for Caesarean Sections in CEmONC facilities * (Progress since 2009 EmONC assessment baseline)				
		2009 (n=43)	2014 (n=45)	2020 (n=48)
Caesarean section	Range	6-10	7-8	5-8
	Mean	7.5	7	7
	Mode	7	7	7

* Private facilities were not included in 2014 and 2020 reviews

7.4 Basic infrastructure (including the availability of electricity and water)

Infrastructure reviewed included: visitors' waiting area, curtains for privacy, functioning toilet, running water, means of ventilation, and sufficient light. Figures 7-3 and 7-4 show all areas had improved since 2009 in both types of EmONC facilities. Areas to strengthen include: curtains for patient privacy and running water in 10% of non-functioning EmONC facilities.

Figure 7-3: Percent of functional EmONC facilities with basic infrastructure available (Progress since 2009 EmONC assessment baseline)

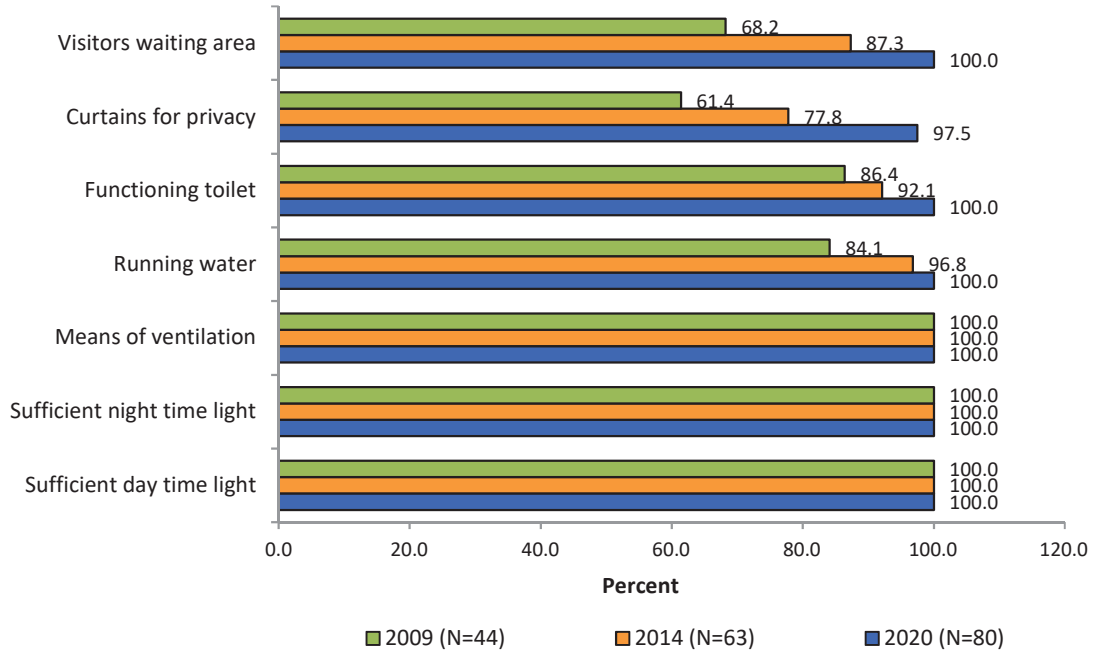
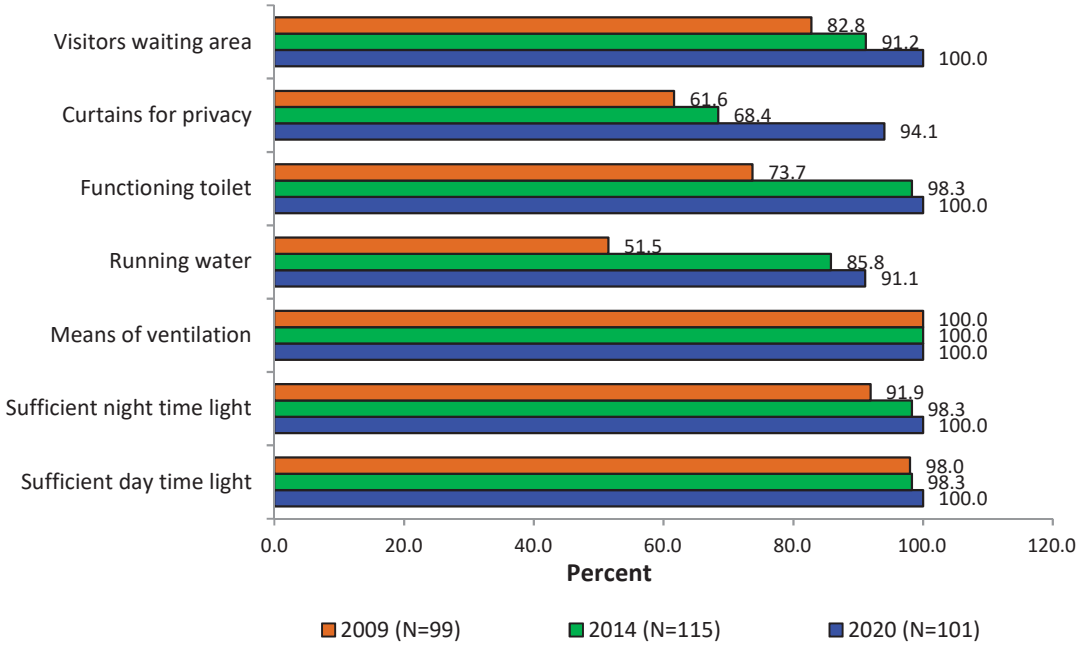


Figure 7-4: Percent of non-functional EmONC facilities with basic infrastructure available
(Progress since 2009 EmONC assessment baseline)



7.5 Availability of utilities in health facilities

The availability of running water and access to a continuous and reliable supply of electricity is a crucial prerequisite for quality EmONC services. The assessment sought to find out whether all EmONC facilities have basic utilities.

Availability of electricity

Table 7-7 shows that at the time of the baseline (2009) and the review (2020) all facilities had functioning electricity; the main source of power is government and private providers. In 2020 no facilities reported having an alternate power source.

Table 7-7: Source of power in functional and non-functional EmONC facilities*
(Progress since 2009 EmONC assessment baseline)

Source of Electricity	EmONC facilities						Non-functional EmONC facilities					
	2009 (n=44)		2014 (n=63)		2020 (n=80)		2009 (n=99)		2014 (n=115)		2020 (n=101)	
	n	%	n	%	n	%	n	%	n	%	n	%
Government power line	11	25.0	43	68.3	59	73.8	23	23.2	61	53.0	72	71.3
Private power line	14	31.8	20	31.7	21	26.3	28	28.3	44	38.3	29	28.7
Generator	3	6.8	0	0	0	0	15	15.2	0	0	0	0
Power line and generator	4	36.4	0	0	0	0	8	8.1	3	2.6	0	0
Solar	0	0	0	0	0	0	19	19.2	7	6.1	0	0
No electricity	0	0	0	0	0	0	6	6.1	0	0	0	0

* Private facilities were not included in 2014 and 2020 reviews

It is essential for EmONC facilities to have 24 hour power plus a backup supply (such as a generator) for emergencies. Electricity is available in all (100%) health facilities. Backup generators are available

in about 62% of facilities. More functional EmONC facilities had a back-up power supply than non-functioning facilities. Fourteen (14) facilities reported backup power source was not working. Only 22 of the 181 facilities surveyed reported having a person on site to maintain the supply. See table 7-8.

Table 7-8: Availability of functional electricity and backup generator by facility type 2020

Availability of electricity	EmoNC facilities (n=80)		Facilities for upgrade (n=101)		Total (n=181)	
	n	%	n	%	n	%
Facilities with electricity functioning	80	100.0	101	100.0	181	100.0
Backup generator available	72	90.0	40	39.6	112	61.9
Backup generator functional	67	83.8	31	30.7	98	54.1
Person on site available to the power supply	21	26.3	1	1.0	22	12.2

* Data not available for 2009 baseline or 2014 EmONC Review

Availability of water

Table 7-9 shows that most (around 95%) hospitals and health centres have access to a public/private water source followed by a well or bore. In 2014 the inverse was true. Less than 5% of hospitals and health centres still rely on rivers and streams for their primary water source. Access to clean water supply is slowly increasing across Cambodia.

Table 7-9: Primary Source of water in hospitals and health centres providing EmONC (Progress since 2009 EmONC assessment baseline)

	Hospital						Health centres					
	2009 (n=77)		2014 (n=90)		2020 (n=115)		2009 (n=66)		2014 (n=88)		2020 (n=66)	
	n	%	n	%	n	%	n	%	n	%	n	%
Public and private system	22	28.6	48	53.2	77	67.0	8	12.1	33	37.5	37	56.1
Well bore hole	44	57.1	38	42.2	33	28.7	38	57.6	39	44.3	26	39.4
Rainwater	0	0	0	0	0	0.0	2	3.0	2	2.3	0	0.0
River/Stream	9	11.7	3	3.3	4	3.5	9	13.6	10	11.4	2	3.0
Other	2	2.6	1	1.1	1	0.9	5	7.6	4	4.6	1	1.5

* Piped water supply

Table7-10 shows water is available in all (100%) hospital operating theatres and delivery rooms (99.1%) and health centres (98.5%) in 2020. The availability of water in post-natal rooms has fallen by 9% since 2004 hospitals; and increased in health centres by nearly 5%. The reason for this is not clear.

Table 7-10: Water supply in selected rooms of functional at time of survey* (Progress since 2009 EmONC assessment baseline)

	Hospital						Health centres					
	2009 (n=77)		2014 (n=90)		2020 (n=115)		2009 (n=66)		2014 (n=88)		2020 (n=66)	
	n	%	n	%	n	%	n	%	n	%	n	%
Delivery room	75	97.4	86	95.6	114	99.1	59	89.4	79	89.8	65	98.5
Post-natal room	60	77.9	55	61.1	69	60.0	23	34.8	35	39.8	33	50.0
Operating theatre	45	95.7	48	94.1	58	100	-	-	-	-	-	-

* Private facilities were not included in 2014 and 2020 reviews

Table 7-11 shows that all facilities had available functional toilets. Feedback from data collectors was that many of the toilets were not clean

Table 7-11: Percent of facilities surveyed with functional toilets in facilities type (2020)						
	EmoNC facilities (n=80)		Non-functional EmONC facilities (n=101)		Total (n=181)	
	n	%	n	%	n	%
Toilet (latrine) functional for general staff	80	100.0	101	100.0	181	100.0
Toilet (latrine) functional for patients use	80	100.0	101	100.0	181	100.0

* Data not available for 2009 baseline or 2014 EmONC Review

8. FINDINGS: ESSENTIAL DRUGS, EQUIPTMENT AND SUPPLIES

Health facilities were visited to assess the availability of recommended drugs, equipment and supplies required for the optimal delivery of EmONC services. This section reports on the findings. Annex 8 provides a comprehensive list of essentials, drugs, equipment and supplies, reviewed as recommended in the EmONC improvement Plan 2016-2020.

8.1 Management of Drugs and Supplies

The current review (2020) found most (98-5%-100%) EmONC facilities reported having a drug inventory and "in-house" pharmacy. Drug inventories were 'up-to-date' in most (93.4 %) EmONC facilities. The Government is the primary supplier for medicines and consumables. Less than 8% of facilities reported using private pharmacies, a source of drugs and supplies when government stocks are not available (table 8-1). These findings are similar or improved since 2014.

Table 8-1: Precent of EmONC facility pharmacies with supply systems in place (2014 and 2020 EmONC reviews)

Pharmacy and source of supplies	Functional EmONC facilities		Non-functional EmONC facilities		Total	
	2014 (n=63)	2020 (n=80)	2014 (n=115)	2020 (n= 101)	2014 (n=178)	2020 (n=181)
	%	%	%	%	%	%
Facility has pharmacy/supply of medicine	100.0	97.5	100.0	100.0	100.0	98.9
Drug inventory exists (stock system)	100.0	100	100.0	100.0	100.0	100.0
Drug inventory (stock system) is up-to-date	90.5	91.3	92.1	95.0	91.5	93.4
Hospital Drug Inventory (HosDID) is in used		92.5		23.8		54.1
Main source of drugs/supplies for facilities						
Government	100.0	100.0	100.0	100.0	100.0	100.0
Private pharmacy	19.1	5.0	21.9	8.9	20.9	7.2

Note: Percentages not showed where denominator is less than 10.

Most (96.7%) pharmacies surveyed were accessible 24 hours a day and most (98.9%) use a "first-expiry-first-out" system of drug distribution. There are mechanisms in place, so expired drugs are not distributed. Most facilities (99.4%) also reported that drugs are protected from moisture, heat and infestation. See table 8-2.

Table 8-2: Pharmacy-related practices in EmONC facilities (%) (2014 and 2020 EmONC reviews)

Pharmacy Practices	Functional EmONC facilities		Non-functional EmONC facilities		Total	
	2014 (n=63)	2020 (n= 80)	2014 (n=115)	2020 (n= 101)	2014 (n=178)	2020 (n=181)
	%	%	%	%	%	%
Pharmacy is accessible 24/7	95.2	98.8	94.0	95.0	94.4	96.7
"First-expiry-first-out" system used	98.4	98.8	99.1	99.0	98.9	98.9
System to stop expired drugs being circulated	98.4	97.5	97.4	96.0	97.7	96.7
Drugs protected from moisture and heat	100.0	100.0	100.0	99.0	100.0	99.4

Note: Percentages not showed where denominator is less than 10.

Table 8-3 shows that required drugs are refrigerated in 96.3% functional EmONC facilities and 87% of non-functional EmONC facilities. These findings are similar or improved since the 2014 review. Over half of facilities surveyed (57.5%) reported keeping oxytocin refrigerated. More functional EmONC facilities refrigerate oxytocin, than non-functional EmONC facilities. It is possible some facilities were reporting the presence of a refrigerator for their immunisation program. Vaccines fridges cannot be used to store other types of drugs. Still, most countries store oxytocin with immunisations. So there is no reason why, in > than 40% of EmONC facilities, oxytocin was not refrigerated.

Table 8-3: Refrigeration of drugs in all EmONC facilities surveyed (%) (2014 and 2020 EmONC reviews)

Pharmacy Practices	Functional EmONC facilities		Non-functional EmONC facilities		Total	
	2014 (n=63)	2020 (n= 80)	2014 (n=115)	2020 (n= 101)	2014 (n=178)	2020 (n=181)
	%	%	%	%	%	%
Required drugs are refrigerated	85.7	96.3	71.1	87.1	76.3	91.2
Oxytocin is refrigerated	-	72.5	-	45.5	-	57.5
Electric refrigerator is available	69.8	96.3	30.7	82.2	44.6	88.4
Gas refrigerator available	1.6	12.5	19.3	25.7	13.0	19.9

Note: Percentages not showed where denominator is less than 10.

To prevent the use of expired drugs and 'stock outs', more than 74.6% of the EmONC facilities order drugs on the same day each week, month or quarter. Around 20% order when stocks reach a reorder level and 2.8% when stocks run out. A small number (2%) use other mechanisms such as "buy from a local pharmacy". Table 8-4 this shows an improvement since 2014.

Table 8-4: Practices in EmONC facilities (%) related to the ordering of drugs (2014 and 2020 EmONC reviews)

Ordering of drug stocks	Functional EmONC facilities		Non-functional EmONC facilities		Total	
	2014 (n=63)	2020 (n= 80)	2014 (n=115)	2020 (n= 101)	2014 (n=178)	2020 (n=181)
	%	%	%	%	%	%
Same time (each week/month/ quarter)	57.1	76.3	62.3	73.3	60.5	74.6
Order when stocks reach reorder level	30.2	23.8	15.8	21.8	20.9	22.7
Reorder when we run out	11.1	0.0	15.8	5.0	14.1	2.8
Never order drugs, shipment automatic	0	0.0	0.9	0.0	0.6	0.0
Other	1.6	0.0	5.3	0.0	4.0	2.0

Note: Percentages not showed where denominator is less than 10.

When all facilities were asked about the cause of delay in the delivery of supplies, 57.5% of all facilities surveyed reported they never experienced a delay. Reasons given for delay were: central store being 'out of stock' (28.8%) followed by administrative difficulties (7.7%). This was the inverse to what was reported in 2014. See table 8-5.

Table 8-5: Cause of delays in receiving supplies as reported by EmONC facilities in 2014 (2014 and 2020 EmONC reviews)						
Cause of Delay	Functional EmONC facilities		Non-functional EmONC facilities		Total	
	2014 (n=63)	2020 (n= 80)	2014 (n=115)	2020 (n= 101)	2014 (n=178)	2020 (n=181)
	%	%	%	%	%	%
Inadequate transport	4.8	1.3	3.5	2.0	4.0	1.7
Administrative difficulties	14.3	3.8	18.4	10.9	17.0	7.7
Financial problems	1.6	2.5	0.9	0.0	1.1	1.1
Insufficient fuel	NA	0.0	NA	1.0	NA	0.6
Insufficient staff	NA	1.3	1.8	2.0	1.1	1.7
Out of stock at the central store	46.0	26.3	44.7	32.7	45.2	29.8
Other	33.3 (no delay)	65.0 (no delay)	30. (no delay)	51.5 (no delay)	31.6 (no delay)	57.5 (no delay)

8.2 Availability of drugs by class and drugs within classes

The availability of selected drug classes is found in table 8-6. Except for antiretroviral for PMTCT/HIV care (44.6%) steroids (89.21%) and antimalarials (84.2%) most EmONC facilities have a good supply of most drug groups in 2020. Baseline findings and the 2014 review were similar.

Table 8-6: Availability of drugs by class in all EmONC facilities (Progress since the 2009 EmONC assessment baseline)												
Drug Class	Functional EmONC facilities (n=44)		Facilities for upgrade to EmONC status (n=99)		Functional EmONC facilities (n=63)		Non-functional EmONC facilities (n=115)		Functional EmONC facilities (n=80)		Non-functional EmONC facilities (n=101)	
	2009				2014				2020			
	n	%	n	%	n	%	n	%	n	%	n	%
Antibiotics	44	100.0	98	99.0	63	100.0	115	100.0	80	100.0	101	100.0
Anticonvulsants	44	100.0	81	81.8	63	100.0	103	89.6	80	100.0	99	98.0
Antihypertensive	44	100.0	91	91.9	63	100.0	109	94.8	80	100.0	98	97.0
Oxytocics/ prostaglandins	43	97.7	95	96.0	63	100.0	106	92.2	80	100.0	101	100.0
Emergency Drugs	44	100.0	96	97.0	63	100.0	103	89.6	80	100.0	98	97.0
Anaesthetics	44	100.0	91	91.9	62	98.4	111	96.5	80	100.0	98	97.0
Analgesics	44	100.0	99	100	63	100.0	115	100.0	80	100.0	101	100.0
Steroids	42	95.5	65	65.7	61	96.8	75	65.2	79	98.8	90	89.1
IV Fluids	44	100.0	99	100	63	100.0	109	94.8	79	98.8	99	98.0
Antimalarials	35	79.5	69	69.7	59	93.7	69	60.0	70	87.5	85	84.2
Antiretroviral for PMTCT/HIV	30	68.2	35	35.4	53	84.1	34	29.6	68	85.0	45	44.6
Contraceptives	12	27.3	67	67.7	51	81.0	111	96.5	78	97.5	97	96.0
Other drugs	44	100	95	96.0	63	100.0	113	98.3	77	96.3	91	90.1

There were shortages of drugs **within selected drug groups**, including: steroids, antimalarials and drugs for PMTCT/HIV care and more. Basic drugs such as amoxicillin, magnesium sulphate and oxytocin

within more common classes, such as antibiotics, anticonvulsants and antihypertensive important for the delivery signal function, were available in most health facilities. See annex 8 for a comprehensive list of basic drugs available in EmONC facilities surveyed.

8.3 Stockout of drugs and supplies related to EmONC

Table 8-7 shows stock outs in the last 3-months of selected EmONC drugs, and interruptions in supply of cold chain and oxygen in the 12-months before the review. With the exception of Antiretrovirals (ARV), stock outs were negligible in the 3-months before the review. When stock outs did occur, they were more likely to be in non-functional EmONC facilities.

Only one facility reported a stock out of oxytocin, and no facilities reported an interruption to the cold chain. Yet, in an earlier section of this report, less than half (40.0.5%) of EmONC facilities reported not keeping oxytocin refrigerated. This indicates a lack of understanding of the importance of the chain in the storage of oxytocin. Of concern is the non-availability of oxygen in 11% of facilities surveyed.

Table 8-7: Percentage of facilities reporting stock outs of selected EmONC drugs and interruption in supply of cold chain and oxygen (among functional and designated EmONC facilities 2020)

	EmoNC facilities (n=80)		Non-functional EmONC facilities (n=101)		Total (n=181)	
	n	%	n	%	n	%
Stock outs of drugs in the last 3-months						
Gentamycin	0	0.0	7	6.9	7	3.9
Magnesium sulphate	1	1.3	5	5.0	6	3.3
Antiretrovirals (ARV)	0	0.0	14	13.9	14	7.7
Stock out of oxytocin in the last 3-months						
Oxytocin	0	0.0	1	1.0	1	0.6
Stock out related to the interruption of the cold chain	0	0.0	0	0.0	0	0.0
Interruption of oxygen supply (cylinder or concentrator) in last 12-months						
In labour and delivery	2	2.5	3	3.0	5	2.8
In the neonatal ward	1	1.3	2	2.0	3	1.7
In the paediatric ward	3	3.8	2	2.0	5	2.8
Cause of Interruption in safe oxygen supply						
No oxygen available	0	0.0	20	19.8	20	11.0
No interruptions	77	96.3	79	78.2	156	86.2
Due to lack of electricity	0	0.0	0	0.0	0	0.0

8.4 Availability of contraceptive methods

Family planning is a cost effective way of contributing to the reduction of maternal mortality. There should be 100% stock levels of all contraceptive methods in all EmONC facilities. With the exception of surgical contraceptive methods in hospitals and female condoms, there has been an increase in all contraceptive methods since the 2009 baseline assessment.

Figure 8-1 shows that all temporary family planning methods have increased since 2009. The current review (2020) found that the availability of temporary methods in hospitals, ranged from male condoms being available in 68.7% of hospitals to combined contraceptives being available in 91.3% of hospitals.

Figure 8-1: Percent of hospitals providing EmONC with contraceptive methods available (Progress since the 2009 EmONC assessment baseline)

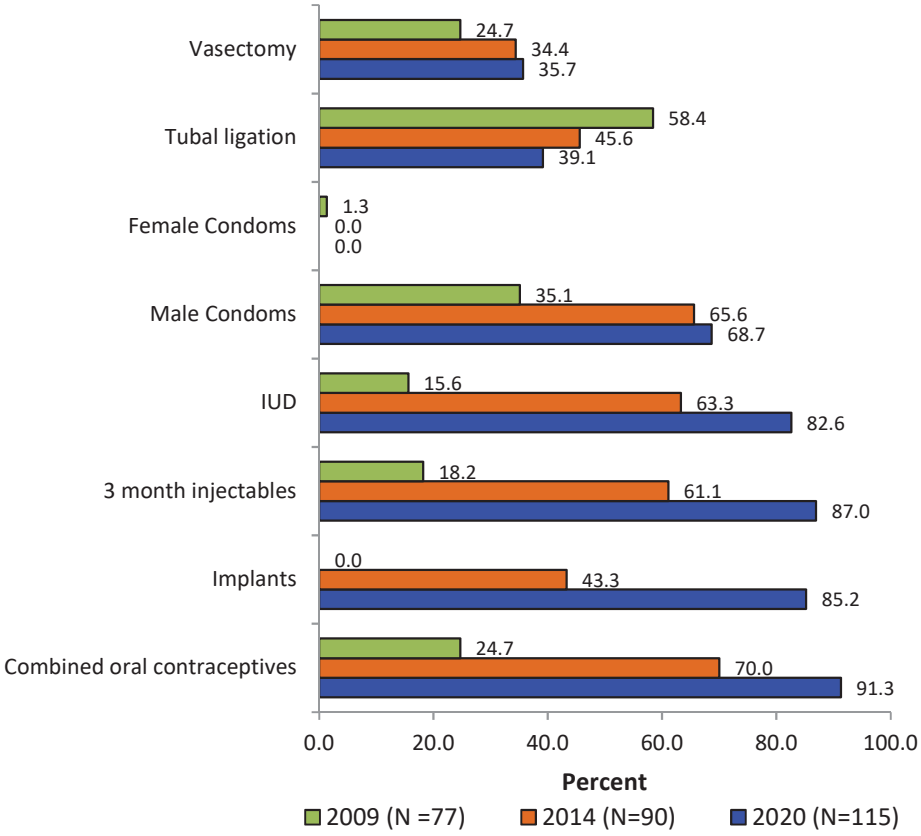
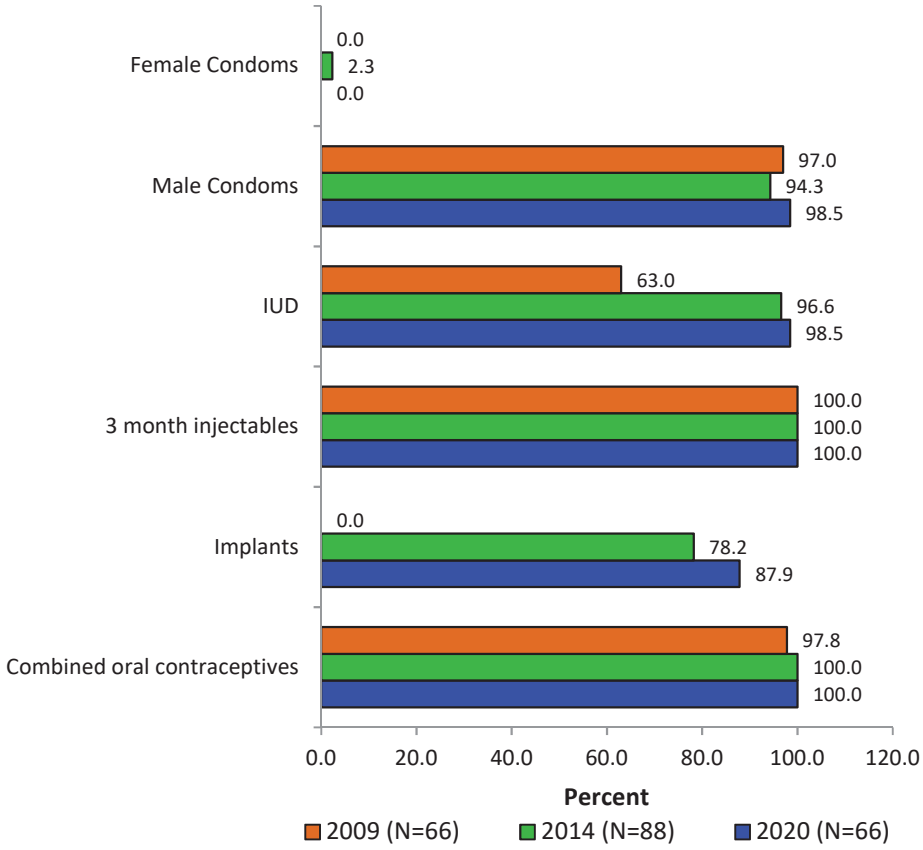


Figure 8-2 show that temporary family planning methods are available in almost all health centres (97-100%). This is possibly because of the presence of community clinics in health centres, where family planning methods are actively promoted.

Figure 8-2: Percent of health centres providing EmONC with contraceptive methods available

(Progress since the 2009 EmONC assessment baseline)



8.5 Equipment and Supplies related to EmONC

Data collection teams assessed facilities for the availability of basic supplies and equipment to support the EmONC. A summary of standardised lists of equipment and supplies in the EmONC Improvement plan (2016-2020) and the availability of individual items are in annex 8.

Availability of basic supplies and equipment

When the data from the 181 EmONC facilities in the network, was grouped and compared, a clear pattern emerged on the type of basic supplies and equipment that were available. Overall, most items were available in >90% of EmONC facilities. Deficits are more likely to be in non-functioning EmONC facilities, and most items are low cost and readily available, suggesting the problem might be in ordering rather than an absence of the equipment/supplies.

Most items in table 8-8 are available in > 90% of EmONC facilities. Shortages are for supplies like suture materials, 70% alcohol and sanitary pads. Deficits are higher in non-functioning EmONC facilities.

Table 8-8: Percent and number of EmONC facilities surveyed basic supplies available (2020)						
Availability basic supplies	**EmoNC facilities (n=80)**		**Non-functional EmONC facilities (n=101)**		**Total (n=181)**	
	n	**%**	**n**	**%**	**n**	**%**
Gloves:						
- Utility	80	100	101	100	181	100
- Sterile or high-level disinfected	80	100	101	100	181	100
- Long sterile for manual removal of placenta	80	100	101	100	181	100
Long plastic apron	80	100	101	100	181	100
Waterproof foot ware	78	97.5	96	95	174	96.1
Plastic eye shield	79	98.8	100	99	179	98.9
Urinary catheters	80	100	101	100	181	100
Syringes and needles	80	100	101	100	181	100
IV tubing	80	100	101	100	181	100
IV solutions (Ringers lactate, normal saline)	79	98.8	101	100	180	99.4
Suture material for repair of tears or episiotomy	76	95	78	77.2	154	85.1
Antiseptic solution (iodophors or chlorhexidine)	80	100	98	97	178	98.3
Spirit (70% alcohol)	65	81.3	67	66.3	132	72.9
Swabs	80	100	101	100	181	100
Bleach (chlorine-based compound)	80	100	101	100	181	100
Clean plastic sheet to place under mother	80	100	101	100	181	100
Sanitary pads	65	81.3	77	76.2	142	78.5
Clean towels/cloths for drying & wrapping the baby	80	100	101	100	181	100
Cord ties/clamp	80	100	101	100	181	100
Urine dipstix	78	97.5	97	96	175	96.7

Most basic equipment in table 8-9 is available in > 90% of EmONC facilities. There are shortages in supplies of surgical scrub brushes, suction tubing and catheters, suture material, laryngoscopes and self-inflating and bags for resuscitation.

Table 8-9: Percent and number of EmONC facilities surveyed with basic equipment available (2020)						
	EmoNC facilities (n=80)		**Non-functional EmONC facilities (n=101)**		**Total (n=181)**	
	n	**%**	**n**	**%**	**n**	**%**
Sphygmomanometer (aneroid) and stethoscope (binaural)	80	100	101	100	181	100
Self-inflating bag and face masks (adult size)	73	91.3	78	77.2	151	83.4
Self-inflating bag and face masks (newborn sizes)	80	100	100	99	180	99.4
Adult/ infant laryngoscope with spare bulb/batteries	67	83.8	65	64.4	132	72.9
Adult and infant laryngoscope tubes	58	72.5	36	35.6	94	51.9
Absorbable, nonreactive sutures (e.g., polyglycolic, chromic catgut) and suture needles	69	86.3	42	41.6	111	61.3
Urinary catheters and closed bag /container for catheter drainage	80	100	101	100	181	100
Dextrose solution (5%)	80	100	87	86.1	167	92.3

Table 8-9: Percent and number of EmONC facilities surveyed with basic equipment available (2020)						
	EmoNC facilities (n=80)		Non-functional EmONC facilities (n=101)		Total (n=181)	
	n	%	n	%	n	%
Ringer's lactate or normal saline	78	97.5	94	93.1	172	95
IV administration sets	80	100	99	98	179	98.9
Adhesive tape	80	100	101	100	181	100
Oxygen tubing, nasal cannula, and face masks	80	100	85	84.2	165	91.2
Suction tubing and catheters	62	77.5	89	88.1	151	83.4
Surgical scrub brushes	28	35	20	19.8	48	26.5

Availability of equipment and supplies for newborn care

Supplies and equipment for early newborn care are in section 6 of this report, which relates to the feasibility of monitoring additional EmNC signal functions. The biggest deficits in equipment and supplies related to early newborn care.

Availability of emergency, labour/delivery rooms sets and packs

The availability of at least 1 functional kit or pack for neonatal resuscitation, delivery, and a range of obstetric and gynaecological procedures, was assessed at each facility. Instruments in kits and packs are in annex 8. Overall equipment and packs are available in > than 90% of facilities. Deficits in equipment and supplies are higher in non-functioning EmONC facilities rather than functional EmONC facilities.

Figure 8-3 shows that there has been an increase in the availability of most items in EmONC facilities. The availability of sets/packs has increased more in functional EmONC facilities. Most (> 90%) functional EmONC facilities now have emergency, labour/delivery rooms packs or sets available.

Figure 8-3: Percent of functional EmONC facilities with emergency, labour/delivery packs and sets available

(Progress since the 2009 EmONC assessment baseline)

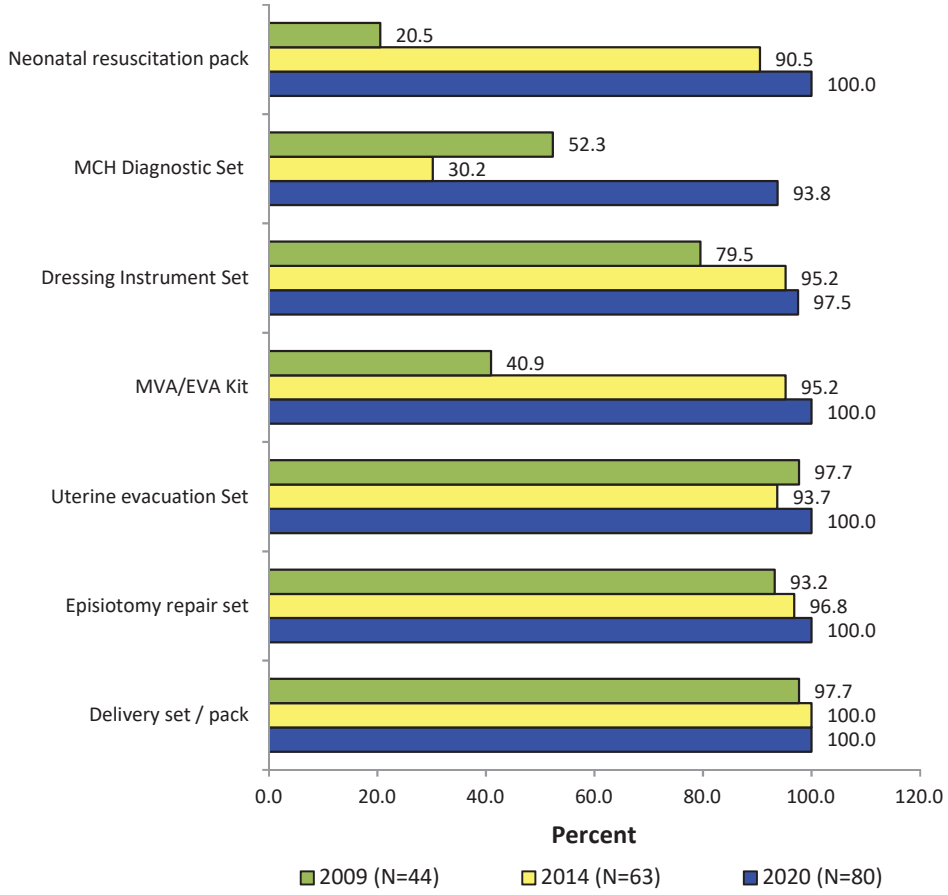
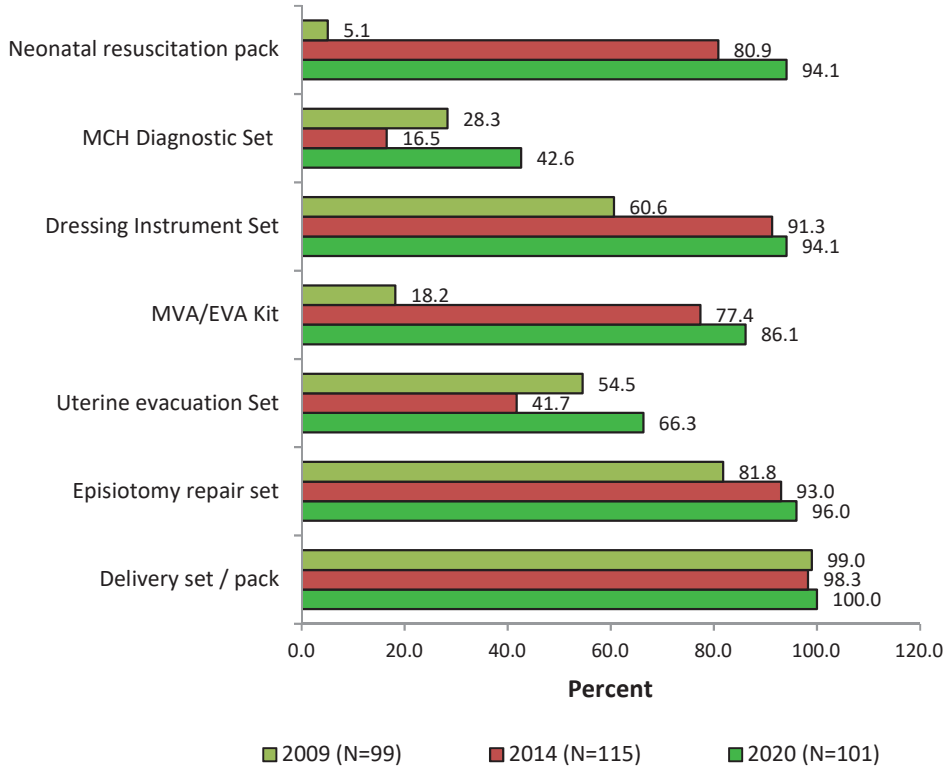


Figure 8-4 shows in non-functional EmONC facilities, emergency, labour/delivery rooms sets, and packs have also increased; however, not as much as in functional EmONC facilities. When MCH diagnostic kits and uterine evacuation sets are excluded, there has been an increase (> 86%) in packs and sets.

Figure 8-4: Percent of non-functional EmONC facilities with emergency, labour/delivery packs and sets available

(Progress since the 2009 EmONC assessment baseline)



Instruments for Delivery

This has been discussed in an earlier section in this report. The use of a vacuum extractor for the delivery of obstructed or prolonged labour, is used almost exclusively in all EmONC facilities. Forceps deliveries are almost never performed. This trend is reflected in table 8-10 below. Since the 2009 baseline assessment, the availability of vacuum extractors has increased in all EmONC facilities and supplies of obstetric forceps have decreased.

Table 8-10: Percentage of EmONC facilities with obstetric delivery instruments available*

(Progress since the 2009 EmONC assessment baseline)

Obstetric delivery instruments	Functional EmONC facilities (n=44)		Non-functional EmONC facilities (n=99)		Functional EmONC facilities (n=63)		Non-functional EmONC facilities (n=115)		Functional EmONC facilities (n=80)		Non-functional EmONC facilities (n=101)	
	2009				2014				2020			
	n	%	n	%	n	%	n	%	n	%	n	%
Vacuum extractor with different size cups	44	100	45	45.5	63	100	80	69.6	80	100.0	84	83.2
Obstetric forceps, outlet	12	27.3	11	11.1	24	38.1	7	6.1	37	46.3	8	7.9
Obstetric forceps, mid-cavity	4	9.1	0	0.0	5	7.9	0	0.0	18	22.5	2	2.0
Obstetric forceps, breech	2	4.5	0	0.0	7	11.1	0	0.0	12	15.0	2	2.0

* Private facilities not included

8.6 Operating theatres

The current review found that 35 EmONC facilities were providing Comprehensive services. All facilities had an operating theatre that was functional. In 2009 and again in 2014, most facilities providing CEmONC had basic supplies and equipment such as drapes, operating tables and syringes to support a functional OT. More commonly used packs for obstetrics, laparotomies and caesarean sections, were available in 2020. However, as was the case in 2009 and 2014, there is a shortfall of specialised packages such as craniotomy equipment.

For the current review (2020), a standardised list of instruments and supplies, used for obstetric laparotomy and /or Caesarean section and anaesthesia, was used as a checklist when checking availability of equipment and supplies. These lists and the availability of both functioning and non-functioning EmONC facilities are in annex 8.

8.7 Laboratory equipment and supplies

Laboratory services are needed for the provision of blood transfusions, HIV testing, diagnosis of malaria, etc. At the time of the 2020 review, most (98.8%) functional EmONC facilities, and 64.4%% of the non-functional EmONC facilities, had laboratories. In 2014 the situation was similar; 98.4% of functional EmONC facilities and 40.9% of non-functional EmONC facilities had a laboratory.

Table 6-9 shows the status of selected laboratory equipment, which is applicable for EmONC. Equipment and supplies in EmONC facilities have been strengthened. Since 2009, 6 out of 10 line items are available in 90% functional EmONC facilities. The provision of items in non-functional EmONC facilities needs strengthening. In annex 8 there is a standardised list of supplies and equipment for laboratories in EmONC facilities ; it also shows the availability of these items in functioning and non-functioning EmONC facilities.

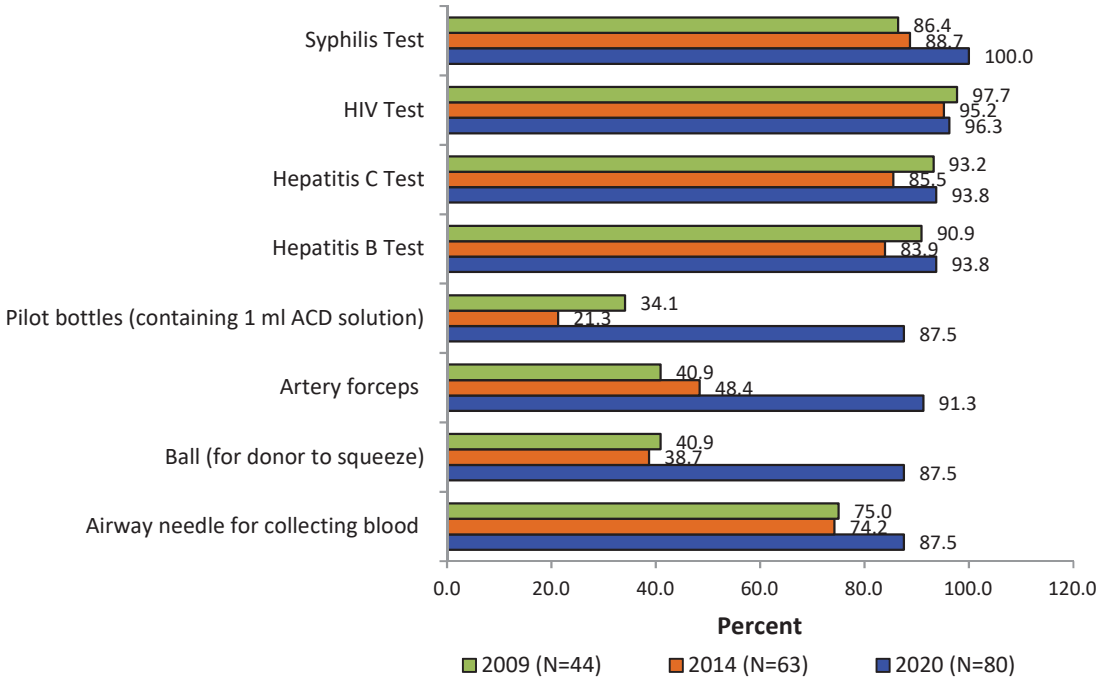
Table 8-11: Distribution of laboratory supplies/equipment available in EmONC facilities* (Progress since the 2009 EmONC assessment baseline)

Laboratory equipment and supplies	Functional EmONC facilities (n=44)		Non-functional EmONC facilities (n=99)		Functional EmONC facilities (n=63)		Non-functional EmONC facilities (n=115)		Functional EmONC facilities (n=80)		Non-functional EmONC facilities (n=101)	
	2009				2014				2020			
	n	%	n	%	n	%	n	%	n	%	n	%
Centrifuge (electric)	44	100.0	43	76.8	62	100.0	31	66.0	80	100.0	76	75.2
Test tubes	43	97.7	45	80.4	57	91.9	25	53.2	80	100.0	63	62.4
Pipettes Volumetric	39	88.6	35	62.5	53	85.5	26	55.3	78	97.5	57	56.4
Microscope illuminator	38	86.4	39	69.6	56	90.3	39	83.0	73	91.3	65	64.4
Compound microscope	33	75.0	29	51.8	54	87.1	33	70.2	71	88.8	74	73.3
Airway needle for blood collection	33	75.0	35	62.5	46	74.2	15	31.9	73	91.3	46	45.5
8.5 g/l sodium solution	28	63.6	26	46.4	34	54.8	14	29.8	58	72.5	37	36.6
Water bath (or incubator)	24	54.5	21	37.5	38	60.3	2	1.7	74	92.5	7	6.9
Artery forceps	18	40.9	8	14.3	30	48.4	25	21.3	63	78.8	43	42.6
20% Bovine albumin	10	22.7	5	8.9	13	21.0	4	8.5	25	31.3	7	6.9

* Private facilities not included

Figures 8-5 shows the availability of equipment and supplies for blood collection and screening tests in functional EmONC facilities since 2009. The current EmONC review found that all items in figure 6-5 have increased in > 85.5% of functional EmONC facilities. This represents an overall increase since the 2009 EmONC assessment.

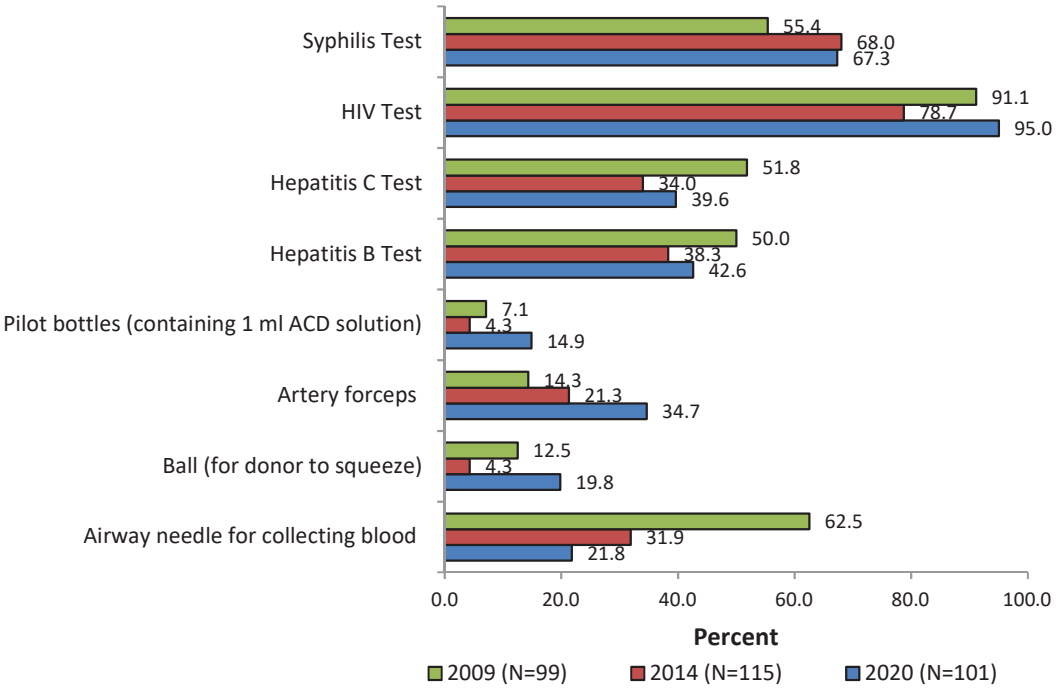
Figure 8-5: Percent of functional EmONC facilities with selected blood collection/screening tests (Progress since the 2009 EmONC assessment baseline)



Figures 8-6 show availability of equipment and supplies for blood collection and screening tests in non-functioning EmONC facilities since 2009. The current review found that, with the exception of syphilis and Hepatitis A and B test kits and airway needles for blood collection, the increase in items has been small. There is a need to strengthen the availably of most items. Particularly, items that are available in < 25% of EmONC facilities. See annex 8 for list rapid test kits and blood transfusions item needed.

Figure 8-6: Percent of non-functioning EmONC facilities with selected blood collection/screening tests

(Progress since the 2009 EmONC assessment baseline)



8.8 Infection prevention

Handwashing: Table 8-12 shows that over 91% of EmONC facilities had hand washing supplies for infection prevention in the maternity areas. Almost all (99%) facilities had soap and towels, and tissues for hand drying were in 92% of facilities. The availability of a hand brush with nylon bristles (nail brush or stick) were deficient in functional (56.3%) and non-functioning EmONC facilities (31.7%).

Table 8-12: Percent of EmONC facilities with hand washing supplies for infection prevention in the maternity areas.

(Progress since the 2009 EmONC assessment baseline)

Supplies for handwashing	Functional EmONC facilities (n=44)		Non-functional EmONC facilities (n=99)		Functional EmONC facilities (n=63)		Non-functional EmONC facilities (n=115)		Functional EmONC facilities (n=80)		Non-functional EmONC facilities (n=101)	
	2009				2014				2020			
	No	%	No	%	No	%	No	%	No	%	No	%
Clean running water	-	-	-	-	-	-	-	-	77	96.3	92	91.1
Soap	43	97.7	97	98.0	63	100.0	113	98.3	80	100.0	100	99.0
Hand brush with nylon bristles (nail brush or stick)	-	-	-	-	-	-	-	-	45	56.3	32	31.7
Clean towels/tissues to dry hands	-	-	-	-	-	-	-	-	78	97.5	93	92.1

Equipment and supplies: to support infection prevention, these are relatively good. Seven (7) out of 11 items in table 8-12 were available in most (98%) facilities surveyed. Items in previous EmONC surveys, such as non-sterile protective clothing, are now available. Items in short supply in 2020 include: a trolley such as a mayo stand and buckets for soiled linen and pads. These items can be easily addressed.

Table 8-13: Percent of EmONC facilities with items in maternity areas for infection prevention (Progress since the 2009 EmONC assessment baseline)												
Supplies to support infection prevention	**Functional EmONC facilities (n=44)**		**Non-functional EmONC facilities (n=99)**		**Functional EmONC facilities (n=63)**		**Non-functional EmONC facilities (n=115)**		**Functional EmONC facilities (n=80)**		**Non-functional EmONC facilities (n=101)**	
	2009				**2014**				**2020**			
	No	**%**	**No**	**%**	**No**	**%**	**No**	**%**	**No**	**%**	**No**	**%**
Sterile gloves or high level disinfectant	43	97.7	99	100	63	100.0	115	100.0	80	100.0	101	100.0
Gloves – utility (non-sterile)	-	-	-	-	-	-	-	-	80	100.0	101	100.0
Non-sterile protective clothing (long apron, waterproof footwear, plastic eye shield)	35	79.5	67	67.7	52	82.5	59	51.3	80	100.0	100	99.0
Regular trash bin	43	97.7	96	97.0	63	100.0	110	95.7	79	98.8	100	99.0
Covered contaminated waste bin	43	97.7	89	89.9	60	95.2	102	88.7	80	100.0	100	99.0
Receptacle for soiled linen	-	-	-	-	-	-	-	-	63	78.8	91	90.1
Bucket for soiled pads and swabs	-	-	-	-	-	-	-	-	43	53.8	48	47.5
Bowel and plastic bag for placenta	-	-	-	-	-	-	-	-	79	98.8	99	98.0
Puncture proof sharps container	44		99	100	62	98.4	114	99.1	79	98.8	101	100.0
Trolley for sterile field (Mayo table)	27	61.4	27	27.3	45	71.4	51	44.3	72	90.0	77	76.2
Standards for the cleaning surfaces available and known?	-	-	-	-	-	-	-	-	77	96.3	93	92.1

Disinfectant/antiseptics: Table 8-14 shows the availability of disinfectant/antiseptics in maternity areas of EmONC facilities. All (100%) facilities surveyed had bleach or bleaching powder and an iodine preparation. The 2020 review found items in short supply (< 60% of facilities) included: prepared disinfection solution, Chlorhexidine and 70% alcohol. Shortages were more likely in non-functioning EmONC facilities.

Table 8-14: Percent of EmONC facilities with disinfectant/antiseptics available in maternity areas (Progress since the 2009 EmONC assessment baseline)												
Disinfectants and antiseptics	**Functional EmONC facilities (n=44)**		**Non-functional EmONC facilities (n=99)**		**Functional EmONC facilities (n=63)**		**Non-functional EmONC facilities (n=115)**		**Functional EmONC facilities (n=80)**		**Non-functional EmONC facilities (n=101)**	
	2009				**2014**				**2020**			
	No	**%**	**No**	**%**	**No**	**%**	**No**	**%**	**No**	**%**	**No**	**%**
Bleach or bleaching powder	41	93.2	93	93.9	58	92.1	98	85.2	80	100.0	101	100.0
Prepared disinfection solution	30	68.2	58	58.6	45	71.4	68	59.1	71	88.8	58	57.4
Chlorhexidine	35	79.5	68	68.7	53	84.1	93	80.9	77	96.3	67	66.3
Ethanold or spirit (70% alcohol)	16	36.4	15	15.2	22	34.9	6	5.2	55	68.8	42	41.6
Iodophors (Preparation containing polyvidone iodine)	39	88.6	97	98.0	63	100.0	115	100.0	80	100.0	101	100.0
Cotton or Alchol based swabs									80	100.0	101	100.0

Autoclaves: More than 90% of EmONC facilities have an autoclave. Autoclaves with temperature gauges and sterilisation drums are mostly available. Steam sterilisers have increased in functional (64%

to 95%) and non-functional (33% to 58%) EmONC facilities. The least used autoclaves are those that are kerosene heated. See figures 8-7 and 8-8.

Figure 8-7: Type of autoclave used in functional EmONC facilities

(Progress since the 2009 EmONC assessment baseline)

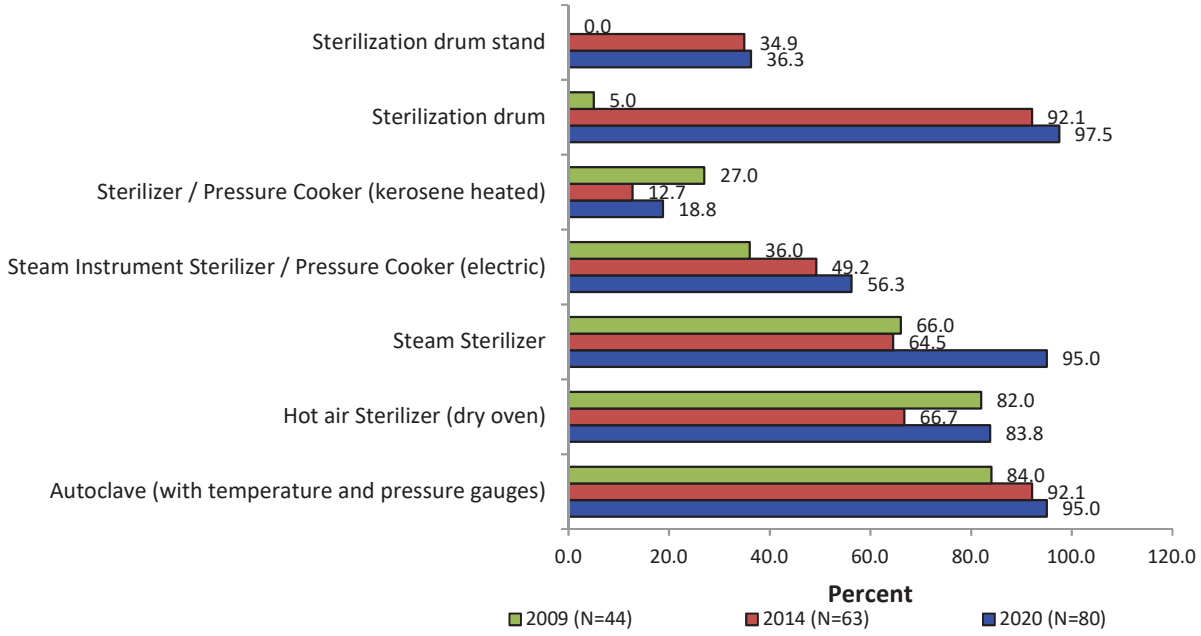
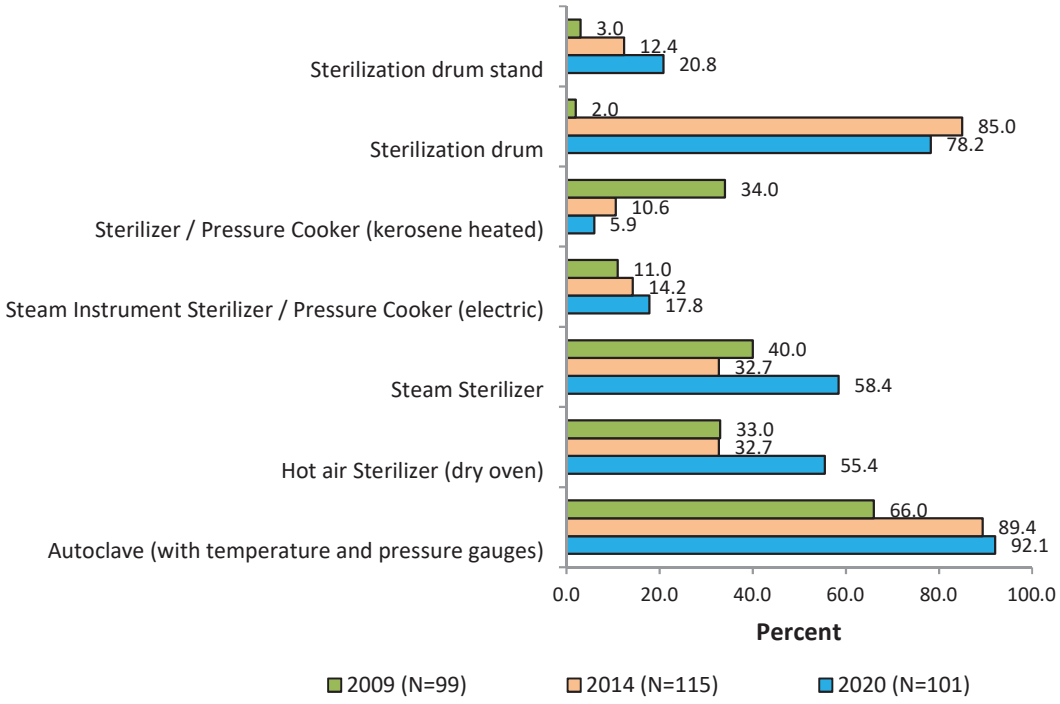


Figure 8-8: Type of autoclave used in non-functional EmONC facilities

(Progress since the 2009 EmONC assessment baseline)



Disposal and cleanliness: Waste disposal is also important for infection control. More than 90% of functional EmONC facilities had a working incinerator and a placental pit. About 10% less of non-

functioning EmONC facilities had similar infrastructure. Data collectors were asked to make a judgement about the cleanliness of the facilities surveyed. The perception of data collectors was that < than 16% of facilities surveyed had no apparent liquid/spills and/or trash on the floor.

Table 8-15: Waste management and general cleanliness of facilities (observations only 2020)

	EmoNC Facilities (n=80)		Facilities for upgrade (n=101)		Total (n=181)	
	n	%	n	%		
Facility has a functioning incinerator	74	92.5	76	75.2	150	82.9
Facility has a placental pit	72	90.0	82	81.2	154	85.1
No apparent liquid/spills and trash on floor	9	11.3	19	18.8	28	15.5

9. FIINDNGS: EMERGENCY COMMUNICATIONS AND REFERRAL TRANSPORT

A functional mode of transport and communication is essential for timely and efficient referral of emergency patients. This section of the report looks at referral. To help understand if referral is working, the following questions have been asked.

9.1 Referral in and out

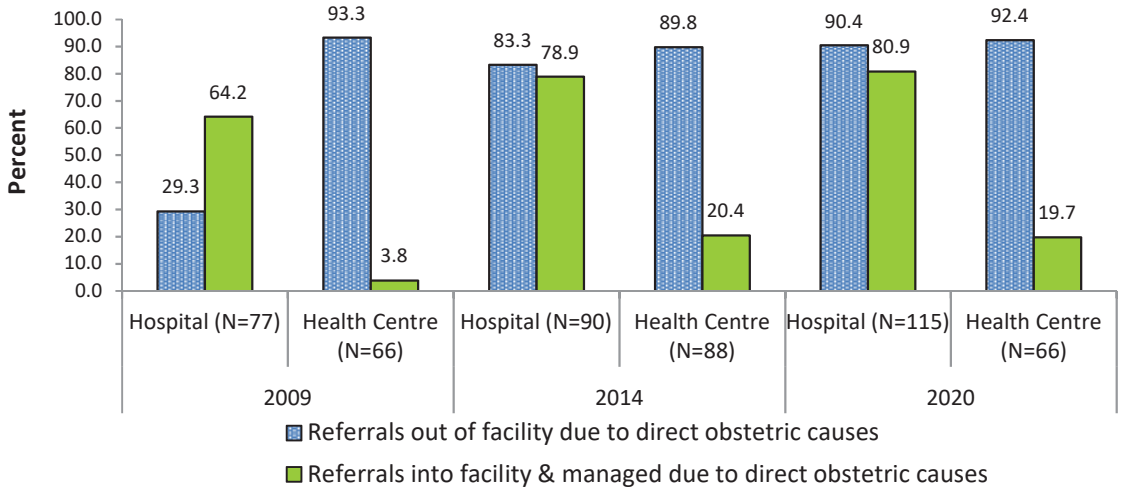
Referrals of women due to direct obstetric complications

Referrals Out: Figure 9-1 shows that since the baseline assessment was undertaken in 2009, the percent of hospitals and facilities that refer out women with direct obstetric complications, has increased by nearly 60%. For health centres, referrals out have remained fairly static, between 2009 and 2020.

Referrals in: Figure 9-1 also shows that referrals into hospitals, of women with direct obstetric complications, have also increased. Between 2009 and 2020, referrals in by hospitals have increased by about 15%. For health centres the increase has been similar.

Figure 9-1: Percent of EmONC facilities that refer women with direct obstetric complications in and out of EmONC facilities

(Progress since the 2009 EmONC assessment baseline)

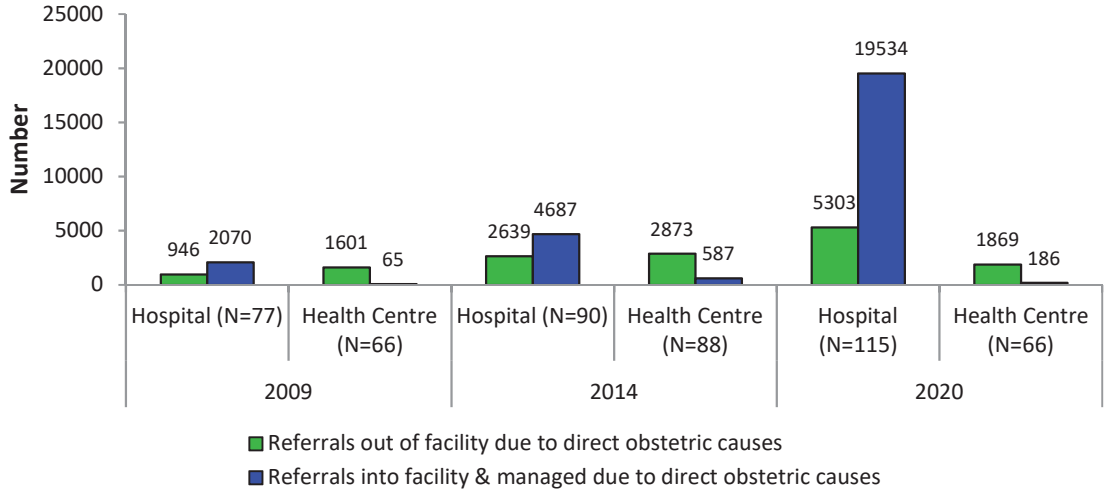


Referral out and in according to numbers: Figure 9-2 shows the referral in and out, in terms of numbers. When the numbers are analysed, the number of referrals out, for women with obstetric complications, has increased over time. The number of referrals in and out for health centres follow a similar pattern to hospitals. What is different is; referrals out between 2014 and 2020 are almost double. With referrals in, there is almost a fourfold difference. These numbers have been validated by review data, undertaken by different levels of CPA referral hospitals. See annex 9.

It is difficult to determine if the changes are due to improved reporting or something else. However, the data for referrals into hospitals needs improving. There is confusion between the recording of referrals in and out and the reason for referring is not recorded regularly.

Figure 9-2: Number of women with direct obstetric complications referred in and out of EmONC facilities over 12-months period

(Progress since the 2009 EmONC assessment baseline)



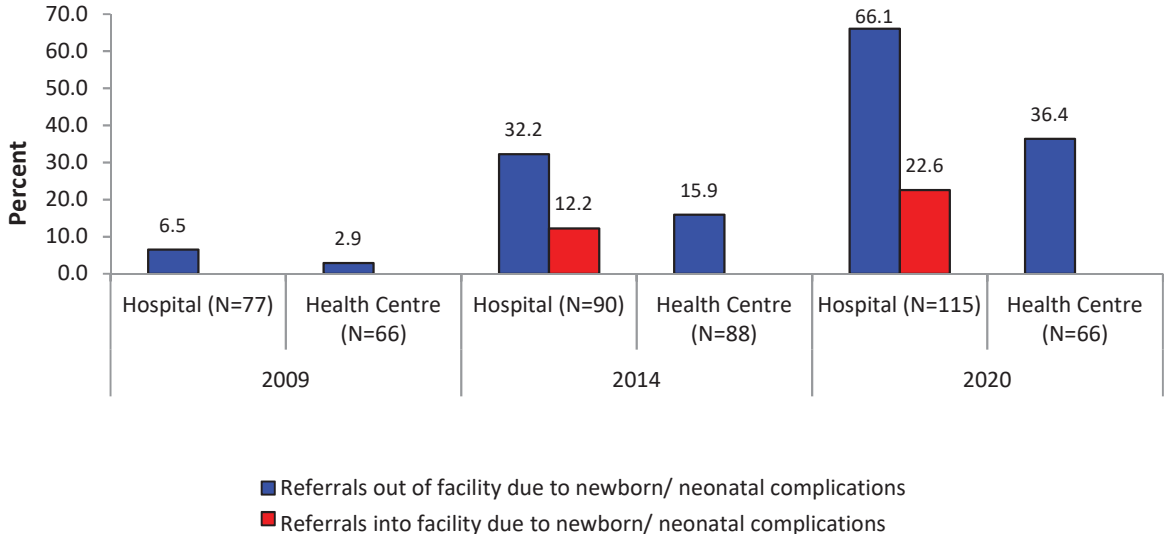
Referrals of newborns/neonates with complications

Referrals Out: Figure 9-3 shows that since the baseline assessment in 2009, the percent of hospitals that refer out newborn/neonates with complications, has increased from 6.65% for hospitals referring out in 2009, to 34.2% in 2014 to 66.1% in 2020. This is almost a 10 fold increase in referrals out since 2009. The referrals out by health centres have followed a similar trend, however the percentage of health centres referring out are lower.

Referrals in: Figure 9-3 also shows that referrals into hospitals of newborn/neonates with complications were only reported by hospitals for 2014 (12.2%) and 2020 (22.2%). The focus on newborn/neonates has only gained momentum in the last 5 years. This helps explain why hospitals are referring newborn/neonates more than health centres.

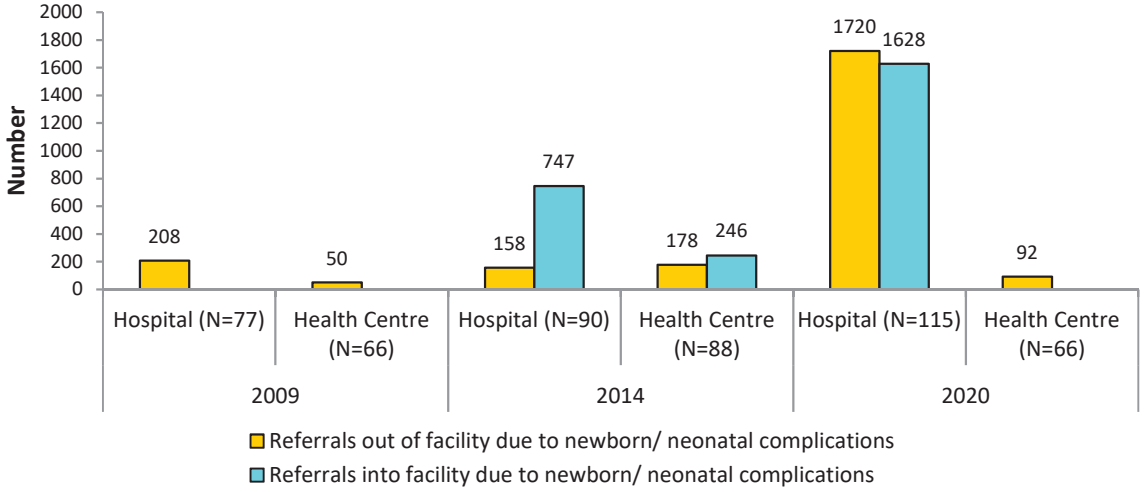
Figure 9-3: Percent of EmONC facilities referring newborn/neonates with complications in and out

(Progress since the 2009 EmONC assessment baseline)



Referral out and in according to numbers: Figure 9-4 shows the referral in and out of newborn/neonates with complications in terms of numbers. When the numbers are analysed, the number of referrals out has increased over time. The number of referrals out from health centres increased from 2009 to 2014 but decreased in 2020. What is different is: the number of referrals in and out in 2020 are significantly different to referrals in and out for 2014.

Figure 9-4: Number of newborn/neonates with complications referred in and out of EmONC facilities over 12-months period
(Progress since the 2009 EmONC assessment baseline)



9.2 Main reasons for referral

Table 9-1 show the main reason for maternal referral by hospitals in 2014 and 2020 reviews was haemorrhage (57.4%) followed by prolonged labour (39.1%) then pre-eclampsia/eclampsia (35.7%). For health centres maternal referrals were similar; haemorrhage (51.5%), followed by pre-eclampsia/eclampsia (48.5%) then prolonged/obstructed labour (36.4%).

Table 9-1: Percent of common maternal conditions requiring referral out of EmONC facilities (Comparison between the 2014 and 2020 EmONC reviews)

	Hospital				Health centres			
	2014 (n=90)		2020 (n=115)		2014 (n=88)		2020 (n=66)	
	n	%	n	%	n	%	n	%
Haemorrhage	28	31.0	66	57.4	14	15.9	34	51.5
Sepsis	0	0.0	2	1.7	0	0	2	3.0
Prolonged / obstructed labour	30	33.3	45	39.1	49	55.7	24	36.4
Pre-eclampsia / eclampsia	18	20.2	41	35.7	14	15.9	32	48.5
Premature rupture of membranes	0	0.0	9	7.8	1	1.1	15	22.7
Preterm labour	1	1.2	33	28.7	0	0.0	8	12.1
Foetal distress	1	1.2	0	0.0	0	0.0	3	4.5
HIV	0	0.0	5	4.3	0	0.0	3	4.5
Malaria	0	0.0	1	0.9	0	0.0	0	0.0
Severe anaemia	4	4.8	23	20.0	2	2.3	15	22.7
Previous Caesarean	-	-	13	11.3	-	-	8	12.1
Big baby	-	-	15	13.0	-	-	13	19.7
Teenage pregnancy	-	-	1	0.9	-	-	4	6.1
Mal-presentation	-	-	23	20.0	-	-	20	30.3
Other (specify)	7	8.3	12	10.4	8	9.1	5	7.6

Table 9-2 shows for newborn care, low birth weight and prematurity are the main reasons for referring newborns/neonates. 40.9% of all referrals of newborns are due to prematurity followed by low birth weight (38.8%). This was similar to referrals in 2014.

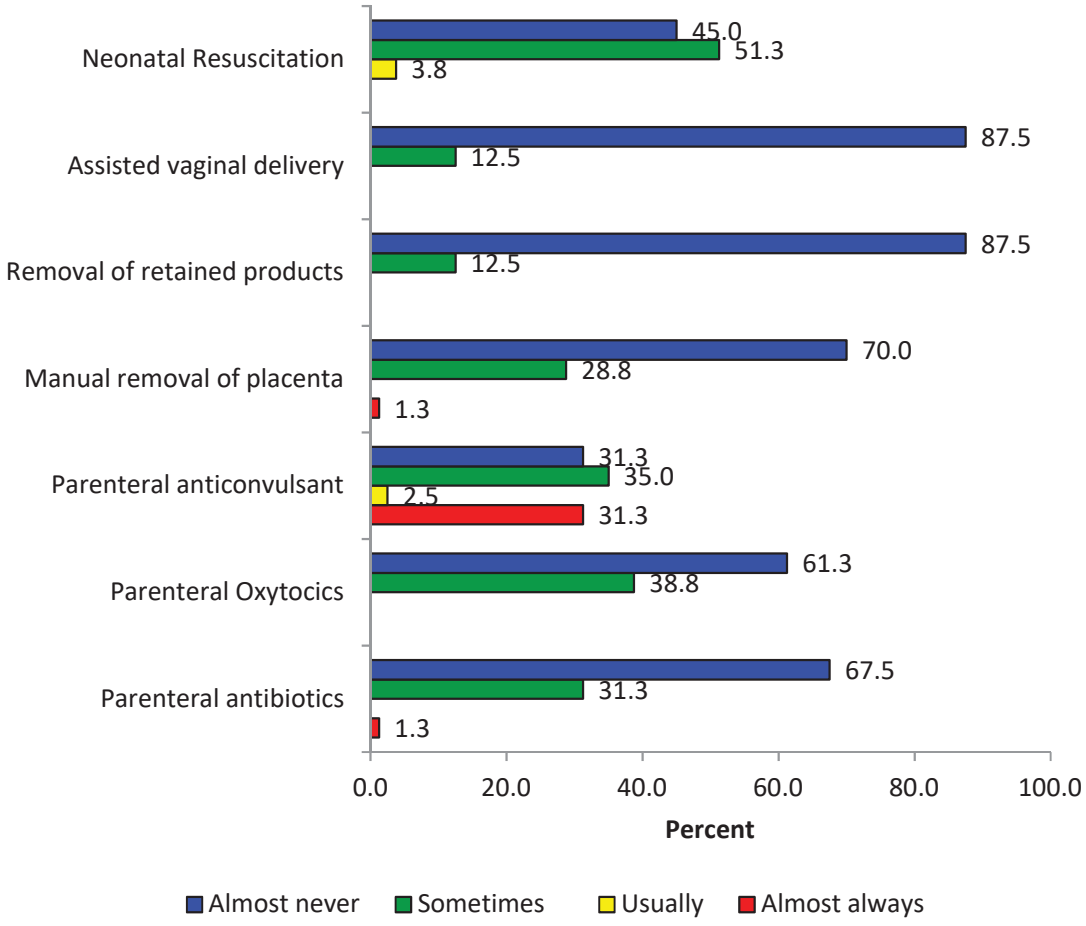
Table 9-2: Percent of common newborn conditions requiring referral out of EmONC facilities (Comparison between the 2014 and 2020 EmONC reviews)

	Hospital				Health centres			
	2014 (n=90)		2020 (n=115)		2014 (n=88)		2020 (n=66)	
	n	%	n	%	n	%	n	%
Low birth weight	41	45.6	29	25.2	34	38.6	19	28.8
Prematurity	21	23.3	47	40.9	21	23.9	13	19.7
Respiratory difficulties	16	17.8	16	13.9	16	18.2	11	16.7
Sepsis	3	3.3	4	3.5	1	1.1	1	1.5
Jaundice	1	1.1	2	1.7	2	2.3	2	3.0
Asphyxia	-	-	12	10.4	-	-	10	15.2
Congenital abnormality	-	-	1	0.9	-	-	2	3.0
Convulsion	-	-	0	0.0	-	-	2	3.0
Hypothermia	-	-	0	0.0	-	-	0	0.0
Failure to suck	-	-	2	1.7	-	-	6	9.1
High fever	-	-	1	0.9	-	-	1	1.5
Others (specify)	5	5.6	0	0.0	10	11.4	0	0.0
Don't know	1	1.1	0	0.0	3	3.4	0	0.0

Referrals related to signal functions

For each EmONC signal function, health facilities were asked if they refer the cases to a higher level "almost never, sometimes, usually and never". Figure 9-5 shows that the dominant signal function that results in referral is the administration of anticonvulsants. Thirty one percent (31.0%) of health facilities reported that after giving anticonvulsant, they usually refer on.

Table 9-5: Percent of EmONC facilities referring women and newborns to a higher level of facility when a signal functions were performed (2020)



9.3 Strategies for referral

Table 9-3 shows that most hospitals (98.3%) and health centres (83.3%) reported that staff from the referring facility often accompanies the mother or newborn. When asked about strategies for transfer, 98.3% of hospitals, but only 53.0% of health centres, stated that the facility has its own means of transport. Over 90% of facilities call a dispatch centre. This is an increase of about 30% since 2014. Many (83.6.9%) health centres call another health care facility for transportation, and a similar proportion (54.5%) state that they assist patients to arrange their own transport.

This suggests that hospitals have ready access to emergency transportation for their patients. In contrast, health centres must rely on a variety of methods, including private vehicles. The main cost of referral for clients themselves, is the cost of fuel for emergency transport.

Table 9-3: Strategies to transfer emergency patients by percent and type of facility (2014 and 2020 EmONC Reviews)				
	2014		2020	
Strategies for Transfer	Hospital (n=90)	Health centres (n=88)	Hospital (n=90)	Health centres (n=88)
	%	%	%	%
Health Staff Accompanying Patients				
Often accompany referrals out[1]	97.7	76.1	98.3	83.3
Transportation				
Own means of transportation	98.9	29.6	98.3	53.0
Call another healthcare facility for transportation	22.7	65.9	33.0	63.6
Use a dispatch centre	54.6	64.8	91.3	92.4
Private transport providers	7.8	28.4	3.5	6.1
Vehicles from District /County Health	1.1	1.1	17.4	27.3
Assist patients to arrange their own	34.1	60.2	20.9	54.5
Other	1.1	0	0.0	0.0

Feedback in 2014 was that 95.5% of clients from hospitals and 68.2% of clients from health centres pay for fuel. This has changed < less than 10% of clients now pay for fuel. This cost could be barrier to seeking care. See annex 9 for more information on costs to families.

9.4 Reporting and guidelines to support referral

The quality of referral data is poor. Facility records do not show: the type of complication; the source of referral, where mothers and newborns were referred to and from and the outcome of the referral. Reporting has improved in most facilities since 2014; however, there is room for improvement. Less than 55% of hospitals and 65% of health centres have a uniform reporting system in place, to support referral. This area needs serious strengthening.

More than 80% of the facilities reported having guidelines to support referral. The Safe Motherhood Guidelines and Protocols used by the MoH include referral; however it is important that reporting, guidelines and protocols are common to all facilities and are implemented uniformly across the country. See annex 9for more information on costs to families.

9.5 Time and distance

It is estimated[35] that 75% of maternal deaths occur as a result of direct obstetric complications. If untreated, death occurs on average in:

2 hours : From post-partum haemorrhage

12 hours : From ante-partum haemorrhage

2 days : From obstructed labour

6 days : From infection

35 UNFPA, (2001), Distance Learning System in Population Issues, Course 6 Maternal Deaths: Selecting Priorities, Tracing Progress. Module 1: Understanding the Causes of Maternal Deaths

Timely intervention is vital for maternal and neonatal survival. The 2020 review found that 77.1% of hospitals and 63.6% of health centres are within 50 km of a higher level referral facility. 67.2% of hospitals and 72.7% of health centres are within one hour's travel. Nineteen (19) hospitals and 2 health centres are more than 2 hours or 100kms travel. See table 9-.4. As EmONC facilities are further strengthened, time and distance should shorten. This is an improvement since 2009.

Table 9-4: Time (minutes) and distance (kms) from higher level referral facility by common transport
(Comparison between the 2014 and 2020 EmONC reviews)

Time and Distance	2014				2020			
	Hospitals (n=90)		Health centres (n=88)		Hospitals (n=115)		Health centres (n=66)	
	n	%	n	%	n	%	n	%
Distance								
0-50 km	37	77.1	64	72.7	72	62.6	42	63.6
51-100 km	9	18.8	23	26.1	18	15.7	22	33.3
> 100 km	2	4.2	1	1.1	25	21.7	2	3.0
Time								
0-60 minutes	38	79.2	60	68.2	78	67.8	48	72.7
61-120 minutes	10	20.1	26	29.5	18	15.7	16	24.2
> 120 minutes	0	0.0	2	2.3	19	16.5	2	3.0

9.6 Communication and transportation

Availability of functional modes of transport and communication systems are essential for timely and quick referral of emergency patients to a higher level of the health system. Communication and transport are two elements at the centre of a referral system. When used effectively, communication can save the lives of women and their babies.

Communication

Communication can serve to request transportation and to inform the receiving facility that a patient is enroute and in what condition. Telephones or radios can also be used to obtain medical advice and to provide counter-referral measures.

Table 9-5 shows that all (100%) facilities visited in 2014 and again in 2020 had at least one functioning mode of communication on site; a cell phone owned by staff. The table also shows that the use of telephone lines to support referral is decreasing while the use of health worker's mobile phones are used almost exclusively to support referral. No facility reimburses staff if they use their personal cell phones for work purposes. This could become an issue in the future. The use of standardised numbers to support referral (call an ambulance and/or seek medical advice) is also decreasing. The reason for this is not clear.

Table 9-5: Facilities with on-site communication systems available and functional for referral (Comparison between the 2014 and 2020 EmONC reviews)								
Communication systems to enable referral	2014				2020			
	Hospitals (n=90)		Health centres (n=88)		Hospitals (n=115)		Health centres (n=66)	
	At least one means available	Used for referral	At least one means available	Used for referral	At least one	Used for referral	At least one	Used for referral
	%	%	%	%	%	%	%	%
Telephone Line(s)	41.1	92.1	21.6	84.2	10.4	10.4	4.5	4.5
Facility Mobile phone(s)	18.9	88.2	3.4	100.0	56.5	56.5	28.8	28.8
Health worker mobile phone(s)	100.0	98.8	100.0	96.6	98.3	98.3	100.0	98.5
Radio communication	12.2	83.3	3.4	66.7	13.0	11.3	10.6	9.1
Standardized phone numbers:								
To call an ambulance	51.1	100.0	40.9	100.0	89.6	89.6	72.7	72.7
For contact receiving facility	32.2	100.0	47.7	100.0	80.0	80.0	54.5	54.5
Call for medical/referral advice	14.4	100.0	21.6	100.0	48.7	48.7	37.9	37.9

Transportation

A functioning mode of transport is essential for referral. Table 9-6 shows that when the baseline EmONC assessment was undertaken, the most common means of transport was car and ambulance from the health facility. In 2020, ambulances are used by over 90% of hospitals and 57% of health centres.

Table 9-6: Health facilities with a functional modern mode of transport (Progress since the 2009 EmONC assessment baseline)												
Modern mode of transport	2009				2014				2020			
	Hospitals (n=77)		Health centres (n=66)		Hospitals (n=90)		Health centres (n=88)		Hospitals (n=115)		Health centres (n=66)	
	n	%	n	%	n	%	n	%	n	%	n	%
Ambulance	66	85.7	18	27.3	75	83.3	12	13.6	108	93.9	38	57.6
Other facility ambulance	34	44.2	35	53.0	0	0	1	1.1	2	1.7	5	7.6
Political ambulance	NA	NA	NA	NA	11	12.2	11	12.5	28	24.3	8	12.1
Private/NGO ambulance	NA	NA	NA	NA	14	15.6	1	1.1	13	11.3	0	0.0
Car	66	85.7	54	81.8	1	1.1	1	1.1	3	2.6	1	1.5

More traditional modes of transport such as three wheel moto, ox/horse cart and remork moto are scarcely used. See table 9-7.

Table 9-7: Health facilities with a functional traditional mode of transport (Progress since the 2009 EmONC assessment baseline)												
Traditional mode of transport	2009				2014				2020			
	Hospitals (n=77)		Health centres (n=66)		Hospitals (n=90)		Health Centres (n=88)		Hospitals (n=115)		Health centres (n=66)	
	n	%	n	%	n	%	n	%	n	%	n	%
Three wheel moto	23	29.9	20	8.7	0	0.0	3	3.4	0	0.0	2	3.0
Motorcycle	53	68.8	158	69.0	1	1.1	7	8.0	0	0.0	0	0.0
Ox/horse cart	16	20.8	64	27.8	0	0.0	0	0.0	0	0.0	0	0.0
Remork moto	46	59.7	76	33.0	NA	NA	NA	NA	0	0.0	0	0.0
Others	22	28.6	74	32.2	0	0.0	0	0.0	0	0.0	0	0.0

Availability and use of ambulances

Most (93.9%) hospitals and 47% of health centres reported having access to an ambulance. Table 9-8 shows that the main use of ambulances is to carry corpses and/or buy or pick up supplies/drugs. More than 90% of hospitals and 63% of health centres have guidelines in place to regulate the use of the vehicle.

Table 9-8: Availability, usage and management of ambulance by type of EmONC facility[1] (Comparison between the 2014 and 2020 EmONC reviews)				
Availability usage and management of ambulances	2014		2020	
	Hospital (n=90)	Health Centres (n=88)	Hospital (n=115)	Health Centres (n=66)
	%	%	%	%
Availability of ambulances				
Any type controlled by facility	98.9	31.0	93.9	96.1
Other means of transportation	5.6	16.1	21.7	88.2
Non-ambulance means used to refer	50.0	92.9	39.1	11.8
Use of ambulances				
To transport facility employees	2.3	0.0	0.9	70.6
To do supervision + monitoring	5.6	3.7	13.9	12.1
For outreach to community	1.1	14.8	19.1	10.6
For immunization campaigns	9.0	18.5	8.7	4.5
To buy/pick up/deliver supplies/drugs	28.1	33.3	34.8	28.8
To transport to trainings or meetings	3.4	3.7	4.3	3.0
To carry corpses	75.3	44.4	76.5	34.8
Protocols/Guidelines				
Guidelines regulate ambulance use	85.4	77.8	91.3	63.6
Observed copy of guidelines	15.8	28.6	75.7	51.5
MoH produced the guidelines	26.7	23.8	64.3	39.4
Don't know or other produced guidelines	62.7	66.6	11.3	12.1

1 all responses and percentages are calculated based on a yes - positive response

The availability of emergency equipment, in vehicles for referral, varied considerably from facility to facility. From table 9-9 it can be seen that most ambulances have stretchers and more than 80% have

a drip line. However other items were in short supply. Only about a quarter of ambulances had birthing kits and there was no protective clothing in less than 56% of vehicles. Availability of emergency equipment and supplies in ambulances have improved since the 2014 EmONC review.

Table 9-9: Availability of emergency equipment and supplies in ambulances (Comparison between the 2014 and 2020 EmONC reviews)

Availability usage and Management of Ambulances	2014		2020	
	Hospitals (n=90)	Health Centres (n=88)	Hospitals (n=115)	Health Centres (n=66)
	%	%	%	%
Drip line	92.1	85.2	94.8	80.3
Birthing kit	28.1	29.6	72.2	53.0
Stretcher	100.0	92.6	98.3	77.3
Pressure dressings	95.5	55.6	97.4	66.7
Splints	59.5	25.9	80.0	60.6
Protective wear for attendants	18.0	22.2	56.5	43.9
Paediatric ambu bag and mask	71.9	44.4	91.3	40.9
Adult ambu bag and mask	85.4	51.9	95.7	71.2
Non-pneumatic anti-shock garment	22.5	37.0	50.4	45.5

Maintenance of vehicles:

The current review found that 79.7% of hospitals and 54.3% of health centres have access to tools, parts and mechanics for maintaining the ambulance. Table 9-10 shows that in more than half of the hospitals there was no one delegated to ensure the ambulance was maintained, even through 97.4% of hospitals and 71.2% of health centres had funds available to support maintenance. Where no funds were available, the main reason given was "lack of planning" or "other". 98.3% of hospitals and 68.2% of health centres had fuel in the ambulance on the day of the survey. It is unclear if those without fuel could be used at short notice. Overall this represents an improvement since 2014.

Table 9-10: Maintenance and repair of ambulances type of EmONC facility[1] (Comparison between the 2014 and 2020 EmONC reviews)

Maintenance and Repair of Ambulances	2014		2020	
	Hospitals (n=90)	Health Centres (n=88)	Hospitals (n=115)	Health Centres (n=66)
	%	%	%	%
Tools, parts, mechanics available for maintenance	64.0	59.3	75.7	54.5
Person responsible for maintenance:				
• No one	56.3	3.7	0.0	0.0
• Facility director	20.7	81.5	51.3	45.5
• Transport officer	20.7	11.1	47.8	28.8
Funds available today for maintenance	88.8	62.9	97.4	71.2
Fuel available today for referral	77.5	59.3	98.3	68.2

1 all responses and percentages are calculated based on a yes - positive response

Driver availability and training

Table 9-11 shows that in 2020, all hospitals (100%) and 96.1% of health centres had an ambulance service. For health centres, this was an increase of about 25% since 2014. Most (92.2%) hospital drivers, and 70.6% of health centre drivers, maintain a logbook for the vehicle used for referral. These logbooks were not inspected to see if they were up-to-date. Drivers are supervised by the health facility administrator or medical director in almost all facilities.

Table 9-11: Availability, management and training of drivers by type of health facility (Comparison between the 2014 and 2020 EmONC reviews)

Availability , management and training of drivers by facility	2014		2020	
	Hospitals (n=90)	Health Centres (n=88)	Hospitals (n=90)	Health Centres (n=88)
	%	%	%	%
Availability of ambulance service				
Full time or part time driver available	100.0	70.3	100.0	96.1
Availability of drivers for emergency				
Almost always	92.1	88.5	94.8	88.2
Usually	6.8	7.7	5.2	11.8
Driver logbooks				
Driver maintains logbook for vehicle	90.9	57.7	92.2	70.6
Supervisors of driver(s)				
Facility administrator	40.9	0.0	59.1	2.0
Transport officer	-	-	5.2	9.8
Facility director	51.1	92.3	27.0	88.2
Driver Training				
Driver(s) have first aid training	60.9	36.0	92.2	88.2
Training includes:				
Airway management	90.7	90.0	92.2	90.2
External bleeding control	90.7	90.0	93.0	90.2
Splinting external extremities	94.4	80.0	93.0	90.2
Principles of spinal precautions	79.6	80.0	82.6	80.4
Triage	74.1	60.0	85.2	68.6
Crash scene management	77.8	70.0	74.8	62.7
Extrication	83.3	70.0	85.2	80.4
Use of fire extinguisher	70.4	40.0	91.3	84.3
Other training received by drivers				
Minor mechanical training	51.1	23.1	72.2	62.7
Preventive maintenance	61.4	26.9	82.6	51.0
Defensive driving	65.9	34.6	87.8	84.3
Correct use of lights and sirens	54.6	19.2	92.2	80.4

Around 90% of drivers have undertaken a first aid course which included airway management, external bleeding control: splinting and more. About 80% of drivers have undertaken additional driving courses, related to maintenance and safe driving, thus enhancing driving skills. There has been an improvement in the availability, management and training of health facility drivers. See table 9-11.

10. HUMAN RESOURCES

Human resources play a central role in providing EmONC services. A workforce with the right skills set, in the required numbers and with the authority to perform their duties, is needed for effective delivery of EmONC services. This section reviews the availability of staff to support EmONC.

10.1 Availability of staff

Health facilities visited were asked to list all cadres of staff performing deliveries in the facility. Figures 10-1 and 10-2 show the availability of staff in EmONC facilities that were performing deliveries in 2009, at the time of the baseline and again in 2014 and the current review (2020).

When comparing the two time periods, it can be seen that in 2009 most (95.5%) functional EmONC facilities had secondary midwives, followed by general medical doctors (79.5%), primary midwives (61.4%) and medical assistants (52.3%). Facilities for upgrade showed a similar pattern, but there was a shortage of secondary midwives at the low levels. In 2014 secondary midwives continued to increase in EmONC facilities.

The current review (2020) found that midwives (secondary and primary) were still the main cadre providing EmONC services, and there had been an overall increase in the number of different cadres providing EmONC services. All functional and non-functional (100%) EmONC facilities have at least one (1) secondary midwife with many having two (2). Only 12.5% of the functional EmONC facilities have less than 6 secondary midwives.

It is also encouraging to see that there has been an increase in cadres, such as nurse anaesthetists, paediatrician/neonatologists and obstetricians/gynaecologists with specialist qualifications since 2009; particularly in functional EmONC facilities, mainly hospitals.

Figure 10-1: Distribution of different health cadres in functional EmONC facilities

(Progress since the 2009 EmONC assessment baseline)

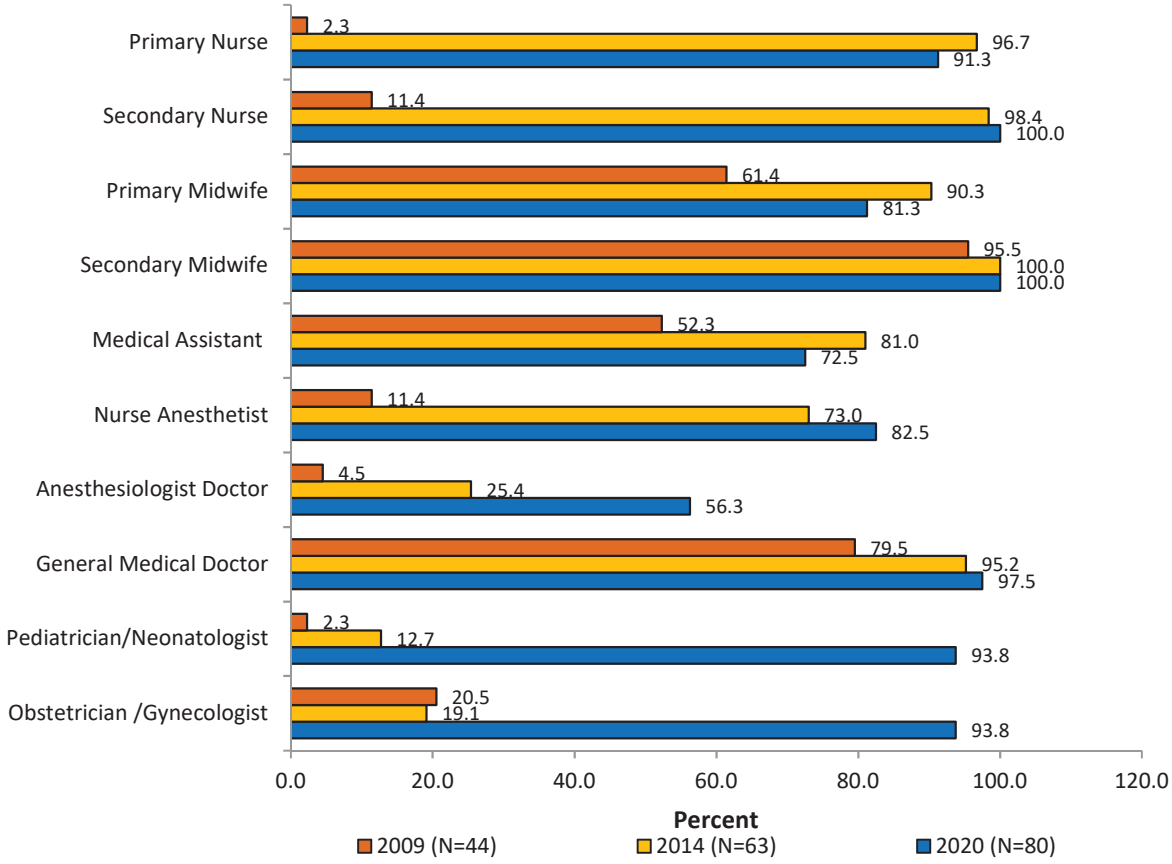
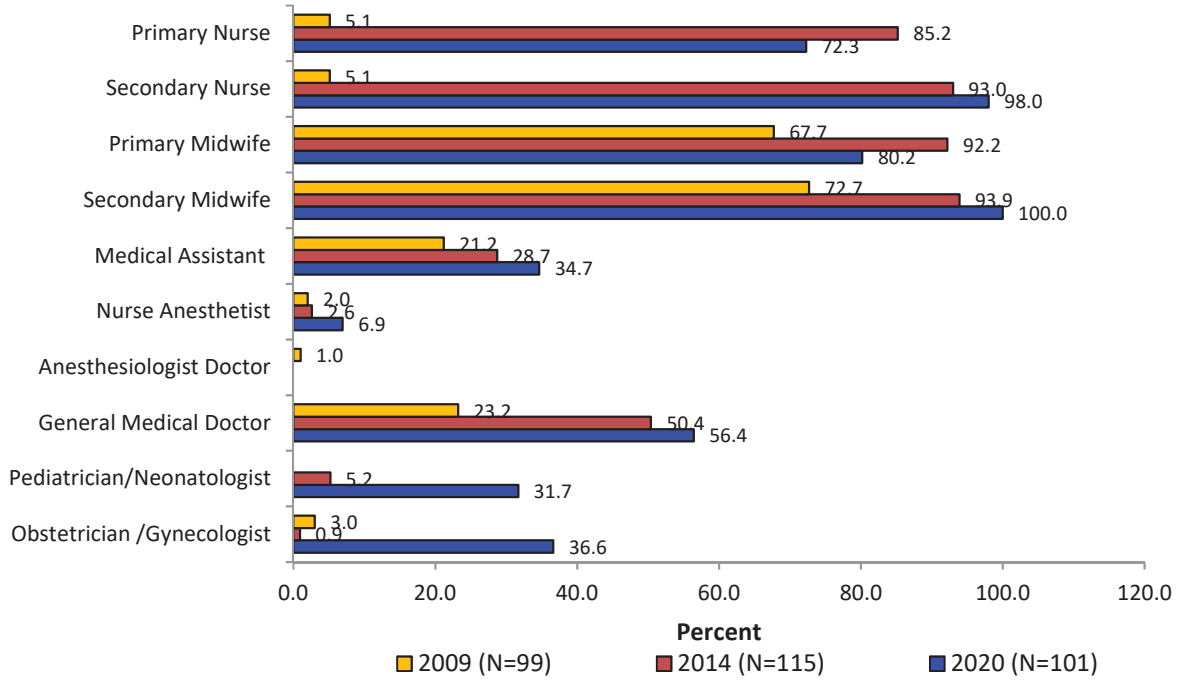


Figure 10-2: Distribution of different cadre in non-functional EmONC facilities

(Progress since the 2009 EmONC assessment baseline)



Co-existence of primary and secondary midwives

The baseline assessment (2009) shows where primary midwives co-existed with secondary midwives. Figure10-3 shows that in 2009 almost half (44.8%) of health facilities surveyed were functioning without secondary midwives, while about 38% of others had only one secondary midwife. Secondary and primary midwives reversely coexisted. The situation has changed. Primary and secondary midwives still co-exist together: however, secondary midwives have increased, and primary midwives have decreased. In 2020, 90% of all EmONC facilities surveyed had more than 2 secondary midwives. There were 12.5% of the functional EmONC facilities have less than 6 secondary midwives, 50% have 6-15 secondary midvives, and 37.5% have more than 15 secondary midwives for the 2020 EmONC review.

Figure 10-3: Number of secondary midwives in hospitals and health centres (Progress since the 2009 EmONC assessment baseline)

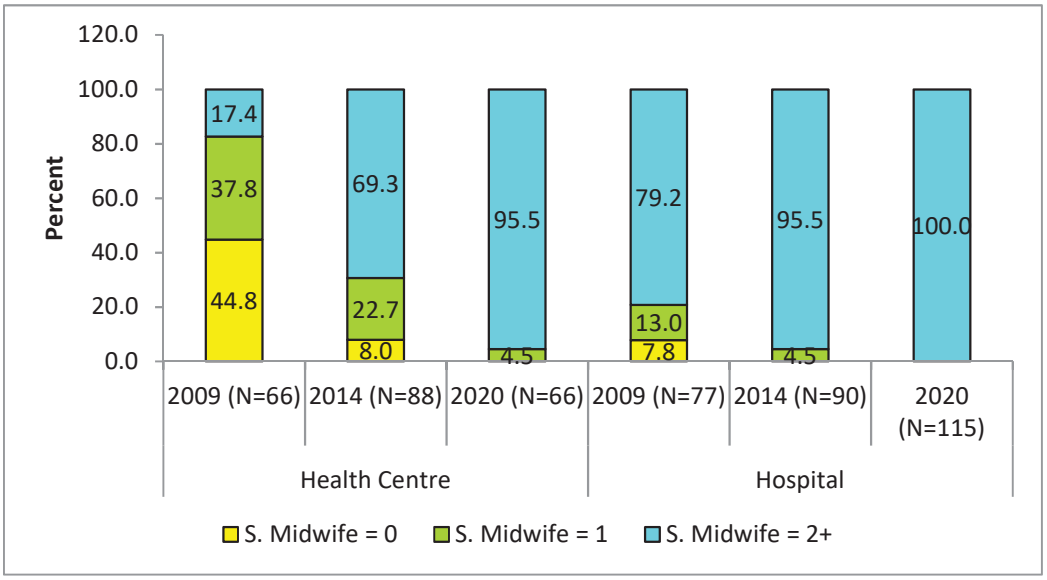
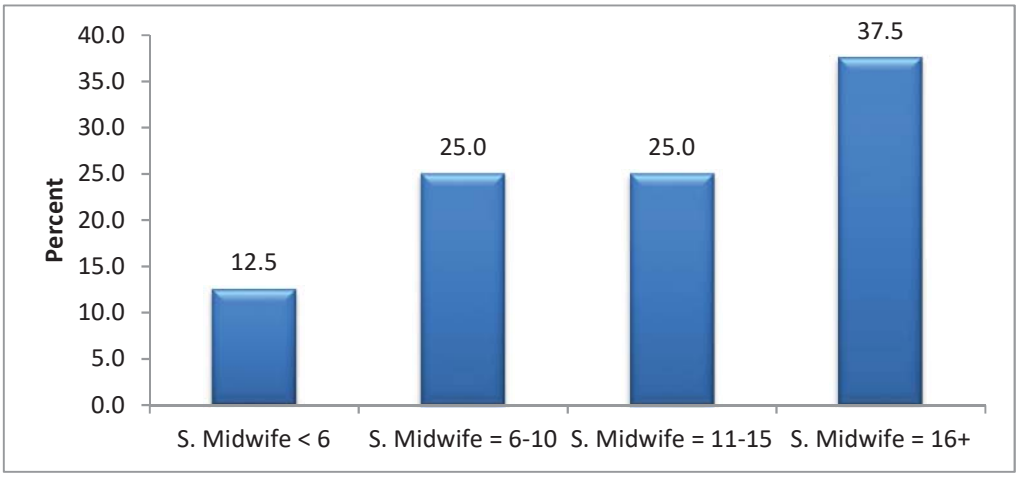


Figure 10-4: Number of secondary midwives in functional EmONC facilities for the EmONC Review 2019-2020 (N=80)



10.2 Distribution of different cadres of staff

Table 10-1 shows the current distribution of different cadre of health workers in EmONC facilities.

- In 2009, 41.8% of EmONC facilities had no secondary midwives. The current review (2020) found this has improved. With the exception of one non-functioning EmONC facility, all EmONC facilities now have secondary midwives.

Table 10-1: Distribution of different health cadres in EmONC facilities in public sector (Progress since the 2009 EmONC assessment baseline)

Different cadre of health workers		Functional EmONC facilities (n=44)		For upgrade to EmONC status (n=99)		Functional EmONC facilities (n=63)		Non-functional EmONC facilities (n=115)		Functional EmONC facilities (n=80)		Non-functional EmONC facilities (n=101)	
		2009				2014				2020			
		No	%	No	%	No	%	No	%	No	%	No	%
Obstetrician /gynaecologist	0	35	79.5	96	97.0	52	82.5	114	99.1	5	6.3	64	63.4
	1	4	9.1	3	3.0	5	7.9	1	0.9	28	35.0	23	22.8
	2+	5	11.4	0	0.0	6	9.5	0	0.0	47	58.8	14	13.9
Paediatrician/ neonatologist	0	43	97.7	99	100.0	56	88.9	109	94.8	5	6.3	69	68.3
	1	1	2.3	0	0.0	5	7.9	4	3.5	34	42.5	28	27.7
	2+	0	0.0	0	0.0	2	3.2	2	1.7	41	51.3	4	4.0
General medical doctor	0	9	20.5	76	76.8	3	4.8	60	52.2	2	2.5	44	43.6
	1	23	52.3	19	19.2	3	4.8	23	20.0	5	6.3	18	17.8
	2+	12	27.3	4	4.0	57	90.5	32	27.8	73	91.3	39	38.6
Anaesthesiologist doctor	0	42	95.5	98	99.0	48	76.2	115	100.0	35	43.8	101	100.0
	1	0	0.0	1	1.0	4	6.3	0	0.0	29	36.3	0	0.0
	2+	2	4.5	0	0.0	11	17.5	0	0.0	16	20.0	0	0.0
Nurse anaesthetist	0	39	88.6	97	98.0	17	27.0	112	97.4	14	17.5	94	93.1
	1	2	4.5	1	1.0	11	17.5	2	1.7	17	21.3	7	6.9
	2+	3	6.8	1	1.0	35	55.6	1	0.9	49	61.3	0	0.0
Medical assistant	0	21	47.7	78	78.8	13	20.6	80	69.6	22	27.5	66	65.3
	1	17	38.6	19	19.2	9	14.3	17	14.8	25	31.3	27	26.7
	2+	6	13.6	3	3.0	41	65.1	18	15.7	33	41.3	8	7.9
Secondary midwife	0	2	4.5	27	27.3	0	0.0	7	6.1	0	0.0	0	0.0
	1	5	11.4	27	27.3	1	1.6	23	20.0	0	0.0	3	3.0
	2+	37	84.1	45	45.5	62	98.4	85	73.9	80	100.0	98	97.0
Primary midwife	0	17	38.6	32	32.3	7	11.1	10	8.7	15	18.8	20	19.8
	1	16	36.4	36	36.4	10	15.9	30	26.1	14	17.5	35	34.7
	2+	11	25.0	31	31.3	46	73.0	75	65.2	51	63.8	46	45.5
Secondary nurse	0	39	88.6	94	94.9	1	1.6	10	8.7	0	0.0	2	2.0
	1	2	4.5	5	5.1	0	0.0	19	16.5	0	0.0	12	11.9
	2+	3	6.8	0	0.0	62	98.4	86	74.8	80	100.0	87	86.1
Primary nurse	0	43	97.7	94	94.9	3	4.8	18	15.7	7	8.8	28	27.7
	1	0	0.0	4	4.0	0	0.0	23	20.0	4	5.0	28	27.7
	2+	1	2.3	1	1.0	60	95.2	74	64.3	69	86.3	45	44.6

- There was only one facility with a paediatrician/neonatologist in 2009. Now there is now at least 1 paediatrician/neonatologist in 34 functional EmONC facilities and 24 non-functioning EmONC

facilities. Specialists in other areas have also increased. In 2009 over 80% of facilities had no obstetricians, general medical doctors or medical assistants. There has been a marked improvement in the distribution of these cadres. In 2020 more than 40% of all EmONC facilities have access to at least (one) obstetrician/gynaecologist, general medical doctor and/or medical assistant.

- In 2009, there were only 2 doctor anesthesiologists providing support to EmONC facilities and less than 5% of facilities had access to a nurse anaesthetist. In 2020, over half of all EmONC facilities have access to a doctor anesthesiologist and around 30% of EmONC facilities have nurse anaesthetists.

10.3 Around-the-clock availability of staff (availability, turnover and transfers)

Without staff, EmONC services are not delivered. All facilities surveyed were asked the same questions about 24-hour staff availability. The availability of staff, physically present 24 hours a day was an issue in 2009. With the introduction of staffing norms, regulations and ambitious targets like 2 midwives in every EmONC facility being met, 24 hour coverage of staff support EmONC has improved.

Table 10-2 also shows staff turnover and transfers in the past year. In 2020 staff turnover and transfers were almost negligible.

Table 10-2: Distribution of staff numbers and staff movements impacting on staff availability (2020)

	Hospitals (n=115)	Health Centres (n=66)
	Staff currently working in the facility	Staff currently working in the facility
Range	50-1061	8-15
Mean	89	12
Mode	50	7
	Staff leaving facilities in last 12-months	Staff leaving facilities in last 12-months
Range	0-1	0-1
Mean	0	0
Mode	0	0
	Staff posted to facilities in last 12-months	Staff posted to facilities in last 12-months
Range	0-9	0-1
Mean	1	0
Mode	1	0

It is difficult to interpret the exact coverage or availability of staff by facility. Table 10-2 and table10-3 show staff availability in hospitals and health centres is improving, based on the mean number of staff currently working in facilities, and the increase in the different cadres of staff available since 2009. Table 10-3 shows that since 2009, the availability of at least one staff, in different cadres of health workers available 24-hours a day, has increased substantially. In each facility surveyed, the person interviewed validated this was the case.

Table 10.3 shows the availability of at least one health staff, 24-hours a day, since the 2009 baselines assessment. Availability means physically present in the health facility, or staying in an "on-call room" within a health facility compound, or within walking distance of the health facility. There has also been an increase in 24 hour staff availability, particularly the availability of midwives and specialists. The increase, in both hospitals and health centres, has been significant.

Table 10-3: Availability of at least one health staff 24-hours a day for all facilities surveyed* (Progress since the 2009 EmONC assessment baseline)

Staff Category	Hospitals (n=77)		Health centres (n=66)		Hospitals (n=90)		Health centres (n=88)		Hospitals (n=115)		Health centres (n=66)	
	2009				2014				2020			
	No	%	No	%	No	%	No	%	No	%	No	%
Obstetrician/gynaecologist	3	3.9	0	0	9	14.3	1	0.9	91	79.1	4	6.1
Paediatrician/ neonatologist	1	1.3	0	0	5	7.9	5	4.3	80	69.6	0	0.0
General medical doctor	10	13	0	0	52	82.5	30	26.1	106	92.2	16	24.2
Anaesthesiologist doctor	1	1.3	0	0	7	11.1	0	0.0	28	24.3	0	0.0
Nurse anaesthetist	5	6.5	0	0	28	44.4	1	0.9	56	48.7	0	0.0
Medical assistant	3	3.9	0	0	39	61.9	11	9.6	61	53.0	6	9.1
Secondary midwife	47	61	24.2	7	61	96.8	78	67.8	114	99.1	62	93.9
Primary midwife	10	13	40.9	1.7	50	79.4	75	65.2	71	61.7	44	66.7
Secondary nurse	4	5.2	0.0	0	60	95.2	82	71.3	114	99.1	55	83.3
Primary nurse	1	1.3	1.5	0.4	55	87.3	79	68.7	84	73.0	45	68.2
Other	1	1.3	4.5	1.3	37	58.7	44	38.3	55	47.8	5	7.6

* Private facilities were not included in 2014 review

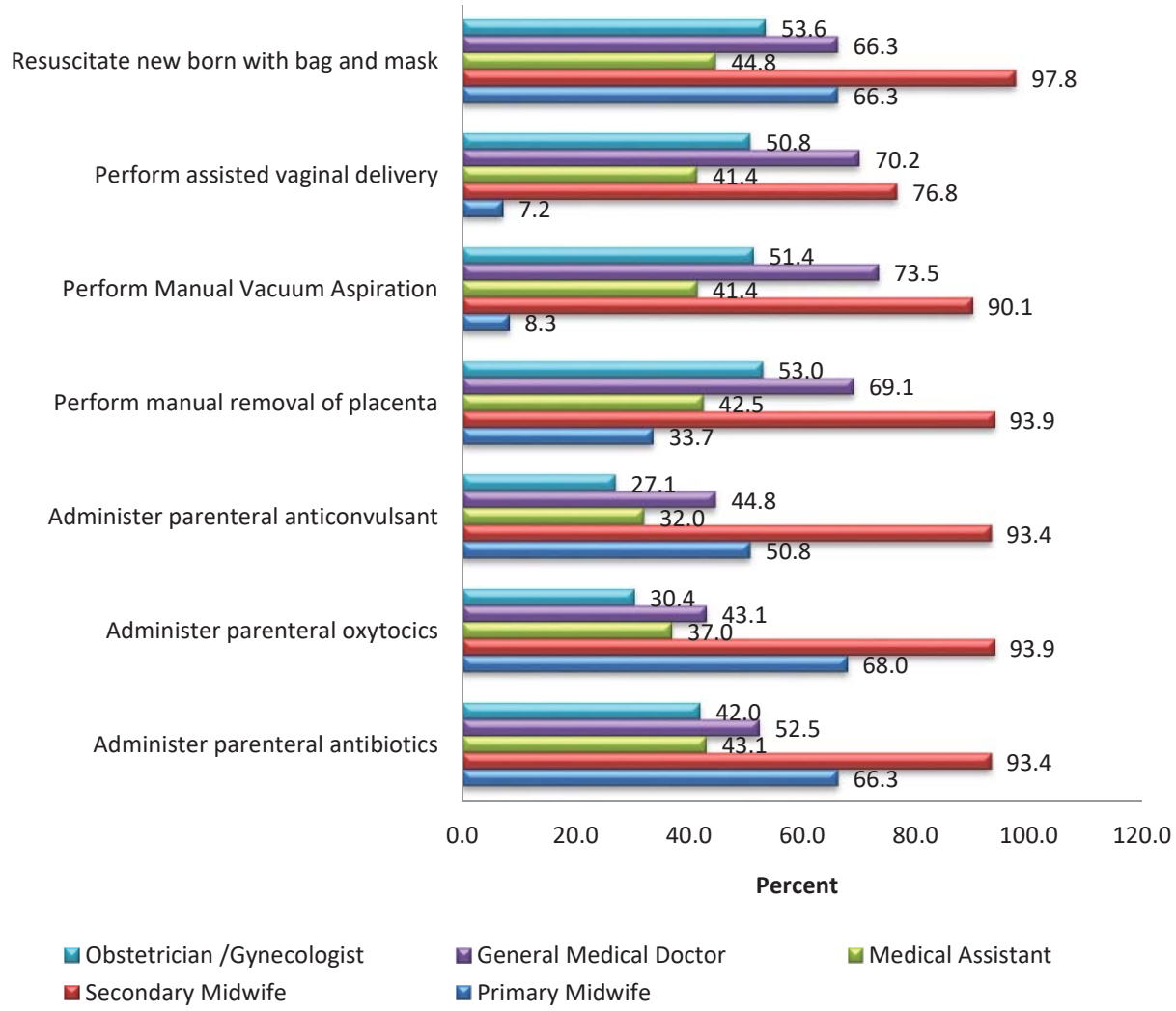
10.4 Health cadres performing vital signal functions

Who is the main provider of basic signal functions

Figure 10.5 shows which cadres perform the most basic signal functions in EmONC facilities. The performance of the 7 basic BEmONC signal functions, is linked closely to staff availability and competence. Staff members were asked if they were performing the signal functions as part of their work. In 2009, the main providers of basic signal functions were secondary midwives followed by primary midwives. They still are. Key findings are as follows:

- In more than 90% of EmONC facilities, signal functions are performed by a secondary midwife. The resuscitation of a baby with a bag and mask is the most frequently performed signal function. The least performed signal function is assisted vaginal delivery. (This seems contradictory)
- After secondary midwives, primary midwives perform the most signal functions in more than 50% of EmONC facilities, with the exception of assisted vaginal delivery.
- Medical assistants perform the least signal functions.
- General medical doctor, followed by obstructions/gynaecologist, perform the assisted vaginal delivery, manual evacuation in more than 70% of the EmONC facilities.
- In summary, most deliveries are performed by secondary midwives. Difficult deliveries, which required assisted vaginal delivery and manual vacuum aspiration, are performed by medical doctors and/or an obstetrician/gynaecologist.

Figure 10-5: Percent of signal functions performed by different health cadre in EmONC facilities 2020 EmONC Review (n=181)



Performance of signal functions by midwives

Basic signal functions were analysed, to determine which functions are performed the most by midwives in hospitals and health centres. Figures 10-6 and 10-7 show that, since 2009, there has been a marked increase in the number of EmONC signal functions performed by midwives. In 2009, secondary midwives performed more signal functions in hospitals, while primary midwives performed more functions in health centres. This is still the case for hospitals, but as the number of secondary midwives is increasing, the scenario is changing. Secondary midwives are performing more signal functions in health centres and hospitals.

The least performed signal functions by midwives, are assisted vaginal delivery and MVA. Overall more signal functions are performed in hospitals than health centres. This is possibly a reflection of women wanting to deliver in a hospital rather than a health centre. Difficult deliveries, which require assisted vaginal delivery and/or manual vacuum aspiration, are more likely to be performed by secondary midwives.

Figure 10-6: Percent of signal functions performed by midwives in hospitals (n=155)

(Progress since the 2009 EmONC assessment baseline)

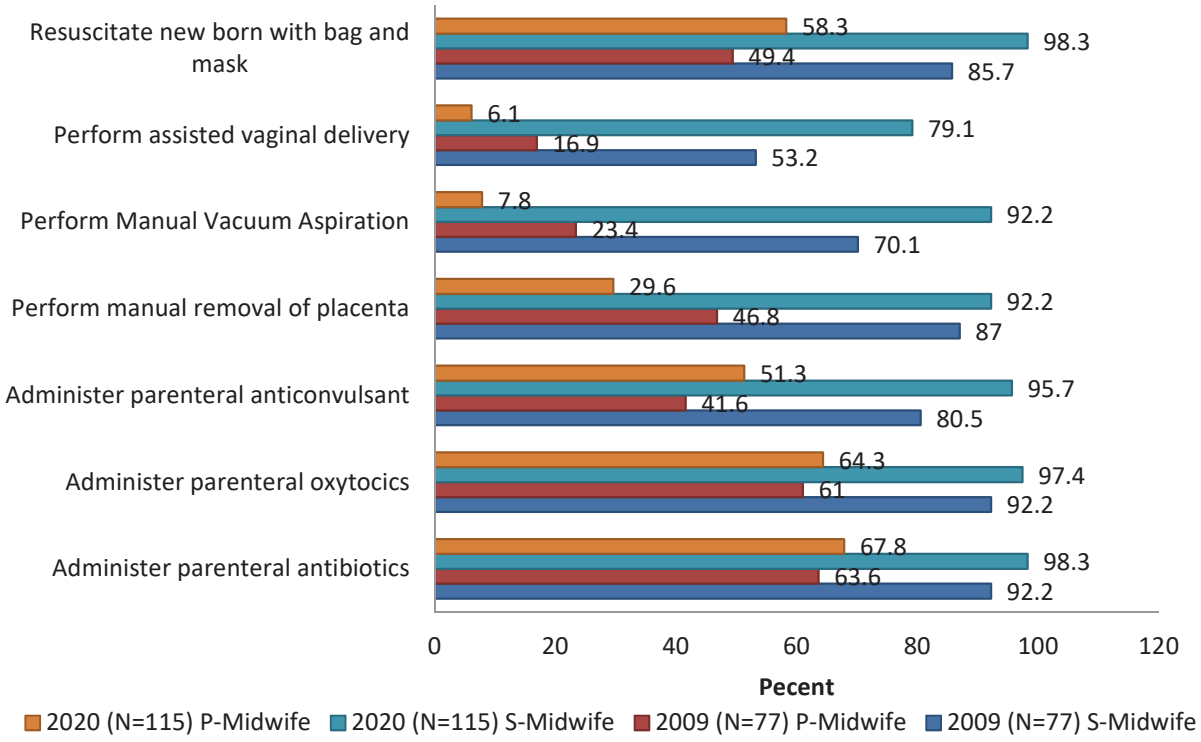
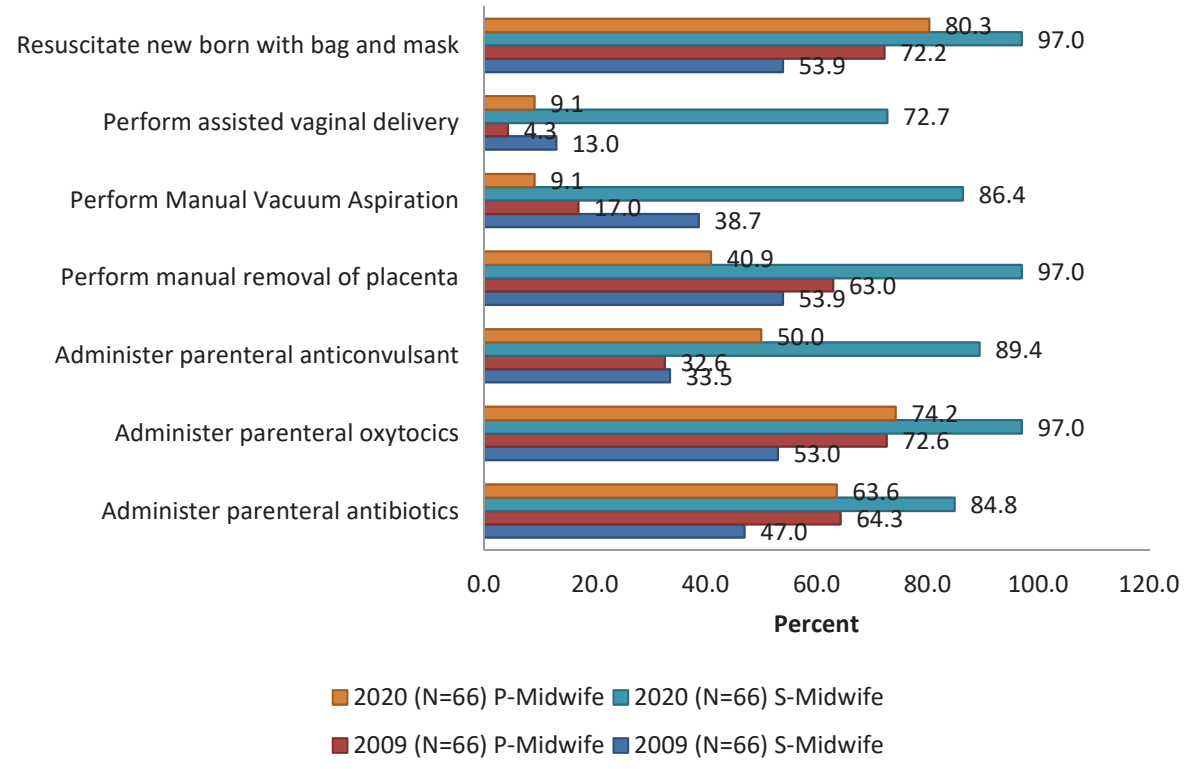


Figure 10-7: Percent of signal function performed by midwives in health centres (n=66)

(Progress since the 2009 EmONC assessment baseline)



10.5 Health cadres performing vital services for mothers and newborns

Figures 10-8 and 10-9 show that both secondary and primary midwives are performing normal deliveries. Secondary midwives perform more deliveries than primary midwives. The number of deliveries they both perform has increased since 2009. A similar situation exists for breech delivery, although the number of breech deliveries performed by secondary midwives has increased. Except for primary midwives in hospitals (86.4%), the use of partographs has also increased to almost 100%. For newborn care, a small number of midwives in both hospitals and health centres are performing these functions. Specialised newborn services, such as intubation and ventilation and administration of parenteral antibiotics, are hardly performed at all and need strengthening.

Figure 10-8: Percent of vital maternity services performed by midwives in hospitals (n=155)
(Progress since the 2009 EmONC assessment baseline)

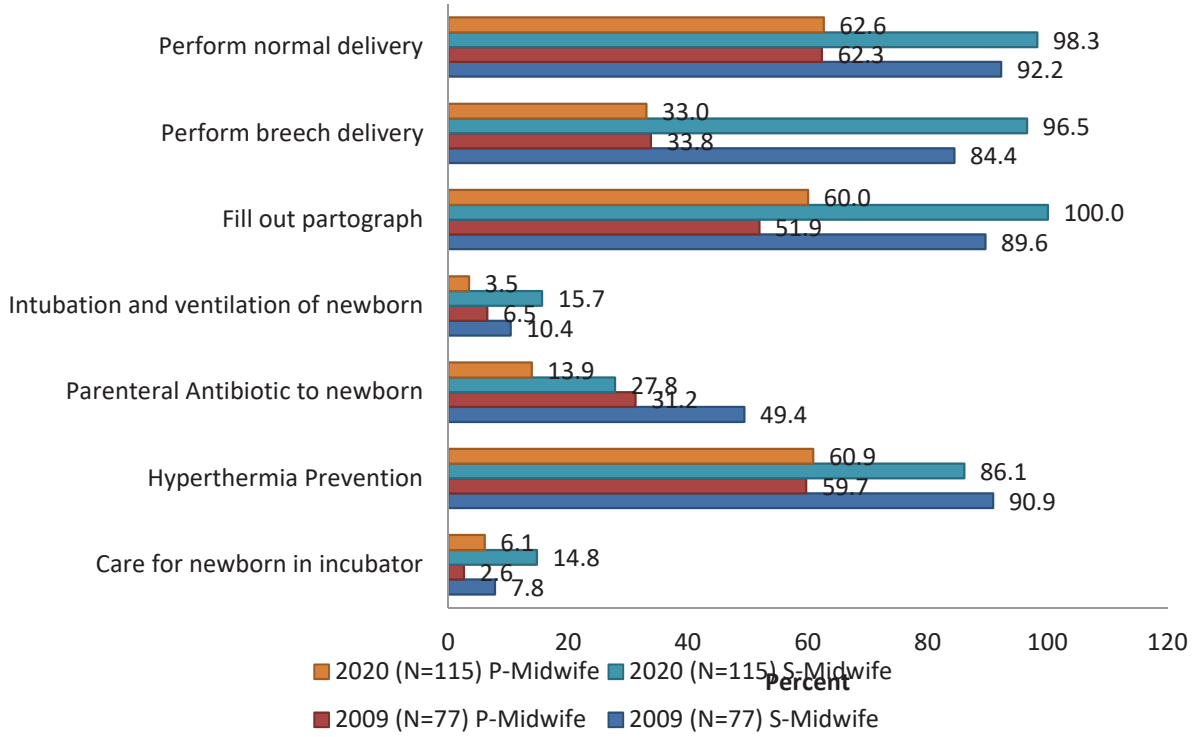
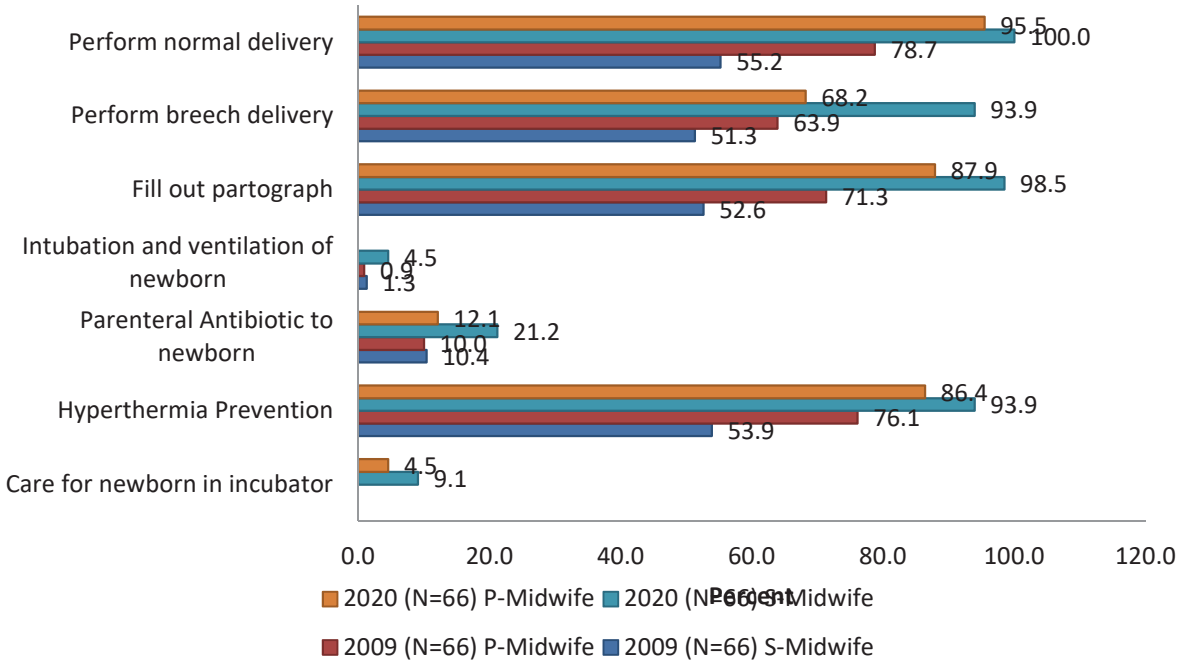


Figure 10-9: Percent of vital maternity services performed by midwives health centres (n=66)
(Progress since the 2009 EmONC assessment baseline)



10.6 Regulatory policy and practice on the frontline

Table 1- to 3 in annex 10 are a series of matrices that shows the signal functions different cadres of health workers are able perform within the Cambodia regulatory framework. This can be seen in all tables for EmONC facilities (hospitals and health centres). In these tables 'Yes' means that policy clearly supports the cadre to perform the signal function and 'No' indicates there is no policy to support the role. The tables provide an indication of the role and training of a particular health worker, and data has been collected to validate the signal functions performed by each cadre. Tables also provide information on knowledge and skills.

Tables 4, 6 and 6 in annex 10 are a series of matrices that shows the signal functions different cadres of health workers are able perform actually perform. The purpose of matrices were to enable a comparison between the regulated role of the health professional, training, current knowledge and whether they are performing the signal functions

An attempt was made to fill this gap (see table 7 and 8 in annex 10) however it was beyond the scope of the current review. A baseline training needs analysis, and a more rigorous reporting system, institutionalised into the MoH training system, would help address this issue.

10.7 Supervision, support and established links to the community

Respondents in all facilities surveyed were asked about the number of supervision visits, and reasons for those visits, over the last 12-months. As the EmONC Improvement Plan (2016-2020) supports the development of provincial EmONC plans through the PHD, respondents were also asked about the existence of such a plan.

Table 10-4 shows that just over 60% of the health facilities surveyed reported they had received a supervision in the last month. Around 30% of facilities reported a supervision visit had occurred in the last 3-months and 6 facilities reported a supervision visit in the last 12-months. Monthly supervision visits were frequent for health centres, while 3-12-monthly visits were more frequent for hospitals.

About 80% of facilities reported they had knowledge of an EmONC plan but only half of the facilities (50.5%) had seen it. It is not clear whether this was the overall arching EmONC Improvement Plan (2016-2022) or a plan that had been developed by the PHD.

Table 10-4: Percent of health facilities which received supervisory visits in last 12-months and availability of a provincial EmONC plan by facility type (2020)

Supervision and support responses	Hospitals (n=115)		Health Centres (n=66)		Total (n=181)	
	n	%	n	%	n	%
Last time received supervision						
Yes in the last month	59	51.3	54	81.8	113	62.4
Yes in the last 3-months	48	41.7	11	16.7	59	32.6
Yes in the last 12-months	5	4.3	1	1.5	6	3.3
Yes but more than 12-months ago	0	0.0	0	0.0	0	0.0
Type of support in last supervisory visit						
Checked records and/or reports	104	90.4	55	83.3	159	87.8
Observed work in the facility	101	87.8	56	84.8	157	86.7
Provided positive or negative feedback on performance	105	91.3	61	92.4	166	91.7
Provided update on administrative or technical issues related to work	107	93.0	60	90.9	167	92.3
Discuss problem the facility had encountered	102	88.7	59	89.4	161	89.0
Other	2	1.7	0	0.0	2	1.1
Knowledge of provincial EmONC Plan						
Yes, there is a provincial EmONC plan	92	80.0	51	77.3	143	79.0
Yes, it has been seen	61	53.0	31	47.0	92	50.8

10.8 Established links to the community

Table 10--5 shows that 81% of health centres and 19% of hospitals meet with communities on a regular basis. Most meet monthly. Communities are likely to be strongly interested in the performance of EmONC facilities and would be willing to engage and participate in EmONC activities which raise the profile of EmONC in the community. There is a need to capitalise on this opportunity. Activities under this output need attention. Community participation and engagement through the Health Centre Management Committee (HCMC) and Commune Councils (CCs), need to be strengthened.

Table 10-5: Percent of EmONC facilities which have established links with the community by facility type (2020)						
Supervision and support responses	**Hospitals (n=115)**		**Health Centres (n=66)**		**Total (n=181)**	
	n	**%**	**n**	**%**	**n**	**%**
Yes, the facility meets regularly with the community	22	19.1	54	81.8	76	42.0
If yes when last met						
Yes in the last month	11	9.6	40	60.6	51	28.2
Yes in the last 3-months	8	7.0	14	21.2	22	12.2
Yes in the last 12-months	1	0.9	0	0.0	1	0.6
Yes but more than 12-months ago	2	1.7	0	0.0	2	1.1

11. FINDINGS: KNOWELDGE, TRAINING AND EXPERIENCE

11.1 Knowledge assessment

The knowledge assessment involved a face-to-face interview with a provider of maternity services in each health facility visited. The criteria for selecting a service provider to interview were:

- The person who had delivered the greatest number of babiews in the past month
- Availability to be interviewed at the time of the visit

Table 11-1 shows total of 181 health services providers were interviewed. Most of the respondents were secondary midwives (91.2%) and most (7.7%) of the remainder of respondents were primary midwives. Thus, the findings in this section of the report relate mainly to midwives. Table 11-2 shows there was very little difference between primary and secondary midwives when the number of deliveries in a month (10) are compared.

Table 11-1: Number and percent of respondents by cadre who contributed to the knowledge section of this report
(Progress since the 2009 EmONC baseline assessment)

	2009		2014		2020	
Different Cadre	**No**	**%**	**No**	**%**	**No**	**%**
Obstetrician / Gynaecologist	1	0.3	0	0	0	0.0
General Medical Doctor	18	5.2	0	0	2	1.1
Medical Assistant	9	2.6	3	1.7	0	0.0
Secondary Midwife	168	48.4	129	72.5	165	91.2
Primary Midwife	139	40.1	41	23.0	14	7.7
Secondary Nurse	7	2.0	3	1.7	0	0.0
Other, specify	5	1.4	2	1.1	0	0.0
Total Respondents	**347**	**100.0**	**178**	**100.0**	**181**	**100.0**

Table 11-2 shows that midwife respondents to this section of the report had been employed in the facility for 10-17 years. They had qualified as a midwife 11-20 years ago and were attending 10 deliveries each month. Primary midwives were older, had been employed longer and had received their qualification around 20 years ago.

Table 11-2: Professional experience of respondents in all health facilities surveyed

		Primary Midwives	Secondary Midwives	Other	Total
Age	Mean	41	35	33	35
	Range	27-56	25-60	31-35	25-60
	Mode	32	30	N/A	30
Deliveries attended in month before the survey	Mean	10	10	10	10
	Range	1-30	2-50	6-15	1-50
	Mode	10	10	N/A	10
Years since receiving professional qualification	Mean	20	11	4	11
	Range	8-30	1-36	N/A	1-36
	Mode	30	7	4	7
Number of years at the facility	Mean	17	10	4	10
	Range	1-32	7	N/A	7
	Mode	9	0-35	4	0-35

Service providers were presented with different maternal and newborn scenarios, to assess their knowledge, competency and management skills to deliver maternity services. With the help of a checklist, open-ended questions were used to better understand a service provider's experience, knowledge, judgment and decision making skills. The interview covered tasks in four service areas:

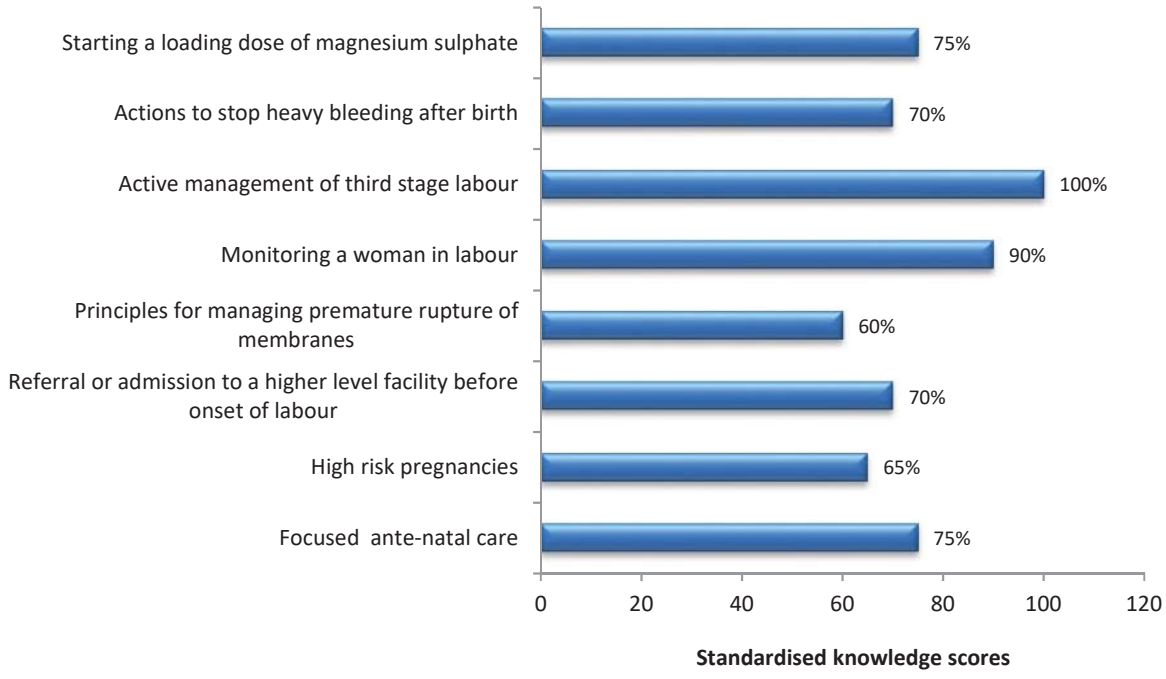
1. Pregnancy, labour and delivery care
2. Safe abortion and gender based violence
3. Immediate Newborn Care
4. Neonatal Resuscitation

Each area was further teased out into various questions and examples, to assess the strengths and weaknesses of service providers. The competency and management skills for each sub area were scored in terms of percentages, based on the number of correct answers to those specific questions. A summary of the findings is in this section of the document. More detailed data is in the annex 10.

Pregnancy, labour and delivery care

As there are only 14 primary and 165 secondary midwives, and the number of responses to some knowledge questions are small, data has been aggregated and standardised into a score out of 100%. Figure 11-1 summarises the results of the responses by midwives to 10 questions related to pregnancy, labour and delivery care. More detailed information on the questions and responses are in annex 10. There were two questions on which midwives scored over 90%. The questions relate to monitoring women in labour and AMSTL. Poorly answered questions relate to high risk pregnancies, referral and the onset of labour, management of pROM, stopping bleeding after birth and giving a loading dose of magnesium sulphate. These areas of knowledge scores less than 75% , will require further attention.

Figure 11-1: Standardised knowledge scores (%) for primary and secondary midwives (n=179) related to pregnancy, labour and delivery (2020 EmONC Review)



Safe abortion and gender based violence

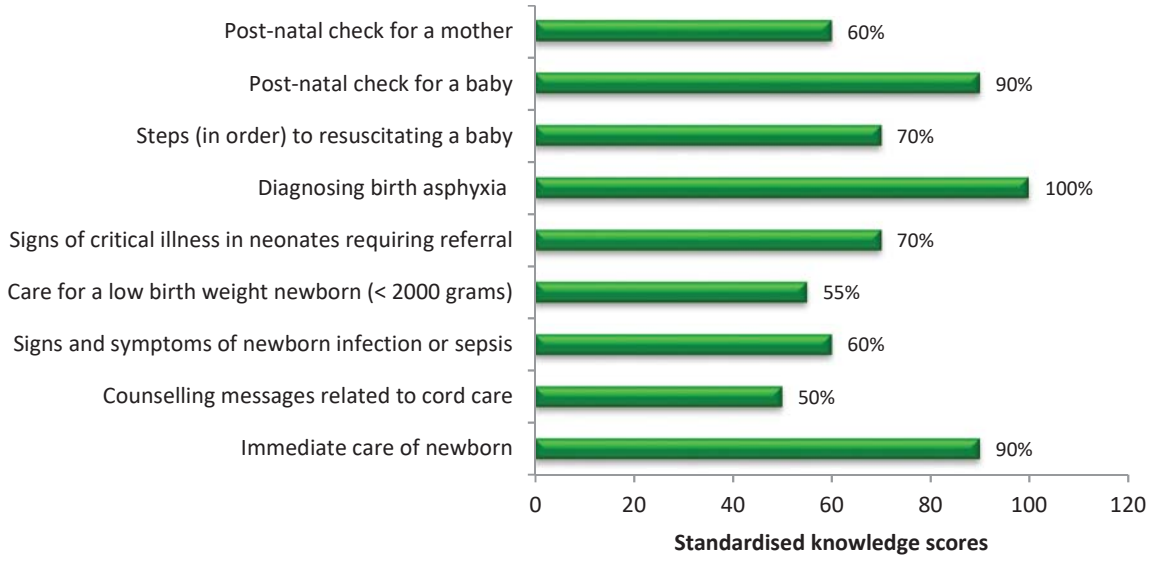
Figure 11-2 summarises the performance of midwives to four questions on safe abortion and gender based violence. More detailed information on responses are in annex 10. The assessment explored respondents' knowledge on how to identify, manage, and counsel women arriving at facilities with complications from unsafe abortions, and also how to manage victims of rape. Standardised scores for two questions which related to unsafe/incomplete abortion and sexual violence, were less than 65%. Two similar questions scored 80% but overall there is a knowledge deficit in this area.

Figure 11-2: Standardised knowledge scores (%) for primary and secondary midwives (n=179) related to safe abortion and gender-based violence (2020 EmONC Review)

Newborn care

Delivery involves care for the mother and the baby. Most newborn deaths occur during the first week of life, and particularly in the first 48 hours, which is also the period of highest risk for mothers. Figure 11-3 shows that primary and secondary midwives who answered the questions had a good knowledge of birth asphyxia, immediate newborn care and the post-natal check of a baby. Scores in these areas were between 90% and 100%. There was a deficit in knowledge, concerning: cord care (50%), care of the infected newborn (60.0%); care if low birth weight and pre-term babies (55.0%) and signs of critical illness in newborns requiring referral (70%). See annex 10 describes for more detail.

Figure 11-3: Standardised knowledge scores (%) for primary and secondary midwives (n=179) related to newborn care (2020 EmONC Review)



Neonatal resuscitation

Data collectors also assessed the knowledge of primary and secondary midwives in areas of newborn resuscitation and immediate newborn care, through a series of questions in a guided interview. Table 11-3 shows most (92-100%) primary and secondary midwives had received training in the resuscitation of a baby and immediate newborn care in 2020. This was an increase since 2014. The main mode of training was in-service (65.4%) followed by pre-service (22.9%) then a combination of both kinds of training (11.7%). The table also shows that over 85% of midwives reported having resuscitated a baby and provided immediate newborn care, in the last 2 years. Most (92%) midwives also reported they had resuscitated a baby in the last 2 years.

Table 11-3: Experience and training of health staff to resuscitate a baby and/or provide immediate newborn care (Comparing the difference between the 2014 and 2020 EmONC reviews)						
	2014			2020		
	Primary midwives (n=41)	Secondary midwives (n=129)	Total (n=170)	Primary midwives (n=14)	Secondary midwives (n=165)	Total (n=179)
	%	%	%	%	%	%
Training in resuscitation of a baby	97.6	90.7	92.7	100.0	100.0	100.0
Training in immediate newborn care	80.5	81.4	81.5	92.9	98.8	98.3
Training in newborn or immediate newborn care was provided as						
In-service training	52.5	63.3	61.3	64.3	65.5	65.4
Pre-service training	27.5	15.0	17.3	21.4	23.0	22.9
Both	20.0	21.7	21.4	14.3	11.5	11.7
Yes, have had training and mentoring in newborn resuscitation in last 12-months						
Resuscitated a baby and provided immediate newborn care	-	-	-	85.7	86.7	86.6
Yes have….						
Resuscitated of a baby and provided immediate newborn care	-	-	-	85.7	92.7	92.2

11.2 Training and experience

Primary and secondary midwives in hospitals and health centres were asked if they had been trained in 27 maternal, newborn and selected reproductive health interventions, which are complementary to EmONC. The interventions are targeted at strengthening Skill Birth Attendance (SBA). If a midwife had received training, they were asked if they had provided the related service for each intervention. Responses were similar for both midwives working in hospitals and health centres.

Figure 11-4 and 11-5 show that for over 90% of the interventions, midwives had received training and have implemented the intervention in the 3-months prior to the review. Interventions included: antenatal care, postnatal care, used a partograph, do active management of the third stage labour, do manual removal of the placenta, using IV fluids, administering MGSo4 for treatment of eclampsia, do bimanual uterine compression, suture an episiotomy, family planning /contraception counselling, provide essential newborn care and resuscitate the newborn with ambu bag.

There are about five interventions which needed strengthening in terms of training and experience (practice). These included suturing, cervical screening, haemoglobin for anaemia lacerations, performing D&Cs and adult resuscitation. Findings were similar to 2014, except the level of training and provision of services has increased marginally.

Figure 11-4: Percent of midwives with EmONC related training and experience supporting the role of a SBA in hospitals (n=113)

(2020 EmONC Review)

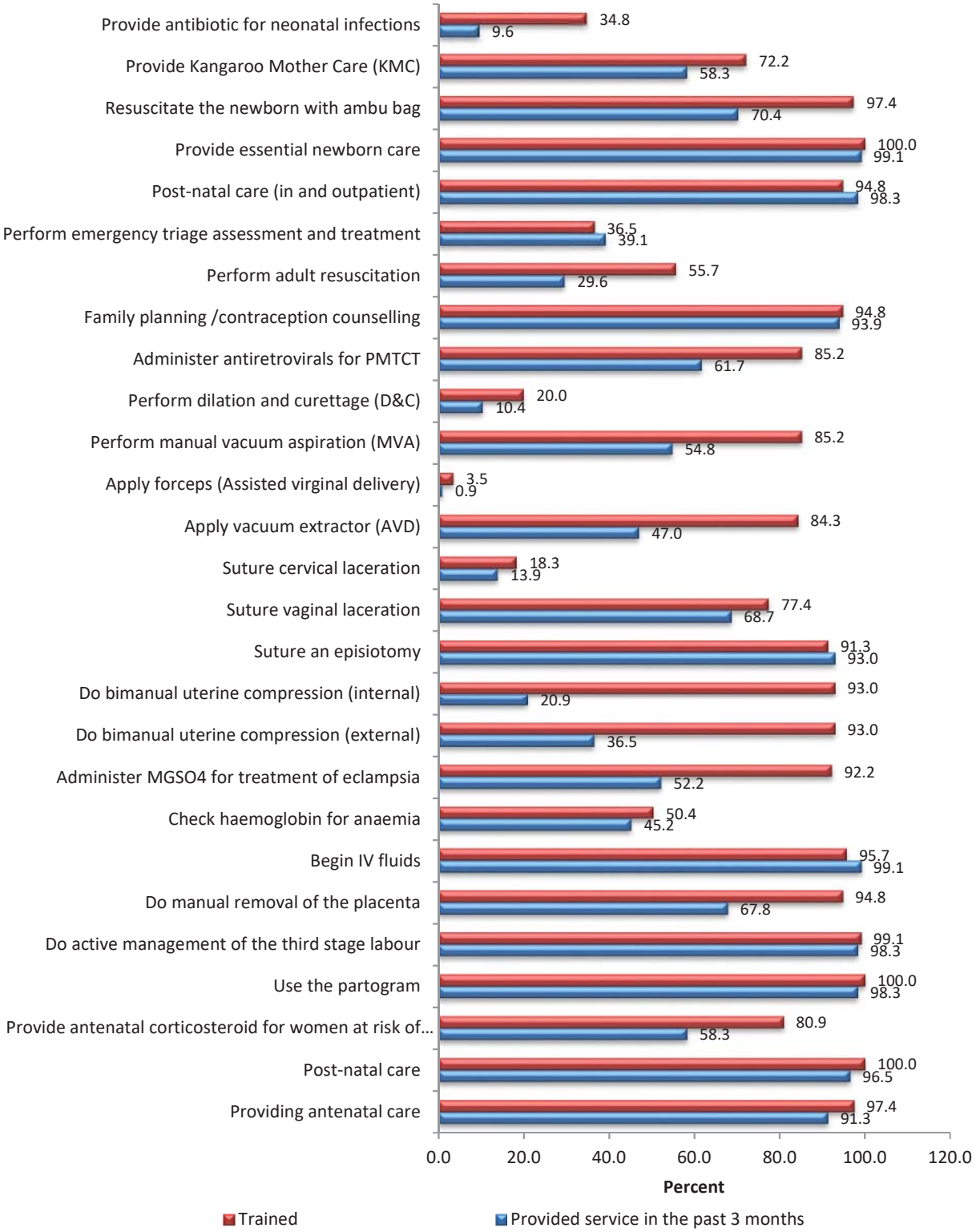
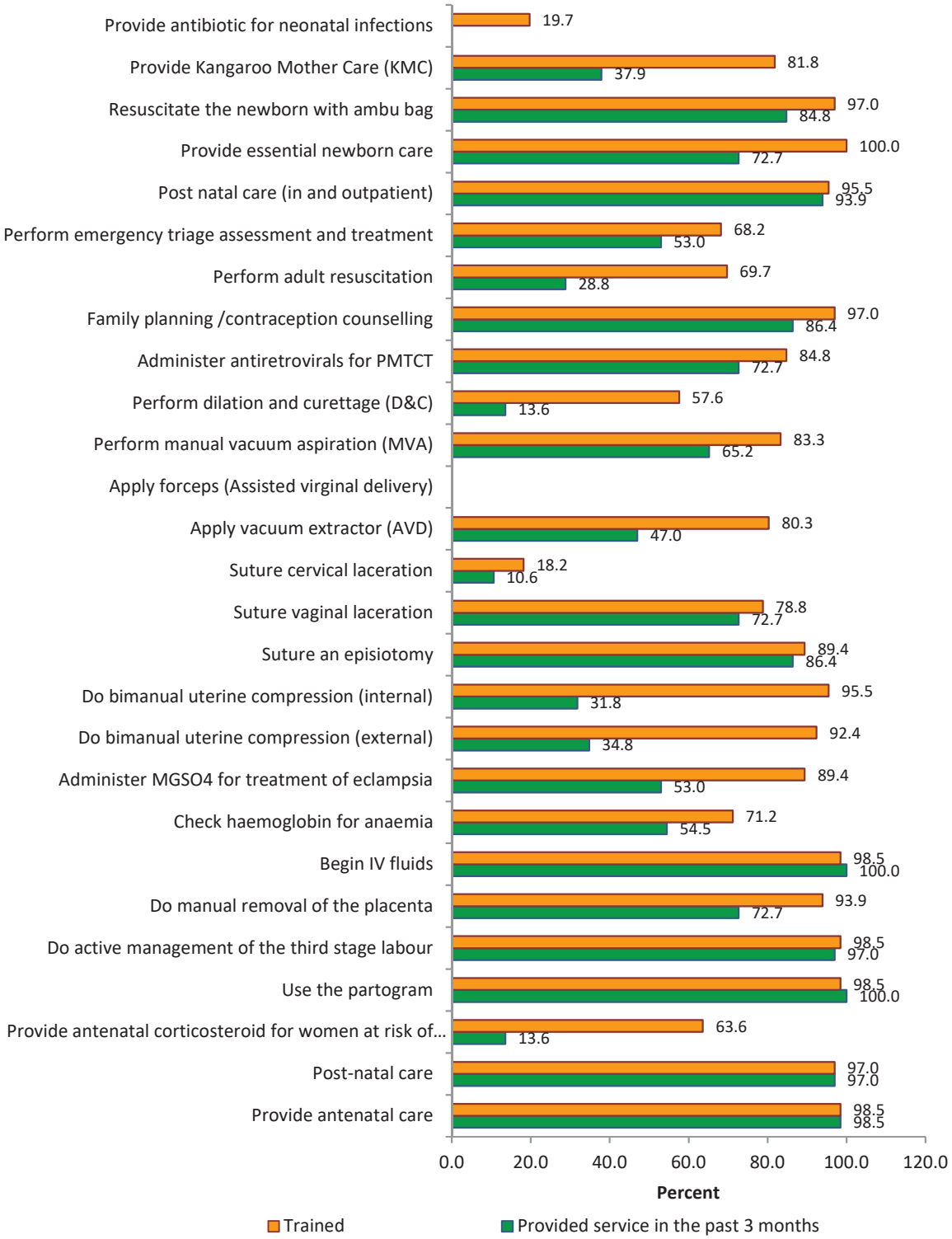


Figure 11-5: Percent of midwives with EmONC related training and experience supporting the role of a SBA in health centres (n=66)

(2020 EmONC Review)



Training for EmONC service providers

At each health facility visited, the manager was asked what EmONC training had been delivered to the staff, in the last 12-months. Figure 11-6 shows that, with the exception of training on the administration of magnesium sulphate, staff in hospitals received more EmONC training, than staff in

health centres. This is to be expected, as more specialised training for Drs, in areas such as anaesthesia, is hospital focused.

Figure 11-6: Percent of health facilities surveyed which have staff who received EmONC training over the last 12months (n=181)

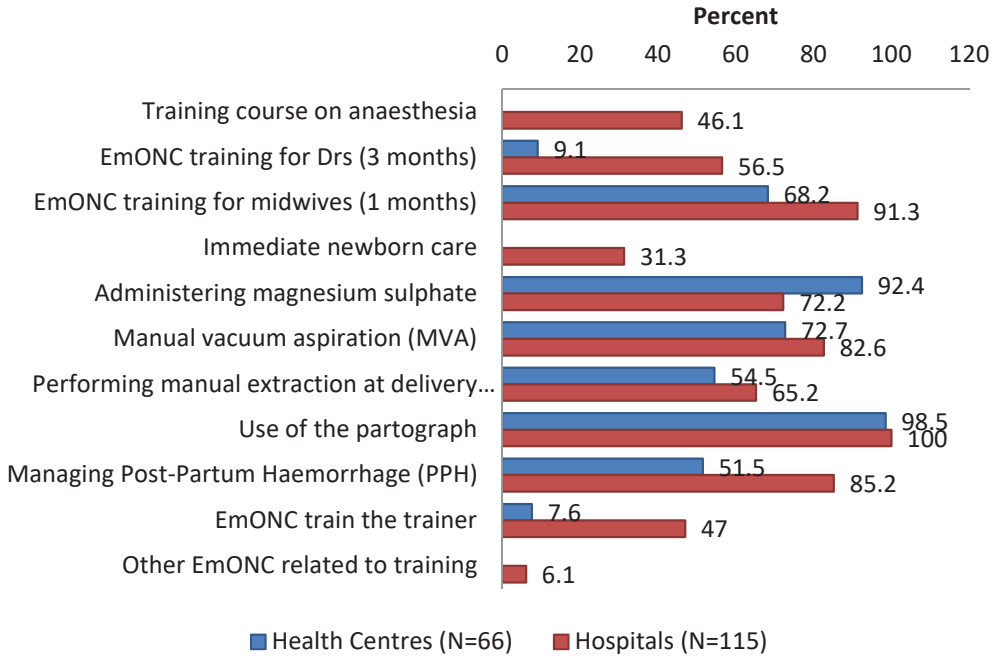
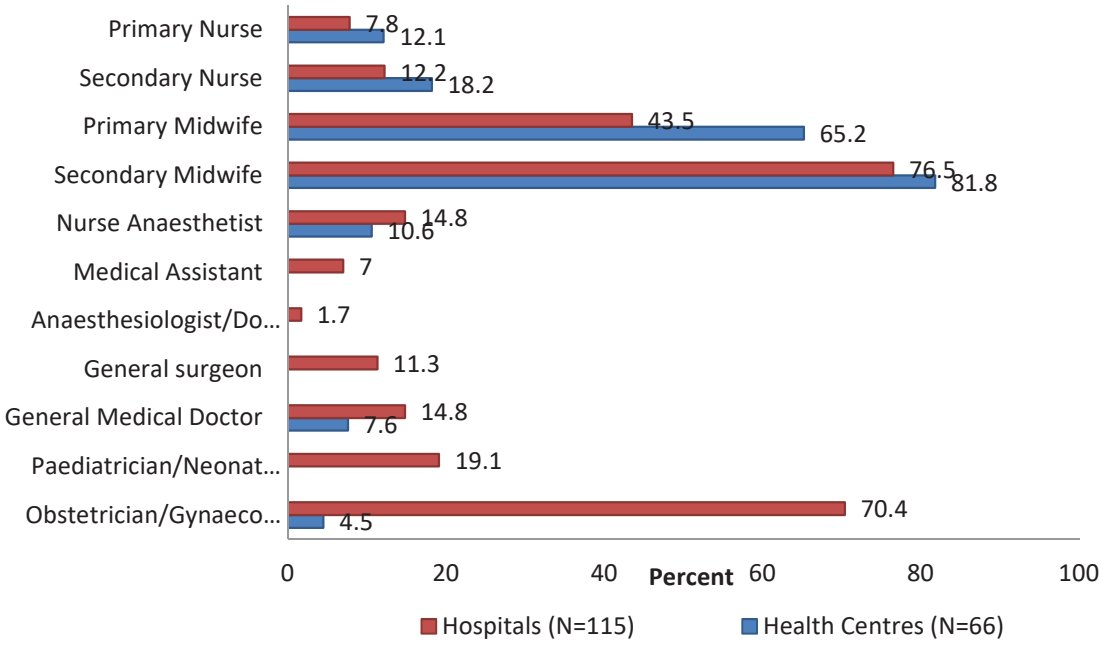


Figure 11-7 shows that the main beneficiaries of coaching and mentoring, have been primary and secondary midwives followed by obstetricians in and gynaecologists. Other cadres such as Paediatrician/Neonatologist, general medical doctors, general surgeons, medical assistants, doctor and nurse anaesthetists and nurse received minimal coaching and mentoring support.

Figure 11-7: Percent of health facilities surveyed that received EmONC coaching and mentoring support in the 12-months (2020)



11.3 Quality of Care

At the end of the interview, respondents were asked a general question about their perception on why they were not able to provide quality of care. Responses were similar for both hospitals and health centres. More than half of all respondents believed that lack of supplies and consumables, equipment and medications did not impact of quality of care. Less than 10% believed these factors impacted on quality of care. See table 11-6

Table 11-4: Health workers perceptions on why they are unable to provide quality of care by hospitals and health centres (Comparing the difference between the 2014 and 2020 EmONC reviews)

Reason for unable to provide care	2009				2014				2020			
	Hospitals (n=90)		Health centres (n=88)		Hospitals (n=113)		Health centres (n=99)		Hospitals (n=115)		Health centres (n=66)	
	No	%	No	%	No	%	No	%	No	%	No	%
Lack of supplies and consumables												
Frequently (several times weekly)	7	7.8	5	5.7	0	0	0	0	0	0.0	0	0.0
Seldom (several times monthly)	8	8.9	11	12.5	1	0.9	0	0	1	0.9	0	0.0
Rarely (several times yearly)	20	22.2	23	26.1	9	8	4	4	9	7.8	3	4.5
Never	55	61.1	49	55.7	103	91.2	95	96	105	91.3	63	95.5
Lack of equipment												
Frequently (several times weekly)	6	6.7	7	8	0	0	0	0	0	0.0	0	0.0
Seldom (several times monthly)	5	5.6	1	1.1	3	2.7	1	1	3	2.6	1	1.5
Rarely (several times yearly)	20	22.2	22	25	16	14.2	5	5.1	16	13.9	3	4.5
Never	59	65.6	58	65.9	94	83.2	93	93.9	96	83.5	62	93.9
Lack of drugs and medications												
Frequently (several times weekly)	6	6.7	5	5.7	0	0	0	0	0	0.0	0	0.0
Seldom (several times monthly)	11	12.2	7	8	2	1.8	1	1	2	1.7	1	1.5
Rarely (several times yearly)	26	28.9	31	35.2	17	15	7	7.1	17	14.8	3	4.5
Never	47	52.2	45	51.1	94	83.2	91	91.9	96	83.5	62	93.9

12. FINDINGS: PARTOGRAPH CASE REVIEWS

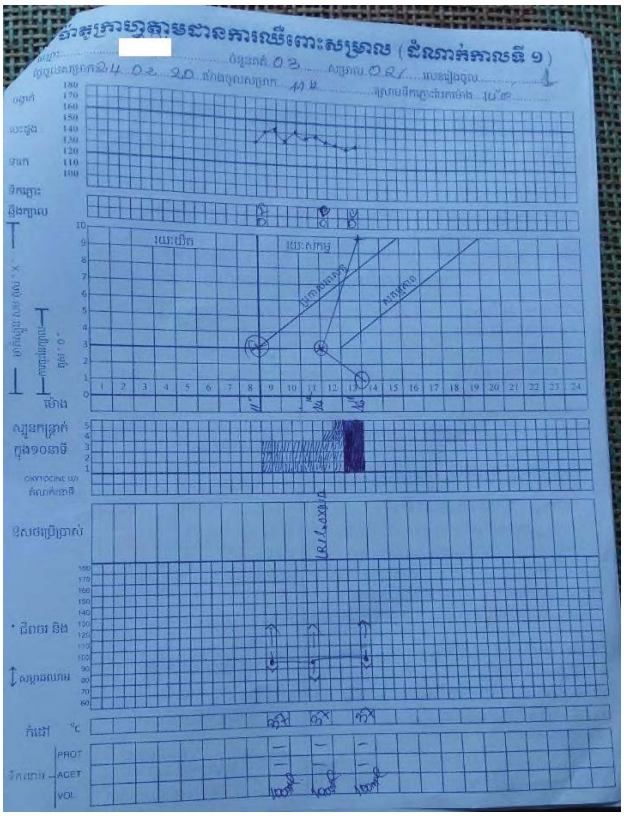
12.1 Partograph review

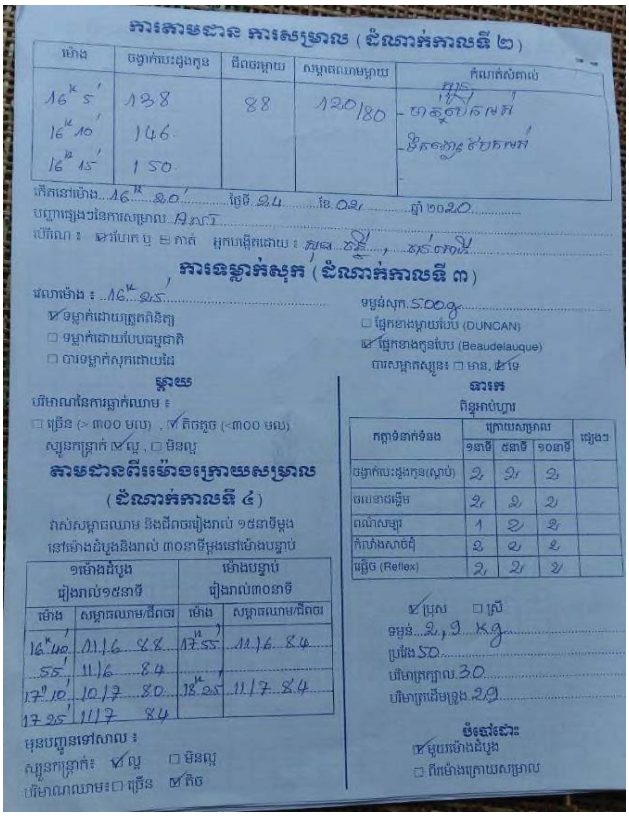
The partograph is an essential tool used for monitoring the progress of labour. When correctly used, the partograph provides a pictorial overview of the progress of labour. It helps early identification of maternal and foetal complications and facilitates the safe management of the labour as it progresses. The tool records key measurements during labour: i.e. blood pressure, temperature, pulse, uterine contractions, cervical dilatation, foetal heart rate, descent of head; and state of membranes and colour of liquor at regular and recommended intervals according to standards.

For assessment purposes at least two of the most recent partograph cases were reviewed at each facility visited. The purpose of the case review was to assess the quality of partograph completion and labour management at the health facilities.

Data collectors were instructed to complete at least two recent partographs, filled in by different providers from each health facility. Partographs had to belong to a woman who was: less than 8cm dilated at the first exam, was a vertex presentation, foetal heart rate was present at the first exam and no complications were to be apparent at the first exam. As the partograph used in Cambodia was a WHO composite partograph, data collectors were also instructed to select only partographs that start with an active phase of labour. Figure 12-1 shows a sample of a partograph used for each case review.

Figure 12-1: Sample partograph used for all case reviews





12.2 Use of partograph

Since 1990, WHO has published 3 different types of partograph; one of these, the 'composite partograph,' has been adapted for use by the Cambodian Ministry of Health to the local context. The composite partograph has been tested successfully with over 35,000 women in South East Asia[36]. It includes a latent phase of 8 hours and an active phase starting at 3 cm cervical dilatation. It has an alert line with a slope of 1 cm per hour which commences at 3 cm dilatation and the action line is 4 hours to the right of, and parallel to, the alert line. It also provides space for recording descent of the foetal head, indicators of maternal and foetal well-being and medications administered. See figure 12-1.

Table 12-1 shows that partograph cases were reviewed from 181 EmONC facilities across Cambodia. All facilities reported using the partograph (100%). Only 161 facilities were using labour management protocols. Twenty (20) health facilities had no labour management protocol in use.

Table 12-1: Percent of EmONC facilities using partographs reviewed by type of facility (Comparison between the 2014 and 2020 reviews)

	2014						2020					
	Hospitals		Health centres		All facilities		Hospitals		Health centres		All facilities	
	n	%	n	%	n	%	n	%	n	%	n	%
Used partograph	90	100	87	98.9	177	99.4	115	100.0	66	100.0	181	100.0
Labour management protocol in use	78	86.7	77	87.5	155	87.1	105	91.3	61	92.4	166	91.7

12.3 Referred Cases

Table 12-2 below shows that there were nine (9) cases being monitored using a partograph, referred into hospitals. When admitted to the hospital two (2) partographs were on the left of the alert line, one (1) was on the right of the alert line and nine could not be determined. All cases linked to referral have been analysed.

Table 12-2: Referral of women and the use of the partograph

Question related to referral	Women with partographs in hospitals		Women with partographs in health centres		All facilities	
	n= 230	%	n= 162	%	n= 362	%
Number and % of women referred from another facility requiring a partograph	9	3.9	0	0.0	9	2.5
For referrals into health facilities was the partograph						
• On the left of the alert line	2	0.9	-	-	2	0.6
• Between the alert and actions line	0	0.0	-	-	0	0.0
• On or to the right of the alert line	1	0.4	-	-	1	0.3
• Could not be determined	6	2.6	-	-	6	1.7

12.4 Quality of partograph completion

36 World Health Organisation. World Health Organisation partograph in the management of labour. Lancet 1994; 343: 1399-1404.

1. Availability of partographs for assessment and number of hours in delivery

In the 181 facilities reviewed, 362 partographs were identified as case studies – all facilities had 2 partograph cases that met the selection criteria. No case was excluded. Feedback from data collectors indicated that the recording on the partographs was poor, and it was difficult to find cases that fitted the criteria.

Table 12-3 shows that in total, 362 partograph case studies were undertaken: 230 in 115 hospitals and 132 in 66 health centres. The table also shows that more than half of all deliveries took place within 5 hours of birth. This was similar for hospital and health centre, with health centres undertaking 5% more deliveries, which overall took more time than in hospitals. This suggests that there are slightly more deliveries in health centres and labour is more prolonged when compared with hospitals.

Table 12-3: Distribution partographs according to hours between first exam and delivery by type of facility

Hours between First exam and delivery	Women with partographs in hospitals		Women with partographs in health centres		All facilities	
	N	%	n	%	n	%
0-2	56	24.3	22	16.7	78	21.5
3-5	124	53.9	76	57.6	200	55.2
6-8	49	21.3	32	24.2	81	22.4
9+	1	0.4	2	1.5	3	0.8
No information	0	0.0	0	0.0	0	0.0
Total	**230**	**100.0**	**132**	**100.0**	**362**	**100.0**

2. Frequency of recordings during labour

Tables 12-4 demonstrates how important standards are, for recording observations during labour, in order to manage labour well. Foetal heart rate, temperature, blood pressure, pulse, contractions, cervical dilatation and descent of head and state of the membranes and colour of the liquor were all analysed by the number of hours women were in labour. Each question was phrased similarly, for example, "*How many times was the woman's temperature checked and recorded between admission and delivery?*"

Temperature: A woman's temperature should be recorded at least every 2 hours. Out of the 362 cases surveyed, 330 (91.2%) of all partographs cases recorded maternal temperature second hourly. Most cases (181) had their temperature taken within 5 hours of birth. There were 32 cases where the temperature was not recorded at all.

Blood pressure: Partograph instructions recommend that maternal blood pressure be taken every 4 hours. The MoH training unit requires temperature to be taken every 2 hours. Out of the 362 women surveyed, 326 (90.1%) of all partographs cases recorded maternal blood pressure every 4 hours. If the training unit 2 hour standard is applied, then 312 (86.2.1%) of the cases had 2nd hourly blood pressure recorded. There were 36 cases where the blood pressure was not taken at all.

Table 12-4: Number and percent of partograph reviewed according to whether key measurements were taken and recorded as appropriate, by time between first exam and delivery (Cambodia EmONC review 2020)										
Times measurements taken	Hours between First Exam and Delivery									
	0-2		3-5		6-8		9+		Total	
	n=80	(%)	n=198	(%)	n=81	(%)	n=3	(%)	n=362	(%)
Temperature observed at least every 2 hours										
Yes	70	87.5	188	94.9	70	86.4	2	66.7	330	91.2
No	8	10.0	12	6.1	11	13.6	1	33.3	32	8.8
Blood pressure observed at least every 4 hours										
Yes	70	87.5	176	88.9	77	95.1	3	100.0	326	90.1
No	8	10.0	24	12.1	4	4.9	0	0.0	36	9.9
Blood pressure observed at least every 2hours										
Yes	70	87.5	175	88.4	65	80.2	2	66.7	312	86.2
No	8	10.0	25	12.6	16	19.8	1	33.3	50	13.8
Maternal pulse observed at least every 30 minutes										
Yes	22	27.5	30	15.2	47	58.0	0	0.0	99	27.3
No	56	70.0	170	85.9	34	42.0	3	100.0	263	72.7
Maternal pulse observed at least every 2 hours										
Yes	62	77.5	185	93.4	75	92.6	1	33.3	323	89.2
No	16	20.0	15	7.6	6	7.4	2	66.7	39	10.8
Foetal heart observed taken at the admission										
Yes	77	96.3	198	100.0	79	97.5	3	100.0	357	98.6
No	1	1.3	2	1.0	2	2.5	0	0.0	5	1.4
Foetal pulse observed at least every 30 minutes										
Yes	73	91.3	191	96.5	77	95.1	3	100.0	344	95.0
No	5	6.3	9	4.5	4	4.9	0	0.0	18	5.0
Moulding assessed at least every 4 hours										
Yes	68	85.0	187	94.4	75	92.6	3	100.0	333	92.0
No	10	12.5	13	6.6	6	7.4	0	0.0	29	8.0
Contractions assessed at least every 30 minutes										
Yes	77	96.3	195	98.5	80	98.8	3	100.0	355	98.1
No	1	1.3	5	2.5	1	1.2	0	0.0	7	1.9
Vaginal exams at least once every 4 hours										
Yes	73	91.3	198	100.0	76	93.8	3	100.0	350	96.7
No	5	6.3	2	1.0	5	6.2	0	0.0	12	3.3
Descent checked and recorded at least once every 4 hours										
Yes	70	87.5	194	98.0	77	95.1	3	100.0	344	95.0
No	8	10.0	6	3.0	4	4.9	0	0.0	18	5.0
State of the membranes or colour of the liquor recorded										
Yes	74	92.5	190	96.0	77	95.1	3	100.0	344	95.0
No	4	5.0	10	5.1	4	4.9	0	0.0	18	5.0

Maternal pulse: *Global standards are that* maternal pulse should be recorded every 30 minutes. Feedback from the Cambodia training unit is that in Cambodia maternal pulse is taken every four hours. As a raised pulse is indicative of bleeding Cambodia should consider recording maternal pulse 2nd hourly as per global standards. Out of the 362 women surveyed, 99 cases (27.3% of all cases) had their pulse taken every 30 minutes. If the training unit 4 hourly standard is applied, then 323 (89.2%) of the cases had 2nd hourly pulse recorded. Most cases (185) had their pulse taken every 3-5 hours. There were 39 cases where maternal pulse was not taken at least 2nd hourly.

Foetal heart rate: The foetal heart rate should be recorded on admission and every half hour. Out of the 362 women surveyed, 357 (98.6%) of cases had a foetal heart rate taken on admission and 344 cases (95%) recorded every 30 minutes. There were 23 cases where foetal heart rate was not taken at all (on admission and every 30 minutes).

Moulding of the head: Moulding of the foetal head should be assessed every 4 hours. Out of the 362 cases surveyed, 333 (92.0%) of all partographs cases recorded moulding of the head every four hours. Most cases (181) had their temperature taken within 5 hours of birth. There were 29 cases were the moulding of the foetal head was not assessed.

Contractions: Contractions should be charted every 30 minutes. Out of the 362 cases surveyed, 355 cases (98.11 %) had their contractions monitored during their labour. This continued over the duration of the labour. Contractions, together with dilatation of the cervix and the descent of the head, are critical to assessing progress of labour and detecting any deviation from normal, to prevent prolonged/obstructed labour. There were 7 cases where contractions were not recorded at all.

Vaginal examinations descent of the head and cervical dilatation: The recommendation is that vaginal examinations, descent of the head and vaginal dilatation should be assessed at least once every 4 hours during the first stage of labour. Of the 362 women reviewed, around 95% of cases reviewed met the standard for vaginal head examinations and monitoring of descent of the head and cervical dilation every 4 hours. There were 30 cases where no vaginal examination and/or assessment of the descent of the head and cervical dilation was undertaken.

The state of the membranes or colour of the liquor recorded: Of the 362 cases reviewed, around 334 (95%) of all partograph cases recorded the state of the membranes or colour of the liquor. There were 18 cases where no relevant observations were recorded at all.

Table 12-5 shows that, of the 362 partograph cases reviewed, 98.1% delivered on or left of the alert line. There were 7 cases that delivered between the alert and action lines, which is the referral or transfer zone, and no cases delivered beyond the action line. It is noteworthy there is little difference in recording between health centres and hospitals.

Among women who were augmented, 1 case used augmentation on alert line, 3 used it between alert and action lines and there were no cases using augmentation beyond the action line. Augmentation is not recommended in health centres and can be dangerous, unless there is a back-up for caesarean.

It is concerning that in 2014 there were 233 cases in health centres that used augmentation. A review of this situation suggested that there was a misunderstanding on how augmentation should be reported. It would seem the problem has been resolved. the reporting on partographs

Table 12-5: Partograph assessment by progress of labour and augmentation by type of facility

	Women with partographs in Hospitals (n=230)		Women with partographs in Health Centres (n=132)		Women with partographs in all facilities (n=362)	
	n	(%)	n	(%)	n	(%)
First dilatation charted correctly on alert line	230	100.0	132	100.0	362	100.0
Among those charted correctly, delivered						
On or left of alert line	226	98.3	129	97.7	355	98.1
Between alert and action line	4	1.7	3	2.3	7	1.9
On or beyond action line	0	0.0	0	0.0	0	0.0
Used augmentation	3	1.3	1	0.8	4	1.1
Among those who used augmentation						
used on alert line	0	0.0	1	0.8	1	0.3
used between alert and action lines	3	1.3	0	0.0	3	0.8
used on or beyond action line	0	0.0	0	0.0	0	0.0

Table 12-6 shows the type of delivery and outcome, by the progress of labour on the partograph. Of the 362 cases, 346 (95.6% %) were a spontaneous vertex delivery (SVD), and 98.6.1% of these cases (357) delivered during normal active phase (on or left of alert line). Only two (2) caesarean sections were undertaken among these cases. There were no stillbirths reported. Five live births were reported to be distressed but were resuscitated successfully.

Table 12-6: Partograph by progress of labour, delivery type and foetal outcome Distribution in all facilities								
Components of management	According to the partograph, the woman delivered						Total	
	During normal active phase (on or left of alert line) (n=473)		Between alert and action line (n=24)		On or beyond action line (n=7)			
	n	%	n	%	n	%	n	%
Total cases	355	98.1	7	1.9	0	0	362	100.0
Delivery type[1]								
SVD	340	95.8	6	85.7			346	95.6
vacuum extraction	13	3.7	1	14.3			14	3.9
caesarean	2	0.6	0	0.0			2	0.6
other	0	0.0	0	0.0			0	0.0
no information	0	0.0	0	0.0			0	0.0
Outcome for the baby[2]								
live births	351	98.9	6	85.7			357	98.6
live birth with distress	4	1.1	1	14.3			5	1.4
stillbirth	0	0.0	0	0.0			0	0.0

1. Partographs with no information on delivery type are not shown
2. Partographs with no information about outcome of the baby are not shown

Table 12.7 shows that Apgar scores for newborns were recorded for most (98.3%) of cases. There were 6 cases where no Apgar case was recorded.

Table 12-7: Outcome of delivery in terms of baby Apgar scores for cases where a partograph was used (2020 EmONC review)						
	Hospitals		Health Centres		All Cased	
	n= 230	%	n= 132	%	n= 362	%
Apgar scores of newborns recorded						
Yes	227	98.7	129	97.7	356	98.3
No	3	1.3	3	2.3	6	1.7

In summary, 362 partograph case studies were undertaken in 181 EmONC facilities: 260 reviews were undertaken in hospitals and 204 in health centres. Overall the quality of recording is bordering on unacceptable. There is a concern about the number of partographs that were incomplete, and the quality of the reporting. There were selected partographs where observations were not reported at all.

13. FINDINGS: RATANAK KIRI AND MONDUL KIRI PROVINCES

This section is dedicated to Ratanak Kiri and Mondul Kiri Provinces. These two provinces in the North East of Cambodia are more remote. KOICA is undertaking an MCH project in these two provinces and require a baseline to inform implementation of EmONC. So, 37 facilities were assessed to determine their EmONC status.

13.1 Background to this section

Vulnerable groups of poor women from remote villages and ethnic communities face additional barriers when accessing EmONC. Two provinces (Ratanak Kiri and Mondul Kiri) in the northeast of Cambodia face such challenges. The percentage of women delivering in health facilities with a skilled birth attendant was 51.2% in Ratanak Kiri/Mondul Kiria while the national average was 83.20%[37].

There are important interrelated issues which influence women's use of health services. These are: affordability, acceptability, geographic accessibility and availability[38] related to lack of autonomy, poverty, poor education and information, financial and sociocultural barriers[39,40]. These challenges disproportionately affect poor women, resulting in lower utilisation of EmONC services. In Cambodia, the issue of accessibility to affordable transportation, long distance and socio-economic constraints often make it prohibitive for poor women to access EmONC and other reproductive services[41].

In recent years, substantial resources have gone into Ratanak Kiri and Mondul Kiri provinces to support improvements in MCH. The government has a policy in place, which provides an incentive payment to pregnant women. These women can receive around 200 USD during their pregnancy until their child reaches the age of two years; this depends on their delivery in a hospital and regular ANC and PNC attendance.

Approach and methodology

The approach and methodology builds the 2020 review of the EmONC Improvement Plan (2016-2020). It makes use of the same tool but uses a different sampling method. Eight (8) of the health facilities surveyed from the two provinces are also included in the 181 facilities that being reviewed across Cambodia. These eight facilities,[42] that are included in the review of the EmONC network, are also included in a separate census of 37 health facilities with the potential to provide EmONC in Ratanak Kiri and Mondul Kiri provinces.

37 Cambodia Demographic and Health Survey (CDHS), 2014 (New data will be available in November 2020)

38 Jacobs, B, Men, C, Sam, OS & Postma, S 2015, 'Ambulance services as part of the district health system in low-income countries: a feasibility study from Cambodia', The International journal of health planning and management, DOI: 10.1002/hpm.2285.

39 Ibid

40 Vidler, M, Ramadurg, U, Charantimath, U, Katageri, G, Karadiguddi, C, Sawchuck, D, Qureshi, R, Dharamsi, S, Joshi, A & Von Dadelszen, P 2016, 'Utilization of maternal health care services and their determinants in Karnataka State, India', Reproductive Health, vol. 13, no. 1, p. 37, DOI: 10.1186/s12978-016-0138-8

41 Matsuoka, S, Aiga, H, Rasmey, LC, Rathavy, T & Okitsu, A (2010), 'Perceived barriers to utilization of maternal health services in rural Cambodia', Health policy, vol. 95, no. 2, pp. 255-63, http://dx.doi.org/10.1016/j.healthpol.2009.12.011

42 In total 37 facilities were assessed in Ratanak Kiri and Mundul Kiri provinces. Eight (8) facilities (2 Hospitals in Ratanak Kiri, 2 hospitals in Mundul Kiri, 2 health centres in Ratanak Kiri and 2 health centres in Mundul Kiri) are included in the 181 facilities as either EmONC facilities and /or designated facilities for upgrade to EmONC status.

As a different sampling method was used to the review of the EmONC Improvement Plan (2016-2020) the eight facilities in that review can be compared to the rest of Cambodia. However the 37 facilities that were surveyed in Ratanak Kiri and Mondul Kiri provinces, to develop an EmONC baseline, are not comparable to the rest of Cambodia. See table 13-1 for facilities surveyed.

Table 13-1: Number of facilities surveyed in current review

Health facilities*	2020 Review of EmONC Improvement Plan		
	Mundul Kiri	Ratanak Kiri	Total reviewed
Total referral hospitals	2	2	4
Total health centres	9	24	33
Total facilities	11	26	37

* Facilities capable of providing maternity services

Limitations

It was difficult apply the UN indicators due to the small population in each province as population. For example, Mondul Kiri has a population of < 90,000. UN indicators are usually applied to a population of 500,000. However 2 EmONC facilities have been designated to that province. This may not be sustainable as the case-load is not there to support these facilities.

While the data has been carefully reviewed over a 12-month period (January – December 2019), there are questions about the validity and quality of the data. The number of signal functions performed, were higher than the expected case load.

13.2 EmONC Indicators

This section applies (5) UN norms and standards to the two provinces. The same indicators have been applied to all of Cambodia, however because the sampling method is different, the results are not comparable. Three (3) UN indicators have not been used; data for these indicators is under reported, and/or difficult to interpret for small population.

A summary of the 5 UN indicators are in tables' 13-2 (Mundul Kiri province) and 13.3 (Ratanak Kiri province). Analysis is by functional EmONC and designated EmONC facilities and all facilities surveyed.

Table 13-2: Baseline EmONC Indicators for Mundul Kiri Province (2020)			
Indicator	**Baseline (June 2020)**	**UN standard/Comments**	**Remarks**
Current availability of functional EmONC facilities	2 EmONC per 88,649 population	≥ 5 EmONC facilities per 500,000 population In the case of Mundul Kiri: 1 EmONC facility per 88,649 population	1 functional CEmONC and 1 functional BEmONC facility With a population of 88,649 availability more than meets the coverage standard
	1 CEmONC facility per 88,649 population	In the case of Mundul Kiri: 1 CEmONC per 88,649 population	
Geographical distribution of functional EmONC facilities	The distribution of EmONC facilities needs attention: • Facilities report families and villages are more than 2 hours by common transport • There are 2 functional EmONC facilities (1 CEmONC and 1 BEmONC) another designated BEmONC facility approved for upgrade.	100% of sub-national areas have the minimum acceptable numbers of basic and comprehensive EmONC facilities	Every woman should be able to reach an EmONC facility within 2 hours This is not the case so distribution needs attention In 2016, WHO undertook a GIS mapping of EmONC. The report would help inform the distribution of EmONC facilities
Proportion of all births in EmONC facilities	• 43.2 % of all live births in Mundul Kiri provinces took place in the 2 functional EmONC facilities • 61.9% of deliveries took place in the 2 functional EmONC facilities and 2 health centres which will be strengthened to provide EmONC • 90.0% of all expected live births occurred in a health facility.	Minimum standard: to be determined. In 2009 the expectation was that 15% of all deliveries would take place in EmONC facilities. Countries can now set their own standard which can be as high as 100%	The MoH needs to determine a standard for all of Cambodia. Less than 10% of deliveries were at home and 28.1% of deliveries where in health centres
Met need for EmONC services	• 28.0% of the expected number of women who developed complications were treated in a functional EmONC facility. • 35.24% of the expected number of women who develop complications were treated in in a functional EmONC facility or designated EmONC facility • 45.31% of the expected number of complicated were treated in all facilities surveyed	100% of the estimated complications which is 15% of all births Does not meet the standard.	Does not meet the standard. There are women with complications that are not being treated. This is particularly disappointing given the high number of deliveries in health facilities. More than half of women with complications are not being treated.
Caesarean sections as a percentage of all births	All EmONC facilities assessed • 2.55% of all births were by caesarean section in a CEmONC facility	Minimum 5% Maximum 15% Does not meet the standard.	There are women who require lifesaving interventions who are not receiving them
See section 3 of this report for the following 3 indicators: (1) Direct Obstetric Case Fatality Rate, (2) Intrapartum and very early neonatal rate, (3) Proportion of maternal deaths due to indirect causes. This section is only relevant for the facilities[43] that are included in the review of the EmONC network.			

43 In total 37 facilities were assessed in Ratanak Kiri and Mundul Kiri provinces. Eight (8) facilities (2 Hospitals in Ratanak Kiri, 2 hospitals in Mundul Kiri, 2 health centres in Ratanak Kiri and 2 health centres in Mundul Kiri) are included in the 181 facilities as either EmONC facilities and /or designated facilities for upgrade to EmONC status.

Table 13-3: Baseline UN EmONC Indicators for Ratanak Kiri Province 2020			
Indicator	**Baseline (June 2020)**	**UN standard/Comments**	**Remarks**
Current availability of functional EmONC facilities	2 EmONC per 204,027 population 1 CEmONC per 204,027	2 EmONC per 204,027 population 1 CEmONC per 204,027	1 functional CEmONC and 1 functional BEmONC facility With a population of 204,027, availability meets the standard, however, if resources are available a second BEmONC facility could be considered
Geographical distribution of functional EmONC facilities	The distribution of EmONC facilities needs attention: • Facilities report families and villages are more than 2 hours by common transport • There are 2 functional EmONC facilities (1 CEmONC and 1 BEmONC) another designated BEmONC facility approved for upgrade.	100% of sub-national areas have the minimum acceptable numbers of basic and comprehensive EmONC facilities	Every woman should be able to reach an EmONC facility within 2 hours. This is not the case so distribution needs attention In 2016, WHO undertook a GIS mapping of EmONC. The report would help inform the distribution of EmONC facilities
Proportion of all births in EmONC facilities	• 41.4 % of all live births in Ratanak Kiri Province took place in the 2 functional EmONC facilities • 49.78% of deliveries took place in the 2 functional EmONC facilities and 2 health centres which will be strengthened to provide EmONC • 85.69% of all expected live births occurred in a health facility.	Minimum standard: to be determined. In 2009 the expectation was that 15% of all deliveries would take place in EmONC facilities. Countries can now set their own standard which can be as high as 100%	The MoH needs to determine a standard for all of Cambodia. Less than 14% of deliveries were at home and 35.9% of deliveries where in health centres
Met need for EmONC services	• 24.72% of the expected number of women who developed complications were treated in a functional EmONC facility. • 32.80% of the expected number of women who develop complications were treated in in a functional EmONC facility or designated EmONC facility • 47.83% of the expected number of complicated were treated in all facilities surveyed	100% of the estimated complications which is 15% of all births Does not meet the standard.	Does not meet the standard. There are women with complications that are not being treated. This is disappointing given the high number of deliveries in health facilities. More than half of women with complications are not being treated.
Caesarean sections as a percentage of all births	All EmONC facilities assessed • 2.96% of all births were by caesarean section in a CEmONC facility	Minimum 5% Maximum 15% Does not meet the standard.	Women who require lifesaving interventions who are not receiving them

Table 13-3: Baseline UN EmONC Indicators for Ratanak Kiri Province 2020			
Indicator	**Baseline (June 2020)**	**UN standard/Comments**	**Remarks**
See section 3 of this report for the following 3 indicators: (1) Direct Obstetric Case Fatality Rate, (2) Intrapartum and very early neonatal rate, (3) Proportion of maternal deaths due to indirect causes. This section is only relevant for the facilities[44] that are included in the review of the EmONC network.			

13.3 Analysis of the situation

The norms and standards in table's 13-2 and 13-3 related to EmONC in Ratanak Kiri and Mondul Kiri provinces, help answer the following questions:

1. Are there sufficient facilities providing EmONC?

Indicator 1: Availability of EmONC Facilities

Table 13-4 shows there is one functional CEmONC and 1 functional BEmONC facility available in each province. In addition, the 2016-2020 Improvement Plan has allowed for 2 additional BEmONC facilities in each province. The UN benchmark for availability for every 500,000 people requires at least 5 EmONC facilities including at least 1 CEmONC facility. Given the populations of Mondul Kiri (88,649) and Ratanak Kiri (204,027) this allocation of the EmONC facilities to these two provinces is generous.

The preference of the MoH is to have 1 CEMONC facility in each province, so the allocation of a CEmONC facility to each province can be justified. However, consideration needs to be given to the case load and cost of sustaining these facilities into the future. Even though the availability of EmONC facilities is adequate, the gap in coverage to meet Improvement Plan benchmarks is 2 BEmONC facilities in each province. When UN standards are applied, the gap in coverage has a shortfall of 1 BEmONC facility in Ratanak Kiri.

Table 13-4: Availability of designated and functional EmONC facilities by province* and gap in coverage when compared with UN Standard and Improvement Plan Benchmarks											
Province	**Population[45]**	**Improvement Plan**		**UN Standard**		**Availability 2020**		**Shortfall (GAP) Improvement Plan**		**Shortfall (GAP) UN Standard**	
		CEmONC	**BEmONC**	**CEmONC**	**BEmONC**	**CEmONC**	**BEmONC**	**CEmONC**	**BEmONC**	**CEmONC**	**BEmONC**
Mondul Kiri	88,649	1	3	1	0	1	1	0	2	0	-1
Ratanak Kiri	204,027	1	3	1	2	1	1	0	2	0	1
Total		2	6	2	2	1	1	0	4	0	1

2. Are EmONC facilities well distributed?

Indicator 2 Geographical distribution of EmONC facilities

This indicator considers geographical distribution and accessibility of facilities. Barriers such as transport, geography and population growth impact on distribution. GIS mapping is helpful in assessing

44 In total 37 facilities were assessed in Ratanak Kiri and Mundul Kiri provinces. Eight (8) facilities (2 Hospitals in Ratanak Kiri, 2 hospitals in Mundul Kiri, 2 health centres in Ratanak Kiri and 2 health centres in Mundul Kiri) are included in the 181 facilities as either EmONC facilities and /or designated facilities for upgrade to EmONC status.

45 National Institute of Public Health and National Institute of Statistics, (2019) General Population Census of Cambodia

distribution. As already discussed in section 3 of this report a GIS mapping study was undertaken in 2016 by WHO[46]. The report is yet to be accepted by the MoH.

A principle which underpins this indicator is that women giving birth should be able to reach an EmONC facility within 2 hours of birth as most maternal and neonatal deaths occur within that time period. Given that GIS mapping was not available each facility surveyed was asked how long it took to reach the most distant village in the health facility catchment area and how long a family took to reach the facility from the furthest point in the health facility catchment areas. Health facilities were also asked how long it took to reach the closest higher level facility by common transport.

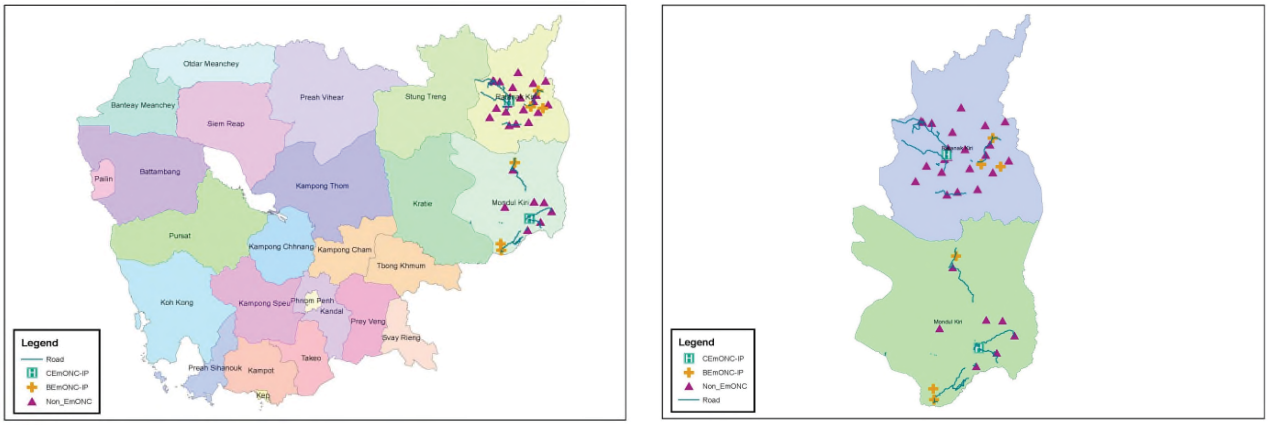
Table 13-5 shows that six health facilities in Mondul Kiri reported there were families and villages in their catchment more than two hours from a health facility. In Ratanak Kiri ten health facilities reported they had clients more than 2 hours from the health facility and 11 facilities reported there were villages more than 2 hours from the facility. There was only 1 facility in the two provinces that reported it took more than 2 hours to reach the nearest higher level facility. A time of more than 2 hours to reach a facility suggests there are gaps in the distribution of EmONC facilities.

Table 13-5: Provincial data to help inform the distribution of EmONC in Modul Kiri and Ratank Kiri Provinces (feedback from health facilities)

Provinces	Facilities have discrete catchment areas		Are there families living > 2 hours from a facility		Are there villages that are > 2 hours from a facility		Facilities where it takes > 2 hours to reach a higher level facility[47]	
	YES	NO	YES	NO	YES	NO	YES	NO
Mondul Kiri	10	1	6	5	6	5	1	10
Rattank Kiri	25	1	10	16	9	17	1	25
Both Provinces	35	2	16	21	15	22	2	25

Maps of the geographical distribution of identified EmONC facilities in Mondul Kiri and Ratanak Kiri are presented in figure 13-1.

Figure 13-1: Distribution of health facilities for KOICA baseline in Mundul Kiri and Ratanak Kiri provinces



46 https://www.healthgeolab.net/KNOW_REP/WHO-HIS-HGF-GIS-2016.2-eng.pdf

47 By common transport

3. Are enough women using EmONC facilities?

Indicator 3: Proportion of all births in EmONC and health facilities surveyed.

In Ratanak Kiri and Mondul Kiri provinces, more than 85.10% of all expected births took place in a health facility. In Modul Kiri 43.33% of births took place in the two functional EmONC facilities and 61.97% of birth took place in the 2 functional and 2 designated EmONC facilities combined. In Ratanak Kiri provinces 41.4 % of births took place in the two functional EmONC facilities and 49.78% of births took place in the 2 functional and 2 designated EmONC facilities combined. See tables 5-6 and 13-7. The old 15% benchmark for this indicator has been met. Countries can now set their own standard which can be as high as 100%.

The reason for the high proportion of birth in health facilities can be attributed to the government policy, which provides an incentive payment to pregnant women, and the fact that there are not private facilities in the two provinces providing maternity services.

Table 13-6: Proportion of births in EmONC facilities in Modul Kiri province and all facilities surveyed (2020)

Facility type	Total No. women giving birth in facilities	Expected births*	Proportion of births	Recommended level %
Functional EmONC facilities	916	2119	43.33%	**To be determined**
Functional and designated EmONC facilities (combined)	1313		61.97%	
All facilities surveyed	1908		90.05%%	

* Population, CBR and expected births and complication calculated using inter-census data and 2019 Census Report for Cambodia.

Table 13-7: Proportion of births in EmONC facilities in Ratank Kiri province and all facilities surveyed (2020)

Facility type	Total No. women giving birth in facilities	Expected births*	Proportion of births	Recommended level %
Functional EmONC facilities	2222	5366	41.41%	**To be determined**
Functional and designated EmONC facilities (combined)	2671		49.78%	
All facilities surveyed	4598		85.69%	

4. Are the right women using EmONC facilities?

Indicator 4: Met need for EmONC

The right women are women with complications such as haemorrhage (ante-partum and postpartum), prolonged and obstructed labour, postpartum sepsis, complications of abortion, severe pre-eclampsia and eclampsia, ectopic pregnancy and ruptured uterus. To meet the UN standard, 100% of all women with complications should be treated in EmONC facilities. Table 13-8 and 13-9 show that less than half of women with complications are treated in all health facilities surveyed, and less than 30% of women in EmONC facilities are not having obstetric complications treated in EmONC facilities. This falls short of the UN benchmark of 100%. Given the high number of deliveries in health facilities this means that there are women with complications who are dying because complications are not treated.

Table 13-8: Met need for EmONC in functional and designated EmONC facilities and all facilities surveyed in in Modul Kiri province (2020)				
Facility type	**No. of women treated with complications**	**Expected births (2019)***	**Proportion of women estimated to have complications**	**Recommended level %**
Functional EmONC facilities	**89**	**2119**	**28.0%**	**100% of the estimated complications**
Functional and designated EmONC facilities (combined)	**112**		**35.24%**	
All facilities surveyed	**144**		**45.31%**	

*** Population, CBR and expected births and complication calculated using inter-census data and 2019 Census Report f**or Cambodia.

Table 13-9: Met need for EmONC in functional and designated EmONC facilities and all facilities surveyed in Ratanak Kiri province (2020)				
Facility type	**No. of women treated with complications**	**Expected births (2019)***	**Proportion of women estimated to have complications**	**Recommended level %**
Functional EmONC facilities	199	5366	24.72%	**100% of the estimated complications**
Functional and designated EmONC facilities (combined)	264		32.80%	
All facilities surveyed	385		47.83%	

* Population, CBR and expected births and complication calculated using inter-census data and 2019 Census Report for Cambodia.

5. Are enough critical services being provided?

Indicator 5: Caesarean sections as a proportion of all births

To save women's lives, it is crucial they have access to Caesarean sections and other lifesaving interventions provided by CEmONC facilities. In a 12-month period preceding the review, 2.55% of all deliveries in Mondul Kiri and 2.96% of all deliveries in Ratanak Kiri took place in a CEmONC facility. These rates are just below the minimum UN standard of 5-15% See table 13-10.

Table 13-10: Proportion of all births delivered by Caesarean section in CEmONC facilities in Modul Kiri and Rattank Kiri Provinces (2020)				
Provinces	**No. of Caesarean sections**	**Expected* births (2019)**	**Proportion of C/S performed**	**Recommended level %**
Mondul Kiri	54	2,119	2.55%	5-15%
Rattank Kiri	159	5,366	2.96%	
Both Provinces	213	7,485	3.8%	

* Population, CBR and expected births and complications calculated using inter-census data and 2019 Census Report for Cambodia

6. Are services adequate? (Indicators 5-8)

There are three indicators which can be used to help assess what services pregnant women need in addition to EmONC services: i.e. Direct Obstetric Case Fatality Rate (DOCFR), intrapartum and very early neonatal death rate and the proportion of maternal deaths due to indirect causes. Data for these indicators is under reported, and/or difficult to interpret, because they are not built on reliable definitions of direct and indirect obstetric complications, intrapartum stillbirths and very early newborn death. So, these indicators have little meaning at present, other than to provide a baseline for future reporting. More information and data on these indicators, relevant to Ratanak Kiri and Mondul Kiri, are in section 3 of this report.

13.4 Performance of signal functions

Table13-11 shows that in Ratanak Kiri and Mondul Kiri provinces all (100%) health facilities surveyed administrated parenteral oxytocics and all (100%) CEmONC facilities provided blood transfusions and Caesarean sections in the 3-months before the survey. Other signal functions were poorly performed.

The most poorly performed signal function was the administration of parenteral anticonvulsants for eclampsia (<13.6% of health facilities) followed by assisted vaginal delivery (<16.2%). Remaining signal functions were only performed by around 25% of health facilities in the two provinces.

There is only a small difference between the number of functions performed over the 3 and 12-month time-frame; this, and the overall poor performance of basic signal functions, suggest that even through there were two functional EmONC facilities in each province, the performance of signal functions is poor. More than 26 health centres reported not performing 6 of the signal functions at all.

When asked reasons for not performing a particular signal function, most health facilities could not provide a reason. For those who did provide a reason the reply given by 10-22 of respondents for non-performance of assisted vaginal delivery and neonatal resuscitation stated, “policy issues, supplies, of equipment and drugs and training issues”. For most signal functions, there were only a small number of respondents, so care must be taken when interpreting this data

Table 13-11: Percent of facilities in Ratanak Kiri and Mondul Kiri Provinces that provided the signal functions in the last 3 and 12-months and reasons for not providing the service (n=37)															
Signal Function	Percentage of facilities (n=37) that provided the procedure in the last:		Number of facilities that did not perform the procedure in the last 12-months	Percentage of facilities that responded that the procedure was not provided in the last 12-months due to one of the reasons listed below (multiple responses allowed):											
	3-months	12-months		availability of human resources		training issues		supplies/ equipment/ drugs		management issues		policy issues		no indication	
	%	%	n	n	%	n	%	n	%	n	%	n	%	n	%
Parenteral antibiotics	24.3	29.7	28	0	0.0	1	3.8	1	3.8	0	0.0	5	19.2	23	23.1
Parenteral oxytocics	100.0	100.0	0	-	0.0		0.0		0.0		0.0		0.0		0.0
Parenteral anticonvulsants	13.5	18.9	32	1	3.3	2	6.7	0	0.0	1	3.3	4	13.3	27	70.0
Manual removal of placenta	29.7	40.5	26	1	4.5	5	22.7	0	0.0	0	0.0	6	27.3	13	59.1
Removal of retained products	24.3	32.4	28	4	16.0	7	28.0	8	32.0	0	0.0	10	40.0	11	28.0
Assisted vaginal delivery	16.2	16.2	31	3	9.7	11	35.5	11	35.5	0	0.0	22	71.0	7	22.6
Neonatal resuscitation	27.0	48.6	27	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	19	5.3
Blood transfusion[1]	100.0	100.0	0	-	-	-	-	-	-	-	-	-	-	-	-
Surgery (Caesarean)[1]	100.0	100.0	0	-	-	-	-	-	-	-	-	-	-	-	-
[1] Only CPA2 and CPA3 hospitals are included (n=2)															

13.5 Performance of vital services or functions provided to mothers and newborns

Table 5-12 shows the performance of selected vital maternity functions by hospitals (n=4) and health centres (n=33) in Ratanak Kiri and Mondul Kiri provinces. The most frequently performed vital function in both hospitals and health centres was the partograph followed by Rapid HIV tests for mothers. All (100%) health facilities reported using the partograph and all (100%) of hospitals and 97% of health centres reported undertaking Rapid HIV tests for mothers.

As discussed earlier in this report, the high use of partograph can be partly explained by an incentive payment for deliveries, linked to a completed partograph. In 2009 there were concerns that the payment would undermine the integrity of partograph use. For this reason, as part of the EmONC reviews, partograph case studies have been undertaken (see section 12 of this report).

Rapid HIV testing of mothers is provided by all (100%) hospitals and most (97%) health centres. The administration of antiretroviral therapy to mother and babies is not a regular occurring in 35 hospitals. Health centres do not perform this vital function at all.

As expected, emergency and more specialised procedures such as, breech delivery (75.0%), the administration of parenteral antibiotics to newborns (75%) and newborn intubation & ventilation (25%) are performed more frequently by hospitals. As there were only 4 hospitals, care must be taken when interpreting this data. Table 13-12 shows, with the exception of partographs and Rapid HIV testing for mothers, health centres are providing few vital maternity functions.

Reasons for non-performance of vital services provided to mothers and newborns

A number of respondents were unable to provide a reason for not performing a specific signal function. See table 13-12. Where reasons were given, issues around newborn care were the area of greatest concern. “Policy issues” followed by “supplies, equipment and drugs” were the main reasons given for not administering parenteral antibiotics, intubating and ventilating a new newborn, or providing ARV to mother and newborns. As the number of facility responses for not performing a signal function was low, care should be taken when interpreting this data.

Table 13-12: Percent of facilities in Ratanak Kiri and Mondul Kiri Provinces providing maternity services the last 12-months and the reasons for not providing the service (among facilities that do deliveries) (n=37)															
Signal Function	Percentage of facilities (n=37) that provided service		Number of facilities that did not perform the services in the last 12-months	Percentage of facilities that responded that the procedure was not provided in the last 12-months for one of the reasons listed below (multiple responses allowed):											
	Hospitals	Health Centres		availability of human resources		training issues		supplies/ equipment/ drugs		management issues		policy issues		no indication	
	%	%	n	n	%	n	%	n	%	n	%	n	%	n	%
Partograph	100.0	100.0	0	-	-	-	-	-	-	-	-	-	-	-	-
Breech Delivery	75.0	30.3	24	1	4.2	1	4.2	0	0.0	0	0.0	9	37.5	16	0.0
Parenteral antibiotics to newborn	75.0	0.0	34	4	11.8	5	14.7	0	0.0	1	2.9	31	91.2	5	14.7
Newborn intubation & ventilation	25.0	0.0	36	0	0.0	0	0.0	5	13.9	1	2.8	33	91.7	1	2.8
Rapid HIV test for mother	100.0	97.0	1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	100.0
ARV to mothers	25.0	3.0	35	0	0.0	0	0.0	8	22.9	0	0.0	27	77.1	9	25.7
ARV to newborns	50.0	0.0	35	0	0.0	0	0.0	9	25.7	0	0.0	26	74.3	11	31.4

13.6 Other Information

Because of the small numbers it was difficult to get a good picture of some of the variables such as:

- Availability of guidelines and protocols
- Service availability, referral and communications
- Human resources
- Knowledge training and experience
- Availability of basic infrastructure
- Essential drugs supplies and equipment
- Case reviews of partographs

Instead, it was decided to develop a fact sheet for health facilities in the two provinces. The international consultants from AMDD provided examples of fact sheets that had been used by other countries. Using these as a template; the research team worked with the MoH and donor agencies in the two provinces, to agree on the format for the fact sheet. There are fact sheets for all health centres and another fact sheet for the 4 hospitals in the 2 provinces. See annex 12 for these fact sheets.

14. FINDINGS AND RCOMMENDATIONS

14.1 Summary of findings

The implementation of the current Improvement Plan has resulted in notable gains in the availability and utilisation EmONC across Cambodia. Success can be attributed to a number of factors, including political commitment by the Government of Cambodia to EmONC and strong local leadership and ownership, a strong technical working group and a shared commitment of key players to making a difference. Progress made towards achieving the EmONC Improvement Plan targets are in annex 1.

14.2 Barriers/Challenges

Despite continued improvement since 2009, the review found significant barriers remain as Cambodia moves towards universal health coverage. These barriers are impacting on the delivery of EmONC across Cambodia. Barriers include:

Cultivating an enabling policy environment

Hight level advocacy, policies and strategies are needed to strengthen EmONC at all levels of service delivery. The 2020 review found that:

- With the exception of national and provincial hospitals, the administration of magnesium was poorly performed by more than 50% of facilities surveyed. Furthermore, health workers at lower levels of the health system seem hesitant to treat eclampsia. Policy guidelines are needed for CP1 referral hospitals and health centres with regards loading does of anticonvulsants and referral.
- Only 57% of facilities surveyed refrigerated oxytocin. Guidelines, protocols and a policies are needed to ensure the cold chain is maintained for the storage oxytocin.
- 62% of CEmONC facilities have access to a blood supply through a facility blood bank. This falls short of the EmONC Improvement Plan target of a 24/7 blood supply in 90% of CEmONC facilities. High level advocacy is needed to expand operational blood depots/banks in all CEmONC facilities.
- The system of recording and reporting for referral and newborn care needs strengthening. A standardised system of forms and registers need to be in place supported by MoH guidelines and protocols.
- Benchmarks for some UN indicators need to be reviewed and updated, for example, the proportion of institutional births. Cambodia has met the old standards of 15%. Countries now set their own standard up to 100%. The MoH needs to agree a standard and implement their decision.

Poor coverage of EmONC

Out of 80 functional EmONC facilities, 35 are national or provincial hospitals providing CEmONC . CEmONC facilities tend to be larger hospitals at the upper levels of the health system in densely populated urban areas

Current BEmONC coverage is only half of what is required to meet the UN standard of availability. There is a gap in coverage of at least 74 functional BEmONC facilities when UN standards are applied and 88 BEmONC facilities if the Improvement Plan (2016-2020) benchmarks are applied. Given private facilities are excluded from the EmONC network it is likely that the UN standards for BEmONC may

never be met. There are serious questions that need to be answered by the MoH on a how CPA 1 and health centres should provide EmONC: as BEmONC facilities but extending the time-line for implementing the BEmONC signal functions to 12 months? providing obstetric first aid and/or a minimum package of life saving intervention then referring on and more….

The distribution of EmONC facilities at subnational level is poor

The distribution of EmONC facilities at a sub-national level is a concern. EmONC facilities, (particularly CEmONC) are clustered around urban areas. The majority of functional EmONC facilities are at higher levels of the health system. The distribution of hospitals according to the MoH classification, shows that all National Hospitals (n=5) and CPA 3 RHs (n=19) and 33 out of 34 CPA 2 RHs (97%) are functional for mostly CEmONC. At lower levels of the health system only 22 out of 57 of CPA 3 (39%) facilities (which tend to be more rural) and 1 health centre (1.5%) are functional for BEmONC. The distribution of CEmONC needs to be improved.

GIS mapping was undertaken by WHO in 2016. The report has information that would inform the distribution of EmONC facilities across Cambodia[48]. Findings need to be reviewed and accepted by the MoH. As GIS was not available, each facility surveyed was asked how long it took to reach the facility from the furthest point and how long it took to reach the closest higher level facility by common transport. 73 facilities surveyed reported there were families and villages in facility catchment areas more 2 hours from the nearest health facility. This suggests gaps in coverage.

There is a significant unmet need for EmONC

EmONC services are still under-utilized and there is a significant unmet need for these services. There are women with obstetric complication who are dying, or their newborns are dying because met need for EmONC is so low. Met need for EmONC has increased to 31.6%. That means that less than a third of women who are expected to develop complications are being treated in functional EmONC facilities. Specific signal functions - such as the administration of anticonvulsants, vacuum extraction, manual vacuum aspiration, and newborn resuscitation – are being underused compared to expected complications needing these interventions.

The needs of newborns are not being met

The needs of newborns with complications are not being met. Early newborn care requires attention in the near future. The review assessed the feasibility of adopting 9 potential EmNC signal functions in addition to newborn resuscitation which is already monitored. Most facilities surveyed (56 and 163) had not performed a specific EmNC signal function in the 12 months prior to the review. There are newborns who are dying for the want of simple life saving procedures. The current review documented serious deficiencies in equipment, supplies and staff competency, skills and knowledge to support newborn care.

Exclusion of private maternity services from the EmONC network

A reason Cambodia is not meeting the UN standards of coverage, met need, institutional delivery and lifesaving interventions such as Caesarean sections is that private facilities have been excluded from

48 https://www.healthgeolab.net/KNOW_REP/WHO-HIS-HGF-GIS-2016.2-eng.pdf

the EmONC network across Cambodia. The EmONC availability indicator is based on a population of 500,000, serviced by 4 BEmONC and 1 CEmONC facility. If private facilities are excluded, the indicators are all underestimated (with the possible exception of the DOCFR) and does not give a true picture of what the government needs to do. In provinces where large private maternity facilities have been excluded, the solution might be to invite them to join the network.

Training, coaching and skills development for staff working at lower levels of the health system

The quality of EmONC services is improving but requires more training, coaching and skills development of staff, as well as significant and continued supportive supervision, particularly at the lower levels of the health system. The current review found that the main beneficiaries of coaching and mentoring were secondary midwives (78.5%) followed by primary midwives (51.4%) and obstetricians/gynaecologists (46.5%) . Other cadres such as paediatrician/neonatologists, general medical doctors, general surgeons, medical assistants, doctor and nurse anaesthetists and nurse received minimal coaching and mentoring support.

Competent staff – adequate for the workload

While staff numbers have improved, there are facilities where staff numbers are not adequate for the workload. For example, the current review found that there were more than 2 secondary midwives for all functioning EmONC facilities (n=80). In 2019 the number of deliveries in functional EmONC facilities ranged from 916 to 24,048 deliveries a year. With staffing levels ranging from a mean of 12 secondary midwives in health centres to 89 in hospitals this does meet the required staffing levels for the number of deliveries.

Staff levels and workloads need to be continually reviewed and pre-service should become an essential part of education for midwives and medicine and in-service training needs need regular review and training. Regional training sites need strengthening to support clinical training and management.

Referral system needs strengthening

The referral system has improved, primarily due to improved communication and transport system but many patients in need still suffer delays in referral and treatment. However there are still areas which need significant attention. The current Review found important gaps remain in identification of complications necessitating referral, respect of referral procedures, competency of accompanying personnel, availability of emergency kits in ambulances, patient comfort, first aid or stabilization training of ambulance staff, and reception and rapid access to appropriate care at the end point, maintenance of ambulances and reporting of referrals.

Limited capacity of Provincial Health Departments (PHDs)

The Improvement Plan (2016-2020) supported capacity building of PHDs and lower level administrative structures to plan, manage, monitor, and support EmONC services. Provincial Health Departments (PHDs) were tasked with supportive supervision, planning and scale-up of EmONC at a provincial level. They were also to have a key role in facilitating; certification of EmONC facilities; provincial partnerships to support resource mobilisation; expanding the supply of blood through CEmONC

facilities and more. The extent to which this was achieved, and the capacity of individual provinces to show such leadership varies from province to province. The EmONC assessment found that less than 50% of health facility respondents have seen an improvement plan. However they were unclear if the plan was a PHD or national plan.

Poor quality of data

The quality of data and reporting is slowly improving. More effort is needed; particularly in the areas of referral, maternal and newborn deaths (including stillbirths), complications and their outcomes. As in many countries, challenges exist in the classification, recording and reporting of intrapartum and very early neonatal death rate. In Cambodia the indicator is not built on reliable definitions of fresh stillbirths, intrapartum and very early newborn deaths. The recording and reporting of newborn deaths is an ongoing problem. The MoH needs to address these issues and ensure the reporting and collection of quality data is reinforced through regular supervision and monitoring. Staff must understand that their recording and reporting is of great value.

14.3 Strategies and recommendations

Recommendations to support EmONC and the strategic direction of the MoH are summarised under the seven (7) outputs of the 2016-2020 EmONC Improvement Plan.

Output 1: Policies and strategies are in place for a supportive and enabling environment

- There is still a gap between the current status of EmONC indicators in Cambodia and UN global norms and standards. Revise the EmONC Improvement Plan (2016-2020) in view of the progress made. Maintain the vision of a network of > 160 functional EmONC facilities across Cambodia, supported by regional clinical training sites, but focus on:
  - improving coverage and distribution of EmONC. Pay attention to the distribution of CEmONC. Ensure EmONC lifesaving interventions are available and accessible at all health system levels;
  - strengthening the capacity of PHDs and lower level administrative structures to plan, manage, monitor, and support EmONC service;
  - improve the quality of data collection and reporting and
  - Continue to focus on improving the quality of EmONC services.
- There is a critical shortage of BEmONC at the health centre level. Only 1 of 88 health centres and 22 of 57 CPA 1 referral hospitals are functional for BEmONC. There is a need to prioritise the upgrade of EmONC facilities one by one. Annex 4 provides a facility by facility assessment of signal functions. This helps prioritise facilities and strategically target them for strengthening.
- The 15% benchmark for the proportion of all births in EmONC facilities has been met in 17 provinces. Most countries raise this indicator slowly until they reach 100%. Cambodia might consider doing this as the minimum level has been met.
- The supply management chain should be strengthened to ensure constant supplies of drugs and equipment needed for EmONC. Ensure logistic systems that include essential EmONC medicines and supplies are in place and functional. Pay particular attention to parenteral antibiotics, oxytocin, magnesium sulphate. Equipment such as vacuum extractors, ambu--bags and masks must be available at all times.

- Over half of facilities surveyed (57.5%) reported keeping oxytocin refrigerated. It is possible some facilities were reporting the presence of a refrigerator for their immunisation program. Vaccine fridges should not be used to store other types of drugs. Still, most countries store oxytocin with immunisations. A policy decision is required on the storage of oxytocin.
- As envisaged in the EmONC improvement Plan, standardised lists of equipment, drugs and supplies should be available to support EmONC facilities across Cambodia. The MoH should ensure standards, guidelines & protocols are disseminated and implemented through PHDs and updated as needed. This also calls for training staff in their use; simply distributing job aids is not sufficient.

Output 2: Ensure adequate coverage of EmONC (availability and accessibility) across Cambodia.

- With increased utilisation of EmONC services the national MoH could be more flexible when classifying BEmONC facilities. Flexibility can only be applied for Basic EmONC facilities and not for Comprehensive EmONC facilities. CEmONC facilities must always meet the benchmark of 9 signal functions in a 3-month period. Consider the following:
  - Extending the timeframe to perform the seven signal functions from 3 to 12 months for BEmONC facilities at a CPA 1 and health centre level. This would increase the coverage from 45 to 71 BEmONC facilities.
  - Allow selected lower level facilities to perform a minimum EmONC package, i.e. all signal functions minus e.g. the administration of parenteral anticonvulsants for pre-eclampsia and eclampsia (magnesium sulphate, diazepam). The make-up of the package should be determined in consultation with local health workers and managers providing and supporting EmONC
  - Consider a different package of interventions such as obstetric-first aid. Where mothers and babies are stabilised and referred on.
- To perform a minimum number of EmONC signal functions, a facility must have full technical potential and properly demonstrated skills necessary to perform the required functions. There would also need to be strict technical guidelines to support implementation of signal functions and timely referral.
- In the case of maternal and/neonatal deaths, death reviews or audits will be necessary for learning and accountability purposes. Newborn death audits as well as reviews of “near misses” should be routinely conducted, following the MoH strategy used for maternal death audits
- In provinces where there are large private facilities providing maternity services, the MoH should invite these facilities to join the EmONC network. For example, Siem Reap has a large private hospital (Jay Varman Hospital) that provides free maternity services. Inclusion of the facility would make a significant difference to EmONC indicators in the province.
- Formal GIS mapping to support EmONC was undertaken by WHO in 2016, but results have not been formally disseminated as there has been no official acceptance of the report by the MoH. The report has readily available[49]. It is recommended that MoH agree to the document being used

49 https://www.healthgeolab.net/KNOW_REP/WHO-HIS-HGF-GIS-2016.2-eng.pdf

to inform the distribution of EmONC facilities across Cambodia.

Output 3: Technical and managerial capacity strengthened to ensure high quality care.

HR development, training, coaching and mentoring

- It is difficult to obtain a good picture of the different trainings that have been undertaken to support EmONC. Reporting of training at a provincial level is poor and there is no consistency across provinces. Consider working with the training unit at the National Maternal and Child Health Centre (NMCHC) to undertake a baseline training needs assessment of all EmONC training and put in place a regular reporting system which is overseen by the MoH.
- The frequency of inservice training should be determined at the time of training needs analysis. Ideally, staff delivering EmOC should be required to demonstrate competence in each signal function at least yearly. In-service training needs for EmONC should be regularly reviewed by managers at each facility, so staff can be appropriately identified for training sessions.
- Each large facility (provincial hospitals and CEmONC facilities) should have manikins and models for the practical training of students and on duty staff, in parallel to the daily service. Where there is a limited case-load to demonstrate competence, staff providng EmONC should be required to demonstrate competence on models in training units.
- Review and revise staffing levels to ensure availability of staff 24/7 for full delivery of quality services. Where workloads are high, provide EmONC facilities with higher numbers and/or advocate for additional staff to support service delivery[50].
- Continue to support teams of competent midwives (and at some levels, physicians and other midwifery staff), so they can help each other and cover services 24/7. Encourage regular staff meetings for team building and constructive review of complicated cases. This should involve EmONC facilities at all levels.
- Continue supporting in-service training and on-site coaching to increase competencies of staff in EmONC facilities to perform the core signal functions and improve quality of care provided at EmONC facilities. Ensure in-service training includes 'skills and drills' trainings to maintain competences.[51] Medical staff, mainly midwives, surgeons and anaesthetists, should be trained to enable 24 hour/7-day availability of quality EmONC services, including Caesarean section, other emergency surgical procedures, and safe blood transfusion in CEmONC facilities.
- Coaching and on-site approaches should be used to ensure training benefits are used in practice, using existing PHD, OD, and senior RH staff, as well as national program staff and retired senior professionals with high level competencies. Lower level staff should also be included in in-service training. This could be achieved through facilitative supervision or staff could visit higher-level high-volume facilities for training/coaching.
- On-site approaches and skills practice are important for students (medical and midwifery

50 A general recommendation would be to add another midwifery team for every additional 300 deliveries per year and add surgical teams as needed. Lab, infection control, pharmacy, cleaners, security and coaching staff should also be included in staffing plans

[51] Ameh CA, White S, Dickinson F, Mdegela M, Madaj B, van den Broek N.. 2018. Retention of knowledge and skills after Emergency Obstetric Care training: a multicountry longitudinal study. PLoS One 13: e0203606

students) as well as for mid-level professionals, who have completed specialised training sessions. Coaching should be available for health professionals who have limited opportunity to practice signal functions such as vacuum extraction, manual removal of placenta, management of pre-eclampsia, and newborn resuscitation.

- EmONC should become an essential part of pre-service education for midwifery and medicine, so that freshly certified midwives and physicians have been exposed to the concept before starting their duties. Existing curricular should be reviewed to ensure this is the case.
- EmONC orientation, training and on-site support should also be encouraged for staff other than midwives and obstetricians. Staff could include, but is not limited to nurses, operating theatre staff, lab technicians, managers, and ambulance personnel.
- 53% and 63% of hospitals respectively reported a lack of competent staff available to perform tubal ligation and/or vasectomy. This situation has not improved since 2014, so there is a need to address this gap in competence.

Quality of data and charting

- Sound monitoring and evaluation require reliable data and reporting. Recording of maternal and newborn deaths (including stillbirths) and obstetric and newborn complications and their outcomes needs to be improved at all health facilities. Facility managers should be encouraged and coached by provincial and national managers to improve recording and reporting of obstetric and newborn complications.
- The participation of all concerned EmONC staff at Maternal Death Audits and Audits of Near-Miss cases is strongly encouraged and should be formalised, in view of the powerful training benefits of these procedures.
- There are some indicators which require reliable definitions to underpin the indicator e.g. definitions of intrapartum stillbirths, very early newborn death and direct and Indirect obstetric complications. There is also a need for standardised forms and a system of reporting which has been approved by the MoH, for collecting data to support referral and Emergency Newborn Care (EmNC). Until such a system exists it will be difficult to monitor newborn signal functions.
- Improve HMIS training, supervision and mentoring especially with regard to the classification of stillbirths, newborn and maternal deaths. In addition, a routine maternal deaths audit should help improve the correct classification of cause of death.
- Consider working with a national or provincial hospital performing selected EmNC signal functions regularly to develop and trial a system of newborn recording and reporting (forms and registers). In time, the system could be scaled up and monitored across Cambodia

Output 4: Increased utilisation of EmONC services to reduce unmet needs

Skills development and lifesaving procedures

- There is a number of midwifery procedures which complement EmONC signal functions and should be part of clinical coaching/mentoring and regular supervision and monitoring. These procedures should be performed according to standards in all EmONC facilities – they include the

partograph, repair of tears, foetal monitoring during labour, dexamethasone for prematurity, antibiotics for premature rupture of membranes, Kangaroo Mother Care, Newborn Corners, PMTCT, etc.

- Increased coverage and utilisation of EmONC has led to the increase in the proportion of births needing Caesarean section. To meet this need the following is required:
  - An increase in the number of trained surgeons and trained anaesthetists
  - Improvement or clarification of the appropriate indications for Caesarean section
  - Improved capacity and authority of midwives to decide when to refer and actually refer
  - Improvement in communications and referral systems
  - Increased attention to quality of procedures, infection control, and prevention and care of adverse events
- An area highlighted in the 2016-2020 EmONC plan was the possibility for surgeons and/or other cadres (GPs, associate clinicians) who may not have learned these other procedures be properly trained to perform other emergency surgical acts such as hysterectomy for severe PPH, uterine rupture, rupture of ovarian cysts, repair of large perineal tears, and ectopic pregnancy. The feasibility of this needs to be explored.

Newborn Care

- Future activities related to EmNC signal functions should focus on refining the list to a small selection of measurable signal functions and testing of these potential signal functions in existing care units where they are implemented on a routine basis.
- Systems in place to support EmNC data collection need to be strengthened and formalised by the National MoH. This will include agreeing on forms and reporting procedures. So, selected national and provincial hospitals, already are providing EmNC and are piloting a system of newborn care data collection and reporting. Based on the pilot scheme, the MoH will decide on how Cambodia will proceed.
- Work with one national or provincial hospital, which regularly performs the EmNC signal functions, to develop or strengthen an existing system of newborn recording and reporting. In time, this would allow EmNC signal functions to be scaled up and monitored across Cambodia.
- The current review found that only 35% of all facilities had a work surface for resuscitation of newborn near delivery bed(s) or newborn corner (Newborn resuscitation table) and there was limited equipment and supplies to resuscitate a newborn. Each facility needs to have a newborn corner (resuscitation area) with emergency trolley/box for 24/7 responses to emergencies (drugs, gloves, syringes, IV) and health workers should be trained to identify asphyxia in newborns and how to resuscitate

Clinical areas related to “met need”

- Lack of recognition and under diagnosis of obstetric and newborn complications is a key limiting factor for full functionality of EmONC facilities. Once conditions are recognized and diagnosed, there seems to be relatively good quality of care provided. Additional strategies to specifically address under diagnosis and action on these critical signal functions are needed in order to make

further progress in EmONC improvement.

- The current review found neonatal resuscitation assisted vaginal deliveries (using MVE), administration of anticonvulsants and manual removal of placenta are signal functions that are less practices and need additional strengthening. So equipment and supplies and training of staff to support implementation of these signal function should be a priority. These are the most commonly missing signal functions in designated EmONC facilities at this point in time.
- Continue to strengthen national guidelines for the clinical management protocols for obstetric and newborn complications. Where guidelines exist, training, and supervision for quality improvement should follow. Where they do not exist, they should be distributed together with training. Every facility needs a complete set of these guidelines and accompanying posters, wall charts, or complication specific charts that designate the appropriate treatment at each level.
- The quality of partograph completion is poor. Consider developing criterion-based audits of partograph and outcomes; this will build more accountability into recording on the tool and allow the review of processes and procedures and show why so many health facilities are not referring women on for more advanced life saving interventions.

Supply of blood

- Blood should be available at provincial hospitals (provincial blood banks) and in all CEmONC facilities in Blood Depots, e.g. fridges that can safely keep a small provision of bags of each blood group for immediate use. Monitoring and replenishment of Blood Depots and inter-facility mobility of supplies also need to be ensured.

Output 5: Referral system in place and operational throughout the country

- Much of the physical infrastructure to operate a functional referral system – access to ambulances, telephone/network access, and improved infrastructure (most EmONC facilities are within 50km and one-hour travel time of a higher level of care) – are now in place. Investment in guidelines and systematic improvement of the referral system would be timely and necessary.
- Ensure availability and maintenance of ambulances and availability of trained personnel to accompany patients around the clock.
- Emergency patients should be accompanied by a qualified health professional, and the vehicle used for transport should also have telecommunications available (cell phone or radio communication).
- All health facilities should record EmONC referrals in and out, and collect information concerning each woman who is referred on: facility of origin and destination, purpose/indication of the referral, treatment or stabilization provided, partograph if started, and patient outcomes.
- Referrals into the hospitals are less than the sum of referrals out of health centres. An explanation might be poor record keeping or lack of a standard recording system, referral procedures are not followed or well understood, or the referral chain needs strengthening. Neonatal complications are referred less frequently than maternal complications. Data are not being collected that show where neonates were referred. This needs further investigation.

- Reduce high DOCFRs and cause-specific CFRs by strengthening the referral system through:
  - Development of protocols for senders and receivers
  - The readiness to respond at each level
  - Provision of adequate emergency transport and communication services
  - Setting or complying with a policy of alerting the receiving facility of a referral enroute
- Much of the physical infrastructure to operate a functional referral system– access to ambulances, telephone/network access, and improved infrastructure (the majority of EmONC facilities are within 50km and one-hour travel time of a higher level of care) – are now in place. Investment in guidelines and systematic improvement of the referral system is timely and needed.

Output 6: Provincial EmONC plans developed, operational and monitored

- More attention and resources are needed to develop the capacity of PHDs to support EmONC more effectively. Where PHDs are performing well they could be a model for other provinces. An award system and/or cross-provincial learning visits could be used to encourage provincial innovation and learning.
- Consideration could be given to making better use of the established regional clinical training sites. Besides clinical support, these sites could be strengthened to support capacity building of PHDs and regional integrated management and clinical teams, who are able to work together to strengthen EmONC through annual work plans, reporting, supervisory visit and other supportive activities.
- The EmONC review was not able to assess the capacity needs of PHD. A more comprehensive review of PHD management capacity could be undertaken, to inform how best to support PHDs.
- PHDs in each province should support EmONC plans, which are revisited and adjusted annually, considering any contextual changes, GIS mapping, EmONC data and outcomes of supervision visits. This would be done for each facility and province.
- PHDs, in consultation with facility managers, should ensure standardised lists of equipment, drugs and supplies be available in all EmONC facilities and PHDs; and hospital management should ensure that all equipment provided is installed, used and well maintained and that supplies are managed effectively.
- As envisaged in the EmONC improvement Plan, data to support the coverage of EmONC facilities across Cambodia should have been available, for annual planning, facility by facility, by PHDs. Likewise standardised lists of equipment, drugs and supplies should be available in all EmONC facilities. Monitoring is the responsibility of PHDs and facility managers. The extent to which this was achieved varies from province to province.

Output 7: Community participation strengthened to increase utilisation

- +Local entities (such as Health Centre Management Committees and Woman and Child Commune Council) should be encouraged to participate in meetings for planning, construction, rehabilitation, identifying equipment needs and discussion of referral needs at EmONC facilities. They may also be encouraged to participate in quality assessment and monitoring.
- Going forward, and as a part of the next EmONC Plan, more emphasis should be given to

engagement and participation of the community.

- Encourage communes, Health Centre Management Committee (HCMC) and Commune Councils to meet and participate in achieving the needs of EmONC.
- Consider the introduction of a certification process for EmONC facilities, or a non-financial award program for facilities that maintain the quality and functional status of EmONC facilities. Engage communities in the process

15. Annexes

Annex 1: Goals and targets EmONC Improvement Plan 2016-2020
Progress made towards the achievement of the 2016-2020 EmONC Plan

Hierarchy of aims	Objectively Verifiable Indicators	Means of verification	Target 2020 and progress made towards targets	Key interventions	Comments
Goal					
Reduce maternal and neonatal deaths and contribute to the Fast Track Initiative Road Map for Reducing Maternal and Newborn Mortality (FTIRM) 2016-2020	Maternal Mortality Ratio	CDHS	140	All below	2020 CDHS will not be available until November. Trends suggest there is progress towards the targets
	Neonatal Mortality Rate	CDHS	14	All below	
Output 1					
Policies and strategies in place for a supportive and enabling environment	EmONC Improvement Plan 2016 - 2020 finalized and disseminated	Document signed by MoH	Complete	-Advocacy for increased financial allocation to EmONC activities -Dissemination of EmONC Improvement Plan to all stakeholders	MoH, NMCHC, PHDs
	Coordination mechanisms operational	Minutes of meetings	Complete	-Regular meetings of MCH Sub- TWG -Annual EmONC meeting	NMCHC and Sub-TWG meet regularly
	Provincial leadership for EmONC IP	Minutes of meetings	90% (Partly achieved)	-Annual work plans, annual reports, supervisory visits, supportive activities -Pro- TWGH	There is variable support for EmONC at provincial level
	% of EmONC facilities with guidance on EmONC standards and procedures	Provincial reports	90% Partly Met (MCH, safe motherhood available in 97% of facilities	-Standards & protocols for staffing, equipment & case management distributed to all EmONC facilities -Standards, guidelines & protocols updated as needed	Standards and guidelines have been updated.
	Stock outs of essential medicine and supplies	MOH reports and databases	<5% Met less than 3% in last 3 month	-Ensure regular supply of basic equipment, supplies & drugs -Logistic systems that include essential EmONC medicines & supplies in place and functional	Stockouts variable across health facilities

Hierarchy of aims	Objectively Verifiable Indicators	Means of verification	Target 2020 and progress made towards targets	Key interventions	Comments
	Blood availability 24/7 in CEmONC facilities	Records of blood transfusion	90% **Target not met. Blood supply is available in 62% of facilities**	-Expand operational blood depots/banks in all CEmONC facilities	National & Provincial
Output 2					
Adequate coverage of EmONC facilities (availability and accessibility, including financial accessibility) assured throughout the country	# EmONC facilities per 500,000 population (UN EmONC PI N° 1)	Provincial records	At least 5 (≥160) Not met 80 facilities	-Upgrade facilities & provide equipment according to phased EmONC IP 2016-2020 -Review status & revise plans for second phase (2019-2020) as needed at end of first phase	Refer to UN indicators. Upgrade plan are available for most provinces
	# of BEmONC facilities per 500,000 population (UN EmONC PI N° 1, sub-indicator)	Provincial records	At least 4 (≥ 125) Not met 45 facilities	- Same as above - GIS mapping of EmONC facilities	Refer to UN indicators. GIS mapping was undertaken by WHO in 2016 but has not been used
	# of CEmONC facilities per 500,000 population (UN EmONC PI N° 1, sub-indicator)	Provincial records	At least 1 (≥35) Met 30 facilities	- Same as above - GIS mapping of EmONC facilities	As above.
	The full package of reproductive, maternal & newborn health services are in benefit packages of Health Equity Funds and national health insurance	MoH reports, Special surveys	TBD	- HEF expansion, other mechanisms as needed to cover hard to reach or marginalized populations	Limited data collected on HEF and cost of services
Output 3					
Technical and managerial capacity strengthened to ensure high quality of care	% of health centers with at least 2 secondary midwives	PHD records	50% 60%	- Pre-service training - Ensure needed staffing at all health centers - PHDs to review & propose adjustments	Varies from province to province (include workforce data)
	% of BEmONC facilities with at least 6 SMWs	PHD records	50% of BEmONC facilities with >400 deliveries per year	- Ensure needed staffing at BEmONC facilities - Pre-service training - PHDs to review & propose adjustments (baseline 2014 – 27% of	As above (include workforce data) Number of trained staff

Hierarchy of aims	Objectively Verifiable Indicators	Means of verification	Target 2020 and progress made towards targets	Key interventions	Comments
			66%	BEmONC and 50% of EmONC facilities with > 400 deliveries per year)	with 3 shifts (5-6 MWs)
	% BEmONC facilities with all SMWs trained on EmONC	PHD records	**80%** **Met 84%**	- Improve quality of care/competencies to perform core signal functions through training & on-site skills coaching - Annual plans for in-service training - Pre-service training	As above (include workforce data) with existing EmONC training data sheet
	% of maternal [and newborn] deaths reviewed through audits	PHD records	**80%** **Met 90%**	- Improve recording & reporting of obstetric & newborn deaths (including stillbirths), complications & their outcomes - Audit maternal & newborn deaths & near misses on a routine basis	While recording and reporting is improving more effort is needed to standardize and strengthen reporting. Particularly for newborn care
	Direct Obstetric Case Fatality Rate (DOCFR) (UN EmONC PI N° 6)	Facility records, PHD records	< 1% Met in functional EmONC facilities 0.44%	- Improve identification & recording of DOCFR at EmONC facilities - Improve referral system	As above. The validity of this indicators remains a concern
Output 4					
Increased utilization of EmONC services to reduce unmet needs	% of births in EmONC facilities (UN EmONC PI N° 3)	CDHS, Facility records	60% **NOT MET 37.9%**	- Improve identification of obstetric & newborn complications - Improve referral system - Ensure 24/7 availability of quality EmONC services at facilities	As above. The validity of this indicators remains a concern
	% of deliveries by Cesarean section (UN EmONC PI N°5)	CDHS, Facility records	10% **NOT MET 4.9%**	- Improve identification of obstetric & newborn complications - Improve quality of care/competencies to perform core signal functions through training & on-site skills coaching - Improve referral system	With donor support for training approaches in the workplace competencies have improved in some provinces. Referral needs strengthening
	% of targeted facilities implementing Expanded INC	PHD records, Facility records	90% **MET 90%**	- Improve quality of newborn care through training and on-site skills coaching	As above

Hierarchy of aims	Objectively Verifiable Indicators	Means of verification	Target 2020 and progress made towards targets	Key interventions	Comments
	% of newborns receiving early PNC (within 2 days of delivery)	PHD, Facility records	95% **MET 95%**	- Improve quality of newborn care through training & on-site skills coaching	As above
	Met need for Direct Obstetric Complications (UN EmONC PI N° 4)	PHDs records Facility records, EmONC Survey	90% **NOT MET 38.6%**	- Improve identification of obstetric & newborn complications - Improve quality of care/competencies to perform core signal functions through training & on-site skills coaching - Improve referral system	As above. The validity of this indicators remains a concern
Output 5					
Referral systems in place and operational throughout the country	% of EmONC facilities with ambulance ready 24/7 with trained personnel	PHD records Facility records	80% MET 85%	- Ensure availability and maintenance of ambulances and availability of trained personnel to accompany patients around the clock - Improve referral system	Needs strengthening, particularly reporting specific cases and outcomes. training of staff, maintenance of vehicles and training of clinical and ambulance staff
Output 6					
Provincial EmONC plans developed, operational and monitored	% of PHDs with annual EmONC Improvement Plan and annual report	PHD records and reports	90**%** **Target not met** **79% of** facilities knew about a plan. 50.8% had no seen it. It is not known if this is a provincial or national plan	- Training and technical assistance to PHDs & ODs to improve EmONC management, coordination, monitoring, analysis of challenges, evaluation & reporting - Support facilities to improve recording & reporting of obstetric & newborn complications & deaths	While recording and reporting is improving more effort is needed to standardize and strengthen reporting. Particularly for newborn care
Output 7					
Community participation strengthened to increase utilization	% EmONC facilities having annual meeting with community representatives	PHD records and reports	**50%** **Target not met** **40% of** health facilities meet with community's 1-3 monthly	-Encourage communes, HCMC & Commune Councils to meet & participate in meeting needs of EmONC	Needs stronger focus. Links to community need strengthening

Hierarchy of aims	Objectively Verifiable Indicators	Means of verification	Target 2020 and progress made towards targets	Key interventions	Comments

Summary of the main progress in EmONC between 2008 to 2020

(in pink: very reliable data; in grey and italic: less-reliable data)

Domain/Indicator	Baseline 2008	Progress 2014	2020	Remarks
Number of functional EmONC facilities (defined as 3 months performance of all signal functions) Number of EmONC facilities recommended for upgrade	44, out of 143 recommended EF, out of a total of 347 assessed (includes 40 private) 99 recommended for upgrade	63, out of a total 178 assessed (no private) 115 recommended for upgrade		Applying the extended definition of 7 and 9 signal functions performed in the last 12 months improves the figures and shows missing signal functions
Density of functional EmONC facilities, per 500,000 population	1.64	2.35	2.62	Expectation: at least 5
Density of functional CEmONC facilities, per 500,000 population	0.93	1.31	1.14	Expectation: 1.0 (met in 2014)
Geographic distribution of EmONC facilities	5 provinces had none	1 province had none (Kep)	Coverage of BEmONC poor at sub-national level	Depending on size of population. USE MAPS
Proportion of births in functional EmONC facilities	11.4%	23.5%	29.7%	Should be minimum 15% but can go up to 100% (optimal)
Proportion of births in all EmONC facilities	17.8%	35.0%	37.9%	same
Met Need for obstetric complications in functional EmONC facilities	*12.7%*	*23.6%*	*31.6%*	Indicator not built on reliable definitions of DOC (Direct Obstetric Complications)
Met Need for obstetric complications in all EmONC facilities	*14.5%*	*30.0%*	*38.7%*	same
Proportion of births by Cesarean section (in CEmONC facilities)	1.3%	3.9% (22.6% in Phnom Penh)	4.9% (15.9% in Phnom Penh)	Decrease in Phnom Penh could be due to more women using private facilities
Direct Obstetric Case Fatality Rates in	*0.75%*	*0.19%*	*0.44%*	Indicator not built on reliable definitions of DOC

Domain/Indicator	Baseline 2008	Progress 2014	2020	Remarks
functional EmONC facilities				(Direct Obstetric Complications)
Direct Obstetric Case Fatality Rates in all EmONC facilities	*0.74%*	*0.16%*	*0.56%*	same
Intra Partum mortality rates	*1.2%*	*1.53%*	*1.2%*	Indicator not built on reliable definitions of intrapartum stillbirths and very early newborn death
Proportion of Indirect Obstetric complications	*29.0%*	*16.7%*	*7.3%*	Indicator not built on reliable definitions of Direct and Indirect OC Obstetric Complications
Number of maternal complications referred OUT of EmONC facilities to higher level in one year	2,545	5,512	7,172	Causes: hemorrhage, obstructed labour, Pre/eclampsia, preterm, anemia, others
Number of maternal complications referred INTO EmONC facilities from lower level in one year	2,135	5,274	19,720	Missing the causes of referral
Number of newborn complications referred OUT of EmONC facilities to higher level	258	336	1,812	Causes: low birth weight, prematurity, respiratory problems, sepsis, jaundice, others
Number of newborn complications referred INTO EmONC facilities from lower level in one year	0	993	1,628	Missing the causes of referral
% of functional EmONC facilities with 2 or more secondary midwives	84%	98%	100%	
% of non-functional EmONC facilities with 2 or more secondary midwives	45%	74%	97%	
% of midwives trained in administering MgSO4 for pre/Eclampsia (and performed this signal	34% (12%)	86% (30%)	92%	

Domain/Indicator	Baseline 2008	Progress 2014	2020	Remarks
function in last 3 months)				

Annex 2: List of health facilities for the review of EmONC Improvement Plan 2020

No.	ID	Province/NH	Operational District Name	Health Facility Name	EmONC Classification in the Improvement Plan	Health facility Level	Health Facility Type
1	1	Banteay Meanchey	Mongkol Borei	10124. Mongkol Borei _PH	CEMONC_IP	CPA3	Provincial Hospital
2	2	Banteay Meanchey	Mongkol Borei	10101. Serei Sophon_RH	BEMONC_IP	CPA1	OD Referral Hospital
3	3	Banteay Meanchey	Poipet	10201. Poipet_RH	CEMONC_IP	CPA2	OD Referral Hospital
4	4	Banteay Meanchey	Poipet	10206. Kob_HCB (O Chrov_RH)	BEMONC_IP	CPA1	OD Referral Hospital
5	5	Banteay Meanchey	Poipet	10202. Poipet I_HC	BEMONC_IP	MPA	Health Center
6	6	Banteay Meanchey	Poipet	10209. Malai Santepheap_RH	BEMONC_IP	CPA1	OD Referral Hospital
7	7	Banteay Meanchey	Preah Net Preah	10301. Preah Net Preah_RH	BEMONC_IP	CPA1	OD Referral Hospital
8	8	Banteay Meanchey	Preah Net Preah	1031202. Phnom Srok_RH	BEMONC_IP	CPA1	OD Referral Hospital
9	9	Banteay Meanchey	Thma Puok	1040802. Svay Chek_RH	BEMONC_IP	CPA1	OD Referral Hospital
10	10	Banteay Meanchey	Thma Puok	10405. Beung Trakuon_HC	BEMONC_IP	MPA	Health Center
11	11	Banteay Meanchey	Thma Puok	10401. Thma Puok_RH	CEMONC_IP	CPA2	OD Referral Hospital
12	12	Battambang	Battambang	20408. Chrey_HC	BEMONC_IP	MPA	Health Center
13	13	Battambang	Battambang	20421. Ta Sanh_HCB	BEMONC_IP	CPA+MPA	Health Center with bed
14	14	Battambang	Battambang	20416. Sdao_HCB	BEMONC_IP	CPA+MPA	Health Center with bed
15	15	Battambang	Battambang	20412. Kantueu II_HCB	BEMONC_IP	CPA+MPA	Health Center with bed
16	16	Battambang	Battambang	20401. Battambang Pro. Hosp._PH	CEMONC_IP	CPA3	Provincial Hospital
17	17	Battambang	Maung Russei	20214. Kaos Kralor_HC	BEMONC_IP	MPA	Health Center
18	18	Battambang	Maung Russei	20213. Prek Chik_HC	BEMONC_IP	MPA	Health Center
19	19	Battambang	Maung Russei	20201. Maung Russei_RH	CEMONC_IP	CPA2	OD Referral Hospital
20	20	Battambang	Sampov Luon	20308. Ta Krei_HC	BEMONC_IP	MPA	Health Center
21	21	Battambang	Sampov Luon	20306. Trang_HCB	BEMONC_IP	CPA+MPA	Health Center with bed
22	22	Battambang	Sampov Luon	20301. Sampov Loun_RH	CEMONC_IP	CPA2	OD Referral Hospital
23	23	Battambang	Sangkae	20518. Ek Phnom_RH	BEMONC_IP	CPA1	OD Referral Hospital
24	24	Battambang	Thma Koul	20101. Thmar Koul_RH	BEMONC_IP	CPA1	OD Referral Hospital
25	25	Battambang	Thma Koul	20110. Bavel I_HCB (Bavel I_RH)	BEMONC_IP	CPA+MPA	OD Referral Hospital
26	26	Kampong Cham	Chamkar Leu	30101. Chamkar Leu_RH	BEMONC_IP	CPA2	OD Referral Hospital
27	27	Kampong Cham	Stueng Trang	30112. Me Sar Chrey_HC	BEMONC_IP	MPA	Health Center

No.	ID	Province/NH	Operational District Name	Health Facility Name	EmONC Classification in the Improvement Plan	Health facility Level	Health Facility Type
28	28	Kampong Cham	Choeung Prey	30201. Choeung Prey_RH	BEMONC_IP	CPA2	OD Referral Hospital
29	29	Kampong Cham	Batheay	30213. Batheay_RH	CEMONC_IP	CPA2	OD Referral Hospital
30	30	Kampong Cham	Batheay	30211. Phaav_HC	BEMONC_IP	MPA	Health Center
31	31	Kampong Cham	Stueng Trang	30325. Hun Sen Stung Trang_RH	BEMONC_IP	CPA1	OD Referral Hospital
32	32	Kampong Cham	Kg. Cham-Kg. Siem	30301. Kampong Cham Prov. Hosp._PH	CEMONC_IP	CPA3	Provincial Hospital
33	33	Kampong Cham	Prey Chhor	30801. Prey Chhor_RH	BEMONC_IP	CPA1	OD Referral Hospital
34	34	Kampong Cham	Srey Santhor	30901. Srey Santhor_RH	CEMONC_IP	CPA2	OD Referral Hospital
35	35	Kampong Cham	Srey Santhor	30902. Prek Romdeng_HC	BEMONC_IP	MPA	Health Center
36	36	Kampong Chhnang	Boribo	40301. Boribo_RH	BEMONC_IP	CPA1	OD Referral Hospital
37	37	Kampong Chhnang	Kampong Chhnang	40112. Kampong Hau_HCB	BEMONC_IP	CPA+MPA	Health Center with bed
38	38	Kampong Chhnang	Kampong Chhnang	40109. Akphivoadth_HCB	BEMONC_IP	CPA+MPA	Health Center with bed
39	39	Kampong Chhnang	Kampong Chhnang	40101. Kampong Chhnang_Prov Hosp_PH	CEMONC_IP	CPA3	Provincial Hospital
40	40	Kampong Chhnang	Kampong Tralach	40201. Kampong Tralach_RH	BEMONC_IP	CPA1	OD Referral Hospital
41	41	Kampong Chhnang	Kampong Tralach	40209. Svay Chuk_HC	BEMONC_IP	MPA	Health Center
42	42	Kampong Chhnang	Kampong Tralach	40211. Krang Lvea_HC	BEMONC_IP	MPA	Health Center
43	43	Kampong Speu	Kampong Speu	50101. Kampong Speu Prov. Hosp._PH	CEMONC_IP	CPA3	Provincial Hospital
44	44	Kampong Speu	Phnom Srouch	50117. Trapeang Kraloeung_RH	BEMONC_IP	CPA1	OD Referral Hospital
45	45	Kampong Speu	Kong Pisey	50201. Kong Pisey_RH	BEMONC_IP	CPA2	OD Referral Hospital
46	46	Kampong Speu	Kong Pisey	50210. Veal Ang Popel_HC	BEMONC_IP	MPA	Health Center
47	47	Kampong Speu	Kong Pisey	50215. Kak Preah Khe_HC	BEMONC_IP	MPA	Health Center
48	48	Kampong Speu	Kong Pisey	50214. Basedth Pomreal_HCB	BEMONC_IP	CPA+MPA	Health Center with bed
49	49	Kampong Speu	Kong Pisey	50213. Pou Angkrang_HC	BEMONC_IP	MPA	Health Center
50	50	Kampong Speu	Ou Dongk	50305. Cheung Roas Samaki_HC	BEMONC_IP	MPA	Health Center
51	51	Kampong Speu	Ou Dongk	50301. Ou Dong_RH	CEMONC_IP	CPA2	OD Referral Hospital
52	52	Kampong Thom	Baray and Santuk	60101. Baray and Santuk_RH	CEMONC_IP	CPA2	OD Referral Hospital
53	53	Kampong Thom	Baray and Santuk	60103. Taing Krasaing_HCB	BEMONC_IP	CPA+MPA	Health Center with bed
54	54	Kampong Thom	Baray and Santuk	60115. Treal_HC	BEMONC_IP	MPA	Health Center
55	55	Kampong Thom	Kampong Thom	60219. Mean Chey_HC	BEMONC_IP	MPA	Health Center
56	56	Kampong Thom	Kampong Thom	60220. Sambo_HCB	BEMONC_IP	CPA+MPA	Health Center with bed

No.	ID	Province/NH	Operational District Name	Health Facility Name	EmONC Classification in the Improvement Plan	Health facility Level	Health Facility Type
57	57	Kampong Thom	Kampong Thom	60201. Kampong Thom Prov. Hosp._PH	CEMONC_IP	CPA3	Provincial Hospital
58	58	Kampong Thom	Stong	60311. Pralay_HC	BEMONC_IP	MPA	Health Center
59	59	Kampong Thom	Stong	60301. Stong_RH	CEMONC_IP	CPA2	OD Referral Hospital
60	60	Kampot	Angkor Chey	70101. Angkor Chey_RH	BEMONC_IP	CPA2	OD Referral Hospital
61	61	Kampot	Chhouk	70201. Chhouk_RH	BEMONC_IP	CPA2	OD Referral Hospital
62	62	Kampot	Chhouk	70217. Bun Rany Hun Sen Koh Sla_RH	BEMONC_IP	CPA1	OD Referral Hospital
63	63	Kampot	Kampot	70411. Trapaing Ropov_HC	BEMONC_IP	MPA	Health Center
64	64	Kampot	Kampot	70401. Kampot Prov. Hosp._PH	CEMONC_IP	CPA3	Provincial Hospital
65	65	Kampot	Kampong Trach	70301. Kampong Trach_RH	BEMONC_IP	CPA2	OD Referral Hospital
66	66	Kampot	Kampong Trach	70310. Touk Meas_HCB	BEMONC_IP	CPA+MPA	Health Center with bed
67	67	Kandal	Kean Svay	80201. Kean Svay_RH	BEMONC_IP	CPA1	OD Referral Hospital
68	68	Kandal	Kean Svay	80212. Koki Thum_HC	BEMONC_IP	MPA	Health Center
69	69	Kandal	Koh Thom	80301. Koh Thum_RH	CEMONC_IP	CPA2	OD Referral Hospital
70	70	Kandal	Ksach Kandal	80401. Khsach Kandal_RH	BEMONC_IP	CPA1	OD Referral Hospital
71	71	Kandal	Ksach Kandal	80407. Prek Luong_HC	BEMONC_IP	MPA	Health Center
72	72	Kandal	Lvea Em	80901. Lvea Em_RH	BEMONC_IP	CPA1	OD Referral Hospital
73	73	Kandal	Muk Kam Poul	80503. Prek Anhchanh_HCB	BEMONC_IP	CPA+MPA	Health Center with bed
74	74	Kandal	Muk Kam Poul	80513. Bunrani Hun Sen Rokakong_RH	BEMONC_IP	CPA2	OD Referral Hospital
75	75	Kandal	Saang	80701. Hopital saang_RH	BEMONC_IP	CPA1	OD Referral Hospital
76	76	Kandal	Saang	80708. Kraing Yov_HCB	BEMONC_IP	CPA+MPA	Health Center with bed
77	77	Kandal	Takhmao	80817. Kandal Stung Referral Hospital_RH	BEMONC_IP	CPA1	OD Referral Hospital
78	78	Kandal	Takhmao	80801. Cheychumnash Hosp._PH	CEMONC_IP	CPA3	Provincial Hospital
79	79	Kep	Kep	230101. Kep Prov. Hosp._PH	BEMONC_IP	CPA1	Provincial Hospital
80	80	Kep	Kep	230104. Pong Teuk_HC	BEMONC_IP	MPA	Health Center
81	81	Koh Kong	Smach Mean Chey	90101. Koh Kong Prov. Hosp._PH	CEMONC_IP	CPA2	Provincial Hospital
82	82	Koh Kong	Srae Ambel	90201. SraeAmbel_RH	BEMONC_IP	CPA1	OD Referral Hospital
83	83	Kratie	Chhlong	100102. Chambak_HC	BEMONC_IP	MPA	Health Center
84	84	Kratie	Chhlong	100101. Chhlong_RH	BEMONC_IP	CPA2	OD Referral Hospital
85	85	Kratie	Kratie	100228. Snoul_RH	BEMONC_IP	CPA1	OD Referral Hospital

No.	ID	Province/NH	Operational District Name	Health Facility Name	EmONC Classification in the Improvement Plan	Health facility Level	Health Facility Type
86	86	Kratie	Kratie	100211. Sambo_HCB	BEMONC_IP	CPA+MPA	Health Center with bed
87	87	Kratie	Kratie	100201. Kratie Prov. Hosp._PH	CEMONC_IP	CPA3	Provincial Hospital
88	88	Mondul Kiri	Sen Monorom	110101. Mondul Kiri Prov Hosp._PH	CEMONC_IP	CPA2	Provincial Hospital
89	93	Mondul Kiri	Sen Monorom	110106. Keo Seima_HCB	BEMONC_IP	CPA+MPA	Health Center with bed
90	95	Mondul Kiri	Sen Monorom	110109. O Am_HC	BEMONC_IP	MPA	Health Center
91	100	Mondul Kiri	Sen Monorom	11010702. Koh Nhek_RH	BEMONC_IP	CPA1	OD Referral Hospital
92	101	Oddar Meanchey	Anlong Veng	220208. Trapeang Prasat_HC	BEMONC_IP	MPA	Health Center
93	102	Oddar Meanchey	Anlong Veng	220201. Anlong Vaeng_RH	CEMONC_IP	CPA1	OD Referral Hospital
94	103	Oddar Meanchey	Samraong	220114. Kouk Mon_HC	BEMONC_IP	MPA	Health Center
95	104	Oddar Meanchey	Samraong	220101. Oddor Meanchey Prov Hosp_PH	CEMONC_IP	CPA2	Provincial Hospital
96	105	Pailin	Pailin	240101. Pailin Prov. Hosp._PH	CEMONC_IP	CPA2	Provincial Hospital
97	106	Preah Vihear	Tbeng Meanchey	130108. Rovieng_HCB	BEMONC_IP	CPA+MPA	Health Center with bed
98	107	Preah Vihear	Tbeng Meanchey	130103. Sra Em_HCB	BEMONC_IP	CPA+MPA	Health Center with bed
99	108	Preah Vihear	Tbeng Meanchey	130104011. Chamksan_RH	BEMONC_IP	CPA1	OD Referral Hospital
100	109	Preah Vihear	Tbeng Meanchey	130105. Koulen_HCB	BEMONC_IP	CPA+MPA	Health Center with bed
101	110	Preah Vihear	Tbeng Meanchey	130101. P Vihear 16 Makara Prov Hos_PH	CEMONC_IP	CPA3	Provincial Hospital
102	111	National Hospital	National Hopital	121012. Kossamak_NH	CEMONC_IP	NH	National Hospital
103	112	National Hospital	National Hopital	121010. Khmer-Soviet Friendship_NH	CEMONC_IP	NH	National Hospital
104	113	National Hospital	National Hopital	121002. Preah Ang Duong_NH	CEMONC_IP	NH	National Hospital
105	114	National Hospital	National Hopital	121004. Calmette_NH	CEMONC_IP	NH	National Hospital
106	115	National Hospital	National Hopital	121016. MCH_NH	CEMONC_IP	NH	National Hospital
107	116	Phnom Penh	Sen Sok	120501. Sen Sok Hospital_RH	BEMONC_IP	CPA1	OD Referral Hospital
108	117	Phnom Penh	Chaktomouk	120207. Chaktomok_RH	BEMONC_IP	CPA1	OD Referral Hospital
109	118	Phnom Penh	Preaek Phnov	120701. Prek Pnov Hospital_RH	BEMONC_IP	CPA1	OD Referral Hospital
110	119	Phnom Penh	Mekong	120101. Samdech Ov Hospital_RH	BEMONC_IP	CPA1	OD Referral Hospital
111	120	Phnom Penh	Chaktomouk	120201. Municipal Hospital_PH	CEMONC_IP	CPA3	Provincial Hospital
112	121	Phnom Penh	Chaktomouk	120202. Phsar Durm Thkov_HC	BEMONC_IP	MPA	Health Center
113	122	Phnom Penh	Dang Koa	120602. Pong Tuek_HC	BEMONC_IP	MPA	Health Center
114	123	Phnom Penh	Sen Sok	120506. Teuk Thla_HC	BEMONC_IP	MPA	Health Center

No.	ID	Province/NH	Operational District Name	Health Facility Name	EmONC Classification in the Improvement Plan	Health facility Level	Health Facility Type
115	124	Phnom Penh	Chaktomouk	120205. Tuol Kork_HC	BEMONC_IP	MPA	Health Center
116	125	Phnom Penh	Por Senchey	120301. Pochentong Hospital_RH	BEMONC_IP	CPA1	OD Referral Hospital
117	126	Phnom Penh	Bassak	120402. Chak Angrae_RH	BEMONC_IP	CPA1	OD Referral Hospital
118	127	Phnom Penh	Bassak	120401. Mean Chey Hospital_RH	BEMONC_IP	CPA1	OD Referral Hospital
119	128	Phnom Penh	Dang Koa	120601. Dang Kao Hospital_RH	BEMONC_IP	CPA1	OD Referral Hospital
120	129	Phnom Penh	Bassak	120403. Steung Mean Chey_HC	BEMONC_IP	MPA	Health Center
121	130	Preah Sihanouk	Preah Sihanouk	180104. Veal Rinh_HC	BEMONC_IP	MPA	Health Center
122	131	Preah Sihanouk	Preah Sihanouk	180102. Steung Hav_HC	BEMONC_IP	MPA	Health Center
123	132	Preah Sihanouk	Preah Sihanouk	180101. Preah Sihanouk Prov. Hosp_PH	CEMONC_IP	CPA3	Provincial Hospital
124	133	Prey Veng	Kamchay Mear	140201. Kamchay Mear_RH	BEMONC_IP	CPA1	OD Referral Hospital
125	134	Prey Veng	Kanhchriech	140401. Kanhchriech_RH	BEMONC_IP	CPA1	OD Referral Hospital
126	135	Prey Veng	Kampong Trabek	140301. Kampong Trabek_RH	CEMONC_IP	CPA2	OD Referral Hospital
127	136	Prey Veng	Mesang	140601. Mesang_RH	BEMONC_IP	CPA1	OD Referral Hospital
128	137	Prey Veng	OD Baphnom	140101. RH Baphnom_RH	BEMONC_IP	CPA1	OD Referral Hospital
129	138	Prey Veng	Peam Ror	140801. Neak Leung Hospital_RH	CEMONC_IP	CPA2	OD Referral Hospital
130	139	Prey Veng	Pearaing	140901. Peareang_RH	CEMONC_IP	CPA2	OD Referral Hospital
131	140	Prey Veng	Preah Sdach	141001. Preah Sdach_RH	BEMONC_IP	CPA1	OD Referral Hospital
132	141	Prey Veng	Svay Antor	141201. Svay Antor_RH	BEMONC_IP	CPA1	OD Referral Hospital
133	142	Prey Veng	Krong Prey Veng	140501. Prey Veng Prov. Hosp._PH	CEMONC_IP	CPA3	Provincial Hospital
134	143	Prey Veng	Sithor Kandal	141101. Sithor Kandal_RH	BEMONC_IP	CPA1	OD Referral Hospital
135	144	Pursat	Bakan	150101. Bakan_RH	BEMONC_IP	CPA1	OD Referral Hospital
136	145	Pursat	Kravanh	150234. Phnom Kravanh_RH	BEMONC_IP	CPA1	OD Referral Hospital
137	146	Pursat	Krakor	150233. Krakor_RH	BEMONC_IP	CPA1	OD Referral Hospital
138	147	Pursat	Kravanh	150222. Pramaoy_HC	BEMONC_IP	MPA	Health Center
139	148	Pursat	Sampov Meas	150201. Pursat Prov. Hosp._PH	CEMONC_IP	CPA3	Provincial Hospital
140	165	Ratanakiri	Borkeo	160201. Borkeo RH_RH	BEMONC_IP	CPA1	OD Referral Hospital
141	167	Ratanakiri	Borkeo	160207. Oyadav_HCB	BEMONC_IP	CPA+MPA	Health Center with bed
142	168	Ratanakiri	Borkeo	160210. Andaung Meas_HCB	BEMONC_IP	CPA+MPA	Health Center with bed
143	175	Ratanakiri	Banlong	160101. Ratanakiri Prov Hos_PH	CEMONC_IP	CPA3	Provincial Hospital

No.	ID	Province/NH	Operational District Name	Health Facility Name	EmONC Classification in the Improvement Plan	Health facility Level	Health Facility Type
144	176	Siemreap	Angkor Chhum	170401. Angkor Chum_RH	BEMONC_IP	CPA1	OD Referral Hospital
145	177	Siemreap	Angkor Chhum	170410. Puok_RH	BEMONC_IP	CPA1	OD Referral Hospital
146	178	Siemreap	Kralanh	170101. Kralanh_RH	BEMONC_IP	CPA2	OD Referral Hospital
147	179	Siemreap	Kralanh	170106. Srey Snam_HCB	BEMONC_IP	CPA+MPA	Health Center with bed
148	180	Siemreap	Siem Reap	170201. Siem Reap Prov. Hosp._PH	CEMONC_IP	CPA3	Provincial Hospital
149	181	Siemreap	Sot Nikum	170304. Samraong_HC	BEMONC_IP	MPA	Health Center
150	182	Siemreap	Sot Nikum	170315. Anlong Samnar_HC	BEMONC_IP	MPA	Health Center
151	183	Siemreap	Sot Nikum	170301. Sotr Nikum_RH	CEMONC_IP	CPA2	OD Referral Hospital
152	184	Stung Treng	Steung Treng	190107. Siem Pang_HCB	BEMONC_IP	CPA+MPA	Health Center with bed
153	185	Stung Treng	Steung Treng	190110. Sre Krasaing_HCB	BEMONC_IP	CPA+MPA	Health Center with bed
154	186	Stung Treng	Steung Treng	190101. Stung Treng Prov. Hosp._PH	CEMONC_IP	CPA3	Provincial Hospital
155	187	Svay Rieng	Chi Phu	200101. Chi Phu_RH	BEMONC_IP	CPA1	OD Referral Hospital
156	188	Svay Rieng	Chi Phu	200105. Me Sa Thngak_HC	BEMONC_IP	MPA	Health Center
157	189	Svay Rieng	Svay Teap	200402. Svay Teap_RH	BEMONC_IP	CPA1	OD Referral Hospital
158	190	Svay Rieng	Svay Teap	200321. Chak_HCB (Rumduol Samaki_RH)	BEMONC_IP	CPA1	OD Referral Hospital
159	191	Svay Rieng	Romeas Hek	200201. Romeas Hek_RH	CEMONC_IP	CPA2	OD Referral Hospital
160	192	Svay Rieng	Svay Rieng	200316. Svay Chrum_RH	BEMONC_IP	CPA1	OD Referral Hospital
161	193	Svay Rieng	Svay Teap	200317. Nhor_HCB	BEMONC_IP	MPA	Health Center with bed
162	194	Svay Rieng	Svay Rieng	200301. Svay Rieng Prov Hosp._PH	CEMONC_IP	CPA3	Provincial Hospital
163	195	Takeo	Ang Rokar	210101. AngRoka_RH	BEMONC_IP	CPA1	OD Referral Hospital
164	196	Takeo	Ang Rokar	210109. Trapeang Andeuk_HC	BEMONC_IP	MPA	Health Center
165	197	Takeo	Bati	210201. Bati_RH	BEMONC_IP	CPA1	OD Referral Hospital
166	198	Takeo	Bati	210213. Rovieng_HC	BEMONC_IP	MPA	Health Center
167	199	Takeo	Daun Keo	210301. Takeo Prov Hospital_PH	CEMONC_IP	CPA3	Provincial Hospital
168	200	Takeo	Koh Andeth	210601. Koh Andeth_RH	BEMONC_IP	CPA1	OD Referral Hospital
169	201	Takeo	Kirivong	210401. Kirivong_RH	CEMONC_IP	CPA2	OD Referral Hospital
170	202	Takeo	Prey Kabass	210501. Prey Kabass_RH	BEMONC_IP	CPA1	OD Referral Hospital
171	203	Takeo	Prey Kabass	20151102. Angkor Borei RH_RH	BEMONC_IP	CPA1	OD Referral Hospital
172	204	Tbong Khmum	Kroch Chhmar	250301. Kroch Chhmar_RH	BEMONC_IP	CPA1	OD Referral Hospital

No.	ID	Province/NH	Operational District Name	Health Facility Name	EmONC Classification in the Improvement Plan	Health facility Level	Health Facility Type
173	205	Tbong Khmum	Memut	250401. Memut_RH	CEMONC_IP	CPA2	OD Referral Hospital
174	206	Tbong Khmum	Dambae	250701. Dambe_RH	BEMONC_IP	CPA1	OD Referral Hospital
175	207	Tbong Khmum	O Reang Ov	250501. O Reang Ov_RH	BEMONC_IP	CPA1	OD Referral Hospital
176	208	Tbong Khmum	Memut	250409. Sla_HC	BEMONC_IP	MPA	Health Center
177	209	Tbong Khmum	Ponhea Krek	250603. Kraek 1_HC	BEMONC_IP	MPA	Health Center
178	210	Tbong Khmum	Dambae	250704. Chong Cheach_HC	BEMONC_IP	MPA	Health Center
179	211	Tbong Khmum	Ponhea Krek	250601. Ponhea Krek_RH	CEMONC_IP	CPA2	OD Referral Hospital
180	212	Tbong Khmum	Tbong Khmum	250105. Roka Po Pram 2_HC	BEMONC_IP	MPA	Health Center
181	213	Tbong Khmum	Suong	250207. Tbong Khmum _RH	CEMONC_IP	CPA2	OD Referral Hospital

Annex 3: Health facilities for the baseline of KOICA Project in Mundul Kiri and Ratanak Kiri

No.	ID	Province/NH	Operational District Name	Health Facility Name	EmONC Classification in the Improvement Plan	Health facility Level	Health Facility Type
1	88	Mondul Kiri	Sen Monorom	110101. Mondul Kiri Prov Hosp._PH	CEmONC	CPA2	Provincial Hospital
2	91	Mondul Kiri	Sen Monorom	110104. Pichreada_HCB	--	CPA+MPA	Health Center with bed
3	92	Mondul Kiri	Sen Monorom	110105. O Raing_HCB	--	CPA+MPA	Health Center with bed
4	93	Mondul Kiri	Sen Monorom	110106. Keo Seima_HCB	BEmONC	CPA+MPA	Health Center with bed
5	94	Mondul Kiri	Sen Monorom	110107. Me Mang_HCB	--	CPA+MPA	Health Center with bed
6	95	Mondul Kiri	Sen Monorom	110109. O Am_HC	BEmONC	MPA	Health Center
7	96	Mondul Kiri	Sen Monorom	110115. PuChrey_HC	--	MPA	Health Center
8	97	Mondul Kiri	Sen Monorom	110118. Dakdam_HC	--	MPA	Health Center
9	98	Mondul Kiri	Sen Monorom	110120. Krang Tes_HC	--	MPA	Health Center
10	99	Mondul Kiri	Sen Monorom	110121. Toul_HC	--	MPA	Health Center
11	100	Mondul Kiri	Sen Monorom	11010702. Koh Nhek_RH	BEmONC	CPA1	OD Referral Hospital
12	149	Ratanakiri	Banlong	160102. Banlung_HC	--	MPA	Health Center
13	150	Ratanakiri	Banlong	160103. Kachanh_HC	--	MPA	Health Center
14	151	Ratanakiri	Banlong	160104. Ochum_HCB	--	CPA+MPA	Health Center with bed
15	152	Ratanakiri	Banlong	160105. Samaky_HC	--	MPA	Health Center
16	153	Ratanakiri	Banlong	160107. Voensai_HCB	--	CPA+MPA	Health Center with bed
17	154	Ratanakiri	Banlong	160108. Kachuon_HC	--	MPA	Health Center
18	155	Ratanakiri	Banlong	160109. VirakChey_HC	--	MPA	Health Center
19	156	Ratanakiri	Banlong	160110. Taveng_HCB	--	CPA+MPA	Health Center with bed
20	157	Ratanakiri	Banlong	160111. Kounmum_HCB	--	CPA+MPA	Health Center with bed
21	158	Ratanakiri	Banlong	160113. Lumphat_HCB	--	CPA+MPA	Health Center with bed
22	159	Ratanakiri	Banlong	160121. Chomrom Bey Sruk_HC	--	MPA	Health Center
23	160	Ratanakiri	Banlong	16011103. Poy_HC	--	MPA	Health Center
24	161	Ratanakiri	Banlong	16011104. Teoun_HC	--	MPA	Health Center
25	162	Ratanakiri	Banlong	16011105. Lbang 1_HC	--	MPA	Health Center
26	163	Ratanakiri	Banlong	16011106. Se Da_HC	--	MPA	Health Center
27	164	Ratanakiri	Borkeo	160122. Nhang_HC	--	MPA	Health Center

No.	ID	Province/NH	Operational District Name	Health Facility Name	EmONC Classification in the Improvement Plan	Health facility Level	Health Facility Type
28	165	Ratanakiri	Borkeo	160201. Borkeo RH_RH	BEmONC	CPA1	OD Referral Hospital
29	166	Ratanakiri	Borkeo	160202. Ke Chong_HC	--	MPA	Health Center
30	167	Ratanakiri	Borkeo	160207. Oyadav_HCB	BEmONC	CPA+MPA	Health Center with bed
31	168	Ratanakiri	Borkeo	160210. Andaung Meas_HCB	BEmONC	CPA+MPA	Health Center with bed
32	169	Ratanakiri	Borkeo	160211. Malek_HC	--	MPA	Health Center
33	170	Ratanakiri	Borkeo	160212. Somthom_HC	--	MPA	Health Center
34	171	Ratanakiri	Borkeo	160213. Borkham_HC	--	MPA	Health Center
35	172	Ratanakiri	Borkeo	160214. Longkhoung_HC	--	MPA	Health Center
36	173	Ratanakiri	Borkeo	160215. Talav_HC	--	MPA	Health Center
37	175	Ratanakiri	Banlong	160101. Ratanakiri Prov Hos_PH	CEmONC	CPA3	Provincial Hospital

Annex 4: List of signal function performed by each EmONC Facility surveyed (2020 EmONC Review)

Note:

- BEmONC 3M, BEmONC 12M, CEmONC 3M, CEmONC 12M : 1 = The facility was classified as functional EmONC facility 3 months and 12 months prior the review
- Non-Functionning 3M, Non-Functionning 12M : 1 = The facility was not classified as functional EmONC facility
- Antibiotics, Oxytocics, Anti-convulsant, Manual removal placenta, Removal retain products, Assisted Delivery, Neonatal Resuscitation, Caesarean Delivery, Blood Transfusion : 1= performed, 0= Not performed

Province/ Facility Name	EmONC Status						# function performed last 3 months		# function performed last 3 & 12 months		Antibiotics		Oxytocics		Anti-convulsant		Manual removal placenta		Removal retain products		Assisted Delivery		Neonatal Resuscitation		Caesarean Delivery		Blood Transfusion	
	BEmONC 3M	CEmONC 3M	Non-Functionning 3M	BEmONC 12M	CEmONC 12M	Non-Functionning 12M	1-7	1-9	1-7	1-9	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M
1- Banteay Meanchey																												
Mongkul Borei-PH		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Serey Sophorn (RH)	1			1			7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Poipet (RH)		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
O Chrov (RH)			1			1	3	3	3	3	1	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0
Poipet 1			1			1	4	4	5	5	1	1	1	1	0	0	0	1	1	1	0	0	1	1	0	0	0	0
Malai Santepheap			1	1			6	6	7	7	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0	0	0
Preah Net Preah (RH)	1			1			7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Phnom Srok (RH)			1	1			6	6	7	7	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0	0	0
Svay Chek (RH)			1	1			4	4	7	7	1	1	1	1	0	1	1	1	1	1	0	1	0	1	0	0	0	0
Boeung Trakuon			1			1	3	3	4	4	0	0	1	1	0	0	0	0	1	1	1	1	0	1	0	0	0	0
Thmor Pourk (RH)	1			1			7	8	7	8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
2-Battambang																												
Chrey			1			1	3	3	4	4	0	0	1	1	0	0	0	1	1	1	0	0	1	1	0	0	0	0
Ta sanh			1			1	4	4	5	5	1	1	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0
Sdao			1			1	2	2	3	3	0	0	1	1	0	0	0	1	1	1	0	0	0	0	0	0	0	0
Kan Toeu			1			1	1	1	2	2	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Battambang-PH (RH)		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Kaos Kralor			1			1	3	3	5	5	0	0	1	1	1	1	0	0	1	1	0	1	0	1	0	0	0	0
Preaek Chik			1			1	4	4	5	5	0	0	1	1	1	1	1	1	0	0	1	1	0	1	0	0	0	0
Mong Russey (RH)		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Ta Krey			1	1			6	6	7	7	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0	0	0
Trang			1			1	3	3	6	6	1	1	1	1	0	1	0	1	1	1	0	0	0	1	0	0	0	0
Sampov Luon (RH)		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Ek Phnom (RH)			1	1			4	4	7	7	1	1	1	1	0	1	0	1	1	1	1	1	0	1	0	0	0	0
Thmar Koul (RH)	1			1			7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0

Province/ Facility Name	EmONC Status						# function performed last 3 months		# function performed last 3 & 12 months		Antibiotics		Oxytocics		Anti-convulsant		Manual removal placenta		Removal retain products		Assisted Delivery		Neonatal Resuscitation		Caesarean Delivery		Blood Transfusion	
	BEmONC 3M	CEmONC 3M	Non-Functionning 3M	BEmONC 12M	CEmONC 12M	Non-Functionning 12M	1-7	1-9	1-7	1-9	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M
Bavel 1 (RH)			1	1			5	5	7	7	1	1	1	1	0	1	1	1	1	1	1	1	0	1	0	0	0	0
3-Kampong Cham																												
Chamkar Leu (RH)	1			1			7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Mesar Chrey			1			1	3	3	5	5	0	0	1	1	0	0	0	1	1	1	1	1	0	1	0	0	0	0
Cheung Prey (RH)	1			1			7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Batheay (RH)	1			1			7	8	7	8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
Ph'Av			1			1	5	5	5	5	0	0	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
Steung Trang (RH)	1			1			7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Kampong Cham-PH		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Prey Chhor (RH)			1	1			6	6	7	7	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0	0	0
Srey Santhor (RH)	1				1		7	8	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
Prek Romdeng			1	1			6	6	7	7	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	0	0	0
4-Kampong Chhnang																												
Boribo (RH)			1			1	6	6	6	6	1	1	1	1	1	1	1	1	1	1	0	0	1	1	0	0	0	0
Kampong Hav			1			1	6	6	6	6	1	1	1	1	0	0	1	1	1	1	1	1	1	1	0	0	0	0
Akpivoth			1			1	4	4	5	5	1	1	1	1	0	1	1	1	1	1	0	0	0	0	0	0	0	0
Kampong Chhnang-		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Kampong Tralach	1			1			7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Svay Chuk			1			1	6	6	6	6	1	1	1	1	0	0	1	1	1	1	1	1	1	1	0	0	0	0
Kraing Lvea			1			1	3	3	6	6	1	1	1	1	0	0	0	1	0	1	1	1	0	1	0	0	0	0
5-Kampong Speu																												
Kampong Speu-PH		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Trapaing Kraleung	1			1			7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Kong Pisey (RH)	1			1			7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Veal Ang Popel			1			1	4	4	6	6	1	1	1	1	0	0	0	1	1	1	0	1	1	1	0	0	0	0
Kak Preah Khe	1			1			7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Baset Pomreal			1	1			5	5	7	7	1	1	1	1	0	1	1	1	1	1	0	1	1	1	0	0	0	0
Por Angkrang*			1			1	4	4	5	5	0	1	1	1	0	0	1	1	1	1	0	0	1	1	0	0	0	0
Choeng Ros Samaki			1	1			4	4	7	7	0	1	1	1	0	1	0	1	1	1	1	1	1	1	0	0	0	0
Oudong (RH)	1			1			7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
6-Kampong Thom																												
Baray-Santuk (RH)		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Taing Krasaing			1			1	3	3	4	4	0	0	1	1	0	0	1	1	0	1	1	1	0	0	0	0	0	0

Province/ Facility Name	EmONC Status						# function performed last 3 months		# function performed last 3 & 12 months		Antibiotics		Oxytocics		Anti-convulsant		Manual removal placenta		Removal retain products		Assisted Delivery		Neonatal Resuscitation		Caesarean Delivery		Blood Transfusion	
	BEmONC 3M	CEmONC 3M	Non-Functionning 3M	BEmONC 12M	CEmONC 12M	Non-Functionning 12M	1-7	1-9	1-7	1-9	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M
Treal			1			1	3	3	4	4	0	0	1	1	0	0	0	0	1	1	0	1	1	1	0	0	0	0
Meanchey			1			1	4	4	5	5	0	0	1	1	0	1	1	1	0	0	1	1	1	1	0	0	0	0
Sambo			1	1			4	4	7	7	1	1	1	1	0	1	1	1	1	1	0	1	0	1	0	0	0	0
Kampong Thom-PH		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Pralay			1			1	3	3	6	6	1	1	1	1	0	0	0	1	1	1	0	1	0	1	0	0	0	0
Stong (RH)		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
7-Kampot																												
Angkor Chey (RH)	1			1			7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Chhouk (RH)	1			1			7	8	7	8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
Bun Rany-Hun Sen	1			1			7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Trapaing Ropov			1			1	3	3	4	4	0	0	1	1	0	0	0	0	1	1	1	1	0	1	0	0	0	0
Kampot-PH (RH)		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Kampong Trach (RH)	1			1			7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Touk Meas			1			1	5	5	6	6	0	1	1	1	0	0	1	1	1	1	1	1	1	1	0	0	0	0
8-Kandal																												
Kean Svay (RH)			1	1			6	6	7	7	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0	0	0
Koki Thom			1			1	4	4	5	5	1	1	1	1	0	0	0	1	1	1	0	0	1	1	0	0	0	0
Koh Thom (RH)	1			1			7	8	7	8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
Ksach Kandal (RH)			1	1			6	6	7	7	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0	0	0
Prek Luong			1			1	4	4	5	5	1	1	1	1	0	0	1	1	1	1	0	0	0	1	0	0	0	0
Lvea Em (RH)			1			1	4	4	6	6	1	1	1	1	0	1	1	1	1	1	0	0	0	1	0	0	0	0
Preak Anhchanh			1			1	5	5	6	6	1	1	1	1	0	0	1	1	1	1	1	1	0	1	0	0	0	0
Rokar Korng (RH)			1			1	5	5	6	6	1	1	1	1	0	0	1	1	1	1	0	1	1	1	0	0	0	0
Saang (RH)	1			1			7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Kraing Yov			1			1	3	3	5	5	0	1	1	1	1	1	0	0	0	1	0	0	1	1	0	0	0	0
Kandal Steung (RH)			1			1	6	6	6	6	1	1	1	1	0	0	1	1	1	1	1	1	1	1	0	0	0	0
Chey Chum Neah-PH		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
9-Koh Kong																												
Koh Kong-PH (RH)		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sre Ambel (RH)	1			1			7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
10-Kratie																												
Chambak			1	1			5	5	7	7	0	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0	0	0
Chhlong (RH)	1			1			7	8	7	8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0

Province/ Facility Name	EmONC Status						# function performed last 3 months		# function performed last 3 & 12 months		Antibiotics		Oxytocics		Anti-convulsant		Manual removal placenta		Removal retain products		Assisted Delivery		Neonatal Resuscitation		Caesarean Delivery		Blood Transfusion	
	BEmONC 3M	CEmONC 3M	Non-Functionning 3M	BEmONC 12M	CEmONC 12M	Non-Functionning 12M	1-7	1-9	1-7	1-9	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M
Snuol (RH)	1			1			7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Sambour			1			1	4	4	5	5	0	0	1	1	0	1	1	1	1	1	1	1	0	0	0	0	0	0
Kratie-PH (RH)		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
11-Mondulkiri																												
Mondul Kiri-PH (RH)		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Keo Seima			1	1			6	6	7	7	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0	0	0
O Am			1			1	5	5	5	5	1	1	1	1	0	0	1	1	1	1	0	0	1	1	0	0	0	0
Koh Nhek (RH)	1			1			7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
12-Phnom Penh																												
Preah Kossamak-NH		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Khmero-Soviet-NH		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Preah Ang duong-NH		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Calmette Hospital		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
MCH-NH		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sen Sok (RH)			1	1			5	5	7	7	1	1	1	1	0	1	1	1	1	1	0	1	1	1	0	0	0	0
Chaktumuk (RH)			1	1			5	5	7	7	1	1	1	1	0	1	0	1	1	1	1	1	1	1	0	0	0	0
Prek Pnov RH			1			1	6	6	6	6	1	1	1	1	0	0	1	1	1	1	1	1	1	1	0	0	0	0
Samdach Ov (RH)			1	1			6	6	7	7	1	1	1	1	1	1	0	1	1	1	1	1	1	1	0	0	0	0
Phnom Penh		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Psar Doem Thkov			1			1	3	3	3	3	1	1	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0
Pong Toeuk			1			1	4	4	4	4	1	1	1	1	0	0	1	1	0	0	0	0	1	1	0	0	0	0
Teuk Thla			1			1	4	4	5	5	1	1	1	1	0	0	0	0	1	1	0	1	1	1	0	0	0	0
Tuol Kork			1			1	2	2	3	3	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Pochen Tong (RH)			1			1	5	5	6	6	1	1	1	1	0	1	1	1	1	1	0	0	1	1	0	0	0	0
Chak Angrae			1			1	6	6	6	6	1	1	1	1	0	0	1	1	1	1	1	1	1	1	0	0	0	0
Meanchey (RH)			1			1	5	5	6	6	1	1	1	1	1	1	0	0	1	1	0	1	1	1	0	0	0	0
Dangkor (RH)			1	1			4	4	7	7	0	1	1	1	1	1	1	1	1	1	0	1	0	1	0	0	0	0
Steng Meanchey			1			1	4	4	4	4	1	1	1	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0
13-Preah Vihear																												
Ro Vieng			1			1	4	4	5	5	0	0	1	1	0	0	0	1	1	1	1	1	1	1	0	0	0	0
Sa Em			1			1	3	3	5	5	0	1	1	1	0	0	1	1	1	1	0	0	0	1	0	0	0	0
Choam Khsan (RH)	1			1			7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Kulen*			1	1			5	5	7	7	0	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0	0	0

Province/ Facility Name	EmONC Status						# function performed last 3 months		# function performed last 3 & 12 months		Antibiotics		Oxytocics		Anti-convulsant		Manual removal placenta		Removal retain products		Assisted Delivery		Neonatal Resuscitation		Caesarean Delivery		Blood Transfusion	
	BEmONC 3M	CEmONC 3M	Non-Functionning 3M	BEmONC 12M	CEmONC 12M	Non-Functionning 12M	1-7	1-9	1-7	1-9	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M
Preah Vihear-PH (RH)		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
14-Prey Veng																												
Kamchay Mear (RH)			1	1			6	6	7	7	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0
Kanchreach (RH)			1			1	3	3	5	5	1	1	1	1	0	0	0	0	0	1	1	1	0	1	0	0	0	0
Kampong Trabek (RH)	1			1			7	8	7	8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
Mesang (RH)	1			1			7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Ba Phnom (RH)			1	1			5	5	7	7	1	1	0	1	0	1	1	1	1	1	1	1	1	1	0	0	0	0
Neak Loeung (RH)		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Peareang (RH)	1				1		7	8	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
Preah Sdach (RH)	1			1			7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Svay Anthor (RH)			1			1	5	5	6	6	1	1	1	1	0	0	1	1	1	1	1	1	0	1	0	0	0	0
Prey Veng-PH (RH)		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Sithor Kandal (RH)			1			1	4	4	6	6	1	1	1	1	0	1	0	1	1	1	0	0	1	1	0	0	0	0
15-Pursat																												
Bakan (RH)	1			1			7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Phnom Kra Vanh (RH)	1			1			7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Kra Kor (RH)	1			1			7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Pramoy			1			1	4	4	5	5	1	1	1	1	1	1	0	1	1	1	0	0	0	0	0	0	0	0
Sampov Meas-PH		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
16-Ratanakiri																												
Bor Keo (RH)	1			1			7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Oyadav			1	1			5	5	7	7	1	1	1	1	1	1	0	1	0	1	1	1	1	1	0	0	0	0
Andaung Meas			1			1	2	2	2	2	0	0	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0
Rattanakiri-PH (RH)		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
17-Siem Reap																												
Angkor Chum (RH)	1			1			7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Pourk (RH)			1			1	6	6	6	6	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
Kralanh (RH)	1			1			7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Srey Snam			1			1	4	4	5	5	1	1	1	1	1	1	0	1	0	0	0	0	1	1	0	0	0	0
Siem Reap-PH (RH)		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Samrong			1			1	5	5	5	5	1	1	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0
Anlong Samnar			1			1	4	4	6	6	1	1	1	1	0	0	1	1	1	1	0	1	0	1	0	0	0	0
Soth Nikum (RH)	1				1		7	7	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	1

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	BEmONC 3M	CEmONC 3M	Non-Functionning 3M	BEmONC 12M	CEmONC 12M	Non-Functionning 12M	1-7	1-9	1-7	1-9	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M
18-Preah Sihanouk																												
Veal Rinh			1			1	3	3	5	5	0	1	1	1	0	0	1	1	1	1	0	0	0	1	0	0	0	0
Steung Hav			1			1	3	3	3	3	0	0	1	1	0	0	0	0	1	1	0	0	1	1	0	0	0	0
Sihanouk Ville-PH		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
19-Stoeung Treng																												
Siem Pang			1			1	4	4	5	5	0	1	1	1	1	1	1	1	0	0	0	0	1	1	0	0	0	0
Sre Kror Saing			1	1			3	3	7	7	0	1	1	1	1	1	0	1	0	1	1	1	0	1	0	0	0	0
Steng Treng-PH (RH)		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
20-Svay Rieng																												
Chi Phu (RH)	1			1			7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Mesar Thngork			1			1	3	3	4	4	0	0	1	1	0	0	1	1	0	1	0	0	1	1	0	0	0	0
Svay Teap (RH)			1	1			6	6	7	7	1	1	1	1	1	1	1	1	1	1	0	1	1	1	0	0	0	0
Samaki Rumduol (RH)			1			1	4	4	4	4	1	1	1	1	0	0	0	0	1	1	0	0	1	1	0	0	0	0
Romeas Hek (RH)	1			1			7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Svay Chrom (RH)			1			1	5	5	5	5	1	1	1	1	0	0	1	1	1	1	0	0	1	1	0	0	0	0
Nhor			1			1	3	3	5	5	1	1	1	1	0	0	0	1	1	1	0	0	0	1	0	0	0	0
Svay Rieng-PH (RH)		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
21-Takeo																												
Ang Rokar (RH)	1			1			7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Trapaing Andoeuk			1			1	2	2	3	3	0	0	1	1	0	0	1	1	0	0	0	0	0	1	0	0	0	0
Bati (RH)	1			1			7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Rovieng			1			1	3	3	5	5	0	0	1	1	0	0	1	1	1	1	0	1	0	1	0	0	0	0
Takeo-PH (RH)		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Koh Andeth (RH)			1			1	4	4	5	5	1	1	1	1	0	1	1	1	0	0	0	0	1	1	0	0	0	0
Kirivong (RH)		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Prey Kabass (RH)	1			1			7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Angkor Borey (RH)			1			1	4	4	5	5	1	1	1	1	0	0	1	1	1	1	0	0	0	1	0	0	0	0
22-Oddor Meanchey																												
Trapaing Prasath			1	1			4	4	7	7	1	1	1	1	0	1	0	1	1	1	0	1	1	1	0	0	0	0
Anlong Veng (RH)	1			1			7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Kok Morn			1			1	5	5	6	6	0	0	1	1	1	1	1	1	1	1	0	1	1	1	0	0	0	0
Samrong-PH (RH)		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Province/ Facility Name	EmONC Status						# function performed last 3 months		# function performed last 3 & 12 months		Antibiotics		Oxytocics		Anti-convulsant		Manual removal placenta		Removal retain products		Assisted Delivery		Neonatal Resuscitation		Caesarean Delivery		Blood Transfusion	
	BEmONC 3M	CEmONC 3M	Non-Functionning 3M	BEmONC 12M	CEmONC 12M	Non-Functionning 12M	1-7	1-9	1-7	1-9	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M
23-Kep																												
Kep (RH)			1	1			4	4	7	7	1	1	1	1	0	1	0	1	1	1	0	1	1	1	0	0	0	0
Pong Teuk			1			1	2	2	3	3	0	0	1	1	0	0	0	0	1	1	0	0	0	1	0	0	0	0
24-Pailin																												
Pailin (RH)		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
25-Thbong Khmum																												
Kroch Chhmar (RH)			1	1			6	6	7	7	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0
Memot (RH)	1			1			7	8	7	8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0
Dambe (RH)			1	1			5	5	7	7	1	1	1	1	0	1	1	1	1	1	0	1	1	1	0	0	0	0
O Reang Ov (RH)			1	1			6	6	7	7	1	1	1	1	1	1	1	1	1	1	1	1	0	1	0	0	0	0
Slar*			1			1	4	4	5	5	1	1	1	1	0	0	1	1	0	1	0	0	1	1	0	0	0	0
HC Krek I*			1			1	1	1	3	3	0	0	1	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0
Chong Cheach			1			1	5	5	6	6	1	1	1	1	0	1	1	1	1	1	0	0	1	1	0	0	0	0
Ponhea Krek (RH)	1				1		7	8	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1
Rokar Por Pram II			1	1			3	3	7	7	1	1	1	1	0	1	0	1	0	1	1	1	0	1	0	0	0	0
Tbong Khmum (RH)	1				1		7	8	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	1

Annex 5: Signal functions performed in health facilities- Baseline study (Mundul Kiri & Ratanak Kiri)

Note:

- BEmONC 3M, BEmONC 12M, CEmONC 3M, CEmONC 12M : 1 = The facility was classified as functional EmONC facility 3 months and 12 months prior the review
- Non-Functionning 3M, Non-Functionning 12M : 1 = The facility was not classified as functional EmONC facility
- Antibiotics, Oxytocics, Anti-convulsant, Manual removal placenta, Removal retain products, Assisted Delivery, Neonatal Resuscitation, Caesarean Delivery, Blood Transfusion : 1= performed, 0= Not performed

Province/ Facility Name	EmONC Status						# function performed last 3 months		# function performed last 3 & 12 months		Antibiotics		Oxytocics		Anti-convulsant		Manual removal placenta		Removal retain products		Assisted Delivery		Neonatal Resuscitation		Caesarean Delivery		Blood Transfusion	
	BEmONC 3M	CEmONC 3M	Non-Functionning 3M	BEmONC 12M	CEmONC 12M	Non-Functionning 12M	1-7	1-9	1-7	1-9	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M
Mondulkiri																												
Mondul Kiri-PH (RH)		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Pichreada			1			1	2	2	3	3	0	0	1	1	0	0	0	0	1	1	0	0	0	1	0	0	0	0
O Raing			1			1	2	2	3	3	1	1	1	1	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Keo Seima			1	1			6	6	7	7	1	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0	0	0
Me Mang			1			1	2	2	3	3	1	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
O Am			1			1	5	5	5	5	1	1	1	1	0	0	1	1	1	1	0	0	1	1	0	0	0	0
PuChrey			1			1	2	2	2	2	0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Dakdam			1			1	1	1	3	3	0	0	1	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0
Krang Tes			1			1	1	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Toul			1			1	2	2	3	3	0	0	1	1	0	0	1	1	0	0	0	0	0	1	0	0	0	0
Koh Nhek (RH)	1			1			7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Ratanakiri																												
Banlung			1			1	3	3	4	4	0	1	1	1	0	0	1	1	1	1	0	0	0	0	0	0	0	0
Kachanh			1			1	1	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ochum			1			1	2	2	2	2	0	0	1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Samaky			1			1	1	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Voensai			1			1	1	1	2	2	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Kachuon			1			1	1	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Virak Chey			1			1	1	1	2	2	0	0	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Taveng			1			1	1	1	3	3	0	0	1	1	0	0	0	1	0	0	0	0	0	1	0	0	0	0
Kounmum			1			1	1	1	3	3	0	0	1	1	0	1	0	0	0	0	0	0	0	1	0	0	0	0
Lumphat			1			1	2	2	3	3	0	1	1	1	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Chomrom Bey Sruk			1			1	1	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Poy			1			1	1	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Province/ Facility Name	EmONC Status						# function performed last 3 months		# function performed last 3 & 12 months		Antibiotics		Oxytocics		Anti-convulsant		Manual removal placenta		Removal retain products		Assisted Delivery		Neonatal Resuscitation		Caesarean Delivery		Blood Transfusion	
	BEmONC 3M	CEmONC 3M	Non-Functionning 3M	BEmONC 12M	CEmONC 12M	Non-Functionning 12M	1-7	1-9	1-7	1-9	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M	3M	12M
Teoun			1			1	1	1	2	2	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Lbang 1			1			1	1	1	2	2	0	0	1	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0
Se Da			1			1	1	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Nhang			1			1	2	2	2	2	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0
Bor Keo (RH)	1			1			7	7	7	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0
Ke Chong			1			1	1	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oyadav			1	1			5	5	7	7	1	1	1	1	1	1	0	1	0	1	1	1	1	1	0	0	0	0
Andaung Meas			1			1	2	2	2	2	0	0	1	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0
Malek			1			1	2	2	2	2	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0
Somthom			1			1	1	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Borkham			1			1	1	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Longkhoung			1			1	1	1	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Talav			1			1	2	2	2	2	0	0	1	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0
Rattanakiri-PH (RH)		1			1		7	9	7	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

Annex 6: List of functional EmONC facilities 3 months prior the survey

No.	ID	Province/NH	Operational District Name	Health Facility Name	Health Facility Type	Health facility Level	EmONC Status for 3 months
1	1	Banteay Meanchey	Mongkol Borei	10124. Mongkol Borei _PH	Provincial Hospital	CPA3	CEMONC_3M
2	2	Banteay Meanchey	Mongkol Borei	10101. Serei Sophon_RH	OD Referral Hospital	CPA1	BEMONC_3M
3	3	Banteay Meanchey	Poipet	10201. Poipet_RH	OD Referral Hospital	CPA2	CEMONC_3M
4	7	Banteay Meanchey	Preah Net Preah	10301. Preah Net Preah_RH	OD Referral Hospital	CPA1	BEMONC_3M
5	11	Banteay Meanchey	Thma Puok	10401. Thma Puok_RH	OD Referral Hospital	CPA2	BEMONC_3M
6	16	Battambang	Battambang	20401. Battambang Pro. Hosp._PH	Provincial Hospital	CPA3	CEMONC_3M
7	19	Battambang	Maung Russei	20201. Maung Russei_RH	OD Referral Hospital	CPA2	CEMONC_3M
8	22	Battambang	Sampov Luon	20301. Sampov Loun_RH	OD Referral Hospital	CPA2	CEMONC_3M
9	24	Battambang	Thma Koul	20101. Thmar Koul_RH	OD Referral Hospital	CPA1	BEMONC_3M
10	26	Kampong Cham	Chamkar Leu	30101. Chamkar Leu_RH	OD Referral Hospital	CPA2	BEMONC_3M
11	28	Kampong Cham	Choeung Prey	30201. Choeung Prey_RH	OD Referral Hospital	CPA2	BEMONC_3M
12	29	Kampong Cham	Batheay	30213. Batheay_RH	OD Referral Hospital	CPA2	BEMONC_3M
13	31	Kampong Cham	Stueng Trang	30325. Hun Sen Stung Trang_RH	OD Referral Hospital	CPA1	BEMONC_3M
14	32	Kampong Cham	Kampong Cham - Kg. Siem	30301. Kampong Cham Prov. Hosp._PH	Provincial Hospital	CPA3	CEMONC_3M
15	34	Kampong Cham	Srey Santhor	30901. Srey Santhor_RH	OD Referral Hospital	CPA2	BEMONC_3M
16	39	Kampong Chhnang	Kampong Chhnang	40101. Kampong Chhnang_Prov Hosp_PH	Provincial Hospital	CPA3	CEMONC_3M
17	40	Kampong Chhnang	Kampong Tralach	40201. Kampong Tralach_RH	OD Referral Hospital	CPA1	BEMONC_3M
18	43	Kampong Speu	Kampong Speu	50101. Kampong Speu Prov. Hosp._PH	Provincial Hospital	CPA3	CEMONC_3M
19	44	Kampong Speu	Phnom Srouch	50117. Trapeang Kraloeung_RH	OD Referral Hospital	CPA1	BEMONC_3M
20	45	Kampong Speu	Kong Pisey	50201. Kong Pisey_RH	OD Referral Hospital	CPA2	BEMONC_3M
21	47	Kampong Speu	Kong Pisey	50215. Kak Preah Khe_HC	Health Center	MPA	BEMONC_3M
22	51	Kampong Speu	Ou Dongk	50301. Ou Dong_RH	OD Referral Hospital	CPA2	BEMONC_3M
23	52	Kampong Thom	Baray and Santuk	60101. Baray and Santuk_RH	OD Referral Hospital	CPA2	CEMONC_3M
24	57	Kampong Thom	Kampong Thom	60201. Kampong Thom Prov. Hosp._PH	Provincial Hospital	CPA3	CEMONC_3M
25	59	Kampong Thom	Stong	60301. Stong_RH	OD Referral Hospital	CPA2	CEMONC_3M
26	60	Kampot	Angkor Chey	70101. Angkor Chey_RH	OD Referral Hospital	CPA2	BEMONC_3M

No.	ID	Province/NH	Operational District Name	Health Facility Name	Health Facility Type	Health facility Level	EmONC Status for 3 months
27	61	Kampot	Chhouk	70201. Chhouk_RH	OD Referral Hospital	CPA2	BEMONC_3M
28	62	Kampot	Chhouk	70217. Bun Rany Hun Sen Koh Sla_RH	OD Referral Hospital	CPA1	BEMONC_3M
29	64	Kampot	Kampot	70401. Kampot Prov. Hosp._PH	Provincial Hospital	CPA3	CEMONC_3M
30	65	Kampot	Kampong Trach	70301. Kampong Trach_RH	OD Referral Hospital	CPA2	BEMONC_3M
31	69	Kandal	Koh Thom	80301. Koh Thum_RH	OD Referral Hospital	CPA2	BEMONC_3M
32	75	Kandal	Saang	80701. Hopital saang_RH	OD Referral Hospital	CPA1	BEMONC_3M
33	78	Kandal	Takhmao	80801. Cheychumnash Hosp._PH	Provincial Hospital	CPA3	CEMONC_3M
34	81	Koh Kong	Smach Mean Chey	90101. Koh Kong Prov. Hosp._PH	Provincial Hospital	CPA2	CEMONC_3M
35	82	Koh Kong	Srae Ambel	90201. SraeAmbel_RH	OD Referral Hospital	CPA1	BEMONC_3M
36	84	Kratie	Chhlong	100101. Chhlong_RH	OD Referral Hospital	CPA2	BEMONC_3M
37	85	Kratie	Kratie	100228. Snoul_RH	OD Referral Hospital	CPA1	BEMONC_3M
38	87	Kratie	Kratie	100201. Kratie Prov. Hosp._PH	Provincial Hospital	CPA3	CEMONC_3M
39	88	Mondul Kiri	Sen Monorom	110101. Mondul Kiri Prov Hosp._PH	Provincial Hospital	CPA2	CEMONC_3M
40	100	Mondul Kiri	Sen Monorom	11010702. Koh Nhek_RH	OD Referral Hospital	CPA1	BEMONC_3M
41	102	Oddar Meanchey	Anlong Veng	220201. Anlong Vaeng_RH	OD Referral Hospital	CPA1	BEMONC_3M
42	104	Oddar Meanchey	Samraong	220101. Oddor Meanchey Prov Hosp_PH	Provincial Hospital	CPA2	CEMONC_3M
43	105	Pailin	Pailin	240101. Pailin Prov. Hosp._PH	Provincial Hospital	CPA2	CEMONC_3M
44	108	Preah Vihear	Tbeng Meanchey	130104011. Chamksan_RH	OD Referral Hospital	CPA1	BEMONC_3M
45	110	Preah Vihear	Tbeng Meanchey	130101. P Vihear 16 Makara Prov Hos_PH	Provincial Hospital	CPA3	CEMONC_3M
46	111	National Hospital	National Hopital	121012. Kossamak_NH	National Hospital	NH	CEMONC_3M
47	112	National Hospital	National Hopital	121010. Khmer-Soviet Friendship_NH	National Hospital	NH	CEMONC_3M
48	113	National Hospital	National Hopital	121002. Preah Ang Duong_NH	National Hospital	NH	CEMONC_3M
49	114	National Hospital	National Hopital	121004. Calmette_NH	National Hospital	NH	CEMONC_3M
50	115	National Hospital	National Hopital	121016. MCH_NH	National Hospital	NH	CEMONC_3M
51	120	Phnom Penh	Chaktomouk	120201. Municipal Hospital_PH	Provincial Hospital	CPA3	CEMONC_3M
52	132	Preah Sihanouk	Preah Sihanouk	180101. Preah Sihanouk Prov. Hosp_PH	Provincial Hospital	CPA3	CEMONC_3M
53	135	Prey Veng	Kampong Trabek	140301. Kampong Trabek_RH	OD Referral Hospital	CPA2	BEMONC_3M
54	136	Prey Veng	Mesang	140601. Mesang_RH	OD Referral Hospital	CPA1	BEMONC_3M

No.	ID	Province/NH	Operational District Name	Health Facility Name	Health Facility Type	Health facility Level	EmONC Status for 3 months
55	138	Prey Veng	Peam Ror	140801. Neak Leung Hospital_RH	OD Referral Hospital	CPA2	CEMONC_3M
56	139	Prey Veng	Pearaing	140901. Peareang_RH	OD Referral Hospital	CPA2	BEMONC_3M
57	140	Prey Veng	Preah Sdach	141001. Preah Sdach_RH	OD Referral Hospital	CPA1	BEMONC_3M
58	142	Prey Veng	Krong Prey Veng	140501. Prey Veng Prov. Hosp._PH	Provincial Hospital	CPA3	CEMONC_3M
59	144	Pursat	Bakan	150101. Bakan_RH	OD Referral Hospital	CPA1	BEMONC_3M
60	145	Pursat	Kravanh	150234. Phnom Kravanh_RH	OD Referral Hospital	CPA1	BEMONC_3M
61	146	Pursat	Krakor	150233. Krakor_RH	OD Referral Hospital	CPA1	BEMONC_3M
62	148	Pursat	Sampov Meas	150201. Pursat Prov. Hosp._PH	Provincial Hospital	CPA3	CEMONC_3M
63	165	Ratanakiri	Borkeo	160201. Borkeo RH_RH	OD Referral Hospital	CPA1	BEMONC_3M
64	175	Ratanakiri	Banlong	160101. Ratanakiri Prov Hos_PH	Provincial Hospital	CPA3	CEMONC_3M
65	176	Siemreap	Angkor Chhum	170401. Angkor Chum_RH	OD Referral Hospital	CPA1	BEMONC_3M
66	178	Siemreap	Kralanh	170101. Kralanh_RH	OD Referral Hospital	CPA2	BEMONC_3M
67	180	Siemreap	Siem Reap	170201. Siem Reap Prov. Hosp._PH	Provincial Hospital	CPA3	CEMONC_3M
68	183	Siemreap	Sot Nikum	170301. Sotr Nikum_RH	OD Referral Hospital	CPA2	BEMONC_3M
69	186	Stung Treng	Steung Treng	190101. Stung Treng Prov. Hosp._PH	Provincial Hospital	CPA3	CEMONC_3M
70	187	Svay Rieng	Chi Phu	200101. Chi Phu RH	OD Referral Hospital	CPA1	BEMONC_3M
71	191	Svay Rieng	Romeas Hek	200201. Romeas Hek_RH	OD Referral Hospital	CPA2	BEMONC_3M
72	194	Svay Rieng	Svay Rieng	200301. Svay Rieng Prov Hosp._PH	Provincial Hospital	CPA3	CEMONC_3M
73	195	Takeo	Ang Rokar	210101. AngRoka_RH	OD Referral Hospital	CPA1	BEMONC_3M
74	197	Takeo	Bati	210201. Bati_RH	OD Referral Hospital	CPA1	BEMONC_3M
75	199	Takeo	Daun Keo	210301. Takeo Prov Hospital_PH	Provincial Hospital	CPA3	CEMONC_3M
76	201	Takeo	Kirivong	210401. Kirivong_RH	OD Referral Hospital	CPA2	CEMONC_3M
77	202	Takeo	Prey Kabass	210501. Prey Kabass_RH	OD Referral Hospital	CPA1	BEMONC_3M
78	205	Tbong Khmum	Memut	250401. Memut_RH	OD Referral Hospital	CPA2	BEMONC_3M
79	211	Tbong Khmum	Ponhea Krek	250601. Ponhea Krek_RH	OD Referral Hospital	CPA2	BEMONC_3M
80	213	Tbong Khmum	Suong	250207. Tbong Khmum_RH	OD Referral Hospital	CPA2	BEMONC_3M

Annex 7: List of functional EmONC facilities 12 months prior the survey

No.	ID	Province/NH	Operational District Name	Health Facility Name	Health Facility Type	Health facility Level	EmONC Status for 3 months
1	1	Banteay Meanchey	Mongkol Borei	10124. Mongkol Borei _PH	Provincial Hospital	CPA3	CEMONC_12M
2	2	Banteay Meanchey	Mongkol Borei	10101. Serei Sophon_RH	OD Referral Hospital	CPA1	BEMONC_12M
3	3	Banteay Meanchey	Poipet	10201. Poipet_RH	OD Referral Hospital	CPA2	CEMONC_12M
4	6	Banteay Meanchey	Poipet	10209. Malai Santepheap_RH	OD Referral Hospital	CPA1	BEMONC_12M
5	7	Banteay Meanchey	Preah Net Preah	10301. Preah Net Preah_RH	OD Referral Hospital	CPA1	BEMONC_12M
6	8	Banteay Meanchey	Preah Net Preah	1031202. Phnom Srok_RH	OD Referral Hospital	CPA1	BEMONC_12M
7	9	Banteay Meanchey	Thma Puok	1040802. Svay Chek_RH	OD Referral Hospital	CPA1	BEMONC_12M
8	11	Banteay Meanchey	Thma Puok	10401. Thma Puok_RH	OD Referral Hospital	CPA2	BEMONC_12M
9	16	Battambang	Battambang	20401. Battambang Pro. Hosp._PH	Provincial Hospital	CPA3	CEMONC_12M
10	19	Battambang	Maung Russei	20201. Maung Russei_RH	OD Referral Hospital	CPA2	CEMONC_12M
11	20	Battambang	Sampov Luon	20308. Ta Krei_HC	Health Center	MPA	BEMONC_12M
12	22	Battambang	Sampov Luon	20301. Sampov Loun_RH	OD Referral Hospital	CPA2	CEMONC_12M
13	23	Battambang	Sangkae	20518. Ek Phnom_RH	OD Referral Hospital	CPA1	BEMONC_12M
14	24	Battambang	Thma Koul	20101. Thmar Koul_RH	OD Referral Hospital	CPA1	BEMONC_12M
15	25	Battambang	Thma Koul	20110. Bavel I_HCB (Bavel I_RH)	OD Referral Hospital	CPA+MPA	BEMONC_12M
16	26	Kampong Cham	Chamkar Leu	30101. Chamkar Leu_RH	OD Referral Hospital	CPA2	BEMONC_12M
17	28	Kampong Cham	Choeung Prey	30201. Choeung Prey_RH	OD Referral Hospital	CPA2	BEMONC_12M
18	29	Kampong Cham	Batheay	30213. Batheay_RH	OD Referral Hospital	CPA2	BEMONC_12M
19	31	Kampong Cham	Stueng Trang	30325. Hun Sen Stung Trang_RH	OD Referral Hospital	CPA1	BEMONC_12M
20	32	Kampong Cham	Kampong Cham - Kg. Siem	30301. Kampong Cham Prov. Hosp._PH	Provincial Hospital	CPA3	CEMONC_12M
21	33	Kampong Cham	Prey Chhor	30801. Prey Chhor_RH	OD Referral Hospital	CPA1	BEMONC_12M
22	34	Kampong Cham	Srey Santhor	30901. Srey Santhor_RH	OD Referral Hospital	CPA2	CEMONC_12M
23	35	Kampong Cham	Srey Santhor	30902. Prek Romdeng_HC	Health Center	MPA	BEMONC_12M
24	39	Kampong Chhnang	Kampong Chhnang	40101. Kampong Chhnang_Prov Hosp_PH	Provincial Hospital	CPA3	CEMONC_12M
25	40	Kampong Chhnang	Kampong Tralach	40201. Kampong Tralach_RH	OD Referral Hospital	CPA1	BEMONC_12M
26	43	Kampong Speu	Kampong Speu	50101. Kampong Speu Prov. Hosp._PH	Provincial Hospital	CPA3	CEMONC_12M
27	44	Kampong Speu	Phnom Srouch	50117. Trapeang Kraloeung_RH	OD Referral Hospital	CPA1	BEMONC_12M

No.	ID	Province/NH	Operational District Name	Health Facility Name	Health Facility Type	Health facility Level	EmONC Status for 3 months
28	45	Kampong Speu	Kong Pisey	50201. Kong Pisey_RH	OD Referral Hospital	CPA2	BEMONC_12M
29	47	Kampong Speu	Kong Pisey	50215. Kak Preah Khe_HC	Health Center	MPA	BEMONC_12M
30	48	Kampong Speu	Kong Pisey	50214. Basedth Pomreal_HCB	Health Center with bed	CPA+MPA	BEMONC_12M
31	50	Kampong Speu	Ou Dongk	50305. Cheung Roas Samaki_HC	Health Center	MPA	BEMONC_12M
32	51	Kampong Speu	Ou Dongk	50301. Ou Dong_RH	OD Referral Hospital	CPA2	BEMONC_12M
33	52	Kampong Thom	Baray and Santuk	60101. Baray and Santuk_RH	OD Referral Hospital	CPA2	CEMONC_12M
34	56	Kampong Thom	Kampong Thom	60220. Sambo_HCB	Health Center with bed	CPA+MPA	BEMONC_12M
35	57	Kampong Thom	Kampong Thom	60201. Kampong Thom Prov. Hosp._PH	Provincial Hospital	CPA3	CEMONC_12M
36	59	Kampong Thom	Stong	60301. Stong_RH	OD Referral Hospital	CPA2	CEMONC_12M
37	60	Kampot	Angkor Chey	70101. Angkor Chey_RH	OD Referral Hospital	CPA2	BEMONC_12M
38	61	Kampot	Chhouk	70201. Chhouk_RH	OD Referral Hospital	CPA2	BEMONC_12M
39	62	Kampot	Chhouk	70217. Bun Rany Hun Sen Koh Sla_RH	OD Referral Hospital	CPA1	BEMONC_12M
40	64	Kampot	Kampot	70401. Kampot Prov. Hosp._PH	Provincial Hospital	CPA3	CEMONC_12M
41	65	Kampot	Kampong Trach	70301. Kampong Trach_RH	OD Referral Hospital	CPA2	BEMONC_12M
42	67	Kandal	Kean Svay	80201. Kean Svay_RH	OD Referral Hospital	CPA1	BEMONC_12M
43	69	Kandal	Koh Thom	80301. Koh Thum_RH	OD Referral Hospital	CPA2	BEMONC_12M
44	70	Kandal	Ksach Kandal	80401. Khsach Kandal_RH	OD Referral Hospital	CPA1	BEMONC_12M
45	75	Kandal	Saang	80701. Hopital saang_RH	OD Referral Hospital	CPA1	BEMONC_12M
46	78	Kandal	Takhmao	80801. Cheychumnash Hosp._PH	Provincial Hospital	CPA3	CEMONC_12M
47	79	Kep	Kep	230101. Kep Prov. Hosp._PH	Provincial Hospital	CPA1	BEMONC_12M
48	81	Koh Kong	Smach Mean Chey	90101. Koh Kong Prov. Hosp._PH	Provincial Hospital	CPA2	CEMONC_12M
49	82	Koh Kong	Srae Ambel	90201. SraeAmbel_RH	OD Referral Hospital	CPA1	BEMONC_12M
50	83	Kratie	Chhlong	100102. Chambak_HC	Health Center	MPA	BEMONC_12M
51	84	Kratie	Chhlong	100101. Chhlong_RH	OD Referral Hospital	CPA2	BEMONC_12M
52	85	Kratie	Kratie	100228. Snoul_RH	OD Referral Hospital	CPA1	BEMONC_12M
53	87	Kratie	Kratie	100201. Kratie Prov. Hosp._PH	Provincial Hospital	CPA3	CEMONC_12M
54	88	Mondul Kiri	Sen Monorom	110101. Mondul Kiri Prov Hosp._PH	Provincial Hospital	CPA2	CEMONC_12M
55	93	Mondul Kiri	Sen Monorom	110106. Keo Seima_HCB	Health Center with bed	CPA+MPA	BEMONC_12M

No.	ID	Province/NH	Operational District Name	Health Facility Name	Health Facility Type	Health facility Level	EmONC Status for 3 months
56	100	Mondul Kiri	Sen Monorom	11010702. Koh Nhek_RH	OD Referral Hospital	CPA1	BEMONC_12M
57	101	Oddar Meanchey	Anlong Veng	220208. Trapeang Prasat_HC	Health Center	MPA	BEMONC_12M
58	102	Oddar Meanchey	Anlong Veng	220201. Anlong Vaeng_RH	OD Referral Hospital	CPA1	BEMONC_12M
59	104	Oddar Meanchey	Samraong	220101. Oddor Meanchey Prov Hosp_PH	Provincial Hospital	CPA2	CEMONC_12M
60	105	Pailin	Pailin	240101. Pailin Prov. Hosp._PH	Provincial Hospital	CPA2	CEMONC_12M
61	108	Preah Vihear	Tbeng Meanchey	130104011. Chamksan_RH	OD Referral Hospital	CPA1	BEMONC_12M
62	109	Preah Vihear	Tbeng Meanchey	130105. Koulen_HCB	Health Center with bed	CPA+MPA	BEMONC_12M
63	110	Preah Vihear	Tbeng Meanchey	130101. P Vihear 16 Makara Prov Hos_PH	Provincial Hospital	CPA3	CEMONC_12M
64	111	National Hospital	National Hopital	121012. Kossamak_NH	National Hospital	NH	CEMONC_12M
65	112	National Hospital	National Hopital	121010. Khmer-Soviet Friendship_NH	National Hospital	NH	CEMONC_12M
66	113	National Hospital	National Hopital	121002. Preah Ang Duong_NH	National Hospital	NH	CEMONC_12M
67	114	National Hospital	National Hopital	121004. Calmette_NH	National Hospital	NH	CEMONC_12M
68	115	National Hospital	National Hopital	121016. MCH_NH	National Hospital	NH	CEMONC_12M
69	116	Phnom Penh	Sen Sok	120501. Sen Sok Hospital_RH	OD Referral Hospital	CPA1	BEMONC_12M
70	117	Phnom Penh	Chaktomouk	120207. Chaktomok_RH	OD Referral Hospital	CPA1	BEMONC_12M
71	119	Phnom Penh	Mekong	120101. Samdech Ov Hospital_RH	OD Referral Hospital	CPA1	BEMONC_12M
72	120	Phnom Penh	Chaktomouk	120201. Municipal Hospital_PH	Provincial Hospital	CPA3	CEMONC_12M
73	128	Phnom Penh	Dang Koa	120601. Dang Kao Hospital_RH	OD Referral Hospital	CPA1	BEMONC_12M
74	132	Preah Sihanouk	Preah Sihanouk	180101. Preah Sihanouk Prov. Hosp_PH	Provincial Hospital	CPA3	CEMONC_12M
75	133	Prey Veng	Kamchay Mear	140201. Kamchay Mear_RH	OD Referral Hospital	CPA1	BEMONC_12M
76	135	Prey Veng	Kampong Trabek	140301. Kampong Trabek_RH	OD Referral Hospital	CPA2	BEMONC_12M
77	136	Prey Veng	Mesang	140601. Mesang_RH	OD Referral Hospital	CPA1	BEMONC_12M
78	137	Prey Veng	OD Baphnom	140101. RH Baphnom_RH	OD Referral Hospital	CPA1	BEMONC_12M
79	138	Prey Veng	Peam Ror	140801. Neak Leung Hospital_RH	OD Referral Hospital	CPA2	CEMONC_12M
80	139	Prey Veng	Pearaing	140901. Peareang_RH	OD Referral Hospital	CPA2	CEMONC_12M
81	140	Prey Veng	Preah Sdach	141001. Preah Sdach_RH	OD Referral Hospital	CPA1	BEMONC_12M
82	142	Prey Veng	Krong Prey Veng	140501. Prey Veng Prov. Hosp._PH	Provincial Hospital	CPA3	CEMONC_12M
83	144	Pursat	Bakan	150101. Bakan_RH	OD Referral Hospital	CPA1	BEMONC_12M

No.	ID	Province/NH	Operational District Name	Health Facility Name	Health Facility Type	Health facility Level	EmONC Status for 3 months
84	145	Pursat	Kravanh	150234. Phnom Kravanh_RH	OD Referral Hospital	CPA1	BEMONC_12M
85	146	Pursat	Krakor	150233. Krakor_RH	OD Referral Hospital	CPA1	BEMONC_12M
86	148	Pursat	Sampov Meas	150201. Pursat Prov. Hosp._PH	Provincial Hospital	CPA3	CEMONC_12M
87	165	Ratanakiri	Borkeo	160201. Borkeo RH_RH	OD Referral Hospital	CPA1	BEMONC_12M
88	167	Ratanakiri	Borkeo	160207. Oyadav_HCB	Health Center with bed	CPA+MPA	BEMONC_12M
89	175	Ratanakiri	Banlong	160101. Ratanakiri Prov Hos_PH	Provincial Hospital	CPA3	CEMONC_12M
90	176	Siemreap	Angkor Chhum	170401. Angkor Chum_RH	OD Referral Hospital	CPA1	BEMONC_12M
91	178	Siemreap	Kralanh	170101. Kralanh_RH	OD Referral Hospital	CPA2	BEMONC_12M
92	180	Siemreap	Siem Reap	170201. Siem Reap Prov. Hosp._PH	Provincial Hospital	CPA3	CEMONC_12M
93	183	Siemreap	Sot Nikum	170301. Sotr Nikum_RH	OD Referral Hospital	CPA2	CEMONC_12M
94	185	Stung Treng	Steung Treng	190110. Sre Krasaing_HCB	Health Center with bed	CPA+MPA	BEMONC_12M
95	186	Stung Treng	Steung Treng	190101. Stung Treng Prov. Hosp._PH	Provincial Hospital	CPA3	CEMONC_12M
96	187	Svay Rieng	Chi Phu	200101. Chi Phu_RH	OD Referral Hospital	CPA1	BEMONC_12M
97	189	Svay Rieng	Svay Teap	200402. Svay Teap_RH	OD Referral Hospital	CPA1	BEMONC_12M
98	191	Svay Rieng	Romeas Hek	200201. Romeas Hek_RH	OD Referral Hospital	CPA2	BEMONC_12M
99	194	Svay Rieng	Svay Rieng	200301. Svay Rieng Prov Hosp._PH	Provincial Hospital	CPA3	CEMONC_12M
100	195	Takeo	Ang Rokar	210101. AngRoka_RH	OD Referral Hospital	CPA1	BEMONC_12M
101	197	Takeo	Bati	210201. Bati_RH	OD Referral Hospital	CPA1	BEMONC_12M
102	199	Takeo	Daun Keo	210301. Takeo Prov Hospital_PH	Provincial Hospital	CPA3	CEMONC_12M
103	201	Takeo	Kirivong	210401. Kirivong_RH	OD Referral Hospital	CPA2	CEMONC_12M
104	202	Takeo	Prey Kabass	210501. Prey Kabass_RH	OD Referral Hospital	CPA1	BEMONC_12M
105	204	Tbong Khmum	Kroch Chhmar	250301. Kroch Chhmar_RH	OD Referral Hospital	CPA1	BEMONC_12M
106	205	Tbong Khmum	Memut	250401. Memut_RH	OD Referral Hospital	CPA2	BEMONC_12M
107	206	Tbong Khmum	Dambae	250701. Dambe_RH	OD Referral Hospital	CPA1	BEMONC_12M
108	207	Tbong Khmum	O Reang Ov	250501. O Reang Ov_RH	OD Referral Hospital	CPA1	BEMONC_12M
109	211	Tbong Khmum	Ponhea Krek	250601. Ponhea Krek_RH	OD Referral Hospital	CPA2	CEMONC_12M
110	212	Tbong Khmum	Tbong Khmum	250105. Roka Po Pram 2_HC	Health Center	MPA	BEMONC_12M
111	213	Tbong Khmum	Suong	250207. Tbong Khmum _RH	OD Referral Hospital	CPA2	CEMONC_12M

Annex 8: Recommended infrastructure, equipment, supplies & drugs for EmONC

<table>
<tr><th>Physical Infrastructure</th><th>Miscellaneous</th></tr>
<tr><td>• Electricity and back up generator
• Water supply
• Staff quarters
• Telephone/radio call/mobile phone
• Ambulance</td><td>• Wall clock
• Torch and extra batteries
• Refrigerator
• Log books
• Records
• Registers</td></tr>
<tr><th>Warm and Clean Room</th><th>Waste</th></tr>
<tr><td>• Delivery bed(s)
• Clean bed linen
• Curtains if more than one bed
• Clean surface (for alternative delivery position)
• Work surface for resuscitation of newborn near delivery bed(s) or newborn corner
• Light source
• Heat source
• Room thermometer)</td><td>• Puncture resistant container for sharps disposal
• Receptacle for soiled linen
• Bucket for soiled pads and swabs
• Bowl and plastic bag for placenta</td></tr>
<tr><th>Hand Washing</th><th>Sterilisation</th></tr>
<tr><td>• Clean water supply
• Soap
• Nail brush or stick
• Clean towels</td><td>• Instrument steriliser
• Jar for forceps</td></tr>
<tr><th>Equipment</th><th>Test Kits</th></tr>
<tr><td rowspan="2">• Blood pressure machine and stethoscope
• Foetal stethoscope
• Foetal doppler
• Thermometer
• Baby scale
• Self-inflating bag and masks (adult)
• Self-inflating bag and masks (newborn sizes 0 and 1)
• Mucous extractor with suction tubes
• Vacuum extractor
• MVA syringe and cannulae</td><td>• Syphilis (rapid test)
• HIV (rapid test)
• Haemoglobin
• Oxymeter</td></tr>
<tr><th>Delivery Instruments (Sterile)</th></tr>
<tr><td>• Scissors
• Needle holder
• Artery forceps or clamp
• Dissecting forceps
• Sponge forceps
• Vaginal speculum</td></tr>
<tr><th colspan="2">Supplies</th></tr>
<tr><td colspan="2">• Gloves:
- Utility
- Sterile or high-level disinfected
- Long sterile for manual removal of placenta
• Long plastic apron
• Waterproof footware
• Plastic eye shield
• Urinary catheters
• Syringes and needles
• IV tubing
• IV solutions (Ringers lactate, normal saline)
• Suture material for repair of tears or episiotomy
• Antiseptic solution (iodophors or chlorhexidine)
• Spirit (70% alcohol)
• Swabs
• Bleach (chlorine-based compound)
• Clean plastic sheet to place under mother
• Sanitary pads
• Clean towels/cloths for drying and wrapping the baby
• Cord ties/clamp
• Impregnated bednets
• Urine dipstix</td></tr>
</table>

Drugs for pregnancy, childbirth, postpartum & newborn care

Drugs
• Amoxicillin • Ampicillin • Arthemeter • Benzathine penicillin • Calcium gluconate • Ceftriaxone • Chloriquine tablets • Ciprofloxacin • Clotrimazole vaginal pessaries • Cloxicillin • Adrenaline • Diazepam • Dexamethazone • Erythromycin • Gentian violet • Gentamycin • Hydralazine • Iron/folic acid tablets • Lamivudine (3TC) • Lignocaine • Magnesium sulphate • Mebendazole • Metoclopramide • Metronidazole • Nevirapine (adult, infant) • Oxytocin • Paracetamol • Quinine • Sulphadoxine-pyrimethamine • Tetracycline or doxycycline • Tetracycline 1% eye ointment • Trimethoprim + sulphamethoxazole • Zidovudine (AZT) (adult, infant) • Water for injection • Vitamine K1
Vaccines
• Tetanus toxoid • BCG • OPV • Hepatitis B
Contraceptives
• Condoms • Progesterone-only oral contraceptives • Progesterone-only injectables • Implants • IUDs • Combined oral contraceptives • Combined injectables

Additional Equipment & supplies for CEmONC

Basic Equipment

- Sphygmomanometer (aneroid) and stethoscope (binaural)
- Self-inflating bag and face masks (adult size)
- Self-inflating bag and face masks (newborn sizes 0 and 1)
- Adult and infant laryngoscope with spare bulb and batteries
- Adult and infant laryngoscope tubes
- Absorbable, nonreactive sutures (e.g., polyglycolic, chromic catgut) and suture needles
- Urinary catheters and closed bag or container for catheter drainage
- Tourniquet
- 16- to 18-gauge IV cannulas
- Dextrose solution (5%)
- Ringer's lactate or normal saline
- IV administration sets
- Adhesive tape
- Oxygen tubing, nasal cannulae, and face masks
- Suction tubing and catheters
- Surgical scrub brushes

Obstetric Laparotomy and/or Caesarean Section

- Stainless steel instrument tray with cover
- Towel clips (5)
- Sponge forceps, 22.5 cm (6)
- Straight artery forceps, 16 cm (4)
- Uterine heamostasis forceps, 20 cm (8)
- Hysterectomy forceps, straight, 22.5 cm (4)
- Mosquito forceps, 12.5 (6)
- Tissue forceps, 19 cm (6)
- Needle holder, straight, 17.5 cm (1)
- Surgical knife handle, No. 3 (1), No. 4 (1)
- Surgical knife blades (4)
- Triangular point suture needles, 7.3 cm, size 6 (2)
- Round-bodied needles No. 12, size 6 (2)
- Abdominal retractors, double-ended (Richardson) (2)
- Curved operating scissors, blunt pointed (Mayo), 17 cm (1)
- Straight operating scissors, blunt pointed (Mayo), 17 cm (1)

Blood Transfusion

- 8.5 g/l sodium chloride solution
- 20% Bovine albumin
- Centrifuge
- 37ºC water bath (or incubator)
- Pipettes Volumetric (1 ml, 2 ml, 3 ml, 5 ml, 10 ml, 20 ml)
- Test tubes (small and medium size)
- Sphygmomanometer cuff
- Airway needle for collecting blood
- Artery forceps and scissors
- Pilot bottles (containing 1 ml ACD solution)
- Compound microscope and slides
- Microscope illuminator
- Blood giving sets

Anaesthesia

- Anaesthetic face masks
- Oropharyngeal airways
- Endotracheal tubes with cuffs (8 mm and 10 mm)
- Intubating forceps (Magill)
- Endoctracheal tube connectors, 15mm plastic (3 for each tube size)
- Spinal needles (range of sizes, 18-gauge to 25-gauge)

Recommended infrastructure, equipment, supplies & drugs for EmONC

Items	EmONC (n=80)		Non-EmONC (n=101)		Total (n=181)	
Physical Infrastructure	n	%	n	%	n	%
Electricity and backup generator	80	100	101	100	181	100
Water supply	80	100	101	100	181	100
Telephone/radio call/mobile phone	80	100	101	100	181	100
Ambulance	80	100	69	68.3	149	82.3
Warm and Clean Room						
Delivery bed(s)	80	100	101	100	181	100
Clean bed linen	80	100	67	66.3	147	81.2
Curtains if more than one bed	75	93.8	70	69.3	145	80.1
Clean surface (for alternative delivery position)	78	97.5	67	66.3	145	80.1
Work surface for resuscitation of newborn near delivery bed(s) or newborn corner	78	97.5	101	100	179	98.9
Light source	80	100	94	93.1	174	96.1
Heat source	65	81.3	27	26.7	92	50.8
Room thermometer)	41	51.3	35	34.7	76	42
Hand Washing						
Clean water supply	80	100	97	96	177	97.8
Soap	80	100	101	100	181	100
Nail brush or stick	65	81.3	47	46.5	112	61.9
Clean towels	78	97.5	93	92.1	171	94.5
Equipment						
Blood pressure machine and stethoscope	80	100	101	100	181	100
Foetal stethoscope	80	100	71	70.3	151	83.4
foetal doppler	80	100	90	89.1	170	93.9
Thermometer	80	100	101	100	181	100
Baby scale	80	100	101	100	181	100
Self-inflating bag and masks (adult)	80	100	88	87.1	168	92.8
Self-inflating bag and masks (newborn sizes 0 and 1)	79	98.8	101	100	180	99.4
Mucous extractor with suction tubes	75	93.8	57	56.4	132	72.9
Vacuum extractor	80	100	84	83.2	164	90.6
MVA syringe and cannulae	80	100	93	92.1	173	95.6
Supplies						
Gloves:						
Utility	80	100	101	100	181	100
Sterile or high-level disinfected	80	100	101	100	181	100
Long sterile for manual removal of placenta	80	100	101	100	181	100
Long plastic apron	80	100	101	100	181	100
Waterproof foot ware	78	97.5	96	95	174	96.1
Plastic eye shield	79	98.8	100	99	179	98.9
Urinary catheters	80	100	101	100	181	100
Syringes and needles	80	100	101	100	181	100
IV tubing	80	100	101	100	181	100

Items	EmONC (n=80)		Non-EmONC (n=101)		Total (n=181)	
IV solutions (Ringers lactate, normal saline)	79	98.8	101	100	180	99.4
Suture material for repair of tears or episiotomy	76	95	78	77.2	154	85.1
Antiseptic solution (iodophors or chlorhexidine)	80	100	98	97	178	98.3
Spirit (70% alcohol)	65	81.3	67	66.3	132	72.9
Swabs	80	100	101	100	181	100
Bleach (chlorine-based compound)	80	100	101	100	181	100
Clean plastic sheet to place under mother	80	100	101	100	181	100
Sanitary pads	65	81.3	77	76.2	142	78.5
Clean towels/cloths for drying and wrapping the baby	80	100	101	100	181	100
Cord ties/clamp	80	100	101	100	181	100
Urine dipstix	78	97.5	97	96	175	96.7
Miscellaneous						
Wall clock	65	81.3	92	91.1	157	86.7
Torch and extra batteries	76	95	86	85.1	162	89.5
Refrigerator	80	100	101	100	181	100
Logbooks	80	100	101	100	181	100
Records	80	100	101	100	181	100
Registers	80	100	101	100	181	100
Waste						
Puncture resistant container for sharps disposal	80	100	101	100	181	100
Receptacle for soiled linen	80	100	91	90.1	171	94.5
Bucket for soiled pads and swabs	80	100	79	78.2	159	87.8
Bowl and plastic bag for placenta	80	100	101	100	181	100
Sterilization						
Instrument sterilizer	80	100	101	100	181	100
Jar for forceps	80	100	98	97	178	98.3
Test Kits						
Syphilis (rapid test)	80	100	68	67.3	148	81.8
HIV (rapid test)	77	96.3	96	95	173	95.6
Haemoglobin	63	78.8	67	66.3	130	71.8
Oxymeter	73	91.3	71	70.3	144	79.6
Delivery Instruments (Sterile)						
Scissors	80	100	101	100	181	100
Needle holder	80	100	101	100	181	100
Artery forceps or clamp	80	100	101	100	181	100
Dissecting forceps	80	100	101	100	181	100
Sponge forceps	80	100	101	100	181	100
Vaginal speculum	80	100	98	97	178	98.3
Drugs						
Amoxicillin	80	100	101	100	181	100
Ampicillin	65	81.3	30	29.7	95	52.5

Items	EmONC (n=80)		Non-EmONC (n=101)		Total (n=181)	
Arthemeter	47	58.8	15	14.9	62	34.3
Benzathine penicillin	69	86.3	66	65.3	135	74.6
Calcium gluconate	77	96.3	81	80.2	158	87.3
Ceftriaxone	77	96.3	67	66.3	144	79.6
Chloriquine tablets	35	43.8	24	23.8	59	32.6
Ciprofloxacin	80	100	96	95	176	97.2
Cloxacillins	67	83.8	55	54.5	122	67.4
Adrenaline	76	95	45	44.6	121	66.9
Diazepam	77	96.3	96	95	173	95.6
Dexamethazone	65	81.3	47	46.5	112	61.9
Erythromycin	78	97.5	98	97	176	97.2
Gentian violet	72	90	95	94.1	167	92.3
Gentamycin	79	98.8	91	90.1	170	93.9
Hydralazine	74	92.5	81	80.2	155	85.6
Iron/folic acid tablets	78	97.5	95	94.1	173	95.6
Lamivudine (3TC)	38	47.5	8	7.9	46	25.4
Lignocaine	80	100	99	98	179	98.9
Magnesium sulphate	80	100	95	94.1	175	96.7
Mebendazole	80	100	100	99	180	99.4
Metoclopramide	77	96.3	66	65.3	143	79
Metronidazole	70	87.5	46	45.5	116	64.1
Nevirapine (adult, infant)	55	68.8	17	16.8	72	39.8
Oxytocin	80	100	101	100	181	100
Paracetamol	80	100	101	100	181	100
Quinine	35	43.8	48	47.5	83	45.9
Tetracycline or doxycycline	70	87.5	80	79.2	150	82.9
Tetracycline 1% eye ointment	66	82.5	74	73.3	140	77.3
Trimethoprim + sulphamethoxazole	57	71.3	56	55.4	113	62.4
Zidovudine (AZT) (adult, infant)	45	56.3	36	35.6	81	44.8
Water for injection	80	100	98	97	178	98.3
Vitamin K1	80	100	99	98	179	98.9
Vaccines						
Tetanus toxoid	80	100	101	100	181	100
BCG	80	100	101	100	181	100
OPV	17	21.3	79	78.2	96	53
Hepatitis B	75	93.8	96	95	171	94.5
Contraceptives						
Condoms	70	87.5	74	73.3	144	79.6
Implants	72	90	84	83.2	156	86.2
IUDs	77	96.3	83	82.2	160	88.4
Combined oral contraceptives	75	93.8	96	95	171	94.5
Combined injectables	80	100	86	85.1	166	91.7
Basic Equipment						
Sphygmomanometer (aneroid) and stethoscope (binaural)	80	100	101	100	181	100
Self-inflating bag and face masks (adult size)	73	91.3	78	77.2	151	83.4

Items	EmONC (n=80)		Non-EmONC (n=101)		Total (n=181)	
Self-inflating bag and face masks (newborn sizes 0 and 1)	80	100	100	99	180	99.4
Adult and infant laryngoscope with spare bulb and batteries	67	83.8	65	64.4	132	72.9
Adult and infant laryngoscope tubes	58	72.5	36	35.6	94	51.9
Absorbable, nonreactive sutures (e.g., polyglycolic, chromic catgut) and suture needles	69	86.3	42	41.6	111	61.3
Urinary catheters and closed bag or container for catheter drainage	80	100	101	100	181	100
Dextrose solution (5%)	80	100	87	86.1	167	92.3
Ringer's lactate or normal saline	78	97.5	94	93.1	172	95
IV administration sets	80	100	99	98	179	98.9
Adhesive tape	80	100	101	100	181	100
Oxygen tubing, nasal cannulae, and face masks	80	100	85	84.2	165	91.2
Suction tubing and catheters	62	77.5	89	88.1	151	83.4
Surgical scrub brushes	28	35	20	19.8	48	26.5
Obstetric Laparotomy and/or Caesarean Section						
Stainless steel instrument tray with cover	80	100	101	100	181	100
Towel clips (5)	65	81.3	87	86.1	152	84
Sponge forceps, 22.5 cm (6)	80	100	79	78.2	159	87.8
Straight artery forceps, 16 cm (4)	80	100	79	78.2	159	87.8
Uterine heamostasis forceps, 20 cm (8)	80	100	96	95	176	97.2
Hysterectomy forceps, straight, 22.5 cm (4)	63	78.8	67	66.3	130	71.8
Mosquito forceps, 12.5 (6)	58	72.5	28	27.7	86	47.5
Tissue forceps, 19 cm (6)	49	61.3	46	45.5	95	52.5
Needle holder, straight, 17.5 cm (1)	59	73.8	98	97	157	86.7
Surgical knife handle, No. 3 (1), No. 4 (1)	75	93.8	56	55.4	131	72.4
Surgical knife blades (4)	72	90	61	60.4	133	73.5
Triangular point suture needles, 7.3 cm, size 6 (2)	75	93.8	33	32.7	108	59.7
Round-bodied needles No. 12, size 6 (2)	68	85	37	36.6	105	58
Abdominal retractors, double-ended (Richardson) (2)	55	68.8	65	64.4	120	66.3
Curved operating scissors, blunt pointed (Mayo), 17 cm (1)	53	66.3	56	55.4	109	60.2
Straight operating scissors, blunt pointed (Mayo), 17 cm (1)	54	67.5	55	54.5	109	60.2
Blood Transfusion						
8.5 g/l sodium chloride solution	58	72.5	37	36.6	95	52.5
20% Bovine albumin	25	31.3	7	6.9	32	17.7
Centrifuge	80	100	76	75.2	156	86.2
37ºC water bath (or incubator)	68	85	7	6.9	75	41.4
Pipettes Volumetric (1 ml, 2 ml, 3 ml, 5 ml, 10 ml, 20 ml)	78	97.5	57	56.4	135	74.6
Test tubes (small and medium size)	80	100	63	62.4	143	79
Sphygmomanometer cuff	58	72.5		0	58	32
Airway needle for collecting blood	73	91.3	46	45.5	119	65.7

Items	EmONC (n=80)		Non-EmONC (n=101)		Total (n=181)	
Artery forceps and scissors	63	78.8	43	42.6	106	58.6
Pilot bottles (containing 1 ml ACD solution)	57	71.3		0	57	31.5
Compound microscope and slides	71	88.8	74	73.3	145	80.1
Microscope illuminator	73	91.3	65	64.4	138	76.2
Blood giving sets	54	67.5	2	2	56	30.9
Anaesthesia						
Anaesthetic face masks	53	66.3	1	1	54	29.8
Oropharyngeal airways	53	66.3	1	1	54	29.8
Endotracheal tubes with cuffs (8 mm and 10 mm)	53	66.3	1	1	54	29.8
Intubating forceps (Magill)	49	61.3	1	1	50	27.6
Endoctracheal tube connectors, 15mm plastic (3 for each tube size)	49	61.3	1	1	50	27.6
Spinal needles (range of sizes, 18-gauge to 25-gauge)	51	63.8	1	1	52	28.7

Master List tables - infrastructure, equipment, supplies & drugs for EmONC

Table-1: Percent and number of EmONC facilities surveyed with warm clean room available (2020)

	EmoNC Facilities (n=80)		Non-functional EmONC facilities (n=101)		Total (n=181)	
	n	%	n	%	n	%
Delivery bed(s)	80	100	101	100	181	100
Clean bed linen	80	100	67	66.3	147	81.2
Curtains if more than one bed	75	93.8	70	69.3	145	80.1
Clean surface (for alternative delivery position)	78	97.5	67	66.3	145	80.1
Work surface for resuscitation of newborn near delivery bed(s) or newborn corner	78	97.5	101	100	179	98.9
Light source	80	100	94	93.1	174	96.1
Heat source	65	81.3	27	26.7	92	50.8
Room thermometer)	41	51.3	35	34.7	76	42

Table-2: Percent and number of EmONC facilities surveyed with basic physical infrastructure available (2020)

	EmoNC Facilities (n=80)		Non-functional EmONC facilities (n=101)		Total (n=181)	
	n	%	n	%	n	%
Electricity and backup generator	80	100	101	100	181	100
Water supply	80	100	101	100	181	100
Telephone/radio call/mobile phone	80	100	101	100	181	100
Ambulance	80	100	69	68.3	149	82.3

Table -3: Percent and number of EmONC facilities surveyed with basic handwashing items available (2020)

	EmoNC Facilities (n=80)		Non-functional EmONC facilities (n=101)		Total (n=181)	
	n	%	n	%	n	%
Clean water supply	80	100	97	96	177	97.8
Soap	80	100	101	100	181	100
Nail brush or stick	65	81.3	47	46.5	112	61.9
Clean towels	78	97.5	93	92.1	171	94.5

Table 4: Percent and number of EmONC facilities surveyed with newborn equipment available (2020)						
	EmoNC Facilities (n=80)		Non-functional EmONC facilities (n=101)		Total (n=181)	
	n	%	n	%	n	%
Blood pressure machine and stethoscope	80	100	101	100	181	100
Foetal stethoscope	80	100	71	70.3	151	83.4
foetal doppler	80	100	90	89.1	170	93.9
Thermometer	80	100	101	100	181	100
Baby scale	80	100	101	100	181	100
Self-inflating bag and masks (adult)	80	100	88	87.1	168	92.8
Self-inflating bag and masks (newborn sizes 0 and 1)	79	98.8	101	100	180	99.4
Mucous extractor with suction tubes	75	93.8	57	56.4	132	72.9
Vacuum extractor	80	100	84	83.2	164	90.6
MVA syringe and cannulae	80	100	93	92.1	173	95.6

Table-5: Percent and number of EmONC facilities surveyed basic supplies available (2020)						
	EmoNC Facilities (n=80)		Non-functional EmONC facilities (n=101)		Total (n=181)	
	n	%	n	%	n	%
Gloves:						
- Utility	80	100	101	100	181	100
- Sterile or high-level disinfected	80	100	101	100	181	100
- Long sterile for manual removal of placenta	80	100	101	100	181	100
Long plastic apron	80	100	101	100	181	100
Waterproof foot ware	78	97.5	96	95	174	96.1
Plastic eye shield	79	98.8	100	99	179	98.9
Urinary catheters	80	100	101	100	181	100
Syringes and needles	80	100	101	100	181	100
IV tubing	80	100	101	100	181	100
IV solutions (Ringers lactate, normal saline)	79	98.8	101	100	180	99.4
Suture material for repair of tears or episiotomy	76	95	78	77.2	154	85.1
Antiseptic solution (iodophors or chlorhexidine)	80	100	98	97	178	98.3
Spirit (70% alcohol)	65	81.3	67	66.3	132	72.9
Swabs	80	100	101	100	181	100
Bleach (chlorine-based compound)	80	100	101	100	181	100
Clean plastic sheet to place under mother	80	100	101	100	181	100
Sanitary pads	65	81.3	77	76.2	142	78.5
Clean towels/cloths for drying and wrapping the baby	80	100	101	100	181	100
Cord ties/clamp	80	100	101	100	181	100
Urine dipstix	78	97.5	97	96	175	96.7

Table -6: Percent and number of EmONC facilities surveyed miscellaneous items available (2020)						
	EmoNC Facilities (n=80)		Non-functional EmONC facilities (n=101)		Total (n=181)	
	n	%	n	%	n	%
Wall clock	65	81.3	92	91.1	157	86.7
Torch and extra batteries	76	95	86	85.1	162	89.5
Refrigerator	80	100	101	100	181	100
Logbooks	80	100	101	100	181	100
Records	80	100	101	100	181	100
Registers	80	100	101	100	181	100

Table -7: Percent and number of EmONC facilities surveyed with specific items available for waste management (2020)						
	EmoNC Facilities (n=80)		Non-functional EmONC facilities (n=101)		Total (n=181)	
	n	%	n	%	n	%
Puncture resistant container for sharps disposal	80	100	101	100	181	100
Receptacle for soiled linen	80	100	91	90.1	171	94.5
Bucket for soiled pads and swabs	80	100	79	78.2	159	87.8
Bowl and plastic bag for placenta	80	100	101	100	181	100

Table -8: Percent and number of EmONC facilities surveyed with basic items available for sterilisation (2020)						
	EmoNC Facilities (n=80)		Non-functional EmONC facilities (n=101)		Total (n=181)	
	n	%	n	%	n	%
Instrument sterilizer	80	100	101	100	181	100
Jar for forceps	80	100	98	97	178	98.3

Table-9: Percent and number of EmONC facilities surveyed laboratory test kits available for tests (2020)						
	EmoNC Facilities (n=80)		Non-functional EmONC facilities (n=101)		Total (n=181)	
	n	%	n	%	n	%
Syphilis (rapid test)	80	100	68	67.3	148	81.8
HIV (rapid test)	77	96.3	96	95	173	95.6
Haemoglobin	63	78.8	67	66.3	130	71.8
Oxymeter	73	91.3	71	70.3	144	79.6

Table 10: Percent and number of EmONC facilities surveyed with sterile delivery instruments available deliveries (2020)						
	EmoNC Facilities (n=80)		Non-functional EmONC facilities (n=101)		Total (n=181)	
	n	%	n	%	n	%
Scissors	80	100	101	100	181	100
Needle holder	80	100	101	100	181	100
Artery forceps or clamp	80	100	101	100	181	100
Dissecting forceps	80	100	101	100	181	100
Sponge forceps	80	100	101	100	181	100
Vaginal speculum	80	100	98	97	178	98.3

Table-11: Percent and number of EmONC facilities surveyed with basic drugs available (2020)						
	EmoNC Facilities (n=80)		Non-functional EmONC facilities (n=101)		Total (n=181)	
	n	%	n	%	n	%
Amoxicillin	80	100	101	100	181	100
Ampicillin	65	81.3	30	29.7	95	52.5
Artemether	47	58.8	15	14.9	62	34.3
Benzathine penicillin	69	86.3	66	65.3	135	74.6
Calcium gluconate	77	96.3	81	80.2	158	87.3
Ceftriaxone	77	96.3	67	66.3	144	79.6
Chloroquine tablets	35	43.8	24	23.8	59	32.6
Ciprofloxacin	80	100	96	95	176	97.2
Cloxacillin	67	83.8	55	54.5	122	67.4
Adrenaline	76	95	45	44.6	121	66.9
Diazepam	77	96.3	96	95	173	95.6
Dexamethasone	65	81.3	47	46.5	112	61.9
Erythromycin	78	97.5	98	97	176	97.2
Gentian violet	72	90	95	94.1	167	92.3
Gentamycin	79	98.8	91	90.1	170	93.9
Hydralazine	74	92.5	81	80.2	155	85.6
Iron/folic acid tablets	78	97.5	95	94.1	173	95.6
Lamivudine (3TC)	38	47.5	8	7.9	46	25.4
Lignocaine	80	100	99	98	179	98.9
Magnesium sulphate	80	100	95	94.1	175	96.7
Mebendazole	80	100	100	99	180	99.4
Metoclopramide	77	96.3	66	65.3	143	79
Metronidazole	70	87.5	46	45.5	116	64.1
Nevirapine (adult, infant)	55	68.8	17	16.8	72	39.8
Oxytocin	80	100	101	100	181	100
Paracetamol	80	100	101	100	181	100
Quinine	35	43.8	48	47.5	83	45.9
Tetracycline or doxycycline	70	87.5	80	79.2	150	82.9
Tetracycline 1% eye ointment	66	82.5	74	73.3	140	77.3

Table-11: Percent and number of EmONC facilities surveyed with basic drugs available (2020)						
	EmoNC Facilities (n=80)		Non-functional EmONC facilities (n=101)		Total (n=181)	
	n	%	n	%	n	%
Trimethoprim + sulphamethoxazole	57	71.3	56	55.4	113	62.4
Zidovudine (AZT) (adult, infant)	45	56.3	36	35.6	81	44.8
Water for injection	80	100	98	97	178	98.3
Vitamin K1	80	100	99	98	179	98.9

Table-12: Percent and number of EmONC facilities surveyed with vaccines available (2020)						
	EmoNC Facilities (n=80)		Non-functional EmONC facilities (n=101)		Total (n=181)	
	n	%	n	%	n	%
Tetanus toxoid	80	100	101	100	181	100
BCG	80	100	101	100	181	100
OPV	17	21.3	79	78.2	96	53
Hepatitis B	75	93.8	96	95	171	94.5

Table-13: Percent and number of EmONC facilities surveyed with contraceptive available (2020)						
	EmoNC Facilities (n=80)		Non-functional EmONC facilities (n=101)		Total (n=181)	
	n	%	n	%	n	%
Condoms	70	87.5	74	73.3	144	79.6
Implants	72	90	84	83.2	156	86.2
IUDs	77	96.3	83	82.2	160	88.4
Combined oral contraceptives	75	93.8	96	95	171	94.5
Combined injectables	80	100	86	85.1	166	91.7

Table-14: Percent and number of EmONC facilities surveyed with basic equipment available (2020)						
	EmoNC Facilities (n=80)		Non-functional EmONC facilities (n=101)		Total (n=181)	
	n	%	n	%	n	%
Sphygmomanometer (aneroid) and stethoscope (binaural)	80	100	101	100	181	100
Self-inflating bag and face masks (adult size)	73	91.3	78	77.2	151	83.4
Self-inflating bag and face masks (newborn sizes 0 and 1)	80	100	100	99	180	99.4
Adult and infant laryngoscope with spare bulb and batteries	67	83.8	65	64.4	132	72.9
Adult and infant laryngoscope tubes	58	72.5	36	35.6	94	51.9
Absorbable, nonreactive sutures (e.g., polyglycolic, chromic catgut) and suture needles	69	86.3	42	41.6	111	61.3

Table-14: Percent and number of EmONC facilities surveyed with basic equipment available (2020)						
	EmoNC Facilities (n=80)		Non-functional EmONC facilities (n=101)		Total (n=181)	
	n	%	n	%	n	%
Urinary catheters and closed bag or container for catheter drainage	80	100	101	100	181	100
Dextrose solution (5%)	80	100	87	86.1	167	92.3
Ringer's lactate or normal saline	78	97.5	94	93.1	172	95
IV administration sets	80	100	99	98	179	98.9
Adhesive tape	80	100	101	100	181	100
Oxygen tubing, nasal cannula, and face masks	80	100	85	84.2	165	91.2
Suction tubing and catheters	62	77.5	89	88.1	151	83.4
Surgical scrub brushes	28	35	20	19.8	48	26.5

Table-15: Percent and number of EmONC facilities surveyed with equipment available for Laparotomy and/or Caesarean sections (2020)						
	EmoNC Facilities (n=80)		Non-functional EmONC facilities (n=101)		Total (n=181)	
	n	%	n	%	n	%
Stainless steel instrument tray with cover	80	100	101	100	181	100
Towel clips (5)	65	81.3	87	86.1	152	84
Sponge forceps, 22.5 cm (6)	80	100	79	78.2	159	87.8
Straight artery forceps, 16 cm (4)	80	100	79	78.2	159	87.8
Uterine haemostasis forceps, 20 cm (8)	80	100	96	95	176	97.2
Hysterectomy forceps, straight, 22.5 cm (4)	63	78.8	67	66.3	130	71.8
Mosquito forceps, 12.5 (6)	58	72.5	28	27.7	86	47.5
Tissue forceps, 19 cm (6)	49	61.3	46	45.5	95	52.5
Needle holder, straight, 17.5 cm (1)	59	73.8	98	97	157	86.7
Surgical knife handle, No. 3 (1), No. 4 (1)	75	93.8	56	55.4	131	72.4
Surgical knife blades (4)	72	90	61	60.4	133	73.5
Triangular point suture needles, 7.3 cm, size 6 (2)	75	93.8	33	32.7	108	59.7
Round-bodied needles No. 12, size 6 (2)	68	85	37	36.6	105	58
Abdominal retractors, double-ended (Richardson) (2)	55	68.8	65	64.4	120	66.3
Curved operating scissors, blunt pointed (Mayo), 17 cm (1)	53	66.3	56	55.4	109	60.2
Straight operating scissors, blunt pointed (Mayo), 17 cm (1)	54	67.5	55	54.5	109	60.2

Table-16: Percent and number of EmONC facilities surveyed with equipment available for blood transfusions (2020)						
	EmoNC Facilities (n=80)		Non-functional EmONC facilities (n=101)		Total (n=181)	
	n	%	n	%	n	%
8.5 g/l sodium chloride solution	58	72.5	37	36.6	95	52.5
20% Bovine albumin	25	31.3	7	6.9	32	17.7
Centrifuge	80	100	76	75.2	156	86.2
37ºC water bath (or incubator)	68	85	7	6.9	75	41.4
Pipettes Volumetric (1 ml, 2 ml, 3 ml, 5 ml, 10 ml, 20 ml)	78	97.5	57	56.4	135	74.6
Test tubes (small and medium size)	80	100	63	62.4	143	79
Sphygmomanometer cuff	58	72.5		0	58	32
Airway needle for collecting blood	73	91.3	46	45.5	119	65.7
Artery forceps and scissors	63	78.8	43	42.6	106	58.6
Pilot bottles (containing 1 ml ACD solution)	57	71.3		0	57	31.5
Compound microscope and slides	71	88.8	74	73.3	145	80.1
Microscope illuminator	73	91.3	65	64.4	138	76.2
Blood giving sets	54	67.5	2	2	56	30.9

Table-17: Percent and number of EmONC facilities with anaesthesia equipment available in 2020						
Items	Functional EmONC facility (n=80)		Non-functional EmONC facility (n=101)		Total (n=181)	
Anaesthetic face masks	53	66.3	1	1	54	29.8
Oropharyngeal airways	53	66.3	1	1	54	29.8
Endotracheal tubes with cuffs (8 mm and 10 mm)	53	66.3	1	1	54	29.8
Intubating forceps (Magill)	49	61.3	1	1	50	27.6
Endotracheal tube connectors, 15mm plastic (3 for each tube size)	49	61.3	1	1	50	27.6
Spinal needles (range of sizes, 18-gauge to 25-gauge)	51	63.8	1	1	52	28.7

ANNEX 9: Additional Information /data to support referral

Table 1: Distribution of time and distance to access obstetric and newborn care						
Facility Type	**Number of Health facilities**		**To a facility that provides obstetric surgery**	**To a facility caring for prem newborns or those with complications**	**To a facility that provides obstetric surgery**	**To a facility caring for prem newborns or those with complications**
			Distance Km		**Time in minutes**	
Hospital	115	Range	5-150	5-550	5-240	5-360
		Mean	21	40	25	45
		Mode	40	40	30	30
Health Centre	66	Range	5-120	5-120	10-120	10-180
		Mean	37	41	45	53
		Mode	35	60	60	30

Table 2: Numbers of patients referred in and out over the last 6 months[52]					
		Hospitals (n=115)		**Health Centres (n=66)**	
		Referrals Out	**Referrals In**	**Referrals Out**	**Referrals In**
		Over the last 6 months	**Over the last 6 months**	**Over the last 6 months**	**Over the last 6 months**
Obstetrics	Range	0-25	0-120	0-12	0-30
	Mean	5	13	3	2
	Mode	1	1	1	1
Newborn	Range	0-30	0-45	0-2	0-1
	Mean	2	2	0	0
	Mode	1	0	0	0
Children	Range	0-30	0-45	0-10	0-25
	Mean	3	5	1	1
	Mode	1	0	0	0
Adults for non-maternity reasons	Range	0-100	0-500	0-60	0-30
	Mean	16	28	8	2
	Mode	10	10	2	0

[52] Number of referral based on verbal estimate

Table 3: Staff perceptions on the period of pregnancy generating the most referrals By province						
	Hospital (n=115)			Health Centres (n=66)		
	Antenatal care	Perinatal care	Postpartum care	Antenatal care	Perinatal care	Postpartum care
	%	%	%	%	%	%
National	100.0	0.0	0.0	0.0	0.0	0.0
Provinces						
Banteay Meanchey	44.4	55.6	0.0	100.0	0.0	0.0
Battambang	50.0	50.0	0.0	12.5	75.0	12.5
Kampong Cham	85.7	14.3	0.0	100.0	0.0	0.0
Kampong Chhnang	66.7	33.3	0.0	75.0	0.0	25.0
Kampong Speu	75.0	0.0	25.0	100.0	0.0	0.0
Kampong Thom	0.0	66.7	33.3	0.0	100.0	0.0
Kampot	80.0	20.0	0.0	100.0	0.0	0.0
Kandal	0.0	62.5	37.5	75.0	25.0	0.0
Koh Kong	50.0	0.0	50.0	0.0	0.0	0.0
Kratie	33.3	33.3	33.3	50.0	0.0	50.0
Mondul Kiri	100.0	0.0	0.0	100.0	0.0	0.0
Phnom Penh	71.4	14.3	14.3	100.0	0.0	0.0
Preah Vihear	100.0	0.0	0.0	100.0	0.0	0.0
Prey Veng	54.5	0.0	45.5	0.0	0.0	0.0
Pursat	25.0	75.0	0.0	0.0	100.0	0.0
Rattank Kiri	100.0	0.0	0.0	100.0	0.0	0.0
Siem Reap	0.0	100.0	0.0	33.3	66.7	0.0
Sihanouk Ville	100.0	0.0	0.0	100.0	0.0	0.0
Stung Treng	100.0	0.0	0.0	100.0	0.0	0.0
Svay Rieng	66.7	16.7	16.7	100.0	0.0	0.0
Takeo	33.3	66.7	0.0	50.0	50.0	0.0
Oddar Mean Chey	100.0	0.0	0.0	50.0	50.0	0.0
Kep	100.0	0.0	0.0	100.0	0.0	0.0
Pailin	0.0	100.0	0.0	0.0	0.0	0.0
Thbong Khmom	100.0	0.0	0.0	100.0	0.0	0.0

Table 4: Percentage of health staff usually accompanying patients and reasons for not accompanying patients for referrals out, by type of facility		
Health Staff Accompanying Patients	**Hospital (n=115)**	**Health Centres (n=66)**
	%	%
Often accompany referrals out[1]	98.3	83.3
Where do they come from		
Come from referring facility	98.3	69.7
Come from receiving facility	0.0	18.2
Ambulance based provider	0.9	9.1
Type of Health worker		
Midwife	99.1	97.0
TBA	0.0	0.0
Community health worker	0.0	1.5
Nurse	98.3	86.4
Doctor	48.7	12.1
Medical Assistant	27.8	6.1
Other	0.0	1.5
Why staff do not accompany patients		
Not enough staff (too busy)	0.0	0.0
No reimbursement for health worker to return	0.0	0.0
Not necessary	0.0	1.5
Other	0	3.0

Table 5: Strategies to transfer emergency patients by percent and type of facility		
Strategies for Transfer	**Hospital (n=115)**	**Health Centres (n=66)**
	%	%
Own means of transportation	98.3	53.0
Call another healthcare facility for transportation	33.0	63.6
Use a dispatch centre	91.3	92.4
Private transport providers	3.5	6.1
Vehicles from District /County Health	17.4	27.3
Assist patients to arrange their own	20.9	54.5
Other	0.0	0.0

Table 6: Expenses and payments by patients and families for transfers in and out		
Expenses/Payments	**Hospital (n=115)**	**Health Centres (n=66)**
	%	**%**
Before transfer OUT		
Obstetric patients need clearance[1]	63.5	18.2
Newborns need clearance[2]	53.9	10.6
Payments by patients and families for:[3]		
Fuel for emergency transport	11.3	6.1
Medical staff accompanying patient	4.3	0.0
Referral after hours at higher rate	6.1	4.5
Before transfer IN[4]		
Obstetric patients pay for treatment	3.5	1.5
Families of newborn pay for care.	1.7	1.5
Family accompanying patients		
Policy to support the following		
Food	8.7	0.0
Lodging	0.9	1.5
Fuel	1.7	0.0
Anything else? (specify)	0.9	1.5

Table 7: Management of REFERRALS OUT by percent and type of health facility		
	Hospital (n=115)	Health Centre (n=66)
	%	%
Referrals Out[1]		
Refers women/ newborns to another facility	97.4	100.0
Refer to a private facility that charges	24.3	19.7
	0.0	0.0
In the last 12 months referred to:	0.0	0.0
Kantha Bopha Siem Reap	26.1	24.2
Kantha Bopha Phnom Penh	60.9	31.8
Angkor Hospital for Children	19.1	7.6
Mothers or newborn are referred together[2]	40.0	57.6
Reporting		
Patients referred out are reported regularly[3]	99.1	95.5
L logbook for maternal referrals out available[4]	49.6	28.8
Maternity wards record referrals out[5]	87.0	86.4
Referral forms (filled by staff) accompany patients [6]	99.1	95.5
Standardised referral forms used in all facilities[7]	88.7	63.6
Communicating and Preparation[8]		
When referring out do staff call ahead to:		
Ask for clinical advice	59.1	57.6
Request an ambulance	22.6	60.6
Inform receiving facility the patient is coming	58.3	86.4
Feedback received about patients referred out[9]	32.2	30.3

Table 8: Management of REFERRALS IN by percent and type of health facility		
	Hospital (n=115)	**Health Centres (n=66)**
	%	**%**
Referrals IN[1]		
Receives women/ newborns from other facilities	94.8	30.3
Patients from private health facilities referred in	50.4	9.1
Receives women/newborns referred by CHWs or TBAs	35.7	40.9
Triage system for patients who are referred in	100.0	71.2
	0.0	0.0
Reporting[2]	0.0	0.0
Patients referred in are reported regularly	82.6	33.3
Maternity wards record referrals in	81.7	31.8
	0.0	0.0
Communicating and Preparation	0.0	0.0
Advance notice of referral in received[3]	100.0	100.0
	0.0	0.0
When notified of a referral in preparations include[4]	0.0	0.0
Notify appropriate health personnel	87.0	77.3
Prepare space in admissions	87.0	78.8
Prepare operating theatre	38.3	0.0
Alert pharmacy	61.7	54.5
Alert blood bank	27.8	0.0

Table 9: Distribution of types of ambulances available by type of facility							
Ambulance Type		Hospital (n=115)			Health Centres (n=66)		
		Available and functional	Available needing minor repair	Available needing major repair	Available and functional	Available needing minor repair	Available needing major repair
Ambulance	Range	0-7	0-1	0-2	0-1	0-1	0-1
	Mean	1	0	0	0	0	0
	Mode	1	0	0	0	0	0
Ambulance from other facility	Range	NA	NA	NA	0-1	NA	NA
	Mean	NA	NA	NA	0	NA	NA
	Mode	NA	NA	NA	0	NA	NA
Political Ambulance	Range	0-2	0-2	0-1	0-1	0-1	NA
	Mean	0	0	0	0	0	NA
	Mode	0	0	0	0	0	NA
Private NGO Ambulance	Range	0-3	0-1	0-1	0-1	0-1	NA
	Mean	0	0	0	0	0	NA
	Mode	0	0	0	0	0	NA
Other	Range	0-1	NA	NA	0-1	NA	NA
	Mean	0	NA	NA	0	NA	NA
	Mode	0	NA	NA	0	NA	NA

Table 10: Distribution of types of transport available for referral (not ambulances)							
Non-ambulances available for referral		Hospital (n=115)			Health Centres (n=66)		
		Available and functional	Available needing minor repair	Available needing major repair	Available and functional	Available needing minor repair	Available needing major repair
		How Many (numbers)			How Many (numbers)		
4 wheeled motor vehicle	Range	NA	NA	NA	NA	NA	NA
	Mean	NA	NA	NA	NA	NA	NA
	Mode	NA	NA	NA	NA	NA	NA
Motorcycle/ three wheel vehicle	Range	0-1	NA	NA	0-1	NA	0
	Mean	NA	NA	NA	0	NA	0
	Mode	NA	NA	NA	0	NA	0
Other Motorised vehicle	Range	NA	NA	NA	NA	NA	NA
	Mean	NA	NA	NA	NA	NA	NA
	Mode	NA	NA	NA	NA	NA	NA

Table 11: Availability, management and training of drivers by type of EmONC facility (Comparison between the 2014 and 2020 EmONC reviews)				
Availability , management and training of drivers by facility	2014		2020	
	Hospitals (n=90)	Health Centres (n=88)	Hospitals (n=115)	Health Centres (n=66)
	%	%	%	%
Availability of ambulance service				
Full time or part time driver available	100.0	70.3	100.0	96.1
Availability of drivers for emergency				
Almost always	92.1	88.5	94.8	88.2
Usually	6.8	7.7	5.2	11.8
Driver logbooks				
Driver maintains logbook for vehicle	90.9	57.7	92.2	70.6
Supervisors of driver(s)				
Facility administrator	40.9	0.0	59.1	2.0
Transport officer	-	-	5.2	9.8
Facility director	51.1	92.3	27.0	88.2
Referral coordinator	-	-	8.7	0.0
Driver Training				
Driver(s) have first aid training	60.9	36.0	92.2	88.2
Training includes:				
Airway management	90.7	90.0	92.2	90.2
External bleeding control	90.7	90.0	93.0	90.2
Splinting external extremities	94.4	80.0	93.0	90.2
Principles of spinal precautions	79.6	80.0	82.6	80.4
Triage	74.1	60.0	85.2	68.6
Crash scene management	77.8	70.0	74.8	62.7
Extrication	83.3	70.0	85.2	80.4
Use of fire extinguisher	70.4	40.0	91.3	84.3
Other training received by drivers				
Minor mechanical training	51.1	23.1	72.2	62.7
Preventive maintenance	61.4	26.9	82.6	51.0
Defensive driving	65.9	34.6	87.8	84.3
Correct use of lights and sirens	54.6	19.2	92.2	80.4

Annex 10: Additional information/data to support human resources

Table 1- to 4 below are a series of matrices that shows the signal functions different cadres of health workers are able perform within the Cambodia regulatory framework. This can be seen in all tables for EmONC facilities (hospitals and health centres). In these tables 'Yes' means that policy clearly supports the cadre to perform the signal function and 'No' indicates there is no policy to support the role. The tables provide an indication of the role and training of a particular health worker, and data has been collected to validate the signal functions performed by each cadre. Tables also provide information on knowledge and skills.

Tables 5 and 6 in are a series of matrices that shows the signal functions different cadres of health workers are able perform actually perform. The purpose of matrices were to enable a comparison between the regulated role of the health professional, training, current knowledge and whether they are performing the signal functions

An attempt was made to fill this gap (see table 10-10 and table 10-11) however it was beyond the scope of the current review. A baseline training needs analysis, and a more rigorous reporting system, institutionalised into the MoH training system, would help address this issue.

Table 1: Regulatory policies to support EmONC signal functions and procedures performed by different cadre of health worker (2020)										
Health worker cadre	Parenteral Drugs			Procedures						
	Antibiotics	Oxytocics	Anti-convulsants	Manual removal of placenta	Removal of retained products		Assisted vaginal delivery	Neonatal resuscitation	Blood transfusion	Caesarean delivery
					MVA	D&C or D&E				
	YES/NO	YES/NO	YES/NO	YES/NO	YES/NO	YES/NO	YES/NO	YES/NO	YES/NO	YES/NO
Obstetrician/Gynaecologist	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Paediatrician/Neonatologist	Yes	Yes	Yes	No	No	No	No	Yes	Yes	No
General Medical Doctor	Yes	Yes	Yes	Yes	Yes when trained	Yes when trained	Yes when trained	Yes when trained	Yes	Yes when trained
General surgeon	Yes	Yes	Yes	Yes when trained	Yes when trained	Yes when trained	Yes when trained	Yes when trained	Yes	Yes when trained
Anaesthesiologist/Doctor	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes
Medical Assistant	Yes	Yes	Yes	Yes when trained	Yes when trained	Yes when trained	Yes when trained	Yes when trained	Yes	Yes when trained
Nurse Anaesthetist	Yes	Yes	Yes	No	No	No	No	Yes when trained	Yes	No
Secondary Midwife	Yes	Yes	Yes when trained	Yes when trained	Yes when trained	Yes when trained	Yes when trained	Yes when trained	Yes follow doctor	No
Primary Midwife	Yes when trained	Yes	Yes when trained	Yes when trained	No	No	No	Yes when trained	Yes follow doctor	No
Secondary Nurse	Yes	No	No	No	No	No	No	Yes when trained and need help	Yes follow doctor	No
Primary Nurse	No	No	No	No	No	No	No	Yes when trained and need help	Yes follow doctor	No

Table 2: Regulatory policies to support early newborn/neonatal care procedures performed by different cadre of health workers on preterm, low birth weight and sick newborns (2020)										
Health worker cadre	Preterm and low birth weight babies					Sick newborns				
	Kangaroo Mother Care (KMC) for premature very small babies	Alternative feeding if baby unable to breast feed (breast feeding support)	Injectable antibiotics for neonatal infections	Antenatal corticosteroids	Antibiotics for premature rupture of membranes (pROM)	Neonatal resuscitation (In table above – already an accepted signal function)	Intubation and ventilation of a newborn baby	Administration of Oxygen CPAP for newborns with respiratory distress	Special of intensive care for newborn baby	Administration of IV fluids to a neonatal newborn
	YES/NO	YES/NO	YES/NO	YES/NO	YES/NO	YES/NO	YES/NO	YES/NO	YES/NO	YES/NO
Obstetrician/Gynaecologist	Yes	No	No	Yes	Yes	Yes	Yes	No	No	No
Paediatrician/Neonatologist	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes
General Medical Doctor	Yes	No	Yes	Yes	Yes when trained	Yes when trained	Yes when trained	No	No	No
General surgeon	Yes	No	No	Yes	Yes when trained	Yes when trained	Yes when trained	No	No	No
Anaesthesiologist/Doctor	No	No	No	No	No	Yes when trained	yes	Yes	No	No
Medical Assistant	No	No	No	Yes	Yes when trained	Yes when trained	Yes when trained	No	No	No
Nurse Anaesthetist	No	No	No	No	No	Yes when trained	Yes	Yes	No	No
Secondary Midwife	Yes	Yes	No	Yes follow doctor	Yes follow doctor	Yes when trained	No	No	No	No
Primary Midwife	Yes	Yes	No	Yes follow doctor	Yes follow doctor	Yes when trained	No	No	No	No
Secondary Nurse	Yes	Yes	Yes follow doctor	No	No	Yes when trained and need help	Yes when trained	Yes when trained	Yes when trained	Yes
Primary Nurse	Yes	Yes	Yes follow doctor	No	No	Yes when trained and need help	No	Yes when trained	Yes when trained	Yes

Table 3: Regulatory policies to support essential maternity services performed by different health workers (2020)										
Health worker cadre	**Provide focused antennal care (goal orientated)**	**Perform normal delivery**	**Provide anaesthesia**	**Perform breech delivery**	**Fill out and perform partograph**	**Perform medical abortion**	**Provide family planning counselling**	**Provide temporary FP methods (pills, injectable, implants and IUDs)**	**Provide permanent surgical family planning methods (Tubal ligation and vasectomy)**	**Provide PMTCT services**
	YES/NO	**YES/NO**	**YES/NO**	**YES/NO**	**YES/NO**	**YES/NO**	**YES/NO**	**YES/NO**	**YES/NO**	**YES/NO**
Obstetrician/Gynaecologist	No	No	No	Yes	No	Yes	No	No	Yes with trained	No
Paediatrician/Neonatologist	No	No	No	No	No	No	No	No	No	No
General Medical Doctor	No	No	No	Yes with trained	No	Yes with trained	No	No	Yes with trained	Yes with trained
General surgeon	No	No	No	No	No	No	No	No	Yes with trained	No
Anaesthesiologist/Doctor	No	No	Yes	No	No	No	No	No	Yes	No
Medical Assistant	No	No	No	Yes with trained	No	Yes with trained	No	No	Yes with trained	Yes with trained
Nurse Anaesthetist	No	No	Yes	No	No	No	No	No	Yes with trained	No
Secondary Midwife	Yes	Yes	No	Yes	Yes	Yes with trained	Yes	Yes	No	Yes
Primary Midwife	Yes	Yes	No	No	Yes	No	Yes	Yes	No	Yes
Secondary Nurse	No	No	No	No	No	No	No	No	No	No
Primary Nurse	No	No	No	No	No	No	No	No	No	No

Table 4: Percent of health service providers in EmONC facilities providing EmONC signal functions in a 12 month period before the 2020 EmONC review (n=181)										
Health worker cadre	Parenteral Drugs				Procedures					
	Antibiotics	Oxytocics	Anti-convulsants	Manual removal of placenta	Removal of retained products		Assisted vaginal delivery	Neonatal resuscitation	Blood transfusion	Caesarean delivery
					MVA	D&C or D&E				
	%	%	%	%	%	%	%	%	%	%
Obstetrician /Gynaecologist (n=112)	67.9	60.7	50.9	98.2	96.4	61.6	100.0	86.6	40.2	87.5
Paediatrician/Neonatologist (n=107)	60.7	5.6	2.8	4.7	0.0	2.8	1.9	96.3	0.9	0.9
General Medical Doctor (n=135)	70.4	57.8	60.0	92.6	98.5	57.0	94.1	88.9	33.3	49.6
Surgeon (56)	14.3	10.7	16.1	35.7	19.6	39.3	26.8	32.1	26.8	91.1
Anaesthesiologist Doctor (n=45)	13.3	2.2	0.0	0.0	0.0	0.0	0.0	11.1	6.7	2.2
Medical Assistant (n=93)	36.6	24.7	21.5	22.6	20.4	52.7	21.5	30.1	9.7	2.2
Nurse Anaesthetist (n=73)	37.0	23.3	12.3	5.5	4.1	1.4	4.1	34.2	32.9	6.8
Secondary Midwife (n=181)	93.4	96.7	93.4	93.9	90.1	72.9	76.8	97.8	20.4	2.2
Primary Midwife (n=146)	82.2	84.2	63.0	41.8	10.3	11.0	8.9	82.2	6.8	0.7
Secondary Nurse (n=179)	54.2	25.1	14.5	2.8	1.7	1.1	2.2	25.7	9.5	1.1
Primary Nurse (n=146)	49.3	14.4	6.2	0.0	0.0	1.4	0.0	15.8	5.5	0.7

Table 5: Percent of health service providers performing EmNC signal functions for newborn/neonatal care procedures for preterm, low birth weight and sick newborns in a 12 month period before the 2020 EmONC review (n= 181)										
Health worker cadre	Preterm and low birth weight babies					Sick newborns				
	Kangaroo Mother Care (KMC) for premature very small babies	Alternative feeding if baby unable to breast feed (breast feeding support)	Injectable antibiotics for neonatal infections	Antenatal corticosteroids	Antibiotics for premature rupture of membranes (pROM)	Neonatal resuscitation (In table above – already an accepted signal function)	Intubation and ventilation of a newborn baby	Administration of Oxygen CPAP for newborns with respiratory distress	Special of intensive care for newborn baby	Administration of IV fluids to a neonatal newborn
	%	%	%	%	%	%	%	%	%	%
Obstetrician /Gynaecologist (n=112)	26.8	33.9	14.3	37.5	33.0	86.6	2.7	33.0	65.2	12.5
Paediatrician/Neonatologist (n=107)	15.9	7.5	40.2	5.6	2.8	37.4	14.0	23.4	9.3	37.4
General Medical Doctor (n=135)	4.4	5.2	7.4	5.9	7.4	26.7	3.0	12.6	13.3	8.9
Surgeon (56)	10.7	10.7	5.4	19.6	14.3	32.1	12.5	14.3	19.6	7.1
Anaesthesiologist Doctor (n=45)	0.0	0.0	0.0	0.0	2.2	11.1	2.2	8.9	6.7	2.2
Medical Assistant (n=93)	9.7	14.0	8.6	15.1	21.5	30.1	3.2	16.1	15.1	11.8
Nurse Anaesthetist (n=73)	4.1	4.1	4.1	6.8	6.8	34.2	11.0	16.4	12.3	4.1
Secondary Midwife (n=181)	70.7	87.8	20.4	66.3	85.6	97.8	3.9	46.4	98.9	19.9
Primary Midwife (n=146)	57.5	80.1	13.7	47.3	65.1	82.2	0.7	33.6	90.4	13.7
Secondary Nurse (n=179)	6.1	6.7	26.8	6.7	11.7	25.7	4.5	18.4	13.4	28.5
Primary Nurse (n=146)	4.1	4.8	15.1	2.1	7.5	15.8	0.7	10.3	8.2	17.8

Table 6: Percent of health service providers performing selected vital maternity services in a 12 month period before the 2020 EmONC review (n= 181)										
Health worker cadre	Provide focused antennal care (goal orientated)	Perform normal delivery	Provide anaesthesia	Perform breech delivery	Fill out and perform partograph	Perform medical abortion	Provide family planning counselling	Provide temporary FP methods (pills, injectable, implants and IUDs)	Provide permanent surgical family planning methods (Tubal ligation and vasectomy)	Provide PMTCT services
	%	%	%	%	%	%	%	%	%	%
Obstetrician /Gynaecologist (n=112)	13.4	63.4	4.5	86.6	15.2	62.5	53.6	48.2	34.8	20.5
Paediatrician/Neonatologist (n=107)	0.9	4.7	0.0	5.6	0.0	1.9	3.7	0.9	0.9	4.7
General Medical Doctor (n=135)	4.4	14.1	3.0	12.6	1.5	5.9	7.4	3.0	3.7	4.4
Surgeon (56)	3.6	17.9	8.9	25.0	0.0	8.9	5.4	5.4	60.7	5.4
Anaesthesiologist Doctor (n=45)	0.0	0.0	22.2	0.0	0.0	0.0	0.0	0.0	2.2	0.0
Medical Assistant (n=93)	3.2	18.3	2.2	23.7	5.4	14.0	11.8	9.7	2.2	6.5
Nurse Anaesthetist (n=73)	2.7	4.1	63.0	2.7	4.1	2.7	4.1	4.1	12.3	1.4
Secondary Midwife (n=181)	94.5	98.9	3.9	93.4	98.3	65.2	98.3	95.0	2.8	72.9
Primary Midwife (n=146)	74.0	87.0	0.7	47.3	84.2	13.7	78.8	68.5	1.4	47.9
Secondary Nurse (n=179)	8.4	4.5	3.9	2.2	1.7	0.6	4.5	2.8	0.0	6.1
Primary Nurse (n=146)	4.1	2.7	0.7	0.7	2.1	0.0	2.7	2.1	0.0	4.8

EmONC Training

Table 7: Number and percent of health facilities that reported their health staff had received EmONC related training (2020)

Health worker cadre	Training course on anaesthesia		EmONC training for Drs (3-months)		EmONC training for midwives (1 month)		Immediate newborn care		Administering magnesium sulphate		Manual vacuum aspiration (MVA)		Performing manual extraction at delivery (MVE)		Use of the partograph		Managing Post-Partum Haemorrhage (PPH)		EmONC train the trainer	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Obstetrician/Gynaecologist	18	9.9	5	2.8	0	0.0	25	13.8	21	11.6	45	24.9	48	26.5	35	19.3	45	24.9	35	19.3
Paediatrician/Neonatologist	0	0.0	0	0.0	0	0.0	31	17.1	5	2.8	4	2.2	0	0.0	12	6.6	0	0.0	4	2.2
General Medical Doctor	15	8.3	45	24.9	7	3.9	35	19.3	57	31.5	68	37.6	82	45.3	128	70.7	68	37.6	77	42.5
General surgeon	12	6.6	7	3.9	0	0.0	0	0.0	7	3.9	3	1.7	35	19.3	5	2.8	9	5.0	8	4.4
Anaesthesiologist/Doctor	25	13.8	3	1.7	0	0.0	0	0.0	2	1.1	0	0.0	3	1.7	0	0.0	6	3.3	15	8.3
Medical Assistant	0	0.0	0	0.0	0	0.0	5	2.8	3	1.7	0	0.0	8	4.4	25	13.8	12	6.6	24	13.3
Nurse Anaesthetist	43	23.8	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	5	2.8
Secondary Midwife	12	6.6	0	0.0	165	91.2	58	32.0	145	80.1	152	84.0	138	76.2	180	99.4	128	70.7	138	76.2
Primary Midwife	7	3.9	0	0.0	71	39.2	19	10.5	68	37.6	68	37.6	21	11.6	78	43.1	56	30.9	89	49.2
Secondary Nurse	10	5.5	0	0.0	0	0.0	5	2.8	57	31.5	15	8.3	2	1.1	57	31.5	29	16.0	56	30.9
Primary Nurse	0	0.0	0	0.0	0	0.0	9	5.0	5	2.8	8	4.4	0	0.0	59	32.6	12	6.6	15	8.3

Table 8: Number of health service providers who have received EmONC training from EmONC related to the EmONC Improvement Plan 2016-2020 (2020)										
Health worker cadre	**Training course on anaesthesia**	**EmONC training for Drs (3-months)**	**EmONC training for midwives (1 month)**	**Immediate newborn care**	**Administering magnesium sulphate**	**Manual vacuum aspiration (MVA)**	**Performing manual extraction at delivery (MVE)**	**Use of the partograph**	**Managing Post-Partum Haemorrhage (PPH)**	**EmONC train the trainer**
	n	**n**	**n**	**n**	**n**	**n**	**n**	**n**	**n**	**n**
Obstetrician/Gynaecologist	4	210	1	150	68	74	70	28	56	56
Paediatrician/Neonatologist	0	1	0	51	5	7	5	1	9	7
General Medical Doctor	7	10	0	15	18	16	13	7	16	3
General surgeon	3	7	0	5	0	0	4	0	0	0
Anaesthesiologist/Doctor	25	0	0	0	0	0	0	0	0	0
Medical Assistant	1	4	0	18	6	10	7	1	13	1
Nurse Anaesthetist	150	0	1	18	3	3	0	3	3	0
Secondary Midwife	18	0	631	670	308	234	215	456	340	82
Primary Midwife	0	0	18	157	95	10	15	133	108	1
Secondary Nurse	19	0	0	27	1	0	0	8	7	8
Primary Nurse	0	0	0	12	0	0	0	1	1	0

Annex 11: Additional information/data to support training and experience

Table 1: Percent of health facilities surveyed which have staff who received EmONC training over the last 12month						
Training course	Hospitals (n=115)		Health Centres (n=66)		Total (n=181)	
	n	%	n	%	n	%
Training course on anaesthesia	53	46.1	0	0.0	53	29.3
EmONC training for Drs (3-months training)	65	56.5	6	9.1	71	39.2
EmONC training for midwives (1 month training)	105	91.3	45	68.2	150	82.9
Immediate newborn care	36	31.3	0	0.0	36	19.9
Administering magnesium sulphate	83	72.2	61	92.4	144	79.6
Manual vacuum aspiration (MVA)	95	82.6	48	72.7	143	79.0
Performing manual extraction at delivery (MVE)	75	65.2	36	54.5	111	61.3
Use of the partograph	115	100.0	65	98.5	180	99.4
Managing Post-Partum Haemorrhage (PPH)	98	85.2	34	51.5	132	72.9
EmONC train the trainer	54	47.0	5	7.6	59	32.6
Other EmONC related to training	7	6.1	0	0.0	7	3.9
	786		**300**		**1086**	

Table 2: Percent of health facilities surveyed which received EmONC coaching and mentoring support in the 12-months (2020)						
Training course	Hospitals (n=115)		Health Centres (n=66)		Total (n=181)	
	n	%	n	%	n	%
Yes, facility staff have benefited from coaching and mentoring in the last 12-months	89	77.4	54	81.8	143	79.0
If yes which staff have benefited						
Obstetrician/Gynaecologist	81	70.4	3	4.5	84	46.4
Paediatrician/Neonatologist	22	19.1	0	0.0	22	12.2
General Medical Doctor	17	14.8	5	7.6	22	12.2
General surgeon	13	11.3	0	0.0	13	7.2
Anaesthetist/Doctor	2	1.7	0	0.0	2	1.1
Medical Assistant	8	7.0	0	0.0	8	4.4
Nurse Anaesthetist	17	14.8	7	10.6	24	13.3
Secondary Midwife	88	76.5	54	81.8	142	78.5
Primary Midwife	50	43.5	43	65.2	93	51.4
Secondary Nurse	14	12.2	12	18.2	26	14.4
Primary Nurse	9	7.8	8	12.1	17	9.4
	321		**132**		**453**	

Pregnancy, labour and delivery care

Table 3: Knowledge scores related to pregnancy and delivery care, by type of midwife (Comparison between the 2014 and 2020 EmONC reviews)						
	2014			2020		
Responses	Primary midwives	Secondary midwives	Total	Primary midwives	Secondary midwives	Total
	(n=41)	(n=129)	(n=170)	(n=14)	(n=165)	(n=179)
1. Knowledge of focused antenatal care						
Average score (out of 6)	4	4	4	6	6	6
Percent providing specific response:	%	%	%	%	%	%
• Minimum of 4 consultations	85.4	90.7	89.9	92.9	93.3	93.3
• Ensure woman has birth plan	53.7	58.1	58.4	78.6	87.9	87.2
• Prevent illness and promote health	95.1	99.1	94.9	100.0	100.0	100.0
• Detect existing illnesses and manage complications	43.9	42.2	43.5	64.3	83.6	82.1
• Teach the danger signs	82.9	83.7	83.7	100.0	98.8	98.9
• Promote breastfeeding	27.5	33.3	31.1	57.1	58.2	58.1
• Maternal nutrition counselling	-	-	-	100.0	98.2	98.3
• Counselling on family planning	-	-	-	64.3	89.7	87.7
2. Knowledge of which pregnant women are at risk						
Average score (out of 11)	**5**	**6**	**5**	**7**	**7**	**7**
Percent providing specific response:	%	%	%	%	%	%
• First Delivery (Para 0)	30.0	35.9	34.1	64.3	89.7	87.7
• Young Age < 18	87.8	85.3	85.4	100.0	99.4	99.4
• Women who have had a caesarean	65.0	65.4	64.6	78.6	85.5	84.9
• Women with 5 or more deliveries	85.4	83.7	84.8	92.9	92.7	92.7
• < 2 years or > 5 years between pregnancies	31.7	33.3	32.9	57.1	61.2	60.9
• Previous stillbirth	2.4	11.6	9.0	28.6	25.5	25.7
• Previous neonatal death	9.8	6.3	7.3	0.0	24.8	22.9
• Previous instrumental delivery	31.7	31.8	31.5	50.0	59.4	58.7
• History of severe obstetric complications	58.5	67.4	65.2	100.0	95.8	96.1
• Shorter women <150 Cm	92.7	88.4	88.8	92.9	97.0	96.6
• Women with non-communicable diseases	-	-	-	85.7	80.6	81.0
• Previous obstetric fistula repair	-	-	-	0.0	4.8	4.5
2a. Women requiring referral or admission to a higher level hospital before the onset of labour? (M6 N7)						
Average score (out of 6)				**3**	**4**	**4**
Percent providing specific response:	%	%	%	%	%	%
• Severe nausea and vomiting (hyperemesis gravidarum)	-	-	-	0.0	18.2	16.8
• Severe pre-eclampsia/eclampsia	-	-	-	100.0	98.2	98.3
• Premature rupture of membranes (pROM)	-	-	-	92.9	95.2	95.0
• Antepartum haemorrhage	-	-	-	78.6	93.3	92.2
• Deep vein thrombosis	-	-	-	7.1	7.3	7.3

Table 3: Knowledge scores related to pregnancy and delivery care, by type of midwife (Comparison between the 2014 and 2020 EmONC reviews)						
	2014			2020		
Responses	Primary midwives	Secondary midwives	Total	Primary midwives	Secondary midwives	Total
	(n=41)	(n=129)	(n=170)	(n=14)	(n=165)	(n=179)
• Uncontrolled chronic medical disorders	-	-	-	64.3	75.8	74.9
2b. Management principles for a women with premature rupture of membranes? (M6 N8)						
Average score (out of 5)				**3**	**3**	**3**
Percent providing specific response:	**%**	**%**	**%**	**%**	**%**	**%**
• Avoid pelvic exam until labour onset or planned delivery	-	-	-	42.9	45.5	45.3
• Admit and monitor with a pROM chart until delivery	-	-	-	50.0	77.0	74.9
• Premature rupture of membranes (pROM)	-	-	-	0.0	0.0	0.0
• Administer antibiotics for preterm and prolonged pROM	-	-	-	92.9	95.8	95.5
• Prepare for early delivery to prevent complications	-	-	-	50.0	66.7	65.4
• Administer corticosteroids for very preterm pROM	-	-	-	50.0	55.8	55.3
3. How do you know when a pregnant woman is in labour?						
Average score (out of 4)	~~3~~	~~3~~	~~3~~			
Percent providing specific response:	**%**	**%**	**%**	%	%	%
• Regular uterine contractions	97.5	93.0	94.3	-	-	-
• Dilation of the cervix	90.2	96.1	94.4	-	-	-
• Discharge of blood and mucus	100.0	95.4	96.6	-	-	-
• Breaking of the waters/ruptured membranes	34.1	30.5	31.1	-	-	-
4. Observation made to monitor a woman is in labour?						
Average score (out of 10)	9	8	8	9	9	9
Percent providing specific response:	**%**	**%**	**%**	**%**	**%**	**%**
• Foetal heartbeat	90.0	96.1	94.9	100.0	100.0	100.0
• Colour of amniotic fluid	65.0	62.0	63.3	78.6	80.6	80.4
• Degree of moulding	52.5	44.9	45.7	64.3	65.5	65.4
• Dilation of the cervix	95.1	92.3	92.1	100.0	98.8	98.9
• Descent of the head	87.8	86.1	87.1	92.9	92.7	92.7
• Uterine contractions	95.1	93.8	92.8	85.7	94.5	93.9
• Maternal blood pressure	100.0	98.5	98.9	100.0	100.0	100.0
• Maternal temperature	90.2	92.3	92.1	100.0	98.2	98.3
• Maternal pulse	97.5	93.0	94.4	100.0	99.4	99.4
• Urine output	-	-	-	64.3	81.2	79.9
4b. Actions to support AMSTL?						

Table 3: Knowledge scores related to pregnancy and delivery care, by type of midwife (Comparison between the 2014 and 2020 EmONC reviews)						
	2014			2020		
Responses	Primary midwives	Secondary midwives	Total	Primary midwives	Secondary midwives	Total
	(n=41)	(n=129)	(n=170)	(n=14)	(n=165)	(n=179)
Average score (out of 3)				3	3	3
Percent providing specific response:	**%**	**%**	**%**	**%**	**%**	**%**
• Immediate uterontic administration (in 1-2 minutes)	-	-	-	100.0	98.8	98.9
• Controlled cord traction	-	-	-	100.0	99.4	99.4
• Check uterine tone – massage if soft	-	-	-	85.7	97.6	96.6
5. Where do you register labour information?						
Average score (out of 4)	~~2~~	~~2~~	~~2~~			
Percent providing specific response:	**%**	**%**	**%**	%	%	%
• Partograph	100.0	100.0	100.0	-	-	-
• Clinical record	46.3	38.0	40.5	-	-	-
• Piece of paper	29.3	32.6	31.5	-	-	-
• Prenatal card	4.9	8.5	7.3	-	-	-
6. Preparation of second stage of labour						
Average score (out of 8)	6	5	5			
Percent providing specific response:	%	%	%	**%**	**%**	**%**
• Check room environment	53.7	43.0	45.8	-	-	-
• Prepare the position of woman	75.6	70.3	71.8	-	-	-
• Wash hands (1st time)	61.0	62.5	61.0	-	-	-
• Prepare dry clothes	87.8	82.8	83.6	-	-	-
• Prepare the resuscitation area and materials	95.1	86.7	88.7	-	-	-
• Washed hands (2nd time)	43.9	50.0	47.5	-	-	-
• Wear 2 pairs of clean gloves when preparing for delivery	46.3	58.6	54.8	-	-	-
• Prepare the delivery materials	90.2	85.9	87.0	-	-	-
7. Actions during active management of third stage labour						
Average score (out of10)	8	7	8			
Percent providing specific response:	**%**	**%**	**%**	**%**	**%**	**%**
• Checked for a second baby	80.5	75.8	76.8	-	-	-
• Immediate oxytocin (1 to 2 min)	95.1	93.8	94.4	-	-	-
• 1st pair of gloves removed prior to touching cord	46.3	41.9	42.1	-	-	-
• Check cord pulsations and clamp after it stopped	70.7	69.0	68.5	-	-	-
• Clamp and cut cord	75.6	76.0	75.3	-	-	-
• Controlled cord traction	97.6	96.1	96.6	-	-	-
• Checked if the placenta and membrane complete	92.7	80.6	82.6	-	-	-

Table 3: Knowledge scores related to pregnancy and delivery care, by type of midwife (Comparison between the 2014 and 2020 EmONC reviews)						
	2014			2020		
Responses	Primary midwives	Secondary midwives	Total	Primary midwives	Secondary midwives	Total
	(n=41)	(n=129)	(n=170)	(n=14)	(n=165)	(n=179)
• Uterine massage	87.8	89.9	89.3	-	-	-
• Counselled mother on feeding cues	61.0	53.5	54.5	-	-	-
• Monitored the vital signs of mother and baby	75.8	75.0	73.5	-	-	-
8. What to look for when a woman has/develops heavy bleeding at birth						
Average score (out of 7)	5	5	5			
Percent providing specific response:	%	%	%	%	%	%
• Signs of shock	46.3	49.6	52.2	-	-	-
• Amount of external blood	63.4	72.1	69.1	-	-	-
• Signs of anaemia	40.0	47.7	44.3	-	-	-
• Damage to the genital tract	87.80	84.5	86.0	-	-	-
• Whether uterus is contracted	82.9	79.1	80.9	-	-	-
• Retained products or retained placenta	78.1	65.9	68.5	-	-	-
• Full bladder	65.9	62.8	63.5	-	-	-
9. Actions to stop heavy bleeding after birth?						
Average score (out of 10)	6	5	5			
Percent providing specific response:	%	%	%	%	%	%
• Massage the fundus	87.8	84.4	85.3	100.0	95.2	95.5
• Give ergometrine or oxytocin (IV or IM) or misoprostol	95.1	83.7	86.0	92.9	97.6	97.2
• Begin IV fluids	97.6	93.0	94.4	100.0	100.0	100.0
• Empty bladder	63.4	57.4	59.0	57.1	72.7	71.5
• Take blood for Hb and cross-matching	9.8	10.1	9.6	14.3	23.6	22.9
• Examine woman for lacerations	82.9	73.7	75.8	85.7	95.8	95.0
• Manually remove retained products	65.9	65.9	65.7	78.6	88.5	87.7
• Bimanual uterine compression	-	-	-	78.6	80.6	80.4
• Pack the uterus with gauze to prevent haemorrhage	-	-	-	14.3	17.6	17.3
• Refer	58.5	62.8	61.2	71.4	80.6	79.9
9b. When to start the loading dose of magnesium sulphate (MN 10)						
Average score (out of 4)						
Percent providing specific response:	%	%	%	%	%	%
• Would never give magnesium sulphate	-	-	-	0.0	17.0	15.6
• When prescribed by authorized staff	-	-	-	57.1	63.6	63.1
• Pregnant or recently delivered women has pre-eclampsia	-	-	-	100.0	99.4	99.4

Table 3: Knowledge scores related to pregnancy and delivery care, by type of midwife (Comparison between the 2014 and 2020 EmONC reviews)						
	2014			2020		
Responses	Primary midwives	Secondary midwives	Total	Primary midwives	Secondary midwives	Total
	(n=41)	(n=129)	(n=170)	(n=14)	(n=165)	(n=179)
• Pregnant or recently delivered women has eclampsia	-	-	-	64.3	76.4	75.4
10. What to do when a woman gives birth and retains the placenta						
Average score (out of 10)	5	5	5			
Percent providing specific response:	%	%	%	%	%	%
• Empty the bladder	63.4	51.2	54.5	-	-	-
• Check signs of placental separation	65.5	65.1	64.6	-	-	-
• Give or repeat oxytocin	60.0	62.8	62.2	-	-	-
• Manually remove placenta	85.4	93.8	92.1	-	-	-
• Administer IV fluids	78.1	76.4	76.7	-	-	-
• Monitor vital signs for shock and act	58.5	57.8	57.1	-	-	-
• Check that uterus is well contracted	36.6	40.3	39.9	-	-	-
• Determine blood type and cross-match	0	6.9	5.1	-	-	-
• Prepare surgical theatre	9.8	14.0	12.4	-	-	-
• Refer	68.3	74.4	71.9	-	-	-

Safe abortion and gender based violence

Table 4: Knowledge scores of midwives related to abortion care and victims of sexual violence (Comparison between the 2014 and 2020 EmONC reviews)						
Responses	Primary midwives	Secondary midwives	Total	Primary midwives	Secondary midwives	Total
	(n=41)	(n=129)	(n=170)	(n=14)	(n=165)	(n=179)
1. What are the complications of unsafe abortion?						
Average score (out of 5)	3	3	3	3	4	4
Percent providing specific response:	%	%	%			
• Sepsis	85.4	77.5	79.2	85.7	80.6	81.0
• Bleeding	90.2	89.9	89.9	100.0	100.0	100.0
• Genital injuries	29.3	31.0	30.3	42.9	46.7	46.4
• Abdominal injuries	58.5	62.8	60.7	64.3	80.6	79.3
• Shock	56.1	55.0	55.6	64.3	83.6	82.1
2. What to do for a woman with an unsafe/incomplete abortion?						
Average score (out of 9)	6	5	5	6	7	7
Percent providing specific response:	%	%	%	%	%	%
• Vaginal exam	65.9	52.7	55.1	71.4	71.5	71.5
• Assess vaginal bleeding	50.0	40.6	43.8	42.9	60.0	58.7
• Assess vital signs	82.9	76.0	78.1	85.7	92.7	92.2

Table 4: Knowledge scores of midwives related to abortion care and victims of sexual violence (Comparison between the 2014 and 2020 EmONC reviews)						
Responses	**Primary midwives**	**Secondary midwives**	**Total**	**Primary midwives**	**Secondary midwives**	**Total**
	(n=41)	**(n=129)**	**(n=170)**	**(n=14)**	**(n=165)**	**(n=179)**
• Start IV fluids	87.8	84.5	86.0	100.0	93.3	93.9
• Start antibiotics	80.0	68.8	70.5	78.6	92.1	91.1
• MVA	61.0	62.8	61.2	71.4	90.9	89.4
• Evacuation with sharp curettage	36.6	29.5	31.5	7.1	35.8	33.5
• Counsel	46.3	35.2	37.9	50.0	60.0	59.2
• Refer	61.0	63.6	62.4	57.1	60.6	60.3
3. Information for women after unsafe/ incomplete abortion?						
Average score (out of 7)	3	3	3	5	5	5
Percent providing specific response:	%	%	%	%	%	%
• How to prevent reproductive tract infection/HIV	22.0	24.0	24.2	35.7	41.2	40.8
• When a woman can conceive again	29.3	29.5	30.3	78.6	66.7	67.6
• Family planning and services	87.8	88.4	88.8	100.0	98.8	98.9
• Information on social support	9.8	14.2	12.5	35.7	29.7	30.2
• The consequences of an unsafe abortion	65.8	76.0	73.0	78.6	75.8	76.0
• Normal recovery and follow up care	26.8	20.9	21.4	85.7	90.3	89.9
• About danger signs	73.2	73.6	73.0	64.3	81.2	79.9
4. What do you do for the victim of sexual violence?						
Average score (out of 8)	3	3	3	3	4	4
Percent providing specific response:	**%**	**%**	**%**	**%**	**%**	**%**
• Information about social service	9.8	20.2	17.4	35.7	40.0	39.7
• Facilitate filling out the police report	17.1	17.1	16.9	28.6	32.7	32.4
• Counsel for HIV testing	31.7	34.1	32.6	42.9	55.8	54.7
• Counsel about pregnancy prevention	31.7	37.2	35.4	28.6	60.6	58.1
• Provide emergency contraception	75.6	74.4	73.6	64.3	77.6	76.5
• Prophylaxis for HIV	12.2	10.9	10.7	21.4	31.5	30.7
• Urine, vaginal smears, and/or blood exams	65.8	62.8	62.9	42.9	75.8	73.2
• Refer	43.9	47.3	45.5	64.3	63.0	63.1

Newborn care

Table 5: Midwives knowledge related to newborn care (Comparison between the 2014 and 2020 EmONC reviews)						
Responses	**Primary midwives**	**Secondary midwives**	**Total**	**Primary midwives**	**Secondary midwives**	**Total**
	(n=41)	**(n=129)**	**(n=170)**	**(n=14)**	**(n=165)**	**(n=179)**
1. Immediate care of newborn						
Average score (out of 12)	5	5	4	10	10	10

Table 5: Midwives knowledge related to newborn care (Comparison between the 2014 and 2020 EmONC reviews)						
Responses	**Primary midwives**	**Secondary midwives**	**Total**	**Primary midwives**	**Secondary midwives**	**Total**
	(n=41)	**(n=129)**	**(n=170)**	**(n=14)**	**(n=165)**	**(n=179)**
Percent providing specific response:	**%**	**%**	**%**	**%**	**%**	**%**
• Deliver skin-to-skin contact on mothers' abdomen/chest	-	-	-	100.0	96.4	96.6
• Drying started within 5 sec after birth	56.1	50.4	52.3	100.0	98.2	98.3
• Cover the baby with dry towel	58.5	61.2	60.1	92.9	84.8	85.5
• Assess the babies breathing	51.2	54.3	52.3	78.6	83.0	82.7
• Clamp cord after 1-3 minutes	-	-	-	85.7	87.3	87.2
• Provide Chlorhexidine gel for cord	-	-	-	0.0	18.2	16.8
• Ensure baby kept ward (skin-to-skin contact)	92.7	96.1	95.5	92.9	87.9	88.3
• Initiate breast-feeding within 60 minutes	-	-	-	92.9	89.1	89.4
• **Apply tetracycline eye ointment once (within 60 min)**	-	-	-	92.9	93.3	93.3
• Give Vitamin K (after 60 minutes)	-	-	-	85.7	98.2	97.2
• With baby after 90 minutes	-	-	-	92.9	84.8	85.5
• Give BCG	-	-	-	78.6	95.8	94.4
1b. Key counselling messages related to cord care						
Average score (out of 4) **MRN 11**	-	-	-	**2**	**2**	**2**
Percent providing specific response:	**%**	**%**	**%**	**%**	**%**	**%**
• Put nothing on cord while waiting for it to fall off	-	-	-	100.0	97.0	97.2
• Cord should remain dry	-	-	-	92.9	95.8	95.5
• Apply chlorhexidine for cord care for 7 days	-	-	-	0.0	18.2	16.8
• Give sponge baths until cord falls off	-	-	-	0.0	24.2	22.3
1c. Recommended hours after birth the baby would have first bath	-	-	-	24 Hours	24 Hours	24 Hours
4. Care for the LBW newborn < than 2000 grams						
Average score (out of 9)	3	3	3	5	5	5
Percent providing specific response:	%	%	%	%	%	%
• Ensure thermal protection (skin to skin) - KMC	97.6	98.5	98.3	100.0	100.0	100.0
• Ensure baby is warm (place in incubator)	-	-	-	21.4	22.4	22.3
• Ensure baby is warm place in radiant warmed	-	-	-	35.7	40.0	39.7
• Provide support to mother to establish breastfeeding	90.2	87.6	88.2	100.0	97.6	97.8
• Monitor ability to breastfeed	53.7	56.6	55.6	100.0	96.4	96.6
• Assess for danger signs	-	-	-	71.4	73.9	73.7
• Assess breathing difficulties	-	-	-	28.6	52.7	50.8
• Monitor baby for first 24 hours	46.3	34.4	38.4	50.0	53.3	53.1
• Ensure infection prevention	19.5	17.8	17.4	21.4	39.4	38.0
3. Signs and symptoms of infection or sepsis						
Average score (out of 5)	-	-	-	3	3	3

Table 5: Midwives knowledge related to newborn care (Comparison between the 2014 and 2020 EmONC reviews)						
Responses	**Primary midwives**	**Secondary midwives**	**Total**	**Primary midwives**	**Secondary midwives**	**Total**
	(n=41)	**(n=129)**	**(n=170)**	**(n=14)**	**(n=165)**	**(n=179)**
Percent providing specific response:	**%**	**%**	**%**	**%**	**%**	**%**
• Temperature > 38_0 C (hyperthermia)	-	-	-	100.0	100.0	100.0
• Temperature < 35.5_0 C (hypothermia)	-	-	-	42.9	40.6	40.8
• Movement only with stimulation	-	-	-	35.7	41.2	40.8
• Severe chest in-drawing	-	-	-	64.3	82.4	81.0
• Poor feeding on observation	-	-	-	71.4	79.4	78.8
3a. Signs of a critical illness for neonates that indicate referral M6N13						
Average score (out of 10)	-	-	-	6	7	7
Percent providing specific response:	%	%	%	%	%	%
• Lethargic exhausted	-	-	-	92.9	79.4	80.4
• Comatose/unconscious	-	-	-	85.7	80.0	80.4
• Seizure	-	-	-	71.4	86.1	84.9
• Unable to feed	-	-	-	85.7	89.1	88.8
• Weak or absent cry	-	-	-	57.1	60.0	59.8
• Excessive cry	-	-	-	21.4	30.3	29.6
• Cyanosis	-	-	-	42.9	78.2	75.4
• Bulging and swollen fontanelle	-	-	-	7.1	16.4	15.6
• Persistent jaundice	-	-	-	57.1	53.9	54.2
2. Suspected infection or sepsis of newborn						
Average score (out of 9)	5	5	5			
Percent providing specific response:	**%**	**%**	**%**			
• Less movement (poor muscle tone), hypertonic, floppy	43.9	52.8	50.6	-	-	-
• Convulsion	48.8	45.7	46.6	-	-	-
• Poor or no breathing	67.5	72.9	70.1	-	-	-
• Hypothermia (<35^0 C) or hyperthermia(>38^0 C)	90.2	90.7	90.5	-	-	-
• Restlessness or irritability	35.0	34.7	33.9	-	-	-
• Difficult breathing or fast breathing (RR ≥ 60)	73.2	62.0	65.2	-	-	-
• Deep Jaundice	51.2	45.0	46.1	-	-	-
• Severe abdominal distension	14.6	7.8	9.0	-	-	-
• Pus from umbilical cord base	48.8	64.1	58.8	-	-	-
1. How to diagnose birth asphyxia						
Average score (out of 4)	4	4	4	4	4	4
Percent providing specific responses:	%	%	%	%	%	%
• Not breathing at birth	58.5	57.4	57.8	92.9	95.2	95.0
• Floppiness	65.9	70.5	69.7	64.3	80.6	79.3

Table 5: Midwives knowledge related to newborn care (Comparison between the 2014 and 2020 EmONC reviews)						
Responses	**Primary midwives**	**Secondary midwives**	**Total**	**Primary midwives**	**Secondary midwives**	**Total**
	(n=41)	**(n=129)**	**(n=170)**	**(n=14)**	**(n=165)**	**(n=179)**
• Heart rate < 100 BPM	61.0	56.6	57.9	78.6	73.9	74.3
• Central cyanosis	97.6	96.1	96.1	85.7	98.8	97.8
1a. Initial steps to starting neonatal resuscitation						
Average score (out of 7)	-	-	-	5	5	5
Percent providing specific responses:	**%**	**%**	**%**	**%**	**%**	**%**
• Call for help	-	-	-	64.3	80.0	78.8
• Explain to mother the condition of the baby	-	-	-	50.0	52.1	52.0
• Place the newborn face up	-	-	-	42.9	57.0	55.9
• Warp and cover baby except for face and upper chest	-	-	-	64.3	76.4	75.4
• Positioned head so neck is extended slightly	-	-	-	71.4	88.5	87.2
• Clear secretions if seen	-	-	-	85.7	75.8	76.5
• Start ventilation using a bag and mask	-	-	-	100.0	98.8	98.9
1b. What to check (for the baby) during a postnatal visit						
Average score (out of 8) M6N14	-	-	-	6	7	7
Percent providing specific responses:	**%**	**%**	**%**	**%**	**%**	**%**
• Breast feeding well	-	-	-	92.9	90.3	90.5
• Proper positioning for breast feeding	-	-	-	85.7	75.8	76.5
• Skin colour of the baby	-	-	-	100.0	91.5	92.2
• Fever of baby	-	-	-	64.3	83.0	81.6
• Breathing difficulty	-	-	-	78.6	90.9	89.9
• Eye swelling or discharge	-	-	-	78.6	78.2	78.2
• Umbilical cord stump	-	-	-	64.3	79.4	78.2
• Alertness of baby	-	-	-	71.4	77.6	77.1
1c. What to check (for mother) during a postnatal visit						
Average score (out of 12) M6N15	-	-	-	7	8	7
Percent providing specific responses:	**%**	**%**	**%**	**%**	**%**	**%**
• Vaginal bleeding	-	-	-	100.0	99.4	99.4
• Signs of infection (fever)	-	-	-	57.1	78.8	77.1
• Blood pressure	-	-	-	100.0	98.2	98.3
• Abdominal tenderness	-	-	-	35.7	53.9	52.5
• Size and firmness of uterus	-	-	-	100.0	98.2	98.3
• Deep vein thrombosis	-	-	-	7.1	6.7	6.7
• Breast swollen and painful	-	-	-	85.7	83.6	83.8
• Signs of anaemia	-	-	-	85.7	86.7	86.6
• Assess vaginal discharge (lochia)	-	-	-	78.6	65.5	66.5

Table 5: Midwives knowledge related to newborn care (Comparison between the 2014 and 2020 EmONC reviews)						
Responses	Primary midwives	Secondary midwives	Total	Primary midwives	Secondary midwives	Total
	(n=41)	(n=129)	(n=170)	(n=14)	(n=165)	(n=179)
• Signs of depression	-	-	-	0.0	19.4	17.9
• Involuntary leakage of urine (urinary incontinence)	-	-	-	42.9	23.0	24.6
• Cough or breathing difficulties	-	-	-	21.4	37.0	35.8

ANNEX 12: Fact sheets for Ratanak Kiri and Modul Kiri Provinces

Table 1: EmONC Fact Sheet for Health Centres in Mundul Kiri and Ratanak Kiri Provinces based on 2020 Review of the 2016-2020 EmONC Improvement Plan for Cambodia						
INDICATORS	Health Centres Mundul Kiri (n=9)		Health centres Ratanak Kiri (n=24)		Total (n=33)	
	n	%	n	%	n	%
Increase availability of Family Planning methods						
Number of temporary methods in stock at time of survey						
• Combined oral contraceptives	9	100.0	24	100.0	33	100.0
• Implants	6	66.7	14	58.3	20	60.6
• Progesterone-only 3-month injectable (Depo Provera)	9	100.0	24	100.0	33	100.0
• IUDs	7	77.8	12	50.0	19	57.6
• Male Condoms	9	100.0	22	91.7	31	93.9
• Female Condoms	0	0.0	0	0.0	0	0.0
• Emergency contraception	8	88.9	15	62.5	23	69.7
Increase availability of selected ANC services						
• Facility has HIV test kit at time of survey	9	100.0	23	95.8	32	97.0
• Facility has TT at time of survey	9	100.0	24	100.0	33	100.0
• Facility has folic acid at time of survey	0	0.0	7	29.2	7	21.2
Increase coverage of skilled attendance						
• Facility conducts deliveries	9	100.0	24	100.0	33	100.0
• Number of births delivered from Jan -Dec 2019	992	-	2376	-	3368	
• Number of Primary Midwives	16	-	33	-	49	
• Number of Secondary Midwives	27	-	36	-	63	
• Number of Primary Nurses	15	-	37	-	52	
• Number of Secondary Nurses	26	-	76	-	102	
• Number of complete delivery sets at time of survey	29	-	70	-	99	
• Facility has oxytocin at time of survey	9	100.0	24	100.0	33	100.0
• Facility has blank partographs at time of survey	9	100.0	24	100.0	33	100.0
• Facility has delivery table with stirrups at time of survey	6	66.7	21	87.5	27	81.8
• Facility has blood pressure cuff at time of survey	9	100.0	24	100.0	33	100.0
• Facility has stethoscope at time of survey	9	100.0	23	95.8	32	97.0
Increase availability of Postnatal Care (PNC)						
• Facility provides PNC	9	100.0	24	100.0	33	100.0
• Facility has ARVs for mothers at time of survey	0	0.0	0	0.0	0	0.0

Table 1: EmONC Fact Sheet for Health Centres in Mundul Kiri and Ratanak Kiri Provinces based on 2020 Review of the 2016-2020 EmONC Improvement Plan for Cambodia						
INDICATORS	**Health Centres Mundul Kiri (n=9)**		**Health centres Ratanak Kiri (n=24)**		**Total (n=33)**	
	n	**%**	**n**	**%**	**n**	**%**
• Facility has ARVs for newborns at time of survey	0	0.0	0	0.0	0	0.0
Increase availability of Post abortion Care and Safe Abortion						
• Facility has functional MVA equipment at time of survey	6	66.7	9	37.5	15	45.5
• Facility provides safe abortion services	5	55.6	4	16.7	9	27.3
• Number of incomplete abortions treated from Jan -Dec 2019	48	-	26	-	74	
Increase availability of Basic and Comprehensive EmONC						
• EmONC status (Basic, Comprehensive, non-EmONC)	0	0.0	0	0.0	0	0.0
• Provided parenteral antibiotics in the last 3-months	4	44.4	1	4.2	5	15.2
• Provided parenteral oxytocics in the last 3-months	9	100.0	24	100.0	33	100.0
• Provided parenteral anticonvulsants in the last 3-months	0	0.0	1	4.2	1	3.0
• Performed manual removal of placenta in the last 3-months	3	33.3	4	16.7	7	21.2
• Performed removal of retained products in the last 3-months	3	33.3	2	8.3	5	15.2
• Performed instrument delivery (forceps/ vacuum extraction) in last 3-months	1	11.1	1	4.2	2	6.1
• Performed neonatal resuscitation in the last 3-months	3	33.3	3	12.5	6	18.2
• Performed caesarean delivery in the last 3-months	0	0.0	0	0.0	0	0.0
• Performed blood transfusion in the last 3-months	0	0.0	0	0.0	0	0.0
• Facility has full oxygen cylinder with key at time of survey	2	22.2	2	8.3	4	12.1
• Facility has misoprostol at time of survey	0	0.0	0	0.0	0	0.0
• Facility has Benzyl penicillin at time of survey	1	11.1	3	12.5	4	12.1
• Facility has gentamicin at time of survey	8	88.9	23	95.8	31	93.9
• Facility has normal saline solution at time of survey	8	88.9	22	91.7	30	90.9
• Facility has had stock out in the last 3-months of oxytocin (Last 3-months)	0	0.0	0	0.0	0	0.0
• Number of direct obstetric complications treated (Jan -Dec 2019)	55	-	186	-	241	-
• Number of medical doctors and health officers trained in CEmONC	0	0.0	0	0.0	0	0.0
• Number of nurses and midwives trained in Basic EmONC	1	-	11	-	12	-
• Facility has guidelines/protocols for managing maternity complications	9	100.0	20	83.3	29	87.9
Improve Newborn Outcomes						
• Number of early newborn deaths (within 24 hours) from Jan -Dec 2019	4	-	0	-	4	-
• Facility has functional ventilatory bag for resuscitation at time of survey	9	100.0	24	100.0	33	100.0
• Facility has neonatal resuscitation table at time of survey	0	0.0	0	0.0	0	0.0
• Facility has guidelines/protocols for immediate (essential) newborn care	0	0.0	1	4.2	1	3.0
• Facility has amoxicillin at time of survey	9	100.0	23	95.8	32	97.0
Improve Infrastructure & Waste Management						
• Facility has electricity	9	100.0	24	100.0	33	100.0
• Facility has running water	9	100.0	17	70.8	26	78.8
• Facility has Gloves Sterile or high-level disinfected at time of survey	9	100.0	24	100.0	33	100.0
• Facility has container for decontamination at time of survey	9	100.0	24	100.0	33	100.0
• Facility has bleach and powder for decontamination at time of survey	9	100.0	24	100.0	33	100.0
• Facility has soap at time of survey	9	100.0	23	95.8	32	97.0
• Facility has puncture proof container for sharps disposal at survey time	9	100.0	22	91.7	31	93.9
• Facility has functional autoclave at time of survey	5	55.6	16	66.7	21	63.6
• Facility has functional steam instrument sterilizer at time of survey	7	77.8	0	0.0	7	21.2
• Facility has incinerator at time of survey	8	88.9	15	62.5	23	69.7

Notes on how these indicators were defined

Temporary methods of Family Planning include combined oral contraceptives, implants, 3-month injectables, IUDs, male condoms and

female condoms.
ARVs for mothers include 1) nevirapine for mother and/or 2) combined ARVs for mother.
ARVs for newborns include 1) nevirapine for newborn and/or 2) combined ARVs for newborn.
Number of incomplete abortions treated refers to women treated for incomplete or unsafe abortion.
Functional MVA equipment is defined as having vacuum aspirators/syringes + flexible cannulae 4 – 6 mm + flexible cannulae 7 – 12 mm.
Basic EmONC status is defined by 7 signal functions, all of which were performed in the last 3-months. The signal functions are 1) parenteral antibiotics, 2) parenteral oxytocics, 3) parenteral anticonvulsants, 4) manual removal of placenta, 5) removal of retained products, 6) instrumental vaginal delivery (forceps or vacuum extraction), and 7) neonatal resuscitation with bag and mask.
Comprehensive EmONC is defined by 9 signal functions, all of which were performed in the last 3-months. The signal functions are the 7 Basic signal functions and 8) caesarean delivery, and 9) blood transfusion.
The direct obstetric complications included are: antepartum and postpartum haemorrhage, retained placenta, obstructed/prolonged labour, ruptured uterus, postpartum sepsis, severe pre-eclampsia/eclampsia, severe complications of abortion (haemorrhage or sepsis), and ectopic pregnancy.
In the survey, we defined immediate (essential) newborn care as making sure the baby is dry, keeping the baby warm (skin-to-skin contact), exclusive breastfeeding, and eye and cord care.
If a cell is blank, that means there is no information for that item.

Table 2: Hospital EmONC fact sheet for Mundul Kiri and Ratanak provinces based on 2020 Review of the 2016-2020 EmONC Improvement Plan for Cambodia

INDICATORS	Mundul Kiri Provincial Hospital	Koh Nhek Referral Hospital	Borkeo Referral Hospital	Ratanak Kiri Provincial Hospital
Increase availability of Family Planning methods				
Number of temporary methods in stock at time of survey				
• Combined oral contraceptives	Yes	No	Yes	Yes
• Implants	Yes	Yes	Yes	Yes
• Progesterone-only injection 3-month injectable (Depo Provera)	Yes	No	Yes	Yes
• IUDs	Yes	Yes	Yes	Yes
• Male Condoms	Yes	Yes	Yes	Yes
• Female Condoms	No	No	No	No
• Emergency contraception	No	No	Yes	No
Increase availability of selected ANC services				
• Facility has HIV test kit at time of survey	1	1	1	1
• Facility has TT at time of survey	1	0	1	0
• Facility has folic acid at time of survey	0	0	1	1
Increase coverage of skilled attendance				
• Facility conducts deliveries	1	1	1	1
• Number of births delivered from Jan -Dec 2019	616	300	572	1650
• Number of Primary Midwives	3	3	3	7
• Number of Secondary Midwives	9	7	11	18
• Number of Primary Nurses	4	0	0	3
• Number of Secondary Nurses	24	10	8	35
• Number of complete delivery sets at time of survey	5	5	10	8
• Facility has oxytocin at time of survey	Yes	Yes	Yes	Yes
• Facility has blank partographs at time of survey	Yes	Yes	Yes	Yes
• Facility has delivery table with stirrups at time of survey	Yes	Yes	Yes	Yes
• Facility has blood pressure cuff at time of survey	Yes	Yes	Yes	Yes
• Facility has stethoscope at time of survey	Yes	Yes	Yes	Yes
Increase availability of Postnatal Care (PNC)				
Facility provides PNC	Yes	Yes	Yes	Yes
Facility has ARVs for mothers at time of survey				
• Nevirapine for mother	No	No	No	Yes
• Stavudine for mother	No	No	No	Yes
• Zidovudine for mother	No	No	No	Yes
• Lamivudine (3TC) for mother	Yes	No	No	Yes

Table 2: Hospital EmONC fact sheet for Mundul Kiri and Ratanak provinces based on 2020 Review of the 2016-2020 EmONC Improvement Plan for Cambodia				
INDICATORS	**Mundul Kiri Provincial Hospital**	**Koh Nhek Referral Hospital**	**Borkeo Referral Hospital**	**Ratanak Kiri Provincial Hospital**
Facility has ARVs for newborns at time of survey				
• Nevirapine for newborn	Yes	No	No	Yes
• Zidovudine for newborn	Yes	No	No	Yes
Increase availability of Post abortion Care and Safe Abortion				
• Facility has functional MVA equipment at time of survey	Yes	Yes	Yes	Yes
• Facility provides safe abortion services	Yes	Yes	Yes	Yes
• Number of incomplete abortions treated from Jan -Dec 2019	39	29	144	458
Increase availability of Basic and Comprehensive EmONC				
• EmONC status (Basic, Comprehensive, non-EmONC)	CEmONC	BEmONC	BEmONC	CEmONC
• Provided parenteral antibiotics in the last 3-months	Yes	Yes	Yes	Yes
• Provided parenteral oxytocics in the last 3-months	Yes	Yes	Yes	Yes
• Provided parenteral anticonvulsants in the last 3-months	Yes	Yes	Yes	Yes
• Performed manual removal of placenta in the last 3-months	Yes	Yes	Yes	Yes
• Performed removal of retained products in the last 3-months	Yes	Yes	Yes	Yes
• Performed instrument delivery (forceps/ vacuum extraction) in last 3-months	Yes	Yes	No	Yes
• Performed neonatal resuscitation in the last 3-months	Yes	Yes	Yes	Yes
• Performed caesarean delivery in the last 3-months	Yes	No	No	Yes
• Performed blood transfusion in the last 3-months	Yes	No	No	Yes
• Facility has full oxygen cylinder with key at time of survey	Yes	Yes	Yes	Yes
• Facility has misoprostol at time of survey	Yes	No	Yes	Yes
• Facility has Benzyl penicillin at time of survey	No	No	No	No
• Facility has gentamicin at time of survey	Yes	Yes	Yes	Yes
• Facility has normal saline solution at time of survey	Yes	Yes	Yes	Yes
• Facility has had stock out in the last 3-months of oxytocin	No	No	No	No
• Number of direct obstetric complications treated Jan -Dec 2019	49	40	68	131
• Number of medical doctors and health officers trained in CEmONC	3	0	0	0
• Number of nurses and midwives trained in Basic EmONC	5	7	7	8
• Facility has guidelines/protocols for managing maternity complications	Yes	Yes	Yes	Yes
Improve Newborn Outcomes				
• Number of early newborn deaths (within 24 hours) from Jan -Dec 2019	4	0	0	1
• Facility has functional ventilatory bag for resuscitation at time of survey	Yes	Yes	Yes	Yes
• Facility has neonatal resuscitation table at time of survey	Yes	Yes	Yes	Yes
• Facility has guidelines/protocols for immediate (essential) newborn care	No	No	No	No
• Facility has amoxicillin at time of survey	Yes	Yes	Yes	Yes
Improve Infrastructure & Waste Management				
• Facility has electricity	Yes	Yes	Yes	Yes
• Facility has running water	Yes	Yes	Yes	Yes
• Facility has gloves sterile or high-level disinfected at time of survey	Yes	Yes	Yes	Yes
• Facility has container for decontamination at time of survey	Yes	Yes	Yes	Yes
• Facility has bleach and powder for decontamination at survey time	Yes	Yes	Yes	Yes
• Facility has soap at time of survey	Yes	Yes	Yes	Yes
• Facility has puncture proof container for sharps disposal at time of survey	Yes	Yes	Yes	Yes

Table 2: Hospital EmONC fact sheet for Mundul Kiri and Ratanak provinces based on 2020 Review of the 2016-2020 EmONC Improvement Plan for Cambodia				
INDICATORS	**Mundul Kiri Provincial Hospital**	**Koh Nhek Referral Hospital**	**Borkeo Referral Hospital**	**Ratanak Kiri Provincial Hospital**
• Facility has functional autoclave at time of survey	Yes	Yes	Yes	Yes
• Facility has functional steam instrument sterilizer at time of survey	Yes	Yes	No	Yes
• Facility has incinerator at time of survey	Yes	Yes	No	Yes

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