Distribution Agreement

In presenting this thesis or dissertation as a partial fulfillment of the requirements for an advanced degree from Emory University, I hereby grant to Emory University and its agents the non-exclusive license to archive, make accessible, and display my thesis or dissertation in whole or in part in all forms of media, now or hereafter known, including display on the world wide web. I understand that I may select some access restrictions as part of the online submission of this thesis or dissertation. I retain all ownership rights to the copyright of the thesis or dissertation. I also retain the right to use in future works (such as articles or books) all or part of this thesis or dissertation.

Signature:

_____ _____

Gabriella A. Van Schoyck Date

Implications of the Latrine Training Mat for Improving the Defecation Practices of Children Under Five in Rural Western Kenya

By

Gabriella A. Van Schoyck

Master of Public Health

Global Health

_____

Clair Null

Committee Chair

_____

Holly Dentz

Committee Member

Implications of the Latrine Training Mat for Improving the Defecation Practices of Children Under Five in Rural Western Kenya

By

Gabriella A. Van Schoyck

B.A.

Covenant College

2008

Thesis Committee Chair: Clair Null, PhD.

An abstract of

A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University

in partial fulfillment of the requirements for the degree of
Master of Public Health

in Global Health

2012

Abstract

Implications of the Latrine Training Mat for Improving the Defecation Practices of Children Under Five in Rural Western Kenya

By Gabriella A. Van Schoyck

Kenya's Western province has the country's second highest prevalence of diarrheal disease among children under five. In 2010, formative research conducted in this region by Innovations for Poverty Action's (IPA) WASH-Benefits Project indicated that children under five often do not use their mud floor latrine due to fear of its large hole and unsanitary conditions. WASH-Benefits staff hypothesized that this lack of latrine use could be contributing to the region's high prevalence of diarrheal disease, and they developed a tool that they hoped would facilitate latrine use among children under five.

This prototype, the "Latrine Training Mat," was a small, lightweight wooden mat with a hole appropriately sized for a child. It could be placed over a latrine's existing hole and would make using a latrine a safer, less threatening, and more sanitary activity for young children. Made of wood or plastic, the training mat could be cleaned with a few rinses of water directly into the latrine hole, and then stored inside the latrine until its next use.

Three versions of the latrine training mat were piloted in the summer of 2011 among 12 households in rural Western Kenya. Each household contained a pit latrine with a mud floor, and had at least one child between the ages of 2 and 5 years old. Qualitative research methods were utilized to understand current local practices surrounding child defecation, feces disposal, and toilet training. In-depth interviews were administered and the training mats distributed to the twelve study households for one week. Focus group discussions were then conducted with participating mothers to understand their experiences with and perceptions of the training mat. The data were analyzed using a Grounded Theory approach with MAXQDA version 10 software.

Results from the study indicate that the concept of a latrine training mat was an effective tool for facilitating latrine use within this study population, and is potentially feasible for scale-up in rural Western Kenya because it accommodates local practices surrounding child defecation, feces disposal, and toilet training. This paper discusses these findings, and makes recommendations for modifications to future training mat designs and delivery methods.

Implications of the Latrine Training Mat for Improving the Defecation Practices of Children Under Five in Rural Western Kenya

By

Gabriella A. Van Schoyck

B.A.

Covenant College

2012

Thesis Committee Chair: Clair Null, PhD.

A thesis submitted to the Faculty of the

Rollins School of Public Health of Emory University

in partial fulfillment of the requirements for the degree of
Master of Public Health

in Global Health

2012

Table of Contents

Table of Images and Diagrams

Chapter 1: Introduction and Aims

1.1. Introduction

Diarrheal disease affects millions of people around the world each year, and children under the age of five are particularly susceptible. The World Health Organization estimates that 1.5 million children under five die from diarrheal disease each year, making it the second highest cause of death among this demographic (WHO, 2009).

In developing countries where water, sanitation, and hygiene conditions are often poor, people are consistently exposed to fecal contamination through human excreta that have not been properly disposed and remain in the environment. Consequently, a well-documented prevention strategy for diarrheal disease is improving water, sanitation, and hygiene conditions in the surrounding environment. At the household level, one of the ways in which this can be done is properly disposing of feces into a latrine so that young children and other family members cannot come into contact with these pathogens.

However, relevant literature indicates that children in many developing countries often do not use a latrine for defecation during their first few years of life, even when one is available in their household. Instead, young children often defecate on the ground or use other pre-latrine tools such as potties or cloth diapers. Many of these behaviors are often not accompanied by proper feces disposal and/or hand-washing practices, which can contribute to the prevalence of diarrheal disease among young children in these contexts.

1.2 Context of Research Project

In the Western province of Kenya, diarrheal disease is a widespread problem: the province has the country's second highest prevalence of diarrhea in children under age five, at 17.2% (DHS 2009, p.135). In this area of Kenya, it is often common to find family compounds that contain a mud floor latrine. (Latrine floors made of wooden boards also exists, but are not as prevalent as the mud floor latrines because they are not considered as stable.) These mud floor latrines are often in poor condition, with large holes that can easily erode and excrement that is littering the floor.

Images 1 & 2: Mud Floor Latrines in Western Kenya

Photo Credits: WASH-Benefits field officers (2011). Used with permission.

Innovations for Poverty Action (IPA), an international research organization, works extensively in Western Kenya. One of their ongoing research studies that is located in this province is the WASH-Benefits project, a multi-year, cluster-randomized study of the impacts of water, sanitation, and hygiene interventions. As the WASH-Benefits investigators and field staff were conducting formative research in rural communities to better understand their study context, they learned that young children – mainly those under the age of five – often did not use the latrines in their family compounds. Through group discussions with local mothers, the WASH-Benefits team found information that was largely reflective of current literature from developing countries around the world. According to the participating mothers, children in this context don't usually begin using the family latrines until they are at least three to five years old – and even then, many do not use the latrine exclusively, often defecating in the bushes nearby their houses, or in or around their family compound (personal communication, Christiano 2010, p.12). Children are initially afraid to use the latrine on their own, because of the pit's large hole as well as the insects or vermin inside the latrine. Mothers also indicated that when children use the latrine, they make it much messier and more unsanitary for the adults to use (personal communication, IPA, 2010).

Mothers described a variety of strategies they used to toilet train their young children, including supporting the children as they squatted over the latrine hole, teaching them to use a chamber pot in preparation for using the latrine, and making them help the mothers dispose of the stools from the potty into the latrine pit. Children are often afraid of the latrine at the beginning of the toilet-training process; mothers address this by consistently reminding them to

use the latrine and sometimes physically coercing them to do so (personal communication, IPA, 2010).

Mothers reported disposing of their children's feces by either throwing them in the latrine or burying them. However, this is not always safely done because the scooping instrument that is used is often stored, unwashed, inside the home, and mothers do not always wash their hands with soap after they handle the feces (personal communication, Christiano 2010, p.12). During these focus groups with the WASH-Benefits team, mothers indicated that they would be interested in encouraging their children to exclusively use the latrine at a younger age (three to five years old) if it were possible, because doing so would improve the sanitation status of the household (personal communication, IPA, 2010).

1.3 The Latrine Training Mat

In response to this perceived need to better facilitate latrine use among young children, the WASH Benefits team began developing the **latrine training mat**, a small, lightweight slab with a key-shaped hole appropriately sized for a child. This training mat could be placed over a latrine's existing hole for a small child to use, and would make using a latrine a safer, less threatening, and more sanitary activity for young children. Made of wood or plastic, the training mat could be cleaned with a few rinses of water directly into the latrine hole, and could then be stored inside the latrine until its next use.

This simple concept seemed to have potentially significant implications for improving sanitation within the household. First, it could promote latrine use among young children by presenting an easy alternative to using potties or defecating outside. Second, it could help

mothers more safely dispose of their children's feces, eliminating the need for direct contact. Third, the latrine training mat would allow children to use the latrine while still keeping it clean for the rest of the family to use. Finally, the latrine training mat could easily be incorporated into the family's existing toilet-training strategies and could more effectively promote exclusive latrine use among children as they get older.

WASH-Benefits created a basic prototype for the latrine training mat, and conducted a small-scale pilot of the mats in four households – each containing one or more children under the age of five – in the Siaya district of Kenya's Western province. The mats were delivered in the summer of 2010, and structured follow-up discussions with the mothers of each household were held a few months later in the fall. The qualitative data generated from these discussions strongly suggested that this tool had potential to facilitate latrine use among young children who might otherwise be considered too young to use the family latrine. This warranted further development of the tool, as well as research into its effectiveness and feasibility within this context.

Consequently, during the summer of 2011 a qualitative research study was conducted in a neighboring district of Western Kenya, in which three versions of the Latrine Training Mat were developed and subsequently delivered to twelve households that had children between the ages of two to five years old. This paper focuses on the results of this 2011 study, and discusses its implications for further development of the Latrine Training Mat (LTM) as a tool for promoting latrine use among children under five.

1.4 Research Aims

The primary research questions that this paper will address are concurrent with those that shaped the research design for the Latrine Training Mat study (referred to in this paper as the WASH-LTM study). In order to ascertain whether the latrine training mat could be considered a feasible tool, it was necessary to first understand the context of rural Western Kenya and how it influences children's defecation practices – particularly those that take place between the ages of two and five years old. It was hypothesized that, during this age range, children were developmentally capable of learning to use the latrine, but this learning process was often delayed due to specific contextual barriers. Consequently, this study aimed to first identify the local perceptions and practices that related to this issue, and then to evaluate how the latrine training mat could be used and would be perceived within the local context. The following are the three questions that shaped the LTM research design, and which will direct the discussion put forth in this paper.

Research Question 1: What are the current practices surrounding child defecation, feces disposal, and toilet training in rural Western Kenya?

Research Question 2: What are the perceived benefits and limitations of the latrine training mat for households in rural Western Kenya?

Research Question 3: Is the latrine training mat a feasible tool for effectively facilitating latrine use and behavior change among young children and their mothers?

Chapter 2: Literature Review

2.1 Diarrheal Diseases and Sanitation

Approximately 2.6 billion people around the world live in poor sanitary conditions in which human excreta are improperly disposed. This unsanitary disposal of waste is linked to such diseases as diarrhea, typhoid, dysentery, cholera, and Hepatitis A (WHO, n.d). The global burden of diseases caused by poor water and sanitation is immense: the World Health Organization (WHO) estimates that there are approximately two billion cases of diarrheal disease throughout the world each year, 2.2 million of which result in mortality.

Those most deeply affected by diarrheal diseases are children under the age of five; an estimated 1.5 million children under five die from diarrheal disease each year, making it the second highest cause of death among this demographic (WHO, 2009). Furthermore, diarrheal disease is locked in a dangerous cycle with child malnutrition: a diarrheal episode can significantly decrease the body's nutrients, thus negatively affecting a child's nutrition status – and malnourished children are then more vulnerable to future diarrheal episodes (WHO, 2009). Diarrhea has also been shown to contribute to poor growth and stunting among young children during their first years of life, when they are undergoing critical stages of development (Humphrey, 2009, p. 1032). Despite the heavy burden of diarrheal morbidity and mortality among children and adults worldwide, many of these cases could be prevented by improving water, sanitation and hygiene conditions and behaviors in the developing world (Montgomery and Elimilech, 2007, p. 19). There are several ways in which feces can come into contact with a new host, including through flies, foods, fingers, fluids, and fields (Wagner and Lanoix, 1958).

These routes are especially significant when considering the issue of open defecation, which is practiced by approximately 1.2 billion people around the world (WHO, 2008). Open defecation directly deposits human excreta to the environment, thus exposing humans to fecal pathogens through flies, fecal-oral contact, run-off from flowing water, and other pathways. Multiple studies over the years have shown that interventions targeting water, sanitation, and hygiene (WASH) are effective in blocking these fecal transmission pathways and thus significantly decreasing the risk and incidence of diarrheal disease (Fewtrell et al 2005, Esrey et al 1991, Cairncross et al 2010, Bartram and Cairncross 2010). A seminal systematic review of WASH-related studies, conducted by Esrey et al in 1991, found that improved water and sanitation resulted in a 26% decrease in diarrheal morbidity (p. 609). A subsequent meta-analysis conducted by Fewtrell et al in 2005 confirmed the effectiveness of WASH interventions in decreasing diarrheal illness; this was found to be true of water, sanitation, and hygiene interventions both independently and combined.

In addition, studies have shown that diarrheal morbidity among children is directly linked to the sanitation status of their household, and is especially linked to the methods used to dispose of the child's feces (Curtis et al 2000, p. 26). Safe methods for feces disposal are those that completely separate excreta from human contact. In a case-control study of child diarrhea cases diagnosed at a clinic in the Philippines, unsafe feces disposal practices (including the habit of disposing of the feces around or outside the family compound, instead of in a latrine) were found more frequently among cases than controls (Baltazar and Solon, 1989, p. S18). In a case control study examining the relationship between excreta disposal practices and child diarrhea in Sri Lanka, Mertens et al. found that children were more likely to succumb to diarrheal illness if their

households did not safely dispose of feces, compared to children whose feces were deposited in a latrine (Mertens 1992, p. 1).

The risk of diarrheal disease is especially high in households that do not properly dispose of young children's excreta; this is due not only to the high pathogenic content found in the feces of young children and infants (WHO, 1993, p. 8), but also to many populations' perception of children's feces as a non-threat. Studies in peri-urban Peru indicate that children are most susceptible to diarrheal disease when they come into contact with feces from other infants and toddlers; this demonstrates the importance of safe excreta disposal so as to keep a young child's environment free of feces (Lanata et al 1998, pp. 8-9). Many cultures do not view children's feces as dirty, which can contribute to unsafe disposal methods such as disposing of the child's feces on the ground in or around the family compound, or allowing children to defecate openly. In a meta-analysis of child defecation and feces disposal practices around the world, Gil et al found that "risky" sanitation and hygiene behaviors (including open defecation, failure to dispose of feces after open defecation, or child's contact with feces on the ground) were significantly linked to a heightened risk of diarrheal morbidity (Gil et al 2004, p.41). Because of this high risk of diarrheal disease, the WHO names safe feces disposal (and especially safe disposal of children's and infants' feces) as one of its three key WASH behaviors that should be promoted, alongside hand-washing and safe water at the source and point-of-use (WHO, 1993, p.2). [It should be noted here that, while not discussed in-depth in this paper, hygiene plays a significant role in safe feces disposal practices; hand-washing is a necessary and effective measure to combat diarrheal diseases. A systematic review by Curtis and Cairncross showed that the risk of

contracting a diarrheal illness could be decreased by as much as 47% by washing one's hands with soap (2003, p.275).]

Safe feces disposal is generally considered to mean depositing of all excreta in a place where it cannot potentially contaminate individuals. In low-income, rural areas without extensive sewage systems, this can mean disposing of feces in the household latrine – however, truly safe practices must include depositing the feces of *all* family members in this manner, including those of young children and infants. Acknowledging the importance of this, the 2006 Human Development Report on sanitation maintains that one of the criteria for sustainable excreta disposal is that the latrine is used by all members of the household (Jenkins and Sugden 2006, p.17). Doing so can significantly reduce the risk of childhood diarrhea. Gil et al concluded that "protective" behaviors such as using latrines or potties to dispose of children's excreta helped prevent diarrheal illness among young children (Gil et al, 2004, p.46). The Philippines clinic-based case control study by Baltazar and Solon indicated the potential for a 25% reduction in diarrheal incidence among young children whose households were unsafely disposing of their feces, if the the families were to improve their existing practices (Baltazar and Solon, 1989, p. S18).

This clear importance of safe excreta disposal practices points to the necessity of improved sanitation facilities in households. UNICEF defines improved sanitation as "facilities that ensure hygienic separation of human excreta from human contact," and considers this to include flush toilets, septic systems, ventilated improved pit (VIP) latrines, pit latrines with a slab, and composting toilets (UNICEF, n.d.). Those facilities deemed not considered improved

include pit latrines that lack a platform or slab, latrines shared by more than two households, bucket latrines, and public latrines (UNICEF, n.d).

Pit latrines are used by people worldwide, and these latrines vary widely in terms of safety, structure and cost, as evidenced by the fact that they are named in the lists of both improved and unimproved sanitation facilities. Some – namely open pit latrines - have very basic structures with a high risk of both personal injury and fecal contamination. Simple pit latrines that are unventilated and inexpensively constructed of local materials such as mud and timber fall low on the scale of safety and durability, and can be susceptible to easy deterioration. Ventilated improved pit (VIP) latrines can also be constructed of simple materials, but are preferred over unventilated models because they reduce flies which can transport pathogens from feces to food. The WHO recommends that latrines have a cement slab (with either a seat attached or a hole in the floor, depending on the cultural context), because slabs can provide a cleaner and more stable surface with a consistently-sized hole (WHO Fact Sheets 3.4 and 3.5, n.d.).

An estimated forty percent of the world's population is currently living without access to improved sanitation (World Bank, 2010). The seventh Millennium Development Goal (MDG) put forth by the United Nations is to halve this number by 2015 (UN Millennium Project, 2005), and participating organizations have made sanitation provision a key objective. In response, many sanitation initiatives over the past few years have focused their efforts on increasing access to improved sanitation such as latrines in the areas of the world where the need is greatest. However, many in the WASH sector have grown increasingly frustrated with this approach and believe that striving to accomplish the seventh MDG is not sufficient or realistic for solving the world’s sanitation problem (Bartram and Cairncross 2010, p.4; Dabire et al, n.d., p.2). One of the

reasons for this is that organizations and researchers alike have realized that provision of improved sanitation facilities does not always translate into utilization of those facilities. Focusing on latrine provision alone does not ensure that adults will be motivated to change their defecation behaviors and begin exclusively using the latrine. What's more, this approach often does not accommodate the fact that the defecation practices of younger children are often very different from those of adults, and often do not include latrine use. In short, providing latrines does not necessarily ensure that they will be used all the time and by all recipients.

In response, there are various alternative approaches to address the sanitation problem. One of the most well-known is the Community Led Total Sanitation (CLTS) movement, which has gained popularity over the past ten years because it seeks to address this gap between provision and adoption. First initiated by Kamal Kar in Bangladesh in 2000, CLTS goes beyond simply providing latrines and instead attempts to catalyze community-generated behavior change. It starts with enabling communities to recognize the problem of open defecation in their area and acknowledge their communal need for improved sanitation. This can then lead to improved sanitation such as latrine construction and complete elimination of open defecation, but it comes from the community members themselves. In addition, CLTS recognizes the need for *total* sanitation, including among young children. The approach often actively involves children in the process, and the end goal is for communities to be 100% "open defecation free" among *all* community members regardless of age (Kar and Chambers 2008).

Another important consideration that is often overlooked when seeking to improve sanitation is that there are many different factors that influence people's sanitation behaviors. The 2006 Human Development Report on sanitation found that people's motivations for wanting

improved sanitation are often focused around issues of convenience and pride in the cleanliness of their compound and latrine for visitors. These are often better motivators for adopting sanitation facilities than perceived health benefits and disease reduction – which are the primary motivators for many sanitation *providers*, especially in the global health community (Jenkins and Sugden, 2006, p.3, Table 1).

Similarly, a WaterAid briefing note from Dabire et al found that demand for latrines in Ghana stemmed from a desire for privacy, prestige, and convenience rather than from an understanding of their health benefits (n.d., p. 3). Understanding these motivations, and subsequently developing marketing and behavior change messaging to address these motivating factors, is critical in ensuring full adoption of any sanitation intervention.

2.3 Child Defecation Practices in the Developing World

It has been repeatedly established that there is a heavy diarrheal disease burden on children under five worldwide. It is also widely recognized that there is a strong link between children's diarrheal illness and the sanitation status of their households. It is therefore surprising that there is a dearth of information on young children's defecation practices in the developing world (Yeager et al 1999, p. 532), and that many sanitation interventions have ignored this critical component in household sanitation (Gil et al 2004, p. 43). (There was next to no information located that specifically addressed these issues within the context of Kenya or East Africa.) Despite the limited information that currently exists on the subject, several relevant considerations should be made when addressing the issue of child defecation practices. There are several key factors that would affect a young child's defecation practices: the type of

sanitation that is available in the household, the nature and extent of the household's access to water, who are the primary and secondary caregivers of the child, and how these key players influence when, where, and how the child defecates.

It is also important to establish consistency in the manner in which young children are discussed, especially since the meaning behind this term often changes based on cultural context. For the purposes of this paper, "young children" will be defined as those between the ages of two and five years, and this age group will be the primary focus of study. (However, some time will also be spent briefly exploring the defecation practices of children under age two and up to seven years old.) The rationale behind this chosen definition of "young children" is that this age range of two to five years best encompasses the child development stages that are most relevant to toilet training and sanitation adoption among children – namely a child's emerging awareness of disgust and shame, his capacity to recognize and adapt to cultural norms, and his ability to be independently mobile (American Academy of Pediatrics, 2011). In using this definition, the defecation practices of young children can be studied with more clarity.

The limited research that has been conducted around the world has demonstrated that children under five often do not use latrines, even if they live in a household that has consistent access to a latrine (Gil et al, 2004, p.52). In Gil et al's systematic review of children's feces disposal practices, they found that latrine use had a low utilization rate among young children around the world, and this peaked at 25% among 4 year olds (p.vi). Gil's review also found that latrine use among young children was more prevalent in Latin American contexts than in Asia or Africa (p.21). (While Gil's review based this conclusion on a limited number of studies conducted on each continent, this finding is consistent with data comparing access to improved

sanitation across these regions. Latin America and the Caribbean had 80% improved sanitation coverage in 2010, while South Asia had 41% and Sub-Saharan Africa had only 30% coverage [WHO/UNICEF Joint Monitoring Program, 2012, p.18].)

This low prevalence of latrine use among young children in the developing world has been documented by various studies. Out of one hundred thirty three children under five whose defecation practices were observed during a study in Sri Lanka, only ten defecated in the latrine (Mertens et al 1992, p. 1162). Lanata, Huttly, et al studied children's defecation practices in Peru and found that latrine use is not common among young children because adults do not view latrines as a suitable defecation spot for them (Lanata et al 1998, p. 9). In that study's context, the most common type of latrine was the simple, unventilated pit latrine; these were not favored for young children because they were unsanitary. The frequent alternative was for infants and toddlers to defecate openly (or use diapers) inside the home or compound, and then switch to defecating openly in places near the homestead around the ages of three or four. On these trips to nearby defecation areas, they would often be accompanied by a caretaker (Huttly et al 1998, p.77).

In the developing world, young children under five do not commonly use latrines to defecate, for a variety of reasons that appear consistently throughout the literature. These barriers to latrine use are largely centered on the issues of the child's and mother's fear as well as the unfavorable conditions of the latrine. As discussed in the previous section, there is a broad spectrum of latrine types that vary in terms of structure, safety, and conditions. Because of this, many can be a significant threat – both perceived and real – to young children. Children may fear the inside of the dark, smelly structure, or be afraid of falling through the hole, or be wary of

snakes or other vermin that they might encounter inside (Jenkins and Sugden 2006, p. 19). In addition, mothers and other caretakers are often fearful of letting the young children use the latrine for very similar reasons. Many view latrines as too unsanitary, structurally inappropriate, and unsafe for young children to use (Gil et al 2004, p. 21; Huttly et al 1998, p, 77; Jenkins 2004, p.8; Mertens et al 1992, p. 1163; Yeager et al 1999, p. 537).

There are various alternatives to latrines that families use with their young children. Infants and young toddlers under the age of two will often defecate into "nappies," or cloth diapers (Gil et al 2004, p. 44; Lanata et al 1998, p.9). Many families will instruct their toddlers to defecate into plastic chamber pots, or "potties," (Lanata et al 1998, p. 9; Traore et al 1994, p. 272). Yeager et al's study in Peru showed potties to be a widely used and accepted method for potty-training children ages one through three, and were preferred over cloth diapers because they were easier to clean (1999, pp. 531, 534). Gil et al determined that potty use was common in certain areas around the world (particularly in the African regions studied), but peaked at 70% prevalence around two years of age (2004, p.18). As children grow older and reach the ages of three and four, the more common practice becomes open defecation (pp. vi, 44). Observations conducted by anthropologists in peri-urban Peru suggested that some children have a regular spot at which they defecate openly, which is encouraged by mothers, whereas other children will defecate openly wherever they please (Huttly et al 1998, p. 77).

2.4 Children's Feces Disposal Practices in the Developing World

When young children defecate inside the home or compound in places other than a latrine, their feces are often disposed of by the mother or caretaker. The disposal methods vary

but most often include throwing the feces down the latrine pit, burying them in the ground, taking them to a trash heap inside or outside the compound, or dumping them in a nearby bush, field, or river (Baltazar and Solon, 1989, p. S17; Huttly et al 1998, p. 78; Mertens et al 1992, p. 1163; Yeager et al 1999, pp. 536-537). Disposal of the child's feces after defecation is common especially when the child uses a potty (Traore et al 1994, p. 272). In some cases, the feces are not removed from where the child defecated. Sometimes they are removed, but after a considerable period of time has elapsed (Yeager et al, 1999, pp. 536-537). Throughout the studies reviewed by Gil and her colleagues, one third of the defecation episodes resulted in feces being left on the ground without being disposed of during the time the households were studied. While the feces may have been collected after the observation period ended, the fact that they were not removed immediately following defecation suggests that there was still time for fecal contamination to be transmitted through various pathways (pp. vi, 31). Yeager et al's study in Peru suggests that when the defecation site is outside of the compound, the feces are not removed (1999, p. 538).

Despite the importance of hand-washing with soap following any type of fecal exposure, hand-washing practices among young children and their mothers vary and are often low in prevalence. In the study conducted by Huttly et al, only five percent of children and twenty percent of mothers studied washed their hands after the child defecated (1998, p.75). Curtis et al reported that mothers in their study were three times more likely to practice safe hygiene after they disposed of their child's feces if they had access to piped water inside their compound (1995, p. 383). The systematic review by Gil et al found that, even if mothers rinsed their hands with water, the use of soap during hand-washing was extremely uncommon following a young child's defecation or the mother's disposal of the child's feces (2004, p, 37).

A possible reason for this low prevalence of proper hygiene and feces disposal following a child's defecation could be that mothers in many cultures do not consider the feces of infants and young children to be as dirty or dangerous as those of adults (Dabire et al n.d., p. 3). This is often because children's feces smell or look different and are perceived to be less offensive than those of adults (Gil 2005, pp. 21, 46; Yeager et al 1999, p. 534). As Huttly et al discovered, "Feces of adults are considered dirtier than those of children because adults eat more, their stools are larger, and their stools have a stronger smell. Feces of young children, especially breastfed infants, are considered less dirty," (1998, p. 2). This perception of children's feces as being low-risk is described by Gil et al as "universal" across cultures (2005, p. 21), and is potentially a major influencing factor in the defecation, feces disposal, and hygiene practices of young children and their caretakers in the developing world.

2.5 Toilet Training Practices

Closely linked to the issue of young children's defecation practices is the issue of when and how their caretakers choose to start teaching them to adopt the defecation practices of adults. This concept of "toilet training" is a broad, oftentimes vague process that is unclearly defined and can vary not only across cultures, but also among families.

2.5.1 Toilet Training in the Developed World

There is a wealth of information about the strategies used in North America and other westernized, developed settings. Several widely-recognized and accepted toilet training methods have arisen in the United States over the past forty years – namely the child-oriented approach

(such as the Brazelton and Spock methods), the operant conditioning approach (championed by Azrin and Foxx with their "toilet training in less than a day" method), and other infant-based approaches such as the early elimination method. The child-oriented approach encourages parents to follow the child's personal developmental pace and wait until he or she is ready to be toilet trained (Luxem and Christophersen, 1994, p. 371; Stadtler et al 1999, p. 1359; Vermandel et al 2008, p. 162). The operant conditioning approach involves parents deliberately training their child to use various strategies to become toilet trained within a short time frame (Foxx and Azrin 1972, p.435; Vermandel et al 2008, p. 162). These two approaches have been the dominant methods throughout the past century: according to Luxem and Christophersen, "Theory and prescription for toilet training in the United States since 1900 has traced a pendulum's path between the polar opposites of passive permissiveness and systematic control," (1994, p. 371). While the child-oriented and operant conditioning approaches differ greatly in regards to their methodology, development theory, duration, and age at which the toilet training is conducted, both methods have been shown to be effective in toilet training children (Klassen et al 2006, p. v). In addition, both methods frequently use a "potty chair" in the bathroom to teach children to model their defecation practices after older children and adults (Choby and George 2008, p. 1062). Parents are advised take time to familiarize the child with the potty chair before encouraging them to use it, and should wait until the child shows interest in using the chair before beginning rigorous toilet training (Stadtler et al 1999, p.1360). An additional, little-studied method that is sometimes used in developed contexts is the early elimination method, in which toilet training begins in early infancy. Mothers rely on non-verbal cues to place their infant in an appropriate elimination position (usually balanced against the mother's legs or feet),

and over time the baby is trained to eliminate in that position on its own (Klassen et al 2006, p. H-112).

In a literature review conducted in 2008 by Vermandel et al, it was concluded that there is no firm agreement among experts on the exact age a child should begin or end the toilet training process, although studies showed that the most common age range for children to begin toilet training is between ages two to three years. This review also found that there is a great deal of ambiguity surrounding what "toilet training" actually means and how a child's toilet training success or failure should be determined (pp. 162, 165). There is a broad variety of factors involved in toilet training – including, for example, using a child's potty versus a regular toilet, using a toilet with versus without the aid of a caretaker, and using the toilet during the daytime versus during both the daytime and nighttime. Because of the breadth and nuance of this issue, there is great variety to the ways in which toilet training is implemented within the developed world.

2.5.2 Toilet Training in the Developing World

Toilet training is much more ambiguous in the developing world, and there is extremely little information available regarding the timeline and methods for toilet training in this context. This dearth of literature is possibly due, in part, to the low prevalence of latrine use and high prevalence of open defecation among children of varying ages. Latrine use is not always consistent even among older children, which may contribute to the ambiguity of the toilet training process within various cultures. Although published data is limited, some experts believe

that structured, rapid, and early toilet training strategies are more common in a developing context than are child-oriented methods (Choby and George 2008, p. 1060).

Almost no literature was found regarding toilet training practices in Kenya or East Africa. However, one often-cited anthropological study among the Digo tribe in eastern Kenya found that the majority of mothers in this culture begin the process of training their infants when they are only a few weeks old, and are able to train the babies to control their bladder and bowel movements during both the daytime and nighttime by the time they are six months old (deVries and deVries 1977, p. 172). The mothers do so by balancing their babies on their legs in specific urination and defecation positions, and providing positive reinforcement when the child eliminates. Through repeated conditioning at a very early age, the baby begins to independently assume the proper position and eliminate on his own by the time he has reached four or five months (p. 173). By the time he is walking around age one, the child is required to adhere to the defecation practices of the rest of the family, and to defecate outside the family compound. Eventually, the child learns to use the household latrine by following the example of the older members of the family (p. 174). The anthropologists who conducted this study concluded that the timeframe and methods of a child's elimination training are based on interconnected socio-cultural factors, and can differ greatly across cultures. They can also differ among households based on various family and personality dynamics (p.175).

It is true that toilet training is broadly defined in different ways across cultures. The previously-referenced studies conducted in peri-urban Peru found that potties are a common tool used to train children in this context to control their elimination patterns. However, the potty training process can be challenging, especially if started at a young age or if the children develop

negative associations with the potties. The process is “deemed to be quite difficult and the long term achievements are determined by the initial training success. In most cases, the training process is authoritative and inconsistent,” (Yeager et al 1999, p. 531).

In terms of beginning to use a latrine, children often learn gradually by going to the latrine with caretakers. In Peru, latrine use is not common until the child is around 4 years old; at that point, he is assisted in the latrine by older family members, such as elder siblings or parents. Eventually, the child is able to use the latrine on his own (pp. 535, 537). There are various factors that help determining the training process – namely, the child’s age when the process is started, the child’s mobility, the child’s capacity to inform the mother when he or she needs to defecate, the schedule that the parents sets for the child’s defecation patterns, and the way in which the child’s feces are perceived by adults in that culture (p.540).

From the limited information available on the subject, it seems as though toilet training in the developing world is often loosely structured, vaguely defined, and highly culture-specific. When considering this in light of the low prevalence of latrine use among young children, and the common practice of open defecation in many cultures, one must wonder if the defecation practices allowed for young children in many developing contexts are the result of a low risk perception of children’s feces.

2.6 Conclusion

Diarrheal diseases affect millions of children around the globe each year, and could largely be prevented by improving WASH conditions, such as increasing sanitation use and properly disposing of feces in the household. Studies from around the world indicate that young children under age five often do not use the household latrine because of various barriers –

including a real or perceived danger of the large hole, various unsanitary and unsafe conditions in the latrine, and snakes and other vermin that sometimes reside there. The common alternatives to latrine use among these children – open defecation or the mothers' unsafe removal of the children's feces – often presents a significant health risk to young children and to the entire household.

Similarly, increasing field evidence is showing that latrine provision to the household is not enough to facilitate full sanitation use by all family members, and neither are sanitation interventions that do not focus on ensuring adoption among young children as well as adults (Yeager et al 1999, pp.531, 540). As Jenkins and Sugden write in their 2006 Human Development Report on sanitation, "To have an impact on public health, latrines have to be used at all times by all members of the family. This is in fact more difficult to achieve than it may at first appear," (p.19). It is evident, therefore, that there needs to be a way to ensure that young children not only have access to, but are actually using, safe sanitation alternatives. One way that this could be done is by making the household latrine a safer, more appealing option for young children.

Chapter 3: Methods

3.1 Data Collection Methods

The concept of a "latrine training mat" was initially introduced by principal investigators and staff members of the WASH-Benefits field study based in the Western province of Kenya. Through their work in the domain of water, sanitation, and hygiene in this context, they had observed that young children – particularly toddlers under the age of five – were not using latrines, even if their family compound had one that was functional. After informally inquiring into the cultural reasons for this practice, the WASH-Benefits team learned that children at this age were often afraid of the large hole, and their mothers did not like them using the latrine because it was considered unsafe and also because it made the latrine less sanitary for the rest of the household to use. The WASH-Benefits team developed the initial design for the latrine training mat in an effort to remove latrine barriers for these young children and facilitate their earlier latrine use by providing them with a stable, washable surface and a smaller hole for defecating into the latrine. The mat was designed to be lightweight so that it could be kept inside the family latrine and easily moved on and off the latrine whenever a young child needed to use it. **Image 3** is a photo of the original latrine training mat prototype that was piloted among four families in Western Kenya in the summer of 2010.

Image 3: Original Latrine Training Mat Prototype, Piloted in Summer 2010

Photo by Andrew Hoekzema, WASH-Benefits Team , Innovations for Poverty Action (2010). Used with permission.

In the summer of 2011, the Latrine Training Mat study (also referred to in this paper as the WASH-LTM study) continued the work started in the 2010 pilot study by enhancing the latrine training mat's design and developing three working prototypes to be delivered to families in two communities. (A thorough description of each LTM prototype is given further in this section.) When preparing the research design for the Latrine Training Mat study, three primary research questions were identified that would shape the purpose and methods of the study:

Research Question 1: What are the current practices surrounding child defecation, feces disposal, and toilet training in rural Western Kenya?

Research Question 2: What are the perceived benefits and limitations of the latrine training mat for households in rural Western Kenya?

Research Question 3: Is the latrine training mat a feasible tool for effectively facilitating latrine use and behavior change among young children and their mothers?

Qualitative research methods were chosen for this study, because they would best be able to explore the issues from the perspective of the study population themselves. In-depth interviews (IDIs) and focus group discussions (FGDs) were selected as the primary qualitative methods to be used during the data collection process. The in-depth interviews would enable the research team to understand the local practices in both general and individual terms. The focus group discussions would facilitate open conversations that would add breadth and nuance to the issues, thus complementing the data from the in-depth interviews.

3.2 Study Site

The intervention and data collection phases of the Latrine Training Mat study took place in the Matungu district of Kenya's Western province. Western province was chosen because it has the country's second highest prevalence of diarrheal disease among children under five. The rural, impoverished district of Matunga was selected because it was representative of the study's target population – namely, rural families with children under the age of five, whose households had simple mud floor pit latrines with easily erodible holes. To gain entry to this community and subsequently select the study's participants, WASH-LTM field officers approached the local village leaders of the district, who then directed them to several households with children in the target age range of two to five years. After visits to several homes in which they spoke to mothers and personally observed the household latrines, the field officers identified twenty potential households in two villages (ten households in each) which met the two key eligibility criteria discussed below. Out of these ten, a random name drawing was used in the field to select six households in each village to participate in the LTM intervention. These twelve participants – six from "Village 1" and six from "Village 2" – participated in in-depth interviews, then received the LTM intervention and took part in follow-up focus group discussions.

It should be mentioned that all research for this study was originally planned to take place in the Siaya district, located near Matungu in Western province. It was chosen because the WASH-Benefits team had extensive connections with village chiefs and other local leaders who would be able to provide access to eligible study participants within the community. In addition, initial inquiries suggested that the region would be representative of the target population. As a result, all the instruments for the study were piloted in the Siaya district; furthermore, four

preliminary focus group discussions with mothers and fathers regarding relevant local practices were held in villages in this district (although the data from these discussions went beyond the scope of this paper and thus were not analyzed). However, throughout the participant selection process for the intervention component of the study, it became apparent that Siaya was not actually representative of the target population, because a relief and development agency had implemented wide-scale sanitation interventions throughout the district, which resulted in the vast majority of the households in the population falling into two extreme categories: they each had either no latrine at all, or a latrine with cement slabs that had been installed during this organization's interventions. Consequently, Siaya was rejected as a valid study site, and Matungu district was selected instead.

3.3 Study Site and Participant Selection

For participation in the Latrine Training Mat study, individuals were chosen based on the following inclusion criteria:

1. **All participants needed to be a mother of a child of "toilet-training age" (aged two to five)**
2. **All participants should have been currently using a mud floor latrine**

The target age of two to five years emerged from review of the 2010 focus group discussion data, as well as through conversations with WASH-Benefits field officers who were themselves parents of young children. The sanitation status of these households – namely, that

they needed to be currently using a latrine that had a mud floor – was specified because these were the latrines that typically had the large, dangerous hole that was hypothesized to be a significant barrier to latrine use among young children in Western Kenya. In addition, the presence of a simple mud floor latrine is typically indicative of a household that has not yet received a sanitation intervention from WASH-Benefits or any other organization. This factor was significant due to the design of the LTM prototypes; they were specifically designed to address and overcome barriers to children's use of unimproved mud floor latrines, and needed to be evaluated without the presence of any other type of intervention.

3.4 Development and Implementation of Research Instruments

In the weeks preceding the intervention and data collection phase of the study, the WASH-LTM team conducted an iterative process of instrument development. In-depth interview guides and focus group discussion guides were drafted, and subsequently refined several times through meeting with WASH-LTM team members. These instruments were then piloted in the Siaya district (in the local language of Luo), and further refined.

Simultaneously, the data collection team for the study was selected from the greater WASH-Benefits field staff. A team of four Kenyan field officers were chosen and then trained in the principles of qualitative research methods, including IDI and FGD moderation and note-taking techniques. As Kenyan nationals who were insiders to the local culture, they made significant contributions to the processes of refining the interview and focus group discussion guides to ensure that the questions were appropriately worded, culturally appropriate, and fully conveyed their intended meaning. The research protocol and all instruments were approved by

the Institutional Review Boards (IRB) of University of California-Berkeley, Emory University, and Innovations for Poverty Action-Kenya.

During the data collection phase, the four trained field officers conducted all in-depth interviews and focus group discussions. Before the start of each interview or discussion, the field officer provided a brief explanation to the participant(s) regarding the WASH-LTM study and the guidelines for the conversation. This was explained in the local language of the participant(s), and the field officer obtained informed verbal consent from each participant before digitally recording the conversation. (The informed consent scripts that were used are included in the Appendices.) The interviews and focus group discussions were conducted in the local language of Luhya, and the FGDs included both a moderator and a notetaker from the WASH-LTM field team.

3.5 Revisiting Participants from Summer 2010 Pilot

Before commencing data collection for the study, the research team returned to the village where the small-scale pilot intervention had taken place in summer 2010. A targeted group discussion was held with three of the four participating mothers, during which they were asked to share their experiences using the training mat over the past year. While it was not a formal focus group, this discussion gave the WASH-LTM team valuable insight into how the first version of the latrine training mat was used in households, and was helpful in shaping the strategies that were then developed for the scaled-up study. The research team also visited each household and observed their latrines and the current status of the wooden latrine training mats

they had received approximately eight months prior. Overall, this visit demonstrated continued use of the LTM among young children; participants reported that their children had quickly grown accustomed to the wooden mat and used it regularly. In addition to sharing their experiences, the three mothers gave recommendations for ways to improve the design of the LTM. These suggestions significantly shaped the final version of the LTM Prototype #3 (the wooden mat).

3.5.1 Phase 1: Understanding Current Practices

As previously mentioned, the first phase of the LTM project was to develop an understanding of child defecation practices, feces disposal methods, and toilet training strategies within this context. In order to do so, in-depth interviews were conducted with each of the twelve mothers participating in the intervention. During the interview, the participant and interviewer discussed children's defecation practices and feces removal methods, both in general terms and then in relation to the mother's child within the target age range. They also discussed the child's current toilet training status, methods the mother used, and any challenges encountered during the toilet training process.

3.5.2 Phase 2: In-home LTM Intervention

Immediately following the in-depth interview, each participant was given one of three LTM prototypes, and was asked to use the training mat with her child for one week.

Image 4: LTM Prototype #1

Photo by Gabriella Van Schoyck (2011)

3.5.2.a Description of LTM Prototypes

Three different prototypes were tested in the field during the LTM intervention in order to identify which model could be most appropriate for this context, and potentially for wider application. **Prototype 1** is a plastic slab that is installed permanently into the latrine. The size of the hole (approximately 18cm) and the slab itself were designed in the hopes that it would be child-friendly but also big enough to be used by the entire family. It has a lid attached to the slab, so that the hole can be covered when the latrine is not in use; this was designed to reduce flies and odor in the latrine. On the LTM Prototype #1, there is a strip of rubber attached to both sides of the lid, to be used as a "foot handle" of sorts; this was designed so that users could move the lid on and off the hole using

Image 5: LTM Prototype #2

Photo by Gabriella Van Schoyck (2011)

their feet, in an effort to reduce hand contamination in the latrine. **Prototype 2** is a plastic mat similar to the first model, but has a smaller hole that is for use by children only. It is not permanently installed, and instead has cord handles on both sides so that it can be easily placed over the latrine's existing hole when a child needs to use it. Then, when the child is finished, the mat can be removed and stored inside the latrine. **Prototype 3** is made of painted wood and is for use by children only. Like Prototype 2, it has a small hole for children, and is light and easily removable on and off the latrine hole. It has a metal handle at the top of the mat to help balance the child, and has wooden risers underneath the mat to keep it slightly raised above the latrine floor. Each prototype was randomly assigned to one third of the intervention's 12 participating households. In an effort to reduce bias, each mother only saw the prototype she was assigned to receive for the intervention: the participants were not shown all three prototypes at the beginning of the intervention so as to prevent mothers from unconsciously comparing the three versions and forming conclusions before the intervention even began.

Image 6: LTM Prototype #3

Photo by Gabriella Van Schoyck (2011)

3.5.2.b Messaging

In the first village (Village 1), participants received the LTM prototype with no explanation of its purpose or recommended use. Field officers merely explained that it was a child sanitation tool to help young children use the latrine. In the second village (Village 2),

participants received the LTM along with a detailed description of its main features, as well as explicit instructions on how the mat should be cleaned.

This Trials of Improved Practice (TIP) methodology was used in Village 1 in hopes that it would shed light on whether the method of intervention delivery would influence the way in which participants adopted and used the intervention. In other words, we wanted to see if the presence of detailed messaging would affect how participants perceived and used the latrine training mat.

It should be noted that the messaging given to Village 2 initially included a recommendation that the removable training mats should be stored inside the latrine at all times so as not to introduce fecal contamination into the house or compound. However, this paragraph on storage was inadvertently omitted from the final script used by the field officers during LTM delivery, and consequently this message was not explicitly conveyed to all four participants in Village 2 who received the removable mats. For this reason, this paper is unable to draw any definitive conclusions about the effect of messaging on storage site selection among participants.

3.5.3 Phase 3: Follow-Up

Exactly one week after the research team delivered the LTM intervention to the selected households in Villages 1 and 2, they returned to each village to conduct a follow-up focus group discussion with the six participating mothers in each village. During these two focus group discussions, participants discussed their individual experiences using the LTM with their children over the past week. Topics included the storage and cleaning of the training mats, as well as how they were received and/or used by the participants' children or family members. The

participants were also shown all three prototypes in detail, and they discussed the strengths and weaknesses of each prototype, as they perceived them. They also engaged in a comparison of the three models, and discussed their preferences for the different features of the prototypes, as well as their overall preference for type of training mat.

3.6 Summary of Data Collected

The data from the Latrine Training Mat Project are comprised of four focus group discussions with mothers and fathers (which were not analyzed for this paper), twelve in-depth interviews with mothers who participated in the LTM intervention, and two focus-group discussions with these twelve participants as a follow-up to intervention delivery and use.

This data from the LTM study were digitally recorded, then simultaneously translated into English and transcribed by WASH-LTM field officers. Each transcript was then translated and transcribed a second time at five random time points in the recording, in an effort to ensure translation/transcription quality.

The data were stored in two secure locations: a password-protected online Dropbox site and a latop computer. The author of this paper de-identified the data at the beginning of the analysis process to protect the identity of the participants.

3.7 Data Quality

It should be noted that the data collected for this study are, overall, thin; in other words, participants' responses were often brief and lacked rich detail. This is possibly due to disinterest, embarrassment, or resistance from the participants, but is more likely because of the way the

interviews and focus group discussions were moderated. Although the WASH-LTM field officers had received training in qualitative research methods before the study was implemented, they had little to no prior experience conducting qualitative research themselves. They were skilled field officers, but their careers had been focused on participating in quantitative studies, and had had little exposure to qualitative research. This became apparent during the data transcription and analysis phases; the field officers frequently asked closed or leading questions, often neglected to probe on interesting statements made by the respondents, and used a limiting "group interviewing" technique in the focus group discussions. As a result, the overall quality of the data is rather thin, although a great deal of important information and implications were nonetheless still found during this study.

3.8 Qualitative Data Analysis Methods

Following data transcription and translation, the data was analyzed in-depth using the MAXQDA10 software. The analysis process that was used followed the grounded theory approach, which was first pioneered by Glaser and Strauss in the 1960s as a qualitative method that focuses on "*developing* theories from research grounded in data rather than *deducing* testable hypotheses from existing theories," (Charmaz 2006, p.4). Clear guidelines for developing grounded theory are outlined in Kathy Charmaz's book *Constructing Grounded Theory* (2006, pp. 5-6). For the Latrine Training Mat study, a preliminary analysis was conducted immediately after the data collection phase concluded: the data were read and memoed, and more than twenty-five initial codes were developed and clearly defined.

Then, a more detailed and in-depth phase of analysis began. Approximately one third of the data were read a second time, and memoed in greater detail. This activity served to form the codebook for the data. Following rigorous qualitative methods and more detailed review of the data, the initial codebook that was developed during the preliminary analysis was refined; based on emergent themes in the data, initial codes were combined, expanded, or removed, and several new codes were created. Each was clearly defined and contained specific examples of what type of data should and should not be included in the code. This iterative process of code development resulted in a final codebook that contained twenty codes. During analysis, the data were divided into two main categories: that data which pertained to local practices surrounding child defecation, feces disposal, and toilet training (retrieved predominantly from the in-depth interviews, as well as to some extent the focus group discussions), and that which pertained specifically to households' experiences with the latrine training mat (retrieved exclusively from the focus group discussions). Consequently, the codebook contained nine codes that related to local practices and eleven codes that related to the LTM intervention.

The data were reviewed again and coded according to the twenty codes; detailed memos were again created at this time. After all the data were coded and memoed, each code was activated in MAXQDA10 and each coded data segment was retrieved and studied. More memoes were written to identify the key links and patterns that began to emerge. After each code was activated and studied in detail, a thick description of the code was written. These descriptions expanded on the code definitions by explaining the patterns and outliers in the data. Links and correlations between codes were identified and explained in these thick descriptions. Codes were often analyzed side by side to identify key concepts and categories. Throughout this

circular process of description, comparison, and categorization, several key constructs emerged from the data. A series of conceptual diagrams were then created to visually represent these themes and the ways in which they interact. These constructs are presented and then discussed in the following sections.

Chapter 4: Results

4.1 Introduction

This chapter will present the findings from the in-depth interviews and focus group discussions with the twelve mothers who participated in the latrine training mat intervention. The first section, "Local Practices," will explore the issues of child defecation, feces disposal, and toilet training within the context of rural Western Kenya, as reported by the mothers. The second section, "Participants' Experiences with and Perceptions of the Latrine Training Mat," will present emergent themes from the focus group discussions with mothers one week after they received the latrine training mats. The mothers' experiences introducing the latrine training mat to their children, and their opinions regarding the benefits and limitations of the tool, will be presented. The themes identified in the results clearly indicate that the latrine training mat was an effective tool for facilitating latrine use among children under age five within the study population, and is feasible for the context of rural Western Kenya because it accommodates local practices surrounding child defecation, feces disposal, and toilet training. However, there are some key limitations and weaknesses in the mat's design that must be addressed before the latrine training mat can be scaled up to a larger population. This chapter will conclude with three conceptual diagrams summarizing these findings, which will then be further unpacked and discussed in Chapter 4.

4.2 Local Practices

4.2.1 Children's Defecation Practices

The mothers' explanations of children's defecation practices indicate that, in the early years of life, children's defecation practices rely on a close communication between mother and child. Even during the child's infancy, a mother quickly becomes attuned to her child's eating and elimination schedules, and can tell when the child is ready to defecate. As the child matures and is able to verbally communicate, she is taught to inform her mother when she is "pressed" (a colloquial term used in Kenya to describe the urge to urinate or defecate). Unstructured open defecation is discouraged, and the mother prefers that the child tell her when she is pressed so that she can assist here with the process in a safer and more structured way. These safe and structured practices occur outside the latrine for the first few years of life; however, little children are usually not permitted to use the latrine.

4.2.1.a Barriers to Latrine Use

4.2.1.a.i Fear

"We don't want him to go to the latrine, he can find someone has messed in the latrine and he can touch the feces and start playing with [them], or maybe, he can go looking through the pit hole and then fall inside." (Village 1, Respondent 2)

The most significant and most often-mentioned reason that young children do not use the latrine is fear of the latrine hole. Mothers and children alike often perceive the latrine hole to be

too large for a small child to use, and consider it dangerous. Children's fear of the hole frequently keeps them out of the latrine entirely; for those who do venture to use the latrine, fear of falling into the hole often causes them to use the latrine incorrectly and instead defecate on the floor next to the hole:

> *"An old child knows how to get into the latrine and use it and this [younger] one may use it and at times defecate on the floor."* (Village 2, Respondent 2)

For participants in the in-depth interviews and focus group discussions, the possibility of the child falling into the hole was considered a very real danger, and many mothers did not allow their younger children to use the latrine because they simply did not consider them old enough to be doing so safely. One mother explained how her young child narrowly avoided falling into the latrine after his foot slipped through the hole, and several mothers mentioned that they do not permit their younger children to use the latrine because they might fall into the pit. One mother had never even introduced the latrine to her four year old child because she considered the hole to be too big, and was waiting until he turned five to begin the toilet training process:

> *"I have not told him because our toilet has a bigger drop hole. So I have not shown him."* (V1 R5)

4.2.1.a.ii Latrine Conditions

In addition, several mothers referred to unsanitary conditions inside the latrine as being too disadvantageous for their little ones to use the latrine. The latrines are often in poor condition, with large holes and mud floors that frequently are covered with feces and urine.

Because the floors are made of mud, they cannot be easily washed, and the feces must instead be scraped off with a *jembe,* or hoe. (A common method of cleaning the latrine is known as "smearing," which involves covering the mud floor with a fresh layer of mud and then smoothing it out.) Mothers recognized that letting their children use an unsanitary latrine increased their risk of coming into contact with feces:

> *"The risk which is there is like when he goes barefoot without using slippers, he might find that another kid has defecated there. Then he steps on the feces."* (V2 R2)

In addition, it often takes children quite a while to learn how to use the latrine correctly without missing the hole when they are relieving themselves. Many mothers complained of the unsanitary conditions in their latrines that usually resulted from their young children using the latrine incorrectly and leaving urine and feces around the hole. This made the latrine an unhygienic place for the whole family, added to the mothers' workload, and presented a health risk for the young children themselves. Consequently, it often contributes to mothers' decision to not let their children use the latrine (unattended, if at all) until they are able to use it properly.

4.2.1.b Designated Defecation Spot

When mothers consider their children too young to use the latrine, a common alternative is what can be described as "designated defecation spots." These appear frequently throughout the data as specific places other than the latrine where mothers teach their young children to defecate when they are pressed, until they are old enough to use the latrine. Ten out of twelve

participants mentioned one or more specific places outside of the latrine where they teach their young children to defecate. Designated defecation spots (DDS) vary among families, and can include the ground under specific trees in the family compound, beside the house, or behind the latrine. They also sometimes include plastic potties or newspapers onto which mothers encourage their children to defecate. Mothers assist children in using these designated defecation spots, or teach them to defecate there without assistance. Then, the mother will go to the assigned spot either immediately following defecation or as soon as possible, and will collect the child's feces and dispose of them in the latrine. Three participants mentioned that they also clean their child with water after he has defecated.

Feces are viewed as distasteful, embarrassing, and potentially offensive to visitors. For this reason, the behaviors classified during this analysis as involving "designated defecation spots" can be distinguished as different from open defecation (OD) because they are more structured, organized, and allow mothers to have control over where their children defecate throughout the compound. Mothers often perceived random, uncontrolled defecation behaviors to be unclean and uncouth, and several mothers listed various places within the compound where they actively discouraged their children from openly defecating. These forbidden spots included anywhere near or inside the house, close to a water source, and in the *shamba* (garden). One frequent reason for this was that many mothers perceived a link between open defecation and disease transmission. For example, several mothers mentioned a disease that could be transmitted by stepping on feces, and that caused one's legs and feet to scratch:

> *"When you dig in the samba [garden] when he [a child] has defecated there, then you can be infected with a disease of scratching the legs."* (V1 R1)

"We do use the well for drinking water, and when they defecate around there, when people come to fetch water, they step on the dirt (germs) and while fetching water the germs fall into the well and that is already cholera." (V2 R4)

Open defecation was also perceived to bring flies and a bad smell to the compound, and to make people uncomfortable or unwell. This perception of the link between feces and disease seemed to influence many mothers' decision to give their little ones a designated defecation spot, as well as their decision to dispose of the child's feces in the latrine as soon as possible.

An advantage of designated defecation spots is that the mother knows where the child is defecating. This can save her the chore of having to search the compound for any piles of feces; when the child has a designated defecation spot, the mother only needs to check there to find the feces and dispose of them. In addition, participants explained that having a DDS helps keep the compound clean and free of bad odor and flies. Finally, another advantage of DDS is that they serve as a helpful preparation stage in the toilet training process. If a child has already been taught to consistently defecate in the same place each time he is pressed, it can make his transition to the latrine that much easier and less challenging:

I do it when they are still young just outside there besides the house... when he wakes up, he just goes behind there, defecates and gets out of that place so he knows, that is the place where I will always defecate at so, when he uses the latrine, he knows that if I am pressed, I just go to the latrine. (V1 R2)

The designated defecation spot is often linked to the mother's sense of pride in the appearance of her home. Mothers often choose to place the DDS away from view from passersby, so that people will not be able to see the child's feces on the ground.

"In case the child defecate[s] in the open he can be found by a visitor, while nobody will be able to see the child behind the kitchen. Some people don't like to see feces, [so] you should have a place set." (V2 R3)

4.2.2 Feces Disposal Practices

Each participating mother reported that she always removed the child's feces immediately after defecation – unless she was not present in the compound, in which case she would remove them as soon as possible. Mothers considered feces disposal important because they believed feces left lying on the ground would contribute to an unclean home environment. Immediate feces disposal helped keep the compound clean and free of disease and dirt. It also reduced bad smell in the compound, and kept the home presentable when visitors came. In the following quote, one mother described her rationale for disposing of her child's feces:

"When he [the child] has defecated where he is [outside]…flies will come. One who is near him won't feel well. Even the child himself won't feel good. He won't. Even people in the compound won't be comfortable…Because we will have bad smell. We will have dirty signs." (V1 R1)

Despite this concern for germs and disease, it should be noted that only one mother reported that she washed her hands after disposing of her children's feces. Since this was not a specific question in the IDI guide, it is possible that more mothers washed their hands but did not think to mention it; however, this still suggests that handwashing is not a common element of feces disposal practices within this context.

The tools mothers use for disposal vary from *jembes* (scooping instruments) and hoes to newspapers and leaves. All mothers said that they dispose of the feces in the latrine (no one mentioned fecal burial or disposal in trash heaps, although this could be because the field officers did not probe deeper into this issue).

Feces disposal is typically the responsibility of the mother. If the child defecates while the mother is away from the compound, there are some cases when an older sibling or other family member will remove the feces. However, most often the mother takes care of this when she returns home. In the following quote, a mother describes how she has trained her child to use a designated defecation spot, from which the mother then disposes of the feces when she arrives home from working in the garden:

> *"In the morning the child will go at the specific location that you showed him/her because you are in the farm. After coming from the farm that is when I will dispose feces."* (V2 R3)

A mother's disposal of her child's feces is an integral part of the cultural practices surrounding children's defecation for the first several years of their lives – from the time they are infants, through the period in which they use a designated defecation spot and subsequently

begin using the latrine, until they are using the latrine exclusively and independently. Throughout this entire multi-stage progression, a consistent theme is that the mother disposes of the child's feces into the latrine either immediately following defecation, or as soon as possible. Many mothers consider this responsibility to be a hassle and a burden, as it adds to their daily workload and can often be a time-consuming task. This was most apparent when mothers were discussing their motivation and rationale for beginning the toilet training process with their young children:

"*When they use the latrine it becomes easy…because when they use the latrine you don't bother the agony of disposing of the feaces to the toilet.*" (V1 R5)

"*[The child using the latrine] is easier than going around all the time collecting feces and taking to the latrine.*" (V2 R2)

"*It made my work easier for the child to go to the latrine.*" (V1 R1)

4.2.3 Toilet Training

At some point during a child's life, he is introduced to the family's latrine and is eventually expected to use it exclusively, as would any older member of the family. While this fact was consistent in each family involved in this study, the specifics of the process were unique in each case. Among all the children between the ages of two to five years who participated in the study, there were some who were already fully toilet trained, some who were somewhere in the toilet training process between nonexistent and exclusive latrine use, and some who had not begun the toilet training process at all. As the study participants represented various stages of

latrine training, several key themes and consistencies emerged through analysis that shed light on the cultural practices surrounding the toilet training process.

4.2.3.a Toilet Training Method(s)

During in-depth interviews, participants reported very similar strategies for how they teach their young children to use the latrine. The most common method used among mothers involves taking the child to the latrine, telling him or helping him to remove his clothes, and showing him where to step, where to position his feet, and how to squat. The mother then assists the child in cleaning himself, either with toilet paper, leaves, or water, and exits the latrine. In some cases, but not all, this is followed by hand-washing. (Only two out of the twelve mothers mentioned that they teach their children to wash their hands after using the latrine.) The process of facilitating the child's adoption of the latrine relies on talking to the child and continually persuading him (often through positive and/or negative reinforcement) that the latrine is where he should defecate from now on. If the child is afraid, the mother talks to him and explains that he should not be afraid; she encourages him and tries to persuade him to use the latrine. The mother accompanies the child to the latrine for each visit until the child gets used to the latrine. This method of toilet training was standard among participants; in fact, one participant who had never before toilet trained a child still described this method when asked to explain the process she planned to take in the future. While the toilet training method may be the same among mothers, there is some variation in the age at which it starts, the duration, and the tools or strategies that are used.

4.2.3.b Age of Initiation and Motivating Factors

There is no specific age at which all mothers begin toilet training their children; mothers listed anywhere from two to five years old as the optimal age to start toilet training. Some seemed to prefer initiating their children as early as possible. Others pointed out that fear of the latrine and the large size of the latrine hole often kept younger children from starting the toilet training process, but that these barriers could be overcome when the child was older (usually four or five years old).

There are various motivating factors that trigger the toilet training process. Many mothers grow tired of constantly monitoring the child's defecation behaviors and disposing of their feces, so they start toilet training in an effort to reduce their workload. Others choose to begin the process once their child has reached a particular "toilet training age." This term is sometimes defined according a particular age, other times according to a certain maturity level. Some women mentioned that they know to begin toilet training when they notice their child's feces change; the feces will begin to smell and/or resemble those of adults.

"*I just noticed at his age the feces were smelling too much.*" (V1 R3, referring to her four year old child)

As discussed in the literature review chapter, this suggests that mothers in this context often perceive children's feces to be different from adults, and perhaps not as offensive. Consequently, when mothers notice the child's feces becoming more adult-like they believe it is time for the child to start using the latrine. One mother expressed her belief that this change in feces occurs when the child is two years old:

"At five years [of age] there is a difference in feces. A five year old child['s] feces are similar to adult feces. A three year old's feces is also somehow similar to an adult's...so a child should be toilet trained beginning from two years." [V2 R3]

4.2.3.c. Duration

The duration of the toilet training process varies among households, with some citing the timeframe as a matter of days, others months, and some years. This seems to be due, in part, to the fact that toilet training is a concept that is broadly defined and can mean different things for different mothers. Some mothers explained that their children could become accustomed to using the latrine after a few days of the mother's careful instructions. Other mothers considered toilet training to be a long, gradual process that can begin long before the child is actually expected to use the latrine. For example, one mother explained that she would "introduce" her child to the latrine when he was 2 years old but would not actually begin training him to use the latrine until he was 3 ½ years old. One mother explained her toilet training method as the following: when the child is 14 months old, she teaches him to defecate on a piece of paper. As he matures, she continues to train him by teaching him to defecate outside the latrine on the ground. This transitions into him using the latrine, but often incorrectly; it is acceptable that he will sometimes miss the hole and defecate on the latrine floor instead. Eventually, the child is able to use the latrine properly on his own.

Mothers mark the end of the toilet training process with a variety of indicators. For some, a child becoming "fully toilet trained" depends on the child's maturational/developmental stage:

"When the child can do everything well [and] speaks well, that child will be able to use a latrine properly…[a 3 or 4 year old] is able to do everything including using a latrine." (V2 R6)

For some mothers, children can be considered fully toilet trained when they reach a certain age. Others consider a child fully toilet trained when he is able to initiate latrine use unassisted (in other words, without informing the mother that he is pressed), without fear, or without making a mess on the latrine floor. As one mother explained,

"When a child wakes up in the morning, he tells you 'Mother, I want to go to the latrine; Mother, I want to defecate,' for me to undress him, but if you hesitate you find him defecating on the floor. You follow and find they have defecated inside the latrine; with that I found a problem. But when they are toilet trained, he just tells you, 'I want to go to the latrine' and immediately he's on his feet [running]." (V2 R4)

Another mother suggested that a child can be considered fully toilet trained when he is able to assist younger children in the toilet training process:

"That is a child of 5yrs. That particular child can be able to toilet train other kids." (V2 R3)

4.2.3.d Tools and Strategies for Toilet Training

Some mothers begin the toilet training process outside of the latrine. For example, one mother taught her child how to squat properly on the ground when he was 1 ½ years old, so that

when he was older, he would know the proper position to assume when he began using the latrine. Another mother explained how she sawed off half of a jerry can and placed it next to the latrine for her child to use as a makeshift potty. Potties were not found to be common tools within this context, although three of the mothers interviewed mentioned that they had used potties with their children either presently or in the past. In these cases, children were taught to defecate in the potty at a very early age – within their first year; in one case, the potty remained the designated defecation spot for that child until he was considered latrine-ready, but in the other two cases, the children stopped using the potty and switched to other designated defecation spots within the compound.

Reinforcements are also used to motivate the child during toilet training – some positive (such as verbal praise or gifts of sweets), but mostly negative (spanking the child with a cane, or threatening to do so). "Caning" the child, as it referred to by mothers, was mentioned often as an acceptable, and even necessary, component of the toilet training process. This is especially the case when the child is experiencing fear of the latrine during toilet training. Many mothers reported their children being afraid of falling through the latrine hole in particular, or fearing the latrine in general. In these cases, caning or cajoling are often employed to motivate the child.

"Tell him that 'you are old enough and should begin using the latrine' or you can even take a cane and cane him a little for him to get used to it. That is, if he fears, but if he doesn't fear, he just masters as you tell him. But if he fears, you just take a cane and cane him a little. (V1 R2)

"It's a must, you have to use it for him to know…eh you know even when a teacher teaches you and you get few marks you must receive a cane for you to know that you got it all wrong." (V2 R5)

"You cane him and then do the soothing." (V1 R5)

4.2.3.e Participants in the Process

The responsibility of toilet training usually falls to the mother, in the same way that she is responsible for supervising the child's defecation habits and disposing of his feces. Some mothers mentioned other members of the household as being secondary participants in this process - namely, older siblings but occasionally the father or grandmothers – however, toilet training is typically considered primarily the mother's role.

However, once the child has been introduced to latrine use and have become comfortable using the latrine without fear, they can often be assisted in the latrine by older siblings. Some mothers reported that their children all visit the latrine together, and the older siblings who are already fully toilet trained help the younger children use the latrine.

"This young one, I just tell him to go and poop inside there and at times when he goes with the others they show him how to poop." (V2 R5)

"For the siblings, he/she just follows them when they are going to the latrine such that when one leaves the latrine another one enters, when one leaves another one enters. Just like

that…Whenever he says that, 'Mum, I want to go to the latrine,' I tell them to escort him there." (V1 R2)

However, this does not eliminate the mother's involvement – she is still the one who is ultimately responsible for overseeing process. Also, if older siblings are in school and the father is working away from home, there can often be times during the day when the mother is the only one home with the young child.

The father can also occasionally take part in assisting the child in the latrine; this usually happens when the mother is unavailable, and he does not play as involved a role as the mother:

"When I am away and their father is present….he usually teaches them…it might be that their father accompanies them [to the latrine] but he only stands out[side]. He won't check if the child has defecated well….[because] he usually perceives that as a tough task or it's work meant for mothers." (V2 R2)

4.2.3.f Child Informing the Mother

The child informing the mother that he is pressed and needs to go to the latrine is also considered a natural and important part of the toilet training process.

"When [they want] to visit the latrine the young children will have to come and ask or tell you that 'Mum I want to go to the latrine….and if the dad is there they say 'Dad I want to go to the latrine' before they go." (V2 R5)

While the child is able to recognize that the latrine is the proper place for him to defecate, he still relies on the supervision and assistance of his mother for a period until he gets older and/or more accustomed to using the latrine on his own.

"First I take him and stand waiting. I show him how to step and defecate and later we come back. But sometimes I know that when I tell him to go to latrine then he may go [and] due to fear he may defecate on the floor. So I usually take him, show him and that is when I come back with him, when he wants to go again then I go with him till the day he tells me he wants to go alone. Then he goes and I follow up to ensure that he has defecated well without any effect." (V2 R2)

As already mentioned in the "Duration" section, some mothers consider their child to be fully toilet trained when he no longer needs to inform her that he is pressed. This is not the definition that all mothers use for their child being "fully toilet trained," but the practice of a child informing his mother when he is pressed is still a key theme in this data because it is present in multiples stages of the child's defecation progression.

4.2.3.g Acceptable Exceptions to Toilet Training

Mothers frequently mentioned two instances in which their requirements for their children's latrine use are relaxed. Regardless of whether or not they have been toilet trained, children are not always required to use the latrine at night; rather, if they must relieve themselves, they should defecate outside next to the house, and the mother will dispose of the feces into the latrine in the morning. Some mothers train their children not to defecate during the

night so as to avoid this issue. Others allow their children to use the latrine at night, but only if she escorts them, even if they already use the latrine unassisted during the day. This suggests that, within this context, it is considered unsafe or inappropriate for children to use the latrine at night, and some data suggest that this is consistent behavior for adults in this context as well.

"Even if it is at night and she has woken up, can you just take a small child to the latrine at night just like that? You just have to take her somewhere closer and then remove it the following day." (V2 R2)

"A child at night, I won't take him to latrine…I will take him next to the house and he defecates there…When he is done I clean after him and he gets into the house. Tomorrow I remove it and dispose off into the latrine….[But in the] daytime I just tell him to go to the latrine." (V1 R1)

In addition, two mothers indicated that children suffering from an episode of diarrheal illness could not be faulted if they could not make it to the latrine in time to defecate.

"He goes to the latrine because I took him and trained him…[but] if he is sick in the stomach, where he is passing loose stool the entire time, he can't move faster to the toilet. I usually show him where to go and then I remove." (V2 R2)

Interviewer: *"Is there any time you find that you have already instructed a child to always use the latrine but he/ she still defecate outside somewhere that is not a latrine?"*

V1 R2: *May be if he/she has a stomach problem, but if he/she is just okay, then I have not witnessed any."*

These two situations were frequently mentioned among participants as being realities of their young children's defecation habits. However, these behaviors carry the potential for fecal contamination within the household, and this will be discussed in the next chapter.

4.2.3.h Perceived benefits of toilet training and of latrine use

Mothers placed a high value on latrine use, and consequently considered toilet training their children to be very beneficial for various reasons. First, toilet training and latrine use enable a cleaner environment within the compound because the child is no longer defecating in the open. With no feces on the ground, the compound has fewer flies and smell. As one mother stated,

"The time I saw the child using a latrine I just knew that unhygienic conditions [were] over in my compound." (V1 R3)

Latrine use also makes the compound presentable and attractive for visitors. This is linked closely to the concept of pride, which many mothers brought up in relation to latrine use, and is consistent with WASH literature. As discussed in more detail in the next section, they consider it important to have a latrine present in the compound so that it can be offered to visitors to use; it would be embarrassing to have no other facility than the bush for a visitor to use. Also, when there is a latrine in the compound and it is being used by everyone, including small children, it becomes a source of pride for the mother because she knows that the visitor won't

encounter feces on the ground or come across her young child relieving himself on the ground or in the bushes. Conversely, many women mentioned that having their children defecate openly where visitors might pass by would be a source of shame and embarrassment.

Another reason mothers favor latrines, and train their children to use them, is that they recognize that latrines help reduce germs and disease transmission. Many women understood that many diseases are transmitted through contact with feces (among the diseases mothers mentioned were cholera, diarrhea, vomiting, and a disease that makes one's feet and legs scratch), and preferred latrine use to open defecation because it reduced the risk of their children or family members getting these diseases:

> *"I prefer children to use latrines because that reduces dirt/germs in the compound…To prevent spread of disease like diarrhea reduces contamination that is houseflies to feces."* (V2 R6*)*

Another often-mentioned benefit of toilet training the child is that it greatly reduces the mother's workload. When the child is pressed, the mother knows she will not have to interrupt her other work to help the child; the child can just use the latrine on his own, and it is not a hassle for the mother. Similarly, when the child uses the latrine, the mother no longer needs to go through the compound and clean up the places where he has defecated and dispose the feces in to the latrine. As one mother mentioned,

> *"It [training the child to use the latrine] is easier than going around all the time collecting feces and taking to the latrine."* (V2 R2)

And as the child becomes more and more toilet trained, he begins using the latrine more correctly and doesn't leave as much of a mess on the latrine floor for the mother to clean up:

"When he's doing all things right you feel good because he has lessened your duty." (V2 R5)

Finally, teaching a child to use the latrine is important because it instills in him lifelong habits for proper defecation practices. Once he becomes used to using the latrine exclusively, both at home and away from home, he will find it difficult to go back to his old habits of defecating in the open. He will also begin to recognize the importance of a clean and safe latrine, and will not settle for using one that is below those standards.

"There are so much benefits because if you go somewhere as a visitor anywhere and you are accompanied by the child, and you find that there's no latrine and you take him outside [and say] 'just poop here,' the child will tell you, "I will not poop here I want to visit the latrine'….. You'll take this child and say, 'poop here' and the child refuses; this will force you to locate where a latrine is and take him there for him to poop but where there's no latrine the child won't poop….the child gets used to using the latrine, even you as an adult if you are used to using the latrine and it reaches a point that you are at a place where there's no latrine surely could you go outside?..... Is it difficult? I believe it's very difficult." (V2 R5)

"The children, even if they use the latrine and find a guest child has defecated on top of the latrine, they won't use it instead they will come and tell you mother there is feces in the latrine.

You dispose it off before they could use the latrine. It's [because of this] that I always see them as having good behavior." (V2 R4)

4.2.4 Pride

As previously mentioned throughout the above text, a key issue surrounding children's defecation, feces disposal, and latrine use was the concept of pride. This presented itself mainly in a mother's concern about the appearance of her family members and compound to visitors, neighbors, and passersby. Pride and concern about what other people will think greatly influences a mother's decisions about her child's defecation behavior. For example, many mothers choose designated defecation spots for their children that are somewhat private and away from where visitors might pass by. This is done not for the privacy of the child but rather so that the visitor won't be embarrassed or offended to see the child defecating.

Mothers also take pride in a clean home environment that is free of feces. Quickly disposing of feces after a child defecates is important not only because it reduces disease transmission, but also because it avoids embarrassment when a visitor comes across some of the child's feces lying on the ground.

Finally, mothers consider having a latrine to bring respect and reputability onto the compound: One mother explained,

"[If the compound has a latrine,] that's respect to that compound since it is clean and if the visitor comes in, then it creates respect." (V1 R3)

It is a source of shame when there is no latrine in the compound to offer to visitors; mothers spoke of this in a way that suggested that a person who lacks a latrine is a secondary citizen of sorts. Several mothers referred to the latrine euphemistically as the household's "office." As one mother put it,

> "*It is good to show a visitor like you that there is our office. Without an office you are like a dead person."* (V2 R3)

These comments reflect the high value mothers place on keeping their household presentable and making sure their family's defecation practices are following an acceptable standard in the eyes of other community members.

4.3 Participants' Experiences with and Perceptions of the Latrine Training Mat

***Note*:** During this chapter and the discussion that follows, much of the data is presented in reference to the latrine training mat in general. In other cases, however, the data is compared between specific prototypes, most often comparing the permanent slab (#1) to the removable mats (#s 2 and 3). There were only a few instances (which are explicitly mentioned) when mothers differentiated between prototypes #2 and #3; because they were very similar in design and structure, they were almost always perceived in the same way by the participants. However, these two prototypes were fundamentally different from the #1 slab in terms of design: the mats were removable and for children's use only, while the plastic slab was permanently installed in the latrine and could be used by the whole family. Consequently, participants had very different perceptions of the #1 slab than they did for the other two prototypes. Comparison of prototypes

will always be clearly stated, and it should be assumed during the results and discussion chapters that the data is referring to the LTM tool in general, unless otherwise specified according to protoype.

Image 7: The mother places the #3 LTM

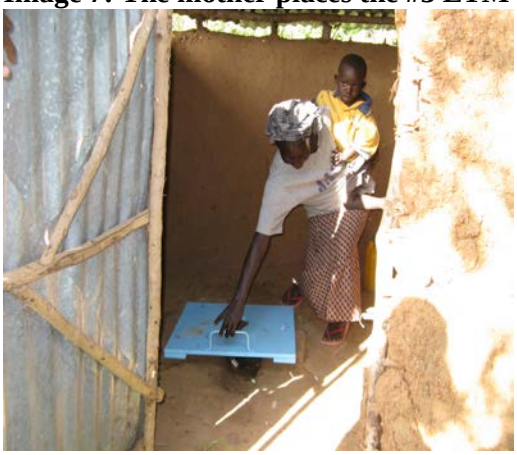


Photo by Gabriella Van Schoyck (2011).

4.3.1 LTM Training Process

When mothers described the ways in which they introduced the latrine training mat (LTM) to their young children, the method they used closely resembled the standard toilet training method detailed in the above section. In other words, it usually involved taking the child to the latrine, placing the LTM over the latrine hole, and explaining to the child that this was where he or she should defecate from now on (see Image 7). The mother would then show the child where to stand and squat, and wait with him until he had finished (Image 8). This process would continue until the child felt comfortable using the LTM (Image 9).

Image 8: The mother teaches the child how to use the LTM

Photo by Gabriella Van Schoyck (2011).

Image 9: The child is comfortable using the LTM

Photo by Gabriella Van Schoyck (2011).

Some mothers trained their child to inform her when he was pressed so that she could assist him with placing and using the LTM; others trained the child to use the LTM by himself from the onset. No clear differences in LTM training methods could be attributed to whether or not participants received messaging about the LTM upon receiving the intervention. The issue of messaging will be discussed in more detail during the discussion chapter, but it should be noted here that there is no clear evidence that the presence of messaging directly influenced correct LTM usage in any case. This is potentially attributed to the fact that all three prototypes were simple, easy to use, and self-explanatory to recipients.

There were a few notable outliers to this common method of training the child to use the LTM. One mother in Village 1 was not involved in the training process at all, and instead assigned the task to the child's older siblings. A mother in Village 2 chose to introduce her child to the LTM outside of the latrine by placing the mat on the grass, helping her child stand on top of it and squat correctly, and explaining to her that this mat was where she should defecate in the future. After the child successfully squatted on the mat on the grass, the mother placed the LTM inside the latrine and helped the child squat on it a second time (see Images 10 and 11).

Image 10: The child is introduced to the #2 LTM outside

Photo by WASH-Benefits field officer (2011). Used with permission.

Image 11: The child then practices using the LTM inside the latrine

Photo by WASH-Benefits field officer (2011). Used with permission.

For some, this LTM training process was simple, uncomplicated, and accomplished within a day. For others, it took two or three days or more because the child was initially afraid of the latrine. (This was usually the case with children who had not been toilet trained at the onset of the intervention, or who were still in the process of being toilet trained when the intervention began.) Mothers reported that this fear was either in relation to the LTM itself (one child thought that the #2 plastic mat would collapse underneath him), or to the latrine in general. However, any fear the child had was easily overcome by the mother talking to the child and convincing him or encouraging him. (Intimidation tactics of any sort were only mentioned once, and caning the child as punishment for being afraid was not mentioned at all.) The following quote suggests that achieving LTM use can become a source of pride for young children:

"When you go to the latrine with the child and the thing, the child goes and stands as you instruct…you know a child can be scared. When she is done with shivering say for about 2 days she will go and tell her friends that she has [used] something meant for the latrine…so she becomes confident and continues to use the latrine and tells her friends to come and see how her latrine is. It has something good." (V1 R6, received LTM #1)

4.3.2 Children's Use

All mothers said that their children learned how to use the latrine training mat within a very short period of time, usually between one to three days. During the focus groups that took place one week after receiving the LTMs, all the mothers reported that their children had quickly adopted the latrine training mat and had begun incorporating it into their daily routine, and some expressed dramatic improvements in their young children's defecation practices. This was the case among all participating households and all three prototypes.

The degree to which the child used the mat on his own and without supervision varied among households. In some households, the children informed their mothers when they were pressed and specifically asked for the LTM to be placed in the latrine for them to use. In some families with several young children who were close in age, the older siblings played a significant role in LTM use by going to the latrine together and assisting the younger ones in using the training mat. Some children became so accustomed to using the LTM that they just used it on their own without any assistance. This involved the children either entering the latrine where the LTM was already stored, or (if it was a mat that was stored outside of the latrine) carrying it from its separate storage space into the latrine to use it.

One mother described how her plastic training mat (the #2 prototype) was used by her children who were ages five, four, and two:

"I left it in the latrine because the children do use it by themselves whenever I am not around. I had already shown them such that even the youngest one here can just use it. The older one goes with her, places it, she uses it and then the older child removes it and places it leaning on the latrine wall." (V1 R4, received LTM #2)

It should be noted that this description encompasses nearly all of the ideal behaviors that are intended for the latrine training mat; the only component not mentioned by the mother is her method and frequency of cleaning the mat.

Among most participants, the training mat was mainly used during the day; only one participant mentioned her child using it at night. This is consistent with the previously-mentioned defecation practices within this context: even young children who regularly use the latrine during the day are expected to defecate closer to the house at night.

4.3.3 Changes in Defecation Practices and Household Behaviors Due to LTM

Overall, mothers indicated a clear difference in their children's defecation behaviors after their introduction to the latrine training mat. Children who would normally have defecated outside were now willing to use the LTM. Children no longer feared the latrine, and many used it more often than they had previously. This was the case across all LTM prototypes.

Several mothers shared specific examples of ways in which the latrine training mat had brought about changes in their young children's behavior, and discussed the state of their

household before and after they introduced their children to this new tool. The LTM eased several children's fear of using the latrine. Some mothers explained that before receiving the LTM, their children's fear kept them from correctly using the latrine. They would miss the hole, and feces and urine would be left on the floor around the latrine. These mothers reported that the latrine training mat helped take away their children's fear by reducing the size of the hole, and enabled them to use the latrine correctly with minimal mess.

One mother explained that before receiving the LTM she had not allowed her child to use the latrine because the hole was too big for the child. She experienced a direct change in her child's behavior because the latrine training mat changed the physical nature of the latrine:

"*Mine had not begun using the latrine…because that latrine hole was big…Children now train to use the latrine because the hole used to be big but now this thing has narrowed it.*"(V1 R5, received LTM #2)

Because children who used to defecate outside began using the latrine training mat in the latrine instead, mothers also reported that the LTM contributed to a cleaner compound, with fewer flies and odors. Similarly, the condition of the latrine improved after the introduction of the training mat. One mother reported that her young child sometimes used to touch the dirty floor of the latrine when he was inside. But since beginning to use the LTM, which was cleaned regularly, the mother felt more at ease about the child touching the surface beneath him while he was using the latrine:

"Before [receiving the LTM], they used to touch the floor often..I wasn't feeling good. At the moment even if they touch the floor I don't feel bad; they don't come into contact with dirt because it's washed often." (V2 R4, received LTM #2)

Similarly, another mother commented on the fact that her latrine used to be difficult to clean because the children would make such a mess around the floor, but pointed out that the latrine training mat was now much easier to clean. In this way, the LTM contributed to an improvement in the mother's workload: the latrine was easier to clean, and she no longer needed to go remove the child's feces from where he had defecated inside the compound.

4.3.4 Cleaning

This issue of the mothers' workload was explicitly linked to the issue of cleaning during the focus group discussions. Overall, mothers found the LTMs to be easy to clean, especially when compared to their former practice of cleaning the child after he defecated openly and disposing of his feces. Participants also indicated that cleaning the LTMs required minimal time. Both the permanent and removable versions of the LTM were perceived by mothers to be easy to clean, although there was some variety in women's responses regarding the permanently-installed slab (prototype #1). One mother who received the slab considered its raised footings to be a challenge while cleaning, while another recipient – who received a different version and saw the slab during the FGD – thought that the slab would actually be easier to clean than the removable mats. While mothers who received the removable mats (prototypes #2 and 3) found them easy to clean, one recipient thought the permanent slab would be easier to clean because

one only needed to wash the top surface, as opposed to both the top and bottom surfaces of a removable mat.

In both villages, mothers were the only ones in the household who cleaned the LTMs. In Village 2, where the mothers received explicit messaging and were told to wash the mats after every use with water, powdered detergent, and a broom or brush, all mothers reported using soap, although the type of soap varied (one woman used bar soap because she cannot afford to buy powdered detergent). In Village 1, where the mothers received no messaging about proper cleaning methods, some mothers used soap and brushes or rags to clean their LTMs, while others varied in their cleaning habits by rinsing with water alone or by scrubbing the LTMs with leaves instead of a brush or broom.

Despite the fact that Village 2 participants received information about cleaning the LTM inside the latrine by rinsing water directly into the latrine hole, no mothers in either village reported doing this except those who received the #1 slabs that were permanently installed in the latrine. Mothers with the removable mats (#2 and #3) cleaned them either outside the latrine, or outside the house.

Among those who received the permanent slab, some washed the slab after every use, while others only cleaned it when it was visibly dirty (i.e. when the child had left feces on the surface). Among mothers who received the removable mats, some cleaned them after every use, while others cleaned them only once a day, either before or after transporting them back to the house for overnight storage:

"After a child has used it, I remove it from the latrine and put it outside where I wash it with soap and then I put it outside to dry and thereafter take it to the house for storage."

(V1 R2, received LTM #3)

Regardless of the frequency of cleaning, there was a clear link between cleaning and storage of the latrine training mats. In both villages, mats that were stored inside the home were washed more frequently and thoroughly during the day than were mats stored partially or completely in the latrine. Mothers always cleaned the LTMs before storing them inside the house; they did not bring the mats into the house without washing them first.

Even mothers who received a permanent slab acknowledged the importance of washing a mat before in-home storage. For example, one mother said that she only cleaned her #1 slab when it was visibly dirty, and she did so by simply rinsing water over it (she did not use soap). However, she said that if she had a removable mat, she would need to clean it more thoroughly and with soap because it would need to be clean when stored inside the house:

"Because this is an item that has to be taken to the latrine and returned to the house, I would be forced to wash it with soap before taking it to the house because of hygiene purposes."

(V1 R1)

4.3.5 Storage

This section refers solely to the removable LTM – in other words, the #2 plastic mat and the #3 wooden mat. Storage of the #1 slab was not discussed in the FGDs, because it was permanently installed into the latrine floor and thus did not have the option of being stored elsewhere.

There is some variety in the places where mothers chose to store their removable plastic (#2) or wooden (#3) latrine training mats. Some women took their LTM to the latrine in the morning when the child was first pressed, left it there during the day, and then washed it and stored it inside the house for the night. Others kept it inside the home whenever it was not being used, and then carried it to the latrine every time the child was pressed. Still others started out the week by storing the LTM in the home, but then switched to keeping it in the latrine at all times because their children had grown accustomed to using it by themselves.

This last group's rationale for storing the LTM in the latrine was mainly one of convenience: because their children were comfortable using the LTM consistently, mothers found it easier to simply leave the LTM in the latrine for the child to use, instead of constantly transporting it to and from the house. In this way, storage of the LTM was linked to the issue of the mother's workload. Storage was also linked to the child's acceptance of the LTM as a defecation tool: the LTM was more frequently stored in the latrine (either exclusively or just during the day) when the child had already grown accustomed to using it without the mother's reminder or assistance. There was one indication that storage could also be linked to the perception of the child's feces as being unthreatening: one mother indicated that she stored her mat on the verandah of her house and did not perceive this to be a risky behavior because her children were the only ones defecating on the tool:

"[I stored it] on the verandah…because it was being used by two children and their dirt is not that bad." (V1 R3, received LTM #3)

Interestingly, the latrine training mat was stored exclusively in the latrine (in other words, during the day *and* night) only among participants in Village 1; all of the participants in Village 2 who received removable mats stored them in places other than the latrine at least during the night, and some during the day as well. When the LTMs were stored outside the latrine, they were most often kept inside the home; in these cases, household storage spots ranged from on the verandah to under a bed or chair.

In Village 2, the primary reason mothers kept their LTMs inside their home was the fear that the mats would be stolen from the latrines if left unattended. The majority of mothers in this village mentioned the lack of safety in the area, and the belief that, since their latrines were not secure, the LTMs could easily be stolen. Some mothers even acknowledged that the latrine was, in theory, the best place to store the LTMs, but explained that they were forced to store them at home because of the fear of theft or lack of latrine security.

In contrast, two out of the four participants in Village 1 who received removable mats did store them exclusively inside the latrine. A third mother stored hers inside the home, and the fourth mother did not specify her chosen storage spot. The fear of theft was not explicitly mentioned in Village 1. Rather, the reasons for household storage varied among the mothers, some of whom received permanent #1 slabs but indicated why they would have hypothetically stored a removable mat inside the home if they had received one. One participant thought that keeping the LTM at home posed a minimal health risk because she considered children's feces to not be as dirty as adults'. Another thought the LTM should be stored at home to prevent adults from using a tool that was only meant for young children. A third mother assumed that the removable mats were supposed to be stored inside the home.

In summary, some women in Village 1 stored their mats in the latrine because it was more convenient to do so, while others thought that it was best to keep them at home for a variety of reasons. All women in Village 2, however, refused to store their LTMs exclusively inside the latrines because they were afraid the mats would be stolen, despite the fact that some acknowledged that they would prefer to store them inside the latrine if they could. This suggests that lack of latrine security was a significant barrier to behavior change and hygienic LTM use among participants in Village 2.

4.3.6 Perceived Benefits and Limitations

Mothers perceived several advantages to all of the LTM prototypes in general. They reported that the mats facilitated their young children's latrine use, even among those who had not yet begun using the latrine at all or who were still in the process of learning. Their children were now able to use the latrine and it had become a stress-free, worry-free, and rewarding process. As one mother described,

> *"The benefit that I have seen, I have not experienced any problem. My children use for free, they feel good, they don't step on urine, they don't struggle."* (V2 R3, received LTM #3)

In addition, the latrine training mat reduced the mothers' workloads by stopping their children's previous habit of open defecation; now mothers no longer needed to remove feces every time their young children defecated. Furthermore, the latrine training mat improved the condition of both the latrine and the compound by reducing flies, odor, feces, and dirt. Finally,

mothers reported that the latrine training mat was appreciated and considered beneficial by other members of the household; for example, the fact that it had facilitated the young children's latrine use impressed some of the fathers and heads of compound.

"He said that they have done something good, the child will now be going to the latrine….He just asked me the purpose of the item and I told him that it is for the latrine." (V1 R5, LTM #2)

"The husband is very happy and the children are alright as wastes are no longer…in latrines." (V1 R4, LTM #2)

Both participants who received the #1 slab and those who received other versions listed several advantages of the #1 plastic slab, particularly appreciating the fact that it was installed permanently in the latrine. This issue of permanence related both to the slab's perceived durability and to its ability to stay in the latrine full-time without being moved back and forth whenever the child was pressed. As one mother explained,

"The goodness is that it was installed permanently so even when [I] am not around, children could still use it…It is just permanent, notwithstanding where I go, even if I die, the children will continue using the latrine." (V2 R1, received LTM #1)

The slab's permanence in the latrine seemed to be its primary advantage in the eyes of those participants who received it. Other features that mother considered to be beneficial were the slab's raised footings, ease of cleaning, and its ability to be used by the whole family. Unlike

the mats that were only for children's use, the plastic slab was available for anyone who wanted to use it:

> *"Number one assists the compound, assists all my generation, starting from young children up to adults, even to my visiting guests."* (V2 R3, received LTM #1)

Some women gave conflicting information as to whether they viewed the larger size of the #1 (family-friendly) slab's latrine hole to be an advantage or a disadvantage. However, it became clear that several mothers who had received other versions perceived the #1 slabs to be appropriate only for children closer to the ages of five and above, while the #2 and #3 mats were able to be used by children much younger (such as two year olds). In other words, several participants liked the #1 slab, but thought that children would not be not able to use it as early as they could the #2 and #3 mats with the smaller holes. This was the perception of several mothers who did not receive the #1 slab but who compared it to the other two prototypes during the focus group discussions.

In contrast, there was very little indication from the mothers who had received the #1 slab that there had been any difficulties with their young children using this prototype. One mother did say that her older children were very happy to receive the training mat, and her two year old child wished she could use the slab but "cannot reach there" (V1 R6). While this suggests that this mother may have shared the opinion of some of the other participants that the slab was not appropriate for the youngest of her children, there was no other evidence that children who had received the #1 slab had been unable or unwilling to use it. It should be noted, however, that while all four mothers who received the slab reported that it had been adopted and used by their

children, these women had several children within the target age range of two to five years, so it was unclear if the slab was in fact used by younger children (e.g. ages two and three) or only those who were a bit older (four and five year olds).

The wooden and plastic mats helped facilitate the toilet training process by making the latrine more accessible and desirable for young children. They were easy for the children to use and easy for the mothers to clean. Some mothers expressed disappointment that the mats were not permanent in the latrine. One mother wanted the mat to be permanent like the #1 slab was. Another woman clearly considered the fact that her mat couldn't stay full-time in the latrine to be a disadvantage, but attributed this to the fact that her latrine didn't have a door.

Participant perceptions about these issues and other features of the latrine training mats are described in further detail below.

4.3.7 Key Features

4.3.7.a Durability of Materials Used

Several mothers expressed concern about the durability of the wooden mat, and thought that the wood would easily rot, decay, or become warped by increased exposure to urine, water, and termites. This was an issue even among the mothers who had received messaging about the wooden mats being coated with a paint that was odor-resistant and termite-resistant. Plastic was preferred over wood because it was considered more durable and longer-lasting. The only notable perceived risk with the removable plastic mat was some mothers' concern that the plastic area surrounding the hole might weaken and eventually cave in over time. Overall, the installed plastic slab was considered to be the most durable and could last several years longer than the

two mats. Mothers thought that, over time, the plastic mat would last longer than the wooden mat.

4.3.7.b Footings

The raised footings on the #1 slab were considered beneficial because they not only showed children where exactly to stand while defecating, but they also prevented the child's feet from coming into contact with urine that might miss the hole and pool on the surface of the slab. Several mothers indicated a desire that the removable mats have footings as well.

4.3.7.c Handles and Lid

Having handles on the mat was considered a great advantage, particularly the metal handle placed at the top of the #3 wooden prototype. Mothers believed that this handle was sturdy and could help a child even as young as age two balance himself while squatting over the hole. Conversely, mothers did not like the cord handles that were attached on the sides of the #2 plastic mat, and indicated that they would prefer this mat to have the sturdier metal handle found on the #3 wooden mat.

The lid on the #1 plastic slab was admired by several mothers because it helped reduce the latrine's smell.

4.3.7.d Size of hole

As previously mentioned, the size of the hole on the latrine training mat was very important to mothers. Recipients expressed a great appreciation for the smaller holes that all three versions provided., but many mothers who received the #2 and #3 mats had concern over the size of the #1 slab's hole, which was bigger so that the whole family could use it. These mothers considered the smaller hole more appropriate for young children, and more conducive to latrine training.

"*The hole used to be big but now this thing has narrowed it."* (V1 R3, received LTM #3)

"*Its advantage is that it trains young children like 2 years old so as not to have fear. Because its hole is small."* (V1 R1, received LTM #1, referring to LTM #2)

In contrast to the more common opinion that the small holes on the mats were an advantage, a couple of mothers (one who received #2 and another who received #3) suggested that the size of the hole on the #2 mat might actually be *too* small, because they believed that it wouldn't be able to capture all of the child's feces and would instead leave a mess on the mat.

Mothers – including those who received the #1 version and those who did not – appreciate the #1 slab because its hole was big enough so as to allow the entire family to use it. One mother (who received the #3 mat) expressed conflicting emotions – she thought the larger hole on the slab was both an advantage (because it was big enough for adults to use as well as children) and a disadvantage (because it was too big for younger children to use).

4.3.7.e Suggested Modifications

Overall, based on mothers' stated preferences for various features, the ideal latrine training mat could be described as one that was made of plastic and that had a lid to cover the hole when it was not being used, a hole small enough for a young child to use, a metal handle for balance, and raised footings on either side of the hole. It could also be kept permanently inside the latrine.

4.3.8 Perceived Age of LTM Initiation

When mothers were first asked which prototype they thought a child could start using the earliest, mothers tended to name the prototype they themselves had received. This suggests that the participants were initially biased towards whatever prototype they had direct experience with. However, when further probed, several mothers expressed the opinion that young children could potentially begin using the plastic and wooden mats (#s 2 and 3) earlier than they could use the plastic slab (#1).

> *"Now that these kids of mine are still little like this… if you could have given me this [#1 slab] they couldn't have used it because...I saw the hole is big…if they could have entered and saw the hole being big they could have said they will fall inside. They couldn't have gone inside."* (V2 R6, received LTM #3)

This perception was especially the case among mothers who had received the #2 and #3 versions, but was mentioned by one #1 recipient as well. Mothers believed that the mats could be used as early as age one or two, through age five. Conversely, they mothers believed that the slab

should not be used by the children *until* the age of five. This difference in the perceived age for LTM use was attributed to the fact that the mats had a small hole that could help young children become toilet trained, while the slab had a larger hole that could be scary and inappropriate for young children. One mother who received the #1 slab suggested that young children could begin by using the #2 and #3 mats, and then transition into using the slab once they reached age five, since the slab was designed for the whole family to use.

4.3.9 Overall Preference

When asked to choose one prototype that they preferred overall, some of the women gave conflicting information. They started out by listing the version that they themselves had received – for example, some recipients of the #2 and #3 mats pointed out that they currently had young children so would choose the training mats designed for young children's use. However, when asked their preference again, one after another, all twelve mothers listed prototype #1, the plastic slab, as their ultimate preference. (This suggests the possibility of some peer-related bias to the results, due to an incorrect "group interviewing" technique used by the focus group moderator.)

The mothers gave several reasons for their preference of the permanent plastic slabs: the slab was able to be used by the whole family, was permanent, brought cleanliness to the latrine, could make a positive impression on visitors, did not rely on the mother's presence for the children to use it, and was a long-term sanitation solution. When asked to affix a price to the training mats, mothers chose much higher prices for the slab than they did for the removable mats; the reasons the mothers listed for why they put a lower value on the mats were that they were portable and for children's use only.

There is some conflict between the mothers' unanimous reported preference for the #1 slab, their acknowledgment of its less child-friendly nature, and their explanation of the #2 and #3 mats' effectiveness at facilitating their young children's latrine use. This tension will be discussed in detail in the next chapter.

4.4 Conceptual Diagrams

The following conceptual diagrams are included in an attempt to visually represent and summarize the key findings and themes that were identified within the data analyzed.

4.4.1 Explanation of Diagram 1

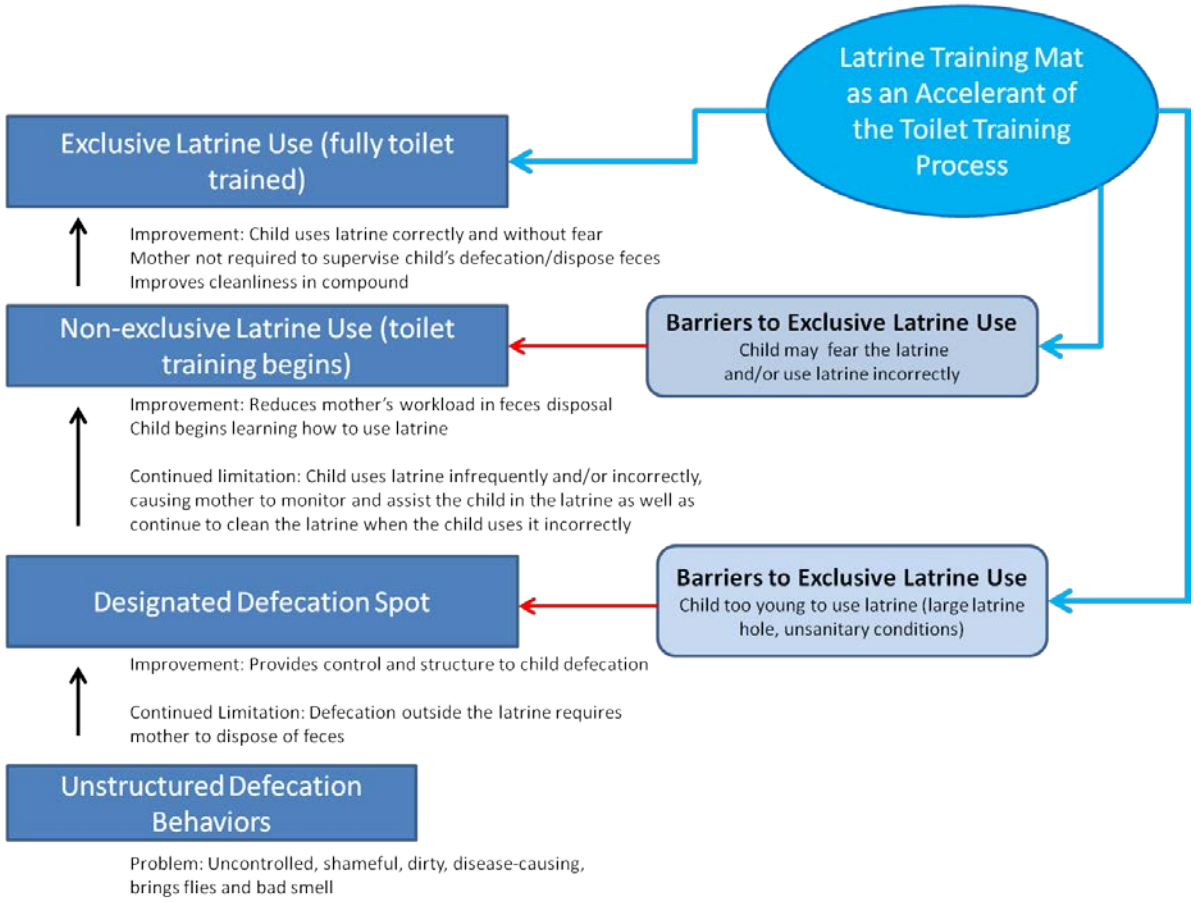
This diagram charts the common progression of defecation practices that a child in rural Western Kenya undergoes when he or she is very young. The box in the bottom left corner of the diagram, "Unstructured Defecation Behaviors," refers to open defecation practices that are considered within this context to be unsavory and less than ideal. The boxes that are placed above it chart a progression of defecation behaviors that are alternatives to open defecation, from the time a child is very young and still considered unfit to use the latrine, until the time he has achieved full latrine use. Throughout each of these stages of defecation behaviors, the child is trained and supported primarily by his morhter. When moving from bottom to top, these practices progress from exclusively childlike defecation behaviors (such as using designated defecation spots) to more adult-like behaviors (such as using the latrine). The last stage of this

progression is exclusive latrine use, during which the child is fully toilet trained and has ceased all forms of open defecation. This stage is considered the ideal.

Under each stage in the progression, there is a brief description of the positive improvement that the stage contributes to a child's defecation practices, as well as the ways in which this stage still remains less than ideal. The boxes located on the right side of the diagram list the key barriers that keep young children in that stage from exclusively using the latrine.

The arrows leading out from the bubble entitled "Latrine Training Mat as an Accelerant of the Toilet Training Process" show that the latrine training mat directly addresses the key barriers to exclusive latrine use during the progression of child defecation practices. The LTM specifically deals with a child's fear of the latrine by making the latrine hole smaller; it facilitates more correct latrine use by providing features such as raised footings for proper positioning and handles for balance; and it makes the latrine a more sanitary place for a child to visit by providing a stable and more easily cleaned surface. Through addressing all of these factors, the latrine training mat has the potential to remove the need for the "Designated Defecation Spot" and "Non-exclusive Latrine Use" stages during this progression, and more quickly and easily allow children to achieve exclusive latrine use at an earlier age than might otherwise be possible.

Diagram 1: The Influence of the Latrine Training Mat on the Progression of Children's Defecation Practices



Legend

Black arrows –The positive progression of children's defecation practices in stages from unstructured (open) defecation to exclusive latrine use

Red arrows – The barriers to exclusive latrine use that exist during this stage

Aqua blue arrows – Affects the LTM has on removing barriers that keep children from progressing to the next stage towards exclusive latrine use

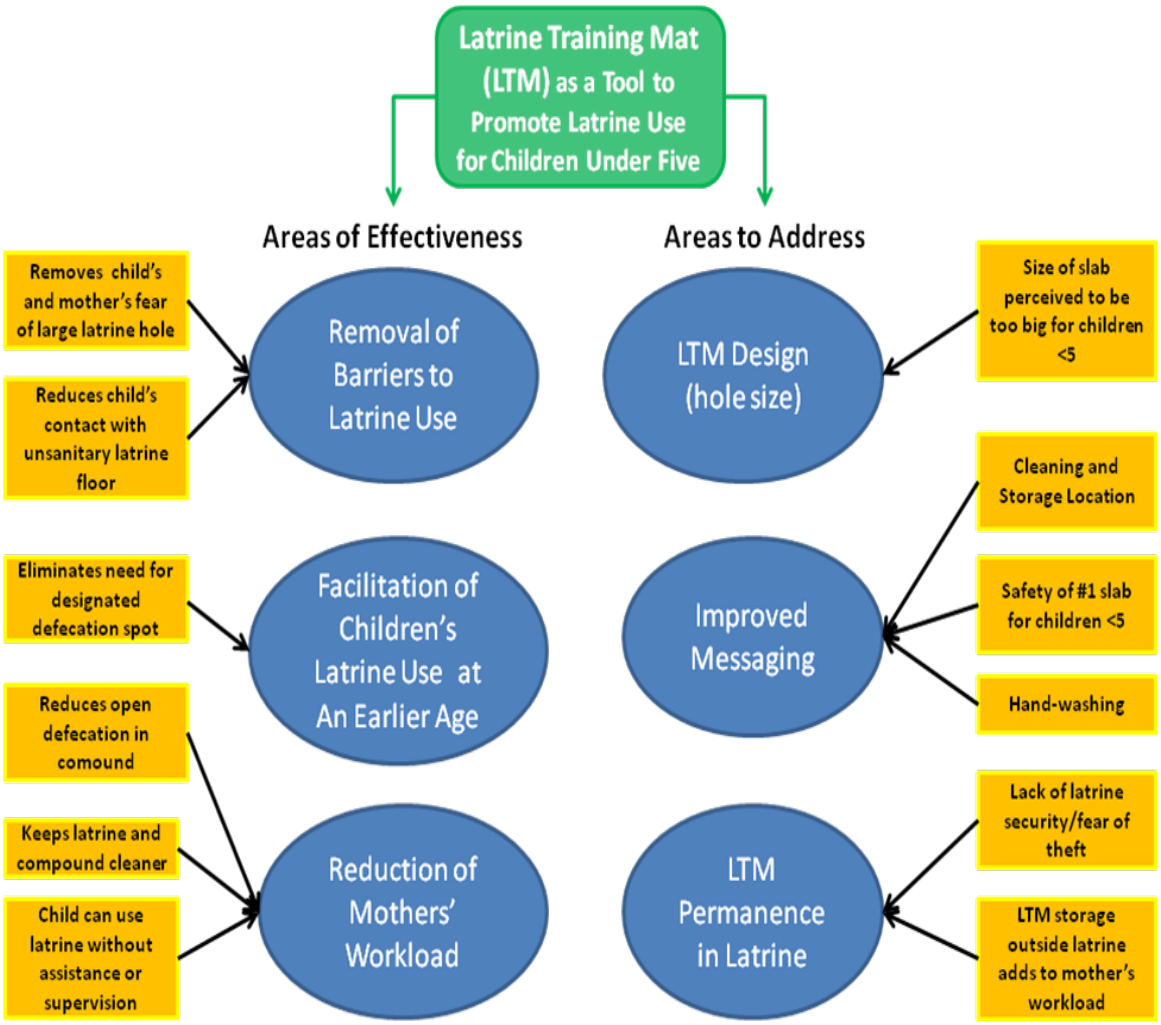
4.4.2 Explanation of Diagram 2

This diagram presents the effects of the latrine training mat in two main categories: the ways in which the LTM has been effective, and the ways in which it was used incorrectly and/or perceived negatively. As listed in the blue bubbles under the heading "Areas of Effectiveness,"and then explained in more detail in the corresponding yellow boxes, the LTM was effective in three main ways. First, it successfully addressed and removed the key barriers to latrine use that existed for young children in this context (namely, the child's fear of using the large latrine hole, the mother's fear of the child falling into the latrine hole, and the mother's fear of the child coming into contact with unsanitary conditions inside the latrine). Next, it was able to facilitate children's use of the latrine at an earlier age, even as young as two years old, by removing the need for designated dfefecation spots outside of the latrine. Third, it also reduced the mother's workload by diminishing her time and effort spent on assisting her child with defecation, removing the feces, and cleaning the area.

The column on the right of the diagram identifies some key issues that need to be addressed in order for the latrine training mat to achieve greater effectiveness. These three areas of necessary improvement are summarized in blue bubbles and then further unpacked in the corresponding yellow boxes. First, the size of the LTM hole – particularly on the #1 slab prototype will need to be addressed. The hole on this slab was perceived by mothers to be too big for children under five, but was still positively perceived because it could be used by adults as well as children. This could potentially be addressed through improving the behavior messaging to include a more effective way of communicating the safety of the slab for young children. In addition, there is a need for improved messaging regarding other issues such as proper LTM

cleaning, hand-washing, storage, etc. Finally, the issue of the mat's permanence in the latrine must be addressed by either finding a way to ensure that it cannot physically leave the latrine, dealing with the issue of latrine security, or re-structuring behavior messaging to strengthen mothers' understanding of the importance of latrine storage to reduce contamination. Storing the mats exclusively in the latrine will not only further reduce mothers' workload (by removing the need for her to carry the LTM to and from the latrine each day), it will also help protect the family from exposure to fecal pathogens.

Diagram 2: Facilitators and Barriers to LTM Effectiveness



Legend
Blue bubbles – Key areas that demonstrate either the ways in which the LTM was effective or the areas which still need to be addressed/improved
Yellow boxes –Influencing factors that contribute to the LTM's effectiveness or need for further improvement

Chapter 5: Discussion

5.1 Introduction

This chapter discusses the key themes that emerged from the data presented in Chapter Four. The discussion first focuses on the behaviors and perceptions related to children's defecation practice that are common within the study context. Next, the results of the LTM intervention are unpacked, and participants' experiences with the latrine training mat are considered in light of the relevant cultural beliefs and practices. This chapter concludes with a discussion of the study's implications for future latrine training mat initiatives.

5.2 Local Behaviors, Practices, and Perceptions Surrounding Child Defecation

5.2.1 Advantages and Risks of Using Designated Defecation Spots

The concept of the designated defecation spots, as they are referred to in this paper, presents an interesting contradiction of sorts. Mothers often choose a particular spot within the compound where they train their young children to defecate consistently. The advantages of using DDS are that they give control and structure to the practice of open defecation, and certainly are preferable to uninhibited open defecation. In addition, they teach good habits that can help prepare a child for the concept of using a latrine as an exclusive defecation spot. Designated defecation spots can help keep the compound clean by containing the feces to a particular area from which mothers can quickly and easily dispose of them in the latrine. Mothers

consider this an advantage because it enhances their sense of pride in a clean household, especially in front of visitors.

However, there are also significant disadvantages of using designated defecation spots, although they are not perceived as disadvantages within this context. Even though using a DDS is a structured and controlled practice, it is still a form of open defecation, which means that there is still the risk that fecal contamination could be introduced into the compound. For example, if the mother is not able to dispose of the feces immediately after the child defecates, the excrement can quickly attract flies that can then spread the contamination elsewhere. Also, the fact that hand-washing following feces disposal was only mentioned by one participant in the LTM study suggests that this may not be a frequent practice for mothers within this context. If a mother handles her child's feces and then prepares food, feeds her children, or performs other household chores without first washing her hands, fecal contamination can spread quickly. Finally, the seemingly acceptable practice of allowing children to defecate outside at night instead of in the latrine means that feces are left on the ground for several hours overnight, allowing for an extended window of time during which the household can become contaminated.

5.2.2 Mothers' Perception of Feces and Disease Transmission

The fact that mothers encourage the use of designated defecation spots, which carry the risk of fecal contamination, may be surprising when one considers that most of the study participants indicated an awareness of the link between feces and diarrheal disease. There was a common awareness among participants that feces are dirty and can lead to a variety of diseases including

diarrheal illness. Many of them seemed to have an understanding of fecal-oral pathways and the importance of keeping feces away from water sources and flies.

This awareness positively influences behaviors among mothers in this context, particularly related to their consistent feces disposal immediately after a child's defecation, or as soon as possible. It also impacts their desire for a clean household and compound and their distaste for open defecation. It sometimes leads to mothers' decision to keep their young children away from the latrine because the conditions inside – namely, feces and urine on the floor surrounding the hole – are considered too unsanitary. (This is an interesting paradox: mothers' fear of their children encountering germs in the latrine leads to alternative defecation practices that introduce germs to the household environment). Finally, during the LTM intervention, this understanding of fecal contamination was evidenced by mothers' emphasis on the necessity of cleaning the LTMs thoroughly before storing them in the home so as not to introduce fecal contamination into the house.

However, despite their knowledge of diarrheal disease transmission through fecal contamination, mothers in this context still exhibit some risky behaviors. First, the common practice of allowing young children – even those who are already latrine trained – to defecate on the ground during the night instead of going to the latrine ignores the fecal contamination that can be introduced into the compound through this behavior. The same applies to the overall absence of explicitly-mentioned hand-washing behaviors following the defecation, feces disposal, or cleaning the child's bottom. During the LTM study, the decision that many mothers made to store their removable mats inside the home (even though they did wash them first) is a cause for concern, because it is still unknown exactly how effectively the pathogens on the mats

are killed through washing. Also related to washing, all eight mothers who received removable mats chose to wash them outside of the latrine; this is a risky behavior because the wastewater to flow or pool in the compound.

There was some indication that, in this context, the feces of younger children are not perceived as being as dirty as those of adults. As previously discussed, some mothers mentioned that they decided to begin the toilet training process when their children's feces changed and began to smell more. This suggests that mothers may believe that children's feces are only a potential hazard when they become more adult-like.

This perceived difference in the pathogenic content of children's and adult feces is consistent with the literature found in many cultures around the world. In this particular context, it may explain the contradiction that exists between mothers' awareness of diarrheal disease transmission pathways and their participation in certain defecation-related behaviors which still carry significant risk of fecal exposure for themselves, their young children, and the other members of their households. In other words, mothers understand that feces can bring disease, so they take care to keep their compound's environment clean, prevent their children from using latrines that are covered in feces, and begin toilet training their children at a certain point. However, they still teach their young children open defecation (albeit in a structured manner), and allow them to defecate outside on the ground when they are sick with diarrhea or when they are pressed during the night. This could be due to the fact that mothers do not consider these behaviors as risky among young children because their feces have not yet become "dirty."

5.2.3 Toilet Training

Because of the near absence of literature dealing specifically with toilet training in the developing world in general and within the context of East Africa and Kenya in particular, the information gathered through the LTM study contributes valuable insight into the ways in which toilet training is perceived and conducted in this culture. This study identified many common perceptions and themes surrounding the toilet training process. First of all, latrine use is highly regarded as important and beneficial, and mothers consider it necessary to purposely teach their young children how to properly use the latrine. (It should be noted, however, that the study's selection criteria only included households that currently had latrines, which may contribute to this common perception among participants.) Second, the basic method of physically entering the latrine with the child and teaching him how to properly use it is standard within this context, as are the common strategies of encouragement or caning. Third, while it may take some children longer than others to overcome their fear of the latrine and use it comfortably, it is widely understood that it takes all children some time to use the latrine without making a mess around the floor.

Despite these common similarities in perceptions and behaviors, this study revealed a cultural understanding of toilet training that is at times vague and loosely defined; this is consistent with current literature. Similar to the wide variety of toilet training definitions, techniques, and indicators of success or failure found in many developed countries, toilet training in rural Western Kenya is defined, initiated, and conducted differently among households. While the methods mothers use inside the latrine to teach their children proper toileting behaviors may

be similar, the particulars often vary family to family. Also consistent with the literature is the fact that children learn to use the latrine by example. Older siblings often play a big role in assisting the child in the latrine, especially when the mother is not present. During the LTM intervention, some mothers mentioned that their children who were close in age sometimes went to the latrine together to use the mat, and the older siblings often assisted the younger child in the latrine. Finally, discussionswith mothers in this study showed that latrine training can be a lengthy process that begins with the child being assisted even outside the latrine and results in the child eventually being able to use the latrine on his or her own. This process relies heavily on communication between mother and child so that the mother knows when the child needs assistance in the latrine, and continues this way until the child is fully independent of the mother in his defecation habits.

5.3 Feasibility and Effectiveness of the Latrine Training Mat

5.3.1 Potential for Integrating LTM into Toilet Training Process

The reports from participants of their young children successfully using the latrine training mats have very positive implications for the tool's future use within this context. The LTMs – particularly the #2 and #3 mats – achieved what they were designed to do: they facilitated latrine use among children under five, and addressed the particular issues that often keep children out of the latrine at this age. [The #1 slab was perceived by some non-recipients to potentially be less effective for young children at the beginning of the toilet training process (under the age of five), and this will be discussed in much greater detail later.] Furthermore, the

LTM was able to be used with a mud floor latrine, and could in fact improve the conditions of a mud floor latrine by providing a more sanitary and easily-cleaned surface upon which a child could defecate. Finally, the three prototypes were well-received by mothers and children alike, and the process and methods that mothers used to introduce this tool to their children closely mimicked those that are used in the general toilet training process within this context. This clearly suggests that the LTM could easily be incorporated into the toilet training process that families use – and could, in fact, accelerate the initiation and completion of the process by facilitating exclusive use at an earlier age than might normally be possible.

In addition, the latrine training mat also has the potential to be widely accepted within this context because it has been shown to decrease the mothers' workload. Some of the LTM study participants trained their children to use the tool on their own or to use it with their older siblings. In these cases, the mothers experienced a decrease in their workload because they no longer needed to be available to help their children every time they were pressed. Some of the mothers trained their children to use the tool with their assistance; in these cases, their workload was also lightened because the tool reduced the amount of time they needed to spend cleaning up after the child, and collecting and disposing of the feces was a much simpler process.

Image 12: A child begins to demonstrate using the #1 LTM

Photo by Gabriella Van Schoyck (2011).

As presented in the results chapter and depicted in the conceptual diagram, this study identified three main barriers to latrine use among young children in this context: the child's

Image 13: The #2 LTM covers the latrine's larger hole

Photo by Gabriella Van Schoyck (2011).

fear of the latrine and/or its large hole, the mother's fear that the latrine is an unsafe place for the child due to the large hole and the unsanitary conditions, and the child's tendency to use the latrine incorrectly and make a mess on the latrine floor that would then affect the rest of the latrine's users. During the intervention, the latrine training mat was shown to address each of these barriers and overcome them. First, the smaller hole on the mat reduced children's fear of falling into the hole, and made mothers more comfortable with letting their young children use the larine (see Images 12 and 13).

Next, the mat could be placed on top of an unsanitary latrine floor, thus effectively covering up the mess and providing a clean surface for the children to step

Finally, while the latrine training mat might not necessarily prevent young children from missing the latrine hole and defecating around it, it did make the clean-up and feces disposal process much simpler and faster for mothers; the mat could be easily washed and the child's feces did not permanently contaminate the latrine floor.

In summary, the latrine training mat significantly eliminated these barriers and enabled children even as young as two years old to use the latrine. There is strong indication that this tool is effective and feasible within this context.

However, despite the positive results, this study identified some issues that would need to be addressed before the latrine training mat could be scaled up within the target population, as

well as to other contexts outside of Western Kenya. The following section will discuss some key areas of concern within the results, and will then explore their implications for this study population as well as for the future of the latrine training mat.

5.3.2 Influence of Behavior Change Messaging

The presence of messaging did not appear to have any direct positive effect on participants' perceptions and uses of the LTM. Similar behaviors were exhibited in both the messaging and non-messaging villages; this was the case both for correct and incorrect behaviors and perceptions. For example, some mothers in each village cleaned their mats with all the materials that had been recommended in the messaging (water, soap, and a brush or broom). In this case, the presence of this messaging *may* have had a positive influence on behavior: all the mothers from the messaging village reported using soap, while only some of the mothers in the non-messaging village used soap and others used only water. However, this is not sufficient evidence to suggest that this difference in behavior can be attributed solely to the messaging. Moreover, none of the mothers in either village followed the recommended procedure of cleaning the mats inside the latrine, regardless of whether or not they received messaging about this (except, of course, for those participants who received the #1 slabs that could not be removed from the latrine).

All mothers from both villages understood that the LTM was intended for young children, and realized that it should be used inside the latrine. Also, all the mothers gave similar reports of the methods they used to train their children to use the tool. Finally, even though half of the participants received messaging during the focus group discussion about the design and intended

use of the #1 slab, mothers from both villages expressed the opinion that the slab's hole was potentially too big for children to use before the age of five.

In short, participants from both villages exhibited similar perceptions and behaviors regarding the latrine training mats, regardless of whether or not they had received behavior messaging. Within this study, it must be concluded that messaging did not have a direct impact on how the LTM was adopted or used. However, there are still important implications of behavior messaging for future LTM interventions, and this will be discussed later in this chapter.

5.3.3 Cleaning and Storage

As presented in the previous chapter, participants reported cleaning their latrine training mats regularly; they washed them with water and most often soap, and usually scrubbed them with a rag or brush. The frequency of cleaning varied among participants (some cleaned them after every use, some once a day, some when the mat was visibly dirty). There was also variety in the storage location for the removable mats. Some mothers found it most convenient to store them inside the latrine because their children had easily adapted to using the mats on their own. Other mothers started by storing the mats in the latrine and then began keeping them in the latrine full time. Still others kept the mats in the latrine during the day, but took them into the house at the end of the day for overnight storage. Alarmingly, many mothers kept their training mats inside the house whenever they were not being used. The predominant reason for this – in fact, this was the sole reason in Village 2 – was the fear that the training mats could be stolen if they were stored in the latrine.

This brings up the issue of the training mat's permanence in the latrine. None of the mothers expressed concern that the #1 slabs might be stolen from the latrine, which suggests a perception that the slab's installation into the latrine floor protects it from the risk of theft. Many mothers favored the #1 slab over the removable mats because it was permanently installed in the latrine. They perceived it as a long-lasting sanitation tool, and its permanence made it convenient for mothers.

These perceptions suggest that the #2 and #3 latrine training mats would be more effective – and appealing to mothers – if they did not have the option of being removed from the latrine. Ensuring that the mat is permanent inside the latrine could help further reduce mothers' workload as well as overcoming the risk of theft. Furthermore, the mat's permanence in the latrine could help ensure that proper cleaning and storage procedures be followed (i.e. always cleaning and storing the mat in the latrine). However, permanently affixing the mat inside the latrine may also come with a tradeoff – it necessitates developing an easy, durable, and inexpensive method of placing the mat on and off the hole whenever adults or older children wanted to use the latrine's larger hole. Developing a permanent, child-friendly mat for the latrine may reduce the simplicity and cost-effectiveness of the LTM design.

5.3.4 The Link Between Cleaning and Storage, and Its Implications for Behavior Messaging

As previously discussed, a major concern that may prevent the LTM from being an effective, feasible tool are the risky behaviors surrounding cleaning and storage practices. Some participants did not clean the LTMs after every use, and none of them followed the proper

procedure of washing the LTMs inside of the latrine and then rinsing the dirty water directly into the latrine hole (with the exception, of course, of the participants who received the #1 slabs that remained installed permanently in the latrine floor). Despite the variety in materials and frequencies of LTM cleaning, there was always a clear link between choice of storage spot and frequency and method of cleaning. Mothers tended to clean the mats more frequently and thoroughly when they were being stored inside the house. Some mothers were more relaxed in their LTM cleanings if the mats were kept inside the latrines. This supports the data previously presented about mothers' understanding of the fecal-oral contamination routes, and their attempts to avoid contamination within the home. This carries important implications for addressing these risky storage and cleaning behaviors: their knowledge of diarrheal disease transmission may help mothers understand the riskiness of improper or infrequent cleaning as well as household storage of the mats. If this is so, more explicit behavior messaging might be an effective way of addressing these problem areas. However, current literature as well as data from this study also suggest that a fundamental belief within this context is that children's feces are not a significant health risk to households. In addition, the paucity of data related to hand-washing in this study also suggests that hygiene practices after defecation and/or handling of children's feces are not considered a priority within this context, although this issue was not probed on during data collection. Both of these could be significant barriers that might not be adequately removed with LTM messaging.

5.3.5 LTM Use at Night

It should be noted that the latrine training mat did not result in facilitating latrine use during the night. Even among children who exclusively adopted the LTM during the day, the tool was not used at night, and children continued their regular practice of defecating on the ground beside the house at night and their mothers disposing of the feces in the morning. This suggests that there is a deeper cultural issue at play here; while this was not explored during data collection for this study, it is possible that families within this context do not consider it safe to leave the immediate vicinity of the house at night. Open defecation might be perceived as a more acceptable risk than visiting the latrine during the night due to safety and security issues.

5.3.6 Mothers' Overall Preference for Latrine Training Mat Design

It is evident that the size of the latrine training mat hole is a significant factor in influencing its adoption by both children and their parents. The data indicated that the smaller hole on the removable mats (LTM #2 and #3) reduced children's fear of the latrine pit and enabled them to use the latrine when they might not have otherwise. Consequently, it improved the sanitary conditions in the compound and mothers reported that it lessened their workload. Conversely, while the plastic slab (#1) also improved the sanitary conditions in household latrines, many mothers perceived its larger hole as not being appropriate for children under five. This was emphasized by mothers' opinion that the #2 and #3 mats were more appropriate for children under five, and the #1 slab for children five and older.

Yet despite this belief, all the study participants indicated an overall preference for the #1 slab and specifically its advantages as being permanent in the latrine as well as available for use

by the entire family, not just young children. This demonstrates a clear tension mothers may have had between wanting a tool that would help their younger children use the latrine at an earlier age, and a tool that would perhaps provide more immediate and greater overall benefits to their household.

The reasons for mothers' overall preference of the #1 slab cannot be ignored, and the slab has great potential as a household sanitation tool. It was valued by mothers and other household members, admired by young children, and considered by participants to be extremely durable. Its permanence in the latrine ensures that all cleaning and storage of the tool takes place exclusively inside the latrine, thus containing the household's exposure to fecal contamination. In addition, because it is a tool that can be used by adults and older children, it may help facilitate the toilet training process among young children by allowing them to follow the example of their older family members. Finally, the size and shape of the slab's hole (18 cm and key-shaped) is smaller and more stable than many latrine holes found in this context, which means that it could be a safer sanitation tool for children under five. However, it was still not used to its full potential within the study population because, despite all these advantages, mothers still perceived it to be inappropriate for use by children under five. The next chapter will explore ways in which this barrier and other challenges can be addressed in the future, particularly through more focused and explicit behavior change messaging.

5.3.7 Limitations of the Study

Each of the three prototypes was only piloted in four households for one week; due to this small sample size and short time period, it was at times difficult to establish patterns in

participants' behaviors and perceptions surrounding each of the prototypes. There was a great deal of data about the latrine training mat in general, but sometimes more limited data about each of the three protoypes in particular; this too was due to the fact that there were only four participants representing each of the three prototypes. It was also not possible to identify participants' behaviors and practices over the long term. In addition, the field officers that collected the data were inexperienced in qualitative research methods, verbatim transcription, and simultaneous transcription and translation. Because of this, the data were at times thin and lower in quality than was desired. Finally, due to an inadvertent omission of the behavior messages related to LTM storage, the effect of messaging on participants' storage practices was not adequately measured.

Chapter 6: Recommendations and Conclusions

6.1 Contribution to the Literature

As previously mentioned, there is a dearth of literature on the defecation practices of young children throughout the developing world, as well as many ambiguities surrounding the methods in which households dispose of these children's feces and subsequently begin to train the children to use the latrine. The results of this study provide valuable insight into the ways in which these practices occur within the context of rural Western Africa, where diarrheal disease is prevalent, pit latrines with mud floors are a standard form of sanitation infrastructure, and exclusive latrine use is not common among children under five. Because these three characteristics can also describe many contexts outside of rural Western Kenya, this study's findings could potentially give insight into children's defecation practices in similar contexts as well. A visual summary of these findings is shown in Appendix A.

6.2 Implications and Recommendations for Future LTM Promotion and Marketing Efforts

6.2.1 Improved Behavior Messaging

As discussed in Chapter 2, the WHO/UNICEF Joint Monitoring Program (JMP) define pit latrines with slabs as a form of improved sanitation, while pit latrines without slabs are still considered unimproved. Many sanitation initiatives focus on increasing improved sanitation coverage within a population, but often do not emphasize behavior change to ensure that this

infrastructure is actually being used by the recipients. Furthermore, many sanitation initiatives do not reach children under five and instead focus only on adult members of the household. One of the benefits of the #1 LTM slab is that it has the potential to not only provide the household with access to improved sanitation, but also to facilitate its use by *all* family members, including young children. This advantage was well recognized by LTM study participants. With so many perceived benefits in its favor, it is important to consider how potential recipients' concerns about the hole size of the #1 slab could be overcome in the future. Because those who received the #1 slab reported very positive experiences overall, while those who received other versions remained skeptical about its appropriateness, it is possible that more structured and intentional messaging about the safety and feasibility of the #1 slab for young children could potentially remove this barrier to its use among the target population. Even though it was unclear if the presence of behavior messaging had any direct positive effect on participants' correct use of any of the latrine training mat prototypes, there is the potential that many of the key problem areas that kept the LTM from being fully effective could be overcome by more focused and explicit messaging.

A potential strategy that should be explored in the future is to revise the behavior messaging to emphasize key points in greater detail: such as the size of the #1 being safe for young children (potential strategies could include physically demonstrating the impossibility of a child falling through the slab's hole), as well as the necessity of cleaning and storing the LTM inside the latrine at all times (emphasizing why this is important, and troubleshooting potential barriers to this that households might face, such as latrine security). Because of the limited mention of hand-washing as a common practice within this context, as well as the risk of fecal

contamination when young children and/or their mothers handle the latrine training mats, there should also be explicit messages about the importance of hand-washing following use of the LTM. Finally, the delivery of the behavior messaging could also be more interactive (such as a discussion with recipients), visually stimulating (using photos instead of a verbal explanation), or accompanied by cues to action (such as giving the household signs or calendars to hang in or near the latrine, that display the key messages of the LTM campaign).

6.2.2 Modifications to the LTM Design

A different option for making the latrine training mat more accepted and feasible for the future would be to significantly modify the #2 and #3 prototypes. There were also specific features on each of the three prototypes that mothers found beneficial and recommended for future versions of the mat: a metal handle (LTM #3), raised footings (#1), and made of plastic for greater durability (#1 and #2). It would also be important to develop a strategy to make the mats permanent in the latrine. It remains to be seen if this should be done by permanently installing the mats into the structure of the latrine (either in replacement of, or in addition to, the existing hole used by adults), or by more directly addressing the fear of theft and working to improve latrine security.

6.2.3 Targeting Mothers

This study highlighted the fact that, although children under five are the target population for LTM use, their mothers should also be considered part of the target population for this tool. Mothers in this context are directly affected by their children's defecation practices – they are the

ones primarily responsible for monitoring their young children's defecation, disposing of the feces after every defecation event, and negotiating the toilet training process. Their workload is greatly affected by this stage in their children's lives, and the latrine training mat has the potential to significantly reduce this workload by not only lessening their children's dependence on their assistance during defecation, but also by providing a cleaner home environment. For this reason, future initiatives to scale up LTM promotion should focus on persuading mothers that the latrine training mat is a valuable and effective tool. Mothers in this context have the most decision-making power in regards to the defecation practices of their young children because they are the children's primary caretakers during this process. Thus their acceptance of the LTM can be extremely influential towards their children's acceptance of the tool as well.

When reaching out to mothers to persuade them of the benefits of the latrine training mat, it is important to remember that pride is an important concept for mothers in this context. A mother values latrines for two main reasons. First, mothers take pride in having a clean household environment, and latrines help keep the compound clean. Second, latrines are considered a sign of social status, and help reduce the presence of feces around the compound, which would be an embarrassment in front of visitors. Having an attractive tool that improves conditions in the latrine and in the family compound, makes it safe for the whole family to use the latrine (young children as well as adults), and reduces the mother's workload could be extremely appealing to mothers. Presenting mothers in this context with the latrine training mat and appealing to their sense of pride in providing a clean environment for their family could greatly facilitate LTM adoption.

Finally, many mothers in rural Western Kenya understand the concept of germs and have an awareness of the fecal-oral route of diarrheal disease transmission. This study revealed an interesting paradox of mothers' chosen defecation behaviors for their children (for example, structured open defecation and limited hand-washing) contradicting their knowledge of fecal contamination. While the reason for this contradiction is unclear, it could be because mothers do not perceive their children's feces to be as dangerous as those of adults. It could also be due to a lack of other safe defecation options for their children, since the latrine is often considered unsuitable. The latrine training mat has the potential to resolve this dilemma by making the latrine a safer place for young children, and mothers' existing understanding of germs and disease transmission make them prime targets for LTM promotion because they can easily understand the benefits this tool would provide.

6.2.4 Summary of Recommendations for the WASH-LTM Project

- Improve LTM communication to emphasize a set of specific messages and behaviors for mother (including messages about cleaning, storage, hand-washing, significance of LTM for reducing the risk of diarrheal disease transmission, and the appropriate age range of users)
- Address the issue of LTM hole size by improving messaging about the safety of the #1 slab
- Design an improved prototype based on the recommendations of study participants; the prototype should include a metal handle at the top of the mat for balance, raised footings

on each side of the hole for proper positioning, a surface made of durable material, and a mat that can be kept permanently inside the latrine

- Target mothers of young children as the primary population for all LTM promotion and marketing efforts

6.2.5 Further Research

The results of this study can be used to inform future Latrine Training Mat studies, both in Western Kenya and in other countries. It is recommended that the LTM design and delivery method be improved, followed by further qualitative research to identify if the tool continues to overcome barriers to latrine use among children under five. Quantitative research is needed to definitively measure the risk reduction of fecal contamination within the household due to LTM use. Further research should be also be conducted to see if this tool is would be effective and feasible within other contexts outside of Western Kenya.

Finally, it would be helpful to conduct follow-up visits to the twelve households that participated in this study. The purpose of these visits would be to monitor LTM use over the long term, discuss participants' experiences with the training mats over time, and check the durability of each prototype.

6.3 Conclusions

Results from this study indicate that the latrine training mat was an effective tool for facilitating latrine use among children under age five within this study population, and is

potentially feasible for scale-up within the context of rural Western Kenya because it accommodates local practices surrounding child defecation, feces disposal, and toilet training. Furthermore, it is able to be used in pit latrines with mud floors, which is a common type of sanitation infrastructure in this region. The concept of the latrine training mat was originally created as a means of providing a safe, stable, and easy-to-clean surface for young children to use in the latrine without the fear or risk of falling through the hole. This concept was accepted by all study participants, regardless of which prototype they received; there is now only a need to furher refine the specific designs that are most appropriate for different contexts.

This study indicated that, within the context of rural Western Kenya, there are some key limitations and weaknesses in the mat's design that must be addressed before the latrine training mat can be scaled up to a larger population. The ability for the mats (prototypes #2 and #3) to be removed from the latrine allowed for incorrect storage and cleaning practices, and mothers preferred an LTM design that would ensure the mat's permanence inside the latrine. The permanent slab was well-liked by participants, and has great potential for facilitating household-wide use of an improved sanitation infrastructure, but it might have difficulty reaching the target population of children under five until the perception that the slab's hole is too large for young children can be overcome.

The identification of these limitations can facilitate future revisions to the LTM design and delivery method, and can increase the possibility of this tool being scaled up in Western Kenya and other contexts. The perceived benefits of the LTM significantly outweigh the challenges, and the concept of the latrine training mat has great potential for increasing latrine

use among young children. Consequently, this could lead to not only a decrease in household exposure to fecal contamination, but a decrease in the burden of diarrheal diseases as well.

References

American Academy of Pediatrics. (2011) "Ages and Stages." Retrieved from http://www.healthychildren.org/English/ages-stages/Pages/default.aspx on November 21, 2011.

Baltazar, J. & Solon, F. (1989). Disposal of faeces of children under two years old and diarrhea incidence: a case control study. *International Journal of Epidemiology*. 18(Supplement 2): S16-219.

Bartram, J. & Cairncross, S. (2010). "Hygiene, Sanitation, and Water: Forgotten Foundations of Health" accessed from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2976722/?tool=pmcentrez#pmed.1000367-WHO1 on November 13, 2011.

Cairncross, S., Hunt, C., Boisson, S., Bostoen, K., Curtis, V., Fung, I. & Schmidt, W-P. (2010). Water, sanitation and hygiene for the prevention of diarrhea. *International Journal of Epidemiology*, 39(suppl 1): i193-i205.

Charmaz, K. (2006). *Constructing grounded theory: A practical guide through qualitative analysis*. (1 ed.). London: Sage Publications, Ltd.

Choby, B. & George, S. (2008). Toilet training. *Am Fam Physician*, 78(9):1059-1064. Retrieved from http://www.aafp.org/afp/2008/1101/p1059.html on May 24, 2011.

Curtis, V. & Cairncross, S. (May 2003) "Effect of washing hands with soap on diarrhoea risk in the community: a systematic review" *The Lancet*, 3: 275-281.

Curtis, V., Cairncross, S. & Yonli, R. (2000), Review: Domestic hygiene and diarrhoea – pinpointing the problem. *Tropical Medicine & International Health*, 5: 22–32.

Curtis, V., Kanki, B., Mertens, T., Traore, E., Diallo, I., Tall, F., & Cousens, S. (1995). Potties, pits and pipes: Explaining hygiene behaviour in Burkina Faso. *Social Science & Medicine, 41*(3): 383-393.

Dabire, L., Osei, M., Seidu, A. & Musah, I. (No date) "Abandoning open defecation: comparison and adaptation of social change dynamics." WaterAid Briefing Note. Retrieved from http://www.wateraid.org/documents/plugin_documents/social_transformation_study_briefing_note.pdf on November 14, 2011.

deVries, M.W. & deVries, M.R. (1977). Cultural relativity of toilet training readiness: a perspective from East Africa. *Pediatrics*, 60(2):170-177. Retrieved from http://pediatrics.aappublications.org/content/60/2/170 on November 27, 2011.

Esrey, S., Potash, J., Roberts, L., & Shiff, C. (1991) Effects of improved water supply and sanitation on ascariasis, diarrhoea, dracunculiasis, hookworm infection, schistosomiasis, and trachoma. Bulletin of the World Health Organization, 69(5): 609-621.

Fewtrell, L., Kaufmann, R., Kay, D., Enanoria, W., Haller, L., & Colford, J. (2005). Water, sanitation, and hygiene interventions to reduce diarrhoea in less developed countries: A systematic review and meta-analysis. *Lancet Infect Dis*, 5(1): 42-52.

Foxx, R.M. & Azrin N.H. (1973). Dry pants: A rapid method of toilet training children. *Behaviour Research and Therapy*, 11(4): 435-442. Retrieved from http://www.sciencedirect.com/science/article/pii/0005796773901022 on November 28, 2011.

Gil, A., Lanata, C., Kleinau, E., & Mary, P. (2004) *Children's feces disposal practices in developing countries and interventions to prevent diarrheal diseases: a literature review*. Environmental Health Project (EHP).

Humphrey, J. (2009). Child undernutrition, tropical enteropathy, toilets, and handwashing. *Lancet* 2009; 374: 1032–35.

Huttly, S., Lanata, C., Yeager, B., Fukumoto, M., del Aguila, R., & Kendall, C. (1998). Feces, flies, and fetor: findings from a Peruvian shantytown. *Rev Panam Salud Publica*, 4(2): 75-79.

Jenkins, M.W. (September 2004) *Who Buys Latrines, Where and Why?* Field Note. Water and Sanitation Program – Africa. The World Bank, Nairobi, Kenya. Retrieved from http://www.bvsde.paho.org/bvsacd/sedapal/buys.pdf on November 21, 2011.

Jenkins, M. & Sugden, S. (2006) Rethinking sanitation: Lessons and innovation for sustainability and success in the new millennium. *Human Development Report 2006.* United Nations Development Programme.

Kar, K. & Chambers, R. (2008). *Handbook on Community-Led Total Sanitation.* Institute of Development Studies, Plan UK. Retrieved from http://www.communityledtotalsanitation.org/sites/communityledtotalsanitation.org/files/cltshandbook.pdf on November 18, 2011.

Klassen, T.P., Kiddoo, D., Lang, M.E., Friesen, C., Russell, K., Spooner, C., & Vendermeer, B. (December 2006). The effectiveness of different methods of toilet training for bowel and bladder control. Evidence Report/Technology Assessment No. 147. (Prepared by the University of Alberta Evidence-based Practice Center, under contract number 290-02-0023). AHRQ Publication No. 07-E003. Rockville, MD: Agency for Healthcare Research and Quality.

Kenya National Bureau of Statistics (KNBS) and ICF Macro. 2010. *Kenya Demographic and Health Survey 2008-09*. Calverton, Maryland: KNBS and ICF Macro, p. 135.

Lanata, C., Huttly, S., & Yeager, B. (1998) Diarrhea: whose feces matter? Reflections from studies in a Peruvian shantytown. *The Pediatric Infectious Disease Journal*, 17(1): 7-9.

Luxem, M., & Christophersen, E. (1994). Behavioral toilet training in early childhood: Research, practice, and implications. *Developmental and Behavioral Pediatrics*, 15(5):370-378.

Mertens, T., Jaffar, S., Fernando, M.A., Cousens, S.N., & Feachem, R.G. (1992) Excreta disposal behavior and latrine ownership in relation to the risk of childhood diarrhea in Sri Lanka. *International Journal of Epidemiology.* 21(6):2257-1164.

Montgomery, M. & Elimilech, M. (January 2007). Water and Sanitation in Developing Countries: Including Health in the Equation. *Environmental Science and Technology*. Retrieved from http://pubs.acs.org/doi/pdf/10.1021/es072435t on November 10, 2011.

Personal communication: Christiano, C., "WASH Benefits focus group discussions: summary report." Innovations for Poverty Action, May 2010.

Personal communication: Innovations for Poverty Action. "Focus group survey: training mats" IPA WASH Benefits Project, August 20, 2010.

Stadtler, A., Gorski, P., & Brazelton, T.B. (1999). Toilet training methods, clinical interventions, and recommendations. *Pediatrics* 103(6):1359-1361.

Traore, E., Cousens, S., Curtis, V., Mertens, T., Tall, F., Traore, A., Kanki, B., Diallo, I., Rochereau, A., Chiron, J-P., & Megraud, F. (1994). Child defecation behavior, stool disposal

practices, and childhood diarrhea in Burkina Faso: Results from a case-control study. *Journal of Epidemiology and Community Health,* 48:270-275.

UN Millennium Project 2005. *Investing in Development: A Practical Plan to Achieve the Millennium Development Goals. Overview.* Retrieved from http://www.unmillenniumproject.org/documents/overviewEngLowRes.pdf on March 14, 2012.

UNICEF. (No date) "Access to water and sanitation: a few definitions." Retrieved from http://www.unicef.org/wcaro/overview_2570.html on November 15, 2011.

Vermandel, A., Van Kampen, M., Van Gorp, C., & Wyndaele, J-J. (2008). How to toilet train healthy children? A review of the literature. *Neurourology and Urodynamics*, 27:162-166.

Wagner EG & Lanoix JN (1958). Excreta Disposal for Rural Areas and Small Communities. WHO Monograph series No 39, WHO, Geneva.

World Health Organization. (No date). "10 facts on sanitation." Retrieved from http://www.who.int/features/factfiles/sanitation/facts/en/index.html on May 23, 2011.

World Health Organization. (August 2009). "Diarrhoeal disease." Fact Sheet No. 330. Retrieved from http://www.who.int/mediacentre/factsheets/fs330/en/index.html on September 12, 2011.

WHO Media Centre news release. (17 July 2008). "2.5 billion people live with poor sanitation facilities." Retrieved from http://www.who.int/mediacentre/news/releases/2008/pr23/en/ on November 13, 2011.

World Health Organization. Improving water and sanitation hygiene behaviors for the reduction of diarrhoeal disease: the report of an informal consultation. WHO/CWS/90.7, WHO/CDD/93.5. Basel. WHO, 1993. Retrieved from http://whqlibdoc.who.int/hq/1993/WHO_CWS_93.10.pdf on November 18, 2011.

World Health Organization and UNICEF Joint Monitoring Programme (JMP). (2012). Progress on drinking water and sanitation: 2012 update. Retrieved from http://www.wssinfo.org/fileadmin/user_upload/resources/JMP-report-2012-en.pdf on March 15, 2012.

WHO / UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation. (No date). "The drinking-water and sanitation ladders." Retrieved from http://www.wssinfo.org/definitions-methods/watsan-ladder/ on November 15, 2011.

WHO Water Sanitation and Health (WSH). (No date). "Fact sheet 3.4: Simple pit latrines." Fact Sheets on Environmental Sanitation. Retrieved from

http://www.who.int/water_sanitation_health/hygiene/emergencies/fs3_4.pdf on November 23, 2011.

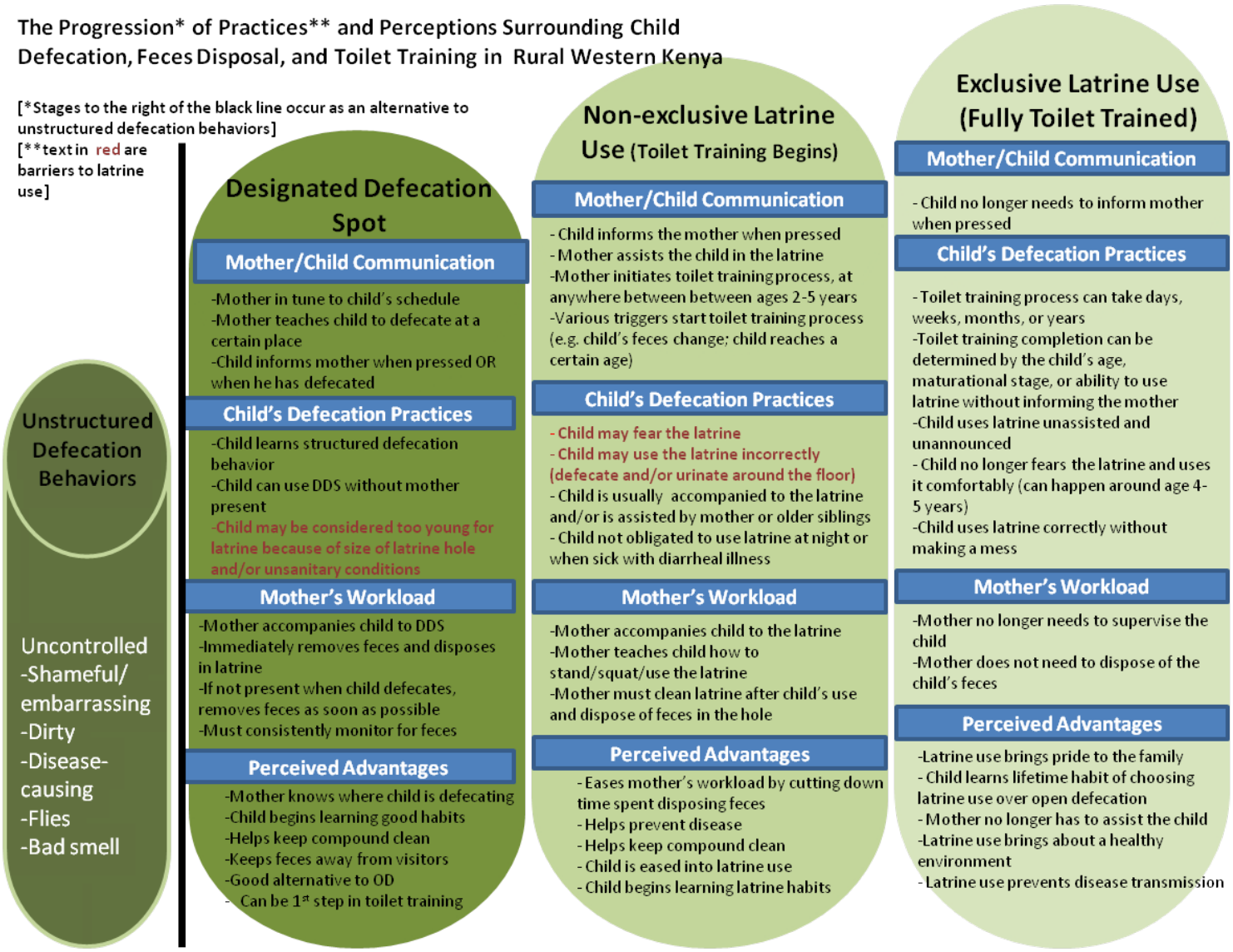
WHO Water Sanitation and Health (WSH). (No date). “Fact sheet 3.5: VIP and ROEC latrines.” Fact Sheets on Environmental Sanitation. Retrieved from http://www.who.int/water_sanitation_health/hygiene/emergencies/fs3_5.pdf on November 23, 2011.

World Bank. (19 July 2010) “40 percent of world population do not use improved sanitation facilities.” Retrieved from http://data.worldbank.org/news/40prct-wrld-pop-dont-use-imprvd-sanitation on November 23, 2011.

Yeager, B.A; Huttly, S. R; Bartolini, R; Rojas, M; and Lanata C. F. (1999). Defecation practices of young children in a Peruvian shanty town. *Soc.Sci.Med.* 49(4):531-541.

Appendices

Appendix A: Visual Summary of the Defecation Practices of Children Under Five in Rural Western Kenya



This diagram, when examined from left to right, charts the progression of defecation practices from the time a child is very young and still considered unfit to use the latrine, until the time he has achieved full latrine use. The column on the far left, “Unstructured Open Defecation,” is separated from the other three columns by a black line, which represents that unstructured OD is considered within this context to be unsavory and not ideal. In contrast, the practices detailed in the three columns are the right are all alternatives to open defecation, and when moving from left to right they progress from exclusively childlike defecation behaviors (such as using designated defecation spots) to more adult-like behaviors (using the latrine). Each stage of progression is examined in terms of 4 key themes: the nature of communication between mother and child, the specific defecation behaviors that children exhibit during that stage, the impact on the mother’s workload, and the perceived advantages of that stage over the other stages to its left. Finally, those items listed in red on the diagram represent issues that can impede a child from immediately moving to the last column on the far right (exclusive latrine use).

Appendix B: IDI Guide

Pre-Intervention In-Depth Interview Guide – Mothers
Latrine Training Mat Project

Inclusion/exclusion criteria

3. *All participants need to be a mother or a caretaker (someone who spends more than six hours a day caring for a child) of a child of "toilet-training age" (approximately aged 2-5)*
4. *All participants must fit one or more of these categories:*
    - *<u>Relationships of households in the compound:</u> Participant is living in a compound with several related families who also have children of the eligible age <u>OR</u> living in a compound with several families who have no familial relationships but who have children of the eligible age*
    - *<u>Number of latrines</u>: Participant is living in a compound with a single latrine <u>OR</u> living in a compound with multiple latrines*
    - *<u>Mother's experience with potty-training</u>: Participant is currently potty-training but also has previously potty-trained children who are now older <u>OR</u> participant is potty-training for the first time*

Goal

1) *To understand child defecation/urination and feces disposal practices in rural Western Kenya from a child's infancy until age 5, with an emphasis on ages 2-5*

Objectives:

1) To understand the caregiver's/mother's thoughts and perceptions about her children's defecation and urination practices, as well as her own role in these practices
2) To gain an in-depth understanding of the process involved in the caretaker's disposal of her children's feces
3) To gain an in-depth understanding of the caretaker's attitudes and approach to toilet-training her young children

<u>Section 1: Welcome & Informed Consent</u>

Read the following paragraph to the respondent in Kiswahili, and ask if he or she agrees to participate.

Read: I would like to thank you for agreeing to speak with me today; I appreciate your time. My name is _____and I am from Innovations for Poverty Action (IPA) a research based organization, in Busia Town.

I would like to have a conversation with you today about your thoughts and opinions about child defecation and feces disposal practices, as well as discuss with you a new tool that we are hoping to develop to help with child sanitation. As a caretaker of young children, your opinion on these topics is very valuable to us. Even if you do not have direct experience with some of the questions or scenarios we would like to know your opinions based on your knowledge of community practices. The information that you provide will help us improve programs in communities like yours; there are no right or wrong answers.

I will keep everything that you tell me private and confidential, and will not talk to other people about what you have said. I will also keep you and your family's names confidential, and not tell anyone that you have talked to me. Your answers will not affect the assistance that IPA may or may not provide to your community or your family. If you have any questions about this, you can call us at our IPA office in Busia town. The number is 0726709525. You may flash our number and we will call you back to respond to any questions or concerns you may have. All answers will be kept private. Participation is voluntary and there is no need to answer any question that you do not want to; however, what you do say will be very important to us.

- I would like to use a voice recorder; the recorder will only record our voices. It does not take any pictures. I use the recorder because it ensures that we gather all of your opinions and thoughts. The recordings are confidential and will not be shared with anyone outside of the research team.

- I think that this conversation should last between 45 and 60 minutes. I look forward to hearing your thoughts and opinions whatever they may be.

- I have a list of topics that I would like us to talk about, but please feel free to bring up any other issues that you think are important to this conversation. Shall we begin?

- Your participation is voluntary and you are free to end this conversation at any time. However, we hope that you will stay for the whole discussion because your thoughts and opinions are valuable to this project.

- We will begin recording now.

Section 2: Background Information

Date (dd/mm/yyyy): |_|__|/|_|__|/|_|__|_|__|

Interviewer ID/Name: |_|__|_|__|/_____

Village: _____ Village ID number: |_|__|_|__|

Division: _____ District: _____

Location: _____ Sub-location: _____

1. Respondent's full name: _____
2. Name of head of compound: _____
3. Role of respondent in household (circle one): Mama Caretaker
4. How many people live in your compound? _____ (total number, including children)
5. Number of children under 7 in compound: _____ (total number)

Section 3: Opening Questions

First, I am going to ask you a few quick, basic questions about your family and home. Then, in a couple of minutes, I am going to ask some more in-depth questions that we can discuss in more detail.

1. How many children do you have?

2. At what age range would you consider a child to be "young"? [Probe: At what age range should a child be considered "older"?]

3. How old is each child that you have listed?
   Child 1: _____ Child 2: _____ Child 3: _____

   Child 4: _____ Child 5: _____

   (if more children, list below)

4. How many latrines do you have in your compound? [Probe: Are there some latrines that are not used/should not be used by children?]

5. What type of latrine do you have? [Probe: mud floor? Mud superstructure? (ask FOs for correct terminology)]

Section 4: Key Questions

Okay, thank you so much for this information. Now I would like to begin discussing some topics in more detail.

Children's Defecation Practices

6. Can you describe the locations where your child defecates? [Probe: If more than one child, are there differences according to age? In a nappy; on the ground; in a hole; in the latrine? Differences in day or night?]

7. Can you describe the differences between where your young child and older children defecate? [Probe: Difference at home or elsewehere?]

8. Can you explain where you encourage your children to defecate? [Probe: Why? How does the child's age affect where you encourage him/her to defecate? Alternatively, where do you discourage him/her from defecating? Why?]

Latrine Use

1. Can you describe children's latrine use? [Probes: When does it start? Why or why not? Older child(ren) vs younger child(ren)? What about your child(ren) in particular? If yes, at what age did your child begin using the latrine?]

2. Can you explain the risks or disadvantages to young children using the latrine? [Probe: Any specific examples from your child?]

3. Can you describe the advantages to young children using the latrine? [Probe: Any specific examples from your child?]

4. Can you describe the preferred places for young children to defecate? [Probe: Why? Different based on age?]

Disposal of Children's Feces

1. Can you describe what happens after your child defecates? [Probe: disposal; where; why; time of day]

Toilet-Training Practices

For Subgroup 1: Mothers who are currently potty-training but who have also previously potty-trained children

1. Can you describe to me your previous experience with toilet-training? [Probe: how many children? Have you begun toilet training your young child?]

2. Can you describe the toilet training process you use, from the time your child is not at all toilet trained until the time that he is fully trained? [Probe: What is the timeframe for this?]

3. Can you explain the methods and tools are you using? [Probes: Do they use potties? Give rewards for good behavior; reprimands for failure? Role models?]

4. How would you compare your current toilet-training practices with those you used for your older children? [Probe: Differences? Similarities?]

5. Can you describe what it means to be fully toilet-trained? [Probes: At what age? How frequently would a child have to use the potty or latrine each day to be considered fully toilet-trained?]

6. At what age do you begin teaching your child to use the latrine? [Probes: When you first introduce the latrine, do you assist the child in the latrine, or do you encourage him to use it himself? How long do you assist the child before he begins to use the latrine himself?]

7. What have been some of the positive and negative experiences you have encountered in toilet-training your children? [Probe: Barriers? Advantages?]

For Subgroup 2: Mothers who are currently potty-training for the first time

8. Please describe when you began toilet training your child. [Probe: Why?]

9. What methods and tools are you using? [Probes: Do they use potties? Give rewards for good behavior; reprimands for failure? Role models?]

10. Can you explain why you decided to toilet train your child in this way?

11. At what age did you begin training your child to use the latrine? [Probes: When you first introduce the latrine, do you assist the child in the latrine, or do you encourage him/her to use it him/herself? How long do you assist the child before he/she begins to use the latrine him/herself?]

12. How would you define being fully toilet-trained? [Probes: At what age? How frequently would a child have to use the potty or latrine each day to be considered fully toilet-trained?]

13. What have been some of the advantages and positive experiences you have encountered in toilet-training your children? [Probe: What have been some of the barriers or challenges you have encountered?]

Section 5: Closing Questions

1. What do you feel are the benefits of latrines for the household? [Probe: For young children? The disadvantages?]

2. What do you think needs to change in order for your young children to use the latrines more? [Probe: change in children's attitude toward latrines; change in safety of latrine; change in cleanliness of latrine, etc]

Before we close, is there anything else you would like to add about these topics that we have discussed?

Thank you so much for your time. I really appreciate all the information that you have given me. Before I leave, I would like to introduce a new invention that may make it easier for children to use the latrine and may help you train them to practice good sanitation.

Section 6: Introduction to Latrine Training Mat Prototype

For Wave 1:

This is a new child sanitation tool that we are in the process of developing. It is specifically for young children. Would you be willing to participate in a study that we are conducting? You would use this tool with your young child(ren) for 1 week, and then have a follow-up discussion with me about it afterwards. The information that you provide will help us improve the design of this tool, and will help us determine if this is would be a good sanitation tool for this area. Are you willing to participate in this study?

If the mama/caretaker agrees, leave the LTM prototype with her and agree upon a day and time for the follow-up interview in one week's time. If the mama/caretaker does not agree to participate in the pilot intervention, thank her for her time and for her insights, and end the interview.

For Wave 2:

This is a new sanitation tool that we are in the process of developing specifically for young children. It is called a latrine training mat, and its purpose is to help young children learn to use the latrine in a safe and non-threatening way at an earlier age.

The latrine training mat is placed over the latrine hole, making a smaller hole that is a more appropriate size for a small child to use. Caregivers can help young children lift and position the mat if they are not old enough to do it themselves.

Children can squat over this hole to relieve themselves. Afterwards, the training mat should be cleaned by rinsing water on and around it and then into the latrine hole. The training mat should be stored inside the latrine at all times. This is important, because bringing it into the house would introduce contamination from the latrine into the home.

Do you have any questions about this latrine training mat?

We are conducting a study to determine if the latrine training mat is a good sanitation tool for this area. Would you be willing to participate in this study? You would do so by using the latrine training mat with your young child for 1 week, and then having a follow-up discussion with me afterwards. It is very important that you follow all the guidelines that I've just explained when using the latrine training mat. The information that you provide will help us improve the design of this tool, and will help us determine if this is would be a good sanitation tool for this area. Are you willing to participate in this study?

If the mama/caretaker agrees, leave the LTM prototype with her and agree upon a day and time for the follow-up interview in one week's time. If the mama/caretaker does not agree to participate in the pilot intervention, thank her for her time and for her insights, and end the interview.

[Refer to messaging script here for how to introduce the latrine training mat]

Appendix C: Messaging Scripts for Village 1 (no-messaging)

LTM - Permanent Plastic Slab Installation
(no messaging)
[To be communicated to participant before delivery and/or installation of LTM]

- This is a new child sanitation tool that we are in the process of developing. It is specifically for young children to use in the latrine.

- Would you be willing to participate in a study that we are conducting? We could leave you with this tool so that you could try using it in your latrine with your young child(ren) for 1 week, and then have a follow-up discussion with other participating mamas about it afterwards.

- You will be able to keep the tool at the end of the study.

- The information that you provide will help us improve the design of this tool, and will help us determine if this is would be a good sanitation tool for this area. Are you willing to participate in this study? *[Have participant give verbal consent here.]*

[If the mama/caretaker gives verbal consent, explain that there will be a follow-up focus group discussion with all participants in one week, and that the village elder will contact her with the time and place of the meeting. If the mama/caretaker does not agree to participate in the pilot intervention, thank her for her time and for her insights, and end the interview.]

- We have brought a fundi to permanently install this in your latrine. It should take him about an hour to complete.
- Are you willing to have this permanently installed? *[get verbal consent from the participant here]*
- We would also like to obtain permission from the compound head before we install this. *[get verbal consent from compound here]*

LTM – Removable Wooden and Plastic Mat Installation
(no messaging)
[To be communicated to participant before delivery and/or installation of LTM]

- This is a new child sanitation tool that we are in the process of developing. It is specifically for young children to use in the latrine.

- Would you be willing to participate in a study that we are conducting? We could leave you with this tool so that you could try using it in your latrine with your young child(ren) for 1 week, and then have a follow-up discussion with other participating mamas about it afterwards.

- You will be able to keep the tool at the end of the study.

- The information that you provide will help us improve the design of this tool, and will help us determine if this is would be a good sanitation tool for this area. Are you willing to participate in this study? *[Have participant give verbal consent here.]*

[If the mama/caretaker gives verbal consent, explain that there will be a follow-up focus group discussion with all participants in one week, and that the village elder will contact her with the time and place of the meeting. If the mama/caretaker does not agree to participate in the pilot intervention, thank her for her time and for her insights, and end the interview.]

- We have brought a fundi to permanently install this in your latrine. It should take him about an hour to complete.
- Are you willing to have this permanently installed? *[get verbal consent from the participant here]*
- We would also like to obtain permission from the compound head before we install this. *[get verbal consent from compound here]*

Appendix D: Messaging Scripts for Village 2 (messaging)

LTM Messaging: Permanent Plastic Slab

[To be communicated to participant before delivery and/or installation of LTM]

Introduction

The last time I visited here, we talked about your child's defecation practices, and the toilet training strategies that you are using with your young children. Today, I would like to show you a sanitation tool that IPA is developing specifically with young children in mind. It is called a **latrine training mat**, and its purpose is to help young children learn to use the latrine in a safe and non-threatening way at an earlier age. ("Chombo cha kufundisha watoto kutumia choo" = a tool used to train children on latrine use)

Description of the Latrine Training Mat

- This is a slab that is permanently installed in a mud floor latrine. A *fundi* installs it by packing mud around the slab, so that the top of the slab is level with the rest of the latrine floor.
- There are raised foot placements on each side of the hole to demonstrate where to stand on the slab.
- The lid should be removed before use, and then placed back over the hole after use.
- The slab is made of thick plastic so that it can support the weight of both children and adults. This slab is intended to be used by the whole household, adults and young children alike.

Would you like to stand on it to see how stable it is? *[Give the mama the opportunity to feel the plastic slab and/or step on it.]*

Would you bring your child so he/she can try standing on it? *[Have the child try standing on it and/or squatting on it.]*

Do you have any questions about how this should be used?

Cleaning

- The training mat can be easily cleaned by simply splashing water onto the surface of the mat directly. The water can then drain into the latrine's pit.
- You should clean the surface of the mat with Omo and a brush or broom, and let the water drain into the latrine pit.
- You should clean the surface of the mat in this way after every use.

Conclusion

- This sanitation tool could be very beneficial for helping grow and nurture your children, and teaching them good sanitation habits from an early age. It could also help improve the health and wellbeing of your entire family.

- Imagine that a child uses the latrine, and leaves feces on the latrine floor around the hole. Then, when another child comes in to use the latrine, his foot comes into contact with some of the feces. This causes contamination, which can lead to diarrheal diseases for your children. This training mat can help prevent this from happening by eliminating contact with feces.

- Imagine that a young child is too afraid to use the latrine because of the large hole, so he defecates in the yard of the compound. Then he begins playing with the feces, or accidentally steps in the feces later on. This too can lead to diarrheal diseases. The training mat provides a smaller hole so that children can freely use the latrine, thus reducing open defecation within the compound.

- Do you have any questions about this latrine training mat?

- We are conducting a study to determine if the latrine training mat is a good sanitation tool for this area. Would you be willing to participate in this study? You would do so by using the latrine training mat with your young child for 1 week, and then having a follow-up discussion with other participating mamas afterwards.

- If you agree to participate, it is very important that you follow all the guidelines that I've just explained when using the latrine training mat. The information that you provide will help us improve the design of this tool, and will help us determine if this is would be a good sanitation tool for this area. Are you willing to participate in this study? *[Have participant give verbal consent here.]*

- We have brought a fundi to permanently install this in your latrine. It should take him about an hour to complete.

- Are you willing to have this permanently installed? *[get verbal consent from the participant here]*

- We would also like to obtain permission from the compound head before we install this. *[get verbal consent from compound here]*

[If both the mama and the compound head give verbal consent, leave the LTM prototype with the mama and explain that there will be a follow-up focus group discussion with all participants in one week, and that the village elder will contact her with the time and place of the meeting. If the mama/caretaker does not agree to participate in the pilot intervention, thank her for her time and for her insights, and end the interview.]

LTM Messaging: Removable Plastic Mat

[To be communicated to participant before delivery and/or installation of LTM]

Introduction

The last time I visited here, we talked about your child's defecation practices, and the toilet training strategies that you are using with your young children. Today, I would like to show you a sanitation tool that IPA is developing specifically with young children in mind. It is called a **latrine training mat**, and its purpose is to help young children learn to use the latrine in a safe and non-threatening way at an earlier age. ("Chombo cha kufundisha watoto kutumia choo" = a tool used to train children on latrine use)

Description of the Latrine Training Mat

- The latrine training mat is made of plastic and is sturdy enough to support a child.
- It has a handle at the front that a child can use to balance himself/herself while squatting.
- The mat is placed over the latrine's existing hole, making a smaller hole that is a more appropriate size for a small child to use. You can help your young child lift and position the mat if he or she is not old enough to do it themselves.
- To move the mat on and off the latrine hole without contaminating your hands, you can slip your foot into this small groove and lift it on and off the hole with your foot.

Would you like to try it? *[Encourage the mama to touch the mat, feel its weight, test its sturdiness, and move it on and off the latrine hole with her foot.]*

Would you please bring your child over here so he/she can try standing on the mat? *[Have the mother place the mat on top of the latrine mat for her child and help the child stand on the mat.]*

Now that you have seen how it can be used, do you have any questions?

Cleaning

The training mat can be easily cleaned by simply splashing water onto the surface of the mat directly. The water can then drain into the latrine's pit. You should clean the surface of the mat with Omo and a brush or broom, and let the water drain into the latrine pit. You should clean the surface of the mat in this way after every use.

Conclusion

- This sanitation tool could be very beneficial for helping grow and nurture your children, and teaching them good sanitation habits from an early age. It could also help improve the health and wellbeing of your entire family.

- Imagine that a child uses the latrine, and leaves feces on the latrine floor around the hole. Then, when another child comes in to use the latrine, his foot comes into contact with some of the feces. This causes contamination, which can lead to diarrheal diseases for your children. This training mat can help prevent this from happening by eliminating contact with feces.

- Imagine that a young child is too afraid to use the latrine because of the large hole, so he defecates in the yard of the compound. Then he begins playing with the feces, or accidentally steps in the feces later on. This too can lead to diarrheal diseases. The training mat provides a smaller hole so that children can freely use the latrine, thus reducing open defecation within the compound.

- Do you have any questions about this latrine training mat?

- We are conducting a study to determine if the latrine training mat is a good sanitation tool for this area. Would you be willing to participate in this study? You would do so by using the latrine training mat with your young child for 1 week, and then having a follow-up discussion with other participating mamas afterwards.

- If you agree to participate, it is very important that you follow all the guidelines that I've just explained when using the latrine training mat. The information that you provide will help us improve the design of this tool, and will help us determine if this is would be a good sanitation tool for this area. Are you willing to participate in this study? *[Have participant give verbal consent here.]*

- We would also like to obtain permission from the compound head before we install this. *[get verbal consent from compound here]*

[If both the mama and the compound head give verbal consent, leave the LTM prototype with the mama and explain that there will be a follow-up focus group discussion with all participants in

one week, and that the village elder will contact her with the time and place of the meeting. If the mama/caretaker does not agree to participate in the pilot intervention, thank her for her time and for her insights, and end the interview.]

LTM Messaging: Removable Wooden Mat

[To be communicated to participant before delivery and/or installation of LTM]

Introduction

The last time I visited here, we talked about your child's defecation practices, and the toilet training strategies that you are using with your young children. Today, I would like to show you a sanitation tool that IPA is developing specifically with young children in mind. It is called a **latrine training mat**, and its purpose is to help young children learn to use the latrine in a safe and non-threatening way at an earlier age. ("Chombo cha kufundisha watoto kutumia choo" = a tool used to train children on latrine use)

Description of the Latrine Training Mat

- The latrine training mat is made of wood and has been treated with special paint to protect it from odors, termites, and decay.
- It has a handle at the front that a child can use to balance himself/herself while squatting.
- It has wooden risers underneath to keep the mat slightly raised up to avoid contact with the latrine floor.
- To use the mat, place it over the latrine's existing hole, making a smaller hole that is a more appropriate size for a small child to use.
- You can help young children lift and position the mat if they are not old enough to do it themselves.
- The mat can be moved on and off the latrine hole by picking it up by its handle.

Would you like to try it? *[Encourage the mama to touch the mat, feel its weight, test its sturdiness, and move it on and off the latrine hole by picking it up by its handle.]*

Would you please bring your child over here so he/she can try standing on the mat? *[Have the mother place the mat on top of the latrine mat for her child and help the child stand on the mat.]*

Now that you have seen how it can be used, do you have any questions?

Cleaning

- The training mat can be easily cleaned by simply splashing water onto the surface of the mat directly. The water can then drain into the latrine's pit.
- You should clean the surface of the mat with Omo and a brush or broom, and let the water drain into the latrine pit.
- You should clean the surface of the mat in this way after every use.

Conclusion

- This sanitation tool could be very beneficial for helping grow and nurture your children, and teaching them good sanitation habits from an early age. It could also help improve the health and wellbeing of your entire family.
- Imagine that a child uses the latrine, and leaves feces on the latrine floor around the hole. Then, when another child comes in to use the latrine, his foot comes into contact with some of the feces. This causes contamination, which can lead to diarrheal diseases for your children. This training mat can help prevent this from happening by eliminating contact with feces.

- Imagine that a young child is too afraid to use the latrine because of the large hole, so he defecates in the yard of the compound. Then he begins playing with the feces, or accidentally steps in the feces later on. This too can lead to diarrheal diseases. The training mat provides a smaller hole so that children can freely use the latrine, thus reducing open defecation within the compound.

- Do you have any questions about this latrine training mat?

- We are conducting a study to determine if the latrine training mat is a good sanitation tool for this area. Would you be willing to participate in this study? You would do so by using the latrine training mat with your young child for 1 week, and then having a follow-up discussion with other participating mamas afterwards.

- If you agree to participate, it is very important that you follow all the guidelines that I've just explained when using the latrine training mat. The information that you provide will help us improve the design of this tool, and will help us determine if this is would be a good sanitation tool for this area. Are you willing to participate in this study? *[Have participant give verbal consent here.]*

- We would also like to obtain permission from the compound head before we install this. *[get verbal consent from compound here]*

[If both the mama and the compound head give verbal consent, leave the LTM prototype with the mama and explain that there will be a follow-up focus group discussion with all participants in one week, and that the village elder will contact her with the time and place of the meeting. If the mama/caretaker does not agree to participate in the pilot intervention, thank her for her time and for her insights, and end the interview.]

Appendix E: FGD2 Guide for Village 1 (non-messaging)

Latrine Training Mat Project
Post-Intervention Focus Group Discussion Guide – Mothers/Caregivers
Village 1 (No Messaging)

Inclusion/exclusion criteria

5. *All participants need to be a mother or a caretaker (someone who spends more than six hours a day caring for a child) of a child of "toilet-training age" (approximately aged 2-5)*
6. *All participants need to have participated in the week-long latrine training mat intervention*

Goal:

2) *To understand the participants' experiences using the latrine training mat with their young children, and their thoughts and perceptions of the latrine training mat as a feasible sanitation tool for children in rural Western Kenya.*

Objectives:

4) *To understand caregivers'/mothers' thoughts and perceptions about the three latrine training mat prototypes, based on their experiences during the one-week intervention*
5) *To gain an in-depth understanding of how the caregivers and their children used the latrine training mat during the one-week intervention*
6) *To identify the caregivers thoughts and perceptions about the design of each of the three latrine training mat prototypes, as well as their acceptability within the context of their communities.*

Background Information

Date (dd/mm/yyyy): |__|__|/|__|__|/|__|__|__|__|

Interviewer ID/Name: |__|__|__|__|/_____

Village: _____ Village ID number: |__|__|__|__|

Division: _____ District: _____

Location: _____ Sub-location: _____

Number of focus group participants: _____

Welcome & Informed Consent

Read the following paragraph to the respondent in Kiswahili, and ask if they agree to participate.

Read: We would like to thank everyone for coming to this discussion today, we appreciate your time. My name is _____and I am from Innovations for Poverty Action (IPA) a research based organization, in Busia Town . This is_____, and [she/he] is a note-taker.

We would like to have a discussion today about people's thoughts and opinions about a new sanitation tool that we are working to develop. Over the past week, all of you have participated in our study by using this tool in your households with your young children. Your experience with this tool, and your thoughts and opinions about this topic, are very valuable to us. The information that you provide will help us improve programs in communities like yours; there are no right or wrong answers, so please feel free to be honest and open about your thoughts and opinions.

I will keep everything that you tell me private and confidential, and will not talk to other people about what you have said. I will also keep you and your family's names confidential, and not tell anyone that you have talked to me. Your answers will not affect the assistance that IPA may or may not provide to your community or your family. If you have any questions about this, you can call us at our IPA office in Busia town. The number is 0726709525. You may flash our number and we will call you back to respond to any questions or concerns you may have. All answers and discussion will be kept private by the note-taker and me, although we cannot promise that other members of this focus group will do the same. We ask that each of you agree to respect each other's privacy once outside of this focus group setting, by not revealing the names of the other group members or the content of our discussion together.

Your participation in this discussion is voluntary and there is no need to answer any question that you do not want to; however, what you do say will be very important to us.

- We would like to use a voice recorder; the recorder will only record our voices. It does not take any pictures. We have a note taker but he/she is only taking notes in case the recorder fails. We use the recorder because it ensures that we gather all of your opinions and thoughts. The recordings are confidential and will not be shared with anyone outside of the research team.

- We will now explain the structure of this discussion.
    - We will only use first names in the discussion.

  - You do not need to speak in order, but only one person should speak at a time (it is difficult for the recorder to pick up more than one voice). It is important that everyone be able to hear each other so that you can have a group discussion.
  - We would like to hear from everyone. It is important that you share your ideas with the group. If you agree or disagree with what other people say then please tell that to the group.
  - It is important that there be a true group discussion. Please talk to the whole group not the person seated next to you.
  - I am here to facilitate the group but I am not an expert on the topics. The reason for being here is to hear your thoughts and opinions.

- We think that this group should last between 60 and 90 minutes. We look forward to hearing your thoughts and opinions whatever they may be.

- I will go around the room and ask your consent to participate. Please say yes or no. Your participation is voluntary and you are free to leave at any time. However, we hope that you will stay for the whole discussion because your thoughts and opinions are valuable to this project.

- We will begin recording now.

Explanation of the Latrine Training Mat Prototypes

The six of you were given three different versions of this sanitation tool, so that we could compare and contrast the three different versions and hopefully determine which one is best.

[Note to FOs: Show the participants the three prototypes and allow them to examine each one in detail, but offer no explanation of its features and use.]

Version 1 is a plastic slab that is installed permanently into the latrine.

- A *fundi* installs it by packing mud around the slab, so that the top of the slab is level with the rest of the latrine floor.
- It can be used by all the family members.

Version 2 is similar to the first model, but is for use by children only.

Version 3 is made of wood and is for use by children only.

[FOs should give participants time to examine each model. Encourage them to touch them, pick them up, stand on them, etc]

Today, we would like to discuss your experiences with this tool over the past week, what you think about the different versions, and answer any questions you may have. We are very interested in your opinion about the strengths and weaknesses of these tools, because your experience will help us improve the design for the future. So please be as honest and as detailed as you can. Shall we begin?

Introductory Questions

1. As an introduction, let's go around the circle so you can introduce yourselves, and tell us how many children you have, and how old they are. Please also tell us which of the three models you have been using in your household this week. **Please identify it as either Model 1, 2, or 3 [Note to FOs: A number should be clearly and visibly affixed to each prototype for easy identification. Also, assign each participant a card with their name, R#, and prototype# for easy identification]**

Specific Questions

Later, we will have a discussion about the three versions of this tool to discuss the strengths and weaknesses of each model. But first, I would like to compare and contrast your experiences using the tool over the past week, and discuss your thoughts and perceptions.

2. Can you describe how you used the latrine training mat?

   [Probes:]
   - Who used it?
   - How often?
   - Other members of the family besides the young child?
   - Differences in use among the 3 models?
   - If you had a different model, how would you have used it?

3. Would you have liked more information related to use of this tool?

   [Probes:]
   - Care
   - Maintenance
   - Storage

4. Please explain the process involved in cleaning the latrine training mats.

[Probes:]

- How?
- What did you clean it with?
- Who did it?
- Where was it cleaned?
- How often? When was it cleaned? Why?
- How easy or difficult was it to clean?
- Differences in the cleaning process among the 3 models?
- If you had a different model, how would you have cleaned it?]

5. Can you talk about where you stored it when you were not using it?

   [Probes:]

   - What made you decide to store it there?
   - Storage in multiple places?
   - For those who had the fixed model, where would you have put a movable mat?
   - In your opinion, what is the best place to store this tool? Why?
   - If you had a different model, where would you have stored it?

6. Can you describe the process involved in introducing your child to this new tool?

   [Probes:]

   - What did you say to him or her when showing the tool for the first time?
   - Was he/she initially afraid?
   - How did you address this?

7. How would you describe your child's attitude and behavior towards the training mat changing over the course of the week? Can you describe his/her willingness to use the tool?

   [Probes:]

   - How long did it take to introduce the child to this tool before he/she began using it?
   - Is the child currently using it?

8. How did other children and/or members of the compound respond to the training mat?

   [Probes:]

   - Like it/not like it

- Showed interest
- Asked questions?

9. Please describe the frequency at which your child used the training mat to defecate this week.

   [Probes:]
   - How many times per day?
   - Differences in frequency of use in daytime or nighttime?
   - How many times did your child use the training mat to urinate this week?
   - If you had a different model, what frequency of use would you expect from your child?

10. Please describe the process of using this tool this week with your child?

    [Probes:]
    - Used when pressed?
    - Specific times chosen?
    - Accompanied or unaccompanied?
    - Assistance by older children?
    - Assistance with moving tool on and off hole?
    - When?

11. Can you please describe any unexpected benefits or challenges you encountered with this tool this week?

    [Probes:]
    a. Who used it
    b. Acceptance or rejection of the mat among child and other household members
    c. How often it was used
    d. Challenges found in cleaning [Note to FOs: probe here on ease of cleaning the permanent slab and whether it remained attached to the mud floor]
    e. Accidents with child soiling him/herself or defecating outside
    f. Different benefits or challenges among the 3 models?
    g. Do you foresee any potential challenges or benefits that might come up in the future?

Now I'd like us to discuss your experiences and opinions regarding the design of these 3 different versions of the tool.

12. How would you compare the model you used with the other two models?

    [Probes:]
    - Strengths, weaknesses of your model compared to either or both of the other two?
    - Structure
    - Ease of cleaning
    - Storage
    - Size

        - For those with the wooden model, what do you think about the height and positioning of the handle (both for the child to hold onto, and for the mother to pick up)?

        - For those with the permanent model, did you use this piece of rubber for anything? How did you use it? **[Note to FOs: This question is referring to the foot handle. Try to find out if they removed the lid with their hands or with their feet.]**

        - For those with the removable plastic model, what do you think about the handles on the side (materials they're made of, their usefulness, etc)?

        - What do you think about the weight of the removable models?

13. Please explain your thoughts about the difference in the three models' durability.

    [Probes:]
    - Strong enough to support a child?
    - Up to what age?
    - What about adults?
    - How long would these last, if used every day? **[Probe on this for each of the 3 models]**
    - Preference among the three models?

14. Can you please discuss your thoughts about the appropriate age a child should start using the different versions of this tool?

    [Probes:]
    - Which version could be used the earliest with young children?
    - At what age? Why?
    - Conversely, which version would need to be used the latest?
    - At what age? Why?

15. Please discuss what model you would prefer overall to use in your household.

    [Probe:]

    - Why?
    - If none of these 3 models, what would you prefer to use instead?

16. Please discuss the most important features that a tool like this should have.

    [Probe:]

    - Features from any of the existing prototypes
    - Features that could improve the design of the prototypes that should be added in the future?
    - Please provide some suggestions for how we can improve the design of the training mat.

    [Note to FOs: look for information regarding the following. However, be aware that some of these factors may have already been mentioned by the respondents. When asking this question, be sure to acknowledge what they had previously said, and then ask about other features.]

    - Permanent versus removable
    - Type of materials used (plastic, wood, other)
    - Handle (yes or no; if yes, where should it be positioned; what type of handle)
    - Lid (yes or no; on which type of mat; removable with hand or with foot)
    - Raised foot placements (yes or no; why or why not; big or small)
    - Surface of training mat (size, smoothness)
    - Size of hole (big or small; for whole family or just for young children)
    - Risers underneath (yes or no; why or why not)

- Weight of training mat (too heavy? too light?)
- Storage (mechanism to store it permanently in latrine? What would they suggest; for example, padlock, chain, etc)

17. As we mentioned last week, the tools which we brought to your house last week are yours to keep. But suppose that a mama sees this tool in a store, or visits her neighbor's compound and sees one in the latrine there. She is interested in acquiring one for her own compound to use with her young children. How much do you think a mama would be willing to pay for a tool like this?

    [Probe on amount she would be willing to pay for each of the 3 models. Is there a difference in the amount she would pay? Why or why not?]

18. Please discuss what your friends or neighbors know about this tool.

    [Probes:]

    - If they know about it, what have you told them?
    - What were their reactions?
    - If they do not, how would you describe it to them?
    - What name did/would you give this tool? **[Note to FOs: be sure to probe here on a name for this tool. Give them the opportunity to brainstorm together.]**

19. Could you please describe to me your thoughts and opinions regarding this tool, both before and after you used it?

    [Probes:]

    - What did you think about this tool when you first received it last week?
    - What were your expectations?
    - What do you think about this tool now that you have had it in your compound for a week?

- How have your thoughts/opinions/expectations changed?

20. Based on your experience this past week, please describe your feelings using the tool to toilet train your children in the future.

    [Probes:]

    - Would you use it?
    - Why or why not?
    - Instead of, or in addition to, other tools and methods of toilet training?
    - Which prototype would you be most willing to use? Why?

Section 4: Closing Questions

21. The last time we spoke, some of you mentioned reasons why your young child did not regularly use the latrine [Examples: fear, danger, unsanitary conditions]. Can you discuss if you think this tool addresses those reasons, or if the situation is still the same?

    [Probes:]

    - Mother's fear of the latrine
    - Child's fear of the latrine
    - Cleanliness
    - Safety
    - Children with special needs?

22. This feedback that you have provided is so valuable. We are about to be finished, and then I would like to visit each of your compounds to see how you are using these tools. Before we finish, is there anything else you would like to add about the latrine training mat? Do you have any questions about the training mat?

Again, thank you so much for your willingness to participate in this project. Your feedback is very important and will be very helpful as we try to develop this idea!

Appendix F: FGD2 Guide for Village 2 (messaging)

Latrine Training Mat Project
Post-Intervention Focus Group Discussion Guide – Mothers/Caregivers
Village 2 (Messaging)

Inclusion/exclusion criteria

7. *All participants need to be a mother or a caretaker (someone who spends more than six hours a day caring for a child) of a child of "toilet-training age" (approximately aged 2-5)*
8. *All participants need to have participated in the week-long latrine training mat intervention*

Goal:

3) *To understand the participants' experiences using the latrine training mat with their young children, and their thoughts and perceptions of the latrine training mat as a feasible sanitation tool for children in rural Western Kenya.*

Objectives:

7) *To understand caregivers'/mothers' thoughts and perceptions about the three latrine training mat prototypes, based on their experiences during the one-week intervention*
8) *To gain an in-depth understanding of how the caregivers and their children used the latrine training mat during the one-week intervention*
9) *To identify the caregivers thoughts and perceptions about the design of each of the three latrine training mat prototypes, as well as their acceptability within the context of their communities.*

Background Information

Date (dd/mm/yyyy): |__|__|/|__|__|/|__|__|__|__|

Interviewer ID/Name: |__|__|__|__|/_____

Village: _____ Village ID number: |__|__|__|__|

Division: _____ District: _____

Location: _____ Sub-location: _____

Number of focus group participants: _____

Welcome & Informed Consent

Read the following paragraph to the respondent in Kiswahili, and ask if they agree to participate.

Read: We would like to thank everyone for coming to this discussion today, we appreciate your time. My name is _____and I am from Innovations for Poverty Action (IPA) a research based organization, in Busia Town . This is_____, and [she/he] is a note-taker.

We would like to have a discussion today about people's thoughts and opinions about a new sanitation tool that we are working to develop. Over the past week, all of you have participated in our study by using this tool in your households with your young children. Your experience with this tool, and your thoughts and opinions about this topic, are very valuable to us. The information that you provide will help us improve programs in communities like yours; there are no right or wrong answers, so please feel free to be honest and open about your thoughts and opinions.

I will keep everything that you tell me private and confidential, and will not talk to other people about what you have said. I will also keep you and your family's names confidential, and not tell anyone that you have talked to me. Your answers will not affect the assistance that IPA may or may not provide to your community or your family. If you have any questions about this, you can call us at our IPA office in Busia town. The number is 0726709525. You may flash our number and we will call you back to respond to any questions or concerns you may have. All answers and discussion will be kept private by the note-taker and me, although we cannot promise that other members of this focus group will do the same. We ask that each of you agree to respect each other's privacy once outside of this focus group setting, by not revealing the names of the other group members or the content of our discussion together.

Your participation in this discussion is voluntary and there is no need to answer any question that you do not want to; however, what you do say will be very important to us.

- We would like to use a voice recorder; the recorder will only record our voices. It does not take any pictures. We have a note taker but he/she is only taking notes in case the recorder fails. We use the recorder because it ensures that we gather all of your opinions and thoughts. The recordings are confidential and will not be shared with anyone outside of the research team.

- We will now explain the structure of this discussion.
    - We will only use first names in the discussion.

- You do not need to speak in order, but only one person should speak at a time (it is difficult for the recorder to pick up more than one voice). It is important that everyone be able to hear each other so that you can have a group discussion.
- We would like to hear from everyone. It is important that you share your ideas with the group. If you agree or disagree with what other people say then please tell that to the group.
- It is important that there be a true group discussion. Please talk to the whole group not the person seated next to you.
- I am here to facilitate the group but I am not an expert on the topics. The reason for being here is to hear your thoughts and opinions.

- We think that this group should last between 60 and 90 minutes. We look forward to hearing your thoughts and opinions whatever they may be.

- I will go around the room and ask your consent to participate. Please say yes or no. Your participation is voluntary and you are free to leave at any time. However, we hope that you will stay for the whole discussion because your thoughts and opinions are valuable to this project.

- We will begin recording now.

Explanation of the Latrine Training Mat Prototypes

The six of you were given three different versions of this sanitation tool, so that we could compare and contrast the three different versions and hopefully determine which one is best.

[Note to FOs: Give the participants the following explanation of each prototype.]

Version 1 is a plastic slab that is installed permanently into the latrine.

- A *fundi* installs it by packing mud around the slab, so that the top of the slab is level with the rest of the latrine floor.
- There are raised foot placements on each side of the hole to demonstrate where to stand on the slab.
- There is a lid that can be removed before use, and placed back over the hole after use.
- The size of the hole and the sturdy plastic of the slab are such that it can be used by the entire family.

Version 2 is similar to the first model, but is for use by children only.

- It is made of plastic, and is designed to support a child.
- It has handles on both sides so that it can be placed over the latrine's existing hole when a child needs to use it. This provides a latrine hole that is smaller and more appropriately-sized for a young child.

- Then, when the child is finished, this tool can be removed and stored inside the latrine.

Version 3 is made of wood and is for use by children only.

- Like Prototype 2, it is removable on and off the latrine hole, and has a smaller hole.
- It has been treated with a special paint to help protect it from odors, termites, and decay.
- It has wooden risers underneath to keep it slightly raised up to avoid contact with the latrine floor.
- It has a handle at the front that the child can use to balance himself/herself while squatting.
- This handle can also be use to move this tool on and off the latrine hole.

[FOs should give participants time to examine each model. Encourage them to touch them, pick them up, stand on them, etc]

Today, we would like to discuss your experiences with these tools over the past week, what you think about the different versions, and answer any questions you may have. We are very interested in your opinion about the strengths and weaknesses of these tools, because your experience will help us improve the design for the future. So please be as honest and as detailed as you can. Shall we begin?

Introductory Questions

23. As an introduction, let's go around the circle so you can introduce yourselves, and tell us how many children you have, and how old they are. Please also tell us which of the three models you have been using in your household this week. **Please identify it as either Model 1, 2, or 3 [Note to FOs: A number should be clearly and visibly affixed to each prototype for easy identification. Also, assign each participant a card with their name, R#, and prototype# for easy identification]**

Specific Questions

Later, we will have a discussion about the three versions of this tool to discuss the strengths and weaknesses of each model. But first, I would like to compare and contrast your experiences using the tool over the past week, and discuss your thoughts and perceptions.

24. Can you describe how you used the latrine training mat?

[Probes:]

- Who used it?
- How often?
- Other members of the family besides the young child?
- Differences in use among the 3 models?
- If you had a different model, how would you have used it?

25. Would you have liked more information related to use of this tool?

[Probes:]

- Was the information provided sufficient?
- Care
- Maintenance
- Storage

26. Please explain the process involved in cleaning these tools.

[Probes:]

- How?
- What did you clean it with?
- Who did it?
- Where was it cleaned?
- How often? When was it cleaned? Why?
- How easy or difficult was it to clean?
- Differences in the cleaning process among the 3 models?
- If you had a different model, how would you have cleaned it?]

27. Can you talk about where you stored it when you were not using it?

[Probes:]

- What made you decide to store it there?
- Storage in multiple places?
- For those who had the fixed model, where would you have put a movable model?
- In your opinion, what is the best place to store this tool? Why?
- If you had a different model, where would you have stored it?

28. Can you describe the process involved in introducing your child to this new tool?

[Probes:]

- What did you say to him or her when showing the tool for the first time?
- Was he/she initially afraid?

- How did you address this?

29. How would you describe your child's attitude and behavior towards this tool changing over the course of the week? Can you describe his/her willingness to use the tool?

    [Probes:]
    - How long did it take to introduce the child to this tool before he/she began using it?
    - Is the child currently using it?

30. How did other children and/or members of the compound respond to this tool?

    [Probes:]

    - Like it/not like it
    - Showed interest
    - Asked questions?
    - How did they refer to it?

31. Please describe the frequency at which your child used the training mat to defecate this week.

    [Probes:]
    - How many times per day?
    - Differences in frequency of use in daytime or nighttime?
    - How many times did your child use the training mat to urinate this week?
    - If you had a different model, what frequency of use would you expect from your child?
    - Frequency of use *now* compared to *previously*?

32. Please describe the process of using this tool this week with your child?

    [Probes:]
    - Used when pressed?
    - Specific times chosen?
    - Accompanied or unaccompanied?
    - Assistance by older children?
    - Assistance with moving tool on and off hole?
    - Differences in habits/practices before and after receiving this tool?
    - Differences among models?

33. Can you please describe any unexpected benefits or challenges you encountered with this tool this week?

    [Probes:]
    a. Who used it
    b. Acceptance or rejection of the mat among child and other household members
    c. How often it was used
    d. Challenges found in cleaning **[Note to FOs: probe here on ease of cleaning the permanent slab and whether it remained attached to the mud floor; also probe on how respondents would address/remedy this issue]**
    e. Accidents with child soiling him/herself or defecating outside
    f. Different benefits or challenges among the 3 models?
    g. Do you foresee any potential challenges or benefits that might come up in the future?

Now I'd like us to discuss your experiences and opinions regarding the design of these 3 different versions of the tool.

34. How would you compare the model you used with the other two models?

    [Probes:]
    - Strengths, weaknesses of your model compared to either or both of the other two?
    - Structure
    - Ease of cleaning
    - Storage
    - Size
        - For those with the wooden mat, what do you think about the height and positioning of the handle (both for the child to hold onto, and for the mother to pick up)?
        - For those with the permanent slab, what do you think about the foot handles?
        - For those with the removable plastic mat, what do you think about the handles on the side (materials they're made of, their usefulness, etc)?
        - What do you think about the weight of the removable models?

35. Please explain your thoughts about the difference in the three mats' durability.

[Probes:]

- Strong enough to support a child?
- Up to what age?
- What about adults?
- How long would these last, if used every day? **[Probe on this for each of the 3 models]**
- Preference among the three mats?

36. Can you please discuss your thoughts about the appropriate age a child should start using the different versions of the mat?

    [Probes:]

    - Which version could be used the earliest with young children?
    - At what age? Why?
    - Conversely, which version would need to be used the latest?
    - At what age? Why?

37. Please discuss what model you would prefer overall to use in your household.

    [Probe:]

    - Why?
    - If none of these 3 models, what would you prefer to use instead?

38. Please discuss the most important features that a tool like this should have.

    [Probe:]

    - Features from any of the existing prototypes
    - Features that could improve the design of the prototypes that should be added in the future?
    - Please provide some suggestions for how we can improve the design of the training mat.

[Note to FOs: look for information regarding the following. However, be aware that some of these factors may have already been mentioned by the respondents. When

asking this question, be sure to acknowledge what they had previously said, and then ask about other features.]

- Permanent versus removable
- Type of materials used (plastic, wood, other)
- Handle (yes or no; if yes, where should it be positioned; what type of handle)
- Lid (yes or no; on which type of mat; removable with hand or with foot)
- Raised foot placements (yes or no; why or why not; big or small)
- Surface of training mat (size, smoothness)
- Size of hole (big or small; for whole family or just for young children)
- Risers underneath (yes or no; why or why not)
- Weight of training mat (too heavy? too light?)
- Storage (mechanism to store it permanently in latrine? What would they suggest; for example, padlock, chain, etc)

39. As we mentioned last week, the tools which we brought to your house last week are yours to keep. But suppose that a mama sees this tool in a store, or visits her neighbor's compound and sees one in the latrine there. She is interested in acquiring one for her own compound to use with her young children. How much do you think a mama would be willing to pay for a tool like this?

    [Probe on amount she would be willing to pay for each of the 3 models. Is there a difference in the amount she would pay? Why or why not?]

40. Please discuss what your friends or neighbors know about this tool.

    [Probes:]

    - If they know about it, what have you told them?
    - What were their reactions?

- If they do not, how would you describe it to them?
- What name did/would you give this tool? **[Note to FOs: be sure to probe here on a name for this tool. Give them the opportunity to brainstorm together.]**

41. Could you please describe to me your thoughts and opinions regarding this tool, both before and after you used it?

    [Probes:]

    - What did you think about this tool when you first received it last week?
    - What were your expectations?
    - What do you think about this tool now that you have had it in your compound for a week?
    - How have your thoughts/opinions/expectations changed?

42. Based on your experience this past week, please describe your feelings using the tool to toilet train your children in the future.

    [Probes:]

    - Would you use it?
    - Why or why not?
    - Instead of, or in addition to, other tools and methods of toilet training?
    - Which prototype would you be most willing to use? Why?

Section 4: Closing Questions

43. The last time we spoke, some of you mentioned reasons why your young child did not regularly use the latrine [Examples: fear, danger, unsanitary conditions]. Can you discuss if you think this tool addresses those reasons, or if the situation is still the same?

    [Probes:]

- Mother’s fear of the latrine
- Child’s fear of the latrine
- Cleanliness
- Safety
- Children with special needs?

44. This feedback that you have provided is so valuable. We are about to be finished, and then I would like to visit each of your compounds to see how you are using your training mats. Before we finish, is there anything else you would like to add about the latrine training mat? Do you have any questions about the training mat?

Again, thank you so much for your willingness to participate in this project. Your feedback is very important and will be very helpful as we try to develop this idea!