MAMA | BANGLADESH

Mobile Alliance for Maternal Action

আপনজন

স্বাস্থ্য হাতের মুঠোয়

MAMA "APONJON" Formative Research Report

December 2013

Prepared by Dnet, and Johns Hopkins University Global mHealth Initiative

USAID FROM THE AMERICAN PEOPLE

MCHIP Maternal and Child Health Integrated Program

JOHNS HOPKINS UNIVERSITY Global mHealth Initiative

dnet

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Contributors to this report include the following individuals from Dnet, the Johns Hopkins Bloomberg School of Public Health and the JHU Global mHealth Initiative (JHU-GmI):

Dnet

Mahfruha Alam
Atik Ahsan
Rahat Bashir
Ananya Raihan

JHU Team

Radha Rajan
Smisha Agarwal
Amnesty Lefevre
Caitlin Kennedy
Alain Labrique

MAMA Global Partners:

USAID FROM THE AMERICAN PEOPLE, Johnson & Johnson, UNITED NATIONS FOUNDATION, mHEALTH ALLIANCE, babycenter

Bangladesh Partners:

BEXIMCO PHARMA, here's to Life

Partners that Contributed to the Aponjon Pilot Initiative:

grameenphone, brac, সূর্যের হাসি ক্লিনিক সবার জন্য, MCHIP Maternal and Child Health Integrated Program, infolady

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GLOSSARY

A2I- Access to Information program of the Prime Minister's Office

ANC - Antenatal check up

Aponjon - The brand name used in Bangladesh to promote MAMA services, derived from a Bangla language word meaning "trusted person".

Baby Center LLC - Combines a pool of experts on maternal and child health who have prepared content on pregnancy and child care since the 1990's. Also a partner of MAMA.

BRAC - Largest NGO worldwide; working to drive change through a holistic approach to development (e.g. education, health care, micro finance, community empowerment etc.)

CHW - Community Health Workers

CSR - Corporate Social Responsibility

DHS - Demographic and Health Survey, a national survey that collects data on fertility, family planning, maternal and child health. The 2011 Bangladesh survey was conducted under the authority of the National Institute of Population Research and Training of the Ministry of Health and Family Welfare and implemented by Mitra and Associates of Dhaka. ICF International provided financial and technical assistance for the survey through USAID/Bangladesh.

Dnet - A social enterprise in Bangladesh; promoting access to information and knowledge through innovations. Dnet is implementing the MAMA initiative in Bangladesh under the brand name "Aponjon"

DoB - Date of Birth, here used for newborn babies' birth date

FIVDB - 'Friends in Village Development Bangladesh', an NGO, working to implement MaMoni project in Sylhet along with 'Save the Children' and 'Shimantik'

Gatekeepers - Key family members of enrolled women, that include husbands, mothers, mothers-in-law, fathers-in-law or other family members, who may influence decisions around pregnancy and child health.

GP - GrameenPhone, a subsidiary of the Telenor group, is the leading telecommunication operator in Bangladesh

IVR - Interactive Voice Response, a mobile phone technology allowing for voice-based interaction with an audio menu

J & J - Johnson and Johnson, core Founding Partner of MAMA Bangladesh

LMP - Last menstrual period, also known as 'first day of the last menstrual period'; used to identify inception date of pregnancy and calculate gestational age and expected date of delivery

Likert scale - Standard scale used to measure responses, often on user perceptions or satisfaction, in survey research

MaMoni - Integrated safe motherhood and family welfare, newborn care and family planning project, funded by USAID and implemented by 'Save the Children'.

MCH - Maternal and Child Health

MCHIP- 'Maternal and Child Health Integrated Program'; the primary implementation mechanism of MAMA Bangladesh.

MDG4 - Millennium Development Goal targeting reduction of child mortality by 2015

MDG5 - Millennium Development Goal to improve maternal health by reducing maternal mortality ratio and by achieving access to reproductive health by 2015.

MoHFW - Ministry of Health and Family Welfare of the Government of Bangladesh

NGO - Non-Governmental Organization

NHSDP - USAID's NGO Health Services Delivery Project, implemented by Pathfinder International. Operates 328 primary health care clinics and 8,000 satellite clinics nation-wide. Formerly known as Smiling Sun Franchise Program, which was implemented by Chemonics International until January 2013.

PMP - MAMA-Aponjon Program Monitoring Plan

PNC - Postnatal Check-up or Postnatal Care

R&D - Research and Development

SMS - Short Message Service, a mobile phone technology that allows text messages to be sent to and received by subscribers

SHIMANTIK - Local NGO working with MaMoni in Sylhet region

SSD Tech - Systems Solutions and Development Technologies, a software development company in Bangladesh

SUS - Samannita Unnayan Sangstha, a local NGO in the Chittagong District of Bangladesh working to implement NHSDP

UISC - Union Information and Services Center

USAID - United States Agency for International Development; the primary funding source for Aponjon.

EXECUTIVE SUMMARY

Despite marked progress towards the United Nations Millennium Development Goals (MDGs), further innovation is needed to meet the maternal and child health targets in resource-limited settings. In May 2011, the United States Agency for International Development and Johnson & Johnson, in collaboration with the United Nations Foundation, the mHealth Alliance, and BabyCenter LLC launched a global public-private initiative known as Mobile Alliance for Maternal Action (MAMA). The goal of this initiative was simple – to leverage rapidly expanding mobile phone networks around the world to connect pregnant women, new mothers and their families to gestational-age appropriate health information. Initially launched in three countries (Bangladesh, India, and South Africa), different recruitment methods, financial models and delivery channels are being tested to maximize coverage, enrollment and retention.

In Bangladesh, the MAMA initiative (branded as "Aponjon," a local term meaning 'close / dear one') was launched in December 2012 after an extensive formative research phase to build local partnerships, tailor content, develop information delivery channels, and build brand awareness among target stakeholder groups. A number of strategic implementing partnerships were developed with social enterprises and non-governmental organizations (NGOs) working to improve maternal and child health outcomes. Community agents including frontline health workers, trusted in the local community, were engaged to identify and recruit target enrollees. The formative research phase thus sought to identify optimal strategies for the recruitment and retention of pregnant women, new mothers and family members, identified as 'gatekeepers' – key participants in health-seeking decision making in the local context. Additional formative research questions included explorations of user engagement and satisfaction with the Aponjon service, as well as preliminary assessments of willingness to pay for the service. Paid and free subscription models were evaluated during this initial formative phase.

There are two purposes to this formative report:

I. To identify the most effective programmatic strategies to guide the future implementation of Aponjon, based on preliminary evidence for the formative research phase

II. To identify gaps in the existing data monitoring and evaluation system and guide future avenues for implementation research

Identifying effective programmatic strategies: This report presents key findings from the formative research phase of the MAMA Aponjon service, spanning from September 1, 2011 to May 31, 2012. The formative study included 1,403 subscribers living in five Divisions (the largest administrative regions) of Bangladesh. The subscribers included 349 pregnant women (25% of subscribers), 575 mothers of children under age one (41%), and 479 gatekeepers (34%).

To support programmatic decision-making, the formative research phase explored five broad questions:

1) Effective strategies for Aponjon enrollment

2) Effective strategies for promoting awareness about Aponjon services

3) Acceptable cost models per the subscriber-base

4) User satisfaction with the Aponjon technology platform and message content

5) Aponjon's influence on subscriber knowledge related to maternal and child health (MCH) related health-seeking behaviors

The key tools of the formative research study that have been analyzed for the purpose of this baseline report include:

- Pretest Focus Group: Internal user acceptance testing and pretest focus group research to gauge acceptability of content and overall user satisfaction. N = 12 in the pretest focus group.
- Registration Forms: Forms collected demographic information, service subscription preferences and willingness to pay information about the subscribers. N=1,403.
- Deregistration Data: Subscribers who no longer wished to subscribe to the service and called a customer call center to request service discontinuation provided reasons for stopping service. N=18 during the formative phase.
- Payment Status Data: Subscribers were ascribed a payment status - paid, discounted or free service - based on an algorithm that considered socio-economic status as well as other registration-related information. N = 1,387.
- Structured Interviews: Structured interviews were conducted with subscribers, gatekeepers and CHWs. Interviews covered topics such as subscriber interaction with the service, CHW commitment to Aponjon, user satisfaction, willingness to pay, assessment of various service features and behavior change resulting from subscription. N = 156.
- Phone Survey Data: Cross-sectional data collected in waves by the call center included questions relating to subscriber interaction with the service, user satisfaction, willingness to pay and changes in knowledge resulting from subscription. N = 54 women subscribers, N = 107 gatekeepers used in this report.
- Field observations in the five Divisions where Aponjon was being piloted. Observations assessed partnerships with strategic implementers. N = 5.

1. Effective strategies for Aponjon enrollment:

During the formative phase, Aponjon's primary subscriber-base was low-SES pregnant women, new mothers and their relatives. **The majority of women subscribers (70%) were ages 18-34, 42% had a primary school education or less and 26% reported a total monthly family income of 4,000 taka or less ($51 USD or less per month).**

- The age distribution of Aponjon women subscribers was comparable to the national age distribution - an estimated 65% of the national female population was ages 15-34 per the 2011 Bangladesh Demographic and Health Survey (DHS). In addition, the percent of Aponjon pregnant women/new mother subscribers with a primary school education or less (42%) was identical to the national proportion of women ages 15-34 with primary school education or less[1].

- **Many more subscribers enrolled in Aponjon with the assistance of a community agent compared to enrolling on their own** (78% vs. 22%, respectively).

- **Community health workers from the NGO BRAC and USAID's MaMoni project assisted in enrollment of the most subscribers,** enrolling 300 and 517 of the total 1,403 formative phase subscribers, respectively. This difference was likely due to the number of CHWs contributed to recruitment by each outreach partner during the formative phase.

1. Effective strategies for promoting awareness about Aponjon services

- The effectiveness of subscription campaigns as a recruitment strategy was difficult to assess during the limited formative phase.

- Popular campaign strategies were executed in select urban locations. **Few subscribers – less than 2% of women and 5% of gatekeepers – recalled any of the popular campaign strategies. The campaigns were focused in particular geographic areas, and may not have had the widespread reach necessary for adequate evaluation of comparative effectiveness.** As geographic location was not available for phone survey respondents, comparison on the effectiveness of different recruitment strategies was not possible.

1. Acceptable cost models per the subscriber base

- **Over half of the subscribers assessed (57%) paid the full price of 2.3 taka per message for Aponjon service, another 25% paid a discounted rate of 1 taka per message and the remaining 17% were offered free service.**

- Missing or incomplete socioeconomic status data created challenges in assigning clients to the appropriate payment tier. Although determination of payment status was intended to be a function of subscriber socioeconomic status, subscribers with incomplete registration data on a series of four socioeconomic indicators were defaulted to paid status. It is estimated that as many as 276 subscribers were defaulted to paid subscriptions, representing 35% of the total paid subscribers in the study.

- At registration, subscribers were asked if they would be ready to pay for the Aponjon service. Among those who noted they would not be ready to pay over half (56%) paid for service either

1 National Institute of Population Research and Training (NIPORT), Mitra and Associates, and ICF International. 2013. Bangladesh Demographic and Health Survey 2011. Dhaka, Bangladesh and Calverton, Maryland, USA: NIPORT, Mitra and Associates, and ICF International.

at the discounted or full rate.

- Subscribers were subsequently asked via phone surveys how much Aponjon should charge per a one-minute voice message. This question was asked after subscribers had started to receive Aponjon messages. **About one-third of women (31%) and 46% of gatekeepers indicated the service should charge two to five taka per minute**.

- Qualitative interviews allowed participants to speak at greater length about their perceptions of the service price, revealing mixed feelings about the per-message rate. messages. About one-third of women (31%) and 46% of gatekeepers indicated the service should charge two to five taka per minute.

- As retention data was not available on a large sample of subscribers, the effect of different pricing tiers on program attrition was not measurable, but remains an important priority.

> *We are getting good information. If we get good suggestions for 2 taka or 4 taka, than it is good for us, isn't it?*
>
> *- Gatekeeper, Gaibandha*

> *(Aponjon) costs a big amount of money. Sometimes I saw suddenly there is no balance in my phone. If the service charge is 50 paisa per message then it'd be better.*
>
> *- Woman subscriber, Sylhet*

- Willingness to pay was challenging to evaluate accurately for a new mobile health service, given the novelty of the service package and the Aponjon content to the enrolled subscribers. Familiarity with the service likely influenced perceptions of willingness to pay. Aponjon assessed willingness or pat at registration, and also after subscribers commenced subscription.

1. User satisfaction with the Aponjon technology platform and message content

- **Overall, 94% of subscribers reported that they were satisfied with the service.**

- **Several subscribers requested additional content about maternal and child nutrition,** with some reporting that existing messages lacked sufficient detail.

- **Subscribers noted that message repetition was disappointing**, and expressed an expectation that content would not be repeated.

> *I got aware of these things [the information from Aponjon]. Now I'll tell 10 more people about the service, then they'll know about it.*
>
> *– Gatekeeper, Gaibandha*

- Subscriber feedback suggests that while the technical platform is generally performing well, some have experienced inconsistent message delivery. **Overall, however, 59% of women subscribers and 76% of gatekeepers consistently received the correct number of messages per week.** In addition, duplicative subscriber accounts in which one person/phone number was accidentally registered twice for the same type of subscription, was the leading reason cited for deregistration from the service.

- **Some subscribers expressed hope for expansion of the Aponjon platform; they wanted a more interactive service.**

1. Aponjon's influence on subscriber knowledge related to maternal and child health (MCH) related health-seeking behaviors

> *You give me the information but at the same time you should also know my queries. If you know my queries then it will be easier to give the answers. Then it will be a real service.*
>
> *– Gatekeeper, urban Dhaka*

- The formative research included limited evaluation of Aponjon's influence on knowledge and health-seeking behavior. **Given the large number of process factors being tested and the short duration of exposure, limited focus on behavior was reasonable.** Subsequent evaluations may place a greater focus on understanding the behavioral impact of the service.

M&E system and future research: Research findings noted above help in identifying some of limitations of the formative data and offer insight into immediate steps Aponjon can take, and in many cases, has already made, to bolster future program monitoring and evaluation. Key findings to inform future implementation research include:

- Electronic linking of registration data, deregistration data and phone survey data through client IDs is recommended. This will afford the ability to trace information on client demographics, stage in pregnancy when MAMA-Aponjon services were used, timing and reasons for deregistering for each subscriber as data is collected at various time points in the subscriber's interaction with the service. These linked data will be invaluable to evaluating service utilization patterns.

- Data completeness, data quality and overall sample sizes limited some possible sub-analyses during the formative phase. Instituting standard operating procedures and quality assurance protocols may help improve the data available in future phases of the evaluation.

- Timely capture of service use data collected by technical partners can greatly improve Aponjon's ability to assess functional performance of the technological platform, and to measure exposure and satisfaction with message content in real-time.

- The development of a core set of message receipt metrics (e.g., complete message receipt, dropped call rate, etc. by message or by subject matter) could add value to future process monitoring and impact evaluation efforts.
- Robust research design and sampling strategies should be major considerations in the future, particularly as the Initiative focuses more on measuring Aponjon's health behavior impact.

CHAPTER 1

INTRODUCTION

In 2008, 358,000 maternal deaths occurred worldwide.[2] Despite a 34 percent decline in maternal deaths between 1990 and 2008, developing countries accounted for 99 percent of these deaths, mostly concentrated in Sub-Saharan Africa and South Asia.[3]

However, recent data suggests that the maternal mortality ratio in Bangladesh has dropped by 40% in the last nine years, from 322 in 2001 to 194 in 2010.[4] Nevertheless, with the approaching United Nations Millennium Development Goals (MDG) target date of 2015, there is a need leverage innovation to accelerate efforts towards these goals.

2 WHO. 2010. Trends in Maternal Mortality: 1990 to 2008. http://whqlibdoc.who.int/publications/2010/9789241500265_eng.pdf

3 WHO. 2010. Trends in Maternal Mortality: 1990 to 2008. http://whqlibdoc.who.int/publications/2010/9789241500265_eng.pdf

4 ICDDR,B. 2010.
http://www.icddrb.org/media-centre/news/2219-new-survey-finds-maternal-mortality-ratio-drops-40-in-bangladesh

Two of the MDGs focus on the areas of maternal and child health (MCH): Goal 4 is the reduction by two-thirds, between 1990 and 2015, of the under-five mortality rate; Goal 5 is the reduction by three quarters, between 1990 and 2015, of the national maternal mortality ratio, and achieve, by 2015, universal access to reproductive health.[5] Aponjon, under the auspices of Mobile Alliance for Maternal Action (MAMA), is an attempt to harness the power of mobile technology to improve access to quality health services and contribute to continued declines in MDGs 4 and 5. With the growing ubiquity of mobile connectivity, availability and access across rural, remote populations worldwide, MAMA Bangladesh is testing whether these emerging information networks can be used to get appropriate health information when and by whom it is needed the most.

1.1 Mobile Alliance for Maternal Action (MAMA)

MAMA is a global public-private initiative that aims to deliver health education messages to pregnant women and new mothers using mobile phone technology. MAMA was launched in May 2011 by The United States Agency for International Development (USAID) and Johnson & Johnson, in collaboration with the United Nations Foundation, the mHealth Alliance, and BabyCenter LLC.

The goal of the MAMA initiative is to substantially contribute to a reduction in maternal and neonatal mortality by improving health-seeking behaviors and improve preventive care in pregnant women, new mothers, and by their families. These actions will contribute towards achievement of MDGs 4 and 5.

The MAMA initiative is being initially implemented in Bangladesh, India and South Africa. In Bangladesh, Dnet, a Bangladeshi not-for-profit social enterprise and market leader in digital content development for mobile apps and games, runs the MAMA Bangladesh initiative. The Bangladesh Ministry of Health and Family Welfare (MoH&FW), Ministry of Information and the Access to Information (A2I) Program of Prime Minister's Office are official government partners. Interventions target new and expectant mothers and their 'gatekeepers,' including husbands, mothers-in-law and other influential family members. The service's multi-tier pricing model allows the MAMA Bangladesh initiative to be offered free of charge to some low-income subscribers of the service.

Starting in 2011, formative research was undertaken to gather data to inform modifications to service design, the pricing model and outreach strategies during the pilot stage. Specifically, the formative research, including a mix of quantitative and qualitative methods, examined:

1. The role and capacity of community agents to enroll women and gatekeepers in the service;
2. The acceptability of the service among women and their gatekeepers;
3. Subscription preferences (e.g., IVR vs. SMS versions of the service) among users;
4. Perception of the pricing of the service;
5. Other demands and expectations of subscribers specific to the service;

5 United Nations. Official List of MDG Indicators http://unstats.un.org/unsd/mdg/Host.aspx?Content=Indicators/OfficialList.htm

6. Ways to improve the message content, service performance, technology platform, and related research and development (R&D);

7. The role of mobile operators (e.g., GrameenPhone) in supporting the service;

8. Sustainability issues, specifically regarding service cost models.

MAMA BANGLADESH OBJECTIVES

- **Objective 1:** Achieve improvements in health knowledge and practice as well as health seeking behavior of targeted women and gatekeepers
  - **Sub-Objective 1.1:** Enroll at least 100,000 pregnant women and new mothers, and 50,000 gatekeepers by June 2013 (within one year of the national launch). Reach a total of 2 million subscribers by June 2015 (within three years of the national launch).
- **Objective 2:** Ensure quality and effectiveness of MAMA service (high quality technology platform and customer satisfaction with the service)
- **Objective 3:** Build and manage partnerships with public and private entities engaged in subscriber enrollment, content development, service delivery, and program financing
- **Objective 4:** Test financing/business model for sustainability
- **Objective 5:** Share learning from the project at the national and global levels

1.2 Aponjon, the MAMA Bangladesh Brand

MAMA Bangladesh operates under the brand name "Aponjon," meaning "close/dear one" in Bangla. The initiative builds upon existing USAID and Government of Bangladesh (GoB) maternal child health and family planning programs and is being implemented through Maternal and Child Health Integrated Program (MCHIP).

From September 2011 to May 2012 Aponjon was piloted in 13 locations across five Divisions of Bangladesh. It is an mHealth program designed to deliver health messages to Bangladeshi pregnant women and new mothers via mobile phones. The program targeted pregnant women or mothers of children under one year old in all 13 pilot locations. The program also included a complementary information service for gatekeepers of the women's health, such as husbands, mothers-in-law and other relatives. More detailed information about the scope of the pilot intervention is presented in Section 2 of this report.

The identification of innovative and sustainable financing models is one of the key objectives of the Aponjon program. The Aponjon model depends on the combined resources and expertise of both public and private sectors to fund and sustain the initiative. Through solicitation

DEVELOPMENT OF MESSAGE CONTENT FOR MAMA APONJON

Multimedia Content & Communication Limited (MCC Ltd) is a subsidiary of Dnet. MCC Ltd led the message development process for MAMA Aponjon, employing a four-step process:

1) Message content identification: This process entailed using ethnographic research to determine mothers' awareness of government-circulated messages related to pregnancy and childcare. Unmet informational gaps and needs were ascertained based on national guidelines and national and international literature on maternal, child and reproductive health. Furthermore, expert review by a panel of Bangladeshi physicians, researchers and communications professionals working in local universities, government agencies and non-profit organizations helped to ensure content comprehensiveness.

2) Message design: This phase employed ethnographic research methods to gather insight on mothers' preferences regarding message delivery and ability to understand content based on various message tones and formats.

3) Message production included the development of voice and text content employing a "dramatic" tone and "Banglish" words/phrases, incorporation of feedback from Baby Center partners, and shepherding messages through the approval process at the Ministry of Health and Family Welfare.

4) Quality assurance included the testing of messages formulated during the formative research phase through focus group, structured interviews and surveys carried out to assess message acceptability.

of corporate sponsorships, in-kind contribution of media promotion and subscriber outreach, and discounted mobile operator charges, MAMA leverages cost sharing agreements with the aim of minimizing reliance on USAID, the major source of funding.

Although this report does not evaluate the financing model and Aponjon's efforts to achieve financial sustainability, the financial model is discussed as it relates to subscriber enrollment, retention and satisfaction with the service.

1.3 Aponjon Partnerships for Outreach and Subscriber Enrollment

Aponjon was piloted among 1,403 subscribers in five Divisions of Bangladesh. During the pilot phase, within the five divisions, Aponjon partnered with BRAC, NHSDP, MaMoni, UISC and Infolady Social Enterprise. These national and international partners have long been respected in Bangladesh for their contributions to the health sector. Dnet's objective in forging these strategic partnerships was primarily driven by the potential to utilize community agents, particularly the frontline community health workers (CHWs) from these partners to efficiently and accurately identify, inter alia, individuals living below the poverty line, who could be a harder-to-reach target audience for the Aponjon service. The community agents from these partner NGOs and projects

OUTREACH PARTNER PROFILES

NHSDP

The 15 community service providers from USAID's NGO Health Services Delivery Project belonged to two local NGOs. Dnet provided NHSDP with targets for enrollment: 49 subscribers each from Anwara, Patia and Raozan, all in Chittagong. These locations had very low rates of GrameenPhone users, and individuals were hesitant to use a neighbor's mobile phone number to enroll in the service.

MaMoni

The 14 MaMoni community health workers belonged to two local partners: Shimantik and FIVDB. MaMoni is operated by Save the Children, through MCHIP. Dnet provided MaMoni with targets for enrollment: 123 subscribers from Balaganj, Sylhet and 123 subscribers from Gowainghat, Sylhet. MaMoni exceeded both targets, enrolling 270 and 128 subscribers in these locations, respectively.

BRAC

The 12 BRAC community health workers engaged in recruitment were known as "Shathyastho kormi," meaning "health worker" in Bangla, and represent one of the core grassroots worker cadres of BRAC.

Infolady

The 5 Infolady workers were supervised by Dnet and their local partner Udayam Shabolombee Sangstha (USS). Infoladies are independent community workers who use laptops to share health and other information with local community members.

UISC

Union Information Service Center (UISC) community agents provided support to Aponjon towards the end of the formative research phase.

often make door-to-door visits to community members (particularly to pregnant women and new mothers) in their catchment areas, and they often have access to populations in rural and remote regions of the country. In addition, the community agents are often trusted in the community, and thus were a logical choice for Dnet to collaborate with in "inspiring" women and their gatekeepers to enroll in the service.

1.4 Subscriber enrollment into Aponjon

There were two main methods of subscriber enrollment into Aponjon: assisted registration and self-registration.

Self-registration

During the formative research phase Dnet conducted population-based campaign activities to increase awareness and encourage registration with Aponjon in some of the research locations. The popular campaign enrollment strategies are described in more detail in Table 1.4A.

A total of 313 formative research subscribers across the five Divisions enrolled via self-registration

TABLE 1.4A

Descriptions of popular campaign enrollment strategies

Enrollment strategy	Description	Dates
Leaflets	Distributed leaflets at least 3 times during the campaign at area establishments such as shopping malls, local clinics, via a mobile recruitment vehicle and, via outreach partner healthcare workers, such as newspaper inserts in Dhaka's Dhanmondi and Mohammadpur neighborhoods.	September – October 2011
Loudspeaker broadcasting	A loudspeaker attached to a vehicle played a pre-recorded message every five minutes about registration to MAMA-Aponjon. The vehicle was parked in town square/market areas for two days each in up to six different locations.	October 2011
Posters	Posters displayed in markets, clinics and places where clinic staff and outreach partner healthcare workers visited/worked.	September – October 2011
Arrangement with hospital/ local clinic	Designated, trained hospital/local clinic staff members at three hospitals/clinics in each location provided assistance to individuals to help them self-register for the service. Hospitals and clinics included NHSDP clinics, Family Welfare Center, Upazilla Health Complex.	September – October 2011
Community meetings	Outreach partner healthcare workers from BRAC, Infolady and MaMoni demonstrated the service to individuals in the community to raise interest in subscription.	September – October 2011

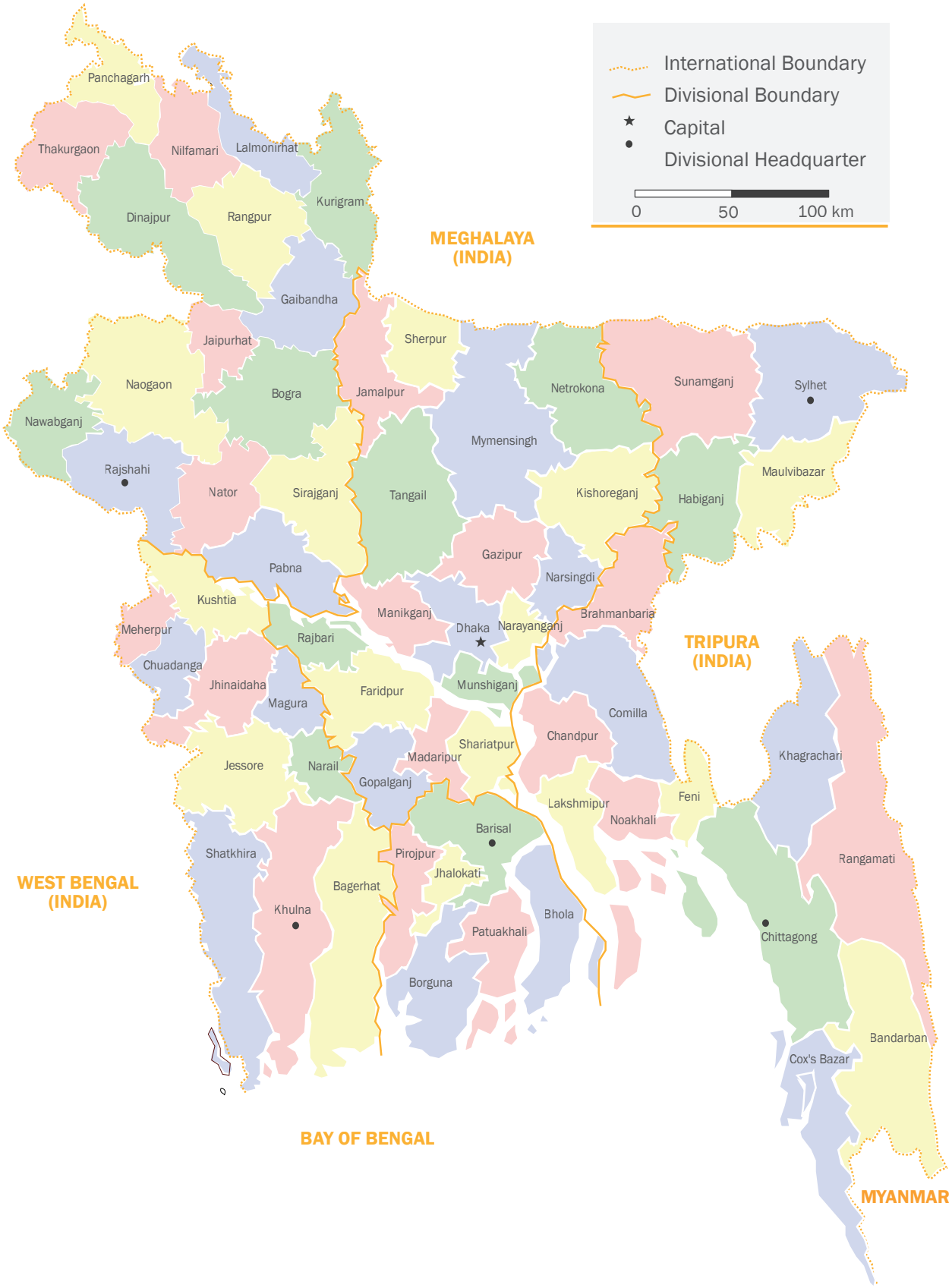
TABLE 1.4B

Diversity of locations for Self-registered Clients*

	Division	District	Upazilla
Self Registration	Chittagong	Chittagong	Raozan
	Dhaka	Dhaka	Cantonement, Dhanmondi, Dohar, Gulshan, Kafrul, Keraniganj, Lalbagh, Mohammadpur, Nawabganj, Pallabi, Uttara
	Dhaka	Narayanganj	Narayanganj Sadar
	Khulna	Bagerhat	Bagerhat Sadar, Mollahat
	Khulna	Khulna	Paikgachha, Phultala
	Rangpur	Gaibandha	Saghatta
	Rangpur	Rangpur	Rangpur Sadar
	Sylhet	Maulvibazar	Rajnagar
	Sylhet	Sunamganj	Jagannathapur
	Sylhet	Sylhet	Balaganj, Bishwanath, Gowainghat

* Location information was completely missing for 74 of the 313 self-registered subscribers.

FIGURE 1.4A:
Map of Bangladesh



Self-registration following instructions in an Aponjon leaflet. Photo credit Dnet.

(see Table 1.4B). To subscribe, these individuals called or texted the Aponjon Customer Service Call Center to indicate interest in subscription. Individuals could also enroll by calling the Aponjon directly using the phone number "16227." These individuals had two options: 1) talking to a call center agent or 2) following a voice-recorded menu to submit initial registration data and subscribe to the service.

All self-registered subscribers were supposed to be re-contacted by a trained agent from the Customer Service Call Center. The agent collected additional registration data, such as information about socio-economic status (SES), for each subscriber in order to complete the subscriber's database fields for all registration data. Call center agents were not always able to re-contact self-registered subscribers, resulting in significant missing registration data, and specifically a lack of the necessary SES data to determine these subscribers' eligibility for discounted or free subscription status.

Figure 1.4B illustrates the call flow that self-registration subscribers experienced when subscribing to the Aponjon service.

Assisted registration

Dnet initially trained 47 CHWs from the outreach partner NGOs and projects to assist in registration of Aponjon subscribers (see Table 1.4C). Dnet set a goal of enrolling 985 pregnant women and new mothers through the assistance of these trained partners. CHWs were asked to conduct outreach and collect registration data from community members interested in subscribing to the Aponjon service. They were also asked to informally gather feedback about the service from subscribers in their catchment areas. The target goal was not ultimately achieved; a total of 678 pregnant women and new mothers and 322 gatekeepers were enrolled with the assistance of the health workers.

BRAC/Shasthyo Kormi community health worker registering a pregnant woman into the Apojon service. Photo credit Dnet.

Most Aponjon subscribers enrolled in the service with the assistance of a CHW from one of the

FIGURE 1.4B:

Call flow for self-registration to Aponjon

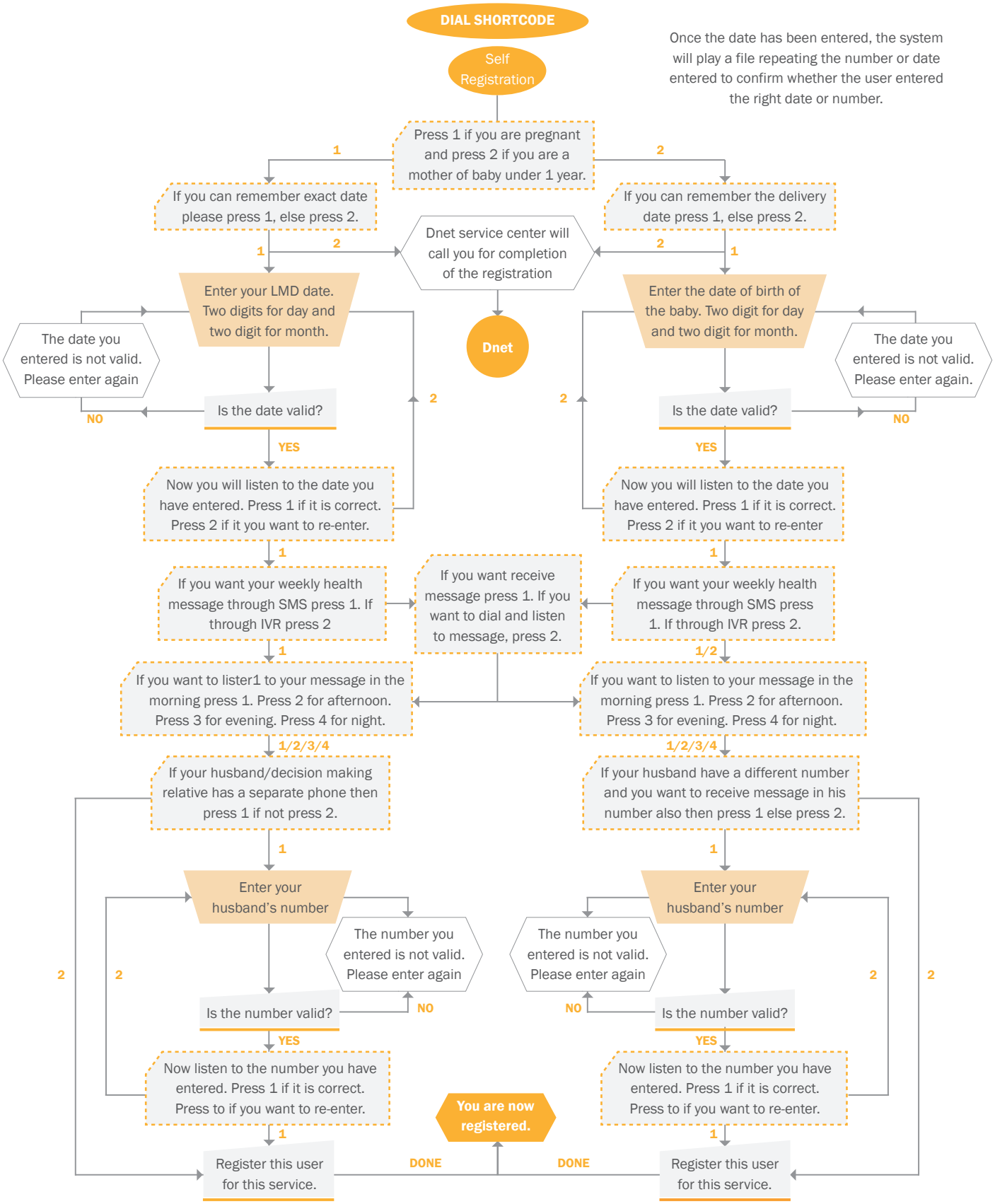


TABLE 1.4C

Outreach partners and associated catchment areas

Outreach Partner	CHWs w/Aponjon	Division	District	Upazilla
NHSDP	15 Community Service Providers	Chittagong Chittagong	Chittagong (missing)	Anowara, Raozan, (missing) (missing)
BRAC	12 Community Health Workers	Dhaka Rangpur	Dhaka Gaibandha	Kafrul, Mirpur, (missing) Gaibandha Sadar
Infolady (run by D.Net)	5 Infolady Workers	Rangpur	Gaibandha	Saghatta
UISC	Not Specified	Khulna	Bagerhat	Bagerhat Sadar
MaMoni	14 Community Health Workers	Sylhet Sylhet Sylhet	Maulvibazar Sylhet (missing)	Rajnagar Balaganj, Gowainghat (missing)

Aponjon outreach partner NGOs or projects. Dnet provided a one-day training to these CHWs, but provided no additional remuneration for their partnership with the service. The CHWs all had at least 2.5 years of work experience in their communities and they spanned a wide age range, though the exact ages of the CHWs were not recorded. Many of the CHWs conducted monthly door-to-door visits in their communities, and thus they were able to identify pregnant women and new mothers who were interested in enrolling in the Aponjon service. This frequent contact also helped CHWs be more informed about the status of a subscriber (e.g., that she had delivered a baby), so that they could be of assistance in updating Registration Data and prompting rollover of subscriptions in a timely manner.

Dnet believed use of CHWs would be more cost-effective than employment of mass media awareness campaigns to encourage Aponjon enrollment; however, several rounds of communication with CHWs was necessary to ensure high-quality registration data. Specifically, CHWs collected registration data from women and gatekeepers interested in registering for the service using a registration form. The registration form contained the same questions as the call center database, including questions to ascertain SES, such as woman's level of education, identity and occupation of the household head and total family income per month. The registration form also asked women to indicate their last menstrual period or the date of birth of their newborn child so that the subscribers could receive messages specific to the woman's stage in pregnancy or motherhood. When women were not able to recall the date of their last menstrual period or the date of birth CHWs conducted a physical test and asked a follow-up series of questions to determine date of birth. Mobile phone numbers for all subscribers were collected via the registration form, as well as preferences about mode of message delivery (SMS or IVR) and timing of message delivery. CHWs submitted complete registration forms to Dnet. Forms were screened for completeness and returned to CHWs if they had incomplete data. Registration form data was also entered into the Registration Database managed by SSD-Tech.

An English copy of the registration form is included in Appendix A of this report.

THE APONJON CHW TASK LIST

CHWs working with Aponjon added this responsibility onto their existing list of tasks within their community. As an Aponjon volunteer, each CHW was expected to:

- Attend a one-day local training hosted by Dnet to learn about Aponjon and the enrollment process
- Identify potential subscribers, particularly low-income pregnant women and mothers with a child age one year or younger, and introduce them to the Aponjon service
- Enroll interested women subscribers and any interested gatekeepers in their household into Aponjon using a standard registration form
- Send completed registration forms to Dnet in a timely manner
- Answer subscriber questions about Aponjon service and address service disruption issues
- Alert Dnet to changes in subscriber status (e.g., from pregnant woman to mother) and deregistration requests
- Collect informal observations about changes in subscribers' health behaviors as a result of the program; relay these to Dnet when possible.

1.5 Aponjon Program Implementation and Dnet Research Activities

Dnet coordinated multiple activities in the implementation of Aponjon and collection of data during the formative research phase. Table 1.5A presents the core activities Dnet led, organized by Aponjon program objective. A detailed account of the research methods will be covered in Section 2 of this report.

TABLE 1.5A

Core Dnet–led Implementation and Research Activities

OBJECTIVE 1: Achieve improvements in health knowledge and practice as well as health seeking behavior of targeted women and gatekeepers

- Sub-objective 1.1: Reach at least 100,000 pregnant women and new mothers and 50,000 gatekeepers by June 2013 (prior to national launch)
- Sub-objective 1.2: Achieve sustained improvements in health knowledge and household's practice of health behaviors
- Sub-objective 1.3: Achieve sustained improvements in health knowledge, household's practice of health behaviors and women and gatekeepers' health seeking behavior

Implementation Activities

1.1	**Communication and Outreach**
1.1.1	Developing branding and communication strategy
1.1.1.1	Communication through media campaigns and activation
1.1.1.2	Maintaining customer loyalty through media campaign and activation
1.1.2	Outreach

(Continued)

	1.1.2.1	Building outreach partnerships with national and international NGOs
	1.1.2.2	Training and capacity building of community health workers and agents in stand-alone facilities (e.g., clinics)
	1.1.2.3	Outreach to enroll subscribers at stand-alone facilities
	1.1.2.4	Outreach to enroll subscribers through community health workers
	1.1.3	Website management and communications
1.2	**Message Content and Customer Service**	
	1.2.1	Modifying governmental MCH and reproductive health message content
	1.2.2	Developing message content ("Banglish" dialect, "Apa" character, "dramatic" tone for some IVR messages)
	1.2.3	Operating customer service center
	1.2.4	Entering subscribers' data (registration, deregistration, call center log)

OBJECTIVE 2: Ensure quality and effectiveness of services

Implementation and Research Activities

2.1	**Implementing pilot**	
	2.1.1	Sending messages to subscribers: 2 per week to pregnant women/new mothers, 1 per week to gatekeepers
	2.1.2	Tailoring messages to woman's week of pregnancy or age of child
	2.1.3	Sending messages via preferred subscription mode as indicated during registration: SMS or IVR
	2.1.4	Sending messages during preferred time slot as indicated during registration: Morning, Afternoon, Evening or Night
	2.1.5	Making redial option available for subscribers who want to listen to old messages
	2.1.6	Rolling subscribers over from "pregnant woman" subscriber type to "new mother" by calling 16227 to report that the baby was born. In the absence of a call from the subscriber, automatically rolling woman over from pregnant woman to new mother status according to the baby's due date, as calculated using the last menstrual period data collected during registration.
	2.1.7	Charging subscribers according to a differential pricing model. Standard price per SMS message/1-minute IVR message is 2.3 taka. Discounted rates (1 taka per SMS/IVR) and free payment status offered to subscribers who meet certain SES criteria
	2.1.8	Automatically deregistering women and gatekeepers from the service when the baby reaches age 1 year
2.2	**Formative research**	
	2.2.1	Acquiring customers for pilot through self-registration (subscriber directly calls call center or texts 16227) and assisted registration
	2.2.2	Collecting quantitative formative research data through phone surveys
	2.2.3	Conducting structured interviews with subscribers and outreach partners
	2.2.4	Collecting observational data through site visits to meet outreach partners
	2.2.5	Preparing final report on formative research
2.3	**Technology and R&D**	
	2.3.1	Managing rented platform with SSD-Tech
	2.3.2	Deploying and operating modified legacy platform
	2.3.3	Ensuring system support

	2.3.4	Conducting Research and Development (R&D)
	2.3.4.1	Developing new platform
	2.3.4.2	Conducting R&D for new services and service elements
2.4	**Project monitoring**	
	2.4.1	Developing Project Monitoring Plan (PMP)
	2.4.2	Implementing PMP
	2.4.3	Providing information to TRACTION for evaluation

OBJECTIVE 3: Build and manage partnerships

3.1	**Building and managing partnerships with public entities**	
	3.1.1	Coordinating, coalition-building, and establishing MAMA ownership
	3.1.2	Managing partnerships with Ministry of Health and other Government agencies
	3.1.3	Building and managing partnership with A2I program at Prime Minister's Office (PMO)
	3.1.4	Managing relationships with Advisory Board of MAMA
3.2	**Building and managing partnerships with private entities**	
	3.2.1	Managing commercial relations

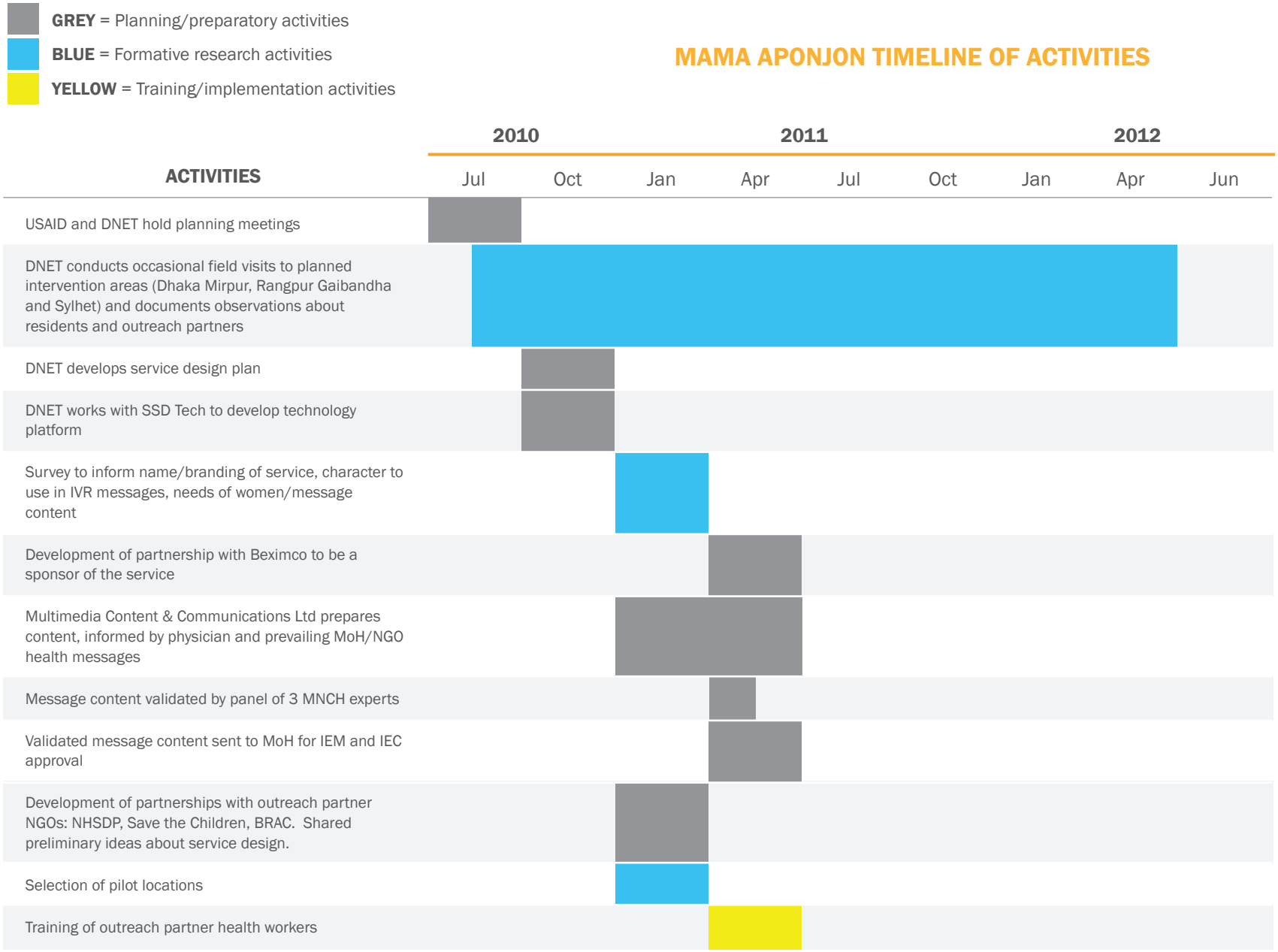
The coordination of implementation and research activities required extensive planning. The Gantt chart that follows (Figure 1.5A) outlines the timeline that Dnet followed for executing the implementation and research activities for the Aponjon formative research phase.

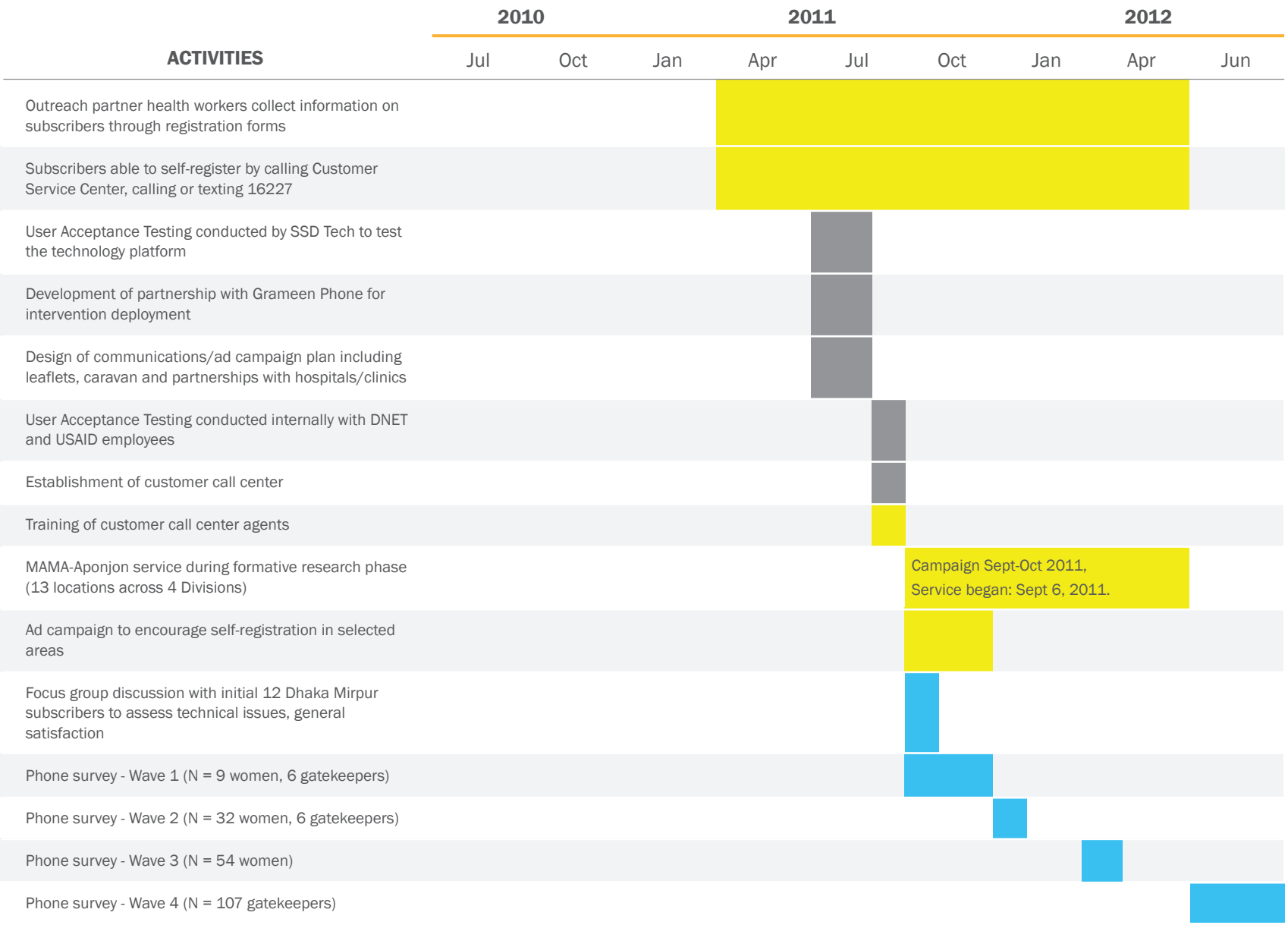
Implementation materials associated with partner outreach trainings, popular campaign enrollment strategies, and other activities noted in the Gantt chart are available upon request from Dnet. Please see the Appendices B-G for the formative research survey and interview instruments, including the phone survey instruments used in Waves three and four[6] as well as the structured interview instruments.

6 Data from phone surveys Waves 1 and 2 were excluded from formative research analyses due to low sample sizes and changes to the survey instrument when compared to Waves 3 and 4. Therefore, only Wave 3 and 4 survey instruments are included in the Appendices for this report.

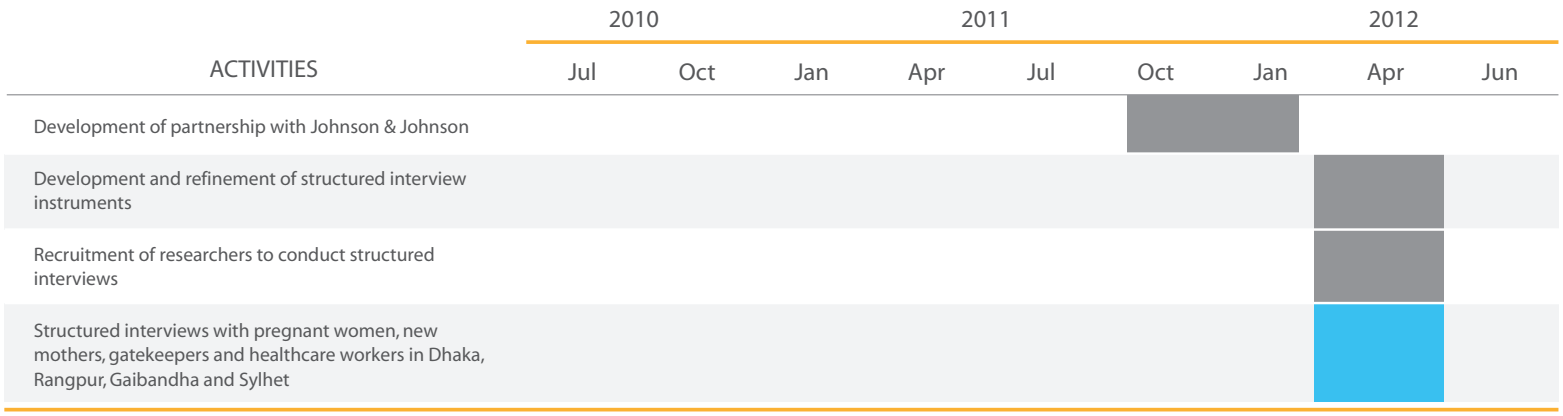
FIGURE 1.5A

Gantt Chart Timeline of Dnet Implementation and Research Activities During Aponjon Formative Research Phase




2010
2011
2012
ACTIVITIES
Jul
Oct
Jan
Apr
Jul
Oct
Jan
Apr
Jun
Outreach partner health workers collect information on subscribers through registration forms
Subscribers able to self-register by calling Customer Service Center, calling or texting 16227
User Acceptance Testing conducted by SSD Tech to test the technology platform
Development of partnership with Grameen Phone for intervention deployment
Design of communications/ad campaign plan including leaflets, caravan and partnerships with hospitals/clinics
User Acceptance Testing conducted internally with DNET and USAID employees
Establishment of customer call center
Training of customer call center agents
MAMA-Aponjon service during formative research phase (13 locations across 4 Divisions)
Campaign Sept-Oct 2011,
Service began: Sept 6, 2011.
Ad campaign to encourage self-registration in selected areas
Focus group discussion with initial 12 Dhaka Mirpur subscribers to assess technical issues, general satisfaction
Phone survey - Wave 1 (N = 9 women, 6 gatekeepers)
Phone survey - Wave 2 (N = 32 women, 6 gatekeepers)
Phone survey - Wave 3 (N = 54 women)
Phone survey - Wave 4 (N = 107 gatekeepers)

(Continued)



1.6 Subscriber assignment to a payment status

As part of the implementation of Aponjon's differential pricing model, Dnet assigned subscribers to one of three payment statuses: paid (2.3 taka per message), discounted (1 taka per message) or free. GrameenPhone charged the full message rate (2.3 taka) to all subscribers regardless of payment status. Dnet manually reimbursed free and discounted status subscribers' phone accounts on a weekly basis according to the number of messages the individual received (e.g., 2.3 taka x 2 for women, 2.3 x 3 for phones receiving messages for both women and gatekeepers).

Generally payment status decisions were guided by SES data available for the subscriber using the pre-determined algorithm shown in Figure 1.6A. However, there were some exceptions to the payment status algorithm applied by Dnet, as noted.

FIGURE 1.6A

Algorithm to determine subscriber's payment status

Steps of payment algorithm		Payment Status	Algorithm Exceptions
1.	Was subscriber assisted by BRAC during registration? → Yes	FREE	Some BRAC-assisted subscribers received discounted or paid status; ofen these subscribers had incomplete SES data.
	↓ No/DK*		
2.	Is pregnant woman/new mother head of household? → Yes	FREE	Applied even if missing Total Family Income data.
	↓ No/DK*		
3.	Does the pregnant woman/ new mother have a primary school education or less? → Yes	FREE	Applied even if missing Total Family Income data. Some gatekeepers were provided service for free; criteria for these decisions are unknown.
	↓ No/DK*		
4.	Is Total Family Income 4,000 taka or less per month? AND the household head's occupation is either farmer or day laborer? → Yes	DISC	Some women with primary school education or less received discounted rather than free status; criteria for these decisions are unknown
	↓ No/DK*		
5.	Subscriber did not meet any of the above criteria? → Yes	FULL	Subscribers were defaulted to paid status if ALL or ANY of the following information was missing: status as household head, level of education, occupation of household head, or Total Family Income

*DK = don't know; these registration data were missing for the subscriber

DESCRIPTION OF FORMATIVE RESEARCH

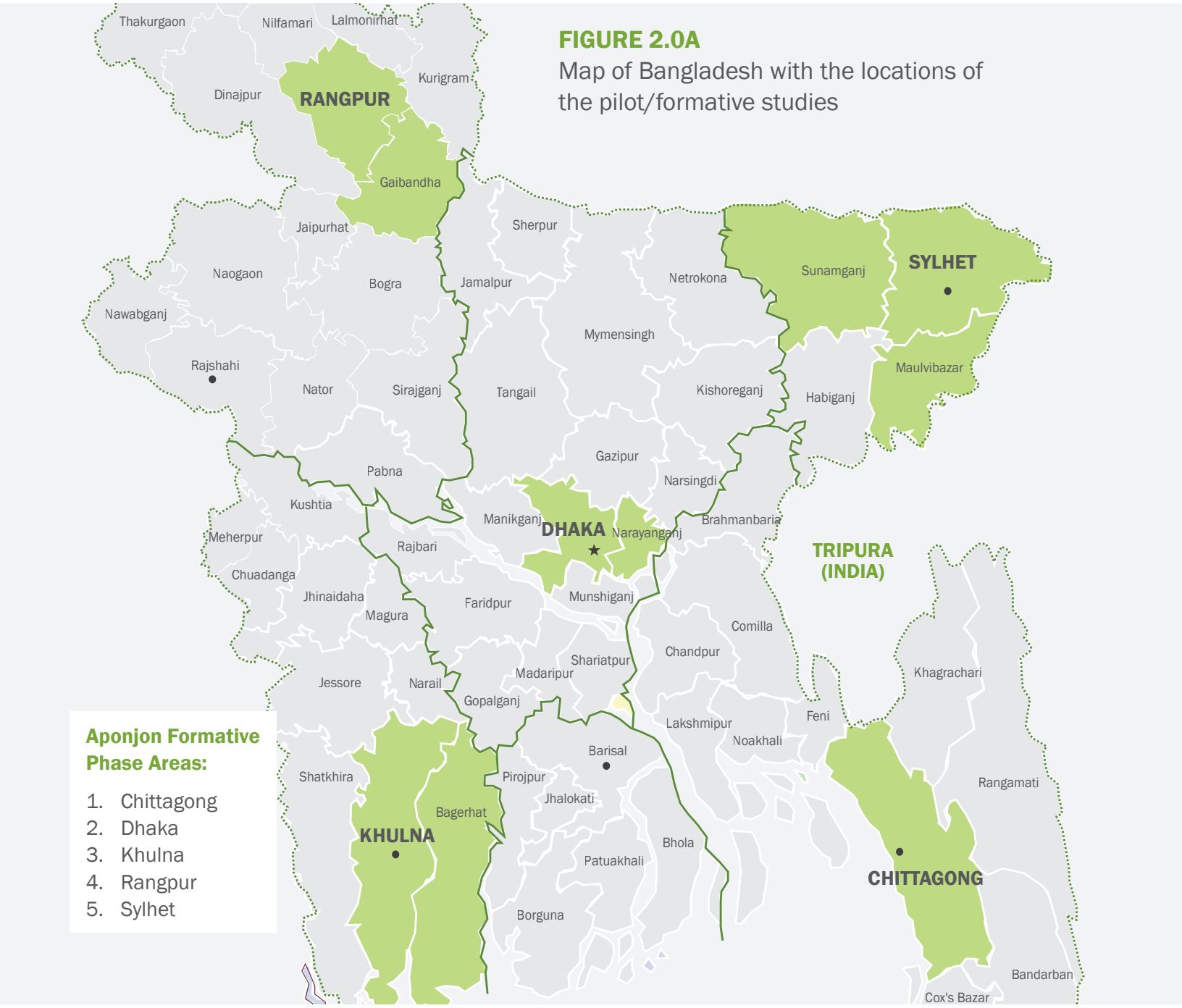


FIGURE 2.0A
Map of Bangladesh with the locations of the pilot/formative studies

Prior to national launch of Aponjon, Dnet conducted a smaller-scale pilot test of the service accompanied by formative research activities. The pilot and formative research were conducted in 13 locations across five Divisions of Bangladesh. The formative research period lasted from September 1, 2011 – May 31, 2012.

Table 2.0A outlines the locations included in the formative research phase, organized by location type (urban vs. rural).

TABLE 2.0A

Locations of MAMA formative program by location type

Location Type	Overall Poverty Level	Location	
		Division	Upazilla
Urban	Poor/Slum	Dhaka	Keraniganj, Mirpur
	Non-Poor	Dhaka	Dhanmondi*, Mohammadpur, Nawabganj
		Dhaka	Keraniganj, Mirpur
Rural	Poor	Dhaka	Dohar
		Rangpur	Saghatta
		Sylhet	Gowainghat
	Non-Poor	Chittagong	Anwara, Patia, Raozan
		Sylhet	Balaganj

*Dhaka Dhanmondi is considered an urban "Non-Poor" population.

Areas of formative research inquiry

The overall aim of the formative research was to better understand the Aponjon target audience as well as their perceptions of and preferences regarding the Aponjon service and factors influencing enrollment. Evaluation of Aponjon impact on health knowledge and behavior were low priority goals for the formative phase of research, but could be of greater interest as the program continues and expands.

The areas of inquiry for the formative research can be categorized into six domains:

1) Identifying how best to reach and enroll clients into Aponjon

2) Identifying how best to promote awareness about the Aponjon services

3) Identifying what cost models are effective in supporting service costs while minimizing subscriber attrition

4) Identifying what cost models are acceptable to subscribers of the service

5) Understanding user satisfaction with the Aponjon technology platform and message content

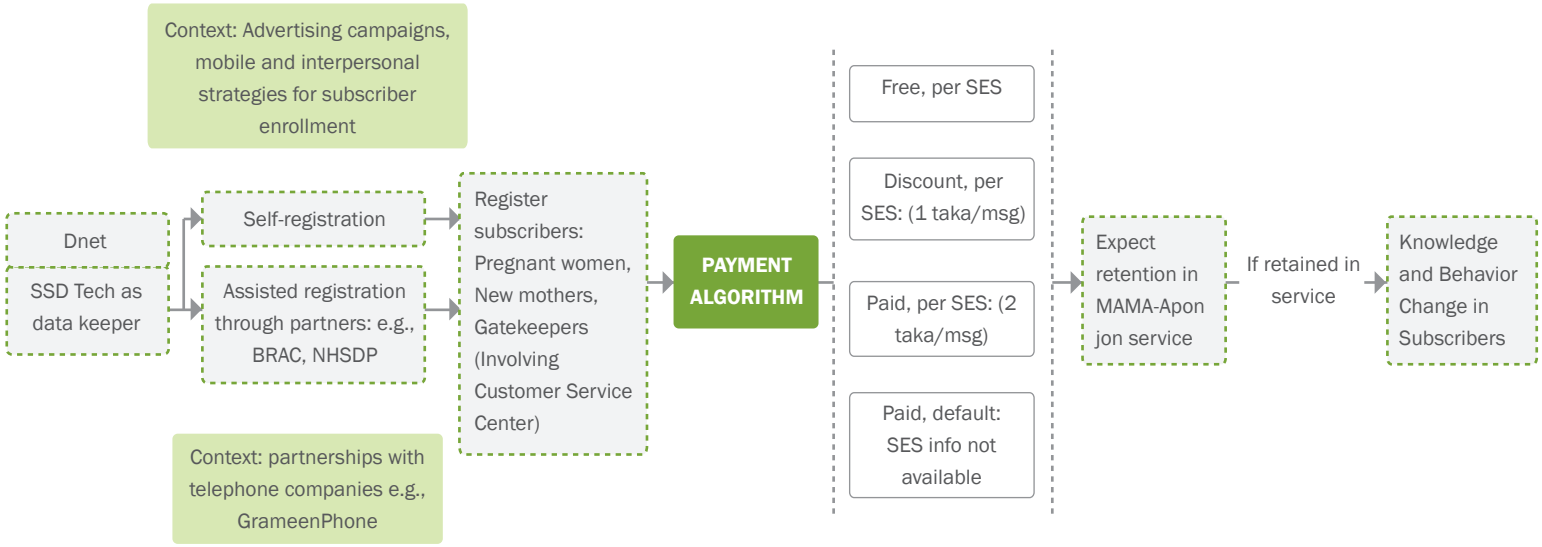
6) Understanding Aponjon's influence on subscriber knowledge related to MCH, household health practices covered by Aponjon and MCH-related health-seeking behaviors

These six domains of formative research can be stated as testable hypotheses. In Figure 2.0B the testable hypotheses are overlaid on the interactions of subscribers with the Aponjon service, from initial awareness of the service through registration and the duration of their subscription. The

figure demonstrates how the testable hypotheses related to the experience of Aponjon subscribers during the formative research phase.

FIGURE 2.0B

MAMA-Aponjon Subscriber Interaction and Formative Research Hypothesis Framework



TESTABLE HYPOTHESIS A:	TESTABLE HYPOTHESIS B:
How does enrollment vary by type of registration, and among assisted registration what is the partner-based variation in enrollment to the service?	How did various enrollment strategies/ ad campaigns affect enrollment in the service?

TESTABLE HYPOTHESIS C:	TESTABLE HYPOTHESIS D:	TESTABLE HYPOTHESIS E:
What was the breakdown of subscribers by payment status (free, paid according to SES data, paid by default)? How did retention in the service vary by payment status?	What are sources of variation in willingness to pay for the service? What did subscribers understand/ CHW discuss about the payment model for the service during the enrollment process?	Were users satisfied with the service? What were other non-outcome findings related to usability and satisfaction with the service?

TESTABLE HYPOTHESIS F:
What effect did the MAMA-Aponjon service have on knowledge and behavior of pregnant women, new mothers and gatekeepers?

MAKING THE CASE FOR LIMITING THE SCOPE OF EVALUATIONS

Dnet sought to evaluate all six testable hypotheses through a single phase of research. While this approach covered a wide range of relevant questions, it did not allow for thoroughly evaluating each domain and exploring each testable hypothesis.

- Each testable variable (e.g., registration mode) may effect subscriber enrollment and retention
- 'Upstream' variables may have an effect on variables 'downstream' in the subscriber interaction with Aponjon (e.g., outreach partner involved in assisted registration can affect payment status determination)

This formative research effort was a massive undertaking. In the future it may be more effective to narrow the research focus to a smaller set of independent factors in order to more thoroughly explore the effect of those factors on subscriber enrollment, satisfaction and retention. In addition, evaluations that seek to evaluate Aponjon's impact will be best served to keep as many of the upstream factors related to enrollment and payment status uniform across subscribers to limit the number of factors that may affect variation in subscriber "dose" to Aponjon content, and subsequently their health-seeking behaviors and health outcomes.

2.1 Formative Research Data Sources and Methodologies

The formative research used a mixed method approach to collect data informing the testable hypotheses noted above. Descriptions of the formative research data sources are provided in Table 2.1A. The table also indicates which sources were used to inform each of the six formative research testable hypotheses (labeled a-f per Figure 2.0B).

TABLE 2.1A

Descriptions of formative research data sources

Data Source	Hypotheses	Description
1.Registration data	A,C,D	Collected by outreach partner healthcare workers and call center callbacks to self-subscribers. Includes demographic and SES information, subscription preferences, and willingness to pay information.
2.Deregistration data	A,C,E	Collected by customer call center. Dnet hand-merged deregistration dates into the registration data file. Separate (unlinked) data file includes reasons why subscribers asked to deregister.
3. Payment status data	C,D,E	Assigned to subscribers by Dnet according to outreach partner and/or SES data collected from registration form
4. Structured interviews	A, D, E, F	Conducted by pairs of Dnet-trained interviewers. Structured interviews with pregnant women, new mothers, gatekeepers and outreach partner healthcare workers. Analysis of the interviews quantified responses to interview questions; data were too thin to conduct textual analyses.

5. Phone surveys	B, D, E, F	Conducted by trained customer call center agents. Sampled pregnant women, new mothers and gatekeepers subscribed to Aponjon during the formative research phase. Four survey waves; waves 1 and 2 had very small samples. Survey instruments were significantly changed after Wave 2. These analyses only use data from Waves 3 (pregnant women and new mothers) and 4 (gatekeepers).
6. Field observations	A, B, D, E, F	Dnet site visits to intervention areas. Observations collected about the type of residents and the perceived fidelity of outreach partner healthcare workers to MAMA-Aponjon registration processes outlined in trainings.
7. Training materials	A, C	Dnet conducted trainings for outreach partner healthcare workers.
8. Pretest focus group discussion	E	Dnet conducted pretest discussion. Focused mainly on issues with technology platform, some overall user satisfaction.
9. User Acceptance Testing	E	Conducted internally with employees of SSD Tech, Dnet and USAID.

Table 2.1B presents a snapshot of the methods for each formative research data source.

TABLE 2.1B

Formative research data sources, sample sizes, data collection dates and locations

Data Source	Sample size	Dates of data collection	Location(s) of data collection
1.Registration data	N=1,403	Apr 2011 – May 2012	All locations
2.Deregistration data	N=18 deregistered before the end of the formative research period.	Sept 2011 – May 2012	All locations
	N=60 deregistered before the end of the formative research period (may include non-formative phase subscribers).	Sept 2011 – May 2012	All locations
3. Payment status data	N = 1,387 with payment status data • N = 792 paid (2.3 taka/msg) - N = 276 possibly defaulted to paid status; missing SES data • N = 357 discounted (1 taka/msg) • N = 238 free	Sept 2011 – May 2012	All locations
4. Structured interviews	N = 37 pregnant women N = 52 new mothers N = 46 gatekeepers N = 21 outreach partners/CHWs Outreach partner staff and their CHWs helped to identify the women and gatekeeper subscribers to interview.	Feb 2012 – May 2012	Dhaka Mirpur slum, Dhaka urban area, Rangpur Gaibandha, Sylhet

5. Phone surveys	Only waves 3 and 4 included adequate sample size for analysis: • Wave 1, N=9 pregnant women and new mothers, N=6 gatekeepers • Wave 2, N=32 pregnant women and new mothers, N=6 gatekeepers • Wave 3, N = 54 pregnant women and new mothers • Wave 4, N = 107 gatekeepers Phone survey respondents were randomly selected from the formative subscriber database	Aug 2011 – March 2012	All locations
6. Field observations	1 field observation per Division	Aug 2010 – Apr 2012	Dhaka Mirpur, Rangpur Gaibandha Sylhet
7. Training materials	Administered to 47 CHWs	Apr 2011 – May 2012	
8. Pretest focus group discussion	N = 12 initial subscribers from Dhaka Mirpur	Sept 2011	Dhaka Mirpur
9. User Acceptance Testing	Sample size unknown; internal to SSD Tech, Dnet and USAID	Aug 2011	

Trained customer service call agent conducting a phone survey with an Aponjon subscriber. Photo credit Dnet.

Dnet-trained pair of researchers interviewing an Infolady outreach partner. Photo credit Dnet.

Dnet staff field visit to Raozan, Chittagong. Photo credit Dnet.

2.2 Aponjon objectives (formative research phase)

Aponjon's broad objectives in the formative phase were to:

1. Increase awareness of the service in intervention locations
2. Register interested clients into the service
3. Assess service pricing acceptability among the formative subscribers
4. Assess user satisfaction among the formative subscribers

The program did not specify any claims for effectiveness during this phase, and thus the indicators used to measure Aponjon against its broad objectives evolved over the course of the formative study period.

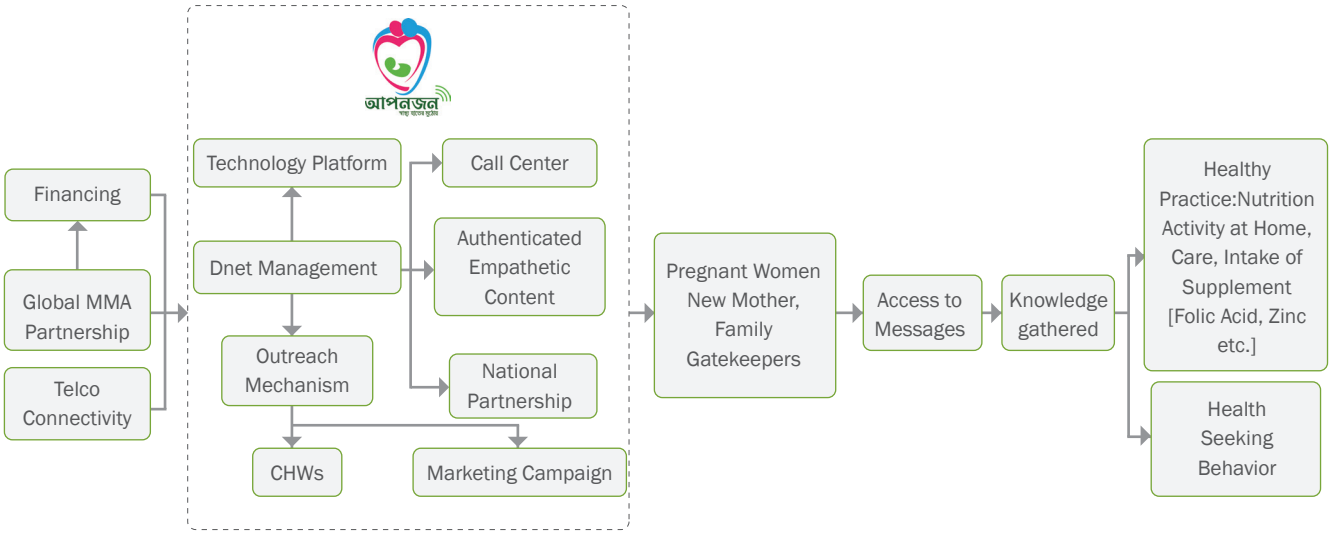
As will be discussed in greater detail in later sections of this report, Aponjon's overall research design, sampling strategy and phrasing of questions related to measurement indicators will need to be carefully reviewed to ensure that they pave the way forward for evaluation of Aponjon. Future research studies will need to take into account the claims the program wants to make in determining appropriate study design.

2.3 Aponjon service evaluation of impact

Dnet did not expect to detect Aponjon's impact on health knowledge, practices and behaviors during the formative phase study. Rather, measurement of the indicators is part of a long-term global vision for the direction of the program. Dnet conceptualized a simplified pathway through which Aponjon may be able to achieve its health outcomes, shown in Figure 2.3A.

FIGURE 2.3A

MAMA Aponjon Pathway to Reaching Health Outcomes



Myriad inputs and processes at the national level contribute to the successful implementation of an mHealth intervention, and ultimately its ability to achieve an impact on its subscribers. The program activities described in Figure 2.3A contribute to specific measurable outcomes. Impact models provide a blueprint to define how project inputs correspond with health outcomes via t specific measurable outcomes. Impact models are a tool for clearly outlining expectations on what is to be measured and how. They can be vital for engaging and communicating with key stakeholders, including implementers, in an iterative process, often in the inception of new interventions and in the wake of changes to programmatic implementation. The impact model in Figure 2.3B is a more complex model of the pathway by which Aponjon can achieve health outcomes. This model may be useful to consider as Dnet moves forward with Aponjon, in order to expand the universe of stakeholders who may be able to contribute useful data and support to the service, and whose contributions to Aponjon can be measured in subsequent research efforts.

FIGURE 2.3B
Aponjon evaluation impact model

INPUTS

Technology and Support infrastructure

- Technology platform by SSD Tech
- Mobile phone service by Grameen Phone
- Network coverage
- Electricity

Health program

- Adequacy of resources
- Skilled human resources
- Collaboration and open communication between SSD Tech, Dnet, Customer call center and outreach partners
- Development of training materials and quality assurance plans
- Development of campaign materials to encourage self-subscription

MAMA-Aponjon policies

- Subscriber selection criteria for assisted enrollment
- Payment status algorithm

PROCESSES

Technology

- Capacity building for refinement, maintenance of technology platform
- Capacity building for data management (registration, deregistration, call center complaints, phone survey)

National Support for MAMA

- MoH cooperation to develop and review MAMA message content
- Availability of outreach partner healthcare workers

Dnet, SSD Tech processes

- Training of outreach partner healthcare workers
- Training of customer call center agents
- Training of field visit staff and structured interview researchers
- Ongoing supportive supervision of technology implementation

OUTPUTS

Technology

- Technical performance (functionality)
- User adoption of technology (satisfaction with technical platform

National/Health System Level

- Local use case for mobile phones to deliver MNCH health information
- Decreased burden for outreach partner healthcare workers

Improved service utilization

- Increased ANC and postnatal care visits
- Increased birth planning, family planning
- Improved nutrition of pregnant women, newborns
- Increased vaccination coverage

OUTCOMES

Client Level

- Improved knowledge of appropriate and timely care seeking for pregnant women and new mothers
- Improved knowledge of recommended healthcare/nutrition practices for pregnant women, newborns
- Increased utilization of services by trained healthcare providers
- Increased social support from gatekeepers for pregnant women, new mothers to utilize trained healthcare providers/services

IMPACT

Population Health

- Reduced maternal morbidity and mortality in pregnancy and childbirth
- Reduced neonatal and child (up to 1 year) morbidity and mortality

Contextual factors

- Technology capabilities in Bangladesh
- MoH support/policy environment

Contextual factors

- Health systems capacity and flexibility
- Culture of 'gatekeepers' to women's health (e.g., husbands, mothers in law)

Contextual factors

- Barriers to access to ANC care and quality of care

Contextual factors

- Feasibility of measurement & assignment of attribution

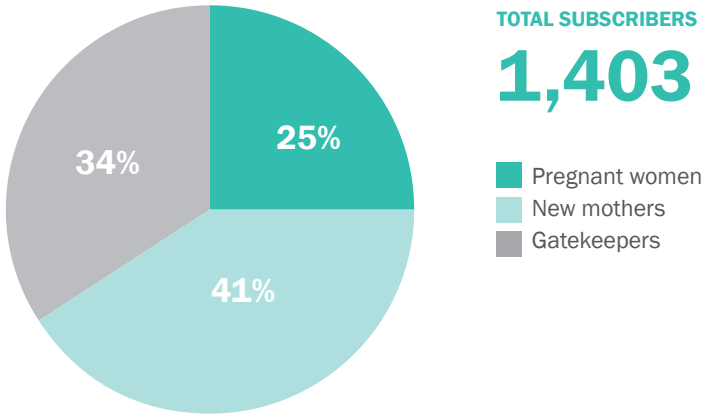
Formative research goal of MAMA-Aponjon: Improve maternal and neonatal health outcomes in 5 selected areas of Bangladesh

RESEARCH FINDINGS DESCRIPTIVE STATISTICS ABOUT APONJON SUBSCRIBERS

The formative research phase of MAMA-Aponjon focused on coverage of the pilot service. Descriptive demographic statistics in Figure 3A help provide a full picture of the type of Aponjon subscribers reached.

A total of 1,403 subscribers were included in the formative research: 349 pregnant women (25%), 575 new mothers (41%) and 479 gatekeepers (34%).

FIGURE 3.0A
Proportion of subscribers by subscriber type



Aponjon allowed women the opportunity to include gatekeepers such as husbands, mothers-in-law and other relatives in the service. Just over half of pregnant women/ new mother subscribers (51.8%, N=479) received the Aponjon messages alongside of their gatekeeper. These households received a total of three messages per week: two directed to the woman subscriber and one directed to the gatekeeper. Due to telephone company agreements, Dnet could subscribe only gatekeepers who were GrameenPhone users. Fewer than half of the women subscribers (48.1%, N=445) received Aponjon messages without a complementary message being sent to a dedicated gatekeeper. These households received only two Aponjon messages per week, both directed to the woman subscriber.

3.1 Geographic Distribution of Subscribers

Aponjon was piloted in 13 locations in 5 Divisions of Bangladesh. Figure 3.1A shows the number of formative research subscribers by each Division overall and broken out by subscriber type.

Modes of registration varied by Division depending on the enrollment strategy that was employed and the distribution of outreach partner healthcare workers. Figure 3.1B shows the variability in registration mode by Division. Assisted registration was the primary mode of registration in most Divisions, and particularly in the rural Division of Rangpur (98% assisted registration). Subscribers for which location data is unknown were primarily self-registered (86%), reflecting the pattern of missing demographic data characteristic of self-registered subscribers.

FIGURE 3.1A

Number of subscribers by Division and subscriber type

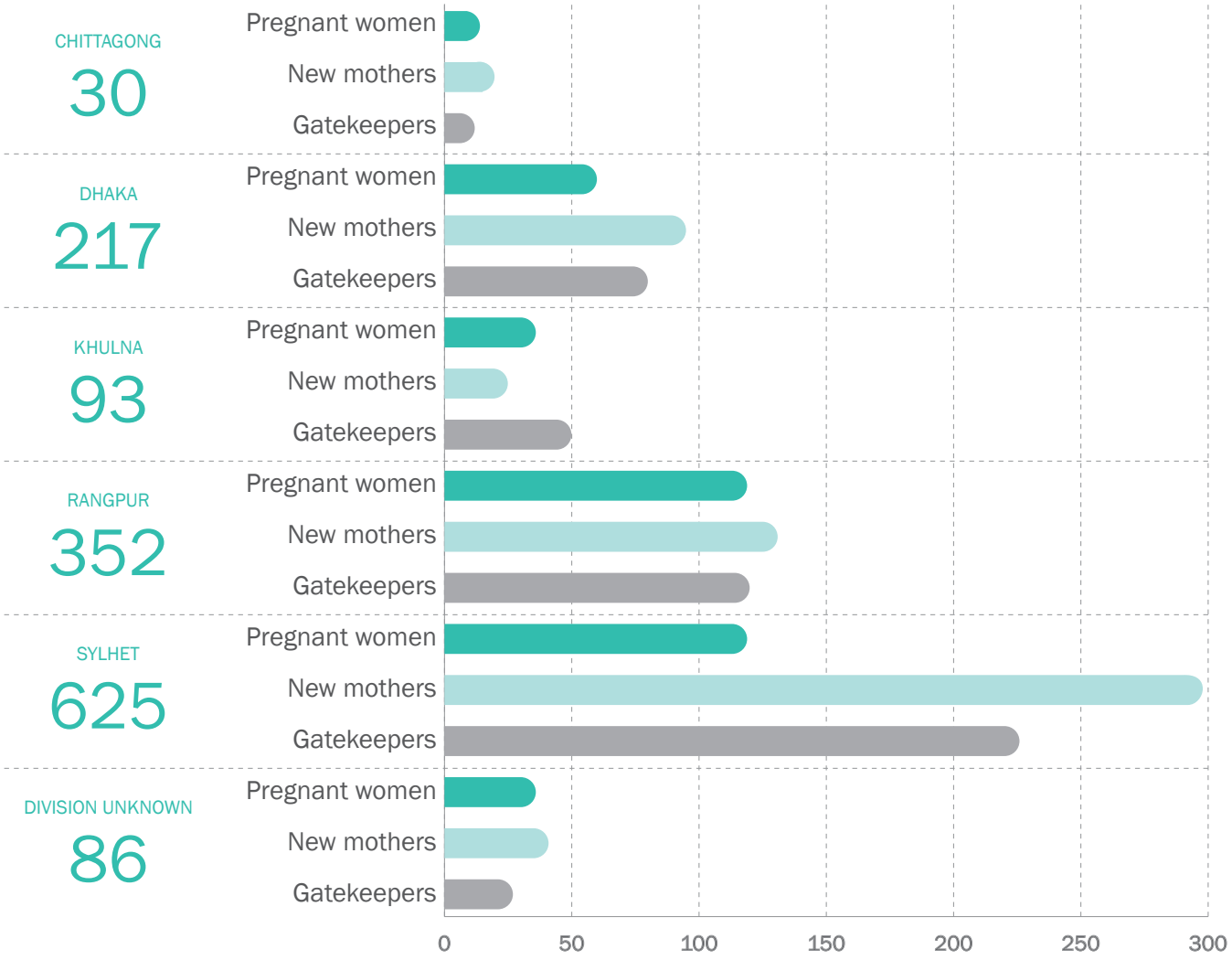


FIGURE 3.1B

Subscribers by Division and registration mode

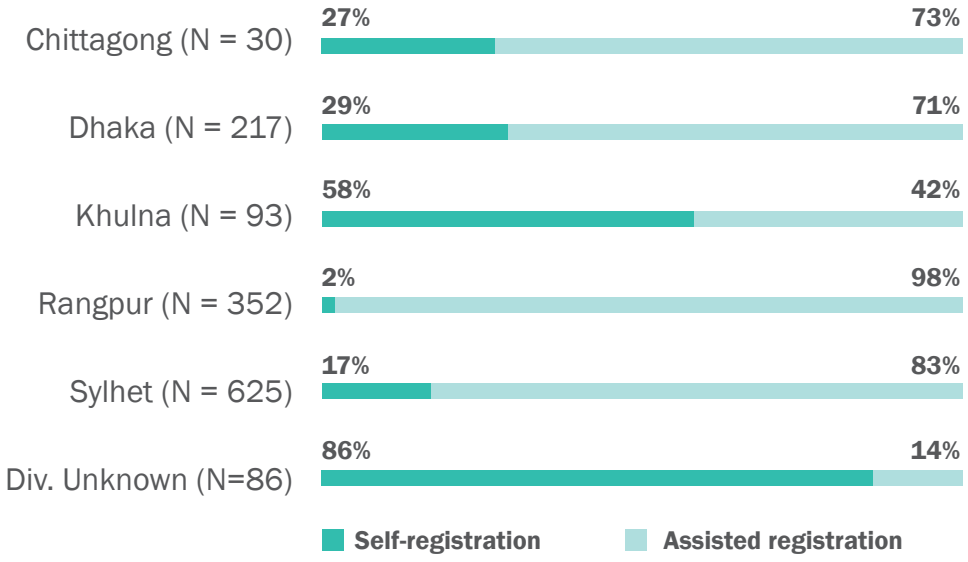
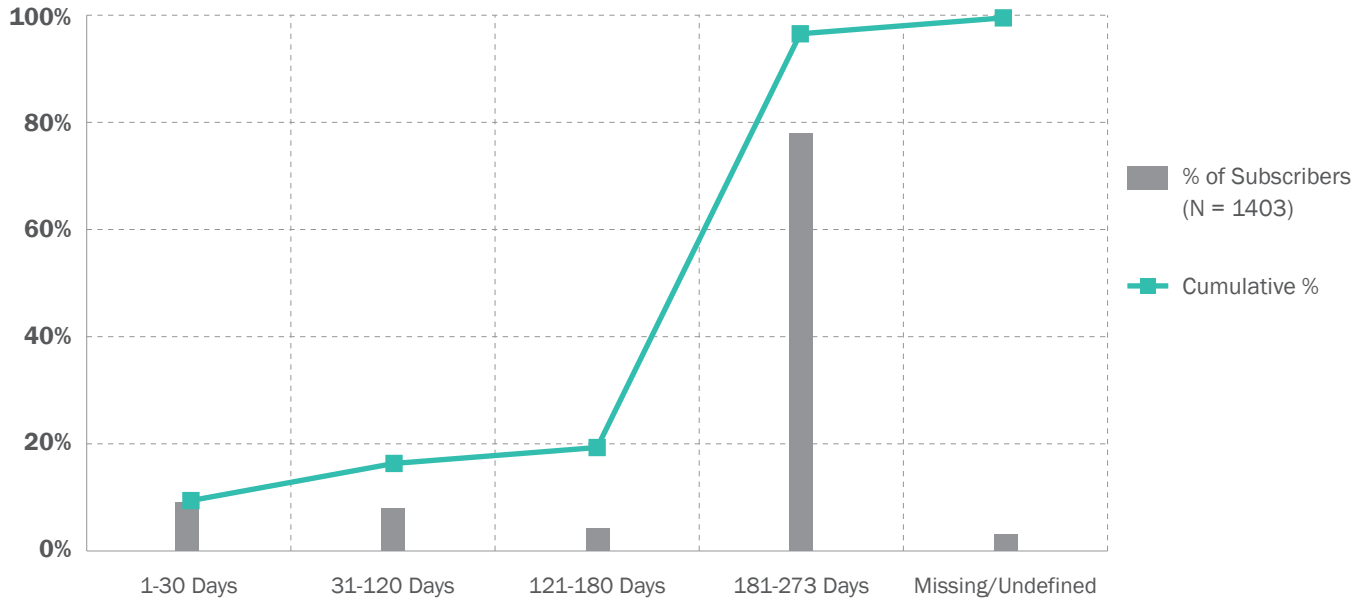


FIGURE 3.2A
Length of Exposure to Aponjon



3.2 Subscribers' exposure to the Aponjon service

There were high rates of exposure to Aponjon in the formative study population. Specifically, over three-quarters of the subscribers were enrolled in Aponjon for at least six months, or two-thirds of the study period.

Figure 3.2A indicates the percent of subscribers who were exposed to Aponjon for each of the defined lengths of time. The cumulative percent line underscores the fact that most subscribers were exposed for at least six months of the study period.

Dnet expressed concern, however, that subscribers who had registered for Aponjon through a neighbor's mobile phone number did not actually receive messages from the service, and thus their actual exposure may have been lower than measured using registration data. To substantiate their concern, Dnet noted that they had limited success in administering phone surveys to clients who subscribed to Aponjon through a neighbor's phone. Qualitative data also attest to the fractured exposure these subscribers may have experienced as a result of low pass-through of messages from neighbor to subscriber:

> *Since my daughter lives nearby and visits me often, I decided to register for the service in my phone. She is young; she will not be able to understand the complete meaning of the message. That is why I registered for the service in my phone so I could read the messages and advise her accordingly.*
>
> *– Gatekeeper, Dhaka Mirpur*

The daughter above may be receiving messages in bulk, only when she visits her mother. In addition when message content is passed through a conduit it opens up the possibility that some information could get lost or altered in the communication process.

Over-estimating exposure among these subscribers may not have great effect on the exposure findings overall. Only 4.6% (N=64) of subscribers elected to receive service messages through a neighbor's phone.

3.3 Demographic profile and subscription statistics of subscribers by subscriber type

The majority of women subscribers were young adults of reproductive age, ages 18-34 (75% of pregnant women, 67% of new mothers). A little over one-quarter of these subscribers had a total monthly family income of 4,000 taka or less per month (26% of pregnant women, 27% of new mothers), making them potentially eligible for free Aponjon service. The majority of female subscribers reported that they were also not heads of household (69% of pregnant women, 64% of new mothers) and a large segment reported an education level of primary school education or less schooling (43% pregnant women, 42% new mothers).

Data from the 2011 DHS can be used for comparisons of Aponjon subscribership with the national female population. Nationally, it is estimated that 65% of the female population of Bangladesh are ages 15-34. Among women ages 15-34, 42% have attained a primary school education or less. Just 11% of women reported that they are the head of their household. The DHS did not collect any income data that is comparable to data collected through Aponjon.

Just over half of women subscribers said that they own the mobile phone that they use for the Aponjon service (53% of pregnant women, 55% of new mothers). The overwhelming majority of subscribers opted for IVR over SMS messages (89% of pregnant women and new mothers, alike). The majority of women subscribers were exposed to Aponjon for longer than six months out of the 9-month study period (65% of pregnant women and 86% of new mothers were exposed for over three-quarters of the intervention period.)

Data on age and total family income were not collected for gatekeepers. It should be noted that the majority of gatekeepers reported that they, too, are not the head of their household (73%) and about half reported having a primary school education or less schooling (51%).

Surprisingly, nearly 6 in 10 gatekeepers reported that they do not own the mobile phone that they use for the Aponjon service (59%). Similar to the women subscribers, the overwhelming majority of gatekeepers opted for IVR over SMS messages (86%). Four in five gatekeepers (79%) were exposed to Aponjon for over three-quarters of the formative study.

Table 3.3A presents demographic information and subscription statistics of formative research subscribers sub-analyzed by subscriber type. Potentially interesting data have been bolded for the reader's convenience.

TABLE 3.3A

Demographic and subscription statistics of subscribers by subscriber type

	Pregnant women	New mothers	Gatekeepers
N=	349 (24.9%)	575 (41.0%)	479 (34.1%)
Age: Column % (N) • <18 • 18-24 • 25-34 • 35-40 • Missing	Range: 13-40 years • 1.1% (4) • 38.7% (135) • 36.1% (126) • 2.6% (9) • 21.5% (75)	Range: 0-38 years • 0.5% (3) • 29.7% (171) • 37.2% (214) • 2.4% (14) • 30.1% (173)	-Data not collected-
Total Family Income (taka) *: Column % (N) • 4,000 or less • 4001-10,000 • 10,001 + • Missing	Range: 0-100,000 taka • **26.1% (91)** • 37.0% (129) • 14.9% (52) • 21.8% (77)	Range: 0-200,000 taka # • **26.6% (153)** • 35.8% (206) • 8.0% (46) • 29.4% (169)	-Data not collected-
Household status: Column % (N) • Head • Non-Head • Missing	 • 11.7% (41) • **68.5% (239)** • 19.8% (69)	 • 15.5% (89) • **64.2% (369)** • 20.3% (117)	 • 18.6% (89) • **73.3% (351)** • 8.1% (39)
Education: Column % (N) • Primary or less • Secondary incomplete • Higher secondary or more • Missing	 • **43.3% (151)** • 29.8% (104) • 7.2% (25) • 19.8% (69)	 • **41.6% (239)** • 31.8% (183) • 5.9% (34) • 20.7% (119)	 • **50.5% (242)** • 34.2% (164) • 7.3% (35) • 7.9% (38)
Subscriber owns phone: Column % (N) • Yes • No • Missing	 • 52.7% (184) • 38.4% (134) • 8.9% (31)	 • 54.6% (314) • 38.1% (219) • 7.3% (42)	 • 36.1% (173) • **58.9% (282)** • 5.0% (24)
Message type: Column % (N) • SMS • IVR	 • 10.6% (37) • **89.4% (312)**	 • 11.5% (66) • **88.5% (509)**	 • 13.6% (65) • **86.4% (414)**
Contribution to formative research phase (days): Column % (N) • 1-30 • 31-120 • 121-180 • 181-273 • Missing/und.	Range: 1-266 days • 10.9% (38) • 16.0% (56) • 4.0% (14) • **64.5% (225)** • 4.6% (16)	Range: 1- 273 days • 4.7% (27) • 4.3% (25) • 3.0% (17) • **86.3% (496) (10)**	Range: 1-266 days • 11.3% (54) • 5.8% (28) • 1.7% (8) • **78.7% (377)** • 2.5% (12)

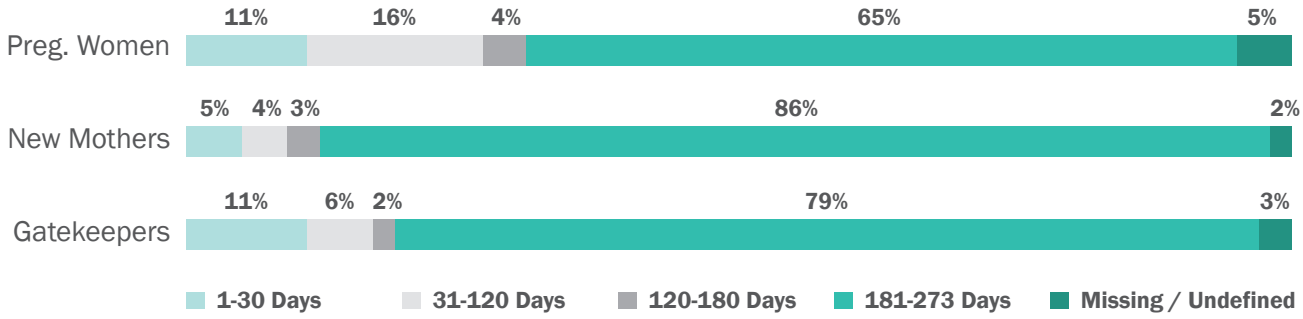
*As of October 2013 $1 USD = 77.5 Bangladesh taka.

#One extreme out lier observation was dropped; the total family income was reported as 1.7 billion taka.

Figure 3.3A shows length of exposure to Aponjon by subscriber type, restricting observation to the formative research phase. From this chart it is clear that most subscribers were exposed to the intervention for 6 months or more, representing exposure to approximately 75% of the intervention or more during the 9-month study.

FIGURE 3.3A

Length of exposure to Aponjon during formative research study, by subscriber type



3.4 Demographic profile and subscription statistics of subscribers by registration mode

Self-registered subscribers

Data from self-registered subscribers was characterized by missing demographic data. The majority of self-registered subscribers had missing data on age (77%), total monthly family income (78%), education (66%) and whether the subscriber was a head of household (64%).

Self-registered subscribers were somewhat evenly distributed between those who own and who do not own the mobile phone that they use for the Aponjon service (36% owned the phone, 39% did not, 26% missing data). Although the majority self-registered subscribers opted for IVR over SMS messages (80%), one in five requested SMS messages (20%). The majority of self-registered subscribers were exposed to the intervention for six months or longer (59%), but nearly one-quarter of self-subscribers (23%) were exposed to Aponjon for less than one month of the formative study period.

Assisted registration subscribers

About half (53%) of assisted registration subscribers were young adults of reproductive age (ages 18-34) and one in five (21%) had a total monthly family income of 4,000 taka or less per month. The majority of assisted registration subscribers reported that they are not heads of household (79%) and just over half said that they have a primary school education or less (55%).

Assisted-registration subscribers were evenly distributed between those who own and who do not own the mobile phone that they use for the Aponjon service (51% own the phone, 47% do not, 2% missing data). The overwhelming majority of assisted registration subscribers opted for IVR over SMS messages (91%) in contrast to the 80% among self-registered subscribers. This may suggest a higher degree of literacy or comfort with SMS information among individuals who self-registered, although it is difficult to ascertain with current data. Over four in five assisted-registration subscribers (84%) were exposed to Aponjon for approximately 75% of the research period.

TABLE 3.4A

Demographic and subscription statistics of subscribers by registration mode

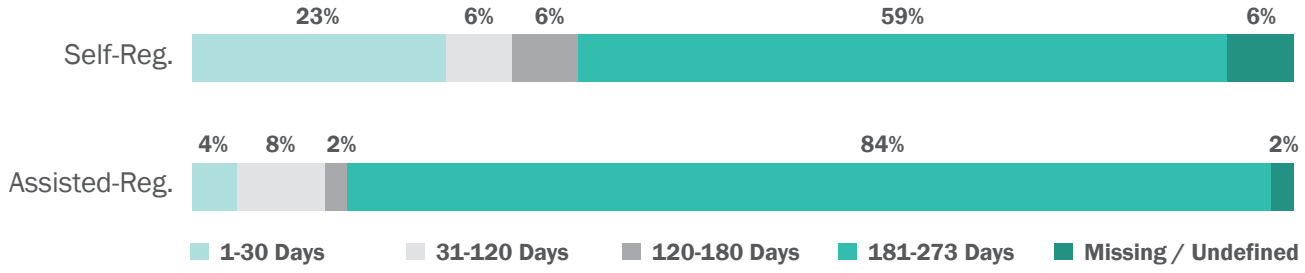
	Self-registered	Assisted registration
N=	313 (22.3%)	1090 (77.7%)
Age: Column % (N) • <18 • 18-24 • 25-34 • 35-40 • Missing	Range: 0-35 years • 0.6% (2) • 12.1% (38) • 8.9% (28) • 1.3% (4) • **77.0% (241)**	Range: 16-40 years • 0.5% (5) • 24.7% (268) • 28.6% (312) • 1.7% (19) • 44.6% (486)
Total Family Income (taka) : Column % (N) • 4,000 or less • 4001-10,000 • 10,001 + • Missing	Range: 0-200,000 taka • 5.1% (16) • 11.5% (36) • 5.4% (17) • **78.0% (244)**	Range: 0-100,000 taka * • 20.7% (226) • 27.4% (299) • 7.5% (81) • 44.3% (483)
Household status: Column % (N) • Head • Non-Head • Missing	• 3.5% (11) • 32.9% (103) • **63.6% (199)**	• 19.1% (208) • 78.5% (856) • 2.4% (26)
Education: Column % (N) • Primary or less • Secondary incomplete • Higher secondary or more • Missing	• 12.1% (38) • 14.7% (46) • 7.7% (24) • **65.5% (205)**	• 54.5% (594) • 37.2% (405) • 6.4% (70) • 1.9% (21)
Subscriber owns phone: Column % (N) • Yes • No • Missing	• 35.5% (111) • 39.0% (122) • 25.6% (80)	• 51.4% (560) • 47.1% (513) • 1.6% (17)
Message type: Column % (N) • SMS • IVR	• 20.4% (64) • **79.6% (249)**	• 9.5% (104) • **90.5% (986)**
Contribution to formative research phase (days): Column % (N) • 1-30 • 31-120 • 121-180 • 181-273 • Missing/und.	Range: 1-273 days • **23.3% (73)** • 6.1% (19) • 6.1% (19) • **58.8%(184)** • 5.8% (18)	Range: 1-266 days • 4.2% (46) • 8.3% (90) • 1.8% (20) • **83.9% (914)** • 1.8% (20)

*One extreme outlier observation was dropped; the total family income was reported as 1.7 billion taka.

Figure 3.4A shows length of exposure to Aponjon by registration mode, restricting observation to the formative research phase. This chart underscores the difference in exposure between self-registered and assisted registration subscribers. While most assisted registration subscribers had high levels of exposure to Aponjon, some self-registered subscribers studied in this formative phase received messages for only a short amount of time. Duration of exposure is an important reference point in better understanding data on user satisfaction and behavioral impact of the service. In addition, exposure could be related to the timing of enrollment strategies. Registration data indicates that 70 out of the 73 self-registered subscribers who were exposed to Aponjon for less than one month only enrolled in the service in May 2012. Thus, the late registration dates of these subscribers contributed to the high rates of short exposure among self-subscribers. Re-contact or extended observation of these late-subscribers may allow researchers to better understand usage and behavior change patterns among these late subscribers, and the actual exposure that these subscribers had to the Aponjon campaign.

FIGURE 3.4A

Length of exposure to Aponjon during formative research study, by registration mode



3.5 Service type by level of educational attainment

Table 3.5A and Figure 3.5A show service type (SMS, IVR) by levels of educational attainment. It should be noted that IVR was the overwhelmingly dominant service type across formative research subscribers, so the table shows only slight variation in service type preference by level of education, with preference for IVR increasing inversely to level of educational attainment. From the figure it can be seen that there is an education-related gradient to service type preferences. Specifically,

TABLE 3.5A

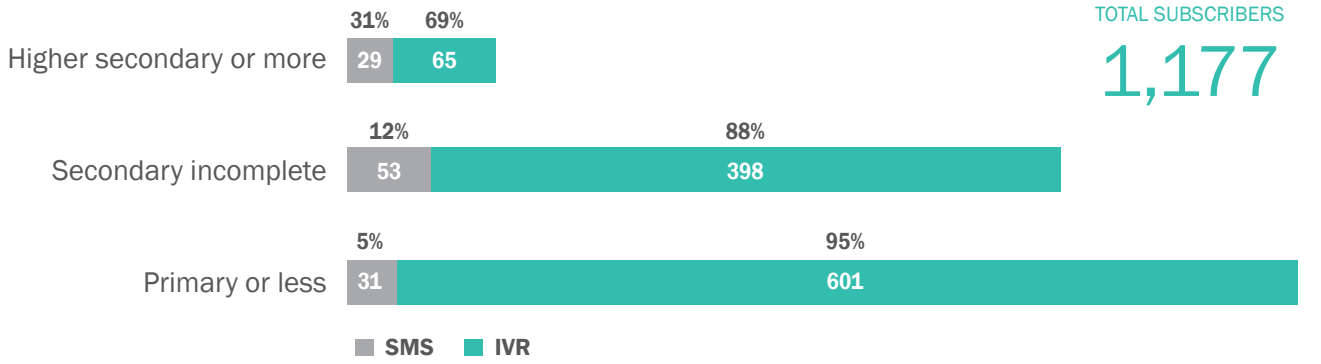
Service type by level of educational attainment*

	Primary or less	Secondary incomplete	Higher secondary or more
Column sample size (N) =	632	451	94
SMS Col % (N)	4.9% (31)	11.8% (53)	34.5% (29)
IVR Col % (N)	95.1% (601)	88.2% (398)	77.4% (65)

*One extreme outlier observation was dropped; the total family income was reported as 1.7 billion taka.

FIGURE 3.5A

Subscribers by educational attainment and service type



among subscribers with a primary school education or less, 95% prefer IVR. As education increases, IVR preference diminishes slightly – 88% of subscribers with up to an incomplete secondary school education prefer IVR, and 69% of those with higher levels of education opt for IVR over SMS.

3.6 Continued subscription from pregnancy to motherhood

An analysis of the continued subscription of women from pregnancy through to motherhood was not possible as the data did not include which subscribers were automatically rolled over to a different subscription status and the timeframe of the study was not long enough for many women to change from one status to another.

3.7 Deregistration by type of subscriber

Given the number of deregistrations, conclusions should be interpreted with caution regarding deregistration data. Based on only 18 deregistrations in the formative research phase, Table 3.7A shows no major variation in the number of deregistrations by subscription type during the formative research period. Extending the observation period until June 30, 2013, we see that deregistrations remained low with the highest share of deregistrations among pregnant women subscribers. The ability to monitor and track deregistration is important, as this could serve as an indicator of client satisfaction with the service.

TABLE 3.7A

Number (%) of deregistered subscribers during the formative research phase, by subscriber type

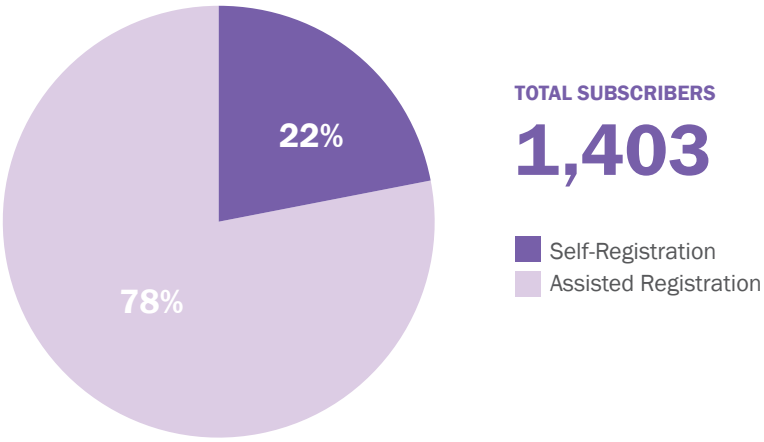
	Pregnant women	New mothers	Gatekeepers
Total Subscribers	349	575	479
Number of subscribers who deregistered during formative phase (Sept 2011 – May 2012)	7 (2.0%)	6 (1.0%)	5 (1.0%)
Formative research subscribers who ever deregistered* (through June 30, 2013)	31 (8.9%)	10 (1.7%)	19 (4.0%)

* These represent active deregistrations in which the subscriber called the Customer Service Call Center and asked to stop service. The data come from Dnet's hand-merged deregistration data into the registration database. Five additional individuals may have deregistered; this is not clear across the multiple datasets. Active deregistrations do not include "dormant" subscribers who stopped responding to SMS and IVR messages (e.g., did not open SMS messages or answer IVR calls), and it does not include individuals who were automatically deregistered from the service after reaching the child's first birthday.

DETAILED RESEARCH FINDINGS BY PRIMARY HYPOTHESES

The following section provides the main findings from the Aponjon formative research study, organized by the six research domains and corresponding hypotheses of this study.

FIGURE 4.1A1
Enrollment by registration mode



4.1a Variations in enrollment and deregistration by registration mode

The majority of Aponjon subscribers during the formative research phase were enrolled via assisted registration. While just 22.3% of all subscribers registered on their own, nearly four in five subscribers (77.7%) registered with the assistance of an Aponjon outreach partner CHW.

Subscribers discussed their experiences with assisted registration, and some lauded the use of familiar CHWs to raise awareness about the service.

Table 4.1A1 shows the variation in registration mode for each subscriber type. These data suggest that outreach partners may be an effective strategy for increasing enrollment in Aponjon.

> *[It was a] health worker who first informed me about this service and she gave me a leaflet of Aponjon service. If you want to distribute your leaflet or anything then you should give those leaflets to health workers like 'Ruby apa,' and health workers will distribute those leaflets to other people who are interested to receive [the service]. You can also give this leaflet to [the] people who worked in the office. You can give this leaflet in the hospital or clinic.* – *Woman subscriber, Syhet*

> *One day a woman who works at the Birth Centre came to my house after hearing about my daughter's pregnancy. She advised me to register myself for the Aponjon service using this number: 16227. She said it will assist me further.* - *Gatekeeper, Dhaka Mirpur*

TABLE 4.1A1

Enrollment per subscriber type, by registration mode

	Self-registered	Assisted registration
Subscribers (N)	313	1090
Pregnant women	30.4% (95)	23.3% (254)
New mothers	**48.2% (151)**	38.9% (424)
Gatekeepers	21.4% (67)	29.5% (322)

Deregistration was a rare occurrence in the Aponjon formative research study (see Table 4.1A2). Specifically, only 18 subscribers deregistered during the formative research phase (from September 1, 2011 to May 31, 2012). The rarity of deregistration could be attributed to the short timeframe of the formative research phase (9 months), but deregistration rates remained low even after extending the length of the observation period. Continuing to follow the subscribers through to June 30, 2013, a total of 60 formative research subscribers actively deregistered[7] from the service, representing just 4% of the formative research subscriber sample. Deregistration rates did not vary by registration mode; self-subscribers were no more likely to deregister from Aponjon compared to assisted-registration subscribers and vice versa. These data suggest that overall, subscribers may have either been content to receive Aponjon messages and had no desire to deregister, or they did not know how to deregister from the service. Indeed, the structured interviews indicated that most subscribers did not know about the Customer Service Call Center, which is how one would deregister from the service.

One woman subscriber, upon learning that there is a call center, noted:

> *I didn't know that I can call them [the Customer Service Call Center]. Now I know and I think it is easy to call them.*
>
> *– Woman subscriber, Dhaka Mirpur*

TABLE 4.1A2

Deregistrations, by Registration mode

	Self-registered	Assisted registration
Subscribers (N)	313	1090
Subscribers who deregistered during formative phase	1.0% (3)	1.4% (15)
Formative research subscribers who ever deregistered*	4.2% (13)	4.3% (47)

*Ever deregistered includes deregistrations after the end of the formative research period.

7 Active deregistration means the subscriber has a deregistration date. These subscribers called the Customer Service Call Center and asked to deregister from the service. The figure does not include any subscribers who were automatically deregistered from the service because they reached the baby's 1st birthday.

4.1b Among assisted registration, partner-based variations in enrollment and deregistration

Given the high rates of assisted-registration during the formative research phase, this evaluation sought to determine whether enrollment and deregistration rates varied by outreach partner, assuming some level of heterogeneity of community health workers (CHWs) within each outreach partner organization.

In general, some outreach partner CHWs struggled with the task of registering individuals into Aponjon on top of their usual responsibilities.

> *On the 1st month, they told me to send them 30 [complete] registration forms and I completed the target. The next month they gave me 30 forms again, but then I didn't fill up the 30 forms. Then I filled up only 15 forms and sent them.* – CHW, Gaibandha
>
> *It was so tough for me actually. I need [at] minimum half an hour per person to register [them.] It hampers my [ability to complete my] regular task[s]. But when I did [work] for Aponjon, I [knew] 'I am going home late.' It really hampers my life.* – CHW, Gaibandha
>
> *During registration, I had to spend a lot for Aponjon work. For instance, I had to travel far distance and for that I had travel costs. Not every woman agreed to register because not everyone is same. In order to fulfill the target of 18 forms, I had to travel long distances. For this, I had both physical stress and also had to bear the conveyance bills. And, also when the visitors came [USAID], I had to push clients by phone in order to ensure their presence. That time I spent a lot of money for Aponjon.* - CHW, Sylhet

CHWs generally wanted recognition for the time, resources and effort they put into Aponjon and asked to be incentivized to continue to work with the service, either through monetary (salary and gifts), reimbursement (for travel and mobile phone costs), or human resource support.

> *Of course. If they support us it would be better.* – CHW, Sylhet
>
> *If Aponjon gave us travel allowance and mobile cost, we can do the work easily. We are working here but hardly getting any recognition. Economic incentive would be helpful.* – CHW, Dhaka Mirpur
>
> *We are 5 health workers working in 5 unions. So [each] union is covered by one health worker. But we are under a lot of pressure. If 2 health workers can be engaged per union then it will be good. And we can perform our duties very well and in a relax mode.* – CHW, Gaibandha

Registration data provided an opportunity to look at actual partner-based variation in enrollment rates. Table 4.1B1 reiterates the geographic distribution of outreach partners involved in the formative research study and indicates the percent of assisted registration subscribers each partner helped to enroll. The figure that follows (Figure 4.1B1) indicates the variation in subscriber types for each partner that assisted in enrollment.

MaMoni and BRAC were the most active outreach partners in subscribing individuals into the Aponjon service, registering a total of 517 and 300 subscribers, respectively. However, it is difficult to make conclusions about the variation in partner-based enrollment by subscription type using quantitative data alone as Dnet gave outreach partners different target enrollment quotas based upon estimates of the number of potential subscribers in the location the partner served. Dnet field visit notes suggest that training, monitoring and buy-in were important factors in outreach partners successfully meeting target quotas. Dnet trained the healthcare workers on how to enroll individuals into the service. However, through field visit monitoring they found some partners did not conduct in-person visits to enroll subscribers.

Dnet realized it is important to provide thorough training on how to enroll subscribers and how to enroll them into the service, and that this training must be reinforced with continuous and close monitoring of the CHWs. In addition, Dnet learned the importance of enthusiasm for Aponjon on behalf of the outreach partners; BRAC and MaMoni CHWs were monitored by their outreach partner staff, and this may have contributed to the higher rates of enrollment among these partners. Finally, outreach workers noted that incentives would motivate them to enroll subscribers into Aponjon.

Given the low number of formative subscriber deregistrations and the variation in the number of subscribers each partner enrolled, it is difficult to interpret the data on partner-based variation in deregistrations (see Table 4.1B2). While BRAC and MaMoni had the highest number of registered subscribers, these partners also assisted the most subscribers in enrolling into the service so proportionally their deregistration rates are lower than other those of outreach partners.

In addition to measuring the quantity of subscribers each outreach partner enrolled in the service, it is important to understand partner-based variation in the completeness of data collected during enrollment. Specifically, it is important to consider the completeness of SES data included in the registration forms collected by the outreach partner CHWs. While data incompleteness may reflect refusal on the part of the subscriber to provide the SES data, it also may reflect commitment, training, or lack of reimbursement structure for outreach partner CHWs. In general, there was an equivalent lack of completeness of registration form data across partners (see Table 4.1B3). At best, NHSDP and Infolady CHWs on average submitted registration forms with complete SES data 63% of the time during the formative research phase. Other outreach partners had lower levels of complete data. For all but BRAC-assisted subscribers, the SES data were critical in determining payment status. CHWs may not have realized the importance of these data, as their training did not discuss the Aponjon payment model and algorithm for the determination of subscribers' payment status in detail; CHWs were simply informed that the cost of the service is 2.3 taka per message and that some subscribers may be able to receive the service for free but would be notified about the decision after enrollment.

TABLE 4.1B1

Geographic distribution and percent of assisted registration by outreach partner

Outreach Partner	Division	District	Upazilla	Total percent of assisted registration subscribers enrolled by partner (N=1090)
NHSDP	Chittagong	Chittagong	Anowara, Raozan, (missing)	2.0%
	Chittagong	(missing)	(missing)	
BRAC	Dhaka	Dhaka	Kafrul, Mirpur, (missing)	27.5%
	Rangpur	Gaibandha	Gaibandha Sadar	
Infolady (run by Dnet)	Rangpur	Gaibandha	Saghatta	18.3%
UISC[T]	Khulna	Bagerhat	Bagerhat Sadar	3.6%
MaMoni	Sylhet	Maulvibazar	Rajnagar	47.4%
	Sylhet	Sylhet	Balaganj, Gowainghat	
	Sylhet	(missing)	(missing)	

[T] UISC was brought in as an Aponjon partner late in the formative research phase and thus had less time compared to other partners to assist in subscriber enrollment

FIGURE 4.1B1

Assisted registration, by outreach partner and subscriber type

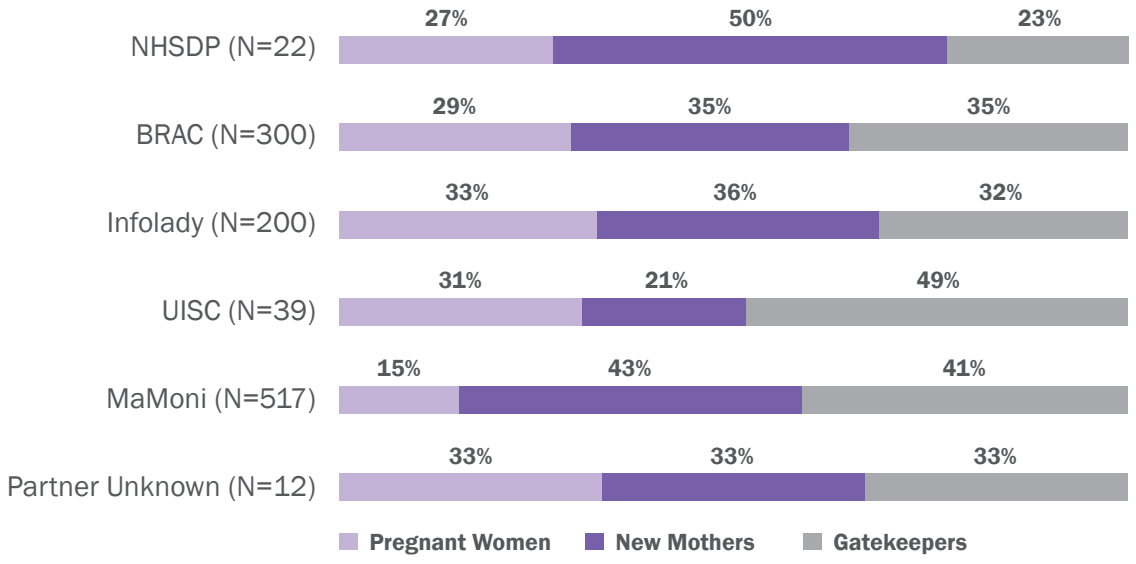


TABLE 4.1B2

Number of assisted registration subscribers who deregistered, during formative phase and overall

Outreach Partner	Number of assisted registration subscribers who deregistered during the formative phase (N=15)	Percent of the partner's total assisted enrollments who deregistered during the formative phase
NHSDP	2	9.1%
BRAC	6	2.0%
Infolady	--	--
UISC	--	--
MaMoni	7	1.4%
Partner Unknown	--	--
	Number of assisted registration subscribers who deregistered overall (N=47)	
NHSDP	2	9.1%
BRAC	16	5.3%
Infolady	4	2.0%
UISC	--	--
MaMoni	23	4.4%
Partner Unknown	2	16.7%

TABLE 4.1B3

Percent of assisted registration subscribers with complete data on payment status criteria, by outreach partner

Outreach Partner (N=no. assisted)	**Percent of assisted subscribers with all SES data fields completed#** Row % (N)
SSFP (N=22)	63.6% (14)
BRAC* (N=300)	55.3% (166)
Infolady (N=200)	63.5% (127)
UISC (N=39)	51.3% (20)
MaMoni (N=517)	52.2% (270)
Partner Unknown (N=12)	0.0% (0)

*BRAC had an agreement with Dnet to provide free service to all subscribers, so incomplete SES data would not have affected payment status of their assisted registration subscribers.

#SES data fields used to determine payment status included: 1) Household head status, 2) Education, 3) Total Family Income and 4) Occupation of the household head.

4.2 Effect of popular campaign enrollment strategies on self-registration enrollment

The minority of formative research subscribers (22%) enrolled via self-registration. These subscribers may have seen one or more of the Aponjon popular campaign enrollment strategies, followed the instructions, and either called or texted a number to signify their interest in subscribing to the service. Popular campaign strategies were employed in select urban locations where Dnet believed the investment in print media would be more worthwhile as compared to rural locations. Table 4.2A indicates where various enrollment strategies were deployed. In some locations enrollment assistance through outreach partners was available alongside self-registration.

Measures of the popular campaign enrollment strategy effectiveness were based purely on participant recall. In the phone survey respondents were asked where they heard about the Aponjon service. Overall, few subscribers reported seeing or hearing about Aponjon through popular campaign enrollment strategies (see Table 4.2B). Specifically, 2% or fewer pregnant women/new

TABLE 4.2A

Popular campaign enrollment strategies to encourage self-registration, by location

				Campaign strategies				
Division	Upazilla	Location type	Assisted Reg. also conducted	Leaflets	Vehicle audio broadcasting	Posters	Arrangement w/ hospital/ local clinic	Community Meeting
Chittagong	Raozan	Rural	X	X	X	X	X	X
Dhaka	Dhanmondi	Urban		X	X	X	X	
	Dohar	Urban		X	X	X	X	
	Keraniganj	Rural		X	X	X	X	
	Mohammadpur	Urban		X	X	X	X	
Rangpur	Nowabganj	Urban		X	X	X	X	
	Gaibandha Saghatta	Rural	X	X	X	X	X	X
Sylhet	Balaganj	Rural	X	X	X	X	X	X

mother respondents recalled any of the popular campaign strategies and at most fewer than 5% of gatekeepers recalled the popular campaign. Over 70% of phone survey respondents reported hearing about Aponjon through a CHW. It is possible that the majority of the respondents were never exposed to the popular campaign since the campaign was focused on particular geographic areas. It is also possible that the majority of respondents were enrolled in the campaign through CHW assistance. The data do not include geographic location or method of enrollment, and thus they do not allow exploration of these hypotheses, or comparative effectiveness of the different recruitment strategies.

One gatekeeper in urban Dhaka said he noticed the popular campaign in a health center and that it prompted him to subscribe to the service:

TABLE 4.2B

Where subscribers learned about MAMA-Aponjon, by subscription type

	Women/Mothers (Wave 3, N=54)	**Gatekeepers** (Wave 4, N=107)
Where did you learn about this service?*		
• Poster	1.9% (1)	0.9% (1)
• Hospital /Clinic	1.9% (1)	4.7% (5)
• Vehicle audio broadcasting	-- (0)	-- (0)
• Leaflet	1.9% (1)	0.9% (1)
• Relative	5.6% (3)	0.9% (1)
• Health worker/Infolady	85.2% (46)	69.2% (74)
• Husband/Guardian	3.7% (2)	15.0% (16)

* Respondents could indicate multiple sources

4.3a Variation in payment status across subscribers

> *I have been registered to "Ganashasthya Kendra" [a local health center in Bangladesh]. I knew about this service on a banner there. The banner told that there is a new service for the pregnant women in mobile [on mobile phones]. So I registered my wife and myself from the instructions there.*
>
> *– Gatekeeper, urban Dhaka*

Aponjon's differential pricing model, based largely on the socioeconomic status (SES) of the client, allowed free service to be provided to some subscribers, discounted service (1 taka per message) to others, and paid service (2.3 taka per message) to the rest. The differential pricing model is meant to support the long-term financial sustainability of the service nationwide.

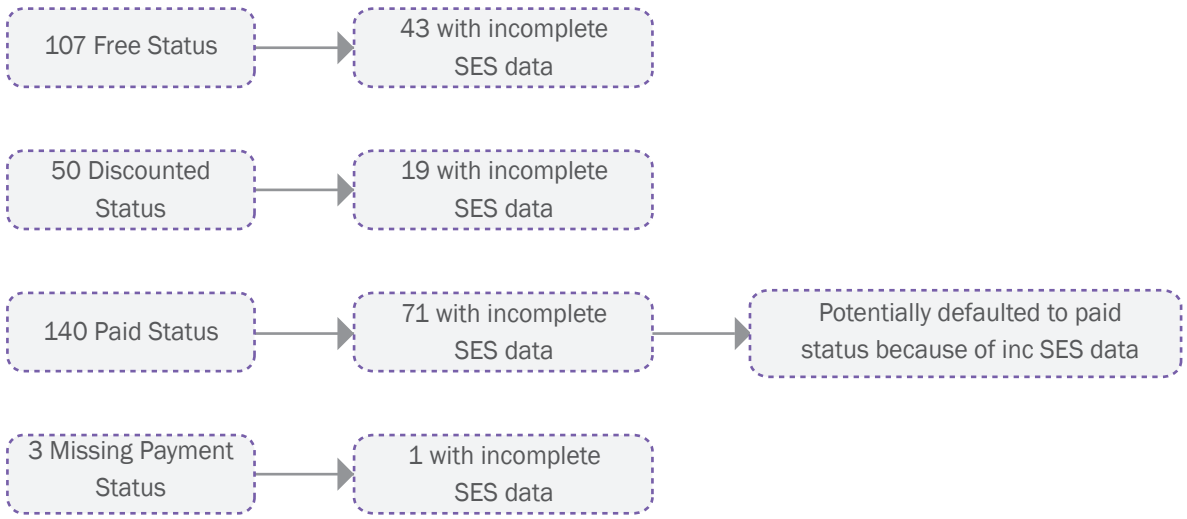
While SES is supposed to be the main determination for payment status, other criteria became influential during the formative research phase implementation of Aponjon. One important exception was for subscribers assisted by the NGO, BRAC in enrollment to the service; BRAC-assisted subscribers were supposed to be given free service per an agreement that Dnet made with the outreach partner. The agreement was not followed in all cases, as exemplified in Figure 4.3A. BRAC assisted enrollment of 300 subscribers, of which 107 were given free status. At the conclusion of the formative research study Dnet re-compensated subscribers who were supposed to

receive free status for the costs that they spent on the Aponjon service.

A sizeable proportion of subscribers were defaulted to paid status if the registration data on SES

FIGURE 4.3A

BRAC-assisted subscribers, by payment status and number with incomplete SES data



status was incomplete. As a result, subscribers who may have qualified for free or discounted status per their SES were defaulted into paid status, possibly imposing financial strain or resulting in frustration for some households. A potential result of mis-categorization of payment status for subscribers missing registration data could be a disproportionate or non-representative series of clients reporting some dissatisfaction with the service. One might speculate that such dissatisfaction could be associated with misclassification into a payment tier that was inappropriate, leading to lower subscriber retention and customer satisfaction than might have otherwise been expected. The data were not available to conduct these analyses but their significance is important to consider for programmatic adjustment. In the formative study the payment algorithm was inherently dependent on complete data; Aponjon must address the issue of missing registration data in future phases of the program.

Over half of the formative research subscribers were assigned paid status (57%), and just 17% of subscribers received free service. It is estimated that 35% of paid status subscribers (n=276) may have been defaulted into this payment category. Table 4.3A shows the proportion of subscribers by payment status.

Phone surveys asked subscribers if they had any complaints about the Aponjon service. While women subscribers did not spontaneously mention dissatisfaction with price, a small number of gatekeepers (8.4%, N=9) reported that they think the service price is too high.

It is possible that outreach partners did not fully disclose the pricing information during registration of subscribers. In a field visit to Sylhet and training in Chittagong, Dnet noticed that

TABLE 4.3A

Proportion of subscribers by payment status.

Payment status	Number of subscribers with payment status assigned (N=1,387)
Paid status+	57.1% (792)
Discounted status	25.7% (357)
Free status~	17.2% (238)

+D.Net defaulted subscribers to paid status if SES data was incomplete. Using the payment status algorithm, JHU research team estimates 276 paid status subscribers were defaulted into this status. While data shows some subscribers with partially incomplete SES data were provided discounted and free status, criteria for these decisions are unknown.
~BRAC and D.Net had an agreement that all BRAC-assisted subscribers receive the service for free.

some of the CHWs were not sufficiently literate to accurately complete registration forms and needed additional training to ensure that the forms were completed correctly. Subscribers in this area may also be illiterate, and thus unlikely to be able to read the registration forms as they are completed. Reminders about pricing of the service are written on the forms, so if neither CHW nor subscriber could read the form it is possible that these issues would never have been raised. After these field observations Dnet concluded that monitoring and re-training of CHWs was essential for improving quality of registration data.

4.3b Effect of payment status on subscriber retention

Due to the low number of deregistrations during the formative research phase (N=18) and overall (N=60) no sub-analyses of deregistered subscribers were possible.

4.4 Sources of variation in willingness to pay for Aponjon service

Willingness to pay was assessed at two time points during the formative research study: at registration, and during phone surveys that occurred after subscribers had started to receive messages.

Timing of research questions is an important consideration when evaluating the rollout of mHealth initiatives such as Aponjon. At registration subscribers had low familiarity with the service – community agents may have demonstrated the messages to subscribers, but they had not yet experienced receiving messages in their daily lives. By the time of the phone survey's administration subscribers had experienced Aponjon service. Familiarity with the service was likely to have influenced perceptions about willingness to pay for the service.

Table 4.4A presents data collected from subscribers at registration on their willingness to pay for Aponjon.

TABLE 4.4A

Registration Data on willingness to pay, by subscriber type

	Pregnant women (N=349)	New mothers (N=575)	Gatekeepers (N=479)
Are you ready to pay for the service?			
• Yes, any amount	7.4% (26)	7.5% (43)	1.5% (7)
• Yes, if it is very small	75.9% (265)	66.3% (381)	7.5% (36)
• No	9.2% (32)	13.0% (75)	0.4% (2)
• Missing	7.4% (26)	13.2% (76)	90.6% (434)
Willing to pay 2 taka/msg*			
• Yes	67.0% (234)	63.5% (365)	6.7% (32)
• No	25.5% (89)	23.3% (134)	2.7% (13)
• Missing	7.4% (26)	13.2% (76)	90.6% (434)
Willing to pay 1 taka/msg**			
• Yes	91.4% (319)	85.9% (494)	9.4% (45)
• No	1.1% (4)	0.9% (5)	-- (-)
• Missing	7.4% (26)	13.2% (76)	90.6% (434)

* Skip logic was supposed to be that the question was only asked if respondent answered, "Yes, if it is very small" to being ready to pay for the service (N=682). In actuality the skip pattern was not followed and the question was asked of N=867.
**Skip logic was supposed to be that the question was only asked if respondent indicated that he/she was unwilling to pay 2 taka/msg because he/she could not afford that rate (N unknown as affordability data was coded incorrectly, at max N=236). The skip pattern was not followed and the question was asked of N=867.

Individuals were subscribed to Aponjon even if they indicated they *were not ready to pay* for the service. CHWs were instructed via the registration forms to tell these subscribers that they would be notified if they were to receive free service. As Table 4.4B indicates, many of these subscribers (44%) did indeed receive free service, and another 30% received discounted service. The one-quarter of subscribers (26%) who said they were not ready to pay for the service and who were assigned paid status were done so on the basis of their SES data per the algorithm that was described in Section 1.6 of this report.

TABLE 4.4B

Payment status, among those who indicated that they are not ready to pay for the service during registration

	Indicated at registration that they are not ready to pay for the service (N=110)
Free	44.0% (48)
Discounted	30.3% (33)
Paid	
• Likely by default	0.9% (1)
• Per SES data	25.7% (28)
Missing payment status	0.9% (1)

Willingness to pay was assessed again during the phone surveys (see Table 4.4C). At that time subscribers may have had a better reference point for responding to questions about willingness to pay since they had received some messages and may have become more familiar with the cost of the service in relation to their other household expenses.

Since the phone survey data was not linked to registration data it is not possible to know which respondents were receiving the service for free or at a discount. The phone survey script assumed all phone survey respondents were paying full price for the service, noting in the question "the service charges you 2 taka for [message]." As a result these analyses must also assume that all respondents were paying the full rate for Aponjon service.

The majority of women subscribers (87%) reported that someone else pays for their phone service, and the largest segment of women subscribers receiving IVR messages (45%) reported that they think the service should cost less than one taka per message. Approximately one-third of women (31.0%) reported willingness to pay between two and five taka per message.

Nine in ten gatekeepers pay for their own phone service (90%) and the largest segment of these subscribers receiving IVR (41.6%) reported that they think Aponjon should charge 2 taka per message. Nearly half of the gatekeeper respondents (46.1%) reported willingness to pay between two and five taka per message.

The sample sizes of phone survey respondents receiving SMS were too small for reliable analyses.

The phone survey for gatekeepers asked whether these respondents had known they were registered for the Aponjon service prior to getting the content. Out of 107 respondents 39.2% said they had not been aware they were registered for the service. These data suggest that gatekeepers may have been unaware what they were subscribing to during registration, that they were registered for the service by their wives or other family members rather than personally volunteering to enroll, or that the registration process was somewhat unmemorable and thus the gatekeepers forgot about the service until messages started to be delivered to their phones.

Structured interviews allowed subscribers and healthcare workers to discuss willingness to pay for the service. Comments revealed mixed feelings about the per-message rate of the service. Some subscribers were satisfied with the service price, or willing to pay more.

> *We are getting good information. If we get good suggestions for 2 taka or 4 taka, than it is good for us, isn't it?*
> *– Gatekeeper, Gaibandha*
>
> *I think 2 taka is okay. You are calling us, so there is a charge for that.*
> *– Woman subscriber, Dhaka Mirpur*

TABLE 4.4C

Phone survey data on Willingness to pay, by subscriber type

	Women/Mothers (wave 3 only, N=54)	**Gatekeepers** (wave 4 only, N=107)
How much should the service charge per SMS message?[T]	(N=11 SMS subscribers)	(N=17 SMS subscribers)
• 5 taka	(0)	(0)
• 3 taka	(0)	(0)
• 2 taka	(1)	(8)
• 1 taka	(6)	(6)
• <1 taka*	(4)	(2)
• Missing/NA	(0)	(1)
How much should the service charge per minute for the IVR?[T]	(N=43 IVR subscribers)	(N=89 IVR subscribers)
• 5 taka	2.4% (1)	3.4% (3)
• 3 taka	-- (0)	1.1% (1)
• 2 taka	28.6% (12)	**41.6% (37)**
• 1 taka	26.2% (11)	31.5% (28)
• <1 taka*	**45.2% (19)**	19.1% (17)
• Missing/NA	-- (0)	3.4% (3)
Who pays for the Aponjon service?		
• Subscriber	11.1% (6)	**89.7% (96)**
• Someone else	**87.0% (47)**	7.5% (8)
• Missing	1.9% (1)	2.8% (3)

[T] Phone survey questions about charging preferences were only asked of individuals subscribed to the relevant mode (SMS, IVR). As such, sample sizes for these questions are very low. Due to low sample sizes of SMS subscribers, percentages have not been reported in the table above.

* Respondents were given a choice of "Other" and asked to name the amount they thought should be charged per SMS/minute of IVR. All respondents that answered "Other" suggested charges below 1 taka.

Some subscribers and gatekeepers questioned whether the service was worth payment, as the same information is available for free through other sources.

> *You are giving only information, and for that you should not charge.*
>
> *- Woman subscriber, Dhaka Mirpur*

> *Some people ask me 'why should we take this service at such costly rate? You tell us all kind of information.'*
>
> *- CHW, Gaibandha*

> *A client's husband said me to stop the service because all content in this service is known to them so it is useless.*
>
> *– CHW, Sylhet*

At least half of subscribers and gatekeepers mentioned that the current cost of the service is a burden.

> *[A] bad thing about the service is that most of the clients I went to complained to me that I did a bad thing to them by registering them into the service. They told me, 'Apa, we are poor people. Sometimes after recharging [reimbursing] 10 taka, they [the Aponjon service] cut off 2 or 3 taka instantly. We can talk a lot with that money...' In the beginning, they agreed to pay the amount but later on they say that 4 or 5 taka is charged; so they find it inconvenient.* – CHW, Sylhet
>
> *In our village every mother wants to hear the messages but they don't have much money. Most mothers want to get the service for free.* – CHW, Gaibandha
>
> *They take a big amount of money. Sometimes I saw suddenly there is no balance in my phone. If the service charge is 50 paisa per message than it'd be better.* - Woman subscriber, Sylhet

While some subscribers were willing to pay more for the service, others said they would not be able to afford increases to the service price.

> *I will continue with the service if the standard of the service is good. If my income increases, then I would spend more money for this service.* – Gatekeeper, Gaibandha
>
> *Maybe if I was charged 3 or 4 taka, I don't have any problem. I [would] continue the service.* – Gatekeeper, Gaibandha
>
> *If you take more in future then it'd be a burden for us. In that case we couldn't keep the service. If you take 3 taka per message than it'll charge six every week. That is high for me.* – Woman subscriber, Sylhet
>
> *If you charge 4 to 5 taka, many people won't take the service. In Bangladesh, the proper rate for messages is around 2 taka, so why would one pay 5 taka for an SMS? It could be an obstruction for you.* - Woman subscriber, urban Dhaka.

Sub-analyses of the phone survey willingness to pay measure by gender were considered but ultimately not included in this report because gender was highly correlated with subscriber type (e.g., wave 3 pregnant women/mothers were all female; wave 4 gatekeepers were 98 male, 9 female and 1 gender missing).

Willingness to pay, by total family income

Total family income (TFI) per month was collected from women subscribers at registration and these data were analyzed to determine whether they explained differences in willingness to pay for

the service (see Table 4.4D). Women who reported TFIs higher than 4,000 taka were slightly more inclined to pay a very small amount for the service compared to those whose monthly household incomes were under 4,000 (a cut-off for receiving free Aponjon service). Very low-income women with monthly household incomes of 4,000 taka or below were more likely to indicate they were not ready to pay for the service at the time of registration. Although a similar question was asked in the phone survey data the sample sizes were too small to produce reliable findings.

TABLE 4.4D

Registration data on Willingness to pay, by level of total family income within subscriber type^

	Pregnant women		New mothers	
Total Family Income/mo (taka): Range 0-200,000+	4,000 or less	4,001+	4,000 or less	4,001+*
Col N=	92	181	153	252
Are you ready to pay for the service?				
• Yes, any amount	9.8% (9)	7.7% (14)	7.2% (11)	11.1% (28)
• Yes, if it is very small	**72.8% (67)**	**84.5% (153)**	**69.3% (106)**	**75.0% (189)**
• No	17.4% (16)	7.7% (14)	23.5% (36)	13.9% (35)

^76 pregnant women and 169 new mothers were missing TFI data. Given the errors in application of skip patterns per the registration form instructions, registration data on willingness to pay 2 taka and 1 taka are not included in the table.
+ Data on Total Family Income not collected for Gatekeepers.
* Dropped 1 data outlier with extremely high TFI.

Structured interviews and field site visit observations reiterated the finding that many subscribers were not willing and possibly not able to pay for the service. At a site visit in Balaganj, Sylhet a Dnet staff member noted:

> *[Assistance with self-registration was provided at a] government run free service clinic; visitors are poor. It is difficult to motivate [enrollment to Aponjon] as a paid service during counseling.*
>
> *– Dnet observation, Sylhet*

Willingness to pay measures can be useful in determining user interest or satisfaction with a product. However, when an intervention is new and thus respondents' estimations of willingness to pay are hypothetical, willingness to pay may not be a very meaningful measure. In the case of Aponjon, at the time of registration individuals were asked about their willingness to pay for this service. Since Aponjon represents a novel service most subscribers would have never experienced in the past, these individuals were essentially asked to report their willingness to pay for an unknown service or product.

In addition, willingness to pay can be a less informative measure when individuals are not cognizant of the total payment they may incur for the lifetime of the service. During Aponjon registration subscribers were first asked if they are ready to pay for the service, and were given response options of "Yes any amount," "Yes, if it [the payment] is very small," or "No." This question and its response options, however, were extremely broad. Subscribers may have gone through very different cognitive processes depending on their SES and a range of other factors before providing an answer to the question. Even in the interpretation it is difficult to know whether there was

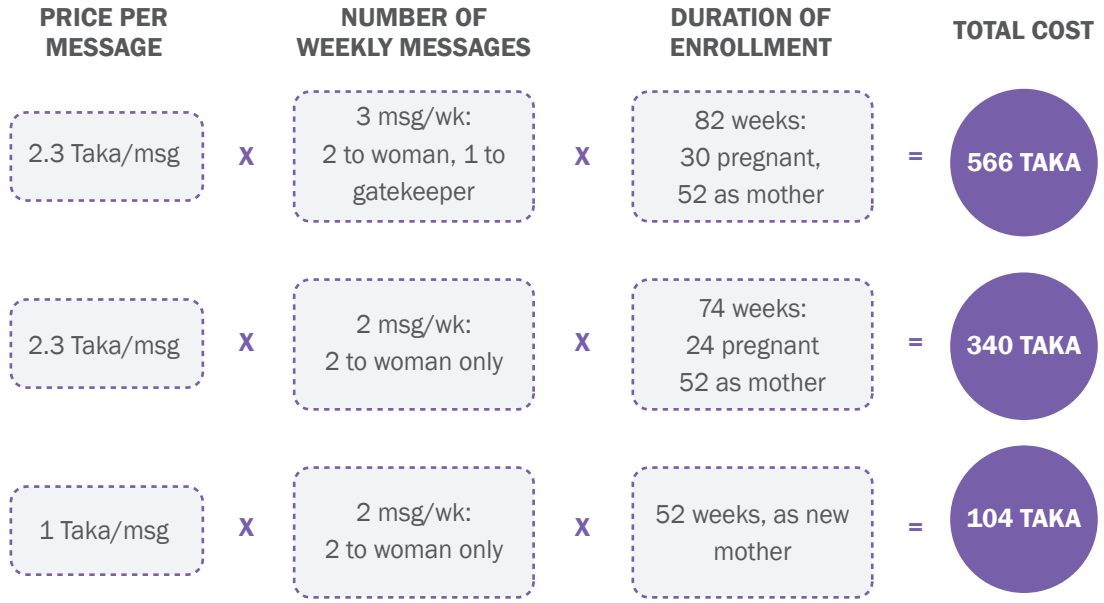
agreement between all subscribers about what a "very small" amount would be and it is not possible to ascribe a value in taka to that description.

Subscribers were subsequently asked if they would be willing to pay 2 taka per message. Although this question is more concrete, the cognitive process for responding to this question may still have varied. It is unclear whether subscribers would have been well informed about how much the service would cost over the length of a subscription. Only after responding to the questions were subscribers told the weekly rate they would have to pay if charged 2 taka per message. It is unknown whether subscribers were ever clearly explained how many weeks they may be registered to the service and what cost they would incur if they retained their subscription throughout that full service period. The rate would have varied depending on the time at which the subscriber enrolled (month in pregnancy or age of child) and depending on whether a gatekeeper also registered for the service. At the very most a subscriber might incur roughly 566 taka for the service if she paid full price (2.3 taka per message), started it in her sixth week of pregnancy, continued through to her child's 1st birthday (82 weeks) and had a gatekeeper who also registered for Aponjon (total of 3 messages per week).

Figure 4.4A demonstrates three different payment scenarios that subscribers may have encountered to illustrate the variability in estimating payment for the service and underscore the difficulty someone could face in answering whether they are willing to pay. The first scenario is a woman and gatekeeper who subscribe at full cost to Aponjon for the entire potential length of the service: from week six of pregnancy through one year of the child's life. The second scenario is for a woman who subscribes at full cost but without complementary gatekeeper messages, starting around the end of her first trimester (when a CHW may notice the pregnancy and approach the woman to enroll her) and continuing though the child's first year of life. In the final scenario the woman subscriber received discounted status and enrolls only for the child's first year, without a gatekeeper message per week. As the figure demonstrates, costs for the service can vary greatly. Without being fully informed about the price of the service in the short-term and the long run, it may be unlikely that the registration forms accurately captured subscribers' willingness to pay for the service.

FIGURE 4.4A

Various Aponjon payment scenarios



4.5a User satisfaction with Aponjon content

Overall satisfaction

Overall satisfaction with the Aponjon service was assessed through the phone surveys using the question, "Are you satisfied with the service?" Reported rates of satisfaction were nearly universal (94%), but the question may have been too broad for these data to be meaningful. Respondents may have reflected on the content of the messages, the design of the service, its delivery through a phone-based technology platform, or any number of other criteria before providing a response to the question.

Over 94% of subscribers agreed that they are satisfied with the Aponjon service.

> *My husband said it [Aponjon] is beneficial for both of us. I should be obliged by the instructions and let other people know to take the service.*
> *– Woman subscriber in Gaibandha*

Interviews confirm a sense of general satisfaction with the service, both on the part of subscribers and gatekeepers.

Gatekeepers were asked if they felt they should be a part of the Aponjon service (should receive messages alongside of the women subscribers). Overwhelmingly the gatekeepers indicated they think they should be included in the service (91.6%, N=98). However, when gatekeepers were asked if they think their wife or other relatives should register for the service, just 58.9% (N=63) said yes; the balance 39.3% (N=42) did not think their female relatives should register for Aponjon.

When subscribers were asked if they have any suggestions for improving the service most women said they did not have any comments; many of the gatekeepers simply asked that the service be made better. This suggests that while there is high satisfaction with the service, gatekeepers in particular still think there is room for improvement.

The high levels of overall satisfaction with Aponjon can be triangulated using field visit reports and structured interviews. Dnet noted that on field visits subscribers routinely gave positive assessments of Aponjon and several women who had completed the service had become "brand ambassadors" of the program encouraging other women in their communities to enroll in the service. Similarly a gatekeeper in Gaibandha said,

> *I got aware of these things [the information from Aponjon]. Now I'll tell 10 more people about the service, then they'll know about it.*
> *– Gatekeeper, Gaibandha*

Deregistration data provides another way to understand user satisfaction with Aponjon in general. A data file indicating reasons why subscribers deregistered from the service includes a total of 60 individuals who deregistered at any point (possibly beyond the end of the formative research

period). Since the data file is not linked to the registration data it is unclear whether all of these individuals are part of the formative research phase sample. Nevertheless, their reasons for deregistration are helpful in understanding some of the main frustrations subscribers may have faced with the service. Table 4.5A1 presents subscribers' reasons for deregistration.

Duplicate registration, in which one person/phone number was accidentally registered twice for the same type of subscription, was the most common reason why subscribers deregistered from the service. In these cases it is unknown whether the subscriber deregistered entirely or just deregistered the duplicative registration. Among pregnant women, miscarriage was also cited as a frequent reason for deregistration. Some subscribers mentioned affordability as a reason for deregistration, but it was not the most frequently cited reason to discontinue service. No deregistration data were available for gatekeepers.

TABLE 4.5A1

Reasons for deregistration

	Pregnant women	New mothers
Number subscribers ever deregistered	30	30
Top three reasons for deregistration	• Duplicate registration (6) • Miscarriage (6) • Wrong identification of client by call agent (5)	• Duplicate registration (8) • At request of TelCo – reason unknown (5) • Affordability (4)

Content

Overall, subscribers discussed their happiness with the content offered through Aponjon. Some, however, felt that the content was not new to them and identified this as a major issue for revision in the service. Message content may be more novel to subscribers who are having their first child and those who live in rural areas in which they have less exposure to maternal and child health information through mass media.

> *There are some good aspects obviously. It reminds me [about] the time of giving vaccinations and initially it gave me some suggestions when I was not going to a doctor.* – Gatekeeper, Dhaka
>
> *If they maintain their quality, then I will continue the service. Actually I know most of the information what they have told me. But I am facing many difficulties besides those, so I need a better service.* – Woman subscriber, urban Dhaka
>
> *I will say, well for this reason, that mobile has been used by all of us. If mobile phone updates ensure the ANC/PNC and TT [tetanus] vaccination, they [clients of the CHW] do not have to go to hospital to know about that. They save money from the transport cost and get the service [health information] in home.* - CHW, Sylhet

Some subscribers had specific requests for improvement of message content. Several noted confusion about the nutrition information and specifically asked for more information and clarification of these messages.

> *The existing service is good, but I have a problem. They only told us that this food is good for your child and give him that. But they never told us which food is good for what? Sometimes it is happened that I gave my child banana and he [got a] cold, and egg is bad for his bowel. So we become confused about what the proper food for him should be. If it [more detailed child nutrition information] can be added to the service then it will be very good for us.*
>
> *– Gatekeeper, Gaibandha*

> *I have not yet got any message about nutrition. If you do not have any content on nutrition [in current messages], then you should include it [nutrition messages]. It will be beneficial for the rural women. Which food would enable brain growth and be good for health should be included in the service... Which food contains more vitamins, I think you should include this.*
>
> *- Woman subscriber, urban Dhaka*

Trust in the Aponjon service

Observational data suggests that Aponjon could increase subscriber trust in the service by increasing the physical presence of staff and CHWs associated with the program. Infolady CHWs in Gaibandha suggested more frequent visits from Dnet staff members so that subscribers would know who is sending them messages and have more trust in the information. Few subscribers reported skepticism about the messages.

4.5b User satisfaction with Aponjon service design and technology platform

Service design

The phone survey among women subscribers assessed satisfaction with Aponjon's service design, and specifically with the length of the service overall. All 14 pregnant women subscribers were satisfied with the length of the service as it currently stands, starting at 6 weeks into pregnancy and continuing through the duration of pregnancy. While three-quarters of new mother subscribers (75%, N=40) indicated satisfaction with the current length of the service through the child's first birthday another 20% (N=8) said they would prefer a longer length of service through the child's toddler years.

Structured interviews also asked subscribers about their satisfaction with elements of the service design related to:

> *I would be happy if the service would continue up to 3 or 4 years of age.*
>
> *- Woman subscriber, Dhaka Mirpur*

- Length of messages: Was the approximate one-minute length acceptable?
- Message frequency: Is two messages to women and one message to gatekeepers per week sufficient?

- Repetition of messages: How do subscribers feel about receiving some messages more than once?

- Language of messages: How do subscribers feel about the use of "Banglish," mixing Bangla and English words and writing Bangla words using English characters?

Feedback from interviews indicated that while the current service was valued overall, some improvements are desired. In addition, given the cost of the service, subscribers and healthcare workers expect a perfectly run system with few disruptions and inconsistencies in service quality. At present, interviewees did not feel as though the service was always performing to the level of their expectations.

> *So far I have received 64 messages where quite a lot of messages are double messages.*
> *– Gatekeeper, Gaibandha*
>
> *English medium messages create another problem for illiterate people. I think the MAMA-Aponjon service network has to work perfectly. They [Dnet and Aponjon] must be aware of service operation when taking a service charge.* *– CHW, Sylhet*

Technology platform

The phone survey assessed whether the technology platform was working as intended and routinely sending subscribers two messages per week. While most women subscribers received two messages per week on a regular basis (59.2%, N=32) many others reported irregularity in receiving the two messages they were supposed to get per week. The majority of gatekeepers (75.7%, N=81) said that the received their one message per week. Few phone survey respondents reported having any problems listening to or reading the messages.

These data indicate that while the technology platform is generally performing well, there are some consistency issues that require attention. Several subscribers commented that they occasionally miss messages from Aponjon because they are working or the phone is with another household member. Some of these subscribers indicated that the service calls again later in the day. Subscribers did not remark upon expecting to receive calls on certain days or planning how the phone would be shared with household members based upon the Aponjon message-sending schedule.

> *When I am busy with my work, it is problematic to receive the call. Or, sometimes my husband takes the mobile and that's why sometimes I don't receive the call* *– Woman, Gaibandha*

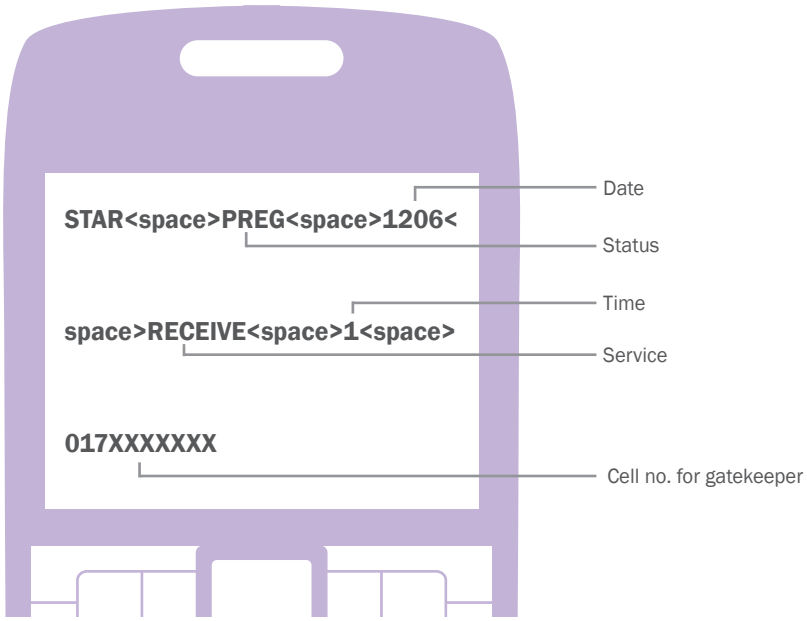
The Aponjon technology platform was a novel way of interacting with a health service and receiving health information in Bangladesh. The technology platform was scaled to allow subscribers of varying levels of comfort with their phone's features to use Aponjon. For example, individuals with a high degree of comfort and fairly advanced literacy skills could elect to self-register to the service via text

message. Those subscribers would follow directions, similar to the schematic in Figure 4.5B1, to subscribe by text to the service, indicating their preference for time of message delivery.

The SMS-based commands and messages from the service were written in English characters even when writing Bangla words. Field visit reports from Sylhet suggest that women with a strong command of Bangla but limited English literacy struggled with the use of English characters in Bangla SMS messages.

FIGURE 4.5B1

Text message to enroll gatekeeper for daily, morning message subscription



While there was high satisfaction with the current technology platform, some gatekeepers suggested that the platform could be improved if expanded. Specifically, these gatekeepers expected that the service would facilitate the opportunity to talk to a doctor when their child or wife is sick. One in five gatekeepers expected the platform to allow them to talk to a doctor in the case of a sick child (20.6%, N=22) and 15.9% (N=17) expected the platform to allow them to talk to a doctor when their wife is sick.

> *I also think you should have a doctor with whom people can talk over the phone. Women who do not have anyone with them - they can take the service in their mobile phones.*
>
> *– Woman subscriber, urban Dhaka*

> *I think this is top-down where I do not take the service; rather you give me the service. My only contribution is just to make the registration. But the information you are giving to me I did not ask for from you. You give me the information but at the same time you should also know my queries. If you know my queries then it will be easier to give the answers. Then it will be a real service.*
>
> *– Gatekeeper in Dhaka urban area*

> *It would be better if the service could include a special service where people could call to the service center [about the] mother's and children's illness and [receive] guidelines for treatment.*
>
> *– Woman subscriber in Dhaka, Mirpur*

4.6 Effect of Aponjon on subscriber knowledge, practices and health-seeking behaviors

The formative research included limited evaluation of Aponjon's influence on knowledge and health-seeking behavior. Given the large number of process factors being tested and the short duration of exposure, limited focus on behavior was reasonable. Subsequent evaluations may place a greater focus on understanding the behavioral impact of the service.

Behavior change was assessed quantitatively using a pair of phone survey questions: "Could you do anything according to the health information?" and a follow-up question asking which actions the respondent took from a provided list of health behaviors. Nearly three-quarters of women subscribers (72.2%, N=39) and gatekeepers (72.9%, N=78) responded that they could do something as a result of the health messages. The most frequently reported actions taken by women subscribers were exclusively feeding the baby breast milk up to six months (46.3%, N=25) and arranging a plan for transport, delivery at a center or delivery with a skilled midwife (38.9%, N=21). Few women responded that they found out their blood group type, changed their food intake during pregnancy, got a tetanus vaccination, started a family planning method, immunized their baby, went to the ANC or took action when seeing a 'danger symptom of pregnancy.' Gatekeepers most often reported that they took action regarding 'nutrition' (41.1%, N=44) though this response option was not well defined. Many gatekeepers also reported taking action to make sure the pregnant woman/mother in the household received ANC check-ups (26.2%, N=28) and the new baby was immunized (20.6%, N=22).

The limited quantitative assessment is inadequate for making conclusions about the influence of Aponjon on behavior. The question "could you do anything" was vague, so it is difficult to know how respondents interpreted the question before reporting their answer. The follow-up question about health actions also included some vague response options that may have been interpreted differently by each respondent. In addition, the follow-up question was supposed to be administered using a skip pattern in which it was only asked of subscribers who had indicated taking some health action. Instead, all respondents were asked about the list of actions. This may have resulted in faulty data, and without properly assessing exposure to the service as part of behavioral impact attribution of behavior change is not possible.

The qualitative research efforts collected some anecdotal data on behavior change. Field visits often highlighted Aponjon successes in affecting behavior change. One family in Gaibandha praised the information they had received from Aponjon. In particular the mother reported satisfaction with the health of her second child after following Aponjon's guidance on child nutrition.

> *"I am following the food schedule that Aponjon suggests and see how healthy my second child is!"*
> *– Woman subscriber, Gaibandha*

Similarly many interview participants suggested they had learned something new from the service. Some, however, did not find the information novel and thus did not ascribe any of their behavioral change to the Aponjon intervention.

"I learned from the messages that after feeding the baby I have to keep her upright for a while. It helps in digestion and the baby does not vomit. It is such a relief! I suffered with my first one.

- Woman subscriber, Dhaka Mirpur

VS

This is my third child, I know all the information from previous experience."

- Woman subscriber, Dhaka Mirpur

DATA LIMITATIONS AND THE WAY FORWARD FOR EVALUATION

This formative research effort was a massive undertaking. In the future it may be more effective to narrow the research focus to a smaller set of independent factors in order to more thoroughly explore the effect of those factors on subscriber enrollment, satisfaction and retention.

The formative research study was primarily designed to assess reach and process-related factors that may affect subscriber enrollment and retention in service – thus serving the **programmatic evaluation** goal of identifying areas for adjustment in program implementation.

However, as the program seeks ways to substantiate MAMA-Aponjon's desired claims about program, future evaluations will want to revise the research approach. Future avenues for research may also help create a better understanding about the variation in impact among various

sub-populations of subscribers. These research efforts could significantly contribute to the **global mHealth evidence base**.

The following section describes ways in which formative data limited potential for analyses that could be informative to the program and to the larger mHealth research community. These limitations should be considered as Dnet considers a way forward for evaluation of Aponjon.

5.1 Formative research design

A study's research design helps to establish arguments of causality and attribution of health behavioral impact to the intervention.

Global evidence base: The limitations below will be important to consider particularly as Aponjon seeks to contribute to the global evidence base by making claims about the impact of this mHealth intervention on critical MCH-related outcomes.

To demonstrate impact, studies need a comparator: The formative study's research design only included an intervention group. The lack of a control group for comparison limits the ability of these data to support claims attributing changes in subscriber knowledge or behavior to their participation in the Aponjon service.

To demonstrate sustained impact, multiple measurements are necessary: The formative research design was cross-sectional, measuring individuals at only one point in time. As a result, the data cannot support claims about sustained knowledge, practices and health-seeking behaviors. Although some individuals may have been sampled multiple times (providing data at registration, through an interview and through a phone survey), there was no repetition in the instruments used to measure indicators relevant to the formative phase.

To understand "rare" phenomena, study length and sample size should be considered: Deregistration was a "rare" phenomenon in the formative research study, with only 18 occurrences during the formative research phase and another 42 occurring after the study period had concluded. This study was conducted over a 9-month (approximately 39-week) period; not long enough for subscribers to potentially be exposed to the full MAMA-Aponjon intervention (82 weeks, all pregnancy and new mother messages). The short length of the study may have curtailed the ability to observe a substantial number of deregistrations from the service. A larger sample is required to conduct sub-analyses on participants who deregister from the service; this could be achieved in two ways: increase in overall sample size or increase in the length of the formative phase to allow for a larger sample of deregistrations to be observed.

To gain deeper insight into subscriber experiences, qualitative methods should be used appropriately: The research design used mixed methods to triangulate findings, but the research methods were not always employed appropriately. Specifically, qualitative methods were not used to gain a depth of understanding about specific research topics. Rather, structured interviews covered a large number of topics and used close-ended questions to gauge magnitude of demographic characteristics, awareness, attitudes, knowledge, and behaviors. The interviews sampled a very large number of likely heterogeneous individuals (156 interviews in total across two rural and two urban locations; approximately 40 interviews conducted per subscriber type and 20 interviews with

outreach community health workers). Given the close-ended nature of questions and the large number of individual responses to analyze, researchers quantified the research findings because the data was insufficient for textual analysis. While the interview samples were large for a typical qualitative study, they were not large enough to justify application of quantitative analytical methods. Appropriate use of qualitative methods will be advantageous to future research and will allow deeper exploration of critical evaluation topics.

THE BENEFITS OF MIXED METHODS APPROACHES TO EVALUATIONS

The formative research study included both quantitative and qualitative methods. A mixed methods approach can help strengthen research findings, allowing researchers to triangulate responses about a particular topic. In this way the qualitative data enriches the researcher's understanding of the quantitative data and helps to better interpret the quantitative findings.

Qualitative methods should:

- Be employed with well-defined samples
- Use theory about variation in sub-populations to drive the sampling frame
- Utilize open-ended questions to allow research participants to speak at length on the topic of discussion.

Qualitative methods can provide insight into variations in quantitative data, but in order to do so samples must be selected carefully and strategically and respondents must have the opportunity speak at length about their experience so that the data they produce is rich enough for analysis.

5.2 Sampling frame and sampling methods of the formative study

A study's sampling frame and sampling strategy help to establish to whom the study's findings can apply.

Programmatic Evaluation: For programmatic direction it is appropriate to sample only those who have access to Aponjon, as the findings will be applied to adjusting the program to better serve the needs of those with access to the intervention. Similarly, enrolling any subscriber willing to take part in the service is appropriate, as the program is interested in gaining broad reach and testing effectiveness of the intervention among any subscribers to the service. However, CHW consistency in promotion and enrollment may serve to reinforce the perception of the service's widespread relevance.

Global Evidence Base: To explore new avenues for research and to build the global mHealth evidence base, however, Aponjon may need to adopt slightly different sampling methods. For example, if Aponjon wanted to conduct research on new audiences for the service, the sampling frame would need to be adjusted accordingly to include populations who currently do not have access to the service. The utility in testing the service among new populations is that it builds an evidence base about the acceptability and effectiveness of the program for additional target audiences who may be fundamentally different from the current subscribership. Should the program wish to expand its reach in the future, this evidence base would provide support and direction as to audiences that

may benefit from Aponjon if it were made available to them. Similarly, the sampling method is important if Aponjon seeks to generate evidence about the effect of the program that can be broadly generalized, or if a research aim is to explore whether the extent of Aponjon' impact varies across different sub-populations of subscribers.

To generalize study findings, careful attention must be paid to the sampling frame: The formative study's sampling frame did not match the population to which Dnet intended to apply the research. The sampling frame is the actual or theoretical "list" of all people who could be included in the research study; it defines the population to which findings can be generalized.

Dnet may have intended to generalize the research to all pregnant women and new mothers in the study locations with access to a mobile phone; however, the sampling frame was slightly limited in comparison. The sampling frame included customers of only one telephone company – GrameenPhone – since this was the only telephone company partnership agreement secured in time for the formative study. GrameenPhone customers are geographically clustered in certain parts of the country. For example, rates of GrameenPhone use are low in the Chittagong Division of Bangladesh. In this way some bias may have been introduced into the sampling frame. In the time since the formative study Dnet has secured a greater variety of telephone company partnership agreements, so this bias is unlikely to persist in future research efforts.

To generalize research findings, careful attention must also be paid to sampling methods: Assisted registration was the primary mode of enrollment in this study. However, CHWs did not apply the same criteria in their selection of individuals to subscribe to the service. While some simply used an available sample of interested individuals in their catchment area, other CHWs sampled purposively by only offering the service to low-income households. In Dhaka Mirpur alone two healthcare workers described the different criteria that they applied in identifying potential subscribers:

> *"I approach everyone who shows interest in the service.*
> *- Healthcare worker, Dhaka Mirpur*

VS

> *[I go to] ultra poor mothers who live in the slum."*
> *– Healthcare worker, Dhaka Mirpur*

Programmatic Evaluation: While programmatically it is acceptable to enroll subscribers inconsistently across CHWs, this could result in some confusion among potential subscribers about who Aponjon is meant to serve. Specifically, if some CHWs target only very low-SES households, other higher SES households may perceive the program as irrelevant to them, generating a skewed perception of Aponjon's utility to offer information and support to pregnant women, new mothers and their families.

Global Evidence Base: Differential enrollment of subscribers based upon demographic characteristics introduces systematic bias into the overall study sample if testing Aponjon's impact in order to generalize to all households with a pregnant woman/new mother and access to a mobile phone. If Aponjon chooses to conduct research to contribute to the global mHealth evidence base, systematic sampling bias will need to be avoided as it reduces the likelihood that the actual study sample matched the sampling frame, and ultimately that the findings can be generalized as

intended.

To assess systematic bias, studies must sample refusals: A moderate amount of selection bias is unavoidable in this study, as subscription to the Aponjon service is voluntary and individuals inclined to subscribe may be systematically different than those who are not inclined to subscribe to the service.

Global Evidence Base: Future research could evaluate differences in patterns in enrollment vs. non-enrollment in the service by including individuals who declined to enroll in the service in the study. This research would add to the global evidence base by improving understanding of the characteristics that differentiate subscribers and non-subscribers to mHealth interventions.

5.3 Data management

Unique identifiers allow linkage of data sets: Formative study subscribers were not assigned unique identifiers at registration. As a result many of the formative research datasets cannot be easily linked together, limiting the potential for in-depth analyses.

Programmatic Evaluation: Use of unique identifiers across all datasets will allow for easy, automated matching of data across multiple data collection points. This will offer the program a greater ability to trace the history of each subscriber through the service, offering deeper insights into the characteristics of subscribers who appreciate Aponjon or exhibit health behavior change based on the program as compared to those who do not.

THE SILOED DATA STRUGGLE

Due to a lack of unique identifiers, MAMA-Aponjon registration form and phone survey data from the formative study cannot be linked. This can lead to limitations in data analyses. For example, the phone survey data did not indicate the actual payment status of respondents, but rather assumed all respondents are paid subscribers to the service. Dnet, however, keeps a separate data file on subscribers' actual payment status. Given that the respondents were randomly selected from the formative subscriber database, it is unlikely that all phone survey respondents were actually paid subscribers. However, all respondents were told during the survey that they were being charged 2 taka per SMS/IVR message and were asked about their willingness to pay for the service. With unlinked databases, it is impossible to do sub-analyses of willingness to pay phone survey data by actual payment status.

5.4 Data robusticity

To increase robusticity of analyses, studies should limit data incompleteness: There was a significant amount of missing data in some of the formative research data sources, particularly the registration data. Analyses of patterns of missingness show that registration mode was a significant factor. Specifically, self-registered subscribers were more likely to have missing data than assisted-registration subscribers. Among assisted-registration subscribers some variation was observed in the extent of missing SES data when comparing across the outreach partners that

offered assistance.

Programmatic Evaluation: Incomplete data limits the insights evaluators can make into the characteristics of subscribers who appreciate Aponjon or exhibit health behavior change based on the program as compared to those who do not.

Global Evidence Base: Patterns of missingness suggest biases in the data and limit the external validity of these findings.

To increase robusticity of analyses, studies should maximize data quality: Data quality was a concern with these formative research data. Field visit notes suggest that outreach partners and CHWs within each partner organization varied widely in their explanation to clients the cost of the Aponjon service. Inconsistencies in the way that the service, and particularly the pricing structure, was described to potential subscribers may have had an effect on subscriber enrollment. In addition, inconsistent descriptions of the pricing structure may have affected subscribers' responses to willingness to pay questions on the registration forms, undermining the reliability of those data.

Inconsistent monitoring of outreach partner healthcare workers may have contributed to compromised data quality. Dnet staff indicated that during site visits they learned about outreach partner healthcare workers who did not visit community members prior to enrolling them in the service, but rather used data collected at the outreach partner office to partially complete registration forms and enroll the subscribers. This practice could have resulted in compromised data quality in a number of ways. Data on registration forms may have been submitted as incomplete, particularly sections on willingness to pay for the service, or data may have been fabricated to avoid submission of incomplete forms. Few measures were taken to avoid such data errors, or validate the authenticity of collected data. The extent to which subscribers were enrolled without consultation is unknown, but does raise important ethical issues. Specifically, it is imperative that subscribers to the Aponjon service be fully cognizant and able to demonstrate their knowledge of the fees for the service and should be enrolled in the service only after providing full consent to be subscribed.

Finally, skip patterns in the data collection instruments were often ignored or administered incorrectly, resulting in data that should be interpreted with caution. For example, the registration data form indicates a skip logic to willingness to pay questions wherein subsequent questions about willingness to pay 2 or 1 taka per message are not asked of individuals who indicate they are not prepared to pay for the Aponjon service. However, some subscribers who indicated they were not ready to pay for the service were asked subsequent questions about amounts they may be willing to pay. Registration data on willingness to pay, therefore, may not be entirely reliable.

Programmatic Evaluation: In standardizing future outreach partner protocols, transparency during the enrollment process should be emphasized as a paramount concern. If subscribers were unaware or under-informed about the costs of the program at enrollment, realization of the lifetime costs of the service may contribute to dissatisfaction in the program and mistrust of CHWs who enrolled them in the service. In addition, training and monitoring of survey data collectors is critical to program evaluation in order to garner useful data to help identify needed adjustments to the program.

Global Evidence Base: High quality data is also important for generating valuable insights about mHealth program acceptability and impact.

5.5 Validity of payment status variable

To increase validity of the payment status variable, the same facets of the measure must consistently be considered and applied: Although the Dnet algorithm for determining payment status was supposed to be based on SES data, payment status was not always an accurate reflection of SES measures. Some exceptions were made to the SES-based algorithm for determination of payment status. Specifically, many BRAC-assisted subscribers were automatically offered free subscriptions to Aponjon per an agreement between Dnet and this outreach partner. As a result, the free subscriber status is not comprised of subscribers with homogenous SES status, but rather is a mix of low SES and subscribers who interact with BRAC community health workers. In addition, many subscribers with incomplete SES data were defaulted to paid status, even though they may have been eligible for free services. As a result, paid status subscribers are not necessarily homogenous in SES status, but rather are a mix of subscribers assigned to paid status either due to complete SES data which supported their ability to pay and subscribers defaulted to paid status as a result of incomplete data. As a result of content validity issues for the payment status variable, analyses of subscriber enrollment and retention by payment status may be muddied by the heterogeneity of subscribers within each payment class.

Programmatic Evaluation: The formative research study tested the determination of payment status algorithm and revealed inconsistent application of some of the algorithms rules. Subscribers trying to determine their payment status may feel frustrated with a system that does not seem transparent given its inconsistencies in applying the algorithm.

MEASURES OF INTERNAL VALIDITY – ARE THE DATA ACCURATE?

- Content validity: Is a variable measuring all the facets of what it is supposed to be measuring? The payment status variable should essentially be a measure of SES. If the variable is actually measuring other phenomenon (e.g., partially measuring subscribers' connection with BRAC), then the content feeding into the variable is inaccurate, thus threatening the content validity of the variable.

- History: Is it possible that outside events may have occurred over the course of data collection that could have influenced the data that was collected/responses provided? Process data help contextualize evaluations of interventions by noting any major events that could have affected respondents' responses to questions in data collection instruments.

- Maturation: Is the passage of time or change in life stage of a respondent affecting his/her response to a question? It is possible that pregnant women in their first trimester may respond differently to questions about satisfaction with message content compared to pregnant women in their final trimester. Without measuring these variables, it is possible that the validity of the data could be compromised due to maturation bias. The phone surveys did not include a measure of stage of pregnancy or motherhood, and thus data from each subscriber type are treated uniformly when there may be important variations to consider.

5.6 Instrument adjustment

Studies should consider the trade-off between instrument adjustment and adequate sample size: Sample size was a particular limitation when analyzing the phone survey data. Each wave of the phone survey included a small sample of subscribers. In addition, the survey instrument was significantly changed between waves 2 and 3. As a result, it was inadvisable to combine data across waves of the survey. Since only waves 3 and 4 of the phone survey were used in the analyses, sample sizes were small (N=54 women subscribers, N=107 gatekeepers), estimates from these data have relatively large confidence intervals and the sample was meager for conducting sub-analyses.

Programmatic Evaluation: To obtain a sizeable sample which can provide guidance on what adjustments t Aponjon may be warranted, survey instruments will need to remain consistent.

5.7 Question phrasing and order

To avoid influencing the respondent, studies should avoid leading questions and carefully consider question order: Some phone survey and structured interview questions were phrased in a leading manner that could have influenced respondents to provide the answer they thought the interviewer wanted to hear or an answer that logically fit with their behavior. For example, the phone survey included the question, "You are currently paying 2 taka per message. What amount would you like to pay per SMS/IVR message?" Subscribers may have felt pressure to answer 2 taka, since that is the amount they have just been told they currently pay. Respondents may avoid a response that demonstrates cognitive dissonance between what they think and what they do. Question order could also steer respondents toward answering in a favorable manner. The final question of the phone survey asks about general satisfaction with the Aponjon service. This question is asked after respondents have spent approximately 15 minutes on the phone with the call center agent and have already discussed what they learned from the service and what pregnancy and MCH-related health actions they have taken. Respondents may be swayed to indicate they are satisfied with the service based upon the responses they have provided to earlier questions and the relationship they have developed with the call center agent over the course of the survey.

Programmatic Evaluation: Eliminating or revising leading questions can help to boost data quality and may reduce respondent frustration with survey or interview questions that are difficult to understand and to answer.

SUMMARY DISCUSSION OF FINDINGS AND RECOMMENDATIONS

6.1 Summary of findings

- Overall the findings suggest that Aponjon was well received, but subscribers are interested in improvements to the service. The technology platform was generally consistent, though some subscribers experienced issues with inconsistent message delivery.
- IVR was a more popular type of service than SMS, and popularity of IVR followed a gradient in which it increased with decreasing levels of education.
- Assisted registration was more effective than self-registration for enrolling subscribers, but there is significant partner-based variation that should be taken into consideration. CHWs voiced a desire to be recognized for the time, resources and effort they dedicated to supporting Aponjon in their catchment area.
- Return on investment in popular campaign strategies may need further exploration. While these strategies may enhance brand awareness of Aponjon, subscribers do not recall the campaign elements and the strategies led to limited numbers of self-registered subscribers. Comparative effectiveness of popular campaign strategies for increasing awareness and driving registration was not possible to assess in this study.
- Payment status algorithms should be adhered to consistently, and data completeness particularly for SES information should be addressed to reduce challenges in assigning subscribers to the appropriate payment tier.
- Training and close monitoring of CHWs, call center agents and others involved in the execution of this program is critical for ensuring success of the program and quality of the evaluation data.
- Aponjon may want to concentrate on establishing how well subscribers understand the cost of the service, both in the short and long-term. Willingness to pay should be evaluated after subscribers have familiarity with the service.
- Conclusions about Aponjon's influence on knowledge and health-seeking behaviors are limited at this time. These research questions were not the primary focus of the formative research study.

6.2 Summary recommendations

While some comparisons could be made between Aponjon subscriber types and modes of registration, data completeness, data quality and overall sample sizes limited potential sub-analyses during the formative phase. Summary recommendations to guide program adjustments and future evaluation efforts focus on research design, indicators, process monitoring, and quality assurance.

Programmatic recommendations: Based on the formative research findings, the following steps are recommended as minor adjustments to the implementation of Aponjon to ensure better fidelity of the intervention to its intended plans, and to strengthen the ongoing monitoring of the program so that evaluation efforts can continue to guide programmatic efforts in the future. The feasibility of integration of these recommendations into routine monitoring of program activities for evaluation should be discussed with all implementing partners and stakeholders involved in the day-to-day program implementation process.

- To boost brand awareness, place greater emphasis on the Aponjon brand name when promoting the service through messages and CHW outreach. Currently subscribers recognize the short code telephone number, but few recognize the program name. Low brand awareness could undermine trust in the service as many subscribers noted that numerous phone-based scams called "Jiner badshah" have taken advantage of people in their locales.

    - The service should capitalize on existing "brand ambassador" subscribers who have enrolled and appreciated the service to spread information about the service and particularly the brand name. Brand ambassadors could be given promotional gifts or other materials to use and distribute, showcasing the service's brand name. They could also lead community meetings to tell others in the community more about Aponjon. Using local leaders and relatable spokespeople can help to increase awareness of Aponjon while also forging greater trust in the brand.

    - Alternatively, Aponjon could elect to forego the name altogether in favor of popularizing the short code 16227. The short code is already widely recognizable among subscribers and it is the number that subscribers must recognize when they receive and decide whether to answer calls on their phones. The number, however, has little meaning compared to the word "Aponjon" and committing to the number as a brand identity would tie the service to a mobile-based platform that may not offer the flexibility the service needs for continuing to grow and expand in the future.

- Institute refresher trainings for CHWs to standardize the registration and enrollment process, including the description of the lifetime cost of the service. Build upon successful partnerships (e.g., MaMoni, BRAC) and identify other community-based organizations that can help to promote Aponjon as a means of generating additional potential subscribers.

- Conduct refresher trainings with call center agents, particularly to discuss quality control processes for avoiding incomplete data.

- Conduct refresher trainings with Dnet staff on the application of the payment determination algorithm. Document reasons for exceptions to the algorithm determinations of payment status within the registration database.

- Develop a system of unique identifiers that can be used to link all together all datasets with subscriber-level information. The option to trace information on client demographics, stage in pregnancy when MAMA-Aponjon services were used, and timing and reasons for deregistering will be invaluable to evaluating utilization patterns of this service.

- Continue to use of a mixed methods approach to evaluation, but refine the instruments and

questions using pre-tests, so that data collection efforts have limited need for mid-stream changes to research instruments, thus allowing data to be combined across waves.

- Aponjon indicators should avoid vague language and should be appropriate to the data collection methodology.
  - Survey questions should be close-ended questions with discrete response options and logical skip patterns that are rigorously followed in data collection.
  - Qualitative indicators should be open-ended and seek to elicit rich discussion that provides insight into a topic of interest in the evaluation.
  - Aponjon must make sure that survey and interview questions are phrased and ordered in a neutral, not leading, manner
- Consider modifications to Aponjon content to include more detailed messages on nutrition. Explore options for increasing the customizability of messages based on subscriber characteristics (e.g., customized for first-time mothers vs. mothers who have already had a child).
- Develop a proactive system for using SSD Tech data on message delivery and receipt to identify and track service issues. Investigate service issues in a timely manner and communicate the resolution to each issue with subscribers as relevant.
- Set a regular schedule for sending messages and reimbursing subscriber telephone accounts for message fees. Unpredictability of messages, charges and reimbursements were sources of frustration for subscribers and could be avoided by setting a regular schedule so subscribers knew when to expect messages and fluctuations to their phone credit accounts.

AVOIDING LEADING LANGUAGE IN MEASUREMENT INDICATORS

Survey questions and qualitative topics of inquiry should avoid the use of leading questions, as the way in which a question is phrased can have an effect on the response a researcher obtains. Here are some examples:

- Respondents should not be reminded about how the service is currently designed (e.g., frequency of messages) before being asked how the service should be designed. **Why?** This type of phrasing often leads respondents to be agreeable and answer that the service should stay as-is.
- Open-ended questions provide opportunities for respondents to voice their opinions and provide constructive criticism about the program. **When can they be used?** If researchers are interested in suggestions for improvements to the service, an open-ended question can elicit feedback respondents may not have raised when responding to previous close-ended questions.

Global evidence recommendations: Based on the formative research study, the following points are recommended for consideration as Aponjon considers its long-term evaluation plan, and the way in which research on this program could contribute to the global mHealth evidence base.

Contribution to the global evidence base can also be valuable to the program, as findings may help to define any variations in program impact for specific sub-populations of subscribers, and sub-population research or new pilot tests for program expansion may build evidence for strategic growth of the program over time.

- **The research design** of an impact evaluation of Aponjon should include a control arm for comparison and attribution of change to the service. It should include a time element to measure sustained change, and even to measure change in individuals' knowledge and behaviors pre- to post-exposure to the service. The design should carefully consider the sampling frame of the study and the sampling approach so that generalizability of findings can be clearly defined.

- Options for **a 'control' or comparison group** for Aponjon should be explored. In order to establish an evidence base for the effectiveness of Aponjon services on health outcomes, it will be critical to measure certain proxy indicators of health service utilization in the next phase of evaluation. Potential data sources to assess antenatal and post-natal service utilization of Aponjon users should be explored to identify suitable data sources as 'controls' for comparison with intervention group of Aponjon users. The merit of using either comparable Demographic and Health Survey (DHS) estimates or creation of a control arm for long-term program evaluation need to be discussed further to inform impact evaluation.

- **The research methods** should be used to their best advantage for gaining insight into program effects. In particular, qualitative methods should focus on specific sub-populations or topics of great interest to the program. For example, qualitative research could explore the difference in perceptions of program content among first-time parents vs. experienced parents, asking interviewees to describe their pregnancy and motherhood experiences and the information that they referenced to ensure that the woman and child remained healthy.

- **A process documentation framework** should be developed to track major program decisions and he rationale for those decisions, so other programs can benefit from the ongoing discussions Aponjon implementers and researchers may have had in launching and scaling-up the service

The way forward: A core data set for Aponjon evaluation

The formative evaluation has aided in the process of collating the on-going monitoring data, assessing the quality of the data and identifying critical gaps in data monitoring that would need to be addressed for the next phase of program evaluation. Table 6.2A provides an overview of key limitations of the data used for the purpose of the analyses presented in this report and preliminary recommendations for the next phase of evaluation.

WHAT IS PROCESS DOCUMENTATION, AND HOW IS IT DONE?

Aponjon is a novel, revolutionary program and global stakeholders are interested in understanding the intricate details of the project's inception and evolution. A process documentation framework may help Aponjon organize its data on the project's development so that the story can be easily shared with others and understood without the need for additional interpretation or explanation.

What is it?

- Process documentation is a framework for consistently capturing and sharing concepts, plans and information.

Why do it?

- A process documentation framework may be valuable for considering the range of stakeholders with whom data could be disseminated and shared, discussed and ultimately turned into recommendations for program revision.
- A framework is useful for ensuring that a project continues to move forward rather than revisiting old discussions – it helps to create a repository of the project's main decisions that helps to shape a story about how the project came into existence and evolved to its current state.
- Documentation helps to create a systematic framework for describing intervention strategies and the subscriber-service interaction.

How is it done?

- Compared to simple project monitoring, process documentation is more involved. It entails constant reflection on critical indicators of process measurement and assessment for the project and the meaningful attributes by which those indicators can be compared.
- Process monitoring entails detailed notes about the process of decision-making and review within a project. This helps outsiders understand how the project actually operated, including what roles and responsibilities individuals covered over the project's lifecycle, but also what the broad goals of the project and expectations of team members were to guide the project over time.

TABLE 6.2A
Key limitations of the data, Preliminary recommendations for next phase evaluation

Data Source	Limitations	Recommendations
Registration Data	Large number of missing fields for registration data, especially for individuals who have self-registered. These concerns about data quality due to missing data undermine confidence in the conclusions of the data analyses	- Registration data provides critical demographic information to inform future marketing and client targeting efforts. It also provides baseline information for comparing user patterns over time. Therefore, in collaboration with implementation partners, assessment of methods to promote data completeness and accuracy should be considered
Deregistration Data	The current evaluation phase did not allow sufficient time to follow a registered family from the pre-natal stage till the time their child is 1 year old. Due to incomplete deregistration data, it was not possible to assess the reason for deregistration.	- Exit interview when a participant deregisters - Matching of patient ID on exit interviews with registration ID to assess the stage of reproductive health continuum of care the client is in when they deregister
Payment Status Data	Self-registered individuals, who have not gone through the call-center registration process, get defaulted into paid status. The algorithm for assigning a payment status to individuals is not uniform across individuals. Inconsistent rules about application of differential pricing models. E.g. All BRAC-assisted subscribers received free service regardless of data completeness or SES data	- Frequent reporting of data from D.Net can aid the process of monitoring the payment data so as to maintain consistency in client assignment and quality of data.
Phone Surveys	Of the 4 phone surveys, the sample size for survey 1 and 2 were very small.	- Increasing sample size for phone surveys based on key outcome indicators that are to be reported - Ensure consistency of survey questionnaires across phone surveys to facilitate longitudinal comparison of adoption patterns and user satisfaction - Review of the questionnaires to revise phrasing of certain questions that might be leading and therefore bias the responses
Qualitative Interviews	Qualitative interviews were highly structured with mostly close-ended questions	- To assess client satisfaction with MAMA and challenges to adoption of MAMA, qualitative interviews should be restructured to include mostly open-ended questions which allow the interviewer to delve further into the reasons for limitations in access. - The number of qualitative interviews should be limited to a few key respondents strategically sampled to represent variations in user groups.

DETAILED RECOMMENDATIONS FOR PROGRAM IMPLEMENTATION AND FUTURE AREAS OF RESEARCH

Detailed recommendations on programmatic adjustments and future areas for research are discussed below.

The formative research study was primarily designed to assess reach and process-related factors that may affect subscriber enrollment and retention in service. **Program implementation** recommendations focus on reach, process monitoring and immediate program implementation adjustments that could improve the program's fidelity to intended processes.

As Aponjon seeks ways to substantiate claims about program impact and offer research that builds the global evidence base for mHealth interventions, recommendations on **future areas of research** suggest research questions the program may find worthwhile to explore. These research areas may help researchers and implementers better understand variations in Aponjon's impact among sub-populations of subscribers.

7.1 Program implementation

Message content

In general subscribers were either pleased with the content of messages or found it redundant with messages they receive through other sources. From the qualitative data is seems plausible that satisfaction with content was correlated with geographic distribution of subscribers and that specifically urban subscribers were less satisfied with the content and found it less novel compared to rural subscribers. Qualitative data also suggested that parents with multiple children may have found the content, particularly about pregnancy, less useful. New parents, however, found the content informative ostensibly since they have not experienced pregnancy and childcare before. Lastly, proximity to other family members may be related to evaluations of the message content. The data did not allow for this analysis, but a few interview comments indicated that women and gatekeepers who live apart from other older family members were reassured by the messages because they had fewer sources to turn to for information about healthy pregnancy and child care.

Aponjon may want to add some new content to the messages, particularly to attract urban subscribers. 'Packages' of messages could be targeted towards more specific audiences, such as urban subscribers. Several subscribers were interested in content related to issues that receive less media coverage such as how to care for a newborn's hair and how to improve the relationship between fathers and children. Some subscribers also requested more nutritional information for pregnant women in their first trimester and for children starting to transition to solid foods and developing food allergies. Field visits and reasons for deregistration also suggest that miscarriage should be addressed in the Aponjon message content.

Service design

While many subscribers were happy with the service as-is, a few suggestions were made pin regards to the length of the service, repetition of messages and in one location the language of the messages.

Many subscribers were happy with the overall length of the service from the sixth week of pregnancy through the first year of a child's life. Some, however, requested that the service be extended through the child's toddler years. Aponjon could consider developing an extension of their service that is relevant to parents of older children.

Several subscribers complained that they received repeat messages during the subscription. Compounded by the fact that each message is associated with a charge, the repeated messages became a source of frustration for a few subscribers. Aponjon should ensure that there is ample content to avoid repeating messages. Subscribers should be made aware of the option to call, at a fee, and re-listen to past messages in case they would like to hear messages once again. Aponjon could also number the messages or indicate the week of pregnancy or motherhood that the message targets, to reassure subscribers that each message is unique and specific to the woman's stage.

Aponjon should continue to explore the extent to which subscribers struggle with the "Banglish" language of the messages. Feedback about difficulty with comprehension was limited to interviews in Sylhet, but may be more widespread. If language is a widespread concern Aponjon should consider using local dialects to enhance subscriber comprehension of the messages.

Technology platform

Ensuring the quality of the Aponjon service is critical to maintaining a high rate of subscriber retention. During the pilot, the "Aponjon" formative research team used phone surveys, interviews, field visits, a user acceptability study and a focus group of initial users to investigate technical problems and the extent of service disruptions.

Across all data collection methods there were several subscribers who noted problems with not receiving messages. Service disruptions of this sort should be addressed immediately, as trust in the service is threatened when the service is inconsistent. Aponjon should conduct a thorough investigation of subscriber issues related to service disruptions such as not being able to hear messages or not receiving messages in order to determine whether the problem lies with the telephone company, SSD-Tech, a lack of phone credit balance, issues with the network or some other reason. Aponjon should also update their project monitoring plan to include an auto-warning signal on subscriber activity reports to SSD-Tech and Dnet to indicate when subscribers are not receiving messages.

One of the most-often cited service issues was the unpredictability of message receipt. Many subscribers described their frustration in missing messages since the messages were not sent on set days. Although subscribers could indicate a general time of day that they preferred to receive messages, some noted that messages sent during the week disrupted their work schedule and thus there may be variability in timing preference depending on the day of message delivery. Finally, messages were sometimes backlogged, so that a few subscribers complained about receiving too many messages within a short time period when the backlogged and new messages all arrived

within the same day. Aponjon should identify fixed days of the week on which messages will be sent (preferably different for women vs. gatekeepers). Adherence to a message-sending schedule will help subscribers can know when to expect the messages, and may prevent frustration associated with missed calls. Pending messages should be spaced apart from the new messages so that subscribers are not overwhelmed.

Similar to the message sending schedule, a schedule for message reimbursement to free and discounted status subscribers should be established. Several subscribers remarked that they were taken by surprise when their phone accounts suddenly increased or dropped in value. Aponjon should strive for a more regular charge and reimbursement schedule, or preferably real-time deduction and reimbursement for messages. Alternatively, if payment for the service is eliminated, this source of frustration can be avoided.

A few subscribers also complained that they received messages for the wrong stage of pregnancy or motherhood. While this may be an issue with data quality from registration forms (e.g., last menstrual period or date of birth recorded incorrectly), it could also represent a technical issue with messages being directed incorrectly. Aponjon should raise awareness of the Customer Service Call Center so that subscribers can have these technical issues addressed and so that Dnet and SSD-Tech can investigate the problems in a timely manner.

Registration process and CHW partnership strategy

The formative findings made it very apparent that there was partner-based variation in enrollment to Aponjon. Dnet concluded that training, monitoring and overall enthusiasm of the outreach partner were critical in the success of engaging CHWs in subscribing their clients to Aponjon. The data indicate incentives are also an important factor in motivating CHWs to enroll subscribers into the service.

Aponjon ought to adopt an incentive system to support CHWs in working with the service. Incentives could help boost enrollment, increase partner support for the program, and potentially improve Aponjon's brand identity since community members place high trust in their CHWs. CHWs working for Aponjon typically earn anywhere from 500-7,000 taka per month. They visit clients once a month on average and each visit requires a significant investment of time and money for transport. Aponjon enrollment often requires multiple visits to a client, since many women ask the CHW to return when a gatekeeper is present and can provide consent for the woman to enroll in the service (this is particularly salient if enrollment entails a financial decision such as paying for service). CHWs are also subscribers' main point of contact if they have questions about service disruptions or when they want to update their subscription status. While greater awareness of the Customer Service Call Center may reduce the burden on CHWs, it is likely that community members would continue to rely on these trusted and familiar individuals for assistance even after the registration process is complete. It is important for Aponjon to acknowledge the work that CHWs contribute to making the service run successfully, particularly in rural communities, and to support the CHWs in their work to make Aponjon a success. Aponjon may be able to leverage partnerships with corporate sponsors to support the provision of incentives to CHWs.

Aponjon may also want to consider ways in which they can boost the quality of the data they receive from the CHWs. One consideration might be educational criteria for the CHWs who enroll participants. Literacy (or lack of literacy) could contribute to lower registration form data quality.

Dnet may have less authority over the criteria for selection of CHWs, however, if they are enrolled into Apojon assistance through the partnering NGOs and projects. In addition, semi-literate CHWs are the fronline of healthcare provision in some areasof Bangladesh; their resonance and their ability to develop rapport with the families in their catchment areas is of critical importance to success in the work that they do. Another option may be to offer trainings, refresher trainings and job aids as means of improving data quality. Dnet should provide regular trainings to CHWs to ensure they maintain a consistent and high standard of quality when enrolling subscribers. Job aids such as an Aponjon "fast facts" card with the short code telephone number, examples of the payment structure and sample topics covered by the messages would help CHWs communicate more accurately about the service. Finally, close monitoring of CHWs – through field visits, data spot checks and reviews of data collection forms for completeness will enhance quality of data.

Development of standard operating protocols and quality assurance measures

Standard operations and quality assurance measures are critical for ensuring high quality data. As Aponjon expands to national scale these procedures will gain importance, since Aponjon staff will not be able to oversee every detail of the program's implementation nationwide.

Standardization of Aponjon processes applies to:

1. Selection of subscribers: CHWs should be applying the same criteria when deciding who to approach and enroll into the service

2. Training of outreach partner CHWs: Dnet must conduct trainings at regular intervals to refresh CHWs on the process of enrolling subscribers. This also allows new CHWs to be brought into the program systematically. Trainings should introduce standard operation protocols for explaining the Aponjon service to potential subscribers, and particularly lifetime service costs.

3. Monitoring of outreach partner CHWs: in partnership with training, CHWs should be closely monitored to ensure they are adhering to protocols for identification of subscribers, enrollment and completion of registration forms. Monitoring could be done with thorough quality checks of registration forms and unannounced spot-checks of CHW interactions with potential subscribers.

4. Standardization of the payment status algorithm: Dnet must make the algorithm more transparent and outline the instances in which exceptions to the algorithm can be made.

5. Monitoring of Customer Service Call Center agents: since agents are responsible for collection of phone survey data, their data collection and data entry should be closely monitored to ensure fidelity to the research instruments and their skip patterns, and to troubleshoot any issues with data quality, data incompleteness and respondent misunderstanding of survey questions.

6. Follow-up on technical service issues: a systematic alert system and clear delineation of tasks for follow-up to technical service issues is very important for maintaining subscriber confidence and trust in the service. Immediate service issues may include failure to receive messages, but ongoing technical issues should also be addressed, such as development of a standardized calendar for sending Aponjon messages to various types of subscribers and a real-time system for charging and reimbursing phone credit for Aponjon messages.

7. Unique IDs for subscribers: to link data from a single subscriber across multiple data collection methodologies, Aponjon should develop unique identifiers for each subscriber. This would infinitely increase the sophistication of analyses that researchers could conduct with the data, as it would allow databases to easily be merged together.

Quality assurance measures are essential for ensuring completeness of data, fidelity to the administration of data collection instruments as intended, and accurate entry and management of the data that has been collected. Study instruments should be rigorously pre-tested before use in the field. Survey questions should avoid vague language. Cognitive interviews help to assess whether respondents are interpreting questions in the way researchers intended and similarly across multiple individuals.

7.2 Future research

Testing differential impacts of the pricing model

The formative phase of Aponjon did not seek to econometrically evaluate different pricing models, however, this could be an interesting avenue for future research. If pricing structures are to be evaluated, Aponjon will need to be able to deploy different pricing structures across similar groups of clients to enable robust comparisons. At present the complex interactions across "ability to pay" and "willingness to pay" for a service that itself is novel in this population make this assessment fairly challenging. The utility of testing different payment schema among subscribers within a common background is that researchers can better determine relationships between pricing tier and subscriber satisfaction and retention to the service. Pricing structures could also be evaluated by seeking a sample of deregistered subscribers at each pricing tier to compare to continuing subscribers of the same pricing tier. Reasons for deregistration as well as other factors that may be associated with deregistration can then be analyzed within a single pricing tier.

While this research may not inform program revisions, as the pricing model for Aponjon is set, the findings could be useful for understanding variation in exposure to and impact of Aponjon as a function of the service's price.

Testing extensions to the technology platform

Several subscribers in structured interviews indicated interest in expanding the technology platform to include a re-contact option. While the informational aspect of the service was appreciated, some subscribers felt they would be better serviced if they were able to contact doctors and ask specific questions through Aponjon.

Aponjon could consider setting up a hotline for subscribers, allowing them to access a doctor who could provide advice to women and gatekeepers, and pilot testing this additional feature against the existing Aponjon service. Alternatively Aponjon could develop and maintain a national database of health facilities organized by location. Interested subscribers could call or text the service using the short code and submit queries about where to go locally for emergency treatment, vaccination, etc. Both strategies may have utility to subscribers; the former may be more beneficial for rural subscribers who have less access to facilities while the latter may be more relevant to urban populations that are more capable of accessing emergency facilities. Pilot

testing of these additional features could offer opportunities to explore satisfaction by location, and identify potential functionalities that could be worthwhile to add to the program in future years.

Testing differential impact by SES

Aponjon's service is available to all women with access to a mobile phone, irrespective of SES. However, a potential avenue for future research is the differential impact of the program by SES. While DHS 2011 data indicates somewhat low ANC utilization across a wide swath of the population[8], use of ANC follows a wealth gradient. Delivery attended by a medically trained provider or trained birth attendant similarly follows an income gradient in which women in lower wealth quintiles have less healthful pregnancy and delivery behaviors. Given the gradations in health behaviors by wealth, we may expect there would be variation in Aponjon's relative impact by wealth categories. For example, population subgroups in lower socioeconomic strata, where the burden of adverse outcomes are greatest, may demonstrate more readily the impact of Aponjon enrollment in contrast to higher-SES subgroups where these differences are less pronounced. Understanding the variability of program impact by SES contributes to the global mHealth evidence base on the utility of these programs among highly vulnerable populations. This area of research would not be intended to supplant routine program evaluation of Aponjon impact on al subscribers, but would be an option for additional analysis to gain deeper insight into the program's effects within more narrowly defined sub-populations of subscribers.

Testing extensions to Aponjon service availability

Aponjon may want to test the health impact of their mobile-based messages broadly, to extrapolate evaluation findings to the national population of Bangladesh. To do so it will be important to consider the fundamental criteria for selection into Aponjon subscription: mobile phone ownership and subscription to a Aponjon partner telephone company. Although the coverage and penetration of individual and household phone ownership is steadily rising across rural and urban populations in Bangladesh, the question of targeting the "last mile" of vulnerable pregnant women remains of interest to the global mHealth community. Further innovation and research would be needed to make Aponjon content available to these underserved clients as necessary, whether through the vehicle of shared community phones, community-health worker managed phones or as is the present case, through connected gatekeepers. Technologies such as cloud-based SIM identities or social innovations such as NGO or Telco-supported 'pregnancy-phones' provided to women during gestation may also provide ways to connect women to this content. A future avenue for research could be pilot testing the relevance and impact of Aponjon's messages on this "last mile" of vulnerable women and their households, to build the case for investment in strategies to scale-up access to these populations that are currently fall outside of Aponjon's reach.

Acquisition and analysis of SSD-Tech call data

SSD-Tech collects a wealth of data on subscriber metrics that could offer exciting avenues for future research to build the mHealth evidence base, and possibly to inform Aponjon's programmatic decisions.

8 DHS 2011 data indicate that report of ever using ANC among Bangladeshi women ages 15-49 who had a live birth in the three years preceding the survey ranged from 48% at the lowest wealth quintile to 55%, 68%, 80% and 93% at quintiles 2-5, respectively.

Dnet should consider developing a core set of receipt metrics to request from SSD-Tech rather than relying purely on sending metrics to measure success of the intervention. Identification of core receipt metrics would require in-depth discussions between Dnet and SSD-Tech to understand exactly what data is being collected and how it can be shared between the two companies. However, a few opportunities for use of call metrics include:

- Categorizing messages by content area (e.g., birth plan development, maternal nutrition, child vaccination, etc) and then measuring exposure to messages by content area. Exposure could be measured by receipt of message.
- Measure acceptability of messages by content area. Acceptability could be measured by length of time subscriber spend listening to IVR messages, or by whether subscribers open the SMS message.
- Use SSD-Tech data on exact dates and times of self-registration requests by call or text to explore how subscriber enrollment may be modified by specific advertising strategies (e.g., mobile van and loudspeaker broadcasting).
- Use SSD-Tech data on daily subscriber rates to monitor fluctuations in enrollment and deregistration by region or in relation to specific time points during pregnancy/motherhood or receipt of messages related to a specific content area.

APPENDICES

A: English version of Registration Form
B: Phone Survey Instrument – Wave 3 (Pregnant women and mothers)
C: Phone Survey Instrument – Wave 4 (Gatekeepers)
D: Structured Interview Guide – Pregnant women
E: Structured Interview Guide - New mothers
F: Structured Interview Guide – Gatekeepers
G: Structured Interview Guide – Outreach partner healthcare workers

Appendix A: English version of Registration Form

Mobile Alliance for Maternal Action
Customer acquisition form by health workers

Verbal consent:

Hi. My name is _____. I am working for a formative research called M4H or Mobile for Health to launch a new service. This research is initiated by USAID and coordinated by Dnet (Development Research Network) with support of outreach partners BRAC, Save the Children USA, Smiling Sun Franchise Programme and Ministry of Health (Government of Bangladesh).

You are selected as a potential respondent of this study as you are either pregnant or have a child under 1 year of age and have agreed to register for the mobile based health service. The aim of our research is to measure the usability of health contents for pregnancy and post-partum level which will be transmitted to women by their mobile phones. As you agree to register for the service you will be given a short code, and you will receive phone calls twice a week. When you receive the call you will get the chance to listen to the health message of that week.

For completing the registration process and better designing of the service, we will ask some basic information on yourself, about the mobile phones you have access to, about your willingness to pay for mobile service.

There should be little or no risk for participating in the survey. The information that you will provide us will be used for our research, which will be incorporated for developing the service nationwide. Any information that you provide us will be confidential. The data from the research will be processed for journal articles or reports and only researchers of this study will have access to it. Your name in no cases will be published. Your identity will be kept confidential and will be transcribed as a code. We might take your pictures during the survey and publish it in reports or journal articles without your name on it. We will show the pictures to you and you may ask us to delete the photos. We will also require your cell number by which you will be registered to the service. We might call you intermittently during the service to get feedback about the service.

You will not receive any incentive for participating in this service.

Here is my card with my name, contact information, name of the research organization responsible for the research. Please feel free to contact me in future if you have any question related to the survey. You might also check out your right to participate in the survey, in that case I can provide you with the contact details to USAID.

Do you have any questions related to this study? Yes No

Do you agree to participate in this research? Yes No

Do you permit us to take your photographs? Yes No

Continue the survey _____Please tick ( )

Or, Discontinue the survey_____ Please tick ( )

Thank you so much for your cooperation

_____

Signature & Name of interviewer

Date:

Time of interview: Start **End:**

I. General Info:

01	**Name (pregnant woman/mother)***						
02	**Age**						
03	**Nationality**	■ Bangali	■ Aborigine				
04	**Village/City/Town**						
05	**Dictrict**						
06	**Position of woman* [pregnant/mother]**	■ Household head [1]	■ Not household head [2]				
07	**Family income (monthly in BDT)**						
08	**Profession of household head***	■ Farmer [1]	■ House-wife [2]	■ Teacher [3]	■ Day la-bourer [4]	■ Business-man [5]	■ Govt. em-ployee [6]
		■ Private sector employee [7]	■ Employee of NGO [8]	■ Working outside village / Migrant worker [9]	■ Others (Write the profession):		
09	**Pregnant/mothers edu-cation***	■ No education [1]	■ Incomplete pri-mary education [2]	■ Primary educa-tion complete [3]	■ Incomplete sec-ondary education [4]		
		■ Complete sec-ondary education [5]	■ Incomplete high-er secondary [6]	■ Higher second-ary complete [7]	■ Higher second-ary [8]		
10	**Present condition of client***	■ Pregnant [1]	■ Mother of child under 1 year [2]				
11	**If pregnant****	Last menstrual period(LMP):					
12	**In case of mother****	Date of birth of baby:					

*** - Must question for the survey** **** - Health worker will prompt the question**

II. For service

No.	Questions	Answer	Direction for health worker
01	**Mobile phone number that will be used for the service ***	■ No phone	Tick no phone if applicable
02	**Who owns the phone?**	■ Women herself [1] ■ Husband's / guardians [2] ■ Neighbour [3]	IF answer is 3, then tell client to inform her neighbour about the service from 16227 and receive the call only when the client is with her.
03	**How do you want the service?***	■by sms [1] ■ by voice [2]	
04	**Incase of voice**	■ Will receive the phone call (push) [1] ■ Will call the service herself (pull) [2]	Incase the answer is 2, user will call to 16227 to listen to messages

No.	Questions	Answer	Direction for health worker
05	**Husband/guardian's mobile number***	■ No phone	■If husband/ guardian has a phone tell client that he will also receive a message every week on same mobile ■If husband/ guardian does not have a phone tell client that he will not receive any message
06	**Time for receiving voice messages***	■ Morning (From 8 a.m. to 12 p.m. ■ Afternoon (12-4 p.m. ■ Evening (4-8 p.m.) ■ Night (8-11 p.m.)	Not applicable if answer to 4 is option 2

*** - Answers are required to end the survey**

III. About paying the bill

Sl.	Questions	Answer	Direction
1	Are you ready to pay for the service?	■ Yes, if it is very small [1]	■ If answer is 1 , go to Q-2 ■ IF answer is 3 , then tell the client that if free service is possible you will tell her
2	If every sms is charged 2 taka and IVR as 2 taka per minute will you pay for the service?	■ Yes, any amount for the service [2]	■ If answer is 1 then say: Thank you for registration. You will receive messages every week. Your husband will receive one message every week. [If answer to section II Q5 is "No phone" then this sentence will not be applicable.] Tell her she will have to pay six taka for herself and husband/guardian every week. If she wants to repeat message, she will be charged extra two taka for each message. ■ If answer is 2 then go to 3.
3	If not why?	■ Not at all [3]	■ If answer is 1, then thank you for your time ■ If answer is 2, see if answer to Q10 of section I is 1 or 2, then go to Q4 of section III.

(Continued)

Sl.	Questions	Answer	Direction
4	Can you pay one taka for the service?	■ Yes [1] ■ No [2]	■ If answer is 1 then say: Thank you for registration. You will receive messages every week .Your husband will receive one message every week. [If answer Section II Q5 is "No phone" then this sentence will not be applicable.] Tell her she will have to pay three taka for herself and husband/guardian every week. If she wants to repeat message, she will be charged extra two taka for each message. ■ If answer is 2 then tell the client that you will inform her if she gets free service.

* - Answers necessary for the survey

Healthworker's signature:

Date:

Signature of focal point:

Date:

Appendix B: Phone Survey Instrument – Wave 3 (Pregnant women and mothers)

Women's Phone Survey Questionnaire

Modified Jan 2012

Questions with answers

1 a. Name:

1 b. Address
- Village/ Area /City
- Zilla
- Upazilla
- Union/ Thana

1 c. What is your family income?
- ≤5000 taka
- 5001-10000 taka
- 10001-20000 taka
- 20001-40000 taka
- > 40000 taka

1 d. What is your occupation?
- Farmer
- Housewife
- Teacher
- Day laborer
- Businessman
- Govt. Employee
- Non-Govt. employee
- NGO employee
- Others _____

1 e. What is the occupation of household
- Farmer
- Housewife
- Teacher
- Day laborer
- Businessman
- Govt. Employee
- Non-Govt. employee
- NGO employee
- Others _____

1 f. What is your level of education
- No eduction
- Incomplete primary
- Complete primary
- Incomplete secondary
- Complete secondary
- Incomplete higher secondary
- Complete higher secondary
- Above higher secondary

1 g. How old are you?

<15 years
15-19 years
20-25 years
26-30 years
31-35 years
>35 years

2. Your cell number:

3. Cause for registration
- Pregnancy
- Mother of one year old

4. Service choice
- sms
- IVR

5. Where did you learn about this service? (Multiple answer)

(Objective: to understand success of campaign materials and involvement of health workers .Will answer hypothesis 5.1.4 –C)

- Poster
- Hospital/Clinic
- Mike
- Leaflet

- Relative
- Health worker/Info lady
- Husband/Guardian
- Others

6. You are receiving 2 messages per week now. How many messages would you like to receive per week? (Single answer)

[Objective: To answer hypothesis 5.1.1 A]

- Every day one message
- 2 health messages per week
- 1 message per week
- 2 messages per month
- 1 message per month

7. You will receive messages for pregnancy from 6 weeks until you deliver the baby. Do you think the duration of receiving messages is adequate?(Single answer)

[Objective: To answer Hypothesis 5.1.1 B]

- Yes
- No,it is not required (See question no. 8)
- Not applicable
- Others

8. If the answer to question no. 7 is "No,it is not required "then ask the respondent her preferred length of period when she wants to receive the messages.(Single answer)

- First trimester of pregnancy
- Second trimester of pregnancy
- Last trimester of pregnancy
- First and last trimester of pregnancy
- Others

9. (For mothers) You are now entitled to receive messages for your baby from his day 1 to 52 weeks (until his first birthday). Do you think the length of period to get the messages is right? (Single Answer)

[Objective: To answer Hypothesis 5.1.1 B]

- Yes
- No,it is not required (See question no. 10)
- Not applicable
- Others

10.If the answer to question no. 9 is "No,it is not required "then ask the respondent her preferred length of period when she wants to receive the messages.(Single answer)

- First three months after the baby is born
- First 6 months after the baby is born
- Others

11. This service charges you 2 taka for sms.How much you think the charge should be per sms?(Single answer)

[Objective: To answer Hypothesis 5.1.3A]

- 1 taka
- 2 taka
- 3 taka
- 5 taka
- Not applicable
- Others

15. This service charges you 2 taka per minute for IVR.How much you think the charge should be per minute? (Single answer)

[Objective: To answer Hypothesis 5.1.3 A]

- 1 taka
- 2 taka
- 3 taka
- 5 taka
- Not applicable
- Others

16. Who pays for the Aponjon service? (single answer)

(To answer Objective 1)

- You
- Your husband
- Guardian
- Not applicable

- Others

17. Who owns the mobile phone that you use for this service? (Single answer)

(To answer Objective 1)

- Your
- Husband's
- Guardian's
- Health worker/Infolady's
- Other

18. Who else receives messages in your family?(Single answer)

- Husband
- Mother
- Father
- Father-in-law
- Mother-in-law
- Grandmother
- Grandfather
- Brother
- Borther-in-law
- Sister
- Sister-in-law
- Uncle
- Aunt
- Other

20. Whom did you consult to enrol for the service? (Single answer)

[Objective: To answer Research question no.4]

- Health worker/Infolday
- Guardian
- Relative
- Neighbour
- Husband
- I decided myself
- Other resipient of the service
- Others

22. How many messages are you receiving now?

- Regular 2 messages per week
- Regular 1 message per week
- Irregular 2 messages per week
- Irregular 1 message per week
- Not getting any message

23. Do you face any problem to listen to messages (Only IVR)

- Yes
- No

24. If yes to 23, then what kind of problems you face? (Only IVR)

- Phone calls come, but can't hear anything, call gets cut after a while
- Phone call comes, lots of noise, can't hear any message
- Sometimes do not have balance in the phone, can't hear anything
- We don't have strong network here, so can't hear anything
- I have problem in my phone set, can't hear anything
- Can't receive phone call when I am busy
- When I am at work, can't concentrate on the messages as the sound gets lost in the crowd
- Other_____

25. Do you have any problem reading the sms? (only for sms)

- Yes
- No

26. If yes to Q-25, What kind of problem you face (sms)

- Understand the message after reading several times
- I can't read , if someone reads it then I can understand this
- If the sms was in Bangla then it would be easier
- Others_____

27. Is your gatekeeper getting message every week?

- Yes
- No
- He is not registered

28. Do you understand the messages?
- Understand without problem
- Sometimes find problem
- Does not understand at all
- Other_____

29. Can you recall the message you received last week?
- Yes (See Q-30)
- No

30. Write down the message in Q 29.

31. Did you listen to any message by calling to 16227?
- Yes
- No, never tried
- Tried but could not listen
- Did not hear about any facilities like this
- Others_____

32. Do you have any complain?(Multiple answers acceptable)
- The service price is too high
- Phone calls get cut in the middle of the message
- Getting repeated messages and I am being charged
- Uncomfortable with the language of the messages
- Cannot read the English text
- Still getiing messages of the pregnant women
- Information is not useful
- Want to discontinue the service but cannot do it
- I want for facilities form the service but cannot get it
- I don't want to pay for the service
- I am not happy with the customer service center
- I do not know who has registered me , but I don't want the service
- Health worker has registered me with the serrvice by force, but I did not want the service
- Others_____

33. Do you have any expectation from the service?
- Want to know where the vaccination center is
- My child is sick, I want to talk to a doctor
- I am sick, I want to talk to a doctor
- Want emergency transport , how can Iinform them
- Need to know which doctor to visit for antenatal check up
- Want consultation of doctor on various issues
- Want address of specialist doctor
- Want to know in which hospital I can get the service
- Want to know where I can get free treatment
- Want to know where I can get medicine
- Others_____

34. Do you expect anything from Aponjon?

35. Could you do anything according to health information?
- Yes
- No
- Others_____

36. If yes to 35, Which actions you could

take?

- I could know my blood group
- Could take food during pregnancy
- Took Tetanus vccination
- Arranged delivery centre/transport/skilled midwife for delivery
- Fed baby breastmilk up to 6 months exclusively
- Took Family planning method
- Went to immuniza baby
- Went for ANC
- Could take actions when saw danger symptoms of pregnancy
- Others_____

37. Did you ask anyone to register for the service?

- Yes
- No

38. If yes to 37, who did you inspire?

- Sister, sister-in-law
- Neighbor
- Friend
- Others_____

39. Are you satisfied with the service?

- Yes
- No

40. Do you have any suggestion to improve the service?

_____(Write in detail)

Appendix C: Phone Survey Instrument – Wave 4 (Gatekeepers)

Gatekeeper's phone survey questionnaire

Modified: Jan 2012

1. Name:

2. Mobile phone number of husband/ guardian:

3. Relationship with pregnant women/ mother (any one)

- Husband
- Mother
- Father
- Father-in-law
- Mother-in-law
- Grandmother
- Grandfather
- Brother
- Borther-in-law
- Sister
- Sister-in-law
- Uncle
- Aunt
- Other

4. Sex of respondent

[Objective: To answer Research question 5]

- Male
- Female

5. Mode of service:

- sms
- IVR

6. Please write down the mobile phone number that the respondent use for the service: _____

7. Who owns the mobile phone that you use for this service? (Single answer)

(To answer Objective 1)

- Yours
- Pregnant women/mother
- neighbour
- Other

8. Where did you learn about this service? (Multiple answer)

(Objective: to understand success of campaign materials and involvement of health workers .Will answer hypothesis 5.1.4 –C)

- Poster
- Hospital/Clinic
- Mike
- Leaflet
- Relative
- Health worker/Info lady
- Husband/Guardian
- Others

9. Who has registered your wife/relative for this service?

[Objective: To answer hypothesis 5.1.7 A]

- You
- Wife/relative herself
- Health worker
- Other

10. Did your wife/relative take your advice to register for the service?

[Objective: To answer hypothesis 5.1.7 A & B]

- Yes
- No

11. Before getting the content did you know that you are registered for this service?

[Objective: To answer hypothesis 3.1.7 A & B]

- Yes
- No
- Others

12. Do you think your wife/relative should register for this service?

[Objective: To answer Research question 4]

- Yes
- No
- Others

13. If answer to 12 is yes, then why do you think she should get the service?

- She will be aware of her health
- She will be able to take care of her health
- Wll take care of child
- Other

14. Do you think you should be a part of the service?

- Yes
- No
- Other

15. If answer to 14 is yes, why do you think it is necessary?

- I don't know a lot of thing which I know now
- I can take care of mother and child better than before
- I am prepared for emergency
- Other

16. You are receiving 1 messages per week now. How many messages would you like to receive per week? (Single answer)

[Objective: To answer hypothesis 5.1.1 A]

- Every day one message
- 2 health messages per week
- 1 message per week
- 2 messages per month
- 1 message per month
- Other

17. This service charges you 2 taka for sms.How much you think the charge should be per sms? (Single answer)

[Objective: To answer Hypothesis 5.1.3A]

- 5 taka
- 3 taka
- 2 taka
- 1 Taka
- Not applicable
- Others

18. This service charges you 2 taka per minute for IVR.How much you think the charge should be per minute? (Single answer)

[Objective: To answer Hypothesis 5.1.3 A]

- 5 taka
- 3 taka
- 2 taka
- 1 taka
- Not applicable
- Others

20. Who pays for Aponjon Service? (Single answer)

(To answer Objective 1)

- You
- Your wife
- Relative
- Guardian
- Not applicable
- Others

22. Are you receiving one message every week?

- Yes
- No
- Others_____

23. Do you have any problem listening to the message(IVR only)

- Yes
- No
- N/A

24. If yes to 23, then what kind of problems you face?

Write in detail_____

25. Did you listen to any message by calling to 16227?

- Yes
- No, never tried
- Tried but could not listen
- Did not hear about any facilities like this
- Others_____

26. Do you have any complain?(Multiple answers acceptable)

- The service price is too high
- Phone calls get cut in the middle of the message
- Getting repeated messages and I am being charged
- Uncomfortable with the language of the messages
- Cannot read the English text
- Still getiing messages of the pregnant women
- Information is not useful
- Want to discontinue the service but cannot do it
- I want for facilities form the service but cannot get it
- I don't want to pay for the service
- I am not happy with the customer service center
- I do not know who has registered me , but I don't want the service
- Health worker has registered me with the serrvice by force, but I did not want the service
- Others_____

27. Do you have any expectation from the service?

- Want to know where the vaccination center is
- My child is sick, I want to talk to a doctor
- My wife is sick, I want to talk to a doctor
- Want emergency transport , how can Iinform them
- Need to know which doctor to visit for antenatal check up
- Want consultation of doctor on various issues
- Want address of specialist doctor
- Want to know in which hospital I can get the service
- Want to know where I can get free treatment
- Want to know where I can get medicine
- Others_____

28. Could you do anything according to health information?

- Yes
- No
- Others_____

29. If yes to 28, Which actions you could take?

- Immunization of baby
- Antenatal checkup of pregnant woman
- Treatment of baby
- Preparation for delivery
- Nutrition
- Family planning
- Others _____

30. Are you satisfied with the service?

- Yes
- No
- Other_____

31. Do you have any suggestion to improve the service?

_____(Write in detail)

Appendix D: Structured Interview Guide – Pregnant women

Questions
W (Q-1) How many phones do you have in your house?
W (Q-2) Whose phone you use for Aponjon service?
W (Q-3) Do you face any problem to get Aponjon service? What kind of problems you face?
W (Q-4) How did you register?
W (Q-5) Who inspired you to register for the service?
W (Q-6) Which date did you prefer for registration? EDD or LMP? Why?
W (Q-10) What is your opinion about this service? (Could you please tell us three good things and three bad things about Aponjon?)
W (Q-11) What is your husband's or guardian's opinion about this service?
W (Q-12) Do you know about the Customer Service Centre (CSC) of Aponjon?
W (Q-13) Did you ever contact with the Customer Service Centre (CSC)? If yes, For what purpose? If no then why?(if applicable)
W (Q-14) What do you think, What could be done to communicate easily with the CSC agents?
W (Q-15) Do you think two messages per week is enough? What do you prefer? More messages or one message per week?
W (Q-16) Which way you prefer most to get the messages -SMS/IVR (push/pull)? What are the reasons behind it? (show the demo)
W (Q-17) Did you ever miss push IVR call? If happened, why? What did you do then?
W (Q-18) What is your opinion about the service charge? What amount will be better for you?
W (Q-19) If the service charge increases, will you continue this service or if needed, will you register again?
W (Q-20) Did you ever feel that any additional content could have been included in the Aponjon messages?
W (Q-21) Did/do you find it difficult to understand (read/listen) the messages? If you have, who did you consult?
W (Q-22) Did you ever seek help from others to understand the messages? If yes, then whose help you had taken?
W (Q-23) From whom did you know about the service? (Did you receive any leaflet? If yes, from where did you get that? If not, which place will be better for you to get the leaflet easily?) (Example: if you get it from the clinic then will it be better for you?)
W (Q-24) Did you feed colostrum to your child after birth? If didn't, what is the reason you think? After six month of your baby's birth, did you give formula milk or anything else? If child is six months, do you feed your baby other family foods with the breastmilk? If not, what are the reason for this? (listen in details)
W (Q-25)Can you tell us some messages those you liked most? (Does it help when to go to immunize, ANC, PNC?) Did you follow the instructions or suggestions? If you were not a subscriber what would you do? (what changes it makes)
W (Q-26) After subscribing this services what new things you have learned?
W (Q-27) Do you find any change to your husband/guardian's behavior after subscribing the service? If there are any changes, how do you feel about that? If there is no change to your husband/guardian behavior, what is your thought about that?
W (Q-28) Do you find any behavior change to your neighbors who are the subscribers of this service? What sort of changes do you find?
W (Q-29) Will you give suggestion to others to be registered? (Listen in detail)
W (Q-30) If you conceive again or become a mother, will you again subscribe the service?

Appendix E: Structured Interview Guide – New mothers

Questions
W (Q-1) How many phones do you have in your house?
W (Q-2) Whose phone you use for Aponjon service?
W (Q-3) Do you face any problem to get Aponjon service? What kind of problems you face?
W (Q-4) How did you register?
W (Q-5) Who inspired you to register for the service?
W (Q-6) Which date did you prefer for registration? EDD or LMP? Why?
W (Q-10) What is your opinion about this service? (Could you please tell us three good things and three bad things about Aponjon?
W (Q-11) What is your husband's or guardian's opinion about this service?
W (Q-12) Do you know about the Customer Service Centre (CSC) of Aponjon?
W (Q-13) Did you ever contact with the Customer Service Centre (CSC)? If yes, For what purpose? If no then why?(if applicable)
W (Q-14) What do you think, What could be done to communicate easily with the CSC agents?
W (Q-15) Do you think two messages per week is enough? What do you prefer? More messages or one message per week?
W (Q-16) Which way you prefer most to get the messages -SMS/IVR (push/pull)? What are the reasons behind it? (show the demo)
W (Q-17) Did you ever miss push IVR call? If happened, why? What did you do then?
W (Q-18) What is your opinion about the service charge? What amount will be better for you?
W (Q-19) If the service charge increases, will you continue this service or if needed, will you register again?
W (Q-20) Did you ever feel that any additional content could have been included in the Aponjon messages?
W (Q-21) Did/do you find it difficult to understand (read/listen) the messages? If you have, who did you consult?
W (Q-22) Did you ever seek help from others to understand the messages? If yes, then whose help you had taken?
W (Q-23) From whom did you know about the service? (Did you receive any leaflet? If yes, from where did you get that? If not, which place will be better for you to get the leaflet easily?) (Example: if you get it from the clinic then will it be better for you?)
W (Q-24) Did you feed colostrum to your child after birth? If didn't, what is the reason you think? After six month of your baby's birth, did you give formula milk or anything else? If child is six months, do you feed your baby other family foods with the breastmilk? If not, what are the reasons for this? (listen in details)
W (Q-25) Can you tell us some messages those you liked most? (Does it help when to go to immunize, ANC, PNC?) Did you follow the instructions or suggestions? If you were not a subscriber what would you do? (what changes it makes)
W (Q-26) After subscribing this services what new things you have learned?
W (Q-27) Do you find any change to your husband/guardian's behavior after subscribing the service? If there are any changes, how do you feel about that? If there is no change to your husband/guardian behavior, what is your thought about that?
W (Q-28) Do you find any behavior change to your neighbors who are the subscribers of this service? What sort of changes do you find?
W (Q-29) Will you give suggestion to others to be registered? (Listen in detail)
W (Q-30) If you conceive again or become a mother, will you again subscribe the service?

Appendix F: Structured Interview Guide – Gatekeepers

Questions
W (Q-1) How many phones do you have in your house?
W (Q-2) Whose phone you use for Aponjon service?
W (Q-3) Do you face any problem to get Aponjon service? What kind of problems you face?
W (Q-4) How did you register?
W (Q-5) Who inspired you to register for the service?
W (Q-6) Which date did you prefer for registration? EDD or LMP? Why?
W (Q-10) What is your opinion about this service? (Could you please tell us three good things and three bad things about Aponjon?
W (Q-11) What is your husband's or guardian's opinion about this service?
W (Q-12) Do you know about the Customer Service Centre (CSC) of Aponjon?
W (Q-13) Did you ever contact with the Customer Service Centre (CSC)? If yes, For what purpose? If no then why?(if applicable)
W (Q-14) What do you think, What could be done to communicate easily with the CSC agents?
W (Q-15) Do you think two messages per week is enough? What do you prefer? More messages or one message per week?
W (Q-16) Which way you prefer most to get the messages -SMS/IVR (push/pull)? What are the reasons behind it? (show the demo)
W (Q-17) Did you ever miss push IVR call? If happened, why? What did you do then?
W (Q-18) What is your opinion about the service charge? What amount will be better for you?
W (Q-19) If the service charge increases, will you continue this service or if needed, will you register again?
W (Q-20) Did you ever feel that any additional content could have been included in the Aponjon messages?
W (Q-21) Did/do you find it difficult to understand (read/listen) the messages? If you have, who did you consult?
W (Q-22) Did you ever seek help from others to understand the messages? If yes, then whose help you had taken?
W (Q-23) From whom did you know about the service?(Did you receive any leaflet? If yes, from where did you get that? If not, which place will be better for you to get the leaflet easily?) (Example: if you get it from the clinic then will it be better for you?)
W (Q-24) Did you feed colostrum to your child after birth? If didn't, what is the reason you think? After six month of your baby's birth, did you give formula milk or anything else? If child is six months, do you feed your baby other family foods with the breastmilk? If not, what are the reason for this? (listen in details)
W (Q-25) Can you tell us some messages those you liked most? (Does it help when to go to immunize, ANC, PNC?) Did you follow the instructions or suggestions? If you were not a subscriber what would you do? (what changes it makes)
W (Q-26) After subscribing this services what new things you have learned?
W (Q-27) Do you find any change to your husband/guardian's behavior after subscribing the service? If there are any changes, how do you feel about that? If there is no change to your husband/guardian behavior, what is your thought about that?
W (Q-28) Do you find any behavior change to your neighbors who are the subscribers of this service? What sort of changes do you find?
W (Q-29) Will you give suggestion to others to be registered? (Listen in detail)
W (Q-30) If you conceive again or become a mother, will you again subscribe the service?

Appendix G: Structured Interview Guide – Outreach partner healthcare workers

Questions
HW (Q-1) Those who you registered - did you find any problem with it? What sort of problems you faced? How do you think we can solve the problem?
HW (Q-2) Which date will be preferable for registration? EDD or LMP? Why?
HW (Q-3) Were you able to meet the target for registration? If you couldn't, why?
HW (Q-4) Which women did you approach to enroll for the service?
HW (Q-5) What is your opinion about the registration process?
HW (Q-6) What is your opinion about this service? Could you please tell us three good things and three bad things of Aponjon service? Do you have any opinion about this service? Did any client tell you any complain about the service? What are those?
HW (Q-7) Do you know about the Customer Service Centre (CSC) of Aponjon?
HW (Q-8) Did you ever contact with the Customer Service Centre (CSC)? For what purpose? If not then why?
HW (Q-10) Do you think two messages per week for mothers and one messages per week for gatekeepers are enough? What do you prefer? (More messages or one message per week)
HW(Q-11) Which way do you think customers prefer most to get the messages -SMS/IVR (push/pull)?
HW (Q-12) Did anybody ever take your help to understand sms/IVR?
HW (Q-13) How do you feel to work with Aponjon? What kind of problems you are facing to work here? How it can be solved?
HW (Q-14) What measures should be taken to involve more pregnant/new mothers in the service?
HW (Q-15) Approximately how much time you spend in a month for Aponjon service? (total working hours and for how many subscribers; calculate time for per subscriber)
HW (Q-16) Maximum how many subscribers you think you can register per month?
HW (Q-17) What are the reasons you think that some subscribers are deregistering from this service?
HW (Q-18) What is your opinion about the price of the service? What price would be preferable for the customers?
HW (Q-19) Do you know about the free of cost and discounted price of the service for poor and ultra-poor people? Do you think we identified proper poor and ultra-poor people to give the service for free of cost and discounted price?
HW (Q-20) How was your training? Is there anything that was not covered in the training (when working in practical)?
HW (Q-21) Do you find any difficulty to understand the registration and training manual of Aponjon? What should we do to make it better?
HW (Q-22) Do you ever read/hear the content? What is your opinion about the content?
HW (Q-23) Did you ever feel that any additional content could have been included in the Aponjon Messages?
HW (Q-24) How much you earn per month?
HW (Q-25) How much you spend for Aponjon purpose?(transport, phone bill, time etc)?
HW (Q-26) What could be the incentive? How much?
HW (Q-27) What can be done to let more people to know about the service? Do you find the clinics are helpful to inform and registering the people?
HW (Q-29) After subscribing this service do you notice any behavior change among the pregnant women, new mothers and their guardian?
HW (Q-30) Does Aponjon help clients to proceed with immunization, ANC, PNC?

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LOCATIONS OF THE PILOT/FORMATIVE STUDIES

- Chittagong
- Dhaka
- Khulna
- Rangpur
- Sylhet

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Contact:

Aponjon, MAMA Bangladesh
Kohinoor Tower 2, Level 4, House -SW (E) 7
Road – 7
Gulshan-1, Dhaka 1212
Bangladesh
Phone: +8802- 09606016227
E-mail: info@aponjon.com.bd