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The Use of Design Thinking in MNCH Programs: A Case Study of the Essential Newborn Care Corps (ENCC) Pilot, Sierra Leone

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The Essential Newborn Care Corps (ENCC) pilot was implemented by Concern Worldwide and Health Poverty Action (HPA) in collaboration with the Ministry of Health and Sanitation (MOHS) of Sierra Leone as part of the Innovations for Maternal, Newborn and Child Health Initiative (*Innovations)* funded by the Bill & Melinda Gates Foundation. JSI served as the global research partner for *Innovations* (Phase II) and conducted this case study in collaboration with Ask Consultancy and Focus 1000. Ledia Andrawes provided technical guidance and framing to interpret the design process. This case study is one of four in a series that reports on the application of design thinking in MNCH programming in Africa.

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Cover photo:
Maternal, Newborn and Children Health Promoters (MNHP) in Bo district, Sierra Leone.
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Executive Summary

Responding to growing interest among designers, global health practitioners, and funders in understanding the potential benefits of applying design thinking methods and tools to solving complex social problems, the Innovations for Maternal, Newborn, and Child Health (MNCH) Initiative (*Innovations*) developed and piloted innovative interventions to address common barriers to improving the effectiveness of basic MNCH health services in low-resource settings. Central to the initiative's overall strategy was experimentation and learning related to the application of "design thinking," a form of inquiry that is applied in the conceptual stages of a planning process and subsequent stages of program or product development. A fundamental rationale for the use of design thinking is that it provides important insights into user experience, needs, and desires and helps to translate these insights into tailored interventions or products, increasing the likelihood of user adoption and reducing the risk of intervention failure. In spite of increased reports of the use of design thinking in developing-country settings, there is little systematically recorded evidence of the value of these approaches in the form of in-depth documentation or formal evaluations that link the application of design thinking to health program performance or health outcomes. Moreover, there are few validated metrics to assess the effect of design thinking.

This case study focuses on the use of design thinking in the Essential Newborn Care Corps (ENCC) pilot project that aimed to transform the role of traditional birth attendants (TBA) in Bo district, Sierra Leone from community midwives to maternal newborn health promoters (MNHP) and test their potential to improve coverage of essential care for mothers and young children. Some of these MNHPs were also enrolled in a microfranchise social enterprise scheme and, in addition to conducting health promotion, sold basic goods to women at community level to build their own sustainable source of revenue. The pilot was segmented into two intervention arms: one focused on MNHPs who were trained to conduct health promotion (HP arm) and a second on MNHPs who were also trained as health promoters but also sold goods as part of a microfranchise scheme (HP+ arm).

The design thinking case study research design used a mixed-methods, comparative case-study approach. We constructed research propositions to describe and explain the application and influence of design thinking in the ENCC pilot and focused our research using the constructs of fit, uptake, buy-in, ownership, and the effectiveness of the ENCC model. We refined these propositions over time and, as data emerged, constructed a theoretical pathway to illustrate the influence of design thinking on the ENCC intervention. The in-depth case study methodology was intentionally designed to be exploratory and analytical but not evaluative.

Description of Design Thinking in ENCC

From August 2013 to October 2013, the *Innovations* program staff relied on peer-reviewed and grey literature on social innovation and design thinking and then adapted design thinking techniques that were developed and packaged by the design firm IDEO to refine the design of the ENCC pilot. The team mainly applied a design thinking approach called rapid prototyping to gain insights into end user

experience and perceptions on health, health products, health advice, and the role of TBAs. They used cycles of iteration to design, test, and redesign different elements of the pilot.

Rapid prototyping was conducted in two phases and included eight workshops with end users (TBAs and women who would receive their health promotion and microfranchise services). The program staff conducted product mix workshops to define the content of the basket of goods to be sold by MNHPs in the microfranchise arm of the pilot and model acceptability workshops to explore the acceptability of TBAs becoming MNHPs and conducting health promotion, referral to facilities, and social franchising. The team used multiple methods to test assumptions and elicit participant feedback. They explored ways to rebrand TBAs (e.g., with logos for their uniform) and introduce referrals, and considered how TBAs wished to be perceived in their communities once they became MNHPs. From the workshops, program staff learned that the TBAs wanted their new role to be recognized or officially endorsed by the formal healthcare system. Refinements to the referral process also resulted in the creation of a paper-based system to legitimize MNHPs referral in the eyes of the community.

The Influence of Design Thinking

To understand the influence of design thinking in ENCC we constructed a theoretical pathway, or grounded theory, during the course of our analysis. In this pathway, we hypothesized that that through the application of design thinking, ENCC achieved fit, meaning the pilot created an essential match between key strategies—mainly steps to transform the role of TBAs from traditional midwives to health promoters and microfranchise managers—and TBA and community needs, desires, and aspirations related to this new role. Fit then played a role in catalyzing uptake or adoption of the ENCC model among TBAs and their clients. As the intervention was further refined with users through feedback loops and adaptation, it achieved an even tighter fit, which influenced continued acceptance of the new role of MNHPs in the community, the health system and among the MNHPs themselves. In ENCC, we defined this lasting influence of design as buy-in, or continued acceptance of the MNHP roles, and ownership, or demonstrated commitment to ensuring the continuity of MNHP activities over time. Based on these observations we propose that design thinking worked alongside other program elements to contribute positively to the realization of pilot outcomes. We discuss and illustrate this pathway below and provide a critical analysis of the added value and limitations of design thinking in the context of ENCC.

Findings

Findings from ongoing in-depth process documentation conducted with communities and MNHPs and from the ENCC evaluation indicate high levels of acceptance and adoption of the MNHPs' new role among MNHPs themselves and within the community. By the end of the pilot the MNHPs were integrated into the formal health system and well accepted by their communities, representing an important step in the pathway to influencing women's health-seeking behavior. We observed that the high levels of uptake, appreciation, and use of the MNHP services clearly had roots in the learning that emerged from the initial design thinking phase that shaped ENCC's implementation strategy and program elements. Design thinking helped to create a fit between the intervention and the end user. In response to the insights gained during rapid prototyping, the program staff tailored ENNC to the TBAs'

vision of their new role (related to their title as MNHPs, uniform logo, and official status in the health system) which in turn influenced the near universal adoption and sustained participation of TBAs in the ENCC pilot. Among the 200 TBAs who were initially trained as MNHPs, 98 percent remained in the pilot even in the face of the Ebola outbreak, during which official pilot activities were suspended for six months. The design thinking process helped shape the model of ENCC in a way that made it acceptable and appealing to the MNHPs, encouraging sustained retention and commitment over time.

In consecutive stages of interviewing, we observed that MNHPs increasingly embraced their new role as health promoters and microfranchise managers. In particular, they compared their role as TBAs to their role as MNHPs, indicating they were now deemed "legal," which allowed them to do their work freely and gain respect in the community. As MNHPs embraced their new role, confidence in their services began to grow. Community-level respondents expressed particular appreciation for the training that MNHPs received, noting that it gave clients confidence in the information and advice that the MNHPs dispensed and confirming that MNHPs were an extension of the health facility. As such, through ENCC's efforts to rebrand TBAs and train them as health promoters, referral agents, and sellers of health products, the MNHPs became a bridge between the community and the formal health system.

The design thinking experience also had a notable influence on the program staff who took part in the design phase and went on to manage the pilot. Staff reported that exposure to design thinking not only changed the way they thought about TBAs, it also influenced their overall approach to managing the ENCC pilot by encouraging them to conduct frequent feedback sessions with MNHPs. The empathy they built for the MNHPs during the design phase made them sensitive to meeting end user needs and the value of frequent feedback and iteration to tailor the ENCC model to MNHP desires.

With respect to the influence of ENCC (and MNHPs) on women's health-seeking behavior and knowledge of health practices, the evaluation found mixed results. ENCC had a significant effect on the use of facility-based deliveries and on women's attendance for four or more ANC visits (HP+ arm only) but the evaluation found no effect on increasing ANC visits during the first trimester. Unusually, in the HP arm, there was a statistically significant decrease in the utilization of four or more ANC visits. The evaluation did observe increased utilization of PNC visits for newborn checkups (15%) and maternal checkups (20%) in both arms when compared with the control. However, there was an overall decrease in PNC visits between baseline and endline. There was a significant increase in both arms related to early initiation of breastfeeding within the first hour of birth. With respect to women's knowledge, there was a significant effect related to improved knowledge of the components of birth preparedness, but the intervention did not improve women's knowledge of danger signs during pregnancy. The evaluation report notes that limited impact on knowledge and behavior could be due to the high values that existed at baseline and the relatively short duration of the pilot timeline.

Discussion

Findings from the final evaluation, process documentation, and this case study document ENCC's success in facilitating the transformation of TBAs to MNSPs, notably in the widespread adoption and

acceptance of the MNHPs' new role among the MNHPs themselves and community members. When we consider the influence of design thinking in ENCC, we focus on its role in driving this transformation through gaining insights from TBAs and the community and shaping the program alongside the TBAs in ways that were appealing and acceptable to all stakeholders. In applying design thinking, the ENCC pilot went beyond traditional health program development to provide a space for user-centered program design, including iteration and adaptation of some design elements during the pilot. Design thinking helped to create a better fit between the intervention and the end users' expressed needs and desires. It introduced a type of needs assessment that helped the program team develop and refine aspects of the ENCC intervention that were critical to introducing a new role for TBAs in the community.

Although we cannot fully explain ENCC's mixed influence on health-seeking behavior, we propose that it reflects less on the successful application of design thinking than on the challenges of training and supervising 200 MNHPs and standardizing the health promotion and referral aspects of their jobs in a short intervention period. In the future, the ENCC team should place greater emphasis on the public health aspects of ENCC, building on the foundation of the well-established acceptance of the MNHPs in their new health promotion role. In addition, design thinking was only used to shape the acceptability of the ENCC model. The use of design thinking could be equally relevant to determining health messaging, and prototyping or co-designing the entire referral process or defining an appropriate monitoring approach to support this new cadre of health worker.

1 Introduction

The Innovations for Maternal, Newborn, and Child Health (MNCH) Initiative (*Innovations*) developed and piloted innovative interventions and strategies to address common barriers to improving the effectiveness of basic MNCH health services in low-resource settings. Central to the initiative's overall strategy was experimentation and learning related to the application of "design thinking" in MNCH programs. Design thinking is a methodology that designers use to solve complex problems and find desirable solutions for clients.[1] The Innovations Initiative responded to growing interest among designers, global health practitioners, and funders in understanding the potential benefits of applying design thinking methods and tools—normally reserved for developing and marketing products—to solving complex social problems, such as improving access to life-saving health services among women and children in the developing world (Brown and Wyatt 2010). In this social innovation space,[2] it is assumed that design thinking can enhance traditional public health planning and implementation strategies and thereby improve their effectiveness and the pace at which improvement takes place. Although there is a growing collection of experience in applying design thinking in global health in countries such as India (IDEO 2009), Uganda, Senegal (Fabricant, Milestone, and Qureshi 2014), and Nicaragua (Villa and Hammer 2013), there is a need for focused documentation and analysis of the practical challenges and benefits of the approach and evidence of its influence. In spite of increased reports of the use of design thinking in developing-country settings, there is little systematically documented evidence of the value of these approaches in the form of in-depth documentation or formal evaluations that link design thinking to health program performance or health outcomes. Moreover, there are few validated metrics to assess the effect of design thinking.

This case study focuses on the use of design thinking in the Essential Newborn Care Corps (ENCC) pilot project that aimed to transform the role of traditional birth attendants (TBA) within the health sector in Bo district, Sierra Leone from community midwives to maternal newborn health promoters (MNHP), addressing a gap in community level care and connecting women to local health facilities. It documents and analyzes the application of design thinking methods and tools within the ENCC pilot and its influence on problem definition, pilot design, implementation, and outcomes. Specifically, the case study examines the pathways through which the ENCC intervention has succeeded or failed in achieving its objectives, focusing specifically on the role that design thinking played at the different stages of the development and implementation of the intervention. This document presents one of four case studies of the *Innovations* Initiative's experience with design thinking. A companion document—a comparison of all four cases—analyzes the evaluation of design thinking concepts in the *Innovations* Initiative and compares experience across all four cases to generate learning and stimulate discussion on the use of design thinking methods and tools in MNCH programs in different settings and for different purposes.

[1] http://www.tonchevassociates.com/blog-bedford/2015/6/24/what-is-design-thinking

[2] For the purpose of this protocol, we define social innovation as "The process of inventing, securing support for, and implementing novel solutions to social needs and problems."(Phillis et al. 2008)

The findings of the individual and comparative studies are intended to inform future investment in design thinking in global health in developing-country settings.

2 Design Thinking Defined

Design thinking is a form of inquiry that is applied in the conceptual stages of a planning process and subsequent stages of program or product development (Box 1). The process of design thinking is described as open-minded,[3] iterative, and human-centered and is intended to result in new, innovative, and groundbreaking solutions. It is used to help define problems from the user perspective, explore user needs and desires with respect to a particular issue or problem, and identify solutions to address those needs and desires. In the context of global health, design thinking is emerging as an approach to enhance the effectiveness of health program interventions. It helps to tailor program interventions to user needs and desires in order to improve the uptake and sustained use of health products, services, and behaviors. The application of design thinking methods and techniques is often referred to as human-centered design (HCD). For the purpose of this case study, we will use the term "design thinking" to describe the application of design thinking methods and tools in the ENCC pilot.

Box 1: Design thinking described

- "…an analytic and creative process that engages a person in opportunities to experiment, create and prototype models, gather feedback and redesign…"(Razzouk and Shute 2012)
- "…a human-centered approach to innovation that draws from the designer's toolkit to integrate the needs of people, the possibilities of technology, and the requirements for business success" (Brown 2009)
- "Design thinking is a powerful approach to innovation that can be used to generate breakthrough ideas." (Brown 2009)

Characteristics of design thinking

- A human-centered approach
- A process of inquiry that involves divergent and convergent thinking
- Iteration of ideas or designs to refine them before widespread use

Central to the design thinking approach is that designers gain insights into the lives of end users and other key actors to develop empathy for them. In ENCC, end users were the Traditional Birth Attendants (TBA) who would become newly branded maternal newborn health promoters (MNHPs) as well as the community members that would benefit from the services provided by the MNHPs. Empathy is defined in various ways,[4] including the image of "standing in the shoes of others." In the context of design thinking, it allows designers to "connect with people on a fundamental level." Empathy, Brown notes, is "the most important distinction between academic thinking [or modes of inquiry] and DT." Design thinking introduces techniques that build empathy in order to create emotional as well as practical links between designers and users and generate ideas or solutions that are readily taken up by users.

[3] i.e., receptive to new and different ideas or the opinions of others (American Heritage Dictionary of the English Language, 2009).

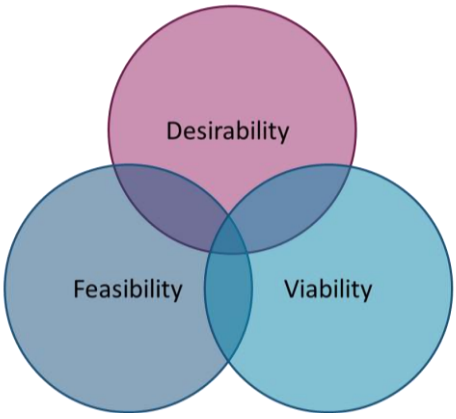
[4] Cognitive empathy is understanding someone's thoughts and emotions in a very rational rather than emotional sense. Emotional empathy is also known as emotional contagion and is "catching" someone else's feelings, so that you literally feel them too.(http://www.skillsyouneed.com/ips/empathy.html)

Empathic understanding goes beyond knowledge: when empathising you do not judge, you "relate to [the user] and understand the situations and why certain experiences are meaningful to these people" (Battarbee 2004), a relation that involves an emotional connection (Battarbee and Koskinen 2005).

A second element of design thinking is the use of facilitation techniques to stimulate divergent thinking where possible by multidisciplinary teams to generate a wide range of possible ideas for addressing a particular challenge or complex problem, followed by convergent thinking to gradually eliminate options and integrate concepts such as viability and feasibility into the process of refining solutions.

Finally, design thinking often integrates the iteration of ideas and solutions on a small scale to test ideas and refine them with end users before introducing them on a wider scale. Iterative approaches, using co-creation or codesign techniques, often take the form of visualization and prototyping.[5] They are nonlinear and cyclical processes of design in which designers test designs, assess effectiveness, define lessons learned, and apply these lessons to refine the design and/or implementation over time. Feedback from stakeholders is used to create further iterations of the product/solution and to make designs more compelling for end users and programs more effective within their target populations (IDEO 2009), increasing the pace of uptake and reducing the risk of program failure.

Figure 1: Overlapping lenses of design thinking



The use of design thinking at the early stages of programs represents a different approach to conceptualization and planning than is traditionally used in public health programming. Design theory, for example, notes that the design process often starts by using a "desirability lens" to examine the needs, desires, and behaviors of the people that designers want to affect with solutions. The desirability lens is used throughout the process and is critical to designers' developing and maintaining empathy for end users, which increases the likelihood of creating a solution that is responsive to unmet or latent user needs and desires. During the later phases of the process, designers bring in the "feasibility lens" and "viability lens" to refine their solutions based on

[5] Prototyping is the act of turning ideas into actual products, services, and systems that are then tested, iterated, and refined. It is an iterative technique for quickly testing a rough and low-cost version of a solution and using the test data to make improvements (Kasper and Clohesy 2008). Prototypes are disposable tools used throughout the concept development process, to validate ideas, to help generate more ideas, and to help designers to think in realistic terms about how users would interact with the concept (IDEO 2009). Prototypes go through stages of testing, learning, and refining, inspired by a notion that it is acceptable to fail because failure moves one closer to a better design. As the project nears completion and heads toward real-world implementation, prototypes tend to increase from low fidelity to high fidelity.

financial, capacity, and other considerations. Figure 1 presents a conceptualization of the overlapping lenses of design thinking. For additional information on the practice of design thinking see Annex A.

3 Mapping the Influence of Design Thinking in MNCH Programs

The use of design thinking in MNCH programming is a new phenomenon with limited evidence or documentation of the way in which it is intended to affect the shape, execution, and outcome of MNCH programs. Thus, we found it necessary to construct research propositions (e.g., hypotheses) to describe and explain the application and influence of design thinking in the ENCC pilot and to focus our research. We refined these propositions over time and, as data emerged, constructed a theoretical pathway to illustrate the influence of design thinking on MNCH programs. Below, we present our original research propositions and research focus. The pathway of the influence of design thinking in ENCC is discussed in Section 7.

3.1 Research Propositions and Focus

The case study was guided by the following general research propositions (i.e., hypotheses) that focus on the application and influence of design thinking in MNCH programs. The concepts in these propositions were then adapted for specific use in the ENCC case study (see Box 2, Section 7.2).

Research propositions

The application of design thinking methods and tools will:

- Create designer empathy for end users/target population
- Result in fit[6] of problem definition with target population/user desires, needs, and barriers related to MNCH programming
- Result in fit of MNCH intervention/pilot with target population/user desires, needs, and barriers related to MNCH programming
- Result in end user buy-in and sense of ownership of the MNCH intervention
- Increase the pace of uptake of the MNCH intervention
- Play an enabling/driving role in the achievement of pilot outcomes

These propositions translated into the following foci for data collection:

- **Application** of design thinking concepts, processes, methods, and tools to:
    - Problem definition
    - Solution identification
    - Intervention design

[6] For the purpose of this case study, "fit" is defined as: Program design addresses a need or desire of the CHN or supervisor identified through the application of design thinking to the program development. General definition of fit: of a suitable quality, standard, or type to meet the required purpose. Synonyms include reflects, corresponds to, mirrors, is tailored to, is responsive to, takes into account.

- Implementation
- Evaluation

- **Translation** of results of application of design thinking concepts, processes, methods, and tools to:
  - Problem definition
  - Solution identification
  - Intervention design
  - Implementation

- **Effect** of applying design thinking with respect to:
  - Designer empathy for end user/target population
  - Fit of problem definition and intervention design with end user desires, needs, and barriers to MNCH programming
  - Uptake of the intervention and pace of uptake
  - End user buy-in and sense of ownership of intervention/behavior
  - Achievement of pilot outcomes

- **Role of contextual factors** on the process and influence of design thinking

- **Lessons** from applying design thinking methods and tools

3.2 Methods

The research design for the design thinking exploration used a mixed-methods, comparative case-study approach, which enabled investigators to explore the application of design thinking in MNCH programming in the *Innovations* Initiative and its influences on MNCH programs in different settings. The ENCC pilot intervention in Sierra Leone constitutes a single case of applying design thinking in the context of MNCH programming. The ENCC case was selected as one of four pilots implemented in the second phase of the *Innovations* Initiative (2012-2016).

3.3 Data Sources

To complete the case study on design thinking, the research team relied on several sources of primary and secondary data. We drew on 1. the primary data collected for routine pilot monitoring; 2. a rigorous program evaluation (baseline and endline studies) to measure the effectiveness of this innovative program model in improving MNCH service utilization; and 3. process documentation, consisting of 64 in-depth qualitative interviews during implementation to document and assess the proposed and actual pathways between program intervention and program effectiveness as proposed in the pilot's theory of change and document, prospectively, the drivers of change. We also conducted separate and focused primary data collection at the same time as process documentation to document and explore the application and influence of design thinking methods and tools. In all cases, primary data on design thinking were collected using in-depth semistructured interviews, group discussion, and observation. Data collection included three rounds of interviews and observations beginning

approximately six months after the initial design thinking activities took place (focusing on the application of design thinking) and continuing one year into program implementation focusing on the influence of design thinking) and ending 18 months into program implementation. In the first round, respondents included program managers, research advisors, and program and research implementers from all partner organizations (Concern Worldwide, JSI, Health Poverty Action [HPA] and the Sierra Leone district health management team). In subsequent rounds, we interviewed the same respondents, as well as the MNHPs, women of childbearing age, community leaders, and "MCHAides" participating in ENCC. In some cases, repeat interviews were conducted with particular key informants to explore the effect of design thinking over time and the evolution of the perceptions of program managers and implementers on the role of design thinking. The team conducted 134 interviews, focus group discussions, and observations. The case study team also reviewed program-related documents, program monitoring data, and the findings of the final evaluation of ENCC. The study teams consisted of Sierra Leonean and international researchers, the majority of whom collected data and conducted analysis in all three rounds of data collection.

3.4 Analysis

The case-study method derives its analytical power from sequential development of themes and theory that are generated from an immersion in the data. Thus, data analysis to describe and explore the application of design thinking in ENCC took place in stages. After the first round of document review and data collection, researchers reviewed and synthesized interviews, reports, graphic summaries of the design thinking activities; constructed a timeline of events; and produced a brief description of each activity. These detailed descriptions of the content and process of the design thinking activities helped define and bound the specific focus of this study of design thinking in ENCC. The descriptions were shared with program staff and design professionals who were involved in the activities and who then verified their accuracy. These verified descriptions then constituted the key design thinking activities whose influence was explored through subsequent rounds of data collection.

As the data collection progressed (process documentation as well as case study–specific data collection), researchers employed NVivo 10 and 11 software (QSR International 2014) to code and sort qualitative data. Codes captured the perceptions of design thinking and the influence of design thinking on designers'/program managers' perceptions of the end users and their program design and management choices. Codes were also used to capture concepts such as the fit between end user needs and desires and program design elements and the extent to which the program as designed had its intended effect (end user uptake, buy-in, ownership). To ensure coding quality, in each round two team members coded the same 10 transcripts. Coders held frequent meetings to discuss coding patterns and used NVivo to check intercoder reliability coefficients.

To synthesize findings, we first identified common themes, forming initial theories and findings and generating additional questions, which were incorporated into the next round of data collection. Researchers refined codes with each iteration of the analysis. These codes were applied at each stage to identify the emergence of or absence of evidence of fit, uptake, buy-in and ownership, and changes in

these variables over time and among intervention groups. We also continued to construct program timelines, define thematic grouping and classification of the data, and triangulate primary data with other sources noted above.

Following the second round of data collection, researchers used the emerging themes to begin to construct a grounded theory about the way in which design thinking was applied in ENCC and influenced the pilot. This theoretical pathway helped the research team explore the relationship between the five elements of design thinking that were assessed in each round of data collection. The pathway was further refined with each subsequent round of data collection and completed once all the data were analyzed. We validated case study findings through discussions with ENCC program managers and evaluation team members.

3.5 Strengths and Limitations

Many reviews and evaluations of program experience in the health sector in low-resource settings use mixed methods to assess program outcomes and effectiveness, combining objective quantitative measures with qualitative exploration of implementation pathways to explain and explore aspects of program success or failure. The ENCC case study is unique for the volume of data collected over time to understand the influence of design thinking in the pilot through a range of data sources. The mixed-methods approach enabled triangulation of results, and the extended time frame allowed researchers to explore nascent themes with key respondents and program managers as they emerged, confirming or adapting them as needed and integrating new questions into subsequent rounds of data collection. The second methodological strength of the study design was its focus on description and reflection of pilot experience with the use of design thinking across four programs. The ability to make explicit comparisons and contrasts among difference experiences of design thinking found in each of the *Innovation's* pilots during the research offered a strong methodological advantage over the use of a single case to reflect on experience.

There were limitations as well. The in-depth study methodology was intentionally designed to be exploratory and analytical but not evaluative. The findings should not be interpreted as a statement on the impact of design thinking, since we did not include a counterfactual or comparison case that implemented the same program without the use of design thinking. Still, the case-study methodology has uncovered information about the opportunities and challenges of applying design thinking in MNCH programming that may be relevant to other teams considering its use.

Finally, we were unable to sufficiently address a key research proposition—the influence of design thinking on the pace of uptake of the ENCC model—because of the lack of reliable monitoring data regarding the distribution and use of referrals for services at the facility. We were also limited in our ability to conduct in-depth analysis of all key contextual factors because of the sheer number and complexity of relationships, timing of events, and limited access to data.

3.6 Ethical Approval

Approval for this study was granted by the Sierra Leone Ethics Review Committee on June 17, 2013.

4 Essential Newborn Care Corps (ENCC) Pilot Summary

The ENCC pilot aimed to transform the role of TBAs within the health sector in Bo district, Sierra Leone from community midwives to health promoters and to test their potential to improve service utilization related to essential care for mothers and young children and women's knowledge of health issues and practices. It focused on establishing a network of frontline health workers to meet community level health needs by providing care, heath messaging, and products for sale to women in their community. ENCC recruited 200 TBAs to form a corps of health promoters. By retraining, repositioning, and rebranding TBAs as Maternal, Newborn Health Promoters (MNHP), the ENCC pilot harnessed their potential to help address the shortage of health workers at community level, working within the boundaries of the national ban on the involvement of TBAs in delivering babies. All of the TBAs trained at the beginning of the pilot continued to work as MNHPs until the end except for three women who passed away during the course of the intervention. Some of these MNHPs were also enrolled in a social franchising scheme and, in addition to conducting health promotion, sold basic goods to women at community level to build their own sustainable source of revenue. For the MNHPs enrolled in the microfranchising scheme, ENCC provided investment funds to enable MNHPs to purchase certain health-related products to sell to women while providing advice and referring women to health facilities for delivery and emergency care. For evaluating the effectiveness of the ENCC pilot, the program staff defined two intervention areas and one comparison area covering all 14 chiefdoms in Bo district. In one intervention area, TBAs received both MNCH health promotion training and microfranchising training/support (HP+) and in the second intervention area they received only MNCH training (HP). The third area served as a control. The ENCC pilot ran from February 2014 through June 2016 with a six-month suspension in activities due to the Ebola outbreak.

The first 18 months of the pilot consisted of program planning, during which the initial concept of the ENCC pilot emerged and was approved by the funder and the program and research team conducted document review and scoping visits to Sierra Leone to inform the public health aspects of the design, determine whether the pilot would be acceptable to local partners and authorities, and choose an implementation site. In addition, formative research was conducted in the form of a market demand survey, which found that community members in Bo district were interested in purchasing health-related products and receiving health promotion messages but lacked adequate financial resources.

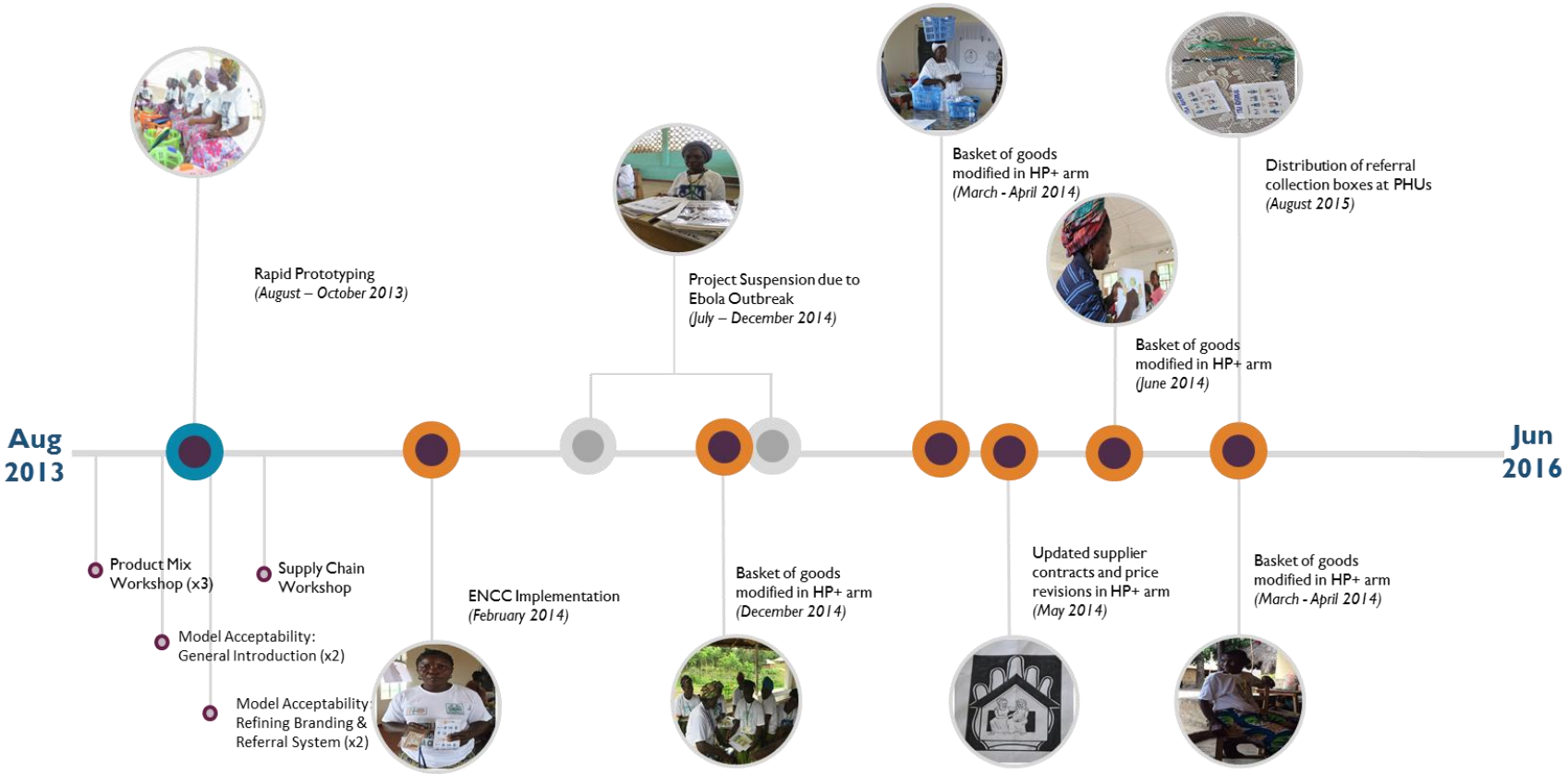
From August to October 2013, design thinking in the form of rapid prototyping was used through a series of workshops to help shape the components of the ENCC intervention. During this period, the program staff applied a series of design thinking tools and methodologies with women in intervention communities and TBAs to determine how TBAs would be branded as health promoters; if the ENCC model was acceptable to both the TBAs and the community; the structure and process of the referral system that MNHPs would use; and the mix of health-related goods that MNHPs in one intervention area would sell in the community.

Implementation of the ENCC initiative began in February 2014. In both of the intervention arms, the TBAs were "rebranded" as MNHPs and trained to provide health messaging and referral services to

women in their community. In the HP+ arm, the MNHPs were given a basket of goods that they could sell as they traveled door-to-door providing health messaging and referral services. Given that the majority of the women were illiterate, the program staff, in collaboration with the MNHPs, designed pictorial referral slips to help MNHPs communicate the reasons for making a referral. Referral slips were slightly modified in the beginning of the pilot to ensure that they captured relevant client information. In August 2015, the program staff placed referral collection boxes at ENCC partner facilities to collect additional information on the number of women that presented at the facility as a result of an MNHP referral as well as compare MNHPs' reasons for referring a client with the services provided at the facility.

The most significant contextual factor to influence the ENCC pilot was the Ebola epidemic that occurred in Sierra Leone from March 2014 to February 2016. The program staff suspended activities from July to December 2014 during the height of the Ebola outbreak. Before activities resumed at the beginning of 2015, all MNHPs received refreshed training and instruction on the "no touch" policy to guide MNHP-client interaction and prevent infection. For a complete timeline of ENCC activities, see Figure 2.

Figure 2: Timeline of activities for ENCC pilot



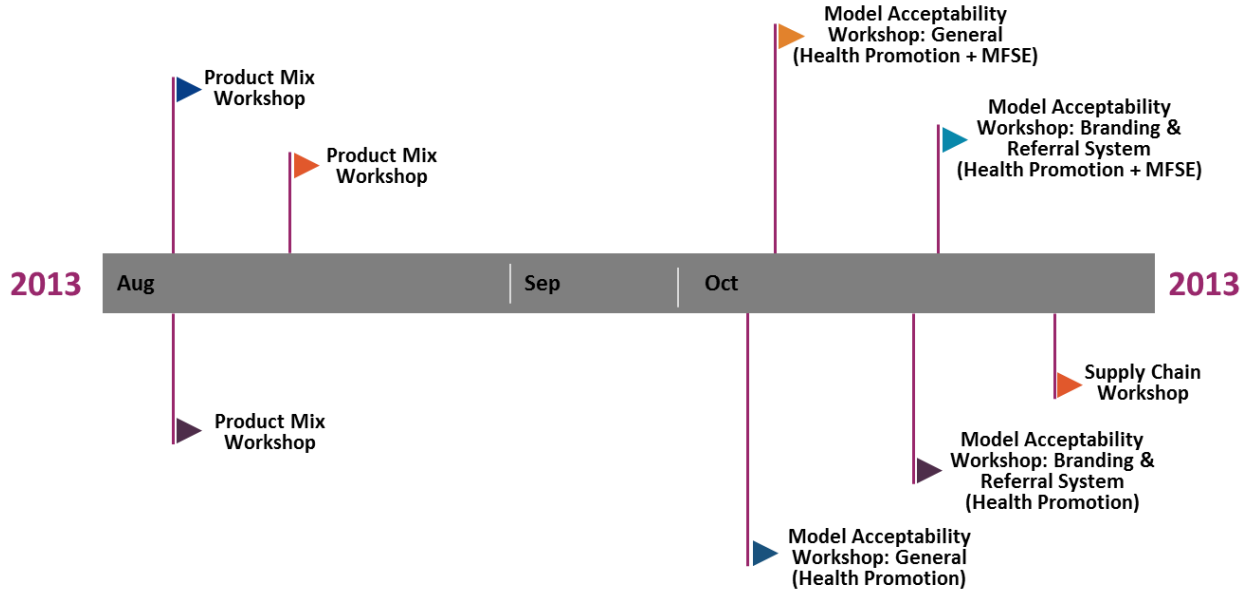
5 Description of the Application of Design Thinking in ENCC

From August 2013 to October 2013, the program team applied design thinking techniques to refine the program design (Figure 3). Each step is explained below.

5.1 Rapid Prototyping in ENCC

The *Innovations* program staff introduced design thinking by consulting peer-reviewed and grey literature on social innovation and human centered design, discussing their plans with designers from the design firm IDEO, and adapting techniques developed and packaged by IDEO.[7] Other inputs into the design phase strategy came from Body Brain, a design partner who made one field visit to Sierra Leone; the Sierra Leone implementing partner (HPA); and a program manager from *Innovations* Phase I who had experience with TBAs in Sierra Leone and helped to contextualize findings from design thinking in the local context. The team mainly applied a design thinking approach called rapid prototyping to gain insights into end user experience and perceptions on health, health products, health advice, and the role of TBAs and used cycles of iteration to design, test, and redesign different elements of the program and the product mix for the basket of goods that would be sold by the MNHPs.

Figure 3: Timeline of design thinking activities for ENCC



Rapid prototyping was conducted in two phases and included eight workshops with end users. For the purpose of ENCC, end users were defined as the TBAs who would become maternal, newborn health promoters (MNHP) and the women they intended to reach with health promotion and microfranchise activities. The first phase consisted of three product mix workshops, which were used to define the content of the basket of goods as well as the acceptability of specific aspects of the ENCC model among women in the community, namely: introducing newly branded MNHPs who would go door to door

[7] Human-Centered Design Toolkit for NGOs and Social Enterprise (2009) by IDEO

delivering health messaging to pregnant women and mothers and, in some cases, sell health-related goods during their door-to-door visits. The second phase of rapid prototyping consisted of four workshops with TBAs divided into two groups according to study arm: health promotion only (HP) or health promotion plus microfranchising (HP+). TBA groups participated in two workshops that focused on the acceptability of the ENCC model, the rebranding of TBAs as MNHPs, and referral mechanisms. The pilot held an additional workshop with the implementing partner (HPA) focusing on designing the supply chain to ensure regular availability of goods for the MNHPs in the microfranchise arm. Table 1 summarizes each activity associated with rapid prototyping, its purpose, content, tools employed, and findings. Each design thinking activity is described briefly below and further described in Annex B.

5.2 Product Mix Workshops

The product mix workshops collected information employing user testing with women in ENCC pilot communities to determine the products to include in the basket of goods that MNHPs would sell under the microfranchising scheme. The program staff used multiple methods to test assumptions and elicit participant feedback. Role playing allowed participants to act out possible sales interactions between MNHPs and community members and enabled program staff to understand social constructs such as credit. It also enabled the participants to "inhabit" different roles to see how they would feel in different scenarios and allowed them to provide feedback to program designers on sales interactions between women and MNHPs. Additionally, through "informance," a process of compiling information through various exercises to better understand a process, facilitators acted out door-to-door sales interactions to explain the ENCC model to workshop participants and to test whether community members would buy products from MNHPs. Participants gave feedback on which products they would use. Discussions centered on ways of selling that were considered "respectful" in the sociocultural context. Lastly, the team used product sorting to test the acceptability and desirability of the product mix prototype and individual products. Products were displayed on the floor. Each workshop participant was given five beans and asked questions about her purchasing habits and preferences. Participants voted by placing beans on a specific product to demonstrate which products were most desirable to women in ENCC communities. As the pilot team gained insights into product demand and purchasing habits of the community, they learned that women preferred to use community-level credit to purchase goods from MNHPs and they incorporated this idea into the program model.

5.3 ENCC Model Acceptability Among TBAs: General Introduction

Following the product mix design activities, the program staff conducted two sets of model acceptability workshops with TBAs from each of the pilot intervention areas. Like the product mix workshops, the first model acceptability workshops focused on exploring, from the TBA perspective, the acceptability of the ENCC model, particularly the role of the newly-branded MNHPs in delivering health promotion messages and conducting door-to-door sale of products. The workshops tested operational components of the model and also initiated the design process for rebranding the TBAs and developing a referral system.

Table 1: Summary of prototyping and user testing activities used to develop the ENCC pilot

Activity	Location	Participant Roles/ Organization	Purpose/ Goals	Tools	Findings	Design Decisions
Product Mix (3)	Gerihun, Damballa, & Serabu	Pregnant Women and/or Lactating Mothers	Understand what customers want/need to buy, the affordability of products, and when and how goods are sold to customers.	• Informance • Product (Card) Sort • Role Playing	Potential products ranked by most wanted, most needed, and purchased most often. Learned about the existing credit schemes .	Determined products to be sold by MNHPs.
Model Acceptability: General Introduction (2)	Concern Office: Bo	TBAs	Determine if the idea of providing health promotion and selling products door-to-doo was acceptable to the TBA as well as model functionality in the community. Also included preliminary discussion on branding and referral system.	• Informance • Scenario Testing • Collective Questioning • Role Playing • Storytelling with Objects • Draw the Experience*	TBAs indicated a preference for working in collective business groups rather than individually, and helped weigh elements of the model such as balancing health promotion/travel/ selling/etc. Initial ideas for branding were illustrated and iterated upon with each subsequent workshop.	Determined community and TBA acceptability of the concept of MNHPs selling goods door-to-door and providing health promotion. Decided to form collective business groups instead of individual MNHPs becoming sole proprietor.
Model Acceptability: Refining Branding & Referral System (2)	Bumpe & Gbaima	TBAs	Understand the TBA "experience" and translate that into acceptable branding that communicates their position in the community/ health system. Create a standardized referral system that links MNHPs to their clients and limits loss of referral slips between the woman's home and the facility.	• Informance • Role Playing • Quick & Dirty Prototyping	TBAs emphasized the importance of official recognition by MOH and formal link to healthcare system . TBAs requested items to perform their new job: uniform, tools and link between these items and sustainability of the new role for MNHPs. TBAs were not satisfied with the use of a bracelet for referring clients; they preferred an official paper record using photos to illustrate the reason for referral.	Determined how MNHPs will be identified in the community: group name, logo, and uniform. Creation of a referral system; design of referral card using images to illustrate the type of referral.
Supply Chain	HPA Office: Freetown	Concern SL & HPA Staff	Develop a prototype of supply chain for goods to be sold by MNHPs; understand the flow of activities through the system and identifying potential challenges and needs.	• Flow & Error Analysis	Goods to be sold must be stored and distributed by the project not out of Primary Health Units (PHU). Providing transport for TBAs to retrieve supplies from Bo would not be sustainable. Need for full-time logistics personnel.	Identified components of ENCC supply chain, tools needed for product tracking, roles and responsibilities for each partner, and the need for full-time logistics personnel.

*Draw the Experience was just in the Model Acceptability Workshop: General Introduction t for HP group and was not used in the HP+ version of the workshop.

During the introductory workshops, the program staff presented the ENCC model to TBAs with visual or pictorial images communicating a storyline depicting interactions between MNHPs and clients. Scenario testing allowed TBAs to use the storyline to explore different aspects of their future interactions with clients, adapted for study arm (HP only or HP+). Using informance, facilitators and TBAs discussed the illustrations and then used role playing to act out door-to-door sales interactions, such as a MNHP visiting a pregnant woman in her home and providing health messaging and selling products. Role playing built the TBAs' understanding of the ENCC model and allowed them to interact with and shape prototypes related to health promotion, sales, and franchise management and reflect on their acceptability. The facilitators then employed collective questioning to solicit feedback from TBAs after they had interacted with the different prototypes. Facilitators posed questions regarding the model to the TBAs and employed a type of Likert scale, using piles of stones and colored sticks, to gauge responses. TBAs were given the opportunity to discuss the reasons for their responses following each question. Findings from this process were used to refine the ENCC model.

Workshop participants also explored branding of the TBAs as MNHPs (e.g., logos for their uniform, how TBAs wanted to be perceived in their community, etc.) through a technique called storytelling with objects. Each TBA was asked to bring to the workshop an object that they felt represented their role in their community. TBAs then discussed the objects as a group and through these discussions determined how they would communicate their new role to the community both in terms of their group name, their uniform and logo Then, through a step called "draw the experience," TBAs drew a representation of their new role as MNCH health promoters and their relationship to the formal healthcare system.

Overall, the introductory model acceptability workshops allowed the TBAs to assess the different elements of ENCC, such as the balance between health promotion, selling products, travel, and other activities, and begin to shape the ENCC model to fit their needs and desires. Through this process program staff learned that the TBAs approved of the program model and found the role of health product seller/health promoter appealing. Role-playing demonstrated that many of the TBAs were already comfortable interacting with members of the community which confirmed the desirability of the model among program staff. Notably, the TBAs indicated a strong preference for working in collective business groups rather than as individuals.

5.4 Model Acceptability: Branding and Referral System

The second model acceptability workshop focused on refining and finalizing the MNHP branding as well as the design of the referral system that MNHPs would use to direct clients to the health facility. During the workshop, facilitators sought to understand the TBAs' vision related to their new role as MNHPs and translate it into branding that illustrated their desired position in the community and in relationship to the formal healthcare system. The TBAs explored ways in which they preferred to be identified within their communities, including elements such as name badges, uniforms, a defining logo, training certificates and the type of carrier used for transporting products. This information was then used in a process of "quick and dirty" prototyping. For example, to advance the branding discussion, a local artist adapted the illustrations generated by the TBAs during the draw-the-experience activity and developed

additional iterations and adaptations in each of the subsequent ENCC model acceptability workshops. Initially, the artist drafted three different logo designs and TBAs provided feedback on them to refine and finalize the logo on their uniforms. From the workshops, the program staff learned that TBAs wanted to be recognized as an officially endorsed link between the community and the formal healthcare system. They therefore chose a logo (Figure 4) that depicted a MNHP in a gloved hand (representing their role in the formal healthcare system) with her arm around a pregnant woman sitting inside a house.

Figure 4: Final MNHP logo

The program staff also aimed to create a standardized referral system to link clients to healthcare facilities, focusing on ways to limit the loss of referral slips and the ease of management for TBAs, most of whom were illiterate. Another round of quick-and-dirty prototyping created and refined two different referral systems: a bracelet whose colors would indicate the reason for referral and a paper form that used illustrations to depict the reason for referral. Facilitators then used informance and role playing to gauge preferences and tested each referral system with the TBAs to determine the one that was most desirable. In the final iteration, the TBAs chose a paper-based system because they felt an official form helped to legitimize the referral process and demonstrate their link to the healthcare system.

5.5 Supply Chain Workshop

The ENCC program staff also applied design thinking to develop a supply chain system that could replenish stocks for the MNHPs who would be selling products. They worked together to prototype the system, aiming to understand the needs and components of the system, highlight possible challenges, and define the flow of goods. They developed a diagram illustrating the proposed steps of the supply chain, using flow-and-error analysis to represent and examine the flow of activity through the system while cataloging challenges and additional needs. Participants walked through product movement from arrival at the Bo field office to the point of sale in the community. Participants discussed purchasing products from vendors as well as the pilot's role in securing the continuity of the supply chain. The group formulated a list of tools to track and document the movement of products and noted the need for tools that could be used by MNHPs who could not read. They developed tools for tracking products and defined the roles and responsibilities of each partner, emphasizing the importance of supervision and monitoring. They also identified the need for full-time logistics personnel.

6 The Experience of Using Design Thinking

The team engaged in the design thinking activities at the early stages of the ENCC pilot included two program managers from Concern Worldwide U.S., who defined and led the process, and staff of implementing partner HPA in Sierra Leone. Health managers from the Bo district health management team also held discussions with the TBAs during the design workshops to provide information about the health system context and to confirm that the government would officially recognize the work of the

newly branded MNHPs under ENCC. TBAs and women of child bearing age from the ENCC communities were defined as the end users.

As part of our exploration of design thinking in ENCC, we conducted interviews with 12 respondents who either participated in the design phase of the pilot or were integrated into the team following the design phase and became familiar with the role that design thinking played in the development and implementation of ENCC. Respondents included ENCC program managers from both Concern Worldwide U.S. and HPA. We also interviewed several TBAs who participated in the design thinking workshops; however, they were unable to distinguish the design workshops from other consultative processes conducted by the ENCC team and did not offer specific insights about this stage of the design process. In the case of program managers and staff, some respondents were interviewed twice, once focusing on the application of design thinking methods to pilot development and again at the end to reflect on the influence of design thinking throughout the life of the pilot. The respondents' experience with design thinking in ENCC fell into four broad categories: essential framing and practical insights, empathy for end users, comparison with other forms of program planning, and observations of the overall value and drawbacks of design thinking.

6.1 Framing and Insights

Program team members who participated in the design thinking workshops indicated that utilizing the design thinking tools and techniques helped them to understand the TBAs' needs and desires in depth. By gaining these insights, the program team was then able to tailor specific elements of the ENCC model to address TBAs' desires, such as the paper-based design of the referral form. They also became sensitive to the way in which TBAs wished to be recognized in their new role as MNHPs. In the past, the Ministry of Health had sanctioned the role of TBAs through training. Following the policy change that outlawed the use of TBAs for delivery, TBAs lost their government-sanctioned role. Design thinking workshops gave program staff a deep understanding of the TBAs' recent experience of losing their previous position with respect to healthcare provision. They also learned about TBAs' inherent capacity to connect with women in the community and their deep desire to once again have a place in the health system in support of women and children. In that way, the design workshops revealed the importance that TBAs attached to being seen as "official" in their new role as health promoters and how this official image would help secure TBAs' commitment to the ENCC pilot. For example, in the "storytelling with objects" workshop, TBAs were asked to bring something that could represent their new role in the community. Many TBAs brought training certificates, some of which were 15 to 20 years old, to show their wish for legitimacy in the eyes of the community. As described below by a program team member:

> *…so we asked the TBAs to bring to the rapid prototyping workshop something of importance that represented their role in the community. Many brought training certificates, there were lots of them! The goal was to determine their brand and [it was clear] that the brand needed to have a strong link to the training certificates.*

When prototyping the referral process, program staff also learned that TBAs favored a paper-based form, despite the fact that most TBAs were illiterate. A paper form was seen as an "official" document that linked TBAs to a government health facility.

As the program team built empathy for the TBAs through the workshops, they also gained understanding of the context in which TBAs wished to work. For example, TBAs expressed the desire to work as a team rather than as individuals, a concept that was used later to shape the ENCC model. As reported by a program team member who attended the workshop: "We originally looked at the project as an individual-based model: TBAs working in isolation, not within groups. The TBAs passionately made an alternative suggestion to allow them to form groups. They would support each other for loan repayments and things like that."

6.2 Role of Empathy

One of the research propositions we explored was the use of design thinking to build empathy for the end users as part of the problem mapping and solution identification process. Program managers who participated in the design thinking workshops indicated that utilizing design thinking tools and techniques not only helped them understand the situation in which TBAs found themselves (in the context of the national ban on TBA-assisted childbirth) but actually allowed them to "stand in the shoes" of the TBAs. Through methods like storytelling and informance, workshop participants gained real understanding of how the TBAs would like to be recognized in the community and would like to interact with their clients. They learned what was important to the TBAs as they embarked on this new role as MNHPs. Reflecting on her experience with the design thinking workshops, a program manager indicated: "Because I [came to] understand [the TBAs'] situation, I always encouraged them. Because I know what they are going through, I always continue to encourage them by saying you are working for your community's people and children to save their lives."

The empathy generated for the TBAs during the design workshops also influenced the way in which program staff managed the pilot beyond the initial design phase. The rapid prototyping inspired the team to continue to take a user-centered approach beyond the design phase by continually engaging the TBAs to gather feedback on program elements and adjustments and adaptations of the pilot based on the TBA experience. A member of the ENCC program staff noted about the commitment among program managers to regular engagement with TBAs over time:

> *I think [program staff] do have a much more in-depth understanding of the issues that are coming up, and I think the level of engagement that they have with [the MNHPs] goes quite deep. I am always very impressed with them; they know these MNHPs, they are very much linked and involved in working with these groups of MNHPs for a long time now, and I think they do feel very invested in the project and making it work. And making sure the MNHPs are happy, but also performing. So I think, I don't know, but that is something that has come from the level of engagement that they had with TBAs as part of the project design.*

One of the major findings for the program team as they went through the design thinking process was the TBAs' desire to be perceived as officially linked to the health system. They also made it clear that when it came to referring clients to the facility that, despite being illiterate, they wanted a paper-based referral system because the paper form is an "official" document that would link them to the facility. One program staff member recalled:

> *...that was the place where you could see where the design thinking influenced how we got to the outcome. We had someone drawing and real-time iteration using some of the ideas they had and putting them on paper in front of them. The brand is really official. They wear their t-shirts and a name tag which is one of the most important possessions they have. They are very official about it. The need to be recognized officially…This came out in the storytelling-with-objects activity. We did not think that name tags and certificates were a big deal. When you see them at a meeting, they have their nametag, certificate, etc. at meetings, and carry it with them, and this is the first thing they show people when they go to their house. This is something we could not have anticipated and it became important.*

6.3 Comparing Design Thinking With Traditional Planning

Program staff cited the techniques and processes used to generate empathy for and understanding of end users' needs and aspirations as the key difference between the ENCC approach and their previous experience with program design. Although they found similarities between the design phase and traditional public health programming, program staff felt that the ENCC design process went into more depth and detail and allowed them to gain a better understanding of the end users up front. The iterative cycles of prototyping and testing also opened up space for all participants to play an active role in the design process. This departure from traditional planning was cited as a major benefit of design thinking. As one member of the ENCC program staff noted:

> *…there are similarities [with traditional program planning]. But I think the rigorousness with which we conducted the rapid prototyping really tried to look at [the broader context] before it was implemented, rather than saying let's try this and see how it works. I think the human-centered approach really pushes us further than what we have done before. It is a different sort of approach in some ways.*

In addition, respondents noted that the rapid prototyping, with its clear focus on the end user, generated ideas and solutions from the ground up to a greater degree than is normally used in health program planning. As a result, the pilot design was tailored to fit the communities and health promoters it was intended to serve and gave a clear voice to the end user. One respondent reported:

> *I think ENCC really does have a ground-to-top approach, where we are trying to take the learning that happens in the field and bring those ideas to policymakers and discuss change within the national context among the line ministries of Sierra Leone. Other projects I have worked on look at defining successful policies in the first place and [then] bring them to the community level. I think the links to the context in which we are working are so important. And I think the ENCC is really able to make it so that villages operate within the context of their own village.*

Another respondent noted:

> *[I am] trying to think of a time when beneficiaries were involved as actively as they were in rapid prototyping [in ENCC]. I can't think of an instance when they were so heavily involved in deciding their "identity." Of course other NGOs would ask: "What do you want to be called?" But actually putting a marker in someone's hand and empowering them in that way is completely different.*

6.4 Value and Drawbacks of Design Thinking

Overall, the workshop participants found the application of design thinking to program development similar to other types of planning and design in that it elicited feedback from the community. However, the process used in ENCC differed from traditional approaches in that it aimed to shift the participants' focus to the end user, taking deliberate steps to build empathy, systemically uncover end user needs, and facilitate codesigned solutions that were intended to help ensure sustained change. Respondents noted that this process that prompts program managers to regularly consult end users generated deep understanding of the needs and desires of the TBAs and the community and, they felt, resulted in a better more contextually relevant program. As a program team member reflected: "It is very useful to get an insight about what drives people's decisions, what people are wanting [as a whole] and that not just [from] this project…I think that it is the systematic way that information is collected and documented. It is very useful."

Respondents also noted some of the drawbacks associated with use of design thinking: it is often time consuming, it requires a substantial investment up front in the early stages of a program, and it requires additional effort to introduce continuous feedback loops. Some respondents noted that it could be difficult to justify the additional investment required from a design approach, given the challenge of explaining the value of design thinking. A respondent noted:

> *I think it more difficult in terms of explaining to other people where [design thinking] is going, why you are changing things so often, and I think it is difficult for other people to understand, especially working with an organization that has been operating [in the same way] for 50 years or more. This new development approach is very different for [some organizations], so I think it can be difficult to understand the benefits in terms of project design.*

7 Influence of Design Thinking on ENCC

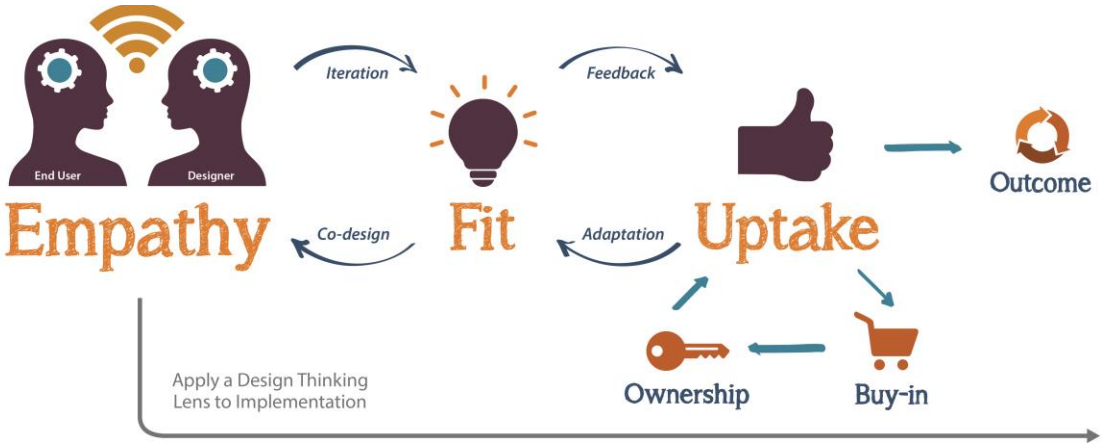
7.1 Grounded Theory

A fundamental premise of the use of design thinking is that it provides important insights into user experience, needs, and desires and helps to translate these insights into tailored interventions or products, increasing the likelihood of user adoption and reducing the risk of intervention failure. Following our documentation of program staff experience with design thinking and working from the original research propositions noted in Section 3.1, we describe below our findings related to the contribution of design thinking in ENCC using the constructs of fit, uptake, buy-in and ownership, and the effectiveness of the ENCC intervention. Specifically, we explore the potential contribution of design

thinking to the transformation of the role of TBAs at the community level and their influence on health-seeking behavior among women using a theoretical pathway or grounded theory constructed in the course of our analysis of the role of design thinking in ENCC (Figure 5).

In Figure 5, we hypothesize that through the application of design thinking, ENCC achieved fit, meaning the pilot created an essential match between key strategies—mainly steps to transform the role of TBAs from traditional midwives to health promoters and microfranchise managers—and TBA and community needs, desires, and aspirations related to this new role. Fit then played a role in catalyzing uptake or adoption of the ENCC model among TBAs and their clients. As the intervention was further refined with users through feedback loops and adaptation, it achieved an even tighter fit, which influenced continued acceptance of the new role of MNHPs in the community and the health system. In ENCC, we defined this lasting influence of design as buy-in, or continued acceptance of the MNHP roles, and ownership, or demonstrated commitment to ensuring the continuity of MNHPs over time. Based on these observations, we propose that design thinking worked alongside other program elements to contribute positively to the realization of some pilot outcomes. We discuss and illustrate this pathway below and provide a critical analysis of the added value and limitations of design thinking in the context of ENCC. Specific definitions for each construct in the pathway are found in Box 2.

Figure 5: Theoretical pathway of the influence of design thinking on MNCH programs



7.2 ENCC Outcomes

As described above, design thinking in ENCC began with a stated intent. In this case, the intent was to improve utilization of MNCH services through the rebranding of TBAs as MNHPs and managers of microfranchises. Although the overall concept of ENCC was already formed by the time the design thinking workshops took place, design thinking approaches were used to tailor aspects of the intervention to the needs and desires of TBAs and communities. Through their participation in the design thinking process, the program team built empathy for the TBAs and gained insight into TBAs' current and desired position in the community. For example, design thinking approaches were used to gain insights into how TBAs wanted to be "rebranded" as health promoters and sculpt the identity that MNHPs would convey in their communities, determine the mix of products that they would sell in the

microfranchise arm, and develop a referral system that allowed TBAs to encourage women to seek care at the health facility. The design process helped the program managers translate TBAs' needs and desires into various aspects of the ENCC model, tailoring the intervention accordingly.

Box 2: Definitions of design thinking pathway elements in the context of ENCC

Empathy: Empathy of designers for the end user (MNHPs or community members) needs and desires during the design phase.

Fit: The ENCC model, referral system, or the microfranchise model address the expressed needs and/or desires of the TBAs or the community identified through the application of design thinking to the program development of the pilot.

Uptake: Indicates acceptance and utilization of the ENCC model, referrals, and/or microfranchise model by the TBAs or community.

Buy-in: Indicates some positive, emotional, or behavioral reaction to the ENCC model (including microfranchise) among MNHPs and/or community members.

Ownership: A stage beyond buy-In, it is the emotional or behavioral acceptance of the ENCC model and further indicating that the program is something MNHPs and/or the community would fight to sustain through instituting structures, rules, and/or resources.

To understand ENCC effectiveness in improving the health seeking behavior of women in the community as well as the new role of MNHPs, the JSI research team conducted an impact evaluation in the last few months of the pilot. [8] This study found high levels of acceptance and adoption of the MNHPs' role among MNHPs and within the community. By the end of the pilot the MNHPs were well integrated into the formal health system and well accepted by their communities, representing an important step in the pathway to influencing women's health-seeking behavior. For example, in the HP arm, MNHPs reached, on average, 86 percent of women in their catchment areas, and in the HP+ arm they reached 93 percent of women, resulting in a 40 percent increase in coverage of their catchment population from baseline.

The percentage of women who were visited within the first 24 hours after birth increased by 30 percentage points in the HP arm (from 40% to 69%), and nearly doubled (from 39% to 77%) in the HP+ arm. The survey also showed a significant increase in the number of women who were visited by a MNHP within 24 hours of giving birth in both intervention arms, though this result was likely to be linked the overall increase in facility-based deliveries. All MNHPs in both the HP and HP+ arms provided counseling and referrals to facilities for deliveries. They also provided referrals to the health facility for other services including antenatal care (ANC) and postnatal care (PNC) and to address potential danger signs in pregnancy.

[8] Ali, D. and Magalona, S. 2016. Essential Newborn Care Corps Project Evaluation Findings. JSI R&T Inc. Arlington VA.

In addition to reported high levels of interaction between MNHPs and women in the community, the study found high levels of approval for MNHP services among community members. In interviews with community-level respondents, the majority reported that they felt that MNHPs had a clear and important role in the community. Health service managers and service providers also reported a strong appreciation for MNHPs and their new role. Some respondents voiced a desire to introduce the ENCC intervention in other chiefdoms and incorporate MNHPs into the country's new community health worker policy. MNHPs themselves also reported high levels of positive interaction with their communities, noting that they felt respected and appreciated in their new role. For many MNHPs interviewed, this respect and appreciation was their main source of motivation for continuing to work as a health promoter.

Although the majority of respondents indicated high or sustained use of MNHP services, some women reported that they did not go to the facility after being referred by a MNHP. In addition, respondents from one community did not respond well to the new MNHP because TBAs from their community were not selected to join the ENCC pilot. Furthermore, some community members refused to purchase goods from the MNHPs because they felt that products should be free.

With respect to the influence of ENCC on women's health-seeking behavior, the evaluation found a significant effect on the use of facility-based deliveries in the HP+ arm but not the HP arm. It found no effect on increasing ANC visits during the first trimester. The impact evaluation observed increased utilization of PNC visits for newborn checkups (15%) and maternal checkups (20%) in both arms when compared with the control. However, there was an overall decrease in PNC visits between baseline and endline. Finally, there was a significant increase in both arms related to early initiation of breastfeeding within the first hour of birth (19.0 percent in the HP arm and 23.7 percent in the HP+ arm).

With respect to women's knowledge, there was a significant effect related to improved knowledge of the components of birth preparedness, but the intervention did not improve women's knowledge of danger signs during pregnancy. The impact evaluation concluded that the findings did not show a significant improvement in knowledge and use of some health services because of the high values that existed at baseline (e.g., 89.8 percent utilization of four or more ANC visits and 92.8 percent of newborn checkups during a PNC visit in the HP arm) and the relatively short duration of the pilot timeline. There was an increase in reported early initiation of breastfeeding; however this is likely to be linked to the increase in facility-based deliveries where mothers would have been encouraged by health staff to initiate breastfeeding soon after birth. The evaluation report concludes that more time and resources would be needed to fully test the MNHPs' overall effect on improving health-seeking and health-promoting behavior among women in the ENCC communities.

7.3 Fit and Uptake

The high levels of adoption by MNHPs of their new role and community acceptance of MNHPs reported in the impact evaluation are consistent with findings that emerged from key informant interviews conducted during the life of the pilot and used to understand the influence of design thinking. We

observed that the high levels of uptake, appreciation, and use of the MNHP services clearly had roots in the learning that emerged from the initial design thinking phase that shaped ENCC's implementation strategy. This link between the use of design thinking and the uptake of the ENCC model is expressed as the concept of fit and depicted in the pathway graphic (Figure 5). The influence of design thinking on fit emerged in several aspects of the ENCC pilot but is best illustrated in the way in which the program tailored its approach to the TBAs' vision of their new role (uniform logo, and official status in the health system) which in turn influenced the near universal adoption and sustained participation of TBAs in the ENCC pilot. Among the 200 TBAs who were initially trained as MNHPs, 98 percent remained in the pilot even in the face of an Ebola outbreak, during which official pilot activities were suspended for six months. The design process helped shape the model of ENCC in a way that made it acceptable and appealing to the MNHPs, encouraging sustained retention and commitment over time.

Through the design process, program managers learned that TBAs wanted to serve in a role where they could continue to help women and children in spite of the official ban on TBA-assisted deliveries. However, they also learned that it was critical for the TBAs to be trained as staff in the formal health system in order to be seen as "official" in the eyes of the community. The program team adapted the ENCC model to respond to this vision and contributed to the strong and sustained uptake of the program by TBAs. A program manager reflected:

> *Knowing that they wanted training was really interesting to me. We were asking about incentives and many of them said that training was a big incentive because most of them weren't able to go to school and most of them had dedicated their lives to the health of their community but hadn't yet been able to have training. I think when you hear the word "incentive" you think financial incentives, and I think we thought that is what they would want, but training is what they said first.*

In the case of ENCC, the link between fit and uptake of the MNHP role can also be demonstrated as follows: MNHPs provided health promotion, counseling services, and referrals to women. Women followed the advice of MNHPs (including referrals), and MNHPs successfully sold goods in the HP+ arm of the intervention. Through the life of the pilot, researchers assessed uptake of the ENCC model using various data sources including referral monitoring and product sales. This information was triangulated with in-depth interviews conducted with MNHPs, women, key community members, and MCHAides to assess the strength of MNHPs' adoption of their new role and the community's willingness to utilize MNHP services. During interviews, MNHPs expressed satisfaction with their new role as health promoters and reported that it gave them status and respect in the community. Community members consistently reported their satisfaction with MNHPs' services and indicated that the MNHPs' role was more clearly defined than their previous role as TBAs. Furthermore, community members expressed their trust in MNHP advice because they knew that the government had trained the MNHPs and they were now seen as members of the health facility team. Below we illustrate the link between design thinking and uptake of the new MNHP role with respect to: MNHPs' new identity, MNHPs' role as a bridge between the community and the healthcare system, and MNHPs' success as microfranchise managers.

New Identity for MNHPs

When discussing MNHP branding during the design phase, insights gained into TBAs' experience and concerns influenced three aspects of the pilot strategy. First, the program managers learned that TBAs wanted to be viewed as "official" and be seen as part of the government health system. As such, TBAs expressed a preference for a paper-based referral system despite the fact that the majority of them were illiterate. For TBAs, paper-based forms appeared more official than using colored bracelets to indicate reasons for referral. Second, when the TBAs designed the official MNHP logo, they insisted that it include a picture of a rubber glove, which to them was a symbol of the official health system. From these insights, the artist that created the logo that depicted an MNPH sitting in a home with her arm around a women, framed in the image of a rubber glove. Finally, in introducing the ENCC model to the communities, program managers reported that MNHPs had completed community health worker training and that MCHAides would support the work of MNHPs in the facilities and the community.

This branding proved essential for community acceptance of MNHPs' new role. Community members indicated that they felt the MNHPs' work was clearly different from theie work as TBAs. They saw the MNHPs as a trained cadre of health workers and as an extension of the formal healthcare system, which gave respondents confidence in the MNHPs' services. A MNHP described her experience:

> *At first when I was a TBA the community never knew about me or the importance of my job, the respect was on normal grounds. After our training as health promoters, the respect the entire community has for me is very high. Even the chief now recognizes my importance.*

In addition, MNHPs indicated that they felt recognized and official because they have new uniforms and name badges. Along with the paper-based referral forms, these MNHP-designed aspects of their new role gave them status. Consequently, they now see themselves as "legal," with a clear niche in the community. MNHPs also noted that the MNHP training increased their knowledge and skills, giving them confidence to reach out to women and encourage use of services at primary health units (PHUs). As confirmed in the evaluation, by the end of the pilot MNHPs had contacted the majority of women in their catchment areas with health promotion and referral services.

Referral System

In the design phase, TBAs asked for an official (paper-based) referral slip to legitimize their role and link them to the formal health system. The ENCC team then developed a symbol-based referral form that MNHPs used to make referrals. A MNHP noted:

> *Mothers do appreciate getting the referral slips from MNHPs. When they go into the health facility with a referral slip, they have the feeling that they are supposed to be there because they have a referral slip, are doing what should be done, are following the instructions of people that are respected in the community.*

Women in the community indicated that they liked receiving referral forms from the MNHPs, and some expressed that having a referral slip gave them an "official" reason to attend the clinic. Respondents also felt that a referral slip ensured they would receive attention from the nurses at the clinic.

Bridging the Gap

Over a short period of time, the MNHPs gained a reputation as the first point of contact with the formal health system because MNHPs often worked "hand in hand" with MCHAides at the health facilities. Respondents, including program staff, MNHPs, and MNHP clients, noted the importance of the MNHPs' role in promoting use of the primary health facilities. As such, through ENCC's efforts to rebrand the role of TBAs and train them as health promoters, agents of referral, and sellers of health products, the MNHPs became a bridge between the community and the formal health system. A program staff member noted:

> *For a lot of women, going to the PHU is something that is quite new. I think that making a decision to go to a health facility is, at the moment, a [big] step…but I think it is a first step [that is] the MNHP's role, [and they are] seen as the first point of contact. A woman will trust her doing that.*

Routine data on health service utilization were not sufficiently reliable to track changes in women's use of specific health services during the pilot. However, based on referrals recorded from referral slips issued by MNHPs and interviews with MNHPs, women in the community, and MCHAides, we learned that many women responded positively to the MNHPs' counseling by visiting clinics when advised to do so. In some cases, women indicated that they sought out MNHPs specifically for referrals before going to the health facility. A MNHP client noted: "I always confer with Aunty Mary (a MNHP) who gives me referrals to the health center. If I don't get a referral from her I may not access the facility in the clinic and it will also appear as if the MNHP is not doing the work. I feel good about the referral she gives."

Facility staff also indicated that they are happy with the new role that has emerged for MNHPs. They noted that by providing services to the community, MNHPs are driving demand for facility-based services. They also observed an increase in the number of women utilizing services, which many attributed to the good work being done by the MNHPs. As a MCHAide noted: "Actually to crown it all, there is a massive turn up of women for both the ANC and PNC checkups. So I am won over that women in this community think good about the MNHPs."

Notably, the MNHPs continued to refer clients even during the Ebola outbreak, when there was a general mistrust and sense of fear within the community associated with the health facilities. In some communities, officials required that a MNHP accompany any woman visiting the PHU, which helped to ease fears about utilizing health services during the outbreak.

Social Franchise

The final illustration of the link between design thinking, fit, and uptake of the ENCC model relates to MNHPs' new role as microfranchise managers. During the design phase, TBAs indicated that it would acceptable for them to sell goods door to door while visiting women to provide health messaging. Community members that took part in the prototyping workshops also indicated they would welcome TBAs in their homes to sell basic health products as part of a health messaging strategy. Role play helped the TBAs understand how they would interact with women when providing health promotion and how

to incorporate the sale of goods during these visits. Women in the community influenced the mix of goods that MNHPs would sell through user testing and product sorting and by suggesting appropriate price points. After gaining experience with the microfranchise model, many of the MNHPs indicated that they were actively selling goods during home visits and that they enjoyed it. Their clients also reported satisfaction with the product mix and the MNHPs were helping them prepare for having a new baby in the home. A MNHP noted: “They [women] usually buy my products and since am selling things like nappies, soap, Vaseline, and Dettol, they prefer buying it from me instead of going to Bo [district capital).”

Most women interviewed remarked on the appeal of being able to purchase goods during MNHP home visits because it gave them easy access to products and they could interact with MNHPs at the same time. A few women indicated that purchasing goods from MNHPs helped them to prepare for giving birth, because it prompted them to acquire necessary items gradually for delivery and for supporting a new baby. Both MNHPs and women noted that some MNHPs allowed women to purchase items on credit, which increased product accessibility. A community leader noted: “When they [MNHPs] are selling these baby items, it adds more respect and value than just doing counseling and advising women to go the health facility.”

7.4 Lasting Change: Buy-In and Ownership

Our analysis of the role of design thinking went on to explore its influence on two concepts beyond uptake—buy-in and ownership of the ENCC model—to understand if the use of design thinking helped lay the foundation for long-term and sustained changes in behavior or practices among MNHPs and community members. Specifically, we explored whether the application of findings from design thinking helped to integrate the MNHPs into the community and the extent to which MNHPs and the community came to rely on the ENCC model and became vested in its continuation, adaptation, and improvement.

Embracing the MNHP Role

Over time, in subsequent stages of interviewing we observed that MNHPs increasingly embraced their new role as health promoters and microfranchise managers. In particular, they noted the difference between their role as TBAs and their role as MNHPs, indicating they were now deemed “legal,” which allowed them to do their work freely and gain respect in the community. MNHPs indicated that they were proud to serve in their new roles, and because of their new status, they felt valued by the community. In addition to embracing their work at the community level, MNHPs also indicated an affinity for working with MCHAides at the health facilities. As a MNHP noted: “I like to work as a health promoter and if there is any other [role] related to this I am always willing to work. I have learned a lot and I enjoy doing it."

Overall, the majority of respondents described MNHPs as extremely enthusiastic about their work. Community and health system stakeholders reported that MNHPs truly embraced their community-level tasks. Their commitment is confirmed by the near universal continuity of MNHP involvement in ENCC from 2014 when the pilot began to the end of the pilot in 2016. Even when the Ebola outbreak greatly

curtailed their ability to carry out their tasks, MNHPs continued to visit women in their homes and accompanied women to the health facilities and helped dispel general mistrust of the health system.

As MNHPs began to accept their new role, confidence in their services began to grow. Community-level respondents expressed their particular appreciation for the training that MNHPs received. A MNHP client noted about a MNHP: "I followed the referral because I know what she was doing was firstly correct, and secondly she worked at the hospital. So she has an idea about what she is doing." A program staff member reported: “Anytime the MNHPs go to the community, the women start singing, that is a sign that they appreciate them and when they start singing the MNHPs will tell them about pregnancy, complications, and all other things.”

Continuation of ENCC

In MNHP and community-level interviews, many respondents recommended that the ENCC pilot should be extended to other communities across Sierra Leone because it was working well in their community. One woman noted: “I will recommend the program to other communities so they too will have health promoters and receive the same services we are now receiving.” Community leaders and MCHAides also expressed their satisfaction with the ENCC model, indicating the value of continuing support for MNHPs.

MNHP and Community Ownership of the ENCC Model

Respondents described MNHPs’ passion for their new role as follows. MNHPs are willing to provide services to women at all times of the day or night. Many MNHPs accompanied women to the health facility for their appointments and during labor, which gave their clients a strong sense of security. In addition, MNHPs reported that they love their jobs and the feeling of respect and appreciation that has emerged over time. A community leader stated about MNHPs:

> *They are respected in the community, they bring innovative ideas, they are very hard working, they provide 24 hour security for the pregnant women and breastfeeding mothers, and they are alerted any time of the day and the night to render services.*

The majority of MNHPs interviewed expressed their commitment to continuing to work as MNHPs after the ENCC pilot ended. MNHPs in the HP+ arm reported they would continue in their MNHP role even if the microfranchise work ceased because they felt it was their duty to support women in their community.

Throughout implementation of ENCC, community members also demonstrated their commitment to maintaining the ENCC model by giving gifts to MNHPs and working on the MNHPs’ farms to free their time for MNHP work. A community leader noted:

> *When she [the MNHP] has work to do on her farm or her garden and asks the community members for assistance, everybody will turn up to help. She even had to turn away some people…others gave her tokens of appreciation for the good work that she is doing.*

Finally, some communities introduced official mechanisms for sustaining the ENCC model. They established bylaws including fines for women who ignored MNHP referrals or who failed to visit the health facility to give birth.

8 Design Thinking Influence Beyond the ENCC Model

In addition to directly influencing the shape and feel of ENCC, the design thinking activities also had a notable influence on the people who took part in the design phase and then went on to manage the pilot. Program staff often reported that their exposure to the design thinking process not only changed the way they thought about TBAs, it also influenced their overall approach to managing the ENCC pilot. For example, the program team continued to consult the MNHPs throughout ENCC to generate feedback on different aspects of the model and adapt the intervention to improve its relevance and effectiveness. A program manager noted:

> *Our knowledge of the MNHPs' work changed our perception of how we relate to the MNHPs. When we learn that this is their problem, this is how things have been, we are able to sympathize with them and with that we are able to make sure that if we had any prior feelings about the MNHPs, we need to change those attitudes and to also see the MNHPs as very important actors.*

Overall, we found a notable shift in the way that program managers thought about their work after they experienced the design workshops. The important insights that were gleaned from the TBAs inspired the program team to move forward with a design mentality as they implemented the pilot through frequent use of end user consultation to gather feedback on program effectiveness and inform adaptation. When asked whether the program team used design thinking beyond the initial design workshops, a program manager replied:

> *Yes! It was used throughout the project. For instance, each and every project officer had it at the back of their mind that this project was designed with such a process. So any steps, any process, activities that we were doing, we looked at how people perceived it, what they thought about it. So, it is like "human-centered" has been use throughout the project, because we were well aware that in such projects, each and every step needs to be documented, needs to be observed, needs feedback, needs to observe the lessons learned. Design had to be at the center of each project activity.*

9 Reflections on Design Thinking in ENCC

Prior to introducing the ENCC pilot to TBAs and their communities in Bo district, Sierra Leone, the Concern Worldwide program team and its partners were aware of many of the basic constraints that TBAs faced when the government placed new restrictions on their role as midwives. The Concern team also perceived an opportunity in the context of Sierra Leone's new community health worker policy to capitalize on the TBAs' long standing and trusted position in the community and designed ENCC to help

transform TBAs from community-based midwives to health promoters (MNHP) and microfranchise managers. Findings from the final evaluation, process documentation, and this case study document ENCC's success in facilitating this transformation, notably in the widespread adoption and acceptance of the MNHPs' new role among the MNHPs themselves and community members. When we consider the influence of design thinking in ENCC, we focus on its role in driving this transformation through gaining insights from TBAs and the community and shaping the program alongside the TBAs in ways that were appealing and acceptable to all stakeholders.

One of the most successful examples of the influence of design thinking was in the development of the MNHP brand or image that reflected both the TBAs' vision of their new role and ensured acceptance of that role by their clients. Findings from the prototyping process reflected the TBAs' desire for three critical elements of the MNHP brand that confirmed their link to the formal health system: a logo with a rubber glove, use of official documents such as name badges and training certificates, and the paper-based referral form. Incorporating these elements gave MNHPs confidence in their new identity and helped them garner respect from community members who came to view them as a trained workforce and an extension of the health facility. With this confidence and support, MNHPs readily embraced their new role, and their commitment to their work began to grow. In turn, community members began to reach out to MNHPs and rely on them as a bridge to the PHU. Prototyping throughout the design thinking process also established the model for microfranchising, which was widely accepted by the community (in the HP+ arm) and provided additional opportunities for MNHPs to meet women in their communities to relay health messages and provide women with ready access to basic health-related goods.

Although we cannot fully explain ENCC's mixed results on influencing health-seeking behavior and knowledge among women in the ENCC intervention sites, we propose that it reflects less on the successful application of design thinking than on the challenges of training and supervising 200 MNHPs and standardizing the health promotion and referral aspects of their jobs. Monitoring reports from the pilot found that at first MNHPs did not fully understand when to use a referral slip and for what purpose. Consequently, they issued many more referral slips than were required, possibly undermining the value of referrals in the eyes of the health staff and the community. The pilot retrained MNHPs on the appropriate management of the referral form; however the pilot team was not able to confirm that training improved the quality of referrals or whether women who received referrals presented at the facility for the reason indicated on their referral slip. Although some women reported that they appreciated the support that MNHPs provided in accessing health facilities, there was some indication that the MNHP might have become a gatekeeper between women and the health facilities rather than a facilitator and promoter. For example, some community leaders insisted that a woman be accompanied by an MNHP whenever she accessed services at the facility. Furthermore, some women reported they did not want to access the health facilities without a MNHP referral. There was also limited monitoring data on the health messages that MNHPs provided during home visits to understand frequency and accuracy.

To fully exploit the potential effectiveness of ENCC in improving health knowledge and behavior among women the pilot could have benefited from added focus on these and other public health program aspects of ENCC, building on the foundation of the well-established acceptance of the MNHPs in their new health promotion role. In the next stage, the use of design thinking could be equally relevant to determining the content of health messaging, prototyping and co-designing the entire referral process, or defining an appropriate monitoring approach to support this new cadre of health worker.

In applying design thinking, the ENCC pilot went beyond traditional health program development to provide a space for user-centered program design including iteration and adaptation of program elements at the outset of the pilot. It introduced a type of needs assessment that helped the program team develop and refine aspects of the ENCC intervention that were critical to introducing a new role for TBAs in the community. In this way, design thinking helped to create a better fit between the intervention and the end users' expressed needs and desires related to the provision of community-based health promotion and support. The experience of using design thinking also inspired the program team to continuously return to the end user (MNHPs) for feedback to help determine how best to iterate on the model to meet the needs of the MNHPs. In many ways, design thinking created a cultural shift for the program team that moved the perceived value of MNHPs' inputs and reflection on their experience to the forefront of decisionmaking when considering pilot adaption and defining pilot success.

ANNEXES

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Annex B: Detailed Description of Design Thinking Methodologies and Visual Products

Product Mix Workshops

Activity Purpose

The purpose of the three product mix workshops was to collect information from women in communities where the ENCC intervention would be implemented in order to understand which products should be included in the basket of goods that TBAs would sell at the household level. They resulted in a prototype basket of products that reflected community needs and desires and that community members could afford to purchase. The product mix workshops also aimed to explore how the products would be sold to the communities as well as the acceptability of the microfranchise model to women.

Activity Description and Methods

Multiple methods were used to elicit participant feedback. During role playing, participants were asked to act out "typical" sales interactions between TBAs and community members. These activities enabled program staff to understand TBA and women's constructs related to credit, and whether it would be used by the communities in their transactions with the TBAs. Through this method, participants could "inhabit" different roles to see how they would feel in different scenarios, allowing them to feed back to designers on sales interactions between women and TBAs.

Through informance, facilitators acted out door-to-door sales interactions to explain the ENCC model to workshop participants and to assess whether community members would buy products from TBAs. Participants gave feedback on which products they would use, and discussions centered on ways of selling that were considered "respectful" in the sociocultural context.

Product sort was then used to assess the acceptability and desirability of the product mix prototype and individual products for workshops participants. Products were displayed on the floor. Each workshop participant was given five beans and asked questions about her purchasing habits and preferences. Participants placed their beans on the appropriate product to vote. The mix of products on the floor was continually adjusted.

Findings from Product Mix Workshops

The product mix workshops produced data regarding community members' product desires and purchasing habits, which was used to determine the products included in the basket of goods sold by TBAs. The product sort activity produced quantitative data on participant desires and habits, which facilitated decisionmaking on the basket contents. Through role playing, the possibility that community members would use credit to purchase products emerged, a finding that was ultimately included in the model. The workshops also produced data indicating that people in the communities where ENCC was to be implemented would respond positively to TBAs approaching them in their homes to deliver health

messages and sell products, that they would like to buy products from TBAs, and that, overall, the ENCC model had promise for uptake by the target communities.

Model Acceptability: General Introduction

Activity Purpose

The two workshops to test the acceptability among TBAs of the ENCC model focused on TBA provision of health promotion messages and door-to-door sales of products by giving TBAs mock experiences with the model and eliciting feedback. We tested operational components of the model (e.g., numbers of days TBAs would work) and through this process built TBA understanding of the model and enabled them to provide inputs into the design. These workshops also initiated the design process for branding TBAs new role as MNHPs and a client referral system

Activity Description and Methods

The ENCC model was presented to TBAs with visual/pictorial images that created a storyline depicting their potential interactions with clients. Scenario testing allowed TBAs to use the storyline to explore different scenarios of their future interactions with clients, adapted for intervention group (health promotion or health promotion with product sales). Facilitators walked the participants through the model, and TBAs reacted to each image and developed their own narrative.

Using informance, facilitators and TBAs discussed the illustrations used in scenario testing and used role playing to act out door-to-door sales interactions—such as a MNHP visiting a pregnant woman in her home, providing health messaging, and selling products and a loan repayment transaction between a MNHP and a field officer at a monthly meeting. Role playing built TBAs' understanding of the ENCC model and allowed them to interact with prototypes related to health promotion and sales and reflect on their acceptability.

Collective questioning was conducted to solicit feedback from TBAs after they had interacted with the model through scenario testing and informance. Facilitators posed questions regarding the model to the TBAs and employed a type of Likert scale, using piles of stones and colored sticks, to gauge responses. Individuals were given the opportunity to discuss the reasons for their responses following each question.

Initial branding activities were explored through storytelling with objects. Each TBA shared an object with the group that they felt represented their role in their community. The TBAs then discussed the objects as a group and determine how they wanted to communicate their role to the community both through their group name and uniform. Then, through draw the experience, TBAs drew a representation of their new role as MNCH health promoters and how they would fit into the formal healthcare system.

Findings of Model Acceptability Activity: Health Promotion and Product Sales

The feedback helped weigh different elements of the model, such as the balance between health promotion, selling, travel, and other activities.

From the activities conducted, it was clear that the TBAs approved of the program model and found the role of health product seller/health message promoter appealing. Notably, the TBAs indicated a strong preference for working in collective business groups rather than individually. The TBAs' responses influenced decisions regarding specific elements of the program, such as how health promotion, selling, and traveling would be balanced. The role-playing activity demonstrated that many of the TBAs were already comfortable interacting with members of the community, and this instilled confidence in the overall program model. Additionally, illustrations generated by the TBAs during the draw-the-experience activity were redrawn by the local artist. Those images were then further iterated upon in each of the subsequent model acceptability workshops to develop and finalize MNHP branding.

Model Acceptability: Branding and Referral System

Activity Purpose

Through the branding model acceptability workshop, facilitators worked to understand the TBAs' "experience" and translate it into branding that illustrated their position in the community as well as in the formal healthcare system. They also aimed to create a standardized referral system that would link their clients to formal healthcare facilities, be feasible for illiterate TBAs, and limit the loss of referral slips.

Activity Description and Methods

TBAs were asked about how they preferred to be identified within their communities, including elements of their uniform elements, the type of carrier for products, and a defining logo. Feedback from this activity led directly into quick-and-dirty prototyping, where an artist drafted different logos that incorporated these elements in each of the TBAs drawings. The artist incorporated these themes and elements identified from both previous design activities to create three initial logo designs, and the TBAs discussed their pros and cons.

Another round of quick-and-dirty prototyping created and refined two different referral systems: a bracelet whose colors would indicate the reason for referral and a paper form that used illustrations to depict the reason for referral. Facilitators then used informance and role playing to gauge their preferences and test each referral systems with the TBAs and determine the one that was most desirable to the TBAs.

Findings of the Acceptability of the Branding and Referral Activity

From the workshops, it was clear that the TBAs wanted their role to be recognized as an officially endorsed link between the community and the formal public healthcare system. They picked the name "Concerned Mothers" to represent them and chose a logo that depicted a TBA in a gloved hand (representing their link to the formal healthcare system) with her arm around a pregnant woman sitting inside a house. They defined a design for their uniform and the basket they would use to transport the products they would sell.

Refinements to the referral process resulted in the creation of a paper-based system to illustrate the reason for referral using laminated cards to ensure durability and sustainability. Each card would include the name of the TBA and referral facility. The TBAs would maintain a pictorial tracking sheet to document a referral, which would be reconciled on a monthly basis with the cards collected at the facility.

Supply Chain Workshop

Activity Purpose

The purpose of the supply chain workshop was to develop a prototype of the system that would resupply MNHPs with the products that they would sell in the communities. Facilitators aimed to define potential challenges and needs and understand the components and flow of system.

Activity Description and Methods

A diagram was developed illustrating the proposed steps of the supply chain. Flow-and-error analysis was used to represent and examine the flow of activity through all the phases of the system while cataloging challenges and additional needs. Participants walked through the movement of products from their arrival at the Bo field office to the point of sale in the community. Participants discussed purchasing products from vendors as well as the pilot's role in securing the supply chain. The group formulated a list of tools to track and document the movement of products and noted the need for tools that could be used by MNHPs who could not read.

Findings of Supply Chain Activity

Through the flow-and-error analysis, the team mapped the flow of the supply chain. They developed tools for tracking products and defined the roles and responsibilities of each partner, emphasizing the importance of supervision and monitoring. They also identified the need for full-time logistics personnel.