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REQUEST FOR INFORMATION

**RFI SOLICITATION NUMBER:
RFI-APPHC MADAGASCAR-2019-002**

Research Lead for Advancements in Post-Partum Hemorrhage Care

DATE OF ISSUE: July 1, 2019

CLOSING DATE AND TIME FOR APPLICATIONS:

July 10, 2019

5:00 PM (UTC+3)

Applications must be emailed to: heard@urc-chs.com

Deadline for Questions: **July 7, 2019, 5:00 PM (UTC+3)**

Questions by email ONLY to: heard@urc-chs.com

Contact Person: Danielle Charlet, M.D., Ph.D.

Issuance of this RFI does not constitute an award commitment on the part of URC, nor does it commit URC/HEARD or the US government to pay for costs incurred in the preparation and submission of an application. URC may reject any submission that does not fully comply with requirements of the RFI. Furthermore, funding of successful proposals is contingent on the availability of funds from USAID.

USAID'S HEALTH EVALUATION AND APPLIED RESEARCH DEVELOPMENT (HEARD) PROJECT

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1. PURPOSE OF THE RFI

The purpose of the RFI is to identify one or more researchers to lead implementation research studies related to Advancements in Post-Partum Hemorrhage Care in Madagascar.

2. SUCCESSFUL APPLICANTS

Successful applicants will have:

- a. Demonstrated technical expertise related to post-partum hemorrhage, maternal health, and health systems in Madagascar;
- b. Demonstrated success in conducting research studies in Madagascar;
- c. Proven track record of collaborating and engaging successfully with governments, NGOs, donors and technical partners in the health sector in Madagascar; and,
- d. Strong institutional financial and management capacities.

3. BACKGROUND

Globally, nearly one-quarter of all maternal deaths are associated with postpartum hemorrhage (PPH). Despite global progress, PPH remains the leading cause of maternal death in most low-income countries. In an effort to accelerate reductions in maternal deaths due to PPH, USAID has designed the Advancements in Postpartum Hemorrhage Care (APPHC) Activity, a one-time, catalytic investment to advance innovation and evidence in PPH prevention and treatment. Activities will be conducted in Malawi and Madagascar, and with significant cross-country, sub-regional, and global learning engagement.

In Madagascar, maternal mortality rates remain high at 478 maternal deaths per 100,000 live births¹. The 2012 Emergency Obstetric and Newborn Care survey identified hemorrhage as the leading cause of maternal deaths (20%) and found that less than half (44%) of all births are attended by a skilled health provider. The limited number of skilled health workers hampers the ability of Madagascar's health system to offer quality health services, and data shows that provider knowledge was notably weak in relation to complications that are the leading causes of maternal death in Madagascar².

Although Malawi's maternal mortality rate has shown a moderate decline, it continues to be among the highest in Sub-Saharan Africa at 439 per 100,000 live births³. PPH accounts for at least a quarter of all maternal deaths in Malawi. Despite very high facility delivery (91%), lack of access to quality care in both the public and private sectors across the pregnancy continuum contribute to these statistics. Inadequate human resources is a major issue; only 54 percent of facilities are staffed 24 hours a day. If health care

¹ National Statistics Institute (INSTAT). 2012-2013. Madagascar Millenium Development Goals National Monitoring Survey. https://madagascar.unfpa.org/sites/default/files/pub-pdf/OMD_Summary_0.pdf

² Maternal and Child Health Integrated Program. 2011. Quality of Care of the Prevention and Management of Common Maternal and Newborn Complications in Health Facilities in Madagascar. <https://www.mchip.net/sites/default/files/Madagascar%20QoC%20report%20-%20Final.pdf>

³ National Statistical Office (NSO) [Malawi] and ICF. 2017. Malawi Demographic and Health Survey 2015-16. Zomba, Malawi, and Rockville, Maryland, USA. NSO and ICF.

providers are present in the facility, many are unable to adequately attend all births due to high client volume and staffing shortages.

The [Breakthrough-RESEARCH](#) and [HEARD](#) projects are collaboratively undertaking the APPHC Activity in Malawi and Madagascar. This activity is aiming to 1) strengthen the evidence base for effective provider behavior change and implementation approaches to prevent and treat PPH, and 2) contribute to strengthening active Implementation Science (IS) platforms/processes for use of evidence base in policies, planning, and implementation; identifying next implementation evidence priorities; and responding to priorities.

Recognizing that there is often a disconnect between research that is commissioned/conducted and the evidence needs of policy-makers and program implementers, B-R and HEARD seek to implement a model of conducting IS activities and provider behavior change research that is more country-led and stakeholder-engaged. We envision employing collaborative strategies to prioritize evidence needs, generate relevant evidence, and support improving access to and use of evidence. Proximal outcomes of this approach include increased relevance and use of studies (by conducting research that addresses stakeholder-driven priorities), increased in-country IS capacity applied to PPH program learning and acceleration, increased demand from decision-makers for relevant and timely PPH IS evidence, and strengthened platforms for generating responsiveness to demand and continuous learning in order to facilitate the uptake of PPH related research findings and insights. With an equal emphasis on generating evidence that is responsive to stakeholders needs and strengthening IS processes and platforms, we anticipate achieving the objectives of APPHC (short-term result) and contributing to strengthening IS systems to achieve longer-term gains from the APPHC investment (long-term result).

Building from the scoping activities and using the MCSP PPH Implementation Framework as a starting conceptual framework, we recognize that reducing maternal mortality due to PPH requires a broad systems approach that spans the domains of the framework (roughly overlapping with the health system six building blocks) and health system actors from community to national levels and with an explicit focus on provider behaviors. We anticipate generating evidence under the APPHC activity that will have programmatic and/or policy relevance within several domains and at several levels within the [Postpartum Hemorrhage Implementation framework](#), which when put into practice should contribute to strengthening the pathway of PPH management from community to referral center, and thus contribute to reducing mortality related to PPH.

Four broad implementation science themes emerged from the desk review and scoping visits in both countries, and are detailed into the following specific research focal areas:

- i. Key determinants of health provider behavior and performance
- ii. Key models and approaches related to service delivery
- iii. Analysis of existing data to improve systems
- iv. (Case) studies around innovation adaptation and implementation

A detailed description of these focal areas is included in Annex A.

4. OVERALL OBJECTIVES

The HEARD Project aims to partner with researchers in Madagascar to conduct implementation research studies within the described thematic areas (in Section 3) to advance the management and treatment of post-partum hemorrhage care in Madagascar.

Through this effort, the HEARD Project also aims to ensure efficiency and effectiveness of the implementation science activities conducted in Madagascar, and to engage in and contribute to strengthening, as needed, platforms/networks for the sharing and uptake of evidence into programs and policies.

5. TIME FRAME

Activities are anticipated to start in July 2019 and are projected to continue for approximately 18 months.

6. EXPECTED ACTIVITIES

It is anticipated that the activities to be carried out by the successful applicant(s) will include:

1. Participation in a process to refine and validate proposed research questions
2. Participate in a proposal co-development meeting to develop full research proposals
 - a. Proposed dates for this meeting are July 16-18, 2019
3. Develop research protocols and tools from approved research proposals
4. Manage in-country ethics review submission
5. Plan and implement research
6. Participate in periodic Country Working Group meetings during the course of research implementation

The anticipated activities may be undertaken by one or more institutions identified through this RFI.

7. INSTRUCTIONS FOR RESPONSES

7.1 ELIGIBILITY CRITERIA

Researchers in technical organizations based in Madagascar are invited to apply. The applicant must be affiliated with an organization of one of the following types:

1. Institutions of higher education;
2. Non-profit organizations (if a US organization, it must be a 501(c)(3) certified non-profit); or
3. For-profit research organizations (no fee or profit will be allowed).

Responses from organizations that do not meet the above eligibility criteria will not be reviewed and evaluated.

7.2 GENERAL INSTRUCTIONS

Key Information

- Due date for questions about RFI: July 7, 2019
- Due date for applications: July 10, 2019
- Number of award(s) expected: one to three

- Maximum page length of technical response: two pages maximum (not including Cover Page, Annexes)
- Language for technical response: French or English only

All responses received by the deadline will be reviewed for responsiveness to the specifications outlined in Section 7. Applications may be judged as nonresponsive if they do not follow the instructions in the RFI. Section 4 addresses the technical evaluation procedures and criteria for the responses. Applicants are advised to carefully read the instructions.

Questions about the RFI must be written in French or English and emailed heard@urc-chs.com by **July 7, 2019**.

Responses to the RFI must be submitted in French or English and emailed to heard@urc-chs.com by **July 10, 2019**.

7.3 CONTENT OF TECHNICAL APPLICATION

The technical application must be specific, complete, and presented concisely, demonstrating the applicant's **Technical Expertise** and **Organizational Capabilities** with respect to achieving the activities described in the RFI. The applicant's statement of Technical Expertise and Organizational Capabilities must include the following areas:

- Demonstrated technical expertise related to post-partum hemorrhage, maternal health, and health systems in Madagascar;
- Demonstrated success in conducting research studies in Madagascar;
- Proven track record of collaborating and engaging successfully with governments, NGOs, donors and technical partners in the health sector in Madagascar; and,
- Strong institutional financial and management capacities.

Section 1. Experience and current methodological and subject matter expertise related to post-partum hemorrhage, maternal health, and/or health systems research (**limit 0.5 page**);

Section 2. Experience and current expertise managing research activities in Madagascar (**limit 0.5 page**);

Section 3. Experience and current expertise related to collaborating and engaging with governments, NGOs, donors and technical partners in the health sector in Madagascar (**limit 0.5 page**);

Section 4. Institutional capacity to coordinate and implement the above-mentioned activities; including technical, financial, and administrative management capacity (**limit 0.5 page**).

7.4 FORMAT REQUIREMENTS FOR TECHNICAL APPLICATION

- The technical application should be:
 - Written in French or English
 - Typed in a Microsoft Word compatible program, single-spaced with a 11-point font and one-inch margins

- Saved and submitted as one document in pdf or Word format, with all sections and appendices put together
 - Labeled with page numbers, the RFI number (RFI-APPHC_Madagascar-2019-002) and the name of the applicant and organization on every page
 - Limited to up to three (2) pages not including cover page and annex
- b. The technical application should have **Cover Page** (not included in the page limit) with the following information:
- Program/Project title;
 - RFI reference number;
 - Name of organization applying to the RFI;
 - Contact person, telephone number, fax number, address, and types name(s) and title(s) of person(s), who prepared the application, and corresponding signatures.
- c. **Curricula Vitae (CVs)** of proposed Research Lead must be included in an Annex.

8. REVIEW AND NOTIFICATION PROCESS

8.1 TECHNICAL REVIEW

A Technical Review Panel (TRP) will evaluate the applicants' Technical Expertise and Organizational Capacity Statement taking into account the eligibility criteria (Section 7.1) and the technical review criteria (Section 8.2) found in this RFI.

8.2 REVIEW CRITERIA FOR TECHNICAL APPLICATION

Technical responses will be reviewed and evaluated against the following criteria:

1. Demonstrated experience and methodological and subject matter expertise related to post-partum hemorrhage, maternal health, and/or health systems research;
2. Demonstrated experience and expertise related to managing and coordinating research activities in Madagascar;
3. Demonstrated experience and expertise related to collaborating and engaging with governments, NGOs, donors, and technical partners in the health sector in Madagascar; and,
4. Demonstrated programmatic experience, and financial and administrative management capacity required to manage USG-funded projects.

8.3 NOTIFICATION PROCESS

URC will conduct a review of submissions and select responses submitted in accordance with the guidelines and criteria set forth in this RFI. Short-listed applicants will be contacted to participate in the proposal co-development meeting (tentatively scheduled for July 16-18 2019).

URC reserves the right to disregard any responses that do not meet the guidelines. URC is not obligated to issue a financial instrument or award as a result of this RFI.

If the review of the applicant's response will result in a decision to request a full application, URC will provide specific requirements and instructions for the full application.

8.4 PROPOSAL DEVELOPMENT AND REVIEW PROCESS

At the proposal co-development meeting, participants will work in collaboration with URC, UCSF, Population Council, and MSH (USAID ACCESS Project) (IS Team) to develop research proposals based on the finalized research questions.

One week after the co-development workshop, participants will submit final proposals to URC. The proposals will be reviewed by the TRP and the TRP will make recommendations about which proposal should be further developed to full protocols. URC make the final determination of which proposals to advance based on technical and financial considerations.

Within one week, URC will notify participants of the decision about which proposals will be advanced for protocol development and funding. The Research Lead will be expected to lead the IS team in the development of a full research protocol. Concurrently, URC will work with the Research Lead to develop a budget for the study and finalize the award package for approval. Within two weeks of notification to develop a full protocol, the research lead is expected to submit the protocol to the appropriate IRB.

8.5 CONSIDERATIONS FOR AN AWARD

To be eligible to receive U.S. Government funding, organizations must meet certain requirements. While these requirements do not have to be met in order to submit a technical response under the RFI, they will need to be met if the applicant is requested to submit a full application. Among those requirements are:

- A. All first-time applicants for USAID funding are subject to a pre-award assessment to verify that the applicant has proper procedures in place to receive USAID funding (ADS 303.3.8)
- B. Each applicant (unless the applicant is an individual or Federal awarding agency that is excepted from those requirements under 2 CFR 25.110(b) or (c), or has an exception approved by the Federal awarding agency under 2 CFR 25.110(d)) is required to:
 - i. Be registered in SAM before submitting its application (**Please allow several weeks for processing through SAM.GOV**);
 - ii. Continue to maintain an active SAM registration with current information at all times during which it has an active Federal award or an application or plan under consideration by a Federal awarding agency. To obtain information regarding the preceding, see the respective links: <http://www.dnb.com> and <https://www.sam.gov/portal/public/SAM/>
 - iii. Provide a valid DUNS number in its application (**Note: the DUNS number must be submitted with the application**).
- C. Submission of relevant SF 424 Forms on request:
 - i. SF-424, Application for Federal Assistance;
 - ii. SF-424A, Budget Information – Non-construction Programs; and
 - iii. SF-424B, Assurance – Non-construction Programs
- D. Submission of a Detailed Budget and Budget Narrative
- E. Submission of additional documentation and certifications including:
 - i. Negotiated Indirect Costs Rate Agreement (NICRA) or audited financial statements to support indirect rates.
 - ii. A signed copy of ADS 303mav, Certifications, Assurances, and Other Statements of the Recipient and Solicitation Standard Provisions.
 - iii. Complete Pre-Award Assessment Questionnaire,

- iv. Organization's registration (e.g., certificate of incorporation, business license, certificate of registration with government).
- v. Organization chart or list of company officers.
- vi. Audited financial statements for the last two fiscal years.

ANNEX A: RESEARCH THEMES

1) UNDERSTANDING KEY DETERMINANTS OF HEALTH PROVIDER BEHAVIOR AND PERFORMANCE SUCH AS ATTITUDE, ACCOUNTABILITY AND MOTIVATION EMERGED AS IMPORTANT DYNAMICS THAT UNDERPIN TEAMWORK SERVICE DELIVERY, QUALITY OF CARE, WHICH ULTIMATELY INFLUENCE EFFECTIVE MANAGEMENT OF EMERGENCIES SUCH AS PPH.

The overall theme of understanding key determinants of provider behaviour cuts across all four themes. Providers' behaviors are influenced by a range of factors which provider behavior change interventions seek to address. In each of the subsequent three focal areas issues touching on the four factors outlined above (internal motivation and attitude, expectation, opportunity, and ability) will be incorporated into the study designs. While there are many efforts to improve provider performance, more robust research in the context of "real world" programs is needed to elucidate the effectiveness of social and behavior change programming on provider performance, improved quality of care, and health seeking behaviors. This is particularly important given that provider behavior change is a critical point of intersection between service delivery and SBC.

Improvements in service delivery and quality of care have been seen following training and skills updates in MNH in many settings. However, there are often unidentified and unaddressed social and facility/health system cultural norms that persist, limiting sustained uptake of new ideas and use of new skills, perpetuating poor provider behaviors and reducing the potential for sustained program impact. The MCSP PPH Framework includes Human Resources - which was one of the key areas identified in both countries. However, as HR is so broad - in this strategy we intend to use the HR domain specifically around HR management including deployment and retention and policy level training approaches. Provider behavior affects, or is affected, by all nine domains.

In both countries health system and facility culture issues include: poor working environments, unsupportive colleagues, limited interprofessional collaboration, disorganized facility functions and inadequate supervision have been hindering workers' performance and productivity—and contributing to low retention of skilled providers especially in busy stressful environments such as dealing with emergencies such as PPH. We intend to identify the specific drivers of provider behavior. For example, one key objective is to identify what are the most influential social normative drivers that shape provider behavior in both interpersonal interactions and clinical practices/standards—by client and provider profile and across health facility levels.

2) KEY MODELS AND APPROACHES RELATED TO SERVICE DELIVERY THAT COULD BE FURTHER INVESTIGATED ARE TRANSPORT AND REFERRAL SYSTEMS; TEAMWORK AND EMERGENCY RESPONSE MODELS (E.G. AIM EXPERIENCE MALAWI); AND LEADERSHIP/MENTORSHIP AND TRAINING/SIMULATION APPROACHES.

Key models and approaches related to service delivery are important for PPH prevention and treatment and fit into the PPH Implementation Framework under '*Service Delivery Best Practices and Quality Improvement*', '*Human Resources*', and '*Functional Referral System*'. They are essential to PPH prevention and treatment both globally and locally for Malawi and Madagascar. Quality improvement and service

delivery significantly overlap with human resource challenges and opportunities. While both countries identified service delivery gaps and human resource limitations, Madagascar was found to have a more prominent challenge with transportation/referral systems to address based on the scoping visit. Note that supply chain and key commodity procurement and distribution are also related to this theme, however this focal area was not selected because it is beyond the scope of the activity.

In Malawi, service delivery is of particular importance now because 90% of births are facility-based and if women receive suboptimal quality obstetric and neonatal care this could result in decreasing demand over time. Therefore, it is pertinent that while the percent of women delivering in facilities is high, quality care must be prioritized. Maintaining sufficient, skilled and motivated providers is therefore a critical element. There are insufficient midwives in the labour and delivery wards, they are rotated on a regular basis, and most midwives prefer not to work in the labour ward as it is seen as being the most stressful post and likely to cause burnout. Mentorship and skills building for health providers, including “refresher” trainings, were identified as a priority in light of staff rotations and the likelihood that some providers may go for long stretches of time without managing or treating PPH. The recognition of a need to focus on mentorship is evidenced in policies and the implementation of different mentorship models and skills labs. The challenge is to shift to more sustainable and cost-effective in-service mentorship models instead of the more expensive and disruptive traditional method of hosting numerous off-site trainings. A focus on effective teamwork was seen as a promising approach to ensuring teams are trained together, accountable to one another, and operate as a cohesive unit prepared to deploy in the case of an emergency. Related to the former, interprofessional collaboration and fostering teamwork across cadres was also highlighted by multiple stakeholder groups. (Scoping visit report, 2019)

In Madagascar, there are also not enough providers and a reluctance among providers to be posted to remote areas. There are similar issues of high turnover, poor provider motivation, supervision challenges and commodity issues. Related to PPH management, providers have received trainings and are generally thought to know the protocols to follow; however, following the protocols does not happen consistently, particularly in an emergency. Addressing these challenges are important in order to build trust in the health system, as the scoping visits revealed deep-rooted cultural trust in matrones leads many women to deliver at home or in their community, even if they have attended ANC at the facility. The decision process for Malagasy community members, as in many contexts, depends on the husband (and sometimes the in-laws) to decide where to go. Interviews showed that women often will only be brought to the health facility as a ‘last resort’ which leads to delayed care-seeking and unmanaged complications that often arrive for care too late.

Under this theme, implementation research with a focus on transport/referral systems, emergency response models including a team approach, and simulation training fit within the research context and could serve to drive local and global policy change. The objectives of research in these areas could be to:

- Understand the feasibility, acceptability, and effectiveness of models of emergency response teams at the community level to stabilize the patient, coordinate transport, and improve time to transport of complicated obstetric referral cases
- Provide recommendations about embedded structured supportive supervision models for providers to increase the quality of health services for prevention and treatment of PPH at referral hospitals and health centers

- Understand what are the most effective approaches to enable/motivate/facilitate different cadres of providers to improve quality of care
- Apply lessons learned around sustainability from other low-resource settings of skill and knowledge acquisition and retention by frontline healthcare workers through the “power of practice” with in-situ simulation training programs focused on PPH prevention and treatment.

3) KEY OPPORTUNITIES FOR ANALYSIS OF EXISTING DATA AND STRENGTHENING PROCESSES FOR DATA USE

In order to improve data systems, research into existing data, complemented by further research, can provide insights for Madagascar, Malawi, and other countries. The importance of accurate and reliable data and surveillance in the management of PPH and quality obstetric care has been documented in the literature (Sotunsa, 2019, and Hogan, 2010) and thus apparent in the PPH Implementation Framework with the PPH Metrics and Actionable Information sphere evident at every level of the health system. From national level policy makers to community health workers, action should be based on timely, quality information on maternal health, care provision, and severe maternal outcomes, including ‘near misses’ and maternal deaths. As both Hasson et al (2012) and Carrol et al (2007) explain in their exploration of implementation fidelity work, analyzing existing data is an important component of implementation science research, because it aims to answer if what is really happening is what was intended to happen. In this light, we can explore questions of to what extent the existing information systems are serving their intended purposes, how can they be improved to serve their intended purposes, and how can they inform priority actions.

Both countries face limitations in data availability, data quality, and data use for decision making. Stakeholders in both countries agreed on the importance of increasing utilization of data for decision making, and some partners in each country are already engaged in some improvement efforts.

In Malawi, many existing data sources were identified that have not been fully utilized to answer service delivery questions. The scoping visit found that there are service statistics at all levels but getting accurate community level data up to the district level is challenging and data quality remains a concern. Although the MDSR is operationally active, and regular reviews occur, there were frequent comments that the “R” in MDSR is weak and there are missed opportunities for data to inform improvements. Some hospitals have review processes in place but may only focus on what happened in the facility, failing to account for the full context including care-seeking processes and delays. It appears GIZ is currently supporting some efforts to strengthen the MDSR.

In Madagascar, the data system is weaker and holds more gaps than Malawi, however this is an opportunity to leverage lessons learned in Malawi in the process of setting up data collection systems to apply to Madagascar. There are also service statistics at all levels, with similar challenges in data quality and data flow. The government is currently transitioning the national information system to DHIS2. Currently the monthly report at facility (CSB) level is active in DHIS2, and the community-level and hospital-level modules are anticipated to follow soon. There is no operationally active MDSR system, but there have been recent efforts within the MoH to do maternal death reviews, there is a policy in place for doing so, and there seems to be interest in establishing a functional system. Some hospitals have inconsistent review processes in place, with review limited to within the facility actions. Similarly, Jhpiego is implementing a project on safe c-sections in which they support reviews for deaths occurring related to

c-section in the supported facilities. MCSP also trained people in MDSR as a part of data review, but it is unclear if this activity has continued.

In both countries, the need is clear and there are gaps in knowledge that can be filled through implementation science research using analysis of existing quantitative data and collecting additional qualitative data including around one or more of the following areas: Maternal Death Surveillance and Response, near-miss audits, blood banks, and secondary analysis of other available data (eg: ONSE and ACCESS baseline data). Analysis of existing data in these areas is feasible within the research context and could potentially drive global and local policy change. The objectives of research in this area could include to:

- Improve the use of existing data surrounding severe maternal outcomes related to PPH in *responding* to gaps and weaknesses in the quality of obstetric care delivered in Malawi and Madagascar (e.g. implementing targeted in-situ simulation and team training based on areas of weakness identified)
- Adapt lessons learned from Malawi's MDSR system to apply in Madagascar in an effort to accelerate the integration of an operational MDSR in Madagascar
- Provide recommendations for setting up a feasible system of near miss audits
- Improve early care-seeking by generating better understanding causes of care-seeking delays
- Improve clinical outcomes for mothers when blood transfusions are required for obstetric cases in Malawi by streamlining the national blood bank system and distribution process
- Consider and identify data sources and/or indicators that highlight provider behaviors to inform service delivery
- Apply lessons learned from Malawi's blood bank system and apply them to Madagascar in an effort to accelerate the integration of an operational blood bank system in Madagascar.
- Review ONSE data set to understand health facility factors associated with clients' negative facility experience and different provider motivating factors

4) THERE ARE POTENTIAL OPPORTUNITIES TO DO (CASE) STUDIES AROUND INNOVATION, ADAPTATION, AND IMPLEMENTATION.

Case studies around innovation, adaptation, and implementation such as NASG rollout, use of WhatsApp for district support and management, and how to improve the role and function of maternity waiting homes are important for PPH prevention and treatment, and fit into the PPH Implementation Framework under the headers of '*Essential PPH Commodities*', '*PPH Metrics and Actionable Information*' and '*Functional Referral System*', respectively. Moreover, there are cross-cutting issues around provider behaviour in all three, including provider perceptions, response and behaviour to use of the rolling out these innovations.

NASG is a valuable tool for PPH management and through a systematic review was found to show a trend to reduce PPH-related deaths and severe morbidities (Pileggi-Castro, 2015). The same review concluded that 'in settings where delays in PPH management are common, particularly where constraints to offer blood products and definitive treatment exist, use of NASG is an intervention that should be considered as a policy option while the standard conditions for care are being optimized' (Pileggi-Castro, 2015). In Malawi, the use of the NASG is of particular importance related to the referral and transportation system

in that it has been used to assist in stabilizing women during transfer. An improved maintenance and refresher system for the NASG was an important topic discussed during the scoping visit.

Mobile instant messaging tools such as **WhatsApp** are in the nascent stages of transforming communication in some health care settings. Chat groups can be used by colleagues to stay in touch and communicate across rural geographic areas for the purpose of referrals and case management, which is of particular importance during a complication such as post-partum hemorrhage. A previous study in Malawi concluded that the implementation of WhatsApp as a communication tool was received positively by the CHWs and it was found to be a useful tool to support distributed rural health work' (Pimmer, 2017). The use of WhatsApp groups was discussed during the stakeholder meeting of the scoping visit in Malawi. It was reported that multiple groups are using WhatsApp groups that have sprung up organically between providers and between managers and that the tool has greater potential to be used to support and resolve case management with a more formalized process.

The use of WhatsApp, or other mobile instant messaging tools, was not brought up in Madagascar during the scoping visit but may be a relevant tool in that context as well. In Madagascar, during the scoping visit it was found that many births are still occurring in the home with the support of matrones. There appears to have been little work to bridge the gap between matrones, community health workers, and facility providers. Similarly, there was mention of men and their role in care seeking behaviors that is also important to explore (APPHC Scoping Visit Report, 2019). These are potential participants for whom WhatsApp groups could be implemented to further improve communication.

Maternity waiting homes (MWHs) aim to improve access to facility delivery in rural areas and have the potential to play a significant role in outcomes during complicated deliveries such as post-partum hemorrhage. To date, there has not been rigorous evidence generated on the effectiveness of maternity waiting homes in improving the identification and management of PPH. This evidence is needed as a critical component to informing policy makers in Malawi specifically, as MWHs are available in a number of facilities (some are formal as in Area 25, and some informal as in Mitundu Community Hospital). Lessons learned could potentially be informative to Madagascar as well given the known geographic barriers around access to care.

The objectives of research in these areas could be to:

- Test context appropriate implementation strategies to improve appropriate use of NASG (including overcoming provider barriers to use)
- Develop implementation strategies around the existing use of WhatsApp groups to improve communication aimed to assist time-sensitive clinical case management of obstetric complications such as PPH in Malawi and Madagascar
- Test the use of existing WhatsApp chat groups to increase clinical knowledge as a job aid and by fostering a geographically disparate 'community of practice' for sustained engagement in being prepared for obstetrical emergencies such as PPH in Malawi and Madagascar
- Understand the feasibility, acceptability, and effectiveness (particularly of identification and management of PPH) of maternity waiting homes.