



Technical Brief

November 2024

BLENDED LEARNING IN ESSENTIAL NEWBORN CARE

An Alternative Training Approach in South Sudan

“Essential newborn care involves immediate care at the time of birth, and essential care during the entire newborn period” (World Health Organization, n.d.). This technical brief provides an overview of a blended (remote/in-person) essential newborn care training program conducted for health care workers based in fragile settings in South Sudan. It builds on [an earlier brief](#) that explores blended training approaches but focuses instead on the implementation and results of the training process, along with lessons learned and recommendations for future blended training efforts.

Essential Newborn Care Includes:

- Thermal care
- Resuscitation when needed
- Support for breast milk feeding
- Nurturing care
- Infection prevention
- Assessment of health problems
- Recognition and response to danger signs
- Timely and safe referral when needed

World Health Organization, n.d.

INTRODUCTION

In South Sudan, poor access to health services, a limited number of appropriately skilled health providers, and lack of access to health services have produced some of the worst maternal, newborn, and child health (MNCH) outcomes in the world. These challenges are illustrated by key indicators such as a newborn mortality rate of 39 per 1,000 live births, a stillborn rate of 25 per 1,000 total births, an under-five mortality rate of 99 per 1,000 live births, and a maternal mortality rate of 1,223 per 100,000 live births (World Health Organization, 2016).

One of the major drivers of these poor outcomes is the compromised human resources for health (HRH) situation across the country. As defined by the World Health Organization (WHO, 2006), HRH encompasses “all people engaged in actions whose primary intent is to enhance positive health outcomes.” And yet, “the dire shortage of health workers in many places is among the most significant constraints to achieving” health-related goals. In South Sudan, the lack of adequate and available health care support is evidenced by:

- The skilled birth attendance rate: 40 percent.
- The proportion of women who receive postnatal care within 2 days after giving birth: 7 percent.
- The proportion of women who initiate early breastfeeding: 51 percent.

Effective HRH and strategies for augmenting the capacity of health care workers are critical to ensuring the quality of MNCH care and service delivery in vulnerable, low-resource settings. However, in South Sudan’s fragile and conflict-affected areas, overcoming the critical shortage of health care workers in the public health system requires innovative approaches for capacity building, including blended (remote/in-person) training models that minimize off-site training for providers and trainers so that they can continue to provide clinical services for their underserved communities. In addition, physical travel into and out of these areas can be fraught with uncertainty due to armed conflict, chronic flooding, poor infrastructure, and similar challenges, thereby making flexible training approaches much more feasible.

PROGRAM DESCRIPTION AND PARTNERS

To help expand the health care workforce and build its capacity, USAID’s MOMENTUM Integrated Health Resilience (MIHR) partnered with Laerdal Global Health (LGH) and the American Academy of Pediatrics (AAP) and worked in collaboration with the South Sudan Ministry of Health (at the national, state, and county levels) and the South Sudan Nurses and Midwives Association (SSNAMA). Together, the partners planned, developed, and implemented a blended Essential Newborn Care (ENC) 1 training program designed to improve the quality of MNCH interventions across the service delivery and life course continuums in fragile settings. ENC 1 training is the first part of the WHO’s basic “[Essential Newborn Care Course](#).” It is grounded in the Helping Babies Breathe (HBB) curriculum and care of the newborn within the first 60 minutes of birth and has proven to be a cost-effective and sustainable method to build frontline health care providers’ capacity for saving lives at birth.

The program included a blended training of trainers (TOT), the rollout of the training to health providers in health facilities by those trained during the TOT, and ongoing remote mentorship of the TOT trainees—all of which align with MIHR’s learning agenda around improving health outcomes and resilience at the humanitarian-development-peace nexus. Participants in the training process are shown in Table 1.

Africa’s Health Care Worker Shortage

Africa had an average of 1.30 health workers per 1,000 people in 2015, significantly less than the 4.5 needed to meet the Sustainable Development Goals (SDGs). Though gains have been made, Africa has the most severe health personnel shortfall, predicted to reach 6.1 million by 2030, out of the anticipated global health staff need of 14.5 million required for Universal Health Coverage (UHC) and SDGs.

African Medical and Research Foundation, n.d.

TABLE 1. TRAINING PARTICIPANTS

Participant	Roles
TOT trainees (n=20; 8 salaried MIHR staff, 12 with no direct MIHR affiliation)	<ul style="list-style-type: none"> Received ENC 1 training through a TOT curriculum. Subsequently cascaded the ENC 1 training to health providers working at the health facility level.
Global mentors (Facilitators; n=5)	<ul style="list-style-type: none"> Provided remote training to the TOT trainees during the TOT sessions. Subsequently provided remote mentorship to the TOT trainees.
Local master trainers (Facilitators; n=2)	<ul style="list-style-type: none"> Provided in-person training in support of the global mentors during the TOT. Provided practical training to the TOT trainees.
Health providers (n=153 to date; 98 for ENC 1; 55 for integrated ENC1-BEmONC)	<ul style="list-style-type: none"> Received practical ENC 1 training from the TOT trainees after they completed the TOT course. Provide newborn services to the clients in health facilities.

The main goal of the program was to pilot a blended ENC 1 training course in MIHR-supported regions in South Sudan. Its objectives were to:

- Train a group of trainers (i.e., the TOT trainees) and impart the ENC 1 training methodology.
- Technically support the training rollout to frontline health providers in MIHR-supported counties.
- Provide ongoing remote mentorship to the TOT trainees.
- Promote low-dose high-frequency (LDHF) training to sustain learned skills.

The training was conducted in two phases: Phase 1 consisted of equipping the facilities and conducting a TOT; Phase 2 involved rolling out the training to health providers at the facility level and ongoing mentorship and support of the TOT trainees by global mentors.

PHASE ONE

In Phase One, the TOT trainees participated in a 3-day blended ENC 1 training facilitated by five global mentors from AAP (three from the United States, one from Kenya, and one from Uganda) and supported by two in-person, credentialed local master trainers (in Juba, South Sudan). This was followed by 2 days of practical sessions conducted in a health facility to enable the local master trainers to evaluate the knowledge and skills acquired by the TOT trainees during the TOT by observing them as they trained health providers.

The Phase One training methodologies included:

- Remote and in-person training.
- Interactive didactic sessions featuring participant discussions, return demonstrations using NeoNatalie manikins and action plans, and small group practices.
- The use of video and other interactive learning methods embedded in [ENC Now!](#), an online ENC course, freely accessible on the [Helping Mothers and Babies Survive platform](#), that features a blended learning approach with digitally delivered content as well as face-to-face practice time.¹

Once the TOT and practical sessions were completed, the TOT trainees were:

1. Equipped with knowledge and skills on neonatal resuscitation and essential newborn care.
2. Able to apply the ENC 1 training methodology to train and provide on-site support to frontline health providers in MIHR-supported health facilities and beyond.

¹ These tools, which require either an internet connection or a device for video playback, were used only during the TOT.

In preparation for the training, several meetings were held with MIHR core and country staff, the master trainers, and global mentors to ensure all logistics and training requirements were in place for a smooth and productive learning environment. The MIHR team, in collaboration with MOH staff, identified the TOT trainees and facilitated the official training invitation. The TOT trainees included doctors, including an OB/GYN and a pediatrician; registered midwives; nurse midwives; nurses; and clinical officers. Along with MIHR and MOH staff, they were from SSNAMA, the Association of Gynecologists and Obstetricians of South Sudan (AGOSS), and the South Sudan Pediatric Association (SSPA).

After a training venue was identified in Juba, information technology (IT) and internet capabilities were configured to prevent technical interruptions. Because there was only one room for the training, breakout sessions took place within a limited space. As a result, solutions were found to ensure that the discussions within each group did not disturb other sessions, particularly for communication with the remote facilitators.

The 3-day TOT was held from January 30 to February 2, 2023. During this event, global mentors provided training remotely to 20 TOT trainees with in-person support from two local master trainers, who also supported four small group sessions focusing on hands-on skills training. To determine training needs and assess knowledge gains, all TOT trainees completed a participant characteristics survey and a pre- and post-course knowledge check. Moreover, each day of training was followed by a debrief session, which enabled the global mentors and local master trainers to reflect and prepare for the next day.

The main topics covered during the training were:

- Newborn resuscitation (stimulate, ventilate, continued care) within the Golden Minute (breathing within one minute after birth).
- Immediate care after birth (keeping babies warm/skin-to-skin, assessing the newborn, promoting exclusive breastfeeding, and preventing infection).
- Treating mother and baby with respect.
- Keeping records to help provide the best care.
- How to train others and how to use the training equipment.
- LDHF practice essentials.
- Quality improvement.

Following the TOT, 2 days of practical sessions organized by MIHR were held on-site at the project-supported Nyakuron Primary Health Care Center (PHCC), where the TOT trainees trained 10 health providers, mainly midwives, in clinical practices and competencies covering:

- Gray Zone: Preparations taken before the birth of the newborn.
- Green Zone: Immediate routine care for newborns.
- Yellow Zone: The Golden Minute, which involves actions taken to conduct a rapid assessment in the first 60 seconds of life to ensure the ventilation of the baby.
- Red Zone: Continue newborn ventilation, monitoring, and referral.

In addition, the TOT trainees had a bag and mask ventilation skill check through objective structured clinical examination (OSCE) to assess the status of their ventilation skills before and after the practical sessions.

PHASE TWO

The Phase Two trainings involved three activities:

Activity One: MIHR and its partners, LGH and AAP, had initially planned for the TOT trainees to cascade only the ENC 1 training to the health providers in their facilities. However, following the TOT, MIHR had to pivot to

roll out the ENC 1 training as part of a basic emergency obstetric and newborn care (BEmONC) training package. This decision was made because some of the non-MIHR staff TOT trainees would not train the health providers without receiving per diems and thus dropped out of the program, even though they had initially agreed to support the training with no additional pay.

From March 2023 to March 2024, the TOT trainees cascaded the training to 21 project-supported health facilities in eight counties: Bor, Budi, Juba, Jur River, Kajo-Keji, Magwi, Wau, and Yambio. Of the 21 health facilities, 10 had staff trained on-site through a 1-day standalone ENC 1 training approach. The remaining 11 health facilities had staff trained off-site for 5 days through the integrated ENC1-BEmONC training, which was facilitated mainly by MIHR TOT trainees and included 1 day devoted to ENC 1 training.

For the 1-day training, the trainers used the ENC 1 training modules, including facilitator guides, provider's handbook, wall charts, training manikins such as NeoNatalie, and bag and mask gear. This training focused mainly on imparting clinical skills and competencies needed to effectively resuscitate and ventilate newborns having difficulty breathing. These practical and interactive sessions used competency-based and adult learning approaches. The practical hands-on approach and the use of action plans and pictorial guides were crucial for acquiring knowledge, particularly for health providers who were not familiar with English. Pre- and post-test training knowledge assessments were administered, with 80 percent considered a passing score. Not all TOT trainees provided scores, but for those results obtained, most health providers scored 60 to 70 percent on the pre-test and 80 to 100 percent on the post-test.

Similar approaches and tools were used for the integrated ENC1-BEmONC training, with two notable differences. First, a pre- and post-training knowledge assessment was also administered but could not be evaluated as only a few questions from the standalone ENC 1 assessment were incorporated into the overall BEmONC test. Second, as the remote mentoring continued, trainers layered in elements of ENC 2² trainings as they cascaded the training to health providers in different facilities.

Activity Two: AAP organized the Customized mentorship and Implementation Support Package ([CRISP](#)) to supplement ENC 1 training with targeted mentorship sessions for the TOT trainees. This monthly, tailored remote mentoring ran for 6 months, facilitated by five AAP global mentors as well as local MIHR trainers. It supported the rollout of the ENC 1 implementation to the health facilities to ensure, improve, and sustain knowledge and skills transfer for ENC 1 services. The sessions attracted an average of 16 participants per session, including MIHR staff, and ranged from 1.5 to 2 hours. The sessions covered comments from the TOT trainees on the ongoing health provider training, the use of the LDHF practice log, challenges encountered and problem-solving, relevant topics that needed reinforcement, administration of the OSCE tools, and data collection. In addition, ENC 2 content and essentials were stressed to lay the groundwork for the next steps in the training cascade rollout.

Activity Three: Consisted of quarterly supportive supervision and coaching conducted by MIHR staff and county representatives. This ongoing effort is part of integrated, comprehensive, supportive supervision and is used to assess the implementation of newborn services by reviewing the process of care, availability of supplies and commodities, and data management. Identified gaps were passed on to MIHR TOT trainees, who then worked with health providers to address the needs.

² ENC 2 focuses on newborn care from 60-90 minutes after birth to discharge from the facility, and the first month of life.

TRAINING TOOLS

Over the course of the training and mentorship, the team employed the following tools:

1) **WhatsApp:** Two accounts were created to facilitate and support the training. The first, a master trainers/mentors account, was created 2 months before the training to facilitate communication and coordination of the training between global mentors, local master trainers, and the MIHR technical team. Frequent planning sessions were held with the MIHR South Sudan country team, AAP, LGH, and global and local mentors. This platform was important for the ongoing coordination between all partners involved. The second account was created for the global mentors, local master trainers, and TOT trainees. The platform, while informal, was used to follow up and inform the group on the ongoing trainings, challenges encountered, and solutions developed. It was also used to communicate and agree on the remote mentoring schedule, as most of the TOT trainees did not have email accounts or access to laptops, which could provide other means of electronic communication and scheduling.

2) **ENC Now!:** An online tool that facilitates remote course delivery of ENC 1 and ENC 2 and offers a means to deliver competency-based training in settings such as South Sudan, where travel and access to educational continuity may be challenging due to safety, security, and/or cost. TOT trainees and MIHR staff, along with two local master trainers, met in-person in Juba, while the five global mentors facilitated the 3-day ENC 1 training remotely via Zoom.

3) **CRISP:** Mentorship and quality improvement measures are necessary follow-up steps to ensure new skills will be incorporated into practice. CRISP uses a blended approach and supplemental mentorship sessions and resources on various topics to support ENC 1 implementation as well as knowledge and skills transfer. After the 3-day ENC 1 TOT was completed and the TOT trainees began cascading the education locally, the AAP global mentors, MIHR staff, and TOT trainees convened monthly via Zoom for six online mentorship sessions. The AAP global mentors led these sessions, which focused on topics such as LDHF practice, data collection, and facilitation skills, as well as organic discussions on supporting the TOT trainees through challenges and successes encountered in cascading the training.

4) The **Learning Improvement and Facilitation Tool (LIFT):** Developed by LGH, [LIFT Assessments](#) is a digital tool that provides automatic scoring and rapid feedback during training. LIFT allows ENC 1 facilitators to assess baseline participant knowledge, follow up on learners' practice and progress, and create and export analytical reports, while also enabling program implementers to monitor and evaluate the effectiveness and efficiency of training programs and make data-driven decisions about participant needs. For this project, LIFT was used to conduct the ENC 1 educational assessments, including the knowledge checks, bag mask skills checks, and case scenarios.

5) **Educational Materials and Equipment:** ENC 1 educational materials and equipment, which included NeoNatalie and NeoNatalieLive simulators, were used during the TOT and for further equipping local facilities for the onsite training, coaching, and peer-to-peer mentoring.

TABLE 2. PARTNERS ROLES AND RESPONSIBILITIES

MIHR	LGH	AAP
<ul style="list-style-type: none"> • Established the partnership. • Managed the recruitment of training participants. • Organized logistics in consultation with LGH and AAP. • Identified and recruited local HBB experts. • Provided on-site technical assistance and support to TOT trainees and health providers. • Helped coordinate the remote training and mentorship by ensuring the availability of TOT trainees. 	<ul style="list-style-type: none"> • Led instructional design of the ENC curriculum. • Developed the platform for Helping Mothers and Babies Survive (HMBS). • Provided NeoNatalie newborn simulator training manikins. • Identified and recruited local HBB experts. 	<ul style="list-style-type: none"> • Oversaw the development of ENC curriculum in collaboration with WHO and other partners. • Coordinated staff and team members to serve as global mentors. • Identified and recruited local HBB experts. • Managed and led the 5-day integrated ENC 1-BEmonC training, six mentorship sessions, the WhatsApp coaching group, and regular planning calls between MIHR and AAP.

FINDINGS/RESULTS/ANALYSIS

MIHR leveraged the Kirkpatrick Training Evaluation Model to analyze and evaluate the experience and outcome of the blended ENC 1 training approach. This model was designed to help organizations determine participants’ satisfaction with a training program, whether they learned from it and could subsequently apply what they learned, and the overall impact of the training (Falletta, 1998).

The model examines training at four key levels: 1) Reaction, 2) Learning, 3) Behavior, and 4) Results.

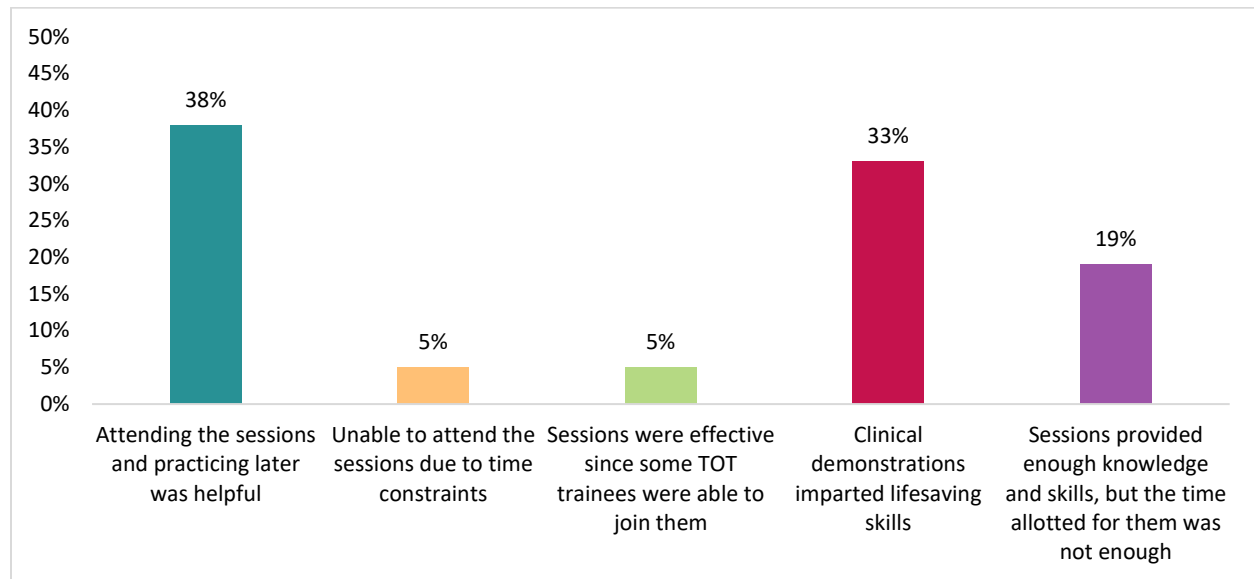
LEVEL 1: REACTION

This level measures the participants’ perception of their training experience, including methodologies used, logistics, and relevancy to their jobs. For the blended ENC 1 training and remote mentorship, 20 TOT trainees were asked to complete a 22-question survey in order to gauge their reactions. Below are some highlights from the survey results.

ENC Now!: When asked if the online facilitation approach allowed for adequate discussion of teaching points, the majority of the TOT trainees either agreed (57 percent) or strongly agreed (19 percent), compared with those who felt neutral (19 percent) or disagreed (5 percent). The same results were noted when TOT trainees were asked whether the delivery method provides adequate interaction with facilitators. Also, when asked if the approach allows for adequate feedback on the skills covered during practice sessions, 62 percent agreed, 19 percent strongly agreed, 10 percent were neutral, and 10 percent disagreed.

CRISP: When asked if CRISP mentorship sessions were adequate to support learners as they worked to cascade the training, 57 percent of the TOT trainees agreed, 19 percent strongly agreed, 19 percent were neutral, and 5 percent disagreed. For another question, on whether remote mentorship sessions provided adequate interaction with mentors/facilitators, 33 percent agreed, 19 percent strongly agreed, 38 percent were neutral, and 10 percent disagreed. TOT trainees were also asked if remote mentorship via CRISP allowed for adequate feedback and support related to ENC training and implementation. In response, 57 percent agreed, 19 percent strongly agreed, 14 percent were neutral, and 10 percent disagreed. Moreover, TOT trainees were asked if the mentors provided an effective and engaging experience—to which 62 percent agreed, 24 percent strongly agreed, and 14 percent were neutral. Figure 1 shows TOT trainee responses to the question: “What worked well with the mentorship sessions?”

FIGURE 1. MENTORING: WHAT WORKED WELL



Alternatively, when asked about the biggest challenge they faced during the mentorship sessions, 76 percent of TOT trainees said the internet, not enough time, and lack of funds for transportation and refreshments were key issues; 14 percent pointed to unclear explanations; and 10 percent noted issues arising from conflicting activities.

General: When asked what additional resources or support they need to improve their experience, 43 percent requested refresher training at some point, 33 percent asked for financial support to help in their training, and 24 percent wanted to have more discussion about data. Also, when asked if they felt that the mentorship session frequency was enough for themselves and their mentor, 71 percent of TOT trainees said “Yes” and 29 percent said “Maybe.” Finally, when asked if they were interested in being trained to serve as a global mentor with AAP, 86 percent said “Yes” and 14 percent said “Maybe.”

LEVEL 2: LEARNING

This level measures how the training improved the knowledge and skills of the participants. For the ENC 1 TOT, the master trainers developed a knowledge assessment questionnaire from key elements of the ENC 1 content and distributed it to the TOT trainees. In all, there were 21 multiple choice questions with a total score of 100 percent. As the results show, the average score was 83 and 92 percent on the pre-test and post-test assessment respectively, suggesting that the selected TOT trainees had a good initial knowledge base and improved upon it following the ENC 1 TOT. Both the pre- and post-test assessments revealed that most TOT trainees scored low in questions related to routine care after birth and on the complications that might result from unnecessary suction of the baby after birth. These identified gaps were then focused on during the follow-up remote mentorship sessions.

In addition, a pre- and post-training skill check using the ventilation bag and mask (VBM) was administered. This practical assessment investigated actions taken by TOT trainees when they were about to begin VBM, actions taken as they continue ventilating for one minute, and actions taken to improve ventilation when the baby’s chest stopped moving despite the initial VBM. Overall, the assessment revealed an average pre-training score of 41 percent, while the post-training score was 96 percent, demonstrating a significant improvement in VBM skills among the 10 TOT trainees who took both tests.

LEVEL 3: BEHAVIOR

This level assesses the extent to which training participants applied what they learned into their day-to-day work activities. For the ENC 1 program, this included 1) how many health providers were reached with either the standalone ENC 1 training or the integrated ENC 1-BEmONC training (a solution implemented after the drop-out of some TOT trainees), 2) how many health facilities were reached with ENC 1 training, including the integrated ENC 1-BEmONC training, and 3) the number of TOT trainees who cascaded the ENC 1 training.

From March 2023 to March 2024, MIHR collaborated with and supported the TOT trainees in reaching 153 health providers with ENC 1 training. Of these providers, 98 were trained through the standalone ENC 1 training, while 55 were trained with the integrated ENC 1-BEmONC training. Twenty-one health facilities were reached with ENC 1 training (10 with standalone ENC 1 and 11 with integrated ENC 1-BEmONC). Across the eight South Sudan counties, the standalone ENC 1 and integrated ENC 1-BEmONC trainings reached 9 medical doctors, 35 nurses, 59 midwives/nurse midwives, 26 traditional birth attendants, and 24 others, including clinical officers, across the 21 health facilities.

Eleven of the 20 TOT trainees facilitated the training. Only seven non-MIHR-affiliated TOT trainees cascaded the trainings to the health providers following the initial blended ENC 1 training. The nine TOT trainees who dropped out after the initial ENC 1 TOT reported not being paid a per diem as the main reason for not cascading the trainings.

LEVEL 4: RESULTS

This level aims to measure the extent to which targeted results can be attributed to the use of knowledge and skills acquired by health providers during training. Data collected on specific ENC 1 indicators were compared to performance 6 months before the ENC 1 training and 6 months after the training. It is important to note that since health facilities were reached at different periods, data on specific indicators were pooled to reflect any observed change after the training. To account for the differences in health facility workload and staff availability, the findings in some cases are presented to reflect the difference in performance between high volume of birth (100 or more births per month) versus low volume of birth (less than 100 births per month) at the facilities.³ In addition, data are presented to show any performance difference between health facilities trained with the standalone ENC 1 curriculum versus those trained with the integrated ENC 1-BEmONC curriculum. Results from 20 out of 21 health facilities are presented, as one health facility was trained much later (after March 2024) and could not present enough post-training results. The measures, which will be noted in turn, included:

1. Newborn mortality rate reported at the MIHR-supported health facilities that received ENC 1 training.
2. The proportion of newborns with difficulty breathing who were successfully resuscitated in MIHR-supported health facilities.
3. The proportion of newborns who started breastfeeding within 1 hour of birth in MIHR-supported health facilities.
4. A performance comparison on ENC indicators among health facilities whose providers were exposed to standalone ENC 1 training versus those exposed to the integrated ENC 1-BEmONC training.

³ Staffing levels and cadre prior experience and training levels were not assessed; however, although there are many variables to consider, it is highly likely that more skilled health providers would be located at a high-level facility (e.g. a hospital rather than a primary care center) than a low-level facility, irrespective of the volume of patients.

The first three measures describe the impact of ENC 1 training irrespective of the approach used to deliver it. Measure 4 includes a look at the standalone ENC 1 and integrated ENC 1-BEmONC independently.

MEASURE 1: NEWBORN MORTALITY REPORTED AT MIHR-SUPPORTED HEALTH FACILITIES THAT RECEIVED ENC 1 TRAINING

Of the 6,765 and 6,462 live births reported, respectively, before and after the ENC 1 training, there was actually an increased number of reported newborn deaths (n=37) 6 months after the training compared with 6 months before the training (n=32). Correspondingly, the newborn mortality rate (NMR) increased from 5 to 6 per 1,000 live births. These findings were observed in both low- and high-volume health facilities. Although it is counterintuitive that outcomes would be worse after the training, the team believes the increase could be due to improvements in facility documentation and data collection practices covered during the training.

Nonetheless, the post-training trend for newborn mortality indicates a progressive decline in the NMR over time in high-volume health facilities, with an erratic trend in low-volume health facilities (Figure 2). This may suggest some improvement in preventing mortality, but with serious data management issues in the low-volume health facilities, which are often underserved.

FIGURE 2. POST-TRAINING NEWBORN MORTALITY TRENDS BETWEEN FACILITY TYPES



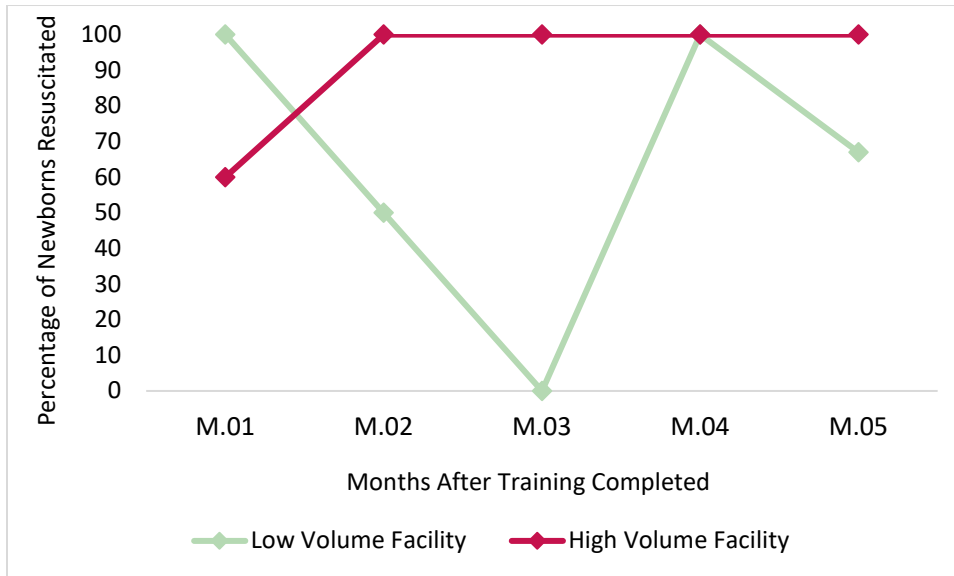
MEASURE 2. THE PROPORTION OF NEWBORNS WITH DIFFICULTY BREATHING WHO WERE SUCCESSFULLY RESUSCITATED IN MIHR-SUPPORTED HEALTH FACILITIES FOLLOWING ENC 1 TRAINING

Overall, in 20 MIHR-supported health facilities, out of the 6,765 and 6,462 live births reported, respectively, before and after the ENC 1 training, 89 percent of newborns with difficulty in breathing after ENC 1 training were successfully resuscitated, compared with 94 percent 6 months before the training. While there was an increase of 2 percent in seven high-volume health facilities (from 91 to 93 percent), there was a decrease in the 13 low-volume health facilities (from 100 to 79 percent). As with the prior discussion of increases in NMR, the team believes the decrease in successful resuscitation in low-volume facilities may relate to improved data recording and documentation following the training.

In fact, after the training, high-volume health facilities recorded a jump in the percentage of newborns who were successfully resuscitated at 1-month post-training (from 60 to 100 percent) and maintained the same performance for 5 months, while low-volume health facilities recorded a series of swings (100 percent, 50

percent, 0 percent, 100 percent, and 67 percent) over the same 5-month period after the training (Figure 3). Again, these fluctuations may be explained by the challenges with data management in low-volume facilities.

FIGURE 3. POST-TRAINING NEWBORNS RESUSCITATED BETWEEN FACILITY TYPES



MEASURE 3. THE PROPORTION OF LIVE BIRTHS WHO WERE PUT ON BREAST FEEDING WITHIN 1 HOUR OF BIRTH IN MIHR-SUPPORTED HEALTH FACILITIES FOLLOWING ENC 1 TRAINING

Of the 6,765 and 6,462 live births reported, respectively, before and after the ENC 1 training, there was a 10 percent average increase in the proportion of newborns who started breastfeeding within the first hour (89 percent before and 99 percent after) at 6 months post-ENC 1 training. The major increase was observed in the high-volume health facilities, although these facilities started with a relatively lower performance (going from 88 to 100 percent), compared with low-volume health facilities, which went from 96 to 98 percent.

MEASURE 4. A COMPARISON OF THE PERFORMANCE ON ENC INDICATORS AMONG HEALTH FACILITIES WHOSE PROVIDERS WERE EXPOSED TO STAND-ALONE ENC 1 TRAINING VERSUS THOSE EXPOSED TO THE INTEGRATED BEMONC TRAINING

Newborn Mortality: In the health facilities where the integrated ENC 1-BEmONC training was used, the NMR remained the same 6 months after training (6 and 6 per 1,000 live births), despite an increase in rates at high-volume health facilities (7 to 11 per 1,000 live births). Meanwhile, in the health facilities where the standalone ENC 1 training was used, NMR increased from 4 to 6 per 1,000 live births. The increase in NMR in this group was recorded in both high- and low-volume health facilities (see Table 3). This calls for further exploration of the causes of the observed differences as well as the causes of newborn deaths in these settings. It could also indicate that a more longitudinal review is needed to study trends over time in order to draw more accurate conclusions, especially with these relatively low numbers of facilities and cases. Alternatively, pivoting to perinatal death surveillance and response (PDSR) data review could help determine causes of death beyond those resulting from a lack of or poor ENC services.

TABLE 3. NEWBORN MORTALITY RATE AT FACILITIES (NUMBER OF DEATHS PER 1,000 LIVE BIRTHS)

Integrated ENC 1-BEmONC Trained	Pre-training	Post-training	Standalone ENC 1 Trained	Pre-training	Post-training
High-volume facility (n=4)	7	11	High-volume facility (n=3)	5	9
Low-volume facility (n=7)	5	5	Low-volume facility (n=6)	3	6

Resuscitation: High-volume facilities showed 100 percent success at resuscitating newborns prior to training, which is curious (see Table 4); such a perfect result may be accounted for by inaccurate reporting. After training, sites showed a decrease (both at sites where health providers were trained through the standalone ENC 1 training and those trained through the integrated ENC 1-BEmONC). This again could indicate improved documentation and recordkeeping rather than poorer performance. However, 18 percent more newborns were successfully resuscitated in low-volume health facilities following the standalone ENC 1 training, while the rate for the integrated ENC 1-BEmONC training was basically the same (96 to 95 percent). The reasons for these differences are as yet unclear.

TABLE 4. NEWBORNS WHO WERE SUCCESSFULLY RESUSCITATED AT FACILITIES

Integrated ENC 1-BEmONC Trained	Pre-training	Post-training	Standalone ENC 1 Trained	Pre-training	Post-training
High-volume facility (n=4)	100%	73%	High-volume facility (n=3)	100%	85%
Low-volume facility (n=7)	96%	95%	Low-volume facility (n=6)	70%	88%

Immediate Breastfeeding: In both standalone ENC 1 and integrated ENC 1-BEmONC health facilities, there was a 10 percent average increase following the training for newborns who started breastfeeding within one hour of birth. A large increase for both standalone ENC 1 (88 to 100 percent) and integrated ENC 1-BEmONC (88 to 99 percent) was recorded in the low-volume health facilities.

LESSONS LEARNED

A number of lessons were documented through observations and feedback from partners and training participants, including the following:

- ENC 1 blended learning is possible in fragile settings, although some adjustments are needed to ensure the activity achieves its intended goal.
- Digital materials and online facilitation can revitalize educational continuity in ENC in fragile and humanitarian settings.
- Sustained improvement in resuscitation skills and knowledge is possible using the online teaching format, particularly when leveraging TOT trainees. However, on-site follow-up at the health facilities is crucial to ensure that skills are well-acquired and maintained. The shortage of skilled health providers, the availability of low skill-level traditional birth attendants, and the lack of availability or inability to use technologies for remote support indicate the need for other means to sustain practice and support at facilities.
- Connectivity and technology issues can pose challenges, requiring advanced testing, building in extra time during training, using innovations in communication, having backup plans, and sharing resources in real-time via smartphone-based group messaging applications such as WhatsApp.

- Use of a WhatsApp group provided an essential way to facilitate an ongoing community of learning between global mentors, TOT trainees, MIHR staff, and program partners.
- Strong centralized leadership from a local implementing partner, such as the MIHR Juba team, helped promote local health resilience and buy-in.
- Mentorship by remote mentors is a possible approach, but internet access was a challenge flagged by the mentees and requires additional or alternative planning to ensure that all mentees participate in ongoing monthly sessions.
- In fragile settings where governments may not be able to sustain in-country trainer/mentor salaries over time, it is important to devise a plan that would ensure a continued training cascade to help deal with local trainer drop-out. This may include implementing a facility-based peer-to-peer mentoring approach, health facility-based simulations with remote monitoring and support, and integration of ENC 1 training into other maternal and newborn health trainings like BEmONC.
- Some clinical indicators are not included in the health information management system, including relevant registers. This underscores the need to map available indicators beforehand and ensure systems are built to capture a few of the most effective indicators that would help improve the quality of care and health provider performance.
- A shortage of skilled health providers, high staff turnover, and unskilled attendants with limited language ability can create a major challenge to documenting data in the files and registers, as well as generating reports, due to a poor understanding of indicator definitions and an increased workload burden.
- Overall, high-volume health facilities seemed to demonstrate improved performance compared with low-volume health facilities. There is a need to explore the reasons for the observed differences, document and share learnings, and implement specific solutions to address the differences in health facility performance.

KEY RECOMMENDATIONS

These recommendations are not only for all actors involved in this training, but for MOMENTUM and its partners, as relevant, and global maternal and newborn health stakeholders working with similar tools and approaches in South Sudan or any similar context or fragile setting.

- To facilitate the implementation of ENC 1 learnings and the provision of associated implementation support, engaging professional associations such as SSNAMA in subawards should be considered to ensure sustainability and enhance the resilience capacities of local actors.
- The NeoNatalie manikins arrived at the MIHR-supported facilities several weeks after the in-person training. To support the cascading of the learning, receipt of the mannequins should happen before or immediately after the in-person training.
- To maximize learning exchanges between health facilities, investing in the new NeoNatalie Live manikins would be beneficial. These manikins are equipped to capture data offline for reporting later to LGH and AAP for analysis and cross-teaching recommendations among health facility workers.
- Access to an on-site helper/facilitator to assist with technology and skills practice is highly recommended.
- To ensure the sustainability of the TOT approach, build adequate funds into program budgets to cover common expenses associated with the full-scale cascading of training, such as ENC 1 trainer transport to sites, participant refreshments, printing costs, internet access, and replenishment of materials.

- Adequate time should be allotted for planning and during the preparation for training, e.g., to test the room setup and improve internet connectivity and technology logistics. In addition, ensure an appropriate on-site ratio of master trainers to TOT trainees to cover all small group sessions and optimize learning outcomes.
- In settings with severe shortages of resources such as in South Sudan, consider integrating ENC trainings with other trainings to enable intervention scale-up.
- Quality improvement should be incorporated throughout the implementation of the ENC 1 training to maximize its impact.
- Consider the potential trainees' profiles in guiding the training methodology, materials and tools, and use of language that fits the local context.
- Engage government, local stakeholders, WHO, and UNICEF to share the results of this training approach and seek means to adopt the training and cascade it to other non-MIHR-supported states and counties. The World Bank's [Health Sector Transformation Project](#) in South Sudan, for example, could potentially leverage MIHR training to scale the intervention in-country.

CONCLUSIONS AND WAY FORWARD

Overall, the blended ENC 1 TOT course, including mentoring following the training, was a successful approach in a fragile setting such as South Sudan. Both the facilitators and trainees provided positive feedback on the training approach and would recommend the scale-up of the intervention. Initial findings and results suggest improved knowledge and skills in providing ENC services, as demonstrated by the post-training performance, particularly in high-volume health facilities.

The ENC 1 TOT trainees demonstrated the ability to competently cascade the trainings to the health providers; however, they need enabling environments to achieve the expected results. This includes ensuring access to the internet and financial support to offset costs that may be associated with traveling to health facilities for on-site coaching/teaching. In addition, having local master trainers offer post-TOT mentorship to the TOT trainees ("mentoring the mentor"), particularly those who cannot join remote mentorship sessions, is crucial to ensuring the quality of trainings while improving and maintaining their ENC 1 trainer skills.

It is also important to closely analyze and review the ENC data at each health facility and then explore the causes of any different performance levels observed. Moreover, pivoting data to include PDSR and quality improvement data and other initiatives is vital to improving services.

Finally, ongoing follow-up is needed for both health providers and health facility performance to assess the retention and sustainability of skills acquired from the training and through ongoing coaching.

Looking ahead, to ensure sustainability and address the issue of mentor travel costs, MIHR will collaborate with the government and pediatric association in South Sudan to introduce and pilot the use of the [Augmented Infant Resuscitation](#) (AIR) device to enhance health providers' capacity to achieve effective ventilation for newborns having breathing difficulties immediately after birth. The use of the AIR device reflects MIHR's approach of using appropriate technology to support and sustain capacity building in fragile settings. The integration of this technology will contribute to resilience capacities by enabling health providers to maintain and enhance their skills independently and deliver quality services while supporting the health care system's ability to adapt and respond to crises.

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Cover Photo: TOT trainees in the ENC 1 training prepare to practice their skills on a NeoNatalie training mannequin. Photo by local photographer Martin Mariaka.

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