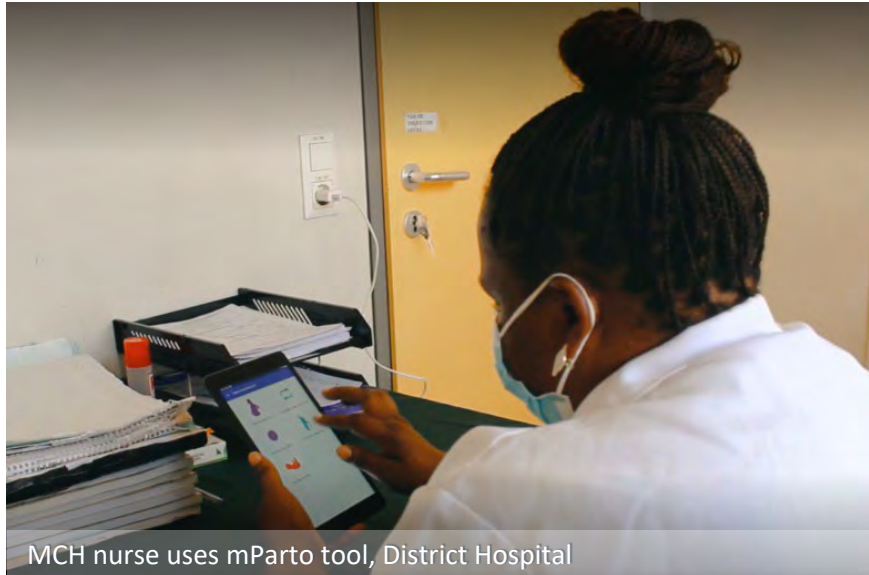


mParto in Monapo District: Using a mobile application to monitor women during labor, delivery, and referral

Alcançar is a consortium comprising eight international and national organizations whose goal is to reduce maternal, newborn, and child mortality in Nampula and Zambézia provinces, Mozambique. The consortium is led by FHI 360 and funded by the U.S. Agency for International Development (USAID) for 5 years (April 2019–March 2024). Alcançar aims to establish Nampula Province as a model for improving provision and increasing use of high-quality, patient-centered maternal, newborn, and child health services by delivering a package of technical support to all levels of Nampula's health system. The project strategy includes innovative, evidence-based, quality improvement approaches to sustain and enhance health service delivery. Alcançar includes FHI 360 (prime), Dimagi, Ehale, Institute for Healthcare Improvement (IHI), Viamo, Associação de Jovens de Nacala (AJN), HOPEM Network, and PRONTO International.



MCH nurse uses mParto tool, District Hospital

Photo: Adelino Wuamusse

PROBLEM OVERVIEW

Most maternal and newborn deaths happen in the period around labor and delivery, thus effective strategies for ending preventable deaths must focus on the quality of care provided from the onset of labor. Mozambique's Ministry of Health (MISAU) has prioritized expanded access to high-quality maternal and newborn health services (HSSP 2013), and there have been improvements in facility-based care. Yet, the maternal mortality ratio — 450 deaths per 100,000 live births (INE 2019) — and the newborn mortality rate — 27 deaths per 1,000 births (MISAU 2011) — remain persistently high.

Careful labor management has been shown to reduce the risk of postpartum hemorrhage and sepsis, uterine rupture, and its subsequent consequences, obstetric fistula and intrapartum fetal deaths (World Health Organization [WHO] 1994). Careful labor management also helps to better diagnose when cesarean surgery is required, thus minimizing unnecessary surgical interventions (WHO 1994). The partograph, a paper-based labor management tool, supports early detection of abnormal progress of labor and has been recommended as best practice by WHO for many years. However, despite decades of effort, it remains incorrectly used or underused, reducing its utility in clinical practice and quality. For example, the partograph is often completed after rather than during delivery, preventing its use in real-time decision support. Partograph usage in Mozambique is no exception: Several studies and program evaluations have documented low rates of correct initiation and completion after delivery (Zelellw and Tegegne 2018). In the face of

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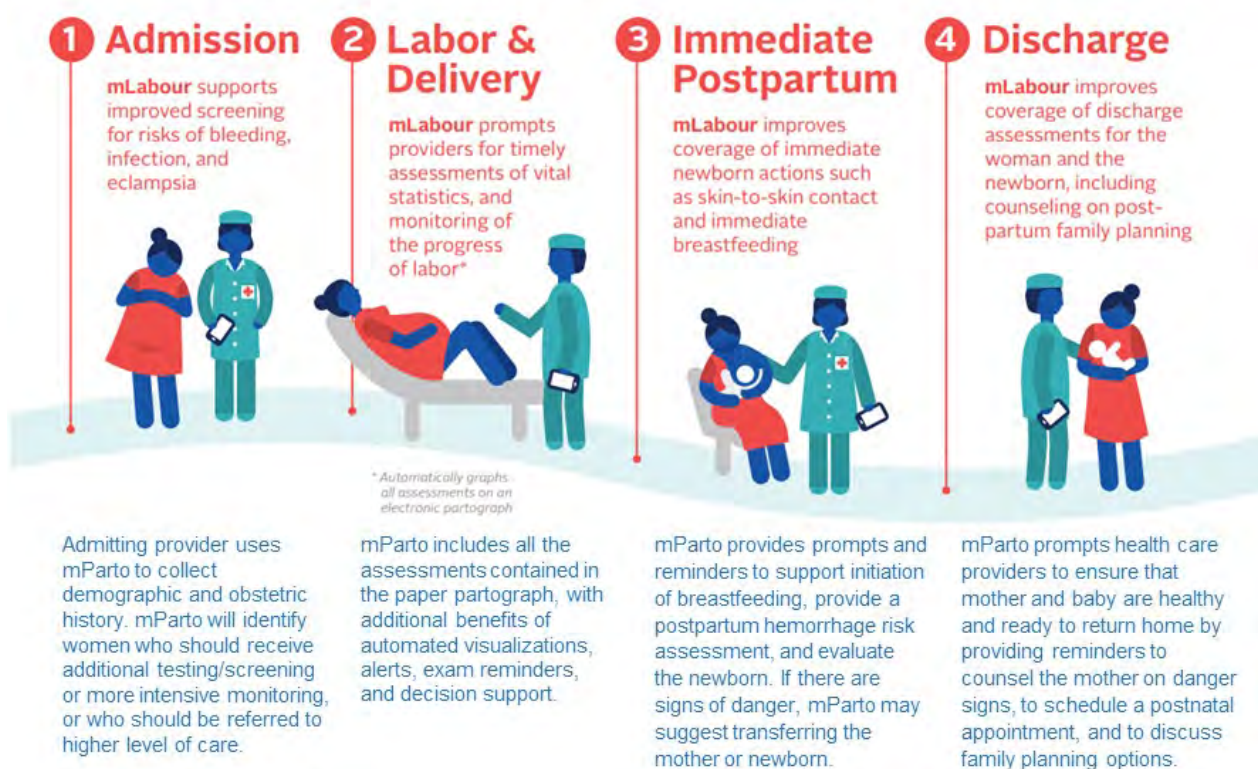
persistently poor uptake and incorrect use of the paper partograph, digital applications have emerged as a promising strategy to improve adherence to clinical protocols and provide decision support to skilled birth attendants.

PROGRAM ACTIVITY

In collaboration with the Nampula Provincial Health Directorate, FHI 360 and partner Dimagi adapted to the Mozambican context a mobile-based digital decision-support application for health care providers to improve labor management. The application is called mParto in Mozambique (mLabour elsewhere). mParto is built on the CommCare platform and includes screens and prompts that provide real-time decision support to health providers as they clinically manage pregnant women — from the time they are admitted to the facility, through labor, delivery, and discharge. The tool can be used without internet or network connectivity, though connection facilitates the uploading of data to a cloud-hosted server (Figure 1).

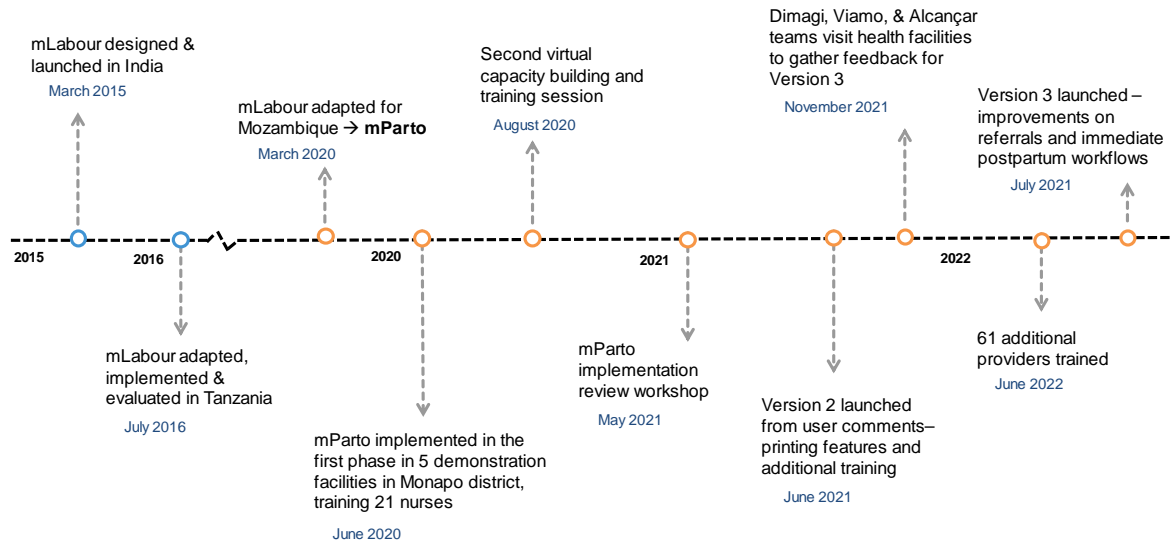
Figure 1. mLabour/mParto – 4 Key Moments

From admission to discharge, **mLabour** supports health care providers to deliver evidence-based care, and quickly identify who needs closer monitoring or referral to a higher level of service.



Since July 2020, mParto has been implemented in a network of five health care facilities in Monapo District in Nampula Province including Monapo District Hospital, Monapo Health Center (HC), Carapira HC, Ramiane HC, and Itoculo HC. During this period, 22 maternal and child health (MCH) nurses were trained and supported to use mParto. Its implementation addresses identified gaps in quality of care including incomplete partograph use, inadequate danger sign screening at admission, intrapartum monitoring of vital signs and labor progress, and immediate newborn care. During the implementation period, feedback has been continuously collected and incorporated into updated versions: Version 2 of mParto, released in June 2021, allowed nurses to print from mParto, and Version 3, released in July 2022, added improvements on referral and immediate postpartum workflows (Figure 2).

Figure 2. Timeline of mParto Implementation



The mParto application is not implemented alone. It is part of a comprehensive package of support that the Alcançar project provides to front line health care providers and health planners. The five facilities that are demonstrating mParto also receive routine, on-site clinical mentorship to strengthen their competence and confidence to diagnose and manage obstetric and newborn complications, and to problem-solve within their teams. The mParto application has improved provider confidence on deciding when to refer and when to retain a patient, and clinical mentorship has strengthened providers’ clinical skills, confidence, and teamwork so they more effectively respond to the complications identified. This has allowed them to successfully manage some complications without referral.

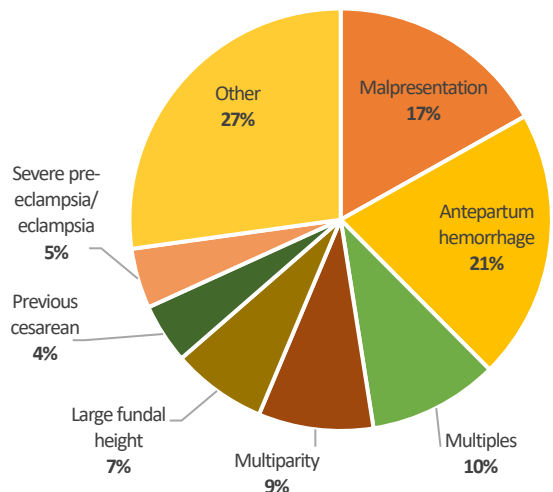
IMPLEMENTATION EXPERIENCES

Between December 2020 and June 2022, about 4,707 women in labor were followed with mParto. Acceptability of mParto among health care providers was high, as were the perceived benefits of its use. Provider uptake of the tool, as a percent of all deliveries in the five demonstration facilities, has fluctuated substantially due to several factors, which are described below.

Strengthened provider confidence to identify women in need of intervention, closer monitoring, or referral

During the demonstration period, 250 women were followed with mParto each month, on average. All women followed with mParto received a complete screening for obstetric risks at admission, and an average of 13 women each month were identified as needing immediate intervention, referral to higher level of care, or more careful/frequent monitoring. The most common risks identified at admission were malpresentation, risk of antepartum hemorrhage, and multiple gestation (Figure 3).

Figure 3. Distribution of conditions among women with an identified risk, December 2020 through June 2022 (n=261)



MCH nurses using mParto indicated that mParto has improved their technical skills to quickly identify women who need closer monitoring, intervention, or referral. And, importantly, they report reduced stress around management of obstetric risks and fetal distress.

“Since the mParto training, we have improved a lot ... our fears were [higher] in the cases we had before, [than in] cases that we see now ... we were ... retaining patients and then we had severe complications because of the doubts we had. The mParto training helps us to identify the risks that a woman may have. ... and now, starting since we started using the tablet, I can say that we are doing well, because we have reduced maternal and infant mortality.”

Laura Inacio, MCH Nurse,
Carapira Health Center

Improved coordination and communication between shifts and during referral

Nurses mentioned that it was easier to follow a patient, even if another staff member admitted them, because mParto provides a summary of the patient history and what needs to be done next. Further, nurses reported that counseling provided to mothers postpartum and during discharge has improved because mParto reminds them of the messages they should share and topics they should cover.



Photo: Felizardo Djive

MCH nurse uses mParto tool, District Hospital

“We received a patient who was transferred from a health center in Monapo. This patient came with an advanced case of fetal distress ... we cared for her and called the doctor. [The patient] was operated on, and she had a live newborn. [When she was discharged 11 days later] ... she was counseled to wash the wound with soap and water ... [to use] exclusive breastfeeding for six months ... and she was counseled on family planning ... mParto helped us to [know] a lot about this lady ... thanks to the tablet [we understood] that this lady had fetal distress [at admission] so we could call a doctor to solve the situation ... and we had a great report for the lady [at discharge].”

Ancha de Lourdes, MCH Nurse,
District Hospital

“Before the implementation of the mParto application, we had difficulty diagnosing women’s risks, correctly filling the partograph, and monitoring labor ... the mParto application ... give(s) us alerts of when we should update, and whenever there is a transfer we can ... prepare to receive, and helps us eliminate the delay in decision-making.”

Dinamarca Manuel, MCH Nurse,
District Hospital

As part of the comprehensive package of support, the Alcançar Project introduced obstetric simulation training across Nampula Province ([“Do the right thing”: Mentoring and birth simulations help nurses manage obstetric complications in Nampula Province, Mozambique](#)), and providers at the five mParto sites have benefitted from this approach that further builds their competence, confidence, and teamwork. The two interventions support providers to build a complementary set of skills: the confidence to identify conditions — which the provider has the requisite clinical skills and institutional resources to manage — and conversely, the ability to promptly detect women in need of referral.

“In 2021, with the Alcançar project, we started to use the [mParto] application. The tablet helped a lot to identify cases that we could not transfer. At times, we admitted patients who had complications, and we, through negligence or for not knowing, kept the women ... without knowing what to do. The Alcançar project [has] ... been doing simulations in the health facility, and those simulations help combat or correct those problems ... for example ... a woman ... came in with normal birth. The baby came out well. Only afterwards the mother had bleeding ... I saw that the woman had a cervical laceration. I remembered from the simulations ... what was needed ... with help from my colleagues was able to suture the cervix. This stopped the bleeding, and the woman stayed well. I had seen this lots of other times, and I could not have done that — she would [instead have] been referred to the district hospital.”




Tania Monteiro, MCH Nurse,
Health Facility of Monapo

Improving coordination of care and communication during inter-facility emergency referral

mParto builds on efforts to improve coordination of care during inter-facility emergency transfer. Alcançar and Dimagi have designed and tested an emergency referral module within mParto that links lower level health facilities with the district hospital. When the health care provider at the originating facility indicates within mParto that a patient is being referred, a corresponding "patient incoming" alert is received at the district hospital. This notification enables the district hospital to be alerted early of the patient's condition, procedures received at the originating health facility, and obstetric history. This early warning allows the district hospital to prepare to receive the patient and provide immediate care, reducing delays and improving continuity of services. Further, mParto allows facilities and the district to monitor time elapsed between decision to refer and receipt of definitive care, and thus to make improvements to reduce delays.



IMPLEMENTATION CHALLENGES AND SOLUTIONS

Challenges	Solutions
 Human resources	
High mobility and turnover rates among nurses make it difficult to keep staff trained on mParto in implementing facilities	<ul style="list-style-type: none"> • Advocated with districts and Provincial Health Directorate for less turnover among nursing staff • Implemented on-the-job training (OJT) on mParto to support new nurses entering health facilities • Created remote communication channels for nurses to report daily on use, challenges, and recommended improvements, and to support one another
Difficulty among nurses using new technology and remembering log-in credentials	<ul style="list-style-type: none"> • Adapted training guidelines <ul style="list-style-type: none"> - New users receive initial training session on how to use and protect the tablet including basic aspects of touchpad devices, logging in using personal identification numbers (PINs), and typing. - Afterward, users are introduced to the mParto application and carefully supported with data entry and moving within the application. • Provided ongoing, monthly visits to users for OJT training and in response to technical needs
 Equipment and infrastructure	
Lack of consistent electrical energy and consistent need to charge devices	<ul style="list-style-type: none"> • Allocated electric accumulators to all health facilities • Recommended that tablets be delivered fully charged to each shift team to avoid low batteries
Lack of access to network to synchronize data	<ul style="list-style-type: none"> • Provided routine maintenance of the tablets including monitoring and replacing SIM cards for the most-available networks at the time
Misuse of tablets	<ul style="list-style-type: none"> • Implemented guidelines for better use and protection of devices within the health facilities, including where devices can be taken and for which activities they can be used • At the provincial level, set up monitoring by managers of mParto implementation (e.g., use of the hardware, access to internet, timing, and duration of use), providing insight into use of the devices within the health facilities and informing collaborative problem-solving
 Workload of health care staff	
mParto is being implemented in addition to the paper partograph	<ul style="list-style-type: none"> • Version 2 of the application allowed printing of the digital partograph. This was meant to eliminate the need to hand-fill the partograph while still adhering to requirements to file the completed partograph with patient files, and to send it along when a patient is referred. However, challenges remain in terms of ensuring health facilities have required printer, paper, and toner.
Alignment with data systems and performance reports	<ul style="list-style-type: none"> • mParto collects indicators that align with the Digital Health Information System 2 (DHIS2). • Data collected via mParto monitors provider use of the tool and produces user performance reports that allow supervisors and program staff to target the right support to the right user.

CONCLUSION

Providers using the mParto application describe many benefits of its use and utility within the health facility, including that it has substantially improved their confidence and ability to manage and coordinate care. The application has important features that support reduced delays and improved inter-facility communication during emergency referral. There have been a range of implementation challenges, both within and outside the control of the project. The project is working actively with the district and provincial health teams to address these challenges and to learn from the experience.

Digital decision-support tools offer platform for quick dissemination of new guidelines

Protocols in mParto reflect current national standards of practice supported by features to improve adherence to established clinical protocols. Digital applications provide a platform to rapidly roll out updated guidelines. Mozambique is beginning the process of adapting, testing, and rolling out the next generation partograph — the Labor Care Guide (WHO, 2018). Once fully adopted by MISAU, an updated version of mParto that reflects the new Labor Care Guide can be quickly pushed out to users.

The Alcançar Project, in collaboration with the Provincial Health Directorate, recently expanded mParto to 13 additional facilities within Monapo District. The application is now used in all Monapo facilities that offer labor and delivery services.

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