



# Qualitative Assessment Component mMom Final Evaluation Report

**“Improving maternal and prenatal care for ethnic minorities in Thai Nguyen, Vietnam through an integrated eHealth and user-provider interaction model”  
(mMom: 2013-2016)**

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September 2016

## Abbreviations

BCC	Behavior change communication
CHC	Commune health center
CHW	Commune health worker
DHDHC	Dinh Hoa District Health Centre
DHC	District health center
EMW	Ethnic minority women
FGD & IDI	Focus group discussion and In-depth interview
HMIS	Health Management Information System
IEC	Information, Education, Communication
IT	Information Technology
MNCH	Maternal, Newborn and Child Health
MCHIC	Maternal and Child Health Information Center
PHAD	Institute of Population, Health and Development
RH	Reproductive Health
SFU	Simon Fraser University
SMS	Short message service
TNHD	Thai Nguyen Health Department
TOT	Training of trainers
TV	Television
VEH	Vietnam e-health medical investment and communication
VHW	Village health worker
VND	Vietnam dong

# Qualitative Assessment Component

## mMom Final Evaluation Report

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## Acknowledgments

*The evaluation team wishes to express our special thanks to the Thai Nguyen Health Department, the Dinh Hoa District Health Centre, all participating commune health centres, the dedicated commune health workers, the project participants and their families, the Department of Maternal and Child Health, and the Department of Information Technologies of the Ministry of Health for their deep and committed support of this evaluation. This evaluation is a part of the mMOM project which is funded by the International Development Research Centre of Canada. The evaluation is also partially supported by Simon Fraser University, Canada.*

## Report Summary

The mMOM project implemented an innovative, integrated mHealth program to improve the maternal, newborn and child health (MNCH) of ethnic minority women (EMW) in remote and mountainous areas of Thai Nguyen, Vietnam. EMW's disproportionately poor MNCH outcomes, and evidence suggesting that current MNCH approaches in Thai Nguyen fall short in providing effective maternal care, provided a rationale for an mHealth intervention to deliver the necessary MNCH information, in a timely manner, directly to community women via mobile phone. The system has a sustainable design due to its partnerships with government and health officials at the local, provincial and national level. Qualitative assessment of the intervention examined its impact on all stakeholder groups and examined avenues for scale-up.

### Key conclusions

- Over its 3-year term from August 2013 to August 2016, the mMOM project achieved its general objectives
- The feasibility of the project model, i.e. integrating a new mHealth system with the existing HMIS, and its appropriateness for the MNCH context have been demonstrated.
- The mMOM model effectively reached its target audience of EMW and women living in remote areas, engaging women in their MNCH care, and there was genuine acceptability of the intervention across all stakeholder groups
- The project has had a positive impact on women's access to MNCH information and care, confidence, health-seeking behaviours and interaction with the health system, and increased quality interaction has benefited CHWs' work.
- The mMOM model has a good chance of being sustained as: 1) participating health staff and managers showed great commitment to the project activities and wish to continue; 2) TNHD expressed interest in including the intervention in the government's budget for the 2017 fiscal year; 3) the MoH showed strong interest and committed to introducing the model and guidelines to other provincial health departments; 4) participating women are eager to continue and willing to pay for the service; 5) the intervention was integrated into the existing HMIS and mMOM activities became routine activities for commune health staff.

### Key recommendations

For future iterations of the mMOM project, it is recommended that:

- The intervention should be continued and scaled; and the involvement of the MoH MCH and IT Departments should be increased upon completion of project evidence compilation
- More frequent, solution-focused, detailed information (with an emphasis on nutrition) should be added to the SMS packages to reflect stakeholder feedback, and packages should be extended beyond the first year of childhood, i.e. through the 2<sup>nd</sup> or 3<sup>rd</sup> year if possible.
- Working with CHWs on ways to include women who are blind or cognitively impaired will support the intervention in being as accessible as possible to all women
- A multiple-scheme model with a fee-based scheme, a subsidized pscheme and a free scheme should be studied and piloted to enable the intervention to self-sustain.

## I. Introduction

The project “Improving maternal and prenatal care for ethnic minorities in Thai Nguyen, Vietnam through an integrated eHealth and user-provider interaction model” (abbreviated as ‘mMOM’), implemented and evaluated a cost-effective solution to a problem of longstanding concern in Vietnam: how to improve the maternal, newborn and child health (MNCH) of ethnic minority women (EMW) living in remote and mountainous areas.

The project was funded by the International Research and Development Centre as part of the “**Strengthening Equity through Applied Research Capacity building in eHealth (SEARCH)**” program from 2013 to 2016. The purpose of this program was to examine how and when integrating eHealth into health systems can contribute to strengthening the health system. A particular focus was placed on governance and equity considerations. The overarching objective of the SEARCH grants was to support LMIC-based researchers to conduct rigorous and useful research on how and when eHealth can influence the functioning of health systems to improve health outcomes, and ultimately contribute toward reducing health inequities.

In general, poor education, socio-economic and social status, as well as rural/remote residence are cited as the primary determinants of poor health outcomes amongst ethnic minorities (EM) in Vietnam (Malqvist, Hoa & Thomsen, 2012). Poor education, limited access to information, low reproductive health knowledge, poor reproductive health behaviours and practices, poor access to and uptake of perinatal and postnatal care services due to distance and geographical difficulties, and language barriers have been identified as key determinants contributing to the substantially higher IMR and poorer MNCH among ethnic minority women and their infants. In addition, health facilities are unevenly distributed throughout Vietnam, with fewer and poorer quality facilities and health staff in remote, mountainous regions.

Disaggregated data from the last three Censuses of Vietnam show that EM people have higher total fertility rates, higher infant and child mortality rates, and lower life expectancies compared to the Kinh (ethnic majority group), and are less likely to attend antenatal or postnatal care or to deliver in a health facility (Dang, 2010). In 2009, the national total fertility rate was 2 children per woman, but 5 for H'Mông minority women. The H'Mông also experience the highest infant mortality rate in the country at 46/1000 live births, while the Kinh infant mortality rate is 12/1000 (2009 Census).

Maternal mortality rates were also found to be significantly higher among EM women compared to Kinh women, at 316 vs. 81 per 100,000 births respectively. The proportion of women of reproductive age who reported having received prenatal care during pregnancy was only 44.6% among the EM as opposed to 75.6% among the Kinh and Hoa (ethnic Chinese) in rural areas.

At the same time, Vietnam’s mobile phone network and its market have developed rapidly as the country has experienced rapid economic growth since the late 1980s and had a late entrance (non-pioneer) advantage. In 2010, the country had 43.7 million new mobile phone subscribers in one year and a total of 153.7 million mobile phone subscribers by the end of December 2010 over a total of population of 86 million. While mHealth has shown great potential for transforming health service delivery across the globe, its application in Vietnam is still very limited. Given the wide coverage of mobile phone services and low cost of SMS in Vietnam (i.e. VND 500 or USD 2.5 cents per SMS sent, and free receipt of SMS) there is a

great potential for affordable provision of health and social services for hard-to-reach populations, such as the EM and poor people living in remote and mountainous regions of the country.

Given this context and the expansion of low-cost mobile service in Vietnam, mHealth was determined to hold great potential to mitigate existing barriers by applying technology in improving MNCH knowledge and building demand for quality natal care. The project aimed to determine whether integrated use of a newly available Health Management Information System (HMIS), mobile technology, and a user-provider interaction model could improve access to MNCH care, and improve health among EMW and their newborns. The project included a pilot intervention and a feasibility cum impact study. mMOM developed a smart MCH Information Center (MCHIC) which provided timely information-education-communication (IEC) and reminder messages to EMW via short message service (SMS). The MCHIC notified EMW of appropriate actions to be taken, aiming to encourage their use of MNCH services and increase their awareness of potential risk factors. Simultaneously, Commune Health Workers (CHWs) were reminded by SMS to communicate with EMW and to take action if responses from EMW were unsatisfactory. These messages and the strengthened interactions between EMW and CHWs were designed to build demand for quality natal care, while increasing the active participation of EMW. The study explored effective ways to implement the intervention, evaluate project impacts, document lessons learned, and assess potential for scale up. Lastly, the project undertook policy advocacy and training in mHealth application.

The broad objective of this project was to determine whether an integrated mHealth intervention would improve access to MNCH care for EMW living in remote areas of Vietnam. Its specific objectives were:

1. To determine the social, cultural and geographic conditions that contribute to poor maternal and child health and limited utilization of health services among the EMW and their children in the Thai Nguyen province of Vietnam
2. To develop and pilot the use of mHealth as an integrated part of the HMIS integrated eHealth and user-provider interaction model with EMW for reproductive health (RH) behavior change communication (BCC) in the Thai Nguyen region
3. To determine the social, cultural and technical barriers and facilitators that impact the implementation of this pilot intervention and the further scaling up this pilot intervention to other regions in Vietnam and other similar resource poor health system settings
4. To determine the positive and negative impacts of this pilot intervention on the awareness and use of maternal and perinatal health services and on issues of equity, governance and the enhanced integration of health systems
5. To improve capacity of health managers, health workers, and researchers in managing, implementing and researching mHealth projects for better health system outcomes

The mMOM project has been underway for 3 years. Between August 1<sup>st</sup>, 2013 and June 30<sup>th</sup>, 2014, pre-intervention preparation was completed. This included preliminary ethnographic fieldwork, procuring hardware and designing software for the HMIS, drafting and piloting the SMS packages and testing the system. Subsequently, the intervention was officially initiated on July 1, 2014. From July 1<sup>st</sup> 2014 to September 30<sup>th</sup> 2016, 819 pregnant women and new mothers across 8 communes participated in the project. By September 1<sup>st</sup> 2016, 1150 pre-intervention survey questionnaires had been collected from 800 project participants in 8 intervention communes and 350 non-participants in 4 control communes. 667 post-intervention survey questionnaires have been collected from 396 participants and 271



non-participants. To ensure the smooth implementation of the MCHIC system, the project team conducted monitoring and evaluation activities on a daily, weekly, and monthly basis to learn about the intervention's progress and to provide technical support for local health staff. The project underwent a midterm evaluation in February 2015 and its findings in general showed a positive impact of mMOM for participating women, commune health centres and staff, and the larger health system in the Thai Nguyen province.

## **II. Objectives of the final evaluation**

The mMOM project final evaluation includes two components: a qualitative and a quantitative assessment. This report presents findings from the qualitative assessment only. The evaluation has the following objectives:

1. Review implementation and achievements of the project
2. Identify weaknesses and limitations to the project model
3. Assess the project impacts on all stakeholders
4. Assess project sustainability and future opportunities
5. Issue recommendations on future directions and project scalability

## **III. Methodology**

### **1. Methods**

The qualitative assessment of the mMOM project was carried out between May and July 2016. This was an appropriate time for assessment, since despite the project receiving a 6-month no-cost extension, the mMOM intervention was formally complete. The qualitative assessment was undertaken at this time to minimize recall biases from the participating women and other key informants. The following methods were adopted in this assessment:

- Review of project documents
- Review of literature on mHealth for MNCH globally and in Vietnam
- Field observations
- In-depth interviews with project managers, implementers, and beneficiaries of the intervention (stakeholders)
- Focus group discussions with stakeholders

The interviews and fieldwork were conducted with both the intervention and control communes in Dinh Hoa district, Thai Nguyen. Data collection occurred through field observations and meetings with the leaders of the MoH, Thai Nguyen Provincial Health Department (TNHD), Dinh Hoa District Health Centre (DHDHC), commune health staff of both the intervention and control communes, and selected women (participants and non-participants) and their families. Specifically, data collection included:

- One meeting (briefing and focus group discussion) with MoH officials
- Two meetings (briefing and focus group discussion) with TNHD officials
- Two meetings (briefing and focus group discussion) with DHDHC officials
- Two focus group discussions with 8 commune health workers from the intervention communes
- Eight in-depth interviews with CHWs involved in implementing the mMOM project
- Three in-depth interviews with CHWs from control communes

- Four focus group discussions with a total of 30 project participants
- Two focus group discussions with 13 non-participant women who have similar characteristics to participating women, i.e. pregnant or having an infant
- Thirty in-depth interviews with project participants and their family members at their homes in 6 intervention communes (Bao Linh, Binh Yen, Dong Thinh, Lam Vy, Phu Dinh and Son Phu)
- Eight in-depth interviews with non-participant women from 2 control communes (Linh Thông, Trung Hoi)

## **2. Key informants**

As described in the evaluation methodology, the evaluation team sought feedback from stakeholders at every level of the intervention. Key informants included government officials at both the national and provincial levels, the Deputy Director of the project district, and participating commune health workers and women. In addition, there was significant representation of ethnic minorities amongst those participating in the evaluation process: one CHW focus group included 5 ethnic minority women out of 8 participants, and for at least one focus group discussion with pregnant women/new mothers, 100% of participants were EMW.

Specific groups of key informants include:

- Project management and technical team at PHAD
- Provincial project coordinator and health managers at TNHD
- District project managers and health managers at DHDHC
- Commune health workers from intervention communes
- Commune health workers from control communes
- Target population women (pregnant women and women who have an infant) from intervention communes
- Target population women from control communes
- Families of the target population women (in both intervention and control communes)
- Health managers from the MoH: Leaders and Officials of the Department of MCH and IT Division

## **3. Data analysis**

The qualitative data collected during the final qualitative assessment consisted of recorded in-depth interviews and focus groups discussions, as well as notes and observations from each evaluation team member. This data was reviewed and categorized into major themes for presentation in this report. In addition, several in-depth interview and focus group discussion recordings were transcribed and translated to provide further insight. Several direct quotes from project stakeholders are presented in this report.

## **IV. mMom project progress and achievements**

- 1. Completion of project activities** (Project activities are described in greater detail in Appendix 1 – Project log frame)

**Completed activities for Objective 1** - To determine the social, cultural and geographic conditions that contribute to poor maternal and child health and limited utilization of health services among the EMW and their children in the Thai Nguyen Province of Vietnam:

- Conducted preliminary ethnographic fieldwork to determine the extent of mobile phone use, literacy barriers, social and cultural issues affecting phone ownership and usage, reproductive health and MNCH indicators, health service utilization, capacity of health workers, organizational factors that may impact mHealth promotion, and technical constraints

**Completed activities for Objective 2** - To develop and pilot the use of mHealth as an integrated part of the Health Management Information System (HMIS) integrated eHealth and user-provider interaction model with EMW for RH behavior change communication (BCC) in the Thai Nguyen region:

- Established the Maternal and Child Health Information Center (MCHIC), developed protocols for operation of the MCHIC, created reference materials, piloted the system, trained staff on its use, and began operating the system
- Developed IEC and BCC materials in SMS format and distributed project cell phones to intervention communes to be given to participants in need of a phone
- Developed the project's website

**Completed activities for Objective 3** - To determine the social, cultural and technical barriers and facilitators that impact the implementation of this pilot intervention and the further scaling up this pilot intervention to other regions in Vietnam and other similar resource poor health system settings:

- Conducted interviews with key stakeholders to identify policy constraints to scale-up and regular project monitoring and evaluation checks
- Conducted the mid-term and final project qualitative assessments
- Held two consultation workshops with external consultants
- Further workshops to disseminate the project findings are currently being planned

**Completed activities for Objective 4** - To determine the positive and negative impacts of this pilot intervention on the awareness and use of maternal and perinatal health services and on issues of equity, governance and the enhanced integration of health systems:

- Administered pre-intervention surveys with all project participants in 8 intervention communes and non-participants in 4 control communes
- Post-intervention surveys are currently being collected

**Completed activities for Objective 5** - To improve the capacity of health managers, health workers, and researchers in managing, implementing and researching mHealth projects for better health system outcomes:

- Conducted a needs assessment of TNHD and DHC staff and CHC workers, hosted a training of trainers (TOT) on MNCH
- Two TOT trainees conducted a MNCH training for the health staff of the 12 project communes, with 27 people in attendance
- Conducted two courses on mHealth and eHealth for TNHD and DHC staff, hospital and university staff and students, PHAD staff and HSPH students, instructed by Dr. David Wiljer from CAMH, Canada

- Dr. Liem Nguyen (Co-PI of mMOM) attended the Asian eHealth Information Network (AeHIN) meeting for learning and networking
- Hosted Daniel Abrams, a Canadian medical student, to support the mMOM project and conduct research on perinatal mental disorders

*What activities were not completed? Why not? How do they affect the project outputs and outcomes?*

One key project activity which was not completed was the administration of two bursaries to Vietnamese graduate students to conduct research based on the mMOM project. Prior to implementation of the intervention, the mMOM project created partnerships with the Hanoi School of Public Health and Thai Nguyen University of Medicine and Pharmacy with the aim of providing bursaries to two students. Despite enthusiasm from the partnering institutions, no students expressed interest or availability in applying for these bursaries. This has negatively impacted the project's 5<sup>th</sup> objective – to build capacity within researchers in managing and implementing health projects. However, the fact that this activity was not completed is not likely to have negatively impacted the project's impact on its primary beneficiaries.

*Changes/amendments during implementation of the project. Reasons? How do they affect the project outputs and outcomes?*

A key significant change to the project activities, made early on during the project's implementation phase, was the discontinuation of one of the SMS packages aimed at newlywed women. The newlywed package was added under recommendation from the TNHD to increase early participation in MNCH care, as the TNHD had a concern that many women came to CHC late for their first antenatal care appointment, i.e. at their 5<sup>th</sup> or 6<sup>th</sup> months of pregnancy. As such, the newlywed package had been included to help women prepare for pregnancy, but the package was discontinued due to low interest and uptake from women. Fieldwork determined that this was due to most women becoming pregnant shortly after marriage (or in some cases, before) and thus moving directly onto the pregnancy SMS package. Because the newlywed SMS package was discontinued based on feedback at the commune and participant level, it is unlikely that it had adverse project outcomes. All women who would have been enrolled in the newlywed package were simply initiated onto the pregnancy package, so there was no loss of participation.

## **2. Feasibility of the project intervention**

One of the mMOM project's most important achievements was that it demonstrated the feasibility of mHealth project implementation within an integrated HMIS system. Thai Nguyen was selected as the intervention site because of the region's relative expertise in, development and use of health information technology. Furthermore, it is a favourable policy environment due to a current emphasis on ehealth. Thai Nguyen has completed the implementation phase of the HMIS system. All hospitals and 181 communes in nine districts are fully integrated into an electronic record management system, and 100% of CHCs are connected by high speed cable to district and provincial health centers. The MCHIC database was developed by Vietnam e-health medical investment and communication (VEH) and implemented in July 2014 in 8 pilot communes in Dinh Hoa. The MCHIC is currently running as an integrated component of the HMIS through using each patient's HMIS unique ID code. The mMOM project has been able to utilize these favourable policy and technological conditions to effectively demonstrate the potential of mHealth in this region.

## V. Project impacts

The mMOM intervention was found to have significant impacts on women and their families, commune health centre staff and operations, and the overall district health system.

### 1. Greater access to MNCH information and care for participants

A major benefit of the mMOM intervention was that it increased access to information and care for participants. All women who provided feedback said that the SMS services had significantly increased their access to important MNCH information during the critical periods of pregnancy and early infancy:

“For my first child, I was not aware of many things: for example, during the first month of pregnancy, I have to take an iron supplement; at 6 and a half months, I have to take calcium. I did not know any of this information at my first pregnancy. But for this second child, the program reminds me, so I know how to take care of myself and my baby.” -P1, *focus group discussion, Binh Yen Intervention Commune*

“When seeing the SMS, I feel that the program is very beneficial, good for pregnant women, children; good for moms with small babies. The program has a lot of useful information that I have learned from to take care of my baby properly.” – 27-year-old Tay woman with one 5-year-old and one 6-month baby

During both qualitative assessments, several women stated that they would want to receive the mMOM messages during future pregnancies as well, as they were concerned they might forget much of the important information.

“During my next pregnancy, I would still continue to participate. Because I did not know much for my first pregnancy, I still want to understand more for my second child.” -P1, *focus group discussion, Lam Vy Intervention Commune*

“I still want to participate next time [next pregnancy], because I may forget [the information] after raising my child for a while.” – P2, *focus group discussion, Lam Vy Intervention Commune*

The most highly valued information related to vaccinations, nutrition, ultrasounds, breastfeeding and when to initiate regular food for the baby. While distance from the commune health centre was not found to be a significant barrier for most women, participants expressed that receiving information over their mobile phones was highly convenient and often eliminated the need for a trip to the health centre. Women also stated that the project had increased their access to care through more regular contact with their CHW.

“After giving birth, my baby's umbilical cord fell off, and I did not know what to do. I called Ms. Chanh [CHW], and she guided me to use tea and on how I could wash it- she guided me through the whole process. Or if my baby has diaper rash, I would call Ms. Chanh and she would tell me not to use that type of diaper. In general, I often call Ms. Chanh.” -P3, *focus group discussion, Binh Yen Intervention Commune*

Many CHWs also mentioned that women have been phoning the CHC more frequently not only for their own health concerns, but for the concerns of other children or family members as well. This increased level of contact has resulted in enhanced relationships between CHWs and community women.

In contrast, focus group discussions and in-depth interviews with the control group illustrated that non-participant women experienced fewer and less convenient opportunities to engage with MNCH information and their CHW. Non-participant women reported obtaining health information from the health centre and CHWs, television, newspapers, the Internet and village health workers, but stated that the CHC was the least convenient source for information. Many reported that they wanted more information about nutrition and vaccinations, and that the information they had received about these topics was insufficient:

“There is no information [about vaccinations before pregnancy]. Here, sometimes we don't really know when we are pregnant, not until being 1-2 months pregnant, when we feel something different. Many people here are like that, so we cannot prepare in advance.” -C1, *focus group discussion, Linh Thong Control Commune*

“We want to take good care of our babies but many families don't have enough resources to buy more milk, iron supplements or calcium. What are the things we can supply to babies that do not cost much?” -C2, *focus group discussion, Linh Thong Control Commune*

While non-participant women expressed that they had semi-regular contact with their CHW and VHW during pregnancy and new motherhood, they seemed less engaged with actively seeking health care during these critical periods.

“Not really, I would only answer if they asked questions.” -C3, *focus group discussion, Linh Thong Control Commune, in response to ‘do you ask the health staff questions?’*

## **2. Convenience of accessing MNCH information at home at all times**

The access point of MNCH information and resources in the project villages has traditionally been the commune health centre. However, mMOM participants emphasized that it was significantly more convenient for them to receive tailored information at home rather than having to pay a trip to the CHC. Husbands and grandmothers stated that they rarely visited the health centre with their wife or daughter-in-law for MNCH care, which meant that they had few opportunities to access MNCH information. Both had experienced increased opportunities to learn about MNCH through the intervention because the information was available at home on a mobile phone. Having the information stored and readily available at any time also encouraged women to spend more time engaging with the messages. Several women mentioned that they routinely saved the messages to re-read later, and shared them with their family members.

Once being informed about the intervention, even women in the control group expressed high interest in mHealth. The mMOM project was described to non-participants at the end of their interview or focus group discussion, and they were asked if they would be interested in accessing health information through their cell phones. All respondents stated that they liked the idea very much, as it would be highly convenient to receive information in this way. Several women said that it could allow them to save time by helping them to avoid unnecessary visits to the health centre.

“I want to learn [about MNCH care] but I don’t have time. If I could stay at home and receive SMS via my mobile phone, it would be much more convenient.” -38-year-old woman with 19-month toddler and an older child, Trung Hoi control commune

### **3. Greater confidence and MNCH engagement amongst participants and greater interaction between participants and CHWs**

The mMOM project was also found to support women’s mental wellbeing during the pregnancy and early motherhood periods by promoting confidence and minimizing anxiety. Several women reported that with the mMOM project, they were less worried throughout their pregnancy experience, and that knowing what to expect at each stage helped them to feel less concerned. This was particularly salient for women in their first pregnancy, many of whom stated that the experience seemed more normal with the messages informing them about what to expect. Women’s increased confidence in their own knowledge of pregnancy and new motherhood also positively impacted their interactions with the health care system.

“I’ve contacted the health staff when my baby has had diarrhea or fever... I feel confident. I don't feel hesitant to call the health staff.” – 26-year-old Nung woman with 11-month baby

“For my first child, whenever I had a problem, I always went to the health centre, but now I just need to call the health staff’s phone number, it is more convenient. Yes, I feel good when I call the health staff, they are very enthusiastic.” – 27-year-old Kinh woman with 5-month baby

CHWs also stated that the mMOM project had had a powerful impact on their interactions with local women. Most health workers remarked that women were phoning more frequently to ask about health care during pregnancy, and that the quantity and quality of interactions between CHWs and women had increased.

“We only need to input women's phone numbers, then they can receive messages right away. Most of the participants call the health staff if they have any questions. Two-way interaction like that is very beneficial.” – CHW 1, in focus group discussion

CHWs also noted that women were more actively engaged in their MNCH care, and that the information in the messages had an enabling effect on their readiness to initiate discussions with health care providers:

“Women ask more questions when they have more information from the SMS. They ask us right away when they have any questions.” -CHW 2, in focus group discussion

Many CHWs commented that prior to the mMOM project, women would sometimes not report problems in their pregnancies, such as bleeding or edema, until the issue had become an emergency. More women were said to be consulting CHWs at the earlier signs of a problem, which has contributed to preventing further complications. Several participants echoed this sentiment, stating that the information from mMOM helped them to feel confident that they had definitively identified a problem and encouraged them to seek care. The mMOM service seemed to act as a mediator and dialogue-initiator between women and health workers, promoting women’s increased access to their local health care system by providing information which could be utilized as a starting point for discussions. In contrast, several non-participant

women expressed that there were many instances where they did not want to bother the CHWs with their problems, because they did not know if they were serious or not. These statements link a low level of confidence with hesitancy in seeking care. In this way, non-participant women's lack of MNCH information and awareness affected their confidence, which in turn directly impacted their willingness to visit the health centre.

#### **4. Greater engagement of husbands and other family members with MNCH information and care**

The mMOM project had a meaningful impact on husbands' engagement with MNCH care. Many women mentioned that they shared the messages with their husbands, that he would read them too, or that they would discuss the message content together. Several stated that the messages should be sent to husbands as well:

"Often fathers don't know how to take care of babies, or when to take their wives for a pregnancy check-up. I am a woman, so I have to take the initiative - it would be better if fathers could also receive messages." -P3, *focus group discussion, Lam Vy Intervention Commune*

"Many husbands, when their wives are pregnant, they do not know how it is. When they saw the messages we received, they were surprised by how much work their wives do [during pregnancy]." -P4, *focus group discussion, Lam Vy Intervention Commune*

In interviews, most husbands stated that they had learned new information from the mMOM messages. Perhaps most notable was husbands' increased interest in MNCH, evidenced by the fact that many said they would also be interested in receiving messages.

"Before planning to have a baby, I searched on the internet and asked for advice from old people and parents. This program [mMOM project], my wife told me about it, so we participated. Because this is our first child, we felt puzzled; we do not have many experiences; we felt worried; but receiving the messages from the project helps us know what to do, makes us feel better. The program reminds us of when to do what. My knowledge has increased a lot; for the second child, we will feel less bewildered." – *Husband, 32, to 26-year-old Nung woman with 11-month baby*

"Of course [I would be willing to receive messages], both of us should receive the SMS so that we could both gain knowledge for taking care of our baby." – *Husband to 27-year-old Tay woman with 5-year-old and 6-month baby*

"Yes, my husband reads the SMS [messages] too, he even reminded me to go for a vaccination when I forgot." – *27-year-old Kinh woman with 5-month baby*

In a social context where maternal and infant health have traditionally been considered the domain of women, husbands' increased participation in this area is a highly positive effect of the mMOM project. Most extended family members were also supportive of the project and expressed interest in learning more about modern MNCH care. Many relatives and even some grandparents stated that they wanted to access the best scientific information on maternal and infant health. While it was clear that some aspects of traditional health were still practiced by families (the use of teas and herbal medicines), it seemed that most were open to modern health information and did not perceive it to be in conflict with traditional practices.



The experiences of the control group contrasted with those of mMOM participants, as non-participant women did not refer to their husbands or family members as being greatly involved in MNCH care. Some women mentioned that pregnancy and child-rearing were generally a woman's responsibility and seemed to accept their husband's low involvement.

## **5. Improved community dynamics**

The mMOM project seems to have initiated greater dialogue and exchange about MNCH care within and beyond the intervention communes. Most participants stated that they had talked about the project with their friends, sisters, neighbours and colleagues, and in many cases, encouraged them to sign up. Several participants stated that they were sharing the mMOM information with their friends who were not yet pregnant or lived outside the intervention communes. One health worker stated that she had received several calls from women in other communes, who had heard about the project from a colleague at work and wanted to know why it wasn't available to them. The mMOM project seemed to be known to many women even outside of the intervention communes, which speaks to the degree of dialogue taking place between women and their peers.

## **6. Improved knowledge and behaviour on MNCH among participants**

Many women also mentioned that mMOM provided them with critical knowledge about the danger signs during pregnancy and for babies, which helped them to distinguish from normal experiences (fatigue, edema, morning sickness) and experiences which could be dangerous and warranted medical attention (heavy bleeding, high fever, breathlessness). Women pinpointed the information on danger signs as critical, as it enabled them to know when a problem was serious and to swiftly contact the health centre. One 31-year-old Tay participant from Lam Vy commune stated that after she had recurrent stomach aches during her pregnancy, she went for a checkup at the CHC because the mMOM messages warned specifically about that occurrence. In contrast, several non-participant women mentioned that they were often unaware of whether an issue during pregnancy or with their infant was severe enough to warrant medical attention. These perspectives suggest that awareness of danger signs amongst the control group was fairly low, and that this was a concern for women.

Despite its relatively short two-year term, the mMOM project appears to have had a positive impact on women and infants' health outcomes. Women's increased awareness of critical determinants of health such as nutrition, breastfeeding and vaccination are likely to support healthy child development in the years to come. In interviews, many women named multiple examples of specific best practices that they had learned via mMOM project, often mentioning the importance of calcium, iron and vitamin A during pregnancy. Most stated that their knowledge of nutrition for themselves and their infants had deepened, and that they were applying the knowledge in their practices. Three women who had several children remarked on the differences between pregnancies and early infanhoods with the mMOM service compared to their earlier pregnancies. They stated that with mMOM, they noticed that their babies were born with higher weights, put on weight faster, were growing taller and had healthier teeth compared to their older children:

"I have 2 children. When comparing between the two, for the first one, I did not take enough iron and calcium supplements, so the teeth grew slower. For my second child, I took calcium and iron according to mMOM guidance, and the second child's grew teeth faster." - P1, focus group discussion, Binh Yen Intervention Commune

While quantitative data is needed to provide robust evidence of improved health outcomes, preliminary qualitative data suggest that the intervention is likely to positively affect women and children's health outcomes over time.

## **7. Improved monitoring capacity and knowledge of CHWs**

Community health workers were unanimous in their support of the mMOM project, stating that it had improved their ability to monitor pregnancies and infant health, and had enhanced their capacity through increased knowledge of MNCH care. CHWs also reported that they felt the mMOM project has contributed to their professional development through increased technical abilities in eHealth.

Mrs. Suu at the DHDHC and nearly all CHWs stated that the mMOM system and its integration with the HMIS has had a positive impact on staff's ability to monitor pregnancies. Both health workers and women themselves were more aware of the physiological events taking place throughout pregnancies, and the HMIS enabled regular and thorough data recording. Many CHWs mentioned that the improved monitoring of pregnancies had allowed women to notice potential issues earlier, which promoted health workers' ability to respond earlier, prevent and de-escalate problems in pregnancy, and avoid severe complications.

At both the district and CHC levels, stakeholders reported that the mMOM project had also had unexpected benefits for commune health workers. Mrs. Suu stated that the mMOM project has supported the increased professionalism of the CHWs in her district, and that many staff have gained concrete knowledge in MNCH care and technology due to the project. CHWs also reported that they had enjoyed the opportunity to become more technologically savvy through using the HMIS and have gained a wider knowledge base which they can use to support the women in their communities. This outcome was an unexpected benefit of the project, but demonstrates that the implementation of ehealth initiatives with novel technology may have the potential to confer benefits to health staff as well.

One concern expressed was in regards to the role of Village Health Workers (VHWs) in MNCH in the villages. Prior to mMOM, VHWs had some responsibility in assisting women with information about pregnancy and notifying CHWs when a pregnancy occurred. However, VHWs have minimal training and function on a part-time basis, so their role was not considered to be particularly effective. The mMOM project has not engaged VHWs, and so their role in MNCH has been further diminished.

There was also some evidence that CHWs might be visiting villages less often for MNCH purposes because they rely more on the mMOM system and phone calls with women. It is important to note that regular phone contact with EM women in the villages is also relatively recent, and this change may be as much due to the availability of mobile phones as it is to the mMOM intervention. In addition, it is clear that communication between CHWs and community women has improved and is occurring at a higher frequency than prior to the mMOM project. Finally, CHWs may be travelling to villages less because pregnant women and new mothers have become more active in phoning and coming to visit the health centre on their own. Because both CHC staff and women reported improved interactions for MNCH care, the frequency of CHWs' visits to the villages is not a significant concern.

## **8. Workload reduction for CHWs**

Most CHWs expressed that the mMOM intervention had reduced their workloads and improved their working efficiency. Many mentioned that because mMOM was providing timely information to pregnant women, they had to spend less time attending to group or individual counselling.

“In the past, we have had to organize communication events a few times per year for pregnant women and women with small kids. But now that the SMS system is in operation, we don't have to give group counseling.” – *CHW 1, in focus group discussion*

Most CHWs stated that prior to the mMOM project, they spent considerable time seeking out pregnant women and new mothers in their communities in order to provide them with care, and that now, women had begun to actively seek care from the CHWs. Several remarked that the automatic sending of messages helped them to feel at ease, knowing that women were accessing the necessary MNCH information for a healthy pregnancy and early infancy. Commune doctors were also able to focus more on their areas of work with the help of the CHWs and their increased capacity. In this way, the mMOM project allowed for improved focus on priority areas of maternal and infant care.

## **9. MNCH communication reached a remote population via remote technology**

The mMOM intervention was developed to address remote and rural location as a specific determinant of health. All available literature illustrates that EM communities living in remote areas face reduced access to MNCH care and poor quality of care, which leads to poorer health outcomes relative to the rest of the population. Through the mMOM project, mHealth was identified as a viable avenue to mitigate these barriers, thereby promoting health equity for marginalized EM groups.

# **VI. Project strengths & opportunities**

## **1. Communication strategy: shift from general IEC to timely BCC**

Ethnographic fieldwork determined that in Dinh Hoa district, MNCH care is delivered through the use of posters and leaflets, and in monthly or less frequent group counselling sessions at the CHC. The occasional nature of these sessions meant that the education delivered is fairly general and focused on knowledge that applies throughout pregnancy. Discussions with local health workers and women suggested that these traditional IEC methods may not be comprehensive, timely or specific to the needs of community women.

The very general education offered in the CHCs' group counselling sessions, presented to women at widely varying stages of pregnancy, was found to be lacking. Women commented that the information presented in these sessions lacked specificity, detail and timeliness, and that it was challenging to absorb sufficient information to benefit from for the next few months of pregnancy. In addition, the group sessions were structured to provide one-way IEC delivery (CHW to women), allowing few opportunities for deeper dialogue between an individual woman and her health care provider. The poster and leaflet IEC materials also fell short, as

some CHWs suggested that it lacked detail and that women did not benefit from it; while women had seen these materials but stated that they did not know how to apply information from them. In summary, the strategy of providing all pregnancy-related information at once to all currently pregnant women, the resulting emphasis on general information, and the one-way IEC approach were found to be limited in their ability to best support maternal and infant health.

Based on these identified challenges with current IEC approaches, the mMOM system was designed to provide frequent MNCH information, specific to a woman's stage of pregnancy (with the appropriate level of detail and references to time-sensitive actions) directly to women through their mobile phones. In this way, the mMOM system aimed to deliver the right information, to the right women, at the right time. In addition, while most of the current mHealth interventions in MNCH use 'passive' SMS, this project applies 'active' SMS with the active participation of CHC staff for Behaviour Change Communication (BCC) rather than passive Information-Education-Communication (IEC). The mMOM intervention moved beyond traditional one-way information approaches by instead emphasizing user-provider interaction to increase participants' demand for quality natal care.

## **2. mMOM is implemented by local health officials and workers**

During the qualitative assessment, the evaluation team questioned local community health workers on whether the mMOM project created additional stress or work in their routines. Their responses suggested that the mMOM project did not introduce additional work for CHWs, but rather streamlined their existing tasks and allowed them to do the same monitoring and education activities, but in a more effective way. In addition, engaging health workers to deliver the mMOM intervention is a sustainable approach to the project and has also contributed to building skills and capacity in local CHWs.

## **3. mMOM is integrated into the local health system and HMIS**

The mMOM intervention was designed to be carefully integrated into existing local health systems and the HMIS. The platform aims to coordinate and add support to community health workers' existing tasks in monitoring pregnancy and new motherhood in community women. In addition, the project's integration into the HMIS has improved data collection and monitoring, and will support future MNCH programming evaluation and improvements due to strong data collection systems.

## **4. Positive attitudes of health officials and health workers towards mMOM**

The TNHD commended the project, and spoke positively about the effectiveness of providing information directly to beneficiaries via their mobile phones. Mrs. Mai Thi Suu at the DHDHC echoed these remarks, emphasizing that the approach of sending short messages at regular intervals directly to women was highly effective and its specificity to phases of pregnancy and after delivery enabled an enhanced quality of information to be communicated.

“[The mMOM message system] is the most effective communications approach until now.”  
–Mrs. Mai Thi Suu, Deputy Director, Dinh Hoa District Health Centre

Commune health staff demonstrated unanimously positive attitudes towards the mMOM intervention. Many remarked that the frequent messages had the ability to suggest very time-sensitive actions (such as when to seek a tetanus vaccine during pregnancy and how to care for a newborn's umbilical cord) in a way that other approaches had been unable to do.

While both the provincial and district health departments found the mMOM model to be effective in reaching community women, some officials at the district level expressed concerns regarding computer literacy for staff. They commented that in some health centres, computer literacy across CHWs is still very basic, and suggested that on-going training of commune health centre staff might be necessary to ensure the sustainability of the project.

## **5. Positive attitudes of the participants towards mMOM**

The mMOM project seemed to be genuinely accepted and embraced by all participating women. All women who provided feedback on their experience said that the SMS services had significantly increased their access to information during the critical periods of pregnancy and early infancy. Women expressed that they were very happy to receive this information, as it enabled them to better maintain their physical health during pregnancy and support the health of their infant.

In contrast, non-participants had few comments or suggestions on what could improve MNCH care in their community. They were more accepting of the current state of care than were mMOM project participants, who were unanimous in requesting more frequent, detailed information. The apparent differences between project participants and non-participants suggested that one of the most significant impacts of the intervention was the increased knowledge of maternal and infant care enjoyed by mMOM participants. Their experiences suggest that through receiving MNCH information, women had become more engaged and interested in their own health during pregnancy and new motherhood, and actively sought out information to this end. It was also clear that this heightened awareness promoted women's confidence in interacting with the health care system, in sharp contrast with non-participants.

## **VII. Project weaknesses & threats**

Through the interim and final qualitative assessments, several project weaknesses and threats were identified. These issues originated from the perspectives of all stakeholders, and were described to or observed by the evaluation team.

### **1. Phone sharing**

At the interim assessment, approximately 10% of women reported sharing a cell phone with their husbands or other family members. During the final assessment, this percentage seemed to have decreased, but was still significant. Phone sharing between family members can affect the reliability of women's access to mMOM messages and delay their response time. CHWs reported instances of husbands taking the phone away for weeks so the woman is left without a phone. In one instance, a husband sold the couple's shared cell phone to pay for gambling. When the CHW offered to provide a new cell phone to the participant, she refused the phone out of concern that her husband would sell it and she would be unable to pay back the cost of the phone. While this was an isolated incident, in general, the sharing of phones poses a risk of participants not receiving messages in a timely way.

## **2. Signal coverage and phone credits**

At both assessments, approximately 2-3% of women were found to face phone credit difficulties. Some reported having to travel a distance to purchase new credit, so at times, balance could remain low for several days, resulting in participants occasionally missing messages. In addition, mobile signal coverage in more remote areas was sometimes weak, so messages could be missed. During the final assessment, one village of 300 people was found to be too remote to receive service at all, and had been thus excluded from the intervention. While mobile signal will continue to improve throughout Vietnam, considering signal and credit issues is important in the planning of future iterations of the project.

## **3. Message content and timing**

During both assessments, some CHWs mentioned that there are some words in messages that women did not understand and needed to be explained. Timing of messages could be an issue because women are often very busy during the day, or working in factories or fields, and don't respond to messages. Finally, TNHD officials stated that without tone, some SMS messages may be difficult to understand. Continued attention to the language and timing of messages and ensuring that they reflect women's needs will help to address this issue.

## **4. Mismatch between recommendations and context**

Several participants mentioned that while the messages regarding vaccination were helpful, they were not aligned with local CHC immunization clinic schedule. Many of the CHCs typically featured one immunization day per month, so sometimes mMOM messages recommending vaccination could come up to 20 days before a vaccination appointment was available. Future iterations of the project should be altered to reflect specific commune or village contexts, and even to coordinate with schedules of commune health centres.

## **5. Reluctance of husbands**

During the interim assessment, several CHWs and participants mentioned that some husbands had been resistant to the project, generally because they were jealous of their wives receiving text messages. However, this was found to be less of a threat during the final assessment. Most women reported having informed their husbands about signing up for the mMOM messages immediately, so this helped to address their doubts. In addition, many husbands were very enthusiastic about the project, and provided feedback that they too appreciated learning about maternal health via SMS. While reluctance of some husbands may constitute a threat, it seems to be able to be mitigated through communication from wives and CHWs.

## **6. Beliefs and superstition**

During the interim assessment, both CHWs and participants reported that some women are not allowed to use cell phone for 6 weeks after delivery. These concerns were repeated during the final assessment, where several women stated that some families believe that a woman should not talk to others or leave the house for 4-6 weeks after giving birth. This practice of not speaking also extends to text messaging (women may read messages, but will not respond). At this time, if the infant needs special care, another family member will take him/her to the CHC so that the mother doesn't need to leave home. One woman mentioned having had two miscarriages before she had a baby, and therefore she did not want to talk about pregnancy as it could bring bad luck. These beliefs constitute a minor threat to the mMOM

project because women who adhere to these practices may not respond to SMS messages at all for many weeks after birth. This after-birth period may constitute an opportunity for SMS communication to be directed at husbands rather than wives who are recovering from delivery.

## **7. Accessibility issues**

At the interim assessment, one woman was found not to be able to join the mMOM project as she was blind and could not read SMS messages on a phone. This issue raises concerns about the accessibility of the mMOM intervention and whether differently abled women would be able to participate.

## **VIII. Project sustainability & scaling-up**

### **1. mMOM was designed with features for sustainability**

The mMOM system was conceived at the outset to be a sustainable intervention. The project is innovative as it is integrated into the local HMIS, and has been implemented by the District Health Centre and local health workers. The provincial health department has co-managed the intervention from the beginning and will own the mMOM system hardware at the end of the project period. Finally, the Vietnam MoH has been heavily involved in the intervention as the Departments of MCH and IT have acted as project advisors. Continuous involvement of the health centres and government bodies at the district and provincial level has supported the project's integration into current systems and boosts the likelihood of its permanent adoption.

### **2. Commitment of local health officials to mMOM project continuation**

Health officials at the local, provincial and national levels voiced their commitments to continuing what the mMOM project had initiated. Specifically, the MoH stated their willingness to provide guidelines for implementation of the mMOM intervention to the Provincial Health Departments that would like to adopt the project, pending the delivery of a project report. They emphasized that their current budgets for IEC are expended in printing paper materials, but that this approach has not been evaluated and its impact is unclear. Several TNHD officials suggested that transitioning some of the current IEC budget, from printed materials to phone-based messaging, would be one viable avenue to provide sustained funding for the mMOM intervention. Staff at the district and commune levels also verbalized their wishes to see the project continued due to its positive effects on community MNCH care and health workers' capacity.

### **3. Attitudes of the participants to mMOM project continuation**

The mMOM participants had highly positive attitudes towards the project, and most expressed interest in continuing to participate for future pregnancies. Participants were also asked whether they would be willing to pay to receive the SMS messages, in order to understand the value that they placed on the service. The large majority of women reported that they would be willing to pay a nominal fee to continue receiving messages. Fees that women were willing to pay ranged from 100-1000 VND per message, or 10,000 to 100,000 VND per month.

“I would pay VND 200 per SMS. Other SMS are not as important, but these SMS provide me with useful information, so I would be willing to pay.” – *26-year-old Nung woman with 11-month baby*

“[I would be willing to pay] about VND 1000 per SMS ... I feel like it is suitable for my family’s economic situation. The information I get from the SMS is clearly worth more than 1000 VND.” – *27-year-old Kinh woman with 5-month baby*

Women’s willingness to pay for this service despite sometimes significant economic constraints suggests that they find the information highly valuable. Interestingly, even non-participants asserted that they would be prepared to pay approximately 100-200 VND per message for the mMOM service once they learned about it. It is notable that the rates cited by non-participants were lower than the rates cited by project participants. This suggests that project participants place a higher value on mMOM service, which is likely due to their experience in benefiting from the messages

#### **4. The uptake of the mMOM intervention**

Both the project hardware and software were developed to be web-based and as simple as possible for CHWs to learn, use and train other staff on. CHWs reported that it does not take much time to learn about how to use the system, and that a new staff person can be trained to use the software within approximately one week. In addition, CHWs commented that the mMOM workload is light: they receive approximately 10 new cases per month; and it takes approximately 10 minutes to register each new case. The project also hosted trainings on MNCH, mHealth and the intervention activities for CHWs and DHC staff to build on their interest and commitment.

#### **5. Cost-effectiveness of the mMOM intervention**

The mMOM platform is cost-effective due to the availability of the computerized HMIS, the use of SMS and cheap mobile phones (instead of an app for smart phones, due to the low socio-economic status of the target population), and the low cost of mobile services in Vietnam. Through capitalizing upon existing infrastructure and cellular systems, and the fact that most families in the region own at least one mobile phone, the mMOM intervention has demonstrated the potential of a highly cost-effective health promotion approach.

### **IX. Recommendations from project stakeholders**

The qualitative assessment collected recommendations from stakeholders at all levels regarding changes that should be made to the intervention. They provided valuable feedback which centred on mMOM project staff training and HR, message content, and message frequency. These recommendations should inform future iterations of maternal mHealth initiatives in similar contexts in Vietnam.

#### **1. Recommendations from health officials and CHWs**



Mrs. Suu expressed that if the project were to be initiated in a new commune or district, more training for health staff and IEC materials to support staff MNCH knowledge were critical. She emphasized training opportunities and ongoing support for CHWs and even VHWs as avenues to ensure the success of the project, and also highlighted the importance of having technical support available.

Recommendations from CHWs related to the messages themselves, and to project HR. Several commented on the timing of the messages, stating that the timing of receipt should match women's schedules. Others stated that the language of the messages should be less medical/technical. With regard to message content, many CHWs recommended that more messages with information on nutrition and breastfeeding should be added. In a focus group discussion, several CHWs commented that the project should extend beyond 1 year of infancy, further into early childhood. One CHW named Huong from Sơn Phú (one of the most populous project communes) requested more project HR, stating that in larger communes, there should be two project support workers rather than one, so that they could work together to monitor women.

## **2. Recommendations from participants**

Recommendations from project participants focused on the content and frequency of messages, and the duration of the program. Most participants asserted that they wanted a higher frequency of messages, particularly when the baby was 6 to 12 months old. Most requested messages with a greater depth of content, and the inclusion of instructional and solution-oriented information. More messages on nutrition for mothers and particularly for infants, with examples of local foods to eat, were requested by nearly all participants. Participants were unanimous in requesting more detailed information and to receive messages more often. Finally, many women recommended that the mMOM project period be extended beyond the first year of childhood, suggesting that it run to at least 2 years of age, if not 3 or 5. Participants desired more information to support their child's health and development beyond infancy into early childhood.

Several participants made specific recommendations for changes to the mMOM project. A 26-year-old Kinh participant with a 5.5-month baby recommended that a specialist be available to field mMOM participants' phone calls and provide more detailed problem-solving information over the phone. A 30-year-old Tay participant from Lam Vy commune with an 8-month baby stated that while the project was of great benefit to her, she felt that it would be even more advantageous for women who live in further remote areas:

*"[The messages] should be expanded to more remote areas, because not everyone has access to a doctor, but everyone has access to a phone."* -30-year-old Tay participant, Lam Vy commune, with 8-month baby

With regard to messages for husbands, participants in a focus group discussion emphasized that the content of messages for husbands should be tailored to match their interests. Examples of topics for husbands were baby care and nutrition, and reminders about baby's vaccination schedule. In addition, several women and husbands mentioned that general reproductive health information, and particularly advice on contraception and pregnancy spacing would be helpful for both women and their husbands to receive. As some couples can face family pressure to have another baby very soon after birth, providing information on the importance of pregnancy spacing to husbands as well as pregnant women could help to address

this pressure. Several participants also mentioned the need for husbands to understand the importance of rest during pregnancy. They stated that many husbands encourage their wives to keep working, and need greater education on why pregnant women require more rest than usual.

## **X. Conclusion**

Over its 3-year term from August 2013 to August 2016, the mMOM project achieved its general objectives (see Appendix 1 for project log frame). Overall, the mMOM model was effective in reaching its target audience and engaging pregnant women and new mothers in their MNCH care. There was genuine acceptability and satisfaction with the mMOM intervention across health officials, frontline commune health staff, participants and families.

In general, the mMOM project has had a positive impact on women's access to information about pregnancy and newborn care. Although women are able to access care and receive information from CHWs in communities without the project, there appears to be a higher level of connectedness and dialogue between CHWs and pregnant women in the project villages, and women report being better informed, having more self-confidence, and feeling a greater sense of security with the mMOM system. The mMOM model has also been embraced by commune health workers who play a critical role in supporting access to care for community women. The increased interaction between community women and local health care staff and systems, coupled with increased information for both parties about MNCH best practices, are the most powerful impacts of the mMOM model.

At present, it is not clear how the mMOM project affects health outcomes, but the feasibility of the model and its appropriateness for the MNCH context have been demonstrated to date. Future work on further integrating mMOM with the HMIS will enhance the value of the model as well as support its long term sustainability. The mMOM project holds significant potential to change the landscape of IEC related to maternal and infant care in northern Vietnam, and to improve women and children's health outcomes over a longer term. We hope to see the mMOM system further implemented to achieve this impact.

In terms of the objectives of the IDRC "SEARCH" program, the mMOM project clearly had a significant positive impact in the three priority areas identified by IDRC:

### **Gender**

Ethnic minority women were empowered by the mMOM project and clearly indicated they felt more informed and more confident in asking questions during their pregnancies. For those comparing a recent pregnancy supported by mMOM with previous pregnancies, many reported that they were less hesitant about contacting the commune Health workers with questions about symptoms and problems.

The project also had an impact on the husbands of EMW, many of whom indicated they had participated through reading information sent over their wives phones, and indicated a heightened interest in learning about pregnancy and supporting their wives. Husbands' increased interest in and awareness of MNCH due to mMOM had led to increased involvement in several cases, where men reported reminding their wives about vaccination appointments and helping out with infant care. Over time, this shift in the sharing of labour around child care will contribute positively towards more equitable gender roles in the home. As women

traditionally bear the burden of reproductive work (home and childcare), often in addition to productive work in agriculture or companies/factories, sharing this burden more equitably with husbands is likely to lessen women's workload and improve women's position in their families. More equal sharing of childcare is also associated with women's increased ability to pursue opportunities outside the home.

### **Inequality**

Although the full impact of the intervention in terms of health outcomes is not known, the mMOM project design was able to effectively address ethnic minority status as a specific determinant of health inequity in Vietnam. mMOM targeted ethnic minority women and their families in its aim to promote health equity for these groups, and there was clear evidence that they experienced increased access to MNCH information and care as a result. The mMOM project was implemented in the Thai Nguyen province specifically due to the high rates of EM people in the area and their relatively poorer MNCH outcomes. 76.1% of mMOM participants across intervention and control communes identified as ethnic minorities, which confirms that the project's aim of targeting these groups was achieved. Interviews and focus group discussions with EMW participating in the mMOM project demonstrated that these women experienced increased access to information and educational materials, as well as increased quality interaction with commune health workers during their pregnancy and new motherhood periods. Most participants reported increased confidence due to the mMOM messages, which positively impacted their interaction with CHWs and health-seeking behaviours. In a context where ethnic minority groups have experienced historical marginalization, and research and programmatic efforts have long worked to engage ethnic minority groups and encourage their increased interaction with the health system, the mMOM project's achievements in increasing EMW's confidence, satisfaction and their active MNCH health-seeking behaviour offer valuable lessons to future MNCH or mHealth programs in support of ethnic minority health.

Increased access together with increased empowerment for pregnant women and new mothers will reduce some of the inequality that EMWs experience in terms of their health care and health outcomes. However, it must be noted that the mMOM project is a practical intervention which supports basic MNCH health access for EM women, and not a strategic intervention aimed at addressing the deeply rooted structural issues which perpetuate their poorer health outcomes. As such, the mMOM project has had limited impact on the underlying social and economic conditions that are responsible for the inequality that ethnic minority communities experience.

### **Governance**

The project was conducted in full partnership with provincial, district and commune level health departments, and support for the project was evident at all stages. There was a clear indication from representatives of these sectors of the health system that the project was seen as feasible and sustainable, and as a potentially new and innovative approach for distributing information and educational material to pregnant and new mother ethnic minority women in remote regions. Indeed, these representatives expressed considerable pride in the achievements of the project, signaling their strong sense of ownership in the implementation and outcomes.

## **XI. Recommendations**

The following recommendations for future iterations of the mMOM project arose out of observation, dialogue and exchange with project stakeholders at all levels. Careful consideration of these issues will support the success of the project.

- It is recommended that future participants are encouraged to have their own phone or discuss with their family members about the importance of having regular access to any shared phones. The importance of keeping phone credits active should also be emphasized.
- Increasing the involvement of husbands is a recommended next step for the mMOM project. Brief counselling for husbands or families as a whole, prior to women's involvement, may go some way to addressing some husbands' reluctance for their wives to participate. It may also help limit phone sharing. Further, husbands' clear interest in the messages suggest that a husbands' SMS package should be considered for future phases.
- Working with the CHWs to determine viable avenues for VHWs to be involved in the mMOM project is recommended to maintain and validate their existing roles in MNCH care.
- Working with CHWs on ways to include differently abled women (such as women who are blind or cognitively impaired) in the mMOM project is important to support the intervention in being as accessible as possible to all women.
- The significant demand for more frequent, solution-focused, detailed information should be acknowledged for future iterations of the project. More detailed messages, particularly with regard to nutrition, should be added to the new mother package. After the project has been successfully piloted in other socio-geographical contexts, extending the messages beyond the first year of childhood should be considered.
- Support for the mMOM project at different levels of government is important for sustainability. In particular, the involvement of the Ministry of Health and the Department of Health of Mothers and Children should be increased for future iterations of the project.

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## Appendixes

### Appendix 1 – Project log frame

Objectives	Activities	Critical milestones	Status
<b>Objective 1:</b> To determine the social, cultural and geographic conditions that contribute to poor maternal and child health and limited utilization of health services among the EMW and their children in the Thai Nguyen region.	<i>Activity 1.1:</i> Preliminary ethnographic fieldwork	<ul style="list-style-type: none"> <li>• Survey conducted</li> <li>• Ethnographic fieldwork report completed</li> </ul>	<ul style="list-style-type: none"> <li>• The survey was completed in the first six-month period.</li> <li>• The ethnographic fieldwork report was finalized in the second quarter.</li> </ul>
<b>Objective 2:</b> To develop and pilot the use of mHealth as an integrated part of the HMIS eHealth and user-provider interaction model with EMW for RH behavior change communication (BCC) in the Thai Nguyen province of Vietnam.	<i>Activity 2.1:</i> Establishment of Maternal and Child Health Information Center (MCHIC)	<ul style="list-style-type: none"> <li>• Hardware procured.</li> <li>• Software developed.</li> <li>• Staffs for MCHIC recruited and trained.</li> <li>• Office is set up and ready to operate.</li> </ul>	<ul style="list-style-type: none"> <li>• One set of hardware for establishment of the MCHIC was procured in the first quarter.</li> <li>• The MCHIC software was developed by VEH in the period of Feb-April, 2014 and it has been updated since then.</li> <li>• Three recruited MCHIC and PHAD staff were trained to use the hardware and software in February, 2014.</li> <li>• An office for the MCHIC was set up with 3 working desks, 3 chairs and 3 telephones in the first quarter.</li> </ul>
	<i>Activity 2.2:</i> Develop protocols for operation of MCHIC	<ul style="list-style-type: none"> <li>• Protocols developed (including Operation manual for admin user and Guideline for DHC, CHC levels of user)</li> </ul>	<ul style="list-style-type: none"> <li>• The operation manual for administrators and users of the MCHIC was developed by the VEH. Instructions for use of the MCHIC at the commune level were printed and distributed for health staff in the 8 intervention communes. These documents were also translated into English and were posted on the project website.</li> <li>• The operation manual for users was updated to include an additional function called “Customer Monitor” which was added on December 18, 2014.</li> <li>• The operation manual for users was updated a second time to reflect modifications to the language of the MCHIC system for appropriateness on May 4, 2016</li> </ul>

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	<i>Activity 2.3:</i> Develop reference materials for MCHIC	<ul style="list-style-type: none"> <li>• IEC materials for MCHIC reviewed</li> <li>• Reference materials for MCHIC developed</li> <li>• New logo and poster were designed</li> </ul>	<ul style="list-style-type: none"> <li>• The reference materials for MCHIC were selected and approved for re-print with project logo on it by The Department of Maternal and Child Health of the MOH (MCH/MOH).</li> <li>• Two posters and a flip book were selected to be duplicated (with approval of the MCH/MOH) and were distributed to 12 communes in May 2014.</li> <li>• A new mMOM logo and poster were designed and finalized by Hanoi School of Public Health students who worked for the project as interns at PHAD in August 2015.</li> </ul>
	<i>Activity 2.4:</i> Piloting and completing MCHIC	<ul style="list-style-type: none"> <li>• MCHIC piloted</li> </ul>	<ul style="list-style-type: none"> <li>• The system was piloted in 8 communes on April 10, 2014.</li> </ul>
	<i>Activity 2.5:</i> Operating the MCHIC	<ul style="list-style-type: none"> <li>• MCHIC operated</li> </ul>	<ul style="list-style-type: none"> <li>• The language of the MCHIC system was modified for appropriateness on May 4, 2016.</li> <li>• Operation of the MCHIC is expected to commence on April 10 but it was delayed until July 1, 2014 because technical problems (relating to missing SMSs) were found and time was required to fix them.</li> <li>• The system was officially operated from July 1, 2014 and has since run smoothly.</li> </ul>
	<i>Activity 2.6:</i> Development of IEC materials in SMS format	<ul style="list-style-type: none"> <li>• SMS from similar interventions reviewed</li> <li>• SMS translated and adapted to local and project context</li> <li>• Final set of SMS pre-tested</li> </ul>	<ul style="list-style-type: none"> <li>• The research team utilized resources from similar interventions to develop 3 sets of SMS messages for 3 programs. The programs are tailored to newlywed women, pregnant women and new mothers and are adapted to be culturally appropriate for the Thai Nguyen province.</li> <li>• On the December 2014 monthly M&amp;E field trip, it was noted that some of the SMS messages should be changed to help participants better understand the information.</li> </ul>
	<i>Activity 2.7:</i> Distribution of cell phones	<ul style="list-style-type: none"> <li>• Cell phones distributed</li> </ul>	<ul style="list-style-type: none"> <li>• 80 cell phones were procured and passed on the TNHD and DHDHC. The DHDHC will manage the phones and distribute them to women. One woman in financial difficulty from Co village, Lam Vy commune received one project cell phone.</li> </ul>
	<i>Activity 2.8:</i> Development of the project's website	<ul style="list-style-type: none"> <li>• Website developed and projects' news, materials are posted on it</li> </ul>	<ul style="list-style-type: none"> <li>• The website was established and the news and materials on the site are updated regularly.</li> </ul>

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<b>Objective 3:</b> To determine the social, cultural and technical barriers and facilitators that impact the implementation of this pilot intervention and the further scaling up this pilot intervention to other regions in Vietnam and other similar resource poor health system settings.	<i>Activity 3.1:</i> Interviews with key stakeholders to identify policy constraints to scale-up.	<ul style="list-style-type: none"> <li>In-depth interviews with TNHD staff, MOH completed.</li> </ul>	<ul style="list-style-type: none"> <li>Informal talks were implemented between the project team and stakeholders on the potential for scaling-up. The leader of TNHD committed to scale the project to provincial level if the project can provide concrete evidence of its impact. We do not expect full scaling-up but partially scaling-up is also appreciated.</li> <li>In-depth interviews will be conducted during the final evaluation.</li> </ul>
	<i>Activity 3.2:</i> Regular project M&E	<ul style="list-style-type: none"> <li>M&amp;E activities and meetings completed.</li> <li>Project barriers and facilitators identified and documented.</li> </ul>	<ul style="list-style-type: none"> <li>M&amp;E activities and meetings are being implemented regularly.</li> <li>These activities involve conducting trips to field areas; monitoring the MCHIC system daily to ensure that it's working smoothly, supporting the commune health workers with technical issues; random checks by phone to monitor implementation of project activities, and sharing information with the TNHD about the progress of the project.</li> </ul>
	<i>Activity 3.3:</i> Mid-term project evaluation	<ul style="list-style-type: none"> <li>Mid-term evaluation carried out.</li> <li>Mid-term evaluation report completed.</li> <li>Project barriers and facilitators identified and documented.</li> </ul>	<ul style="list-style-type: none"> <li>The mid-term evaluation trip was implemented on Feb 09-10, 2015 with a four-expert team including Prof. Dr. John O'Neil (Dean of Faculty of Health Sciences – Simon Fraser University (SFU), Prof. Dr. Scott (Faculty of Health Sciences – SFU), Barbara Eagles (expert on maternal and child health), Dao Khanh Hoa (expert on sociology – Ministry of Health of Vietnam). They evaluated the project by reviewing project documents, conducting field observations and completed a qualitative assessment through in-depth interviews and focus group discussions.</li> <li>Project barriers and facilitators were noted in the mid-term evaluation report.</li> </ul>
	<i>Activity 3.4:</i> Final evaluation	<ul style="list-style-type: none"> <li>Final evaluation carried out.</li> <li>Final evaluation report completed.</li> <li>Project barriers and facilitators identified and documented.</li> <li>Scenarios for scaling-up developed.</li> </ul>	<ul style="list-style-type: none"> <li>The final evaluation trip was implemented on May 24-27, 2016 with Prof. Dr. John O'Neil (Dean of Faculty of Health Sciences – Simon Fraser University (SFU), Prof. Dr. Rachel Eni (Faculty of Health Sciences – SFU), Liem T. Nguyen (Deputy Director, PHAD), Dao Khanh Hoa (expert on sociology – Ministry of Health of Vietnam), Tien Nguyen (Department of Health Information Technology- Ministry of Health of Vietnam), Trinh Thi Hue (PHAD officer) Hanh Phuc Nguyen (PHAD officer) and Bronwyn McBride (MPH student, SFU). They evaluated the project by reviewing project documents, conducting field observations and completed a qualitative assessment through in-depth interviews and focus group discussions.</li> <li>Project barriers, facilitators and scenarios for scaling up were noted in the final evaluation report.</li> </ul>



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	<i>Activities 3.5:</i> <i>Consultation workshops</i>	<ul style="list-style-type: none"> <li>• Consultation workshops (including project findings disseminating workshop) organized.</li> </ul>	<ul style="list-style-type: none"> <li>• Two consultation workshops with external consultants were implemented.</li> </ul>
<b>Objective 4:</b> To determine the positive and negative impacts of this pilot intervention on the awareness and use of maternal and perinatal health services and on issues of equity, governance and the enhanced integration of health systems.	<i>Activities 4.1:</i> Conduct pre- and post-intervention surveys		<ul style="list-style-type: none"> <li>• The pre-intervention survey training was completed on June 26-27, 2014</li> <li>• The final set of questionnaires was sent to commune health staff before July 1, 2014.</li> <li>• The pre-intervention survey was initiated on July 1, 2014.</li> <li>• By April 30, 2016, 1000 pre-intervention questionnaires had been collected from 12 communes: 721 questionnaires from 8 intervention communes and 299 questionnaires from 4 control communes.</li> <li>• The post-intervention questionnaire was finalized and collected from each participant as soon as they had completed their health care package. By April 2016, 247 post-questionnaires had been collected from 12 communes (166 questionnaires from 8 intervention communes, 81 questionnaires from 4 control communes)</li> </ul>
<b>Objective 5:</b> To improve the capacity of health managers, health workers, and researchers in managing, implementing and researching mHealth projects for better health	<i>Activity 5.1:</i> Conduct trainings of trainers (TOT) on MNCH for TNHD and staff of DHC	<ul style="list-style-type: none"> <li>• TOT training for 20 staff of THND and Dinh Hoa DHC completed</li> </ul>	<ul style="list-style-type: none"> <li>• This training was completed on March 11-12, 2014 with 10 participants from TNHD and DHDHC.</li> </ul>
	<i>Activity 5.2:</i> Conduct trainings on MNCH to health staff at commune levels	<ul style="list-style-type: none"> <li>• Trainings for CHC staff in 8 communes completed</li> </ul>	<ul style="list-style-type: none"> <li>• This training was completed on March 27-29, 2014 with 27 participants: 24 health staff representing 12 communes and 3 health staff from Dinh Hoa District Health Centre.</li> <li>• In December 2014, when the “Customer Monitor” function was added to the MCHIC, CHC staff were trained on the new function.</li> </ul>

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system outcomes.	<p><i>Activity 5.3:</i> Conduct short training courses on mHealth, eHealth, ethnicity and health, and health equity for TNHD, DHDHC, junior staff of PHAD, and students of TNMU, HMU, and SFU</p>	<ul style="list-style-type: none"> <li>• Training courses and workshops on eHealth - mHealth organized</li> </ul>	<ul style="list-style-type: none"> <li>• Assoc. Prof. David Wiljer (CAMH Canada) provided a presentation called “Better Information and Better Health: The Promise of New Technologies” in Thai Nguyen at THND office with participation of TNHD staffs, health leaders of district and commune health centers, health institutions in the provinces, the Central General Hospital in Thai Nguyen, and the Thai Nguyen Medical and Pharmaceutical University.</li> <li>• David’s second presentation titled “Transforming lives through Innovative Health Education” took place in Hanoi with the presence of staff from PHAD, HSPH, Pathfinder International, and Social Sciences Research Council.</li> <li>• On March 30, 2016, Mrs. Hoa K. Nguyen and Loi M. Vu took part in a gender and eHealth webinar conducted by IDRC.</li> </ul>
	<p><i>Activity 5.4:</i> Conduct short training courses on project management for TNHD and Dinh Hoa DHC staff</p>	<ul style="list-style-type: none"> <li>• Training course on project management organized.</li> </ul>	<ul style="list-style-type: none"> <li>• On April 29, the VEH and PHAD team went to TNHD to provide facilities for the transfer of the MCHIC system.</li> <li>• On May 9, the equipment of the MCHIC system was transferred and set up at TNHD. PHAD staff trained 1 TNHD officer on how to manage and operate the MCHIC system.</li> <li>• The training on project management is delayed since the project got approval for no-cost-extension till the end of the year.</li> </ul>
	<p><i>Activity 5.5:</i> Bursary for two graduate students</p>	<ul style="list-style-type: none"> <li>• 2 students to receive bursary for their training and participation in the project</li> </ul>	<ul style="list-style-type: none"> <li>• The project has faced a challenge in disbursing this funding for graduate students. Although agreement in principle for implementation of this activity between PHAD, HSPH, HMU and TUMP was reached in 2014, these Universities found it difficult to match this activity with their timeframe and could not find students who were interested in participating in the project.</li> </ul>

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	<p><i>Activity 5.6:</i> Attending and presenting findings in local/international workshop</p>	<ul style="list-style-type: none"> <li>Project findings presented in local and international workshops.</li> </ul>	<ul style="list-style-type: none"> <li>On November 7-8, 2014 in Providence, Rhode Island, Ms. Tiffany K. Hoang from Geisel School of Medicine at Dartmouth, Dr. Cuong K. Nguyen, and Dr. Liem T. Nguyen from PHAD participated in “National Student Conference of Physicians for Human Rights” and contribute a poster presented about mMOM project. The poster named “The uptake of an mHealth model in improving maternal and child health in the ethnic minority population in Thai Nguyen, Vietnam”.</li> <li>On March 20-21, 2015 in Lima, Peru, Dr. Liem Nguyen presented the mMOM project at the symposium “Information and Communication Technologies and Mobile Health: Lessons Learned and Challenges for Latin America and the world”. Dr. Liem also met and exchanged with the Peru’s Wawared team of the SEARCH (Strengthening Equity through Applied Research Capacity building in eHealth), Dr. Jose Perez and Ruth Iguiniz Romero, as well as other symposium participants</li> <li>On March 26–28, 2015 in Boston, Massachusetts, Drs. David Wiljer and Cuong Kieu Nguyen presented a poster titled “mMOM - Improving maternal and child health for ethnic minority people in the mountainous region of Thai Nguyen province of Vietnam through integration of mHealth in HMIS and user-provider interaction” at the Consortium of Universities for Global Health (CUGH) “Mobilising research for global health” 6th annual conference.</li> <li>The preliminary data from the mMOM project were shared with the IDRC office in Ottawa, ON by Dr. Cuong Kieu Nguyen</li> <li>Dr. Cuong Kieu Nguyen also visited the CAMH office in Toronto, ON and had several mMOM-related discussions with Drs. David Wiljer and other CAMH colleagues.</li> </ul>