Task Shifting, Tools, and Tactics: Investigating the Collaborative Practices of Community Health Workers in India

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Abstract

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In this study, I investigate the work practices of health workers across five different health centers in India in rural, peri-urban, and urban settings. Study methods includes a clinic site survey, semi-structured interviews, and direct observations. Participants included 26 health workers in roles such as medical officers, lab technicians, junior health assistants, and supervisors.

I use critical theory such as De Certeau's concepts of strategies and tactics, and feminist standpoint theory to understand how health workers navigate the challenges of their daily work. The findings of this study show that: (a) the structural conditions in which health workers work strongly shape their responsibilities; (b) health workers depend on a range of collaborative practices to accomplish their work; and (c) the information tools they use both help and hinder their ability to navigate these challenges.

Finally, this study identifies four kinds of practices that health workers employ to confront these challenges. These practices include resistance, making work meaningful, self-representation, and reconfiguration. Understanding these practices can thus be used to develop more impactful technologies for global health.

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ABBREVIATIONS

ANC: Antenatal care

ANM: Auxiliary nurse midwife

ASHA: Accredited social health activist

AWW: Anganwadi worker

CHC: Community health center

CHW: Community health worker

CSCW: Computer-supported cooperative work

JHA: Junior health assistant

ICTD: Information and Communication Technology for Development

LHV: Lady health visitor

MCTS: Mother-Child Tracking System

MO: Medical officer

NGO: Non-governmental organization

NUHM: National Urban Health Mission

NRHM: National Rural Health Mission

3P: Public-private partnership

PHC: Primary health center

PNC: Postnatal care

SMS: Short message service (i.e. text messaging)

UFWC: Urban family welfare center

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DEDICATION

For my father.

Chapter 1

INTRODUCTION

There are few domains as ripe as global health for technology to have a positively transformative impact. From bringing diagnostics capabilities out of the laboratory and into the field, to collecting timely and accurate data about the health of the community, new technologies (especially mobile technology) have the potential for addressing health disparities in innovative ways. But the landscape of technologies for global health is littered with projects and interventions that have failed to live up to this potential, indicating a need to better understand the conditions required for these interventions to succeed. Because of the complex interplay of technology, policy, and resources, designers and researchers can easily lose sight of the direct impact for in-the-field users who will use these tools on a day-to-day basis.

This dissertation investigates the work practices and structural conditions of health workers in Southern India. It is anticipated that by understanding both the work practices and work conditions, technologists, designers and researchers can better understand how to build technologies that can have a positive impact. I used primarily qualitative methods including interviews and direct observation, as well as surveys at five different health centers with 26 health workers from these sites.

This chapter provides the background that motivates this study. I describe the problem statement, statement of purpose, and research questions. Next, I include a description of the research approach, my perspective as a researcher, and my assumptions. I conclude the chapter with a statement of the rationale for, and significance of, this study.

The trajectory of technologies for global health is shaped heavily by a series of initiatives built on broad-sweeping general goals and straightforward metrics to evaluate their effectiveness. The institutions that established these initiatives, such as the Gates Foundation and the World Health Organization, have, however, been critiqued by scholars such as Birn (2005) and Garrett (2007) for their technocratic, singular focus on specific health issues (such as tuberculosis, malaria, and HIV) at the expense of other important determinants such as poverty and policy. The liberal use of technology as a tool of international development more generally has also been critiqued by scholars such as Toyama (2011) for failing to achieve the changes that the technology creators and funders promised would happen, because it failed to address the sociopolitical context alongside the technological one.

These critiques are further supported by the number of ambitious, but failed, technology-based projects that dot the global health landscape. In sub-Saharan Africa, for instance, evaluations of pilot mHealth projects have failed to generate sufficient evidence and guidance for scaling up additional projects (Tomlinson et al., 2013).

Together, these critiques point out a weak spot in technology development for global health: it undervalues how existing practices and relationships impact what technology can achieve. In order to address this limitation, this study investigates how the practices and relationships of community health workers in Southern India can serve as a starting point for technology development. Most literature on understanding and describing the work of community health workers in global health has come from the field of medical anthropology, but is absent from the discourse on human-centered design and engineering. This investigation attempts to close that gap through the conducting and analysis of field work with community health workers in India.

1.1 Statement of Purpose and Research Questions

The purpose of this multi-case qualitative study is first to understand and characterize the work practices, structural constraints, and individual attitudes of community health workers at health centers in Southern India and how these are mediated through the tools that they use for their work.

1.1.1 Research Questions

This investigation is focused on the following research questions:

1. How are the activities of community health workers determined by the structural conditions of their workplace?
2. How do health workers reconcile the contradiction between their prescribed roles and responsibilities and the emergent needs of the communities they serve?
3. How do health workers' information tools reflect and shape their idealized and actual practice with respect to how they engage with their colleagues and communities?

1.2 Rationale and Significance

This dissertation provides two core contributions that collectively have implications for practice, policy, and theory.

Firstly, this dissertation bridges the findings of the empirical investigation of work practices to develop a set of design considerations that can inform the creation of tools for community health workers.

Secondly, I generate a typology of work practices built from theoretical themes drawn from sociology and computer-supported cooperative work. These constructs draw from role theory, hidden work, feminism, and theory of the practice of everyday life. The human-centered issues covered by this typology are of core relevance to human-centered design and engineering, but have not yet been fully explored in the context of community health workers. This typology will support better integration of the skill and desire for designers to build technologies that address health disparities in global health, while remaining responsive and attentive to existing work practices and motivations of community health workers.

The rationale for this study stems from my desire to develop better tools and technologies that promote global health, and recognizes the expertise, skills, and motivations of community health workers as being core to improving health outcomes. Our pathway for supporting this, as technology designers, is incomplete. Improving health is not simply reducible to a set of features. What is valuable, however, is the way that these systems can help the users of technologies, support their motivations, and leverage their expertise.

Unpacking what that might look like in the design is a daunting challenge that still remains to be resolved. However, this research offers both practical and theoretical guidance on how we might design better technologies.

1.3 Assumptions

In this section, I lay out several of my assumptions and perspectives that I held or developed while conducting this work.

1. The development of technologies in global health has focused mainly on their instrumental potential, while ignoring important, but non-instrumental, aspects such as how technology advances personal and professional goals and aspirations, or how those technologies might impact health workers' morale.
2. Health workers' activities are heavily intertwined and driven by important, but highly siloed, national and state-initiated programs and structures. These global initiatives are sometimes in tension with local health needs and priorities, resulting in role conflicts for health workers.
3. Health workers are fundamentally motivated and empowered by their ability to serve and promote the health of their communities. In other words, health workers are mission-driven and intrinsically motivated by their ability to do good work for their community. This assumption was originally developed through experience prior to this dissertation, but was further crystallized in the course of conducting this study.
4. Health workers are experts in the health needs of their communities, and sometimes these health needs may compete with the priorities that have been identified by funding agencies.
5. Consequently, the design and evaluation of current tools for global health are centered on specific health outcomes rather than on the impact these tools have on the practices and relationships of community health workers. As a result, the unique and specific

perspectives of community health workers have not been adequately taken account of in the design processes that result in technologies that are built for them.

1.4 The Researcher

The development of this dissertation was borne from my professional background as a user-experience researcher. I have learned to develop and deploy systematic research approaches that drive actionable, implementable findings. At times, my focus in practice has been at odds with more academic research objectives or training, and has relied strongly on an interdisciplinary committee and professional colleagues to help me remain critical of my biases in this work. I have developed my experience and empathy through a number of projects that investigate the needs, concerns, and expertise of individuals in low-resource and disadvantaged contexts. Through these projects, I have increasingly recognized that my work will continue to be motivated by theory and by engaging with theoretical perspectives that provide avenues for researchers to acknowledge and recognize users' voices. I also draw from my collaborations in the design of technologies for healthcare practitioners in global health. In these collaborations, I am often one of the few members trained in human-centered design approaches. My background sensitizes me to keeping users first in my mind, even while my peers focus on how to build the technology. Often, the nature of these research collaborations has focused on building new tools or features that would augment or replace existing systems. This features-first approach looks in part for ways that may shift the status quo, but often without first taking a step back to understand what the status quo actually is, or without adequately understanding how it links to other processes. In particular, this features-focused approach does not seem to have been examined in light of the day-to-day practices of the numerous audiences they were designed to serve.

I have learned from these experiences how technology has been built without careful consideration of how it impacts (positively and negatively) its users, its context, and other work practices. A consequence of these collaborations is that researchers move on from the project and take their excitement with them. The grinding work of continuing the project falls to the workers whom the project was supposed to help. The uncertainty and resulting project friction highlighted that there is still important work to be done in closing the research-to-practice (or the translation) gap when working in these collaborations. Additionally, this work is often conducted in contexts that serve resource-constrained communities, further underscoring the research team's responsibility for developing positive, sustainable, and community-supportive interventions.

My previous and ongoing work in this space reveals that there are many points of friction that tinge our understanding of how to support on-the-ground practice. There are frictions between policies, bureaucracies, institutions, and individual workers. There are also frictions between researchers, research sites, and participants. But ultimately, effective design has to confront these frictions by recognizing the on-the-ground realities in which they function.

Human-centered design and engineering have a unique role to play in the development of interventions that not only answer research questions and contribute to knowledge, but also lend themselves to being implemented and so impacting the real world. An important point of reflection for me is that I came to this work as an outsider on several levels. On the one hand, I am an Asian-American academic in human-centered design and engineering, doing work in a low-resource setting, in a foreign country, with participants for whom English is not a first language (and one which they are still uncomfortable speaking). Undoubtedly, my data collection and interpretation of the findings have been influenced by my efforts at trying to fit in while conducting research with my participants, when there have been so many different ways in which I may seem to stand apart. In order to make clear my own standing in this research so that the reader can take that into account, and in the spirit of the theoretical commitments of representation, I report on my observations self-reflexively and in the first person.

By employing interviews and direct observations, I have attempted to safeguard my biases, and the limitations of my perspective, by iteratively adapting both my foci of observation and my interview protocol. This effectively provides a mode of triangulation. While conducting this research, I have learned many things about myself and the research process that have ultimately shaped my process in completing this dissertation (and inevitably its outcomes).

1.5 Research Approach

With the approval of the Human Subjects Division of the University of Washington, I conducted a cross-case qualitative study to investigate the work practices and perceptions of 26 health workers from primary health centers in India. Most study participants were junior health assistants, male and female; but other participants included lay health workers, medical officers/doctors, staff nurses, pharmacists, and lab technicians. These participants were recruited from several research sites in urban, peri-urban, and rural settings.

I collected data through three research activities: surveys at each study site, in-depth semi-structured interviews, and direct observation.

The closed-ended surveys contained a list of questions for each study site that determined what kinds of services and capabilities were provided by the clinic. I devised the study instrument by adapting a primary health center evaluation checklist developed and distributed by the Indian Government. The survey was conducted verbally with an administrator or medical officer at the clinic. In this dissertation, I compare across various types of study sites, and in particular how urban, peri-urban, and rural study sites compare. This survey provides a standardized way for comparing such different types of sites.

I also conducted in-depth semi-structured interviews with the 26 health workers. This was a primary source of data collection. These interviews lasted from 30 minutes to over an hour. Most interviews were conducted individually, though interviews with some participants were conducted in group settings. While the study was not originally designed to be conducted in a group setting, it was done that way to accommodate the needs of the site, and to make the best use of the participant's time.

Direct observation was the final method, and another way of collecting primary data. Direct observation took place at the primary health centers, as well as in the field, with community health workers. I captured and synthesized data from direct observation using field notes, photographs, reflective audio recordings, and written memos.

In order to make sense of the data collected in this study, I also developed a conceptual framework. I created the framework iteratively. It was both developed as a tool to understand the data that I collected, as well as the product of understanding that data. Thus, it is best understood as a dialogical artifact, that is, it has arisen as a result of going back and forth through the data and analysis. What is presented in Chapter 2 is only the most current resting point.

The original motivation and goal of this study was slightly simplified from I present here. I originally wanted to understand the work practices of health workers to directly find opportunities for design. But as the study progressed, it became clear that this descriptive understanding was not the correct framing for understanding what I was seeing and learning. The framing was not sufficient for understanding the tension between health workers, health institutions, and community members. Thus, the conceptual framework emerged as I worked on making sense of what this study was really about: the challenges that CHW's face, and the practices they employ to resolve these challenges.

The anchoring components of that framework are the institutions that define and structure community health work, the workers who accomplish that work, and the tools those workers use. I provide more details of the conceptual framework in Chapter 2, but I mention it here because it informs how I've structured the dissertation as a whole. As reflected in the research questions, this dissertation aims to understand these work practices are situated at specific sites that share a broader public health and global health context (Chapter 4), how health workers navigate their prescribed responsibilities in this context (Chapter 5), and how they use information tools in navigating those responsibilities (Chapter 6).

1.6 Organization of the dissertation

I organize the dissertation as follows:

Chapter 2 contains a literature review that provides background on the concerns of primary health care as it is defined in the context of global health; how that work is being done in India; and the role that technology plays in that work. It also introduces several bodies of theory that could provide valuable insight into unpacking the work practices of community health workers in primary health centers. This chapter concludes with a conceptual framework to frame and situate this work.

Chapter 3 describes the study methodology and design. It describes recruitment, participants, study sites, research activities, and study limitations.

Chapter 4 looks at the structural environment in which this study takes place. I describe the physical environment, material resources, human resources, and institutional relationships of each study site

Chapter 5 focuses on the practices and attitudes of study participants and their work. I further explore how these health workers work alone and together to comply with, or subvert, their prescribed responsibilities.

Chapter 6 describes the use of information tools available to community health workers. I analyze these tools from the perspectives of both health institutions and community health workers. In doing so, I build a more nuanced characterization of what impact these information tools have.

Chapter 7 provides a theory-driven typology of work practices, conclusions, implications of this study, and ideas for future research.

Chapter 2

BACKGROUND

This study seeks to understand how community health workers (CHWs) in Southern India navigate the challenges of their daily work in order to drive a better approach to technology design. This study joins the concerns of computer-support cooperative work (CSCW) with the concerns of information and communication technologies for development (ICTD). My goal in joining these concerns is to show how a broader theoretical framework can be used in productive ways for empirical studies across multiple disciplines.

In this chapter, I provide background on primary health care both globally and in India. I describe accounts and findings of what we know about the work of CHWs, including their workflows, work practices, and motivations. I also place this study within the broader CSCW literature and health ICTD literature. I conclude with a conceptual framework to show how I conducted this study and to generate better design approaches for supporting the work of CHWs.

2.1 Global and primary health care

This study takes place in Indian health centers that provide primary health care. To understand how community health workers provide primary health care, we must first understand its the origins and evolution. In this section, I provide background on global health and the popularization of primary health care in the late 1970s. I trace how global health institutions defined and implemented primary health care. I next focus on how India implemented its primary health care efforts against this changing context.

2.1.1 Origins of primary health care

In 1978, the World Health Assembly, the precursor to the World Health Organization, adopted primary health care as paramount in its declaration of the International Conference on Primary Health Care. The conference, convened in Alma-Ata, Kazakhstan, was intended to recognize the essential role that primary care plays in promoting health (Starfield, 1998). The theme of the conference became "Health Care for All." Prior to this meeting, health outcomes worldwide were worsening even as health institutions were increasing their spending (Magnussen et al., 2004).

The World Health Assembly originally defined primary health care as: "Essential health care based on practical, scientifically sound and socially acceptable methods and technology made universally accessible to individuals and families... It is the first level of contact of individuals, the family, and the community with the national health system, bringing health care as close as possible to where people live and work...(World Health Organization and General, 1978)."

Conference attendees discussed a number of health determinants, including environmental sanitation, food and water, and traditional medicine (Starfield, 1998). Primary health care was championed as an approach that would increase access to health care by addressing the roles that social, economic, and political factors play in causing poor health (Magnussen et al., 2004).

By considering the broader determinants of health, primary health care directly opposed the prevailing bio-medical paradigm of health and wellness. But only one year after the Alma-Ata meeting, critics like Julia Walsh and Kenneth S. Warren argued that primary health care would be impractical and costly for governments to implement (Walsh and Warren, 1980). Walsh and Warren proposed a stripped-down definition of primary health care, named "selective primary health care," as a more pragmatic alternative to "comprehensive primary care" (Magnussen et al., 2004).

Walsh and Warren argued a utilitarian position:"To do the greatest good, health services should be directed toward controlling those diseases producing the largest amount of death and disability, and care should be made accessible to the greatest numbers (Walsh and Warren, 1980, p.146)." Thus, rather than address health disparities by tackling difficult socioeconomic determinants, selective primary health care emphasized shifted towards more measurable and monitorable solutions (Cueto, 2004).

Selective primary health care has since been a prominent model for primary health care. Selective primary health care departs from the holistic, ecological approach of comprehensive primary health care, and instead addresses primarily high-mortality diseases. Starfield (1998) attributes this shift to a techno-centric focus in wealthy nations where general practice has given way to specialization, and health technology is becoming increasingly prevalent. Additionally, wealthier nations felt that they had already addressed the broader determinants of health identified at Alma-Ata, and chose to focus on selective primary health care instead.

Though governments have fallen short of the vision first posed at Alma-Ata, Bhatia and Rifkin (2010) have found NGOs leading the charge in implementing comprehensive primary health care programs. The authors attribute this success to the small size of these programs, as well as the NGOs charismatic leadership. Nevertheless, highly populated countries like China and India are trying to demonstrate that comprehensive primary health care programs can succeed at scale, and consequently both countries are focusing on strengthening their rural health care networks.

2.1.2 Primary health care in India

In the early 1950s—three decades prior to the Alma-Ata conference—the government of India committed to improving the country's public health infrastructure by building rural health centers and training new health workers. But by 1961, the Indian government found itself unable to continue building new facilities and maintaining the needed level of personnel. Instead, the government introduced targeted programs to address malaria, smallpox, cholera, trachoma, tuberculosis, leprosy, filariasis, and population growth. The results of these programs were inconsistent. Outcomes for the rate of cholera improved, while the rates for malaria showed only temporary improvement. The rate of tuberculosis showed barely any improvement (Deodhar, 1982).

In 1980, a government-appointed commission issued a report titled “Healthcare for All: An Alternative Strategy.” The commission recommended the Indian government to adopt many of the tenets of comprehensive primary health care (Deodhar, 1982). The country formally adopted these recommendations in its 1983 National Health Policy (Government of India, 2003).India was one of the first countries to introduce community health workers (CHWs) after the Alma-Ata conference. The Alma-Ata declaration recognized that CHWs were core to meeting the goals of primary health care by providing services and education. But within a decade of its establishment, the CHW program failed due to lack of funding and policy challenges (Lehmann and Sanders, 2007). Meanwhile, Indian non-governmental organizations (NGOs) established other successful primary health care initiatives that continue to be in operation today, such as the Comprehensive Rural Health Project and the Society for Education Action and Research in Community Health (Pri, 2009).

India issued its next National Health Policy in 2002. The policy aimed to revive primary health care and integrate vertical health programs, while better enabling individual states to administer the programs locally (Government of India, 2003). In 2005, India inaugurated the National Health Mission (NHM) to develop and implement programs that would advance primary health care in rural India. This mission is the responsibility of the Indian government’s Ministry of Health and Family Welfare. Its mission statement states: “The NHM envisages achievement of universal access to equitable, affordable & quality health care services that are accountable and responsive to people’s needs.” The NHM accomplishes this mission through two sub-missions: the National Rural Health Mission, also established in 2005, and the National Urban Health Mission, established in 2013. The shared goals of these missions are to strengthen health systems, improve reproductive, maternal, newborn, child and adolescent health (RMNC+A) and control both communicable and non-communicable diseases.

2.1.3 Community health workers as the key to primary care delivery

Trained CHWs are the foundation of primary health care because they serve basic health needs and provide education in places where there are few highly trained health providers. The World Health Organization (WHO) has established a critical threshold of health care providers as a total of twenty-three doctors, nurses, and midwives per 10,000 capita in order to deliver essential maternal and child services (World Health Organization, 2010). India meets this minimum threshold. World Bank figures from 2011 show that India has seventeen nurses or midwives and seven physicians per 10,000 population (Bank). Although the WHO threshold has been met, the metric fails to represent the fragmentary nature of access to health care in India. In rural areas, where the population is sparse and many of India's poor live, patients sometimes have to travel far to get access to health care. In urban areas, where population densities are highest, the wealthy have access to a small number of private doctors, while larger, poorer populations must vie for a limited number of available providers. For instance, 74% of graduate physicians in India live in urban areas, which is where 28% of the population lives (Yadav et al., 2009).

Reductive per capita health metrics such as these reveal important limitations in how to evaluate and understand the improvement of health systems in India. These statistics obscure the social aspects and structural barriers to providing care, such as health worker motivation and differential levels of socioeconomic status. The disparities in access suggest that reaching a systematic understanding of health systems in India requires an understanding of how these systems perform across contexts and a close look at primary care delivery as it is practiced at a local rather than national level.

2.1.4 The challenge of measuring primary health care

The 2002 National Health Policy and the draft 2015 National Health Policy established targets for the country, including eradicating and reducing infectious diseases and reducing infant and maternal mortality rates (Government of India, 2003, 2014). CHWs are integral in providing service to the community as well as collecting data for tracking progress towards these goals.

Defining targets has only an indirect relationship to national health policies, as is the case in India. For example, in a study on the documentation practices of CHWs in India, Coutinho et al. (2000) found that public health officials developed targets that were inappropriate for their context. The officials built targets based on outdated or inaccurate figures or used formulas that were arcane or arbitrary. These practices obscured the origins of the targets, making it difficult to assess their validity. Sometimes health targets didn't follow the trends that CHWs observed in the field, but when those trends were acknowledged, health centers could adjust their planned targets accordingly.

Consequently, setting targets and collecting data is a practice that very much depends on negotiation. Coutinho et al. further describe the outcomes of negotiation as "numerical narratives, where data represents not just the thing it says it is, but also an entanglement of narratives, priorities, and tensions." While the data collected is meant to reflect how well health care programs are achieving their goals, the data also becomes a proxy measure for how well health care workers are doing their jobs. Thus, understanding health policy and practices in India means more than just reading government policies or mission statements. Looking at actual practice is an essential piece of understanding India's overall approach to healthcare.

Coutinho et al.use immunization rates as an example of this phenomenon. Immunization is important to track because it serves broader health policy goals, such as the reduction of infant mortality rates. Since CHWs provide immunizations, immunization rates are a partial reflection of the work CHWs perform. But often a singular metric like immunization rates is used to represent all of a CHWs' work, concealing the value of their other efforts. Singular metrics like immunization rates fail to capture the relationship and confidence building that health workers must engage in with their communities in order to get members of the community to seek health services. While understanding how data are collected might seem mundane, it in fact shows a tremendous amount about the work practices and organizational context of CHWs. While understanding how data are collect might seem mundane, it in fact represents a tremendous amount about about the work practices and organizational context of CHWs.

2.2 Information and Communication Technologies for Development: Critiques and Opportunities

The promise of technological and computational interventions for addressing the core concerns and issues of development has catalyzed the field of information and communication technologies for development (ICTD). A key premise of ICTD is that technology can be used to help expand the capabilities of target populations and address gaps of economic development, education, human resources, and health (Patra et al., 2009). Consequently, NGOs, governments, and for-profit organizations have invested large amounts in building ICTD technologies in hopes of improving the lives of others (Lahiri and Pal, 2009).

But in the last few decades, the initial optimism of technology has been tempered by a number of failed projects. Root causes have included inappropriate technology, inadequate infrastructure to support the technology, inadequate training, redundancy in technology solutions, regulatory obstacles, and the lack of a sustainable plan to support and operate the technology after the initial pilot system (Dodson et al., 2012; Rogers, 2010). In many cases, ICTD projects become burdensome for the local community. In response to the proliferation this "pilotitis", Uganda instituted a highly publicized moratorium on mobile health (mHealth) projects in 2012 because of the number overlapping and unproven projects (McCann, 2012). Tomlinson et al. (2013) found that numerous mHealth pilot projects have shown inconclusive results regarding their effectiveness and ability to be scaled up and implemented and recommended better coordination between governments, funders, and industry.

In light of the challenges faced in implementing successful ICTD projects, researchers and practitioners have shared a number of "lessons learned" reports that outline the specific ways in which these projects have succeeded or failed (Anokwa et al., 2009; Batchelor et al., 2003; Grameen Foundation, 2011; Donner et al., 2008). Common to many of these reports are several themes, including: failing to anticipate and respond to local needs and infrastructures, failing to integrate into existing sociotechnical arrangements, underestimating the logistical and technical support and training needed for implementation, and failing to provide a sustainable plan for continuing the technological intervention beyond the initial pilot program.

The prevalence of these themes suggests fundamental deficiencies in how technologies are created in ICTD, leading some researchers to question whether technology can address the challenges of development.

One critique levied against ICTD projects is the almost exclusive focus on the instrumental uses of technology. In this context, "instrumental uses" refers to the strictly controlled use of technology for prescribed purposes in order to accomplish predetermined, instrumental goals, such as using a device only for work. This is in contrast to "non-instrumental use," which refers to activities engaged in for leisure and entertainment rather than for education or work. Some ICTD researchers believe that non-instrumental uses of technology such as playing games and using social networking are intrinsically valuable (Sey et al., 2013; Ferreira, 2015), valuable for building broader computing skills (Kolko and Racadio, 2014), or for improving self-confidence in one's work (Schwartz et al., 2014).

In addition to understanding the value of non-instrumental technology use, other researchers have suggest investigating how technology use fulfills users' aspirations (Kumar and Parikh, 2013; Pal et al., 2009). This perspective argues that technology can be more impactful if we can understand the aspirational reasons users adopt technology in the first place, such as a means for improving social status.

In their study of laborer's perceptions of technology in Karnataka, India, Pal et al. (2009) found that many participants believed that having access to technology was a pathway to a better future for their children by providing access to education and employment, thus providing a means of improving their own social status and power. This is notable since an overwhelming number of participants in this study had never used a computer. Their perceptions were based on seeing computers in places like bus stations, banks, and village council offices. Despite their limited, second-hand exposure to technology and little conceptual understanding of its capabilities, being able to use technology was believed to open new doors. This aspirational view of technology has not always been there, and Pal and his colleagues (2009) hypothesize that this shift is due to the visibility of technology as filtered through mass media and politics of a growing cosmopolitan Indian middle class, itself fueled largely by the booming technology and software industry. Kumar and Rangaswamy (2013) similarly found that youths in the slums of India enjoyed higher social status with their peers by sharing knowledge on how to download music to their phones.

These examples from the Indian context have encouraged ICTD researcher to look past the instrumental value of technology and look at other ways technologies can be transformative.

2.2.1 Technology as an amplifier of human intent

Another prominent critique of ICTD questions how technology adds value. Rather than focusing on what kinds of new value technology adds (for example, instrumental, non-instrumental, aspirational), Toyama (2011) argues that technology can only amplify existing human intent. In the additive view, technology intrinsically adds value by virtue of being available. In the additive view, technology intrinsically adds value by virtue of being available. The additive view is the reasoning behind projects like One Laptop Per Child (OLPC), where the OLPC founder and MIT professor Nicholas Negroponte exclaimed that he would take laptops and drop them out of helicopters, "where children will teach themselves to use the devices" (Hachman, 2011). The assumption here is that the simple introduction of the computer is sufficient to have a positive impact.

Instead, Toyama argues that impact of technology is multiplicative. Having technology available is not enough to have a positive impact. Technology amplifies human and institutional capacity already present. If human and institutional capacities are limited, so too are the impacts of technology. Thus, in settings like the developing world where there are already great disparities between members of society, technology can only magnify these differences. Toyama identifies three recursive modes of amplification:

- Differential access: people with greater power consistently have better access to technology than those who do not. Power may come from having better access to resources like money or transportation. Over time, the technology increasingly caters to those with better access to it.
- Differential capacity: some people are better equipped to use technology for their own purposes. This differential is often education, but there are other factors, like differences in social skills and self-confidence.
- Differential motivation: individuals have different reasons for using a technology, both different from each other and different from the technology's intended use. A technology loses its impact if people are not interested in using the technology as intended.

These modes of amplification can set off a repeating cycle that continually leaves technology out of reach of the disadvantaged. Toyama's outline of technology-access differentials draws clear parallels to the sociological concept of cultural capital, which describes the non-economic determinants of social mobility, such as education, credentials, and other markers of social status (Portes, 1998). What Toyama and cultural capital theorists both highlight is the self-enforcing quality of status and access.

2.2.2 Fixing the failures of the design process

In order to address the negative critiques of ICTD, many technology designers and researchers are turning to critical theoretical frameworks and design methodologies to understand why technologies have not been the panacea they were anticipated to be. One such critical framework is postcolonial theory. Postcolonial theory is a critical perspective that understands and examines how the state of the world now is the consequence and reinforcement of global politics and economic forces stemming from the spread of colonization and globalization. Irani et al. (2010) uuse post-colonialism to examine how technologists both design and deploy technology. Mainstream design processes perpetuate many of the same ideologies perpetrated by colonization. This includes the paternalistic viewpoint that the global North can and should use technology to help the disadvantaged global South. Designers design at a distance “where they develop solutions wholly separate from where they will be used.” Finally, these projects are driven by capitalism and globalization to make a profit, overshadowing any intention of making technologies appropriate for users and their context (Mays et al., 2012).

Irani et al. argue that design research is always culturally situated and power laden and that we must directly confront those issues. The authors identify three phases of a context, culture and power-sensitive design process: engagement (how users become involved in the design process); articulation (how designers frame and understand the design situation); and translation (how design requirements become design solutions). These phases can take on many forms, but they have a shared focus on facilitating mutual understanding and decision making with the intended users of the technology, rather than abdicating control of the outcomes of the technology solely to the designers and researchers.

2.2.3 ICTD and Health

These larger critiques of ICTD research introduce a set of concerns and theoretical challenges to many technology-driven development projects. Such critiques are especially relevant to ICTD projects in health, which grapple with various groups of users, including policy-level stakeholders, vulnerable patient populations, and overworked health system employees. Design and implementation projects in the health field have demonstrated the concerns discussed in the previous sections.

An overarching concern within ICTD and health technology has been creating deployments that are culturally and contextually appropriate and which can be used within existing infrastructures and practices. The Partopen, a digital partograph-recording pen deployed in Kenya, was designed so that it did not require network connectivity and could be easily recharged using standard mobile phone chargers (Underwood et al., 2013). Other projects have carefully considered the importance understanding the larger ecosystem of technology, people and expertise (Kolko et al., 2012). In another study of mobile-phone based data collection, community health workers complained of limited battery life, the rigid data entry flow required by the application and the need to still do some paper-based data collection (Medhanyie et al., 2015).

In addition to the need for the deployment of technology being appropriate, the way that the technologies are evaluated also need to be changed. Chang et al. (2011) conducted what is called a ”pragmatic trial (Zwarenstein et al., 2008)” of an mHealth intervention for HIV/AIDS for peer health workers to report on antiretroviral therapy adherence. As a “pragmatic trial,” the intervention provided a general framework while allowing a high level of flexibility to adapt to local needs.

Natarajan and Parikh (2013), citing Dourish and Mainwaring (2012) andEscobar (1995), argue that interventions aimed at health information universality are reincarnations centralized authority and the standardization of knowledge. Natarajan and Parikh worked with an NGO to study the information access and disclosure practices of HIV-positive women in India. They found that addressing sociocultural factors like gender-based access to information technology and affective relationships was incompatible with efforts of standardization and measurement. The donors of the NGO wanted hard, quantitative metrics, which pushed the NGO to give priority to the donors’ requirements over the needs of the community. Reflecting on this tension, Natarjan and Parikh argue that institutional pressure to adopt universalized health information access is counterproductive to meeting the needs of those for whom the intervention is designed.

Several health-related ICTD projects also demonstrated the aspirational meanings of technology use, particularly for less trained health workers. Midwives in Uganda who used an adapted ultrasound device for maternal health wanted to learn more about sonography after using the device (Kolko et al., 2012). Low literate lay health workers in India felt more effective and respected after using a multi-media phone-based tool to deliver health education (Treatman and Lesh, 2012). Kumar et al. (2015) and Kumar and Anderson (2015) similarly found that lay health workers who used small digital projectors to share health videos for groups felt better engaged with their communities. In both projects using technology enhanced the community health worker's social status and legitimacy with community members as well as with their more highly trained colleagues.

Chang et al. (2011) found that Ugandan health workers who used a mobile application to report drug adherence felt empowered to be more truthful and more communicative with other clinic staff members. For many of these projects, graphic and video-based health tools bolstered the confidence of low literate health workers in sharing health information with their communities.

Similarly, in her work looking at the mobile dissemination of community-generated health videos,Kumar and Anderson (2015) found that women developed expertise in using their mobile phones and sharing multimedia content as a way to overcome constraints imposed by a patriarchal culture. Several user studies of mobile-phone based tools for community health care workers also found that users perceived a real increase in social status through the use of technology, further supporting the aspirational nature of these tools (Fiore-Silfvast et al., 2013; Ramachandran and Canny, 2010; Ayiasi et al., 2015).

Health projects in ICTD also demonstrated the issues of differential access, differential capacity, and differential motivation as described by Toyama (Toyama, 2011). Health organizations actively restricted health workers from accessing health technologies through a number of intentional and unintentional strategies. In an effort to prevent losing expensive and hard to replace mobile phones, organization locked up phones each day (Kumar et al., 2015) or required health workers to pay replacements if the phones got stolen or lost (Chang et al., 2011). These efforts to curb theft and damage discouraged use of the devices altogether.

Other users were kept from using health technologies because they lacked sufficient resources. A study of South African patients found that they could not afford airtime for their mobile phones or keep their phones charged (Jack and Mars, 2014). In a project studying remote online doctor-to-doctor consultations in Ghana,Luk et al. (2009) found that urban doctors were less likely to adopt the technology than rural doctors. In rural hospitals, there were only one or two doctors using the facility's sole computer, making the computer easier to share, while in urban hospitals there were many more doctors per computer.

Many projects directly confronted the challenge of differential capacity. Where users were unable or uncomfortable in using technology because they lacked education or self-confidence, these projects supported intermediated use—the use of a technology through another person. Sambasivan et al. (2010) studied technology use in Bangalore slums and identified three kinds of intermediated use: surrogate usage in which someone fully uses the technology on behalf of a user, proximate enabling in which someone inputs information on behalf of a user, and proximate translation in which someone interprets information on behalf of a user.

Intermediated use is a valuable strategy for addressing the technological disparities caused by differential capacity. Understanding the practice of intermediated use to address differential capacity is especially important for health technology, where users can be quite diverse in both health and technical literacies. Jack and Mars (2014) conducted a survey of urban and rural patients in South Africa where they found that that 37% of respondents shared their phones with other people, 22% loaned their phones to others, and 54% received health messages for other people. These findings showcase the prevalence of intermediated access and highlight how technology interventions should support it.

Several projects involved training health workers to facilitate community health education meetings (Kumar et al., 2015; Kumar and Anderson, 2015; Vashistha et al.; Treatman and Lesh, 2012). In these projects, health workers served as intermediaries for the community in accessing the video and multimedia content on their devices.

Intermediated use can also be beneficial when health workers are the users. Medhi et al. (2011) compared the accuracy of entering data directly into a mobile device to calling a data-entry operator. They found the data entry operators to be more accurate. Nevertheless, numerous technology deployments focus on the use of CHWs to enter the data into their systems.

Issues of differential motivation arise when health workers are not interested in using new health technology interventions as intended. On one hand, health workers may be interested in using their work devices to access Facebook, take photos, and share music (Kumar et al., 2015; Schwartz et al., 2013). Schwartz et al. (2014) explain that encouraging such non-prescribed uses of the technology helps health workers in building a stronger sense of agency, accomplishment, and responsibility. On the other hand, health workers may be reluctant to use devices altogether because the devices increase or duplicate their work (Medhanyie et al., 2015). Understanding how differential motivations impact the success of health technology deployments remains an ongoing area of research.

Technology access and use throughout the developing world is largely male-dominated, while community health workers worldwide are mostly women. Thus interventions aimed at community health workers or maternal and reproductive health must implicitly confront gender dynamics. Yet few projects directly address gender in their objectives (Flynn-Dapaah and Rashid, 2010). The challenge of gender dynamics is especially acute traditional households in which men make health decisions for the family. Ormel and Magbity (2012) conducted interviews with community members in Sierra Leone to determine the feasibility of using mobile phones to improve communication between health workers and community members. Female participants described how their husbands made health decisions for the women. Some female participants feared how their insecure husbands would react to the women having their own phones. In a mobile phone-based consultation project in Uganda, researchers found that direct home visits by community health workers helped husbands better support their wives during their pregnancies. In other cases, the introduction of mobile phones encouraged men to be more engaged in their wives' care (Kumar et al., 2015).

With respect to postcolonial concerns, researchers have argued that health projects in ICTD inadvertently repeat colonial patterns of control and authority. In a survey of international mobile health projects, Al Dahdah et al. (2015) found projects like the Mobile Technology for Community Health's (MOTECH) maternal health care follow-up tool as being largely driven by US-based stakeholders. But across the mobile health landscape, few projects clearly document the key public and private actors and funders of the research. This omission makes it difficult to evaluate the economic and political implications of this work.

2.3 Trust, teamwork, and collaboration of CHWs

The previous section contained examples of the emerging influence of technology on health care work. But alongside the technology, those examples also hinted at the interpersonal relationships that health workers like CHWs form with each other and with members of their community.

CHW's relationships are centered on trust. Previous research has investigated the roles that trust play in community health work (Gilson, 2003, 2005). CHWs form relationships with community members, with their peers, and with their supervisors. Trusted relationships provide legitimacy to both health institutions and health workers and enhance morale and motivation for the workers.

Through an ethnographic study of CHWs in Southern India, Mishra (2014) identified different strategies for CHWs to use to successfully build trust. First, CHWs should interact and talk to the village regularly. Second, CHWs need to concretely demonstrate how they are able to improve the health of the community, such as giving out medications or financial incentives. Third, CHWs should be responsive to local needs and traditions. These trust-building strategies work because they show the community how the work of CHWs has an impact on the community. These strategies also frame health institutions as being agents of goodwill, which can encourage community members to seek preventative health services.

Of these trust building strategies, responding to local needs and traditions is one of the most challenging because it requires CHWs to reconcile institutionalized Western ideals of medicine with traditional and local values in order to remain legitimate. One example of this integration was to describe health services, like vaccination, in terms more acceptable to the community. Many vaccination drives are focused on the national eradication of a single disease—a recent example of this is the Pulse polio program (National Health Mission of India, 2014)—but community members did not care about fulfilling national objectives. Instead, Mishra (2014) found that community members were more willing to get vaccinated when CHWs described how vaccinations improve overall health, thereby respecting the local concern of protecting children from disease. CHWs were also successful when they addressed all of their patients health needs, not just the needs addressed by government programs. Finally, CHWs responded to local needs and traditions by participating in traditional birth ceremonies that are meant to ward off harm, and by acknowledging local explanations for diseases.

It is important to note that the strategies described above may not be universal Goudge and Gilson (2005). Different communities have different modes and signals of trust. A study by Riewpaiboon et al. (2005) of working class and middle-class women in Thailand, for example, found that working class women were more trusting of reputable healthcare providers in their kinship networks while the middle class women were more trusting of healthcare provider whom they paid. Thus, trust is socially situated and needs to be examined in context.

2.4 Computer Supported Cooperative Work and Community Health Work

Community health work in the developing world is a productive area for contributing to CSCW knowledge. The previous sections highlighted how the design and deployment of technology is shaping the way CHWs provide primary health care. Despite the prescribed, and often constrained, uses of these technologies, CHWs have to be able to shift and adjust in response to evolving community needs. The previous sections also described the importance of interpersonal relationships in being able to provide that care. As described in the previous, health care workers strive to build trust in their communities. Additionally, the community health work environment is heterogenous and encompasses a wide variety of locations, including clinics, community member's homes, and administrative offices. Technology, relationships, and complex work sites are topics well explored in other domains within computer-supported cooperative work (CSCW), but community health work itself remains understudied in CSCW. Nevertheless, trends in global health should motivate CSCW to investigate community health work more closely.

2.4.1 Task shifting

In order to meet the shortfall of highly trained health providers, many health ministries and governmental organizations are introducing (or re-introducing) community health workers. CHWs are a cadre of health workers whose goal is to close gaps in health service delivery where health care service providers are rare. They are particularly important in improving access to the delivery of care activities that do not require the highly specialized level of training required to be a physician, such as providing health-related counseling or administering medications (World Health Organization, 2008).

More generally, this is known as task shifting. Task shifting refers to the transfer of responsibilities from one class of worker to another, typically shifting highly skilled tasks to lower-skilled workers. Examples of task shifting include moving work from physicians to non-physician clinicians, from non-physician clinicians to nurses and midwives, or from nurses and midwives to nursing assistants and other lay health workers. This shifting of responsibilities is extremely valuable in environments were there are very few fully qualified health professionals available to provide specialized care. By allowing existing lower-skilled workers such as CHWs to fill some of the responsibilities of more skilled healthcare workers, access to quality health care could be improved.

CHWs with lower levels of training, for example, are delegated roles that focus more on support and education, activities that other health care providers are too taxed to provide, rather than direct treatment. This delegation can range from the transfer of a few key tasks to the complete collapsing whole sets of responsibilities.

Task shifting has recently risen to prominence as an important strategy in global health, receiving attention in academic circles and in the media. In 2008, the World Health Organization held the First Global Conference on Task Shifting (World Health Organization). In 2009, the World Medical Association adopted a resolution on implementing task shifting (World

Medical Association, 2009). And in 2014, the UK-based newspaper The Guardian published an article explaining task shifting to a wide and general audience (Leach, 2014).

In 2013, the Indian government issued a memo to better delineate the roles between several kinds of community health workers, but the memo also confirms that these workers should sometimes be able to stand in for each other (of Women and Development, 2013). This illustrates that even when with the expansion of a cadre of workers, it's not always clear how they fit in.

The Health Workforce Advocacy Initiative (Baker et al., 2007) identifies four simultaneous goals for task shifting, including:

1. share and assign tasks among health workers in the most efficient manner in order to take advantage of the different competencies of the existing mix of health workers.
2. take advantage of simplified health promotion and treatment protocols that permit task-shifting to less intensively trained and specialized cadres of health workers.
3. shift more health promotion and treatment and care delivery to the community level by introducing new or strengthening existing cadre of community health workers
4. increase access to health care and advice in under-served communities, particularly rural communities.

Similarly, the World Health Organization (World Health Organization, 2008) has developed twenty-two recommendations on how to implement task shifting, related to the core areas of adoption; regulation; quality of care; sustainability; and organization. While their guide is focused on using task shifting as a means of strengthening health systems to combat HIV, the overall recommendations and content of the document could be suitably applied to the strengthening of health care systems in general.

The kind of task shifting described in the World Health Organization recommendations can be described as *vertical task shifting*. In *vertical task shifting*, responsibilities are shifted downward from highly trained and skilled workers to less skilled or less trained workers. But in evaluations of task shifting efforts in both Uganda (Dambisya and Matinhure, 2012) and Tanzania (Munga et al., 2012), researchers found that task shifting on-the-ground not only occurred vertically, but it also occurred horizontally. In *horizontal task shifting*, responsibilities are shifted to other workers of similar, but different, skill level. In the Uganda study (Dambisya and Matinhure, 2012), horizontal task shifting occurred when nurses or midwives who were not cross-trained were posted as the sole health worker responsible for both types of practice.

While vertical task shifting is intentional and formal, enacted through health worker training programs and staff placement, horizontal task shifting is contingent and informal. It is a situated response to immediate resource shortages, and horizontal task shifting can . In the Tanzania study, horizontal task shifting was also described as being the most common kind of task shifting, such as drug dispensaries being manned by administrator with limited medical training, or district hospitals being directed by junior medical providers.

Examples of horizontal task shifting illustrate the practical limitations and real-world constraints of task shifting. Because task shifting relies on being able to create a robust cadre of lower-level health workers, and is thus sensitive and responsive only to certain types of staffing patterns. Vertical task shifting programs rebalance skills in a workforce through training, but it is premised on there being a large enough workforce at lower-level cadres to actual shift the work to. But when there is a shortage of health care workers at all training and skill levels, the workload of the existing workers grows larger. This pile-up of work is called horizontal task shifting.

Vertical task shifting requires careful planning, investment in education, and oversight to maintain positive health outcomes. Thus, vertical task shifting not only involves the transfer of health skills, but also implementation and strengthening of management and supervision structures. Because these different factors need to align, vertical task shifting paradoxically requires an “ideal” human resource situation.

In contrast, horizontal task shifting is more tactical and informal. It’s the immediate and on-the-ground response of a health organization when there is a shortage of highly skilled health workers, lower skilled health workers, and a shortage of management and supervision structures. Understanding the distinction between vertical and horizontal task shifting is important because it highlights how difficult it is for vertical task shifting do not apply.

Studies have also shown that task shifting can potentially produce successful health outcomes in the population. In a systematic review of task shifting in AIDS/HIV care, Callaghan et al. (2010) found that task shifting improved access to medications, improved quality of care, and was cost-effective.

Task shifting has also been shown to have negative impacts on workers, including overwork and burnout (Kruse et al., 2009; Baine and Kasangaki, 2014), which further compounds the challenges that CHWs already face. From a human resources perspective, there is a limit to what a health care worker can accomplish and by shifting and increasing work to a cadre of workers who may still require training, supervision, and support may serve only to delay, rather than prevent or reverse, the shortage of health professionals in resource-constrained settings.

Two important drivers have made task-shifting a more viable and desirable option. First, transferring responsibilities from one role to another requires the simplification and codification of the task to be transferred so that a less-trained cadre of health workers can learn that task. Second, the proliferation of mobile technologies such as tablets and mobiles can extend the capacities of health workers by providing education, scaffolding, and support for their new responsibilities (Braun et al., 2013; Tamrat and Kachnowski, 2011). And there is no shortage of tools catered towards CHWs in low-resource settings. These tools are aimed at supporting supervision, decision support, and data collection, e.g.(Grameen Foundation, 2011; Hartung et al., 2010). And, encouragingly, in short-term studies, these tools show promise at being useful and usable for frontline workers, e.g. (Medhi et al., 2012).

2.4.2 Task shifting and the design of technology

Task shifting is about the simplification and standardization of skilled work processes and procedures so that workers with less training can undertake them, and the idea of simplifying work has been a key interest for human-computer interaction (HCI), and particularly computer-supported cooperative work (CSCW). Consequently, both global health and

CSCW share an interest in related concepts of improving work.

One area of research is the digitization of paper-based work processes (Dell et al., 2015). Another area of research is in crowd work, which is the division of work into micro tasks that can be easily accomplished by a large number of workers (Kittur et al., 2013).

Though crowd work is directly enabled by and requires digital information technologies, recent scholarship in the area has challenged the equity and ethics of how crowd workers are treated (Irani and Silberman, 2013). These issues include the rights of the workers, the de-skilling of their labor, and their limited professional development opportunities. These issues have several parallels to the work of community health workers.

2.4.3 Informal Practices

As Pine (2012) notes, one of the key areas of investigation has been to understand the ways in which work of CSCWs can be decomposed into individual tasks and re-articulated into a meaningful course of action. In her study of nurses at a hospital in the United States, Pine adopts the term "choreography" to describe the "situated, embodied, and effortful work of coordinating multiple streams of action into a coherent performance of work." She uses the term choreography to distinguish itself from the related concept of multi-tasking. Rather than focus on how people use technology to maintain continuity of multiple tasks across multiple interruptions, Pine's study instead investigated how nurses weave together two distinct trajectories of work—patient work and documentation work—into a coherent set of actions. This framing has interesting implications for understanding work in the community health care context.

Another important area of investigation is the informal documentation practices of health workers. Fitzpatrick (2004) and Hardstone et al. (2004) recognize how recognize how health care workers rely on individualized, locally-generated informal documents for managing their patient care. Fitzpatrick (2004) calls these documents a "working record", which is defined as "an evolving distributed collection of complexly interrelated documents that provide clinician-centered views to complement the patient-centered chart." Hardey et al. (2000) investigate how acute elderly care nurses at a United Kingdom clinic use short, handwritten notes (or "scraps") for managing patient care. The nurses used scraps as more accessible and convenient than the hospital's electronic medical record (EMR) system for creating task lists and communicating patient care handoffs to other nurses. In another study, Chen (2010) similarly found doctors and nurses in a United States-based emergency department relied on paper-based documents and on white boards to document and communicate transitional events that could not adequately be captured by their EMR system. These studies demonstrate the central documenting transitional and contingent information is for workers, as well as the limits of EMR in supporting this core aspect of their daily work.

2.4.4 Boundary Objects

Interestingly, these analyses of healthcare environments and workers in the US tend to focus on artifacts like notes or working records that serve as "boundary objects." Boundary objects are objects that are shared by different communities to coordinate work and communication. How each community uses and understands a given boundary object is varied and often contested. The concept of boundary objects considers how tools and artifacts are multifaceted in the ways they address the needs of different communities. As an element of the theoretical perspective common in CSCW, boundary objects provide a platform for which work practices can be unpacked and understood. In the ICTD world, the prototypes and pilots built by designers often serve as boundary objects—sites of contestation and negotiation—and that (usually unintentionally) reveal complex working relationships and role multiplicities.

Star and Griesemer (1989) first defined boundary objects as

> "objects which are both plastic enough to adapt to local needs and constraints to the several parties employing them, yet robust enough to maintain a common identity across sites. They may be abstract or concrete. They have different meanings in different social worlds but their structure is common enough to more than one world to make them recognizable, a means of translation. The creation

> and management of boundary objects is key in developing and maintaining coherence across intersecting social worlds (p. 393)."

While boundary objects simultaneously serve different interests and communities in different ways (Larsson, 2003), boundary objects have distinctive features to make them similarly identifiable between these different communities.

What makes boundary objects a productive concept in CSCW, and the study of community health work, is how the field characterizes materials and objects as sites of coordination for groups working in different worlds, including communicating shared understanding (Henderson, 1999; Anderson, 2007)), enlisting participation (Henderson, 1999; Karsten et al., 2001), and satisfying the informational needs of each community of practice (Bowker and Star, 1999).

In her review of boundary objects, Lee (2007) iidentifies several areas where existing conceptions of boundary objects need to be further developed. First, what we might initially consider to be boundary objects, such as political borders or repositories, require discussion to be understood by multiple communities of practice, highlighting how they fail to meet the needs of those different communities. Additionally, boundary objects such as prototypes may require multiple iterations before it can meet the informational needs of its audiences, while they can also "break" in the face of organizational change, thus highlighting their fragility. Finally, the concept of boundary objects does not adequately describe objects to document traces and transition, such as sketches.

Thus, through her studies of museum exhibition designers, Lee (2005) argues that the concept of boundary objects may "not be up to the conceptual heavy lifting that many of us have been trying to assign to it (p. 393)." As an alternative concept, Lee proposes the complementary concept of *boundary negotiating artifacts* to describe objects that temporarily align communities practice around specific problems during larger projects. Boundary negotiating artifacts "record, organize, explore and share ideas; introduce concepts and techniques; create alliances; create a venue for the exchange of information; augment brokering activities; and create shared understanding about specific design problems (p. 403).” Boundary negotiating artifacts are produced in order to stabilize momentary gaps in work process.

Lee’s conception of boundary negotiating artifacts sensitizes investigations of collaborative tools to the flux and dynamism that shape objects used in practice. In the context of community health work, understanding boundary objects as being both stable and in flux helps to describe how government-required artifacts of work can be reinterpreted and reappropriated by community health workers.

2.5 Conceptual Framework

Building off previous literature, as well as off my own research experiences, I have developed a conceptual framework, illustrated below in Figure 1.1.

In Chapter 1, I first introduced the conceptual framework that structures the analysis of this study. As described in that earlier section, the conceptual framework was developed iteratively throughout several knowledge gathering phases of the study - during design, data collection, and analysis. As a whole, the conceptual framework characterizes the relationship and tension between health workers, their health institutions, and the tools that they use. Here, I introduce the conceptual framework in-depth, as well as provide more in-depth description on the theoretical lenses that are incorporated into the conceptual framework.

This conceptual framework was used to guide how I designed the study, collected the data, and organized the findings. The conceptual framework has been generated iteratively as the literature review and data analysis were ongoing to accommodate a changing understanding of the data. Specifically, I created this conceptual framework to help me understand and investigate the work practices of CHWs.

The conceptual framework is anchored by three main conceptual categories: health institutions, individual CHWs, and the tools and artifacts that health workers use. These three categories are drawn from the three theories that inform this study: the practice of everyday life, standpoint theory, and hidden work. The practice of everyday life frames practice—in the case of this study, the work practices of CHWs—as acts of resistance against institutions

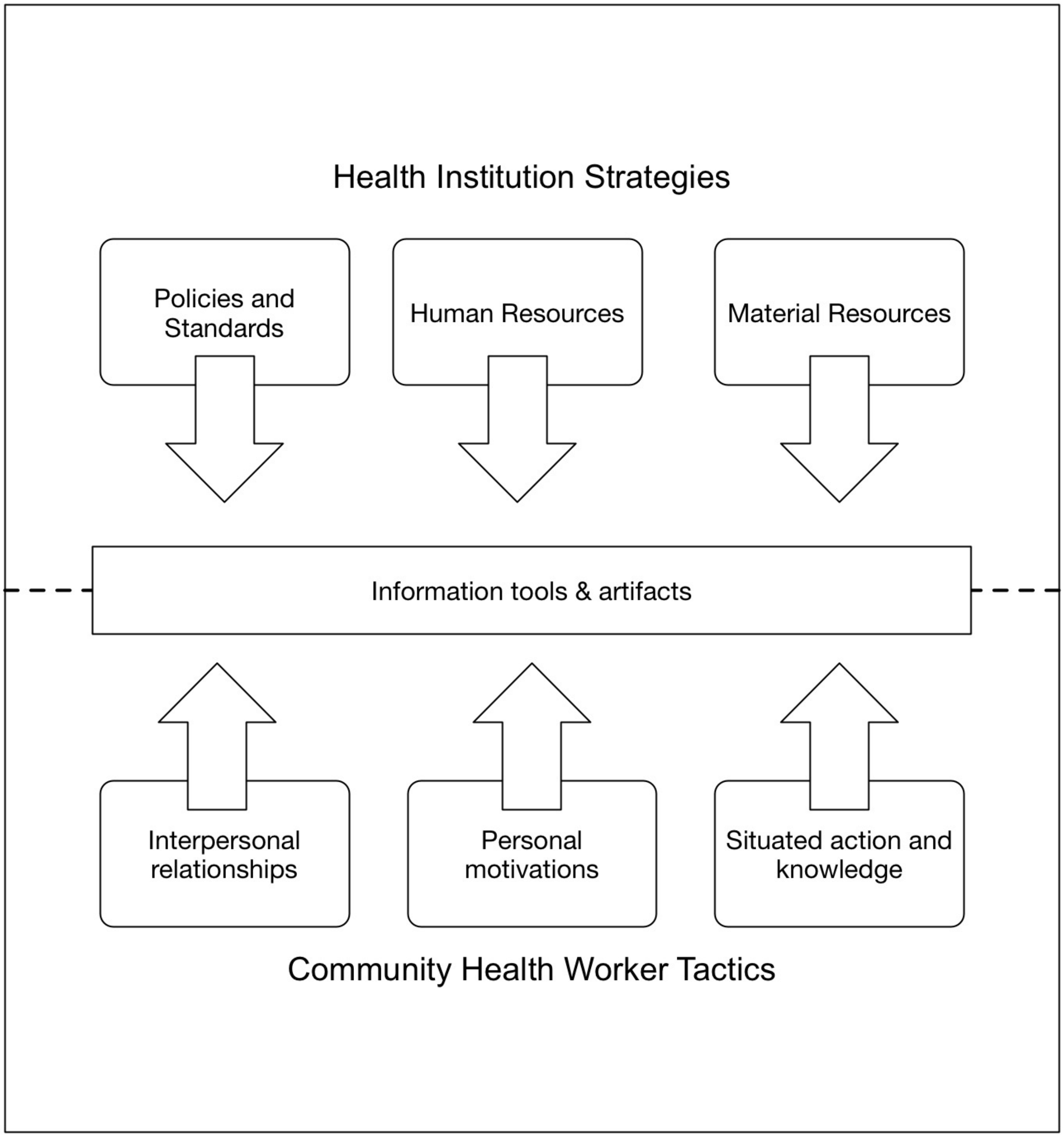

Figure 2.1: Conceptual framework for the dissertation.

that impose control over individuals who want to exercise their individual agency.

Health institutions enact their strategies through the policies and standards that are established at the international level (such as through WHO), national, and regional government levels. These policies and standards communicate what are institutional priorities and what the standards for those priorities are. Health institutions also enact strategies through the management of human and material resources, such as staffing, supplies, and infrastructure.

CHWs, in turn, deploy tactics for pushing back against institutional strategies. These tactics grow from the CHWs localized relationships with their community, their own motivations, and expertise.

Brokering these tensions are the information tools and artifacts that act as boundary objects between health institutions and health workers. These tools are developed and deployed by health care institutions , while they are used on the ground.

2.6 Theoretical Framing

In this section, I describe the theoretical concepts that ground the conceptual framework. These theories provide a lens with which to examine the work of CHWs and how we design technologies for them. These theories include Suchman's concept of "hidden work," Feminist Standpoint Theory, and Michel de Certeau's Practice of Everyday Life. The ecosystem of CHW practice is an entanglement of policies, institutions, social relations, practices, data, and tools. The frameworks described above are especially productive in conducting a nuanced analysis of the work practices of community health workers for the following reasons. First, these frameworks privilege the perspective (or standpoint), expertise, and agency of individual health workers and thus provide a much richer depiction of work than workflows. Second, in privileging the perspective of the individual health worker, these frameworks can inform an alternative approach to technical innovation that is situated in the day-to-day practice of workers rather than more abstract depictions. Third, by adopting a technological approach sensitive to local conditions, we can begin to strengthen the ability of institutions and structures to be better responsive to the daily needs of workers on the ground.

2.6.1 Hidden Work

Role descriptions and depictions of their workflows have been important in the development of technologies for CHWs. These workflows represent a standardization of routine of activities, practices, and tools. Consequently, workflows are a common focus of technological intervention because of their inherent transferability and scalability across many different settings or, as is the case of task shifting, across many different roles. Depicting work as workflows is also attractive for designing technologies because it allows for a neat mapping of features of the technology to parts of the workflow.

But Suchman (1995) argues that representations of work (such as workflows, role definitions, or job descriptions) are not neutral and instead represent specific interests and stakeholders. Technology designers, for instance, might not be interested in using representations of work that include aspects they believe to be beyond the scope of their technologies—aspects such as identity-formation, group membership, or informal learning. But this seems unnecessarily self-limiting—if we do not represent these important parts of work, how will technology ever support them? Suchman also points out that representations of work can promote stereotypes. This is particularly a risk for workers whose positions are considered low skilled. By flattening the complexity of what workers actually do, representations can hide the high level of skill, judgment, and expertise that workers deploy in order to do their work. Finally, representations of work are used for organizations to make reasoned decisions, but if these representations are constructed at a distance from what takes place on the ground (as is common in top-down design approaches in ICTD work), problems can arise. It is on the basis of these representations that policies are created about workers, the allocation of resources, the determination of workloads, and the evaluation of workers (Star and Strauss, 1999). How work is depicted impacts how technologies are developed or how social structures can be changed.

2.6.2 Feminist Standpoint Theory

Feminist standpoint theory is a multi-disciplinary body of theory whose focus is on recognizing that everyone occupies a specific standpoint shaped by factors such as social status, role in the community, gender, and race. This standpoint informs how people experience and make sense of the world. By providing ways to account for different standpoints—the standpoints of the CHWs, the designers, and the health institutions)— standpoint theory provides guidance on how to understand and describe CHW practice. Standpoint theory rejects the notion of a singular, objective truth and instead recognizes reality as being socially situated. It recognizes that we are physical, socially, and culturally situated in positions that give us access to and influence on certain aspects of the natural and social world. Second, this positionality influences our actions, our interests, and our influences. It also argues that our experience of reality is structured through sociological dimensions such as class, social status, race, gender, and sexual orientation, which together constitute a standpoint (Bardzell and Bardzell, 2011b). Thus, we share standpoints with those whom we share these sociological dimensions.

Occupying a disadvantaged viewpoint—or one that differs from the dominant group—can help individuals develop a sort of "double vision" of the world that allows them to have a more comprehensive and less distorted view of social reality (Campbell and Wasco, 2000). It allows them to understand the normative contours of the world molded by the dominant, advantaged viewpoint, while at the same time recognizing the ways that those viewpoints marginalize their own.

Another important aspect of feminist standpoint theory is that of embodiment (Harrison et al., 2011). CHWs are not only socially situated with respect to each other, the citizens they serve, and those who develop the policies and provide the resources that shape their work, they are also physically situated—their practices occurs at specific locations, during specific times and specific situations, and within surrounding systems. Paying attention to embodiment provides a way of discussing the environments, the tools, and the interactions of CHWs and how these help them make meaning in the world.

What's clear about the use of standpoint theory, however, is that it takes an ethical stance on how we should conduct research and account for different perspectives (Dourish and Bell, 2011; Bardzell and Bardzell, 2011a; Rode, 2011b; Harrison et al., 2011). Introducing standpoint theory to the context of global health provides an alternative view of the challenges of global primary health from being about systems, processes, and workflows. Instead, it reminds us that there are *people* at the center of our understanding. It's through this sensitizing lens that this study investigates the work of health workers.

But most importantly, standpoint theory is an important frame for this work because in resource-constrained environments, the communities in which research takes place often endure systemic oppression. One way to address this condition is through a reflexive and critical research process. Standpoint theory provides a methodological and theoretical orientation that enables this process.

2.6.3 Practice of Everyday Life

In complement to standpoint theory, I will also draw on Michel de Certeau's Practice of Everyday Life (1984), and in particular focus on his notions of tactics and strategies. For De Certeau, our day to day practices, even though they may seem humble and inconsequential, can be understood to be forms of self-expression and rebellion against the dominant power structures. These concepts will thus provide another way to analyze the sociotechnical context of health workers while recognizing their individual aspirations, motivations, and challenges.

I use De Certeau's thinking on the practice of everyday life from the field of practice theory, as a lens for investigating the day-to-day practices of community health workers. De Certeau's work is premised on the concepts of strategies and tactics.

He defines strategies as "the calculation (or manipulation) of power relationships—an effort to delimit one's own place in the world bewitched by the invisible powers of the other." In other words, strategies are the structural constraints imposed by institutions that constrain and prescribe the activities of individuals. They are exertions of power.

Tactics, in contrast, are "a calculated action determined by the absence of a proper locus." The proper locus here refers to a sanctioned social order, and, with this in mind, we can understand tactics as being the disruptive acts that individuals commit in order to push back against power structures to get by in the world. Tactics, thus, are a form of resistance and a pathway for re-configuring structural norms.

De Certeau uses the spatial and temporal exploration of Paris to illustrate the dynamics of strategies and tactics for urban dwellers, and, in so doing, inverts the birds-eye view of the city to a point of view situated on the ground. De Certeau motivates a similar inversion in this study: from a conceptual workflow view of the practices of health workers to one centered at the front lines of community health work.

As part of this dissertation's objective to describe the visible and invisible work of CHWs, analyzing the tactics CHWS deploy and the strategies they use to structure their activities, while at the same time examining the boundary objects in which these tensions take place, will help provide a more nuanced description of what that work looks like and what it is trying to accomplish.

2.7 Summary

In this chapter, I provided background on primary health care both globally and in India. I describe accounts and findings of what we know about the work of CHWs, including their workflows, work practices, and motivations. I also place this study within the broader CSCW literature and health ICTD literature. I concluded by describing the conceptual framework I use to investigate the research questions of this study.

Chapter 3

METHODOLOGY AND RESEARCH APPROACH

In this chapter, I describe and justify the methods used in conducting this study. The purpose of this study as a whole was to understand how health care workers in India conducted their work, the barriers they faced, and how they overcame those barriers. This study investigates the work practices of twenty-six health workers from five health centers. Three research questions guide this investigation:

1. How are the activities of community health workers determined by the structural conditions of their workplace?
2. How do health workers reconcile the contradiction between their prescribed roles and responsibilities and the emergent needs of the communities they serve?
3. How do health workers' information tools reflect and shape their idealized and actual practice with respect to how they engage with their colleagues and communities?

The data needed to address these three questions include (a) descriptive data; (b) demographic data; (c) and perceptual data. I took a qualitative approach that investigated behaviors and perceptions of health workers. Qualitative research is a "situated activity that locates the observer in the world" and "consists of a set of interpretive, material practices that make the world visible (Denzin and Lincoln, 2000)." The ultimate aim of collecting qualitative, observational data is to "draw large conclusions from small, but very densely textured facts (Geertz, 1977)."

In this study, a qualitative approach allowed me to discover previously undescribed phenomena and reinterpret the previously described experiences of health workers. This work tries to address subjectivities, individual experiences, and the ways that individuals make sense of the worldall of which are key to addressing the research questions laid out above.

Without being able to interrogate these *in context*, *with participants*, I would not have been able to address my research questions.

3.1 Summary of the Research Design

The follow list summarizes the steps I took to conduct this research.

1. I conducted an initial review of the literature to gain an understanding of the Indian health centers and the roles of community health workers within this system. I continued to review the literature after data collection to better situate the work and provide theoretical framing for data analysis.
2. I developed a multi-method research study protocol. The methods included surveys, semi-structured interviews, and direct observations.
3. I obtained approval from the University of Washington Institutional Review Board to conduct this research. I provided the study protocols, outlined the process for recruitment and providing informed consent, explained how I would handle the translation process, and how I would manage the data.
4. I identified and contacted potential study sites before and during data collection. In total, I visited five study sites: two health centers in rural settings, one health center in a peri-urban setting, and two health centers in urban settings.
5. I administered my survey at each health center to assess their staffing, capabilities, and services. This survey collected the data that would form an initial basis of comparison between the different study sites.
6. I interviewed community health workers using a semi-structured interview protocol to understand their roles, responsibilities, attitudes, and perceptions about their work. Depending on the study situation, these interviews were conducted either individually or in groups.
7. I conducted direct observations of CHWs work practices, staff-to-staff interactions, and staff-to-patient interactions in the health centers and in the fields where CHWs work. Direct observation provided new data and insight about work in health centers, as

well as provided a way to triangulate findings learned from other research activities. I captured data from my direct observations in field notes and photographs.

8. I transcribed my interviews and expanded field notes.
9. Analyzed and coded transcriptions, field notes, and photographs.

Three assistants translated the study materials from the original English into Kannada and interpreted some of the interviews. The assistants not only provided linguistic support but also cultural support for navigating the cultural context of the field sites.

3.2 Rationale for a multi-case qualitative study

This study is based on the the qualitative multi-case approach (Audet and d'Amboise, 2001). The multi-case approach draws on case study methodology, a methodology that generates intensive descriptions of a phenomenon, social unit, or system that is bounded by place and time (Algozzine and Bob, 2015). According to Merriam (1998) the purpose of the case study "is to gain an in-depth understanding of the situation and meaning for those involved. The interest is in process rather than outcomes, in context rather than a specific variable, in discovery rather than confirmation. Insights gleaned from case studies can directly influence policy, practice, and future research."

In this study, cases are defined by the study site, and they are united by the objective of carrying out primary health programming by the Indian government. For the different sites of this study, their prescribed function in the community is similar and they are acted upon by similar structural circumstances. However, this study is interested in understanding how each of the individuals respond (via their work practices and motivations) to these shared structural circumstances. This study wants to understand the similarities and differences of these individual responses.

The case-study framework works well for the overarching research questions of this study because it focuses on understanding individual practices in specific contexts, with the goal of making concrete recommendations and conclusions at a larger level.

Furthermore, trying to analyze these practices from the perspectives of participants includes asking participants to describe and make judgments and evaluations of their lived experiences. This is a challenging thing to ask participants who may well have a marginalized status in their worlds, and so a careful, multi-tiered approach was used in this research. This approach included the use of a survey, interviews, and observations.

3.3 Recruitment and Participants

From October to December 2013, I conducted research with 26 participants who worked in five health centers in Karnataka, India, near the city of Bangalore. These sites included two primary health centers in rural areas, one community health center in a peri-urban area, one family welfare center in an urban area, and one primary health center in an urban area.

My recruitment strategy was non-probabilistic, purposive sampling. Non-probabilistic purposive sampling is a sampling strategy in which participants are recruited based on the researchers evaluation of their appropriateness for the study rather than randomly choosing participants from a given population (Teddlie and Yu, 2007). Non-probabilistic purposive studies are appropriate for building an in-depth understanding of complex and sensitive phenomena (Bernard, 2011).

I selected five study sites to represent a range of settings: rural, peri-urban, and urban. Within these specific sites, I recruited participants in specific roles that existed across the different study sites. Professional colleagues provided initial contacts in India who had relationships with primary health centers. These contacts included university faculty at Indian universities who were engaged in collaborations with health centers, research assistants and employees at local non-governmental organizations (NGOs), and contacts of my interpreters and translators. The study sites are further described later in this chapter.

At each site I requested and confirmed my permission to conduct interviews with the staff of these centers, as well as conducting direct observations at the clinic or when health workers went on field visits. Prior to approaching participants, I received verbal permission from someone in a supervisory capacity at the clinic (such as a medical officer, administrator, or health supervisor). This supervisor would then identify which staff would be available to participate in the interviews.

I directly approached potential participants. I described the study, assessed their interest in the study, assessed their linguistic ability, and obtained their consent. Consent forms and interview guides were translated into Kannada, the local language, and both English and Kannada copies of documents were provided to participants. I conducted interviews and surveys in English. When an interpreter was available, I asked participants if they preferred to conduct the surveys and interviews in English or in Kannada. During some interview sessions, I also had the assistance of a note taker, who spoke English and had a limited fluency in Kannada. At the end of these sessions, I debriefed with the note taker and interpreters to discuss salient themes from the interviews.

I did not offer participants an honorarium for their participation based on guidance from colleagues local to the area.

3.3.1 Recruitment criteria

The primary recruitment criteria was that participants be current employees of a health center in India and 18 years of age or older. I originally recruited from the following categories of health workers:

- Medical officers who are responsible for providing care and overseeing the administration of the health center.
- Staff nurses who, in collaboration with the medical officer, provide direct care to patients in the clinic.
- Male and female junior health assistants (JHAs), Accredited Social Health Activists (ASHAs), and a group of workers called Link workers who conduct field visits outside the clinic to administer basic care, provide checkups for government programs, educate patients on health topics, and encourage patients to seek care at the clinic.
- Support staff who help with the day-to-day operations of PHCs such as administration and maintaining the facility.

Clinic Role	Urban	Peri-Urban	Rural
Medical Officer	1		1
Staff Nurse			1
Lady Health Visitor	2		
Male Health Supervisor	1	1	
Female Junior Health Assistant	2	2	4
Male Junior Health Assistant	2		3
ASHA or Link Worker	2	1	
Lab Technician			1
Pharmacist-cum-Accountant			2

Table 3.1: Overview of study participants by role and health center setting.

- Lab technicians who examine and test biological specimens.
- Pharmacists who dispense medication and provide administrative support.
- Supervisory staff who directly supervise male JHAs and female JHAs. The official titles for these roles were senior male health assistant and lady health visitor.

Senior male health workers, lady health visitors, junior health assistants, lab technicians, and pharmacists require a post-secondary education of two to four years. Medical officers require further post-graduate training. Lay health workers such as ASHAs and link workers do not require any post-secondary education.

A summary of participants recruited and grouped by study setting (urban, peri-urban, and rural) is listed in Table 3.1.

3.3.2 Research sites

The primary health centers, community health centers, and family welfare centers in this study are first-level health facilities positioned to address the basic health needs of the community through curative, preventative, and promotive health care. While these first-level health centers are meant to serve the health needs of the entire population, they are more often a resource geared towards serving the neediest, such as the rural, the poor, and the marginalized. These centers also act as a point of referral to higher-level health facilities for more complicated health issues. Those with higher socio-economic status usually have access to a broader range of health care options, including private clinics and hospitals, and thus do not seek care from the centers in this study.

The location of a health center can impact how thoroughly health care standards are implemented. To understand these differences, the research takes place at urban, peri-urban, and rural health centers. Selecting sites in different settings allowed this study to investigate similarities and distinctions between and within these settings.

Urban health centers were located within the city limits of Bangalore, and the boundaries of the regions that they served were often limited in area, but at the same time very densely populated. These health centers also often included informal settlement areas such as slums. Urban health centers were also located close to a myriad of other health providers in the city, including private practices, other public health centers, and university and private hospitals.

Peri-urban health centers were located on the outskirts of the city. These areas were less dense compared to the location of urban primary health care facilities, but many of the workers commonly commuted from the city. The number of health facilities available in peri-urban locations was fewer than those available in the city.

Rural health centers were located far from the urban center and had a much less dense population. Rural health center sometimes served multiple villages. Residents of these communities typically worked in agriculture. Access to other health facilities was very limited, which made health centers the primary source of health care in those communities. I describe the study sites in more detail in Chapter 4.

3.4 Data Collection

This study used three main data collection methods: a clinic site survey, semi-structured interviews, and direct observation.

3.4.1 Site Survey

At each study site, I administered a clinic site survey to collect data on the types of care and services that the health clinic provided. The survey was adapted from health center assessment materials developed by the government of India (of Health and Welfare, 2012). The data collected in the survey allowed comparisons between each study site, as well as comparisons of each study site with nationally established standards.

The survey asked questions regarding the number of staff the clinic had, the size of the populations the clinic served, and the health programs and schemes in which the clinic was currently participating. Sensitive questions regarding the castes of patients that the health centers served were omitted from the instrument as requested by the University of Washington Institutional Review Board.

I administered the survey verbally with a health center employee in a supervisory or leadership role who would be able to answer detailed questions about the overall day-to-day operations of the clinic. I conducted the survey with medical officers where possible, but also conducted it with senior male health workers, lady health visitors, and administrators.

The survey interview was also used as a way to build rapport with staff at the site. An advantage of surveys is that they are easily administered and provide an unobtrusive way of interacting with participants.

In staying close to the original survey created by the Indian government, the survey remained primarily a quantitative study instrument while, at the same time, complementing the structured interviews and direct observation activities. I relied on these other, more qualitative methods to help ascertain the reasons for or consequences of significant discrepancies.

The final clinical survey instrument can be found in Appendix E.

3.4.2 Interviews

I conducted semi-structured interviews with clinic staff to discuss and understand their work responsibilities, their motivations, and their challenges. Semi-structured interviewing is a method in which a researcher develops a set of questions to ask a participant as a starting point but is otherwise free to explore other lines of questioning as new themes unfold during the interview (Weiss, 1995). Unlike structured interviews, where each participant is asked the same set of questions, semi-structured interviews treat the questions as a point of departure, giving the interviewer flexibility to ask other questions throughout the interview in order to explore emerging topics of interest or to get participants to elaborate on issues that they have brought up. The semi-structured interview protocol focused on learning, in the participants own words, what their roles and responsibilities were at the clinic, how they collaborated and worked with other clinic employees, and what some of the tools they used in their work were. For example, I asked questions to describe what health workers did on a day-to-day basis, what they enjoyed most about their work, and what they did not enjoy about their work.

Semi-structured interviews were appropriate because a goal of this study was to understand the roles and responsibilities of participants in both a concrete, definitive sense (and in their own words), but also to use these definitions as a point of reflection on their perceptions, understandings, and attitudes toward their work. Semi-structured interviews also provided the flexibility to modify questions so that the content remained steady, but the phrasing was more accessible for participants. This was especially important given the potential language barriers between the participants and me.

The semi-structured interview protocol began with relatively concrete, descriptive questions (such as asking participants to describe what they did that day), so that I could better establish rapport with them (Charmaz, 2006). AAs participants felt more comfortable with my interpreters, my note taker, and me I progressed to more reflective, perception-related questions of the participant, such as what they would like to change about their work.

While everyone was asked the same core questions, semi-structured interviews allowed my lines of questioning to evolve and my understanding progressed throughout the study. I triangulated responses from other participants and explored unanticipated topics across sites. In cases where I was able to conduct interviews after direct observations, I used the interviews to investigate specific observations in more detail. Conversely, the findings of the semi-structured interviews guided my direct observations.

Appendix G contains the semi-structured interview protocol in English and in Kannada.

3.4.3 Direct Observation

My third research method was conducting direct observations of health workers both inside and outside the health center. Direct observation as a qualitative research technique allows the researcher to see first hand the activities and practices that take place at the sites and context of interest (Bernard, 2011).

Generally, "direct observation provides much more accurate results about behavior than do reports of behavior (Bernard, 2011, p. 323)." When used in conjunction with other research methods, direct observation can corroborate, validate, or contradict what participants might have described during semi-structured interviews. When studying behavior, for example, there is often a discrepancy between what people do and what people say they do. The reasons for this vary, including participants inaccurately recalling what they actually do and instead providing a response to reflect more what they should do.

To initially guide the direct observation, I created an observation guide based on the AEIOU framework (Martin et al., 2012). AEIOU stands for Actvities, Environments, Interactions, Objects, and Users. It serves as a useful mnemonic for structuring what types of things to observe during the field visits.

I conducted observations with community health workers during their field visits to community members' homes. I also conducted observations at the health centers. While collecting my field notes and observations, I minimized my interactions with both health workers and other individuals who were not study participants. However, at times between events, I sometimes asked participants to clarify or describe what had just taken place

As part of my direct observation data collection, I initially composed jottings, or shorthand notes, of my observations. I later expanded those jottings into field notes. The field notes provided an "account describing experiences and observations the research has made while participating in an intense and involved manner (Walford, 2009)." These accounts represent only my own perceptions and worldview and thus are not the only correct account of my observations. I recorded voice memos at the end of the day as a way for me to debrief myself on what happened. I also took photographs of the health center settings, the field settings, uncompleted records, artifacts, and the various data collection and record keeping tools and devices that community health workers used in their daily work

Patients were not the focus of this study and they constituted a vulnerable group, thus my field notes avoid collecting details of patients or any direct quotations of what was discussed with any health participants.

Appendix F contains the direct observation guide.

3.5 Data Analysis

3.5.1 Forms of Data Collected

The primary forms of data I collected were transcripts generated from digital audio recordings of interviews, photographs taken during direct observation, and field notes generated from observation. Additionally, sketches of workflows and diagrams were generated throughout the study to capture and illustrate the workflows of participants. All interviews were digitally recorded and transcribed either by me or by an outside professional firm. Within the transcripts participant names were replaced with study codes.

Another source of data was the photographs I took over the course of the study. I took photographs at each of the health centers upon my arrival, during direct observations while accompanying health workers, and, after I had spent some time with clinic staff, in between interview sessions. The use of a mobile phone for documenting photographs also provided useful metadata that helped in reconstructing the account of this study, including timestamps and GPS coordinates. Photographs also provided visual support for tools and phenomena described during other research activities.

3.5.2 Data Analysis

My analysis approach follows the process outlined by Braun and Clarke (2006). Their analysis steps include: familiarizing yourself with the data; generating initial codes; searching for themes; reviewing themes; and defining themes.

While this outline implies a linear approach, these activities occurred continuously and simultaneously throughout the study. During data collection, I regularly recorded voice memos and composed short analytic notes to capture my nascent impressions and understanding of what was happening during the study. I coded field notes, interview transcripts, and photographs from my observations. I also composed additional analytic memos during the coding process.

Coding in qualitative data analysis is the application of a keyword to a segment of the data. The data is then viewed through the lens of these codes to identify patterns between and within codes (Coffey and Atkinson, 1996). I initially close-coded the interview transcripts by the semi-structured interview questions as a first set of codes. I then open-coded the interview transcripts, field notes, and photographs by generating codes based on terms and phrases present in the data. Code generation during this phase was iterative, and as new themes emerged from subsequent analyses, new codes, descriptors, and themes were added to the codebook. The transcripts were reviewed again for application of these emergent codes.

Once this initial coding pass was completed, the codes were grouped thematically. These themes were formed both from the recurrence of codes, the salience of these codes, and the studys conceptual framework. I also generated memos for most codes and code themes.

Memos are an artifact of analyses-in-process, and I used them to document my understanding of the phenomena and themes as I reviewed the data. These memos ranged from descriptive to analytic and were useful in that they formed the initial drafts of the following chapters.

In writing these memos and early drafts, new conceptual ideas emerged which were crucial in making sense of the data. The conceptual framework that I described in Chapter 2 is the result of this iterative and emergent process. Thus, the conceptual framework was both a synthesis of my ongoing understanding as the study took place, and also an analytic tool that helped me understand

3.6 Ethical Considerations

The University of Washington Human Subjects Division approved this study. For all research activities, I described the study and obtained informed consent from my participants before proceeding with any research activities. I provided this information to participants in either English or Kannada, according to their preferences.

The focus of this study is on health workers, not the patients they serve. As a result, the methods of this study were carried out with health workers as participants and avoided interactions with patients. Additionally, this study was carried out in a way that minimized unnecessary interactions with patients that might make them uncomfortable. When observing interactions of health workers with patients, I requested permission from both the health workers and the patient to continue my observations.

3.7 Issues of Trustworthiness

In this section, I describe the steps I took to ensure this research was conducted rigorously and systematically. I will describe my strategies using the following quality markers of qualitative research: credibility, transferability, dependability, and confirmability (Shenton, 2004; Devers, 1999).

3.7.1 Credibility

Credibility addresses how accurately the findings reflect reality. This study demonstrates this criterion through the use of multiple established ethnographic methods, including semi-structured interviews and direct observations of multiple participants in multiple settings. Consequently, the work practices of health workers were triangulated from multiple perspectives. Additionally, the site survey was adapted from a resource developed by the Indian government. Experts in the domain of health care and technology design in resource constrained settings also informed the study design, greatly helping in developing familiarity with the context and study setting. I also reviewed related literature to assess whether the findings of this research were consistent with past research.

I also addressed credibility by being self-reflexive throughout the study process. During data collection and data analysis, I used memos to integrate the data I collected with my personal impressions and experiences with participants.

Being self-reflexive is an opportunity to triangulate and re-interpret the data that I have collected. Rode (2011a), drawing on Buroway, identifies four ways that reflexivity is used as an analytic tool. "First, unlike positivism, reflexivity embraces intervention as a data gathering. Second, reflective texts aim to understand how data gathering impacts the quality of the data itself... Third, reflexive practitioners attempt to find structural patterns in what they observed, and fourth, in doing so they extend theory (Rode, 2011a, p. 124)."

Thus, in presenting my findings, I have include myself as a researcher in the data collection landscape. In doing so, I hope to make explicit that production of knowledge isn't simply observing a truth that is "out there," but are instead a reflection of the social circumstances of their production (Law, 2004).

3.7.2 Transferability

Transferability addresses the extent to which the findings can be transferred to other situations. This study takes place in a very specific geographic, socio-political, and cultural context. But as I described the research sites, I described them in different layers, dimensions, and characteristics. I also provided the background of my study and my participants. Together, these provide a robust toolkit for applying the findings of this study to other settings and situations. By providing an accurate and detailed description of the study sites and the findings within and between these sites, readers of this dissertation will be in a better position to evaluate how this study can apply to other settings and situations.

3.7.3 Dependability

Dependability addresses the extent to which the research can be repeated, while recognizing that the phenomena under investigation can change over time. This criterion is tied closely to credibility, and thus the strategies described help in ensuring a quality study. Additionally, thorough descriptions of how data were collected (and not just the data) can help readers of this dissertation evaluate the effectiveness of the methods used

3.7.4 Confirmability

Confirmability addresses the extent to which the research findings are the result of the participants experiences and responses rather than the researchers preferences and biases. One way I address this is through data triangulation, described above. I also address confirmability by providing a thorough description of methods and its limitations.

3.7.5 Human Subjects Approval

The Human Subjects Division Subcommittee E/B at the University of Washington approved the research activities presented in this dissertation.

3.8 Study Limitations and Mitigation

As a qualitative study of phenomena in a challenging real world setting, this study had several limitations. In this section, I describe these limitations as well as the efforts taken to mitigate the negative impacts of these limitations.

3.8.1 Participant reactivity

One important limitation of this study is the participant reactivity that arises due to differences between myself and my participants in terms of social status and culture. As an outsider, it is challenging and often impossible to develop an emic (or insiders) perspectiveas opposed to an etic (or outsiders) perspective. So another potential limitation includes the cultural challenges I faced as a foreign male researcher conducting research with a foreign audience. With respect to my participants, I was an outsider in several ways: ethnically, culturally, and socio-economically. The distance caused by these differences meant that it was possible that participants werent always comfortable or forthcoming in disclosing their work practices, especially if they had negative things to say about their work. I attempted to mitigate my impact as an outsider by hiring locals to serve as interpreters. In one instance, the man whom I had hired as a driver acted as an interim interpreter because of his fluency in both the local language and in English. Participants felt comfortable talking with him. Conversely, my outsider status also served as a bridge for improving my relationship with participants. As much as I had questions for them, they also had questions about me. As I gained more experience in conducting my research in this setting, I became more and more forthcoming about both my academic and personal life. My outsider status, to my surprise, also seemed to provide legitimacy to the work. That someone so far removed and external to their context and culture was interested in their work seemed to help some participants answer more openly than if I had not been an outsider. One participant, a medical officer, was willing to be so candid because, as he stated, “this work must be really important to you if you were willing to come out to India to conduct it.”

Another strategy I used to mitigate participant reactivity was to maintain self-reflexivity throughout the research process. I tried to be aware of how my questions, my posture, and my positioning would have an impact on the participants and the data about their practices they were willing to share. Participants were sometimes uncomfortable with answering questions about themselves and their work. When participants had a hard time responding, for example, I relied on my previous experiences in interviewing to progressively ask questions that would help the participant better understand and thus better respond to the question that I was asking. I was prepared to halt an interview if a participant requested it or was visibly uncomfortable. No participants asked me to halt an interview altogether, though one participant asked me not to audio record our interview and I complied with his request.

3.8.2 Number and variety of sites

Another limitation that I encountered was the limited number of each type of site that I visited. I targeted three different types of settings for my fieldwork (urban, peri-urban, and rural) and visited two urban sites, two rural sites and one peri-urban site. Consequently, the findings across any one given setting might not be generalizable to other health center settings. However, it is a goal for the findings of this work to be transferrable. By providing clear descriptions of the sites I visited, situating findings across these different sites, and drawing comparisons between these findings, I am helping the reader to better evaluate how transferable the findings and conclusions of this work might be for other settings.

Another limitation of this study was the varied and limited amount of time that I was able to spend at each site. In some settings, I was able to spend several days at the site to conduct interviews and observations. In other settings, I was only able to spend one afternoon. I mitigate this limitation and potentially uneven accounting by providing clear and thick descriptions of my experiences at these sites so to make transparent the extent of the data I was able to collect.

3.8.3 Linguistic intrepretation

To conduct my interviews, I relied on interpreters to help me and participants communicate with each other. But one of the challenges of interpretation is the risk that information gets lost during the interpretation process. This can happen when there is no clear, direct translation into the local language, when the interpreter mishears what I have asked, or when the interpreter inadvertently leaves out a part of a participants response. Interpreters can also choose not to communicate everything the researcher or respondent says. To mitigate these limitations, I paid close attention to the timing and rhythm of the interpretation, sometimes reminding the interpreter to interpret at more frequent intervals and to avoid getting into discussions with participants.

Sometimes during interviews I would purposely ask the translator to repeat or reiterate a response, or I would ask questions again if I suspected that the translation was a paraphrase or a summary of what the participant said rather than a direct translation of his or her words and phrases. At the end of interpreted interviews, I would also debrief the interpreter to discuss how interpretation was going and how to improve the process for subsequent interviews. Finally, I used both male and female interpreters to help male and female participants, respectively, feel more comfortable.

3.8.4 Participant hesitance

Participant hesitation is a known issue in obtaining reliable accounts, particularly if the researchers motives are unclear or unknown. In order to address this, I did my best to build a rapport with participants, either through repeated visits to demonstrate earnest curiosity in their practices and their honest responses, or through multiple interviews in which I asked similar but related questions. For each participant, I tried to employ the specific strategy that I thought would encourage an open dialogue.

3.9 Summary

In this chapter, I described the studys methodology and research approach. I provided details about the studys settings and participant recruitment. I detailed the three main research activities that I conducted at each site: a clinic site survey, semi-structured interviews, and direct observations. The overall approach of this study is a cross-case qualitative study, and I provided a rationale for taking this approach. In addition, I discussed issues of trustworthiness for qualitative research, including credibility, transferability, dependability, and confirmability. Finally, I described and reflected on the limitations of how the study was conducted.

Chapter 4

HEALTH CENTERS

This chapter is the first of three findings chapters. In this chapter, I explore my first research question: How are the activities of community health workers determined by the structural conditions of their workplace? I ask this question to understand how community health work reflect priorities that originate outside the communities in which this work takes place.

To answer the research question above, I provide descriptions of each study site, including the setting, the kind of site, and the structural conditions of each of each site; I describe the kinds of care and activities that take place at the study sites; and I discuss the relationship between the characteristics of the study site and the services they provide.

The number of study sites and the various roles explored in the study constitute a complex ecosystem of individuals, roles, settings, policies, and tools. By first describing my findings about each study site, I am providing context to orient the findings in subsequent chapters. Understanding the sites with respect to these structural dimensions provides a basis of comparison complementary to the site setting and type of health center. The structural conditions of each study site because these conditions reflect the priorities and policies of health institutions. I focus on the following five structural conditions:

- **The physical work environment**: the material and physical working conditions, infrastructure, and supplies available at the health centers and the surrounding community.

- **Availability of health services**: the health and medical services provided by the health centers.

- **Financial management**: the funding and management model of the health center.
- **Staffing patterns**: the number and kinds of health workers employed at the health center.
- **Relationships to other health institutions**: the relationships that the health center has to other health institutions, such as serving as a referral site to other health centers, or as a coordinating site for managing health programs at different sites.

I generated this list after reviewing the literature about global and public health, reading policy and program documents about the Indian health system, and analyzing my interviews, field notes, and photographs.

After describing the sites, I present the findings from the clinic site survey. The clinic site survey asks what types of health services provided and health facilities are available at each study site. These structural conditions and the impacts of task shifting and the selectivity of primary health of the study sites are further reflected in the services that these clinics offer.

Finally, I conclude this chapter with a discussion of how the structural findings from the study site influence the activities of CHWs and shape task-shifting practices.

4.0.1 Overview of the health centers

I studied rural, peri-urban, and urban health centers to understand how different sites in a shared public health policy environment might have different work practices based on their setting.

4.0.2 Types of health centers

I visited primary health centers (PHCs), community health centers (CHCs), and urban family welfare centers (UFWCs). In the NRHM, PHCs formed the base of the public health system. PHCs were established to serve as first access point to a medical doctor, which make them important to providing care to poor and rural populations. PHCs are also the most numerous kind of health center. PHCs have a small team that can include the medical officer, a small team of CHWs, a staff nurse, a pharmacist, a lab technician, an administrator, and facility support staff. The facilities at the centers are typically basic, so health conditions requiring more complex treatment are referred to higher-level facilities.

CHCs are an example higher level facility. CHCs have more robust facilities over CHCs. The staff at CHCs is larger, may include specialty services such as obstetrics and gynecology and dentistry. CHCs are often equipped for overnight stays and round-the-clock availability. While patients from PHCs are referred to CHCs for more complex treatment, CHCs also provide direct service to their surrounding community.

The CHCs and PHCs in this study also operated smaller outposts called subcenters. Subcenters are locations in the community where CHWs can see patients to provide basic health needs, immunizations, or counseling and education. Each subcenter is operated by one of the health center's female JHA's. These centers consisted of small, stand-alone buildings; as rented rooms in another building; or directly out of the female JHA's home.

UFWCs are roughly an urban counterpart to PHCs. UFWCs were originally established to provide health programs related to maternal and child health services and family planning services to urban communities. Now, UFWCs also offer primary care services and disease prevention programs that PHCs provide. In accordance to the most recent Indian health plan (Government of India, 2014), UFWCs will be a core health facility in the recently created National Urban Health Ministry (NUHM). This means that UFWCs will operate under a distinct framework from rural and peri-urban PHCs and CHCs to meet the needs of urban populations.

Figure 4.4 below illustrates the hierarchical relationship between health centers in rural and urban settings. Table 4.1 summarizes how the study sites are categorized according to health center type and setting.

Health center staff

The different types of health centers employed the same kinds of health center staff. Health center staff could be roughly divided into three groups: clinic service providers, community health workers (CHWs), ancillary workers, and support staff.

Clinic service providers worked primarily in the health center. This included the medical officer, a licensed doctor who managed the health center and provided services to patients. This also included staff nurses who provide basic services and assist the medical officer at the clinic. CHWs provided most of their services in the field, outside the clinic. CHWs included male and female JHA's, male health supervisors, and lady health visitors. Ancillary workers provided other kinds of health-related services. These staff included lab technicians and pharmacists. Finally, there are support staff like administrators, accountants, and maintenance workers.

Financial management

The study sites were either funded and operated publicly or through a public-private partnership (3P). Publicly run health centers were the most common funding model in this study. Public health centers are directly managed and funded by the Indian government. Public-private partnership (3P) health centers are funded by the Indian government, but are operated privately by for-profit corporation or not-for-profit organizations. Health centers run as 3Ps have become more popular because advocates believe private entities would be more efficient and cost-effective than government entities.

Some health centers like UFWCs have operated as 3Ps for several decades, but the 3P arrangement is more recent for PHCs, CHCs and hospitals established under the National Rural Health Mission. In 2000 Karnataka opened its first PHCs to be operated as public-private partnerships with NGOs and university hospitals (Indo-Dutch Programme on Alternative Development, 2005).

The 3P sites in this study were managed and operated by non-governmental organizations

Site Name	**Setting**	**Funding model**
Ramanagara PHC	Rural	Public-Private Partnership
Tumkur PHC	Rural	Public
Kanakapura CHC	Peri-urban	Public
Nandini UFWC	Urban	Public-Private Partnership
Outer Ring PHC	Urban	Public

Table 4.1: Overview of study sites by type of health center, setting, and funding model.

(NGO's) contracted by the Indian government. These NGO-operated health centers used government and donor funding to operate the health center. 3Ps had the same program administration and reporting requirements as public-run centers, but they also had additional reporting specific to the NGO, such as reports aimed at the NGO's donors. 3Ps also were able to pay lower salaries to their staff since the staff worked for the NGO and not directly for the government.

4.1 The study sites

In this section, I describe the settings of each study site. I provide site-specific details for each structural condition identified in the introduction of this chapter. The data for these descriptions were collected through field notes, observations, and the clinic site survey.

4.1.1 Ramanagara Primary Health Center

The physical work environment

The Ramanagara Primary Health Center is a rural PHC located 50 kilometers west of Bangalore. The health center feels large relative to its surroundings, making it very easy to spot from the road. The PHC serves approximately 40,000 residents living in 43 surrounding

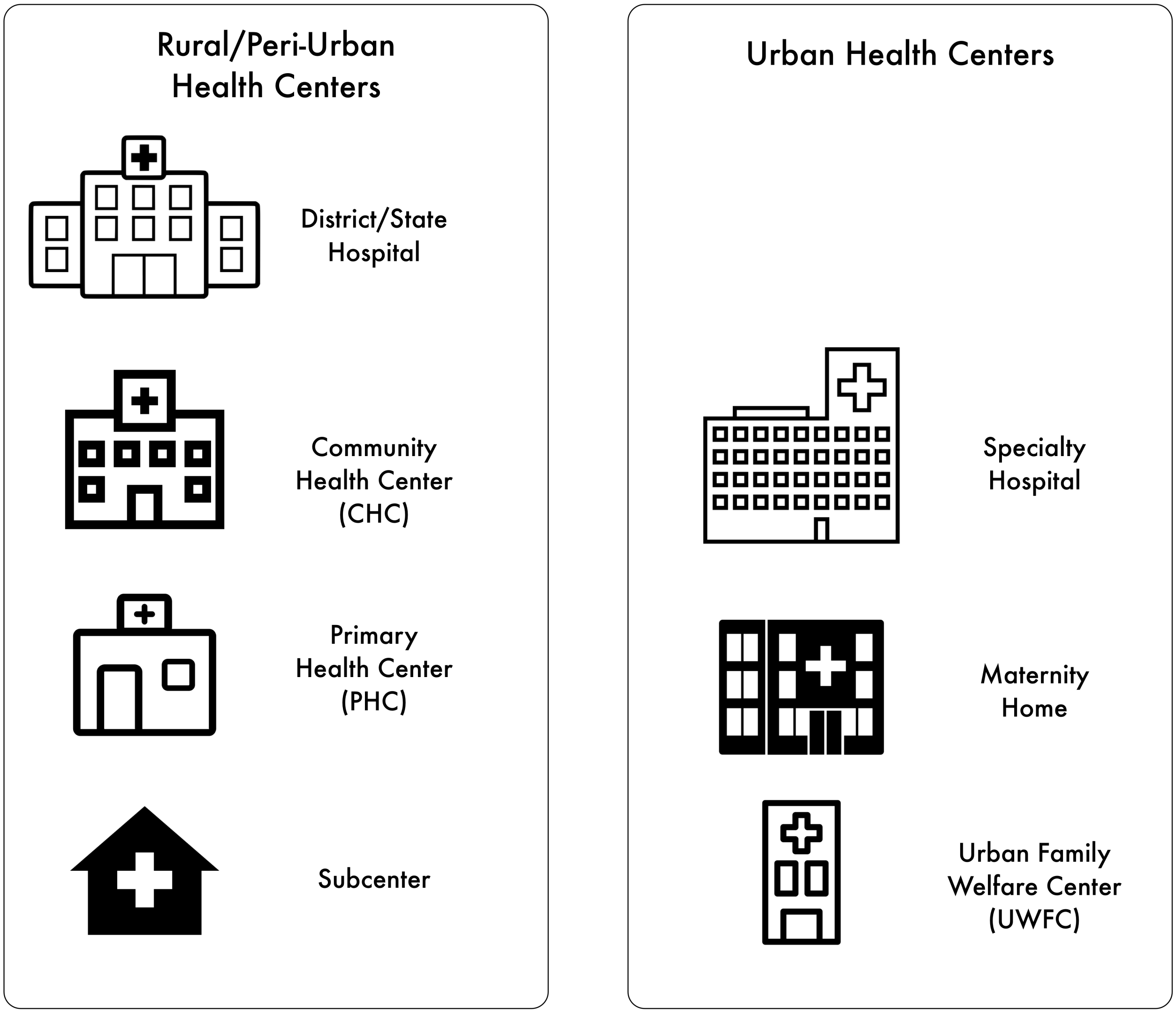

Figure 4.1: Hierarchy of health institutions for rural, peri-urban, and urban settings. Rural and peri-urban health centers are operated under the NRHM, while urban health centers will be operated under the NUHM.

villages. The PHC also operates four subcenters located among the villages.

The PHC has a small, well-tended garden outside the entrance. A small placard reads that the plants are used in traditional Indian medicine, but Kumar, the PHC's pharmacist and account, is quick to point out that PHC does not currently use the garden for any treatment.

The PHC is long and divided into many several spaces by a main hallway running from the entrance to the back. Directly left of the entrance, there is an area filled with shelves of medicines and two chest-freezers containing vaccines. A small pharmacy is connected to this room. A large display board next to the pharmacy entrance shows the current inventory of the medicines the PHC should have on hand.

The pharmacy room leads into a larger laboratory where Deepti, the lab technician, conducts her tests. The counters in the room are covered in newspaper stained purple by the reagent used to see tuberculosis. The laboratory has several pieces of basic lab equipment: a few centrifuges, a microscope, refrigerators, as well as the slides and glassware used for testing. The clinic uses this equipment to do a few basic blood tests and visual sputum examinations, but for other tests the PHC sends specimens to the district hospital for further testing. The lab technician is trained to use more sophisticated equipment, but is unable to use those skills here because the equipment is not available.

To the right of the entrance, the PHC has a small bench to accommodate maybe four or five waiting patients. This waiting area is just in front of a small examination room where a partition divides the check-in desk, where Kalindi, the staff nurse, sits, from the examination area.

The PHC also has a large, multipurpose room where the clinic stores its paperwork and conducts its weekly and monthly staff meetings.

Along the hall on the right side, there is a small exam room for immunizing and measuring babies and young children. Next to that, there is a larger delivery and recovery room with several beds for women who deliver children at the health center. At the end of the hall, there is a separate recovery room for male patients so that male and female patients are not in the same space.

The clinic overall is very clean and tidy. During the three days that I was able to visit the PHC, none of the patient recovery rooms were being used.

I also visited one of the PHCs subcenters. The subcenter was the front room of the home of Sangita, a female JHA. The room contained a few boxes of medicines and vitamins, some illustrated educational charts, and supplies for weighing and measuring infants.

Staffing patterns

The PHC is staffed by a medical officer, one staff nurse, four female JHA's, two male JHA's, one lab technician, one pharmacist-cum-accountant, one male maintenance worker, and one female assistant worker. Each of the PHCs four female JHA's is responsible for one subcenter. Missing from the PHCs staff as a male health inspector and lady health visitor to supervise the JHA's. One of the two male JHA's took over the administrative duties of a male health inspector, and Kalindi took over the supervisory duties of a lady health visitor. During the days that I visited, the medical officer was on an extended leave and so day-to-day operations were managed by Kumar and Kalindi.

Financial management

The PHC is currently operated by an NGO as a 3P, but was formerly publicly operated. Before it transitioned to a 3P, the Ramanagara PHC was ranked in the bottom 50% of PHCs in Karnataka (Indo-Dutch Programme on Alternative Development, 2005). The PHC operates using both government and donor funding. But despite having multiple sources of funding, several CHWs disclosed that their salaries were lower than their peers and had not been paid for several months. Additionally, Kumar explained that the medical officer had to travel regularly to Bangalore to meet with NGO officials and thus there were days the medical officer was not able to see patients in the clinic.

Relationships to other health institutions

The PHC is the main health facility in its surrounding area, and so the staff interact primarily with the district hospital where they refer patients and submit reports. Community members at the edge of the PHCs service area may sometimes go to a neighboring PHC that is closer to them.

4.1.2 Tumkur Primary Health Center

The physical work environment

The Tumkur PHC is located in a village 100 kilometers northwest of Bangalore, just outside of a larger town. The PHC serves a community of roughly 16,000 rural residents living in 20 surrounding villages. However, Korategere is home to nearest district hospital and a number of private health care providers. Due to this proximity, many residents in the community served by the Tumkur PHC prefer to go to the town for their care.

Compared to the Ramanagara PHC, the other rural PHC, the Tumkur PHC is small. The Tumkur PHC was originally established as a primary health unit, a stripped-down predecessor to PHCs, before it was upgraded to a PHC. There have been a few small improvements for waste disposal, and a half-assembled, but unconnected, alarm system, but no other renovations despite the center's upgraded status.

Since the building is not long, there are no hallways. The rooms of the PHC progress into each other. The first room is a small waiting area, flanked on one side by an area that serves as the registration desk and the pharmacist's area, and flanked on the other side by the primary examination area where the doctor sees patients. On the day that I visit the clinic, two men are sitting in two chairs by the door, waiting to see the doctor. Behind the waiting area is the staff meeting room. A large, long table crowds the middle of the small room, and the shelves on the walls are piled with old registers.

Another room is furnished as a child delivery room. The room has new equipment and incubators, but the PHC does not offer child delivery because there are not enough staff.

The Tumkur PHC does not offer laboratory services on-site, and instead sends out all of their testing to the district hospital.

Staffing patterns

The Tumkur PHC's staff is small. It's headed by a medical officer, and employs two female JHAs, one male JHA, a pharmacist-cum-accountant, and a maintenance worker. The center does not employ a staff nurse, nor any CHW supervisors. All supervision falls to the medical officer. The staff is not big enough to cover the community, so that on community vaccination days when CHWs administer vaccinations in the community, the Tumkur PHC needs one female JHA from a nearby PHC to help out.

Financial management

The PHC is administered by the Indian government. Funding and resources for the PHC have been unreliable. Many medicines have not been resupplied by the government, promised renovations have not been completed. Thus, the PHC has found it challenging to maintain its facilities, staff, and supplies such as medicine.

Relationships to other health institutions

The PHC has an uneasy relationship with other health institutions because the PHC is under-resourced and understaffed. The PHC has to refer its patients to the district hospital for services that the PHC should be able to provide, including child delivery, diagnoses of infectious diseases, and minor surgeries. Also, as described earlier, the PHC depends on female JHA's to help out with coverage.

Figure 4.2: The exterior of the Kanakapura Community Health Center.

4.1.3 Kanakapura Community Health Center

The physical work environment

The Kanakapura Community Health Center (CHC) is a large peri-urban health center located on the outskirts of Bangalore. Its environment has characteristics of both urban and rural settings. Dense villages, factories, and agricultural farmland share the local landscape. They and the CHC are linked by a busy highway road that leads straight back into Bangalore.

The community that the CHC services consists largely of laborers who work either in the factories in the city or on the farms on the outskirts. Many of the area's residents are migrant workers who move to the area temporarily for work, and move on to other areas when work opportunities dry up. The villages near the peri-urban CHC are more densely inhabited than the villages near the rural PHCs. Because of this density and mobility, it was challenging to keep track of residents who moved frequently.

The Kanakapura CHC originally started out as a smaller PHC before it was upgraded. But what's most notable about the CHC is its size. It feels similar to a single-building elementary school. A wide hallway leads from the entryway to the back wall of the clinic. It is crisscrossed by two narrower hallways that run the length of the building. There are several multipurpose rooms that can serve as meeting spaces or makeshift classrooms, as well as dedicated offices for administrative and supervisory staff. The center also has its own laboratory, two large gender-separated patient recovery rooms.

Surendra, the senior male health assistant who gives me a tour of the CHC, is proudest of the CHCs newly renovated operating room. The room is large and clean. There's a patient bed in the middle, surrounded by operating lights. Bowls full of stainless-steel medical supplies sit on carts along the perimeter of the room. But when I ask Surendra how often the CHC performs surgeries, he tells me it's not being used yet because they do not have a surgeon. He tells me the room has been completed for several months, but that he does not know when a doctor will arrive to use it.

The CHC also has an array of generators tucked into the corner of one of the hallways to keep the electricity running amid the numerous power outages.

Staffing patterns

Commensurate with its relatively larger size and its 24/7 availability, the Kanakapura CHC has a larger staff than the other sites. It's headed by a medical director, has eight staff nurses, two female JHA's, one male health supervisor, one lab technician, and two pharmacists-cum-accountants. It also employs two specialists: a gynecologist and a dentist, which allows the CHC to provide a wider range of services than the other sites of this study.

Though the CHC has a greater diversity of the kinds of doctors it employs, the CHC has a significant shortage of field workers. The CHC currently has no male JHA's and only two female JHA's who cover five subcenters. The senior male health assistant is responsible for supervising both groups.

Financial management

The Kanakapura CHC is managed by the Indian government. Patients receive free care, and the government provides medicines and supplies. Payment at the center is delayed. At the time of my visit, the female JHA's mentioned that the health center was four months behind in paying them.

Relationships to other health institutions

The Kanakapura CHC provides the same services as it did when it was a PHC, but now also serves as a referral site for nearby PHCs. The CHC also has partnerships with local universities to provide training to public health and health administration university students. Because of its close proximity to the city, some of the community members will seek health services in Bangalore rather than from the CHC.

Figure 4.3: The exterior of the Nandini Urban Family Welfare Center.

4.1.4 Nandini Urban Family Welfare Center

The physical work environment

The Nandini UFWC is a small urban health center in northwest Bangalore, nestled a few blocks off of a busy commercial corridor that's home to one of the city's largest shopping malls and one of the country's largest temples. But the side streets that branch off this corridor is quiet and residential. The homes around the health center vary from large, multistory homes, multi-unit apartment buildings, and small shacks side-by-side.

The Nandini UFWC is provides both primary health services to the community, as well as serves as a tuberculosis (TB) unit for India's tuberculosis treatment program, known formally as the Revised National Tuberculosis Control Program (RNTCP). As a TB unit, the UWFC is responsible for registering and monitoring individuals with TB in area. The TB staff at the UFWC travel to nearby health centers and hospitals to provide supplies and follow-up on possible TB cases identified at those locations. At any given time, the UFWC is managing 200 TB cases.

The Nandini UFWC takes up on the first floor of the two-story building, while the second floor is the office for a local private ambulance service. The health center comprises a large hall, with smaller rooms along the perimeter. The main hall stages numerous health center activities. There's a small bench near the medical officer's office for wait. But midmorning, when the clinic is busiest, a line of patients winds its way from the doctor's desk and out into the hall.

Even though the main hall is large, it is divided into two distinct spaces that reflect the dual TB and primary health care role of the UFWC. Near the entrance of the hall, Link workers sit at a long table where they can complete their paperwork as well as help to check-in patients. At another corner of the main hall, a male JHA sits in front a wall of boxes, each containing TB medication. There, he waits administers, observes, and documents the patients taking their medicine.

One of the side rooms serves as a workspace for the male and female JHA's, and the lady health visitor. This space is crowded by desks and the walls are lined with shelves piled with old registers.

The room next to this is a space shared by the center's lab technician and senior male health assistant. The lab technician works at a lab bench along the wall, covered in newspaper, purple stain, and slides waiting to be inspected. On the other side of the room, the senior male health assistant has a desk where he works when he's not busy traveling to other health centers.

The doctor's examination room is across from the lab on the other side of the hall. Most of the patients are examined by the doctor at his desk, in full view of the next few patients waiting their turn. But if a patient requires more privacy, there's an exam room that contains a more private exam area. Next to the doctor's examination room is a smaller room used by JHA's to administer vaccinations.

Staffing patterns

The staffing structure is split into two staffing structures: one for providing primary health care and another for supporting TB work. Both groups are headed by the same medical officer. The TB team consists of the male health supervisor, one male JHA, one senior lab supervisor, and one lab technician. The supervisory structure in the TB group is robust: across its four employees, two are supervisors.

The primary health team consists of one lady health visitor, two female JHA's, one male JHA, and eight Link workers. Link workers are analogous to ASHA workers at PHCs and CHCs. Like ASHA's, link workers provide education and encouragement for patients to seek priority services for the health center, such as family planning and child wellness visits.

Financial management

The Nandini UFWC is managed by an NGO. The NGO founded the center nearly 30 years ago and has operated it since. The health center relies on state government, city government, and donor funding. Additionally, it collects a small fee from patients who seek its services.

Relationships to other health institutions

The Nandini UFWC maintains close contact with individual private practices, public and private clinics, and public and private hospitals through its work as a TB unit. Because the clinic only provides basic primary care, it refers patients mostly to the nearby government hospital. Additionally, the health center regularly hosts health camps in partnership with local NGO's and with the support of local political leaders. Getting the support of local political leaders is strategic in the clinic for getting middle-class residents to attend health camps since these residents are hard for the health center to attract.

4.1.5 Outer Ring Primary Health Center

The physical work environment

The Outer Ring PHC is an urban PHC located at the northeast edge of Bangalore, just beyond the Outer Ring Road that formerly marked the city's smaller boundaries. The Outer Ring PHC stands out from the other health centers in this study because it is located entirely inside another health center. The PHC sits inside a government hospital, but the PHCs staff work independent of the hospital. The area around the clinic has not yet been developed with high-rise residences and shopping centers growing in other parts of the city. Instead, the area is filled with small industrial workshops, stores, and slums.

The PHC is small and has limited equipment. It comprises only two rooms. The first room serves as a waiting area and a work area for the CHWs. It's filled with a handful of chairs, a single long bench, a few tables, and tall metal cabinets for storing registers and records. The second room is meant for administering vaccinations. it contains a patient bed and large chest freezers for storing vaccines. Outside of providing vaccines and storing vaccines, this room is otherwise unused.

Figure 4.4: Courtyard leading to the Outer Ring Primary Health Center.

Staffing patterns

The PHC doesn't have a doctor and is staffed only by community health workers: one male JHA, three female JHAs, and one lady health visitor. The PHC has no ASHA workers to support outreach work in the community. The medical director who is in charge of the PHC works at a maternal hospital located elsewhere.

The Outer Ring PHC doesn't offer comprehensive primary care services because those services are provided by the hospital. Instead, the PHC focuses on administering 24 of the NRHM's community health programs. As a result, the staff spends focuses most of their work in the field. The PHCs catchment area consists of nearly 100,000 residents, but they prioritize visiting the growing number of migrant and poor residents who are in the nearby slums. The PHC estimates that only 20% of its residents are permanent, and the remaining 80% are migrant workers.

Only a few services are provided at the PHC itself, so the PHC is more of an administrative space rather than a care-providing space. On a rotating basis, the JHAs stay at the PHC for administrative duties, such as verifying vaccination records for maternal health incentive program, delivering incentive payments, or to provide immunizations for young children.

Financial management

The Outer Ring PHC is funded and operated by the Indian government through the government hospital in which it's located. Study participants did not discuss any issues regarding to delayed payments. However, one female JHA and one male JHA both complained about staff having to spend their own money to pay for computer access outside of the health center and hospital. The staff needed to register new records online for one of the government incentive programs.

Relationships to other health institutions

The Outer Ring PHC has a complicated partnership with the hospital in which it is located because the PHC focuses only on administering health programs for the NRHM. The PHC refers patients to the government hospital to receive primary health care services. Because the PHC is operated separately from the hospital, it is not able to use resources at the hospital. For example, the hospital employs data entry operators, but the CHWs at the PHC are responsible for completing their own data entry in addition to their other responsibilities.

4.2 Overall themes from the health center survey

The previous section provides descriptions of each health center. Here, I present overall results of the health center survey, as well as related findings about the health centers that were uncovered during interviews and field observations.

4.2.1 Staffing and patient load

The first set of questions from the health center survey asks the health centers to describe the kinds of staff they employed and the number of patients they served.

Size and diversity of clinic staff

Each study site exhibited different staffing characteristics related to the size of staff and the number of staff at each site.

The most highly staffed and diversely staffed health center is the Kanakapura CHC. Its staff included a general practitioner medical officer, as well as specialist practitioners such as a gynecologist and a dentist. The CHC also employed have HIV counselors, lab technicians, eight staff nurses, and three administrative staff. But compared to the expanded staff who work inside the clinic, the field staff who work outside of the clinic is smaller. The center has only one male senior health assistant, three female JHAs, and no male JHAs.

The Tumkur PHC and the Outer Ring PHC have the fewest employees. At the Outer Ring

PHC, this is partly related to its location within a government hospital. The government hospital provides most curative services to the patients, thus the Outer Ring PHCs staff consists of an abbreviated team of five field workers: one LHV, one male junior health assistant, and three female junior health assistants. The Tumkur PHC also has a small staff of one medical officer, one pharmacist, one male JHAs, two female JHAs who work for the center, and one female JHA from a neighboring PHC who provides occasional support.

Most study sites are missing CHW supervisors. Only the Nandini UFWC has both male and female supervisors for CHWs. The Ramanagara PHC has no CHW supervisors, the Tumkur PHC and Outer Ring Road PHC have no male CHW supervisors, and the Kanakapura CHC has no female CHW supervisors. Without formally appointed supervisors, some of JHA's have to do some of the activities that supervisors would do. For example, the male JHA at the Outer Ring PHC, was responsible for overseeing the 24 different national programs that the PHC provided. At the Ramanagara PHC, CHW supervisory duties are shared between the staff nurse, who does not work in the field despite supervising field workers, and a male JHA with three years of experience.

Table 4.2 provides an overview of staff at each of the study sites.

Patient load

The study sites range in the number of patients they had visiting their clinics. At the lower end, the Ramanagara PHC served 800-1000 per quarter, which averages to roughly 10 patients each day. On the other end, the Tumkur PHC serves 50 patients per day, peaking to 100 patients on Saturdays.

Study participants attribute the number of patients who came to the clinic relied on several factors: staff size and composition, the proximity of patients to the health center or its subcenters, the demographic characteristics of the surrounding community, and perceived quality of service that the PHC offers.

Staff size and staff diversity seems to be related to the number of patients who visit. The Kanakapura CHC had both the largest staff and the largest number of daily patient visits to the center. The center has a correspondingly large staff, including multiple staff nurses, doctors, and administrators that allow the staff to allow for patient visits twenty-four hours a day, seven days a week. Additionally, both the Tumkur PHC and the Nandini UFWC both report a similar range of daily patient visits (approximately 50 daily visits), and both have roughly the same size staff.

The catchment areas served by the study sites were geographically bound to those areas surrounding the clinic. The size of these areas is driven by the size of the population that the clinic serves. At rural and peri-urban sites, the geographic catchment area is large because the population is less dense. CHWs at the Ramanagara PHC work mostly in the field and do not return to the PHC daily because their communities are far from the health center. At the urban sites, the geographic area is much smaller because the population is much denser. Thus, the catchment area is within walking distance of the clinic, meaning CHWs can return to the PHC on a daily basis.

Demographic characteristics of the community is also related to the number of patients who visit a health center. Most patients going to any of the health centers are below the poverty line (BPL), meaning the patients earn less income than the government-defined economic threshold. The health centers largely targeted BPL patients through free or low-cost care and through government programs that provided cash incentives to CHWs and to patients for getting care at the health center. ASHA workers, for example, are paid partly on how many patients they bring to the health center.

At the rural sites, patients were primarily agricultural workers who permanently live in the area. At the peri-urban site, patients are often laborers who commute to the city and work in nearby factories, or who work. In the urban sites, patients were often residents of the slums or they were from households of migrant laborers working in the city. But at the Nandini UFWC, many of the surrounding middle-class neighborhoods are called “elite areas” by staff, and the community members there are not interested in going to the UFWC because it is perceived as a health center for the poor.

The Ramanagara PHC and the Tumkur PHC each serve communities between 14,000-

15,000 people. But the Ramanagara PHC has a much lower number of daily patient visits, only 8-10, compared to the Tumkur PHC's 50 visits. This could be due to the catchment area for the Ramanagara PHC being more dispersed than the catchment area for the Tumkur PHC. Thus, it's more difficult for many patients at the Ramanagara PHC to go directly to the health center for care. Instead, patients who live far from the health center they rely on getting care in their homes or at their nearest subcenter through CHWs.

Another factor that may impact the number of patients that visit a clinic is the presence of other health centers nearby. Participants at all the study sites described how the presence of both public and private health center nearby drew patients away their health centers. For example, the community members near the Nandini UFWC who live in "elite areas" choose to go to private clinics and private hospitals because they believe they will get better care. Health workers at the Tumkur PHC said many patients will go to the public district hospital or a private health clinic at a nearby large town. But community members do not only seek private alternatives. They sometimes have other public options. For example, community members who live at the borders of Ramanagara PHC's catchment area sometimes choose to go to instead to a neighboring PHC that is geographically closer.

The last factor that influences patient visits is the perceived quality of care. As described earlier for the Nandini UFWC, higher-income community members do not go to health centers because they see the care as being lower quality than what is available at a private doctor or clinic. And sometimes this was merited. The Tumkur PHC frequently refers patients to other health centers because the PHC was not equipped to provide more than basic services. Both health centers have had varying levels of success in addressing these negative perceptions of quality. At the Nandini UFWC, staff explained that it has taken years to convince the community that the UFWC provided useful services, and the health center also relies on the support of local leaders to help the center seem credible. At the Tumkur PHC, the staff sometimes encounter community members who tell others to avoid going to the PHC altogether.

Participants identify these factors as being related to the number of patients who seek care from their health centers, but this is not an exhaustive or definitive list. Some of these relationships are more obvious. Government guidelines provide ratios of the number of staff to the size of the population served. Thus, it is reasonable to expect a directly proportional relationship between staff size and community size. But as will be further described below, staffing numbers do not always follow this. Additionally, this study was not designed to distinguish the individual impact of these factors. Instead, this section identifies potential and emergent factors from interviews and observations that could be explored through additional study.

Staffing shortages

With the exception of the Nandini UFWC, the study sites have fewer staff than recommended by the government. This was especially the case for field workers like senior and junior health assistants. The Indian government recommends one female JHA and one male JHA for every three- to five-thousand people (Ministry of Health and Family Welfare, 2012a). Based on these figures, all the sites experienced some understaffing relative to the size of the population.

Staffing shortages can be measured in two ways: either as vacancies or as shortfalls. Vacancies are the number of positions that have been sanctioned and allocated by the government, but are unfilled. Shortfalls are the number of positions that is required according to government guidelines, but remain unfilled. It’s possible for the number of vacancies to be lower than the number of shortfalls because the government has not yet created positions in sync with population growth. Because the number of *sanctioned* positions is not tied strictly determined from population size like the number of *required* positions is, shortfall most accurately reflects staffing shortages. While all sites had a shortfall of health workers, not all sites had vacancies. The Ramanagara PHC, Nandini UFWC, and the Outer Ring CHC were operating with all the staff that had been allocated to them. The Tumkur PHC had one vacant female JHA position, and the Kanakapura CHC had three vacant female JHA positions.

Clinic Role	Ramanagara PHC	Tumkur PHC	Kanakapura CHC	Nandini UFWC	Outer Ring Road PHC
Medical Officer	1	1	1	1	0
Staff Nurse	1	0	8	0	0
Lady Health Visitor	0	1	0	1	1
Male Health Supervisor	0	0	1	1	0
Female Junior Health Assistant	4	3	2	2	3
Male Junior Health Assistant	2	1	0	2	1
ASHA or Link Worker	16	9	3*	8	0
Lab Technician	1	0	1	1	0
Pharmacist-cum-Accountant	1	1	2	0	0
Approximate Population Served	14,000	15,000	30,000	64,000	100,000

Table 4.2: Staffing numbers at patient load by study site. Note that ASHA and Link Worker numbers are incomplete for the Kanakapura CHC since the health site survey does not directly capture the number of ASHA or link workers.

The best worker to population ratios were at the rural PHC in Ramanagara PHC, where four female JHAs serve a population of approximately 14,000. Thus, there is approximately one female JHA per 3,500 people and within government recommendations. However, the PHC lags in male JHAs, with only two on staff, or one per 7,000 people. The worst staffing ratio was at the Outer Ring PHC in urban Bangalore. The PHC had three female JHAs, one female LHV, and one male junior health assistant to cover a population of roughly 100,000 people. In other words, the Outer Ring Primary Health Center has only one female junior health assistant per every 30,000 people, and only one male junior health assistant for 100,000 people.

The unevenness of staffing observed at the study sites echoed the broader trend within Karnataka, the Indian state where this study was conducted. In 2012, Karnataka had a surplus of female junior health assistants, with 11,434 female JHAs for 16,178 sanctioned (i.e. government approved to hire) positions (Ministry of Health and Family Welfare, 2013). However, this number is still greater than the requirement of having one female JHA per subcenter which is 11,221. However, there is still an overall shortage of male junior health assistants in Karnataka. Also in 2012, there were only 3,148 male JHAs for 5,853 sanctioned positions, while the requirement is 8,870.

4.2.2 Availability of treatment services

In addition to learning about staffing and patient loads, the health center survey also asks clinics about the curative services each clinic offers. Treatment services refers to a range of health service for treating and curing a condition. Examples include activities like treating a fever, providing first aid, reproductive health services, immunization, and child delivery.

Almost all of the health centers provide basic services such as physical examinations, wound management, minor surgery, burn management, gynecological examination, and poison control. The exception was the Outer Ring PHC, which does not provide any treatment services at the PHC itself, but patients could go to the district hospital instead. For all the sites, more complicated cases that required additional care or overnight supervision, such as serious fractures or major surgery, are referred to nearby district and government hospitals.

Of the treatment services, none of the health centers were equipped to conduct the medical termination of pregnancy (i.e. medical abortions). I did not learn from the study if these services are not available because they were cultural unaccepted or because there were not enough resources to support the procedure.

4.2.3 Availability of laboratory services

The next set of questions on the survey asks about the kinds of laboratory services that the health centers offered. CHWs most commonly collected blood and mucus samples in the field specifically to test for malaria and for tuberculosis. Testing for these two conditions is important because both malaria and tuberculosis are highly prioritized by the Indian government.

All of the health centers have access to diagnostic laboratory testing either on-site or by sending samples elsewhere. Three sites have lab facilities on-site, and two do not. These two sites, the Tumkur PHC and the Outer Ring PHC, deliver any samples they collect to government laboratories. These samples can include blood samples, mucus samples, or water samples to test for parasites.

The health centers that had testing available on site focused on providing basic diagnostic tests, such as blood-type testing, malaria testing, platelet testing, blood sugar testing, as well as mucus testing and monitoring for tuberculosis. These diagnostic tests are key tests for the various national health programs that focus on maternal and child health, non-communicable, and communicable diseases. These tests can be performed using basic laboratory equipment. Other tests that require more sophisticated testing need to be sent out to other labs to be completed.

4.2.4 Availability of medications

All of the health centers provided their medications free of charge to patients. These medications are provisioned to the centers by the government. Common medications include pain relievers (like paracetamol), antibiotics, prenatal vitamins, as well as medicines for treating and managing high-priority health conditions like tuberculosis, leprosy, and malaria.

However, there are sometimes shortages of these government provisioned medications and thus patients and health workers need to obtain the medications elsewhere. At the Ramanagara PHC, one female JHA shared that she would sometimes go to a private pharmacy and use her own money to get medications such as paracetamol to give to patients she visited in the field. If there is another nearby government health facility, such as the district hospital near Tumkur PHC, patients are given a prescription and referred there instead to get medication but asked to return to the PHC for ongoing follow-up and monitoring.

4.2.5 Condition of Physical Infrastructure

Though this was not incorporated directly in the health center survey, the health sites display a variety of infrastructural conditions across the centers. These infrastructural conditions include access to electricity, access to medical equipment, and access to technology.

Access to health equipment

The availability of health equipment was generally a direct reflection of the kinds of health services they provided. The Ramanagara PHC provides a suite of basic care services, such as doctor examinations, immunizations, basic wound and burn treatment, laboratory testing, and child delivery services. In the case of laboratory testing, the PHC uses diagnostic test kits even if their quality might be compromised by improper storage and temperature control.

Similarly, the Outer Ring PHC provides only a limited set of health services directly related to the delivery of NRHM programs, which focus mostly on monitoring, medication, and immunization. Without a doctor onsite, PHC could not perform any medical procedures or provide other kinds of treatment. Thus, the center does not have medical equipment except to support vaccinations and specimen sample collection as part of their health program work.

Two health centers have more equipment than they are able to use. As described earlier, the Tumkur PHC had received a new incubator and patient bed so they could conduct child

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1.	PARACETOMOL	9000	4-16	1.	DERIPHILLIN	270
2.	DICLOFENAC	9600	4-15	2.	METHARGIN	Nil
3.	BRUFEN	3500	8-15	3.	OXYTOCIN	45
4.	C P M	34000	4-15	4.	T. T.	150
5.	CITRIZINE	4000	2-16	5.	ARV	40
6.	DICYCLOMIN	Nil	-	6.	ANTI SNAKE VENOM	N
7.	RANITIDINE	Nil	-	7.	DICLOFENAC	250
8.	ALBENDAZOLE	200	7/15	8.	PARACETOMOL	Ni
9.	TINIDAZOLE	1400	2-15	9.	C P M	Ni
10.	DOMOERIDONE	3000	10-15	10	DICYCLOMINE	130
11.	METACLOPRAMIDE	200	9-15	11.	RANITIDINE	100
12.	FURAZOLIDINE	Nil	-	12.	METACLOPRAMIDE	50
13.	I. F. A. LARGE	570	7-14	13.	P P F	150
14.	CALCIUM	1000	12-13	14.	BENZYL PENCILLIN	Ni
15.	DIAZEPAM	Nil	—	15.	BETNISOL	40
16.	SOLBUTAMOL	16000	2-15	16.	DEXONA	10
7.	INDOMETHACIN CAP	Nil	—	17.	GENTA MYCIN	Ni
8.	FLUCONAZOLE	200	12/14	18.	ADRINALINE	20
9.	DOXYCYCLIN CAP	500	3-15	19.	ATROPINE SULPHATE	100
.	TETRACYLLIN CAP	100	12/13	20.	DIAZIPAM	22
.	RESPIRIDONE	600	10-15	21.	XYLOCAINE 2%	15
.	ALPRAZOLAM	400	11-13	22.	HYDROCORTISONE	5
	CIPROFLOXACIN	800	1-16	23.	ORS	N

Figure 4.5: An inventory of the medications available at the Ramanagara Primary Health Center.

deliveries, but it sits in a back room unused. At the Kanakapura CHC, there is a newly constructed operating room with new equipment but no trained doctors to use it. In both these cases, the health centers have equipment but lack the staff to make use of it.

Access to electricity

Access to reliable electricity is problematic for all the study sites (as it is for much of this part of India). Only the Kanakapura CHC and the Outer Ring Primary Health Center (owing to its colocation in a hospital) are equipped with diesel-powered generators to provide power to the whole facility during a power outage.

At the Ramanagara PHC, the only backup generator is connected to the vaccine freezer to keep the vaccines at the critical temperatures that keep them viable. But the center does not have generators to keep power to other equipment. This was especially problematic for the laboratory services, because many of the reagents and tests required the use of electricity to run equipment such as centrifuges, or to keep diagnostic reagents at the proper temperature. The lab technician there told me that she still has to use those reagents, even though she knows that they are not stored properly.

The remaining study sites operated without any backup power. The Nandini UFWC and the Tumkur PHC work around this limitation by storing and retrieving their vaccines at health facilities with backup power. However, this adds to their responsibilities since staff have to travel to these other sites.

Access to Technology

The availability of computing technology at the health centers is overall very minimal. The most commonly available technology is mobile phones. All participants in this study had personal mobile phones, and the field workers and medical officers at all sites except the Nandini UFWC had their phone service partially paid by the government. The Nandini UFWC is the exception because mobile phone service is not yet available by the NUHM.

Desktop computers are rare. Only the Ramanagara PHC has a computer, and the internet access there is unreliable. The lack of computers is surprising since some of the government programs require online patient registration and data reporting. All the staff who need to use computers have to go to a district hospital, private cybercenters, or use their personal computers to complete their work. I provide more details on how health workers used these technologies use in Chapter 6.

4.3 Discussion

In this discussion, I reflect on the findings described in this chapter begin to draw out the relationship between the structural conditions at the health centers and the activities of CHWs. This study was originally designed so to create comparisons across different settings urban, peri-urban, and rural and different types of health centers PHCs, CHCs, and UFWCs. I originally stratified across these two dimensions expecting that the work practices at health centers would be most similar within dimensions, and most different across different dimensions.

But even within the small number of sites that this study visited, these dimensions were not definitive for comparing the practices of each site. For example, The Tumkur PHC and the Ramanagara PHC were both rural PHCs, but differed considerably in their staffing patterns, funding models, and access to other health institutions. Because the Ramanagara PHC was better resourced overall, its staff did not have the same tight constraints on their work as the Tumkur PHC. So instead of looking at setting and type of health center, the findings suggest that comparing across structural conditions can yield better insight into health center practices.

Here, I discuss how two structural conditions in particular staffing patterns, relationships to other health institutions arise as being key conditions in shaping the activities of CHWs. First, I discuss the role of staffing patterns on shaping the activities of each study site. I then relate these to the broader global health trend of task shifting. Next, I discuss how relationships to other health institutions and financial management relate to the health priorities of institutions and reflect the broader influence of selective primary care.

4.3.1 Staffing patterns and task shifting

Participants at all study sites felt that their health centers were short staffed. Participants had different explanations for what the cause of these shortages were. I asked a female JHA at the Kanakapura CHC why she thought her health center had been understaffed for such a long period time. She speculated that the shortage was due to health workers being sent to rural areas, instead of urban and peri-urban areas. But staffing imbalances also existed in rural areas, as well. When I asked the medical officer at the Tumkur PHC why he thought his clinic was short-staffed, he said that he wasn't able to get the staff that he needed because the government authorities were slow-moving to find employees.

Having a skilled and diverse staff was necessary to take advantage of the resources available at the health center. The Kanakapura CHC had recently constructed a surgery room outfitted with new equipment, but it remained unused because the health center did not have trained staff who could use it. The Tumkur PHC also received new equipment to handle child deliveries at the clinic, but it also lacked enough staff who could support child delivery at the clinic. As a result, patients at both health centers had to go elsewhere for these missing services. The medical officer at the Tumkur PHC also explained that although he has the equipment for providing child delivery services, he would need another full-time female health worker, such as a staff nurse or female JHA, in order to use it. At the Tumkur PHC, the medical officer disclosed that not having a sufficient number of female health workers working at the clinic deterred female patients in coming to the clinic.

In response to staff shortages, health centers had to to informally shift tasks to other health workers. This informal task shifting between workers looked similar to the horizontal task shifting previously described by Dambisya and Matinhure (2012) and Munga et al. (2012). At the Outer Ring Primary Health Center, where many services have been moved to the district hospital, the workers lack administrative support or resources (such as computers) to fulfill some of their responsibilities, such as registering mothers and children into the government-run mother-child tracking system. Without these resources, the health workers have needed to go to cybercenters and pay for their own computer use in order to complete those registrations online.

Supervisory patterns also had a strong role in shaping the nature of task shifting. At centers lacking supervisors, there seemed to be more diffuse sharing of tasks than at centers with more supervisors. This supports the idea that vertical (formal) task shifting requires more oversight, described earlier in Chapter 2.

The relationship between supervision and task shifting can be seen most clearly at the two urban study sites. The Outer Ring PHC only had a lady health visitor, and the staff there worked hard to cover for each other roles. I observed the one male JHA there helped to administer incentive payments for maternal health programs, which was not observed at other health centers. In contrast to the Outer Ring PHC, the Nandini UFWC had a robust supervisory structure. It employed a medical officer, a senior male health worker, and a lady health visitor. The health workers at Nandini UWFC seemed less likely to task shift. They also better abided by the gendered divisions of their work, such as having male JHA's interact primarily with only male community members, and having female JHA's interact primarily with only female community members.

One explanation could be that supervisors enforce how health workers divide their work more closely match what is sanctioned and expected. Thus, even when a health center has a staffing shortage like the sites in this study, supervisors prevented staff from doing work that was not typical for their roles.

4.3.2 Institutional relationships and selective primary care

The health centers in this study were part of a broader network of public and private health facilities that served the community. The specific configurations of this network shaped what the kinds of service were prioritized at each center. Being better connected to other health institutions may mean that the scope of services provided are more narrow.

This relationship might seem counterintuitive in a primary health care system. The primary health care system in India is built on a tiered system of health centers to serve increasing levels of specialized care. Lower-level health centers, like those in this study, should serve as first points of care that refer out to health institutions that could offer more specialized care. However, this set-up reflects an idealized case, and instead many public and private facilities that provide specialized care also readily provide basic care. The peri-urban Kanakapura CHC was an example of a mid-level health center that could provide basic and specialized services.

Both urban study sites readily referred patients to nearby hospitals to seek services that could not be managed or resolved using the facilities available at the site. This was reasonable given that the clinics had limited equipment and facilities, and since there are many health facilities within the city. Nandini UFWC had a number of hospitals a short walking distance away while the Outer Ring PHC was located within a government hospital. Instead, the community health workers at these health centers focused their activities on outreach and monitoring for core health programs, such as tuberculosis management, family planning, and maternal and child health programs.

In more rural areas, health care facilities are less common, and thus the rural health centers were in more of a position to provide more health services "in-house." The Ramanagara PHC was equipped for a range of basic services, pharmacy services, and lab testing. The PHC also had residential subcenters where CHWs could provide basic health care in the local community.

The rural Tumkur PHC differed from the Ramanagara PHC because it was located near other health centers. This made it more similar to the urban PHCs in that community members had other healthcare options. Meera, a female JHA, explained:

> *"Whenever the case is the serious, we refer [patients] to a private hospital. People have more trust in private hospitals. We do not usually refer to private hospitals unless there is a lack of infrastructure or there is a lack of facilities."* (Meera, female JHA, Tumkur PHC)

But since the facilities and infrastructure at the Tumkur PHC were rudimentary, and many patients went elsewhere for their care. Thus, the care that the center did provide was most focused on priority government health programs.

4.4 Summary

This chapter explored the findings related to my first research question. I described each of the study sites in terms of five structural conditions: the physical work environment, the availability of health services, the financial management of the health center, staffing patterns, relationships to other health institutions. I also presented the findings from the clinic site survey to describe in more detail the kinds of services available at each health center. I concluded this chapter with a discussion on how staffing patterns and institutional relationships situate the work activities at health centers within the two global health trends of task-shifting and selective primary care.

Chapter 5

ROLES, RESPONSIBILITIES, AND ATTITUDES OF COMMUNITY HEALTH WORKERS

In Chapter 4, I investigated the first research question on the structural conditions of health centers and how those shape the activities of CHWs. In this chapter, I focus on the second research question: How do health workers reconcile the contradiction between their prescribed roles and responsibilities and the emergent needs of the communities they serve? In asking this question, I am foregrounding the tensions that can arise when institutional prescriptions of work practice are enacted by health workers in diverse settings. Understanding this tension is important for designers and researchers working on community health technologies to better anticipate what impact new technologies can have on these workers.

This chapter begins by describing the roles and responsibilities participants held as detailed by Indian government guidelines. I then focus on data collection as a core practice that undergirds these different responsibilities. Understanding how data are collected and used provides a key framing for understanding how health workers navigate the tension between their responsibilities and the needs of the community. Then, I describe the barriers that health workers have toward their work. Next, I investigate and describe the nature of collaboration within community health work. I conclude this chapter with a discussion that brings findings related to this research question in conversation with the broader themes of this study.

5.1 Participant Overview

Study participants encompass a range of roles and experience. Participants include staff who provide direct service to community members, those who provided support service to the health center. But by design, the findings of this study are most representative of workers who interact directly with community members in the field and in the clinic. These patient-focused workers are most intimately involved in providing direct care and services, and by connecting the community to broader health services. The patient-focused staff in these roles represent the majority of the participants. The roles of these workers include medical officers, male JHAs, female JHAs, lady health visitors, senior male health assistant, link workers, and ASHAs. Other participants in this study have the role of pharmacists, lab technician, and administrators. This does not mean, however, that the other roles that I do not focus on are unimportant. Their participation in the study provides helpful perspective for better understanding the larger workflows of the fieldworkers.

Table 5.1 shows an overview of study participants by role and study site.

5.2 Roles and responsibilities

The government in India has published guidelines that define roles and responsibilities for health workers (Ministry of Health and Family Welfare, 2012b). Below is a description of the main groups of health workers in this study.

Medical officers are licensed medical doctors responsible for providing leadership at the clinic. As the head of the health center, medical officers are responsible for ensuring staff are up-to-date on national health programs, distributing duties at the health center. Medical officers examine and treat patients in the clinic and visit patients referred to the clinic by other health workers. Additionally, medical officers are administratively responsible for their health center, and thus approve and sign official reports and documents that get submitted to the government.

Lady health visitors (LHV's) provide guidance and training to female JHAs, as well

Study site	**Pseudonym**	**Role**
Ramanagara PHC	Kalindi	Staff Nurse
	Priya	Female Junior Health Assistant
	Sangita	Female Junior Health Assistant
	Varun	Male Junior Health Assistant
	Sanjay	Male Junior Health Assistant
	Kumar	Pharmacist/Accountant
	Deepti	Lab Technician
Nandini UFWC	Dinesh	Medical Officer
	Darshan	Senior Male Health Assistant
	Rana	Lady Health Visitor
	Kumari	Female Junior Health Assistant
	Mandip	Male Junior Health Assistant
	Bharati	Link Worker
Kanakapura CHC	Surendra	Senior Male Health Assistant
	Vinata	Female Junior Health Assistant
	Jaya	Female Junior Health Assistant
	Kiran	ASHA Worker
Tumkur PHC	Anand	Medical Officer
	Indra	Female Junior Health Assistant
	Meera	Female Junior Health Assistant
	Padma	Pharmacist/Accountant
	Ashok	Male Junior Health Assistant
Outer Ring PHC	Sita	Lady Health Visitor
	Neema	Female Junior Health Assistant
	Jyoti	Female Junior Health Assistant
	Manoj	Male Junior Health Assistant

Table 5.1: Study participant pseudonyms, roles, and study sites.

as conduct direct supervision visits with JHAs in the field. They also review the individual records maintained by female JHAs and consolidate those records into regular reports. LHV's focus on family welfare, maternal and child health, nutrition, and immunization.

Female junior health assistants (JHAs), often still referred by the older title Auxiliary Nurse Midwives (ANM), provide basic care for patients in the community. They organize and manage immunization days, administering immunizations with the help of other health center employees such as the male JHAs and ASHAs. They are also in charge of subcenters located in the community where she can administer basic care to patients and refer them to the health center as needed. When in the field, their work is primarily focused on maternal and child care.

Senior male health assistants have responsibilities that nearly mirror those of the lady health visitor. Senior male health assistants provide supervision, training, and guidance to male JHAs. Senior male health assistants focus on programs related to communicable diseases, environmental sanitation, and health outreach education.

Male Junior Health Assistants (JHAs) support female JHAs in their community health outreach activities, such as weekly immunizations. Their work in the field is distinct from female JHAs. Male JHAs focus have the same program priorities has the senior male health assistants (i.e. monitoring communicable disease, environmental sanitation, and health outreach education.)

Accredited Social Health Activists (ASHAs) and **Link Workers** are lay health workers who provide education, counseling, and motivation to patients to seek health services at the health centers. ASHAs and link workers are members of the community have gone through training to support the outreach efforts of the health center.

5.3 Data collection as a core practice

Data collection is the core activity that structures and guides the responsibilities that clinic staff have. Collected data are used to measure and evaluate government health programs, and indirectly to the CHWs performance. Thus, CHWs spend much of their time collecting data and documenting it in paper and digitally. Participants collect data in different ways. Often, data are collected after a CHW has performed a service, such as documenting when a vaccination has been given or when a medication has been taken. Other times, data may be collected by asking community members to report about themselves or their households, or by reviewing documents provided by the patients in and out of the health center, asking community members to report about their neighbors, and asking other health workers for information.

5.3.1 Coverage practices: targeted and triggered

With respect to collecting and documenting data, participants described two different kinds of coverage practices in the field. The first practice is the targeted approach. This approach is used when conducting specific programmatic monitoring of the health needs and status of community members. For example, female JHAs usually have specific days that they focus on certain efforts, like immunization, so in those cases they will specifically reach out to households to administer specific kinds of care.

The second coverage practice is the triggered approach. Triggered coverage occurs as a response to a need in the community coming to the attention of the health center. This includes home visits that are a response to being notified by someone in the community, or if there is a suspected outbreak or environmental health issue located in a home. Thus, this type of visit is a reaction to the community health worker receiving new information about an incident in the community.

Targeted coverage

CHWs often conduct home visits sequentially, going from house to house in a specific geographic area. During a field visit in Nandini UFWC, I followed Bharati, a link worker, as she visited households with children or with eligible couples. As a link worker, her primary day-to-day responsibility is to visit homes in a specific geographic area. Each day she is in the field, she visits a different area, and is able to rotate through each area about once a month. To support the ordering of these visits, her register was arranged in order of the houses, structuring and supporting her house-to-house visit strategy. Prior to arriving at each house, she would review the entry for those households.

During her visits in the neighborhood, she accomplishes three types of tasks. First, she wants to get status updates on household she had visited in the past, such as whether an eligible couple had started any family planning methods, or whether a child received vaccinations. When she receives this information, she also asks for their health records, such as a visit record such as a visit report or a child's immunization card, to verify the change in status. Patients would hand over the information while she reviewed it, and then the link worker would update her register with the corresponding changes. Relatedly, she also took the time to ask general questions about household members well-being.

Second, she collects changes in the makeup of the households of the community. A few times over our visits, we would occasionally come to a home where the former residents had moved out. The new resident answered the door, or neighbors would tell us that whoever was living there before had moved out. When this happened, the link worker would cross out the old information with a single line, and fill out the new details in the space available. She would collect information about each member of the household such as names, ages, and genders - using this to learn whether or not a household fit the requirements of being only for eligible couples. It would be difficult for her to put the information in a different part of the because the records are already ordered in her book in geographically and sequentially.

Third, she "links" the household with other health services by providing counseling and education. At some houses she would chat with the residents about the main concerns of the female welfare center, including birth control, immunizations, and nutrition, or remind parents when they should be bringing their children to the doctor. She also provided ongoing support for women who were already on birth control, answering questions they have, making sure condoms are available, and checking to see if there are any ongoing concerns she could address or advise. She also makes recommendations to visit the health center to obtain these services.

Through these three methods, CHWs accomplish their designated responsibilities of monitoring the ongoing health status of the community and linking them the health institution through counseling and education.

Targeted coverage allows Bharati to continuously monitor the community across broad measures like demographics, the number of households using family planning methods, and specific information like when household members were last vaccinated.

A pitfall of the targeted approach is that it relies on chance encounters with the community. CHWs visit certain areas only on specific days. During my visits with Bharati and with other CHWs in other settings, we encountered several households where residents were not home or had moved away. To overcome this limitation of the targeted approach, Bharati relies on neighbors to fill in the gaps of her information.

Triggered coverage

Targeted coverage is a tactic used by health workers when their visits to patients are triggered by an external influence, such as a report of an illness at a clinic or by a neighbor. They represent a follow-up investigation of an incident reported elsewhere.

Varun, a male JHA at the Ramangara PHC, explained how he conducted home visits to check the sanitation of the home water supplies. These visits are often predicated by someone making a visit to the health center and receiving a positive result for an infectious disease, such as cholera.

In addition to checking an individual household, Varun will also investigate the water supplies of neighboring household to help him determine the extent of possible contamination, as well as institute measures and education to help patients control them.

In addition to environmental health checks spurred by a clinical visit, a targeted approach also happens in the management of difficult-to-control diseases, such as tuberculosis. Health workers visit patients to ensure that they are adhering to the strict medication schedule for managing and curing TB since the stakes are so high. If a patient fails to take their medication on schedule, they have to go on to a more aggressive course of treatment and continue to risk infection of others in their community.

Targeted coverage is labor-intensive, requiring health workers to ensure that they follow-up with specific individuals and document progress and status. As a consequence of the extra labor involved, targeted coverage also means that a smaller number of patients can be visited in a given workday since the amount of time traveling or interacting as with a patient was much greater.

The types of coverage tactics deployed by participants was roughly associated with either the male or the female junior health assistants. The female junior health assistants, by virtue of their unique ability to work with women and children in supporting ongoing child and maternal health, engaged less often in targeted coverage than the male junior health assistants. Additionally, male junior health assistants were almost solely responsible for environmental health monitoring.

5.3.2 Tensions in Data Collection

Field work differs from the clinical work because it the onus of the health care relationship is on the health care worker. When visiting the clinic, patients have already demonstrated their desire to receiving care from the health center. However, in the field, this is not always true. Households and community members may actively avoid receiving services or education from community health workers. They might avoid talking opening their doors to patients, make themselves unavailable for when community health workers are making their visits, or ignore their advice and guidance.

CHWs have to take into consideration their responsibilities to the community and put that in balance with the constraints they face with respect to resources, staffing, and time. Because their work most often puts them at the homes of community members, they have different methods for addressing the health needs of their community.

As part of their monitoring work for different programs, CHWs have to keep track of community members who do not go their clinic. I observed several encounters where CHWs needed to reconcile their records with the records of patients who sought care elsewhere.

While at the Ramanagara PHC, I accompanied Priya, a female JHA, on a visit to a village. She was conducting post-natal wellness checkups as part of her maternal and child health responsibilities. During these visits, Priya asks the mothers how they're doing, provides counseling and health advice, and checks in on recent and upcoming health care visits. On this day, we visited a new mother who did not go to the Ramanagara PHC, but lived in the PHCs catchment area. Because of this, Priya was still responsible for keeping track of this mother's PNC health activities. Priya asked the mother about this, and the mother left to fetch a plastic bag filled with papers. The mother pulled out the stack and showed Priya immunization records from care she received from another clinic. Priya had to spend a few moments to review the documents for the information she needed and update the immunization information in her paper register.

I observed a similar encounter during my field visit with Bharati, who I introduced earlier. During one specific household visit, we met a woman recently moved to the neighborhood. Bharati did not have any current information about her. Bharati crossed out the information of the former residents and began to enter the information for the new residents in the space above it. Bharati asked the mother to share any health records she had and the woman, a young mother, brought a plastic bag filled with visit slips, test results, and x-rays from another health center. Bharati sifted through the documents and asked about more details to put into her paper register.

These two instances illustrate the scope of the responsibilities that CHWs have in integrating community members into their work. Both women we visited sought care from other health centers, but it was still necessary for the CHW to keep track of those visits for herself and for her health center.

These examples also begin to surface the tension that CHWs face in balancing their reporting responsibilities with their care and service-providing responsibilities. For community members who already receive care elsewhere, it is not immediately clear what value these visits provide. Reviewing and deciphering health records from other health centers and transcribing them into a register requires time and effort.

I spoke to was asked whether she felt she was able to address the needs of the community explained how health workers are not always in a position to address community member needs.

> *"If we come across some people they will make us sit and they'll tell their story. We'll just be a good listener. We may not be able to solve [their problems], we'll at least be a good listener so she'll be satisfied."*

As this worker describes, health care workers have certain responsibilities that they need to perform, in priority to the other health issues that warrant investigation. Consequently, the role of health care workers when confronting some of these issues is one of comfort when they are not able to directly address what the problems are.

5.4 Health worker barriers

In this section, I describe the barriers that participants identified in their work.

5.4.1 Socioeconomic differences with the community

Through interviews and observations, socioeconomic differences arose as a barrier to providing care. Specifically, community members with higher socioeconomic status choose not to get their health services because the quality of care is perceived as being lower.

I observed this at the Ramanagara PHC. While accompanying Priya on a series of home visits, we arrived at a small homestead. Priya was doing a home check-up on the residents of this home. She was an expectant mother. However, I observed that she did not go to the PHC to receive all of her care. Priya asked the mother for her health records, and saw that these records did not come from the PHC. After the visit, my translator commented on how the home, though rural, had improvements like its own water well and expensive crops, that suggested it belonged to a wealthier family.

At the Nandini UFWC, both Rana, the LHV, and Dinesh, the medical officer, explained how difficult it was for their health center to reach out to the elite households in their community, that is, those of higher socioeconomic status.

> **Rana:** *We have an elite area with a large population. Twenty to thirty thousand we have in the elite area. We go to some areas and we're doing house visit during working hours, [that's] easy. But the elite area are a big issue*
>
> **Robert:** *Because they... because you do not have time? Or because they're not interested.*
>
> **Rana:** *We're interested, but she's not interested. They end up going to private hospitals, family doctors also. They're not accepting of our services.*

After interviewing Rana, I also asked Dinesh to describe how the clinic's services are perceived by wealthier residents.

> *Some of them will not come to our hospital because they think it is not good. it is OK. Earlier it was like that, now it is better. Over the years, they've learned that the service is good. But still the middle class and the upper-middle class, they'll not come to us. They'll look after themselves, that's not an issue.* (Dinesh, medical officer, Nandini UFWC)

Both Rana and Dinesh directly ascribe socioeconomic status as the reason that care is not more widely sought at the Nandini UFWC. But this can have negative impacts on the community. Although Dinesh said here that wealthier residents are able to look after themselves, he later disclosed that malnutrition is surprisingly high among the children of wealthier families because the health center is not tracking their growth.

Participants also described how poorer community members fear that getting certain kinds of care will disadvantage them. Dinesh described an incident in which a man from the community had finally agreed to undergo the procedure. But as he was getting prepared for the procedure, the patient had second thoughts and ended up running out of the health center.

> *"We tell the males, what happens when they go back to the home, the females, the wife, they'll think something will happen. And he is the bread earner for them, so the females will [inaudible]. So it is like that, male vasectomy."* (Dinesh, Nandini UFWC)

Anand, the medical officer at the Tumkur PHC also shared similar difficulties in getting male patients to follow through in getting vasectomies. The wives of some of the male patients there also prevented their husbands from going through with a vasectomy because they did not want their husbands to stop working.

5.4.2 Acceptance from the community

The study sites each have different degrees of acceptance by the communities. Participants discussed how some patients had varying attitudes toward either the types of services that the health centers provided, as well as toward the health centers in general.

At some of the study sites, the health workers feel that the local community is very accepting of the health center and it services, and actively used the centers and ordered to get healthcare. For example, staff from the Ramanagara PHC believe that their patients were actively looking for the Western medicine that the clinic was able to offer. Staff feel that they were accepted by the community.

But overall, local acceptance is much more nuanced than outright acceptance or rejection. As described earlier, the Nandini UFWC has ongoing difficulty to get middle-class members of the community to use the services of the center. A surprising consequence of this is that many children of middle class families are considered malnourished. The medical officer at Nandini UFWC attributes this to the families unwillingness to go to the health center. Additionally, the center has difficulty convincing the male members of the community to take advantage of family planning procedures such as vasectomy. The medical officer told me about one patient came to the health center to get a vasectomy, but after the doctor was preparing for the procedure, he returned to the room and found that the patient had jumped out the window.

At the Tumkur PHC, staff commented that community members had mixed opinions of the health center. The medical officer there told me that there are vocal members of the community who warned others not to go to the PHC because they believe that the quality of care at a publicly run facility is poor. Instead, the PHC naysayers recommended that the members go to other private health centers or better equipped health centers nearby. The medical officer recalled that one point, things got heated, that he ended up getting into a physical fight with a community member over the negative comments this member was saying about the clinic.

5.4.3 Avoidance of care

Outside of socioeconomic status, participants also had identified stigmas, superstitions, and low-literacy as barriers to their work.

HIV is particularly stigmatized, and patients with it are reluctant to seek care. Sometimes, however, participants work around patients' fears by visiting patients at their homes. Varun, a male JHA from the Ramanagara PHC, told me that he had a patient with HIV that he was monitoring. He and the doctor would only see that patient at home, in order to protect his privacy.

In other cases, patients are openly skeptical of the services provided by the health workers, especially when patient's do not fully understand how services will impact them. Participants complained about TB patients who stopped coming to take their TB medications when symptoms abated. This is problematic because if they interrupt the first course of treatment, which takes at least six months, they have to go on more aggressive and longer course of treatment.

Indra, a female JHA from the Tumkur PHC, described a challenging patient who she could not convince to adopt a family planning method or go to the health center for delivery.

> *"it is the sixth time she is pregnant. All the previous one had been home deliveries. She is like, 'Why do I need the government's care, why do I need to take this injection? I'm delivering normal. I do not need that.' "* (Indra, female JHA, Tumkur PHC)

Indra was unable to sway this mother to go on family planning because the mother had not experienced any complications or issues with her children. The mother did not see what benefit she would get from going to the hospital to receive care. Indra attributed this refusal to a lack of awareness.

5.4.4 Increasing Workload

Although participants valued being able to listen in counsel members of the community, they had difficulty doing so when there were staffing issues at their health centers. As described earlier, Vinata, a female junior health assistant at the Kanakapura CHC, had to cover three PHCs total instead of her original one.

> *"There's a loss of human resources here... We should have eight field staff; we are having only three. That's the problem. Vacancies."* (Vinata, Kanakapura CHC)

Later, after we concluded our interview and headed back to the CHC together, she explained that the positions had been vacant for two years. She did not know why.

5.4.5 Lack of Institutional Support

Lack of institutional support was another barrier that participants discussed. This includes lack of material and human resources to help participants do their work, as well as a perceived lack of appreciation of the work that they do. The findings here are closely related to the structural findings described in Chapter 4.

At the Outer Ring PHC, workers had a tenuous relationship with the staff at the district hospital in which they were located. The hospital had its own support staff focused on data entry for patients at the hospital, but the health workers at the PHC were unable to get their support. They needed their support to complete tasks such as electronically registering new patients into the mother child tracking system. But the hospital workers complained that it was not their responsibility. Thus, the PHC workers had to register patients outside of working hours using computers at cybercafs and paying for access out of their own pockets.

Participants from the Ramanagara PHC and the Kanakapura CHC complained about long delays in payment. Participants at both locations reported delays of two months and more.

Jyoti, a female JHA from the Outer Ring PHC, described an important tension between her sense of duty to the people she served in the community and the kind of treatment she felt she received from the government. She had worked as a government health worker for more than two decades, and moved from her original posting in a rural PHC, a nursing home in a bigger area, to her current position now in Bangalore. Her family followed her as she moved for her job. When her husband fell ill with heart problems, she thought that she could turn to the government to get him the help that he needed. But what she had found was a long, drawn-out process. Her husband died because he could not get his treatments in time.

Participants at the publicly operated health centers also felt like the government was not communicative about when their working conditions might improve. Participants did not know when staffing vacancies would be filled, or when their facilities would be upgraded. At the Kanakapura CHC, Surendra, the senior male health worker, showed me the new operating room equipment that his clinic received. The equipment had already been set up for several months, but he did not know the plan was for getting medical staff would actually be able to make use of that equipment. This was similar to what that situation was at the

Tumkur PHC, which was promised a series of facility upgrades.

Anand, the medical officer and describes how the upgrade has been delayed.

> **Anand**: The government has upgraded this particular unit into a [primary health] center but. There are still upgrades to be done. it is still basically a PHU which is being upgraded to a PHC.
>
> **Robert**: How long until it is upgraded?
>
> **Anand**: it has been two years that this has been upgraded but theres no communication. It has not happened.

The health center had a number of unfinished improvements, such as an alarm system that was installed on the wall, but not fully connected. And as described earlier in Chapter 4, the PHC had new child delivery equipment, but there was not enough staff to be able to use it.

5.5 Relationships and collaboration

My first field visits were at the Ramanagara PHC. My first impression was that working in the field must be lonely. Sangita and Priya explained how they did not return to the clinic regularly because the subcenters and communities they were responsible for were too far. I felt similarly when I accompanied Bharati on her visits as described above, and when interviewing Jyoti at the Outer Ring PHC about her experience out in the field. I initially observed and heard how, for large part of the day, CHWs do work solitarily.

But contrary to these impressions, participants across all sites consistently describe their work as highly collaborative, spanning relationships within the health center, between health and administrative institutions, and with members of the community. The relationships that community health workers form with each other, with other institutions, and with their patients, form the grounding for their ability to serve their communities.

These relationships provide as a way for health workers to distribute the labor, in formally codified ways or through informal ways. These relationships represent a network of social support in professional and personal capacities for health workers as they endure the often challenging work of serving their communities.

There are myriad social relationships that can exist within the contexts and among the different roles, but this dissertation focuses on a few key configurations uncovered in this study. I focus on how these relationships enable links between different entities as demonstrated through prescribed workflows, demonstrated practices, and shared interests.

5.5.1 Collaboration and support among health workers

The Indian government guidelines for health workers directly recognizes the collaborative nature of health work across roles. In the IPHS Guidelines for Primary Health Centers (Ministry of Health and Family Welfare, 2012b), under the heading of Team Work, the first responsibility for both male and female junior health assistants reads, "Help the health workers to work as part of the health team." Additional responsibilities ask the workers to coordinate," and "assist" in the activities of other workers and other agencies. The descriptions of these responsibilities are vague. The descriptions outline what kind of relationship that health workers should have with each other, while leaving flexibility as to how those relationships are accomplished.

The value of this flexibility is demonstrated when CHWs structure their education and counseling efforts along gendered lines. The list of responsibilities does not explicitly dictate that male and female CHWs interact with only male and female community members, but local cultural customs enforce this in practice. It is culturally inappropriate for female CHWs to talk to male community members about gender-specific health issues, and it is similarly inappropriate for male CHWs to talk about gender-specific issues with female community members.

Kumari describes how she and Mandip share responsibilities in talking to the community.

> **Kumari**: [None of the counseling] be accepted by patients if the male [health] worker is teaching [to women]. **Robert**: OK. **Kumari**: That will be a problem. To men he will talk, and the link worker will talk to the females. He telling the link workers [which female patient to talk to]. **Robert**: You will [talk to female patients]. He will [talk to male patients]. Do you ever talk to male [patients?] **Kumari**: No. For gender information in health education, in communicable diseases, we will combine both, men and women. Anything personal, we [the male CHW and I] will do it separate.

The CHWs are comfortable talking about gender issues in general, but not in personal matters because talking with members of the opposite gender on personal gender-specific matters is frowned upon in the local culture.

Another example of collaboration is when CHWs work together on labor intensive tasks. Vinata, a female JHA at the Kanakapura CHC, describes how she used to share her work with a male JHA when the CHC had one on staff.

> *"When we are out doing surveys, one of us will ask, one of us will write. It is so easy for us. If we collect information, they will write. Like that only, we will share. If we ca not go to one visit, sometimes if they are around they will go and collect the information. Like that they are doing work."* (Vinata, female JHA, Kanakapura PHC)

The surveys she describes are community needs assessment surveys. Health centers conduct these surveys annually, and use them to plan out the activities and resources they need for the upcoming year. Administering the surveys is labor intensive activity because CHWs have to visit each household and get extensive details. Female JHAs are primarily responsible for collecting this data, but in the past Vinata has teamed up with a male JHA to make the work go more quickly. She describes both how they would work together simultaneously, as well as how they cover for each other when one of them is not available.

During my field visits at the Ramanagara PHC and the Kanakapura CHC, I observed female JHAs and ASHAs as they conducted visits together. At both sites, CHWs were conducting PNC visits but they divided the work such that the female JHA would focus on collecting data and providing reminders about health care, and the ASHA would provide follow-up with education and counseling. This partnership was mutually beneficial for both the female JHA and the ASHA. It allowed the female JHA to be more expeditious in her visits, while also allowing her to supervise the work of the ASHA.

In addition to helping each other with tasks, the staff had supportive relationships with one another. These supportive relationships are demonstrated as casual support and companionship while working next to each other, but independently, as well as strong emotional support and consoling for coping with personal hardships.

At the Outer Ring PHC and Nandini UFWC, two urban sites, the health workers used the health center as a home base where they start and end their workdays. Thus, the health center workers are able to spend time together in the mornings and afternoons. Here, CHWs spend the last two to three hours of their day as a group reviewing their records, completing their records, and aggregating it into reports. The least busy time is in the afternoons, which offers some downtime for CHWs to catch up on their work and socialize. Where they complete their work is in the open area of the clinic where they are still able to respond to the needs of patients who may come in.

At Outer Ring PHC the junior health assistants returned to the clinic in the around 2PM. When they all arrive, they spend time to take lunch together. Afterwards, they finish up completing any loose ends in their registers. They exchange occasional banter, but mostly focus on working on their registers. Their focus on their registers could be due to the amount of work they have to stay on top of since there are so few health workers relative to the population they serve. Even though the female JHAs were working on their own paper registers, returning to the clinic to do so a regular part of their daily routine.

At the Nandini UFWC, link workers trickle back to the clinic in the afternoon, after they complete their visits. They gather at the long table at the entrance to eat lunch together, chat with one another, and finish documenting information into their paper registers. This end of the day routine allows the link workers, who otherwise are working solitarily throughout the day, to connect with their coworkers for support.

This social network of support could be extremely valuable. As I concluded field visit with Bharati, I asked her why she carried two mobile phones, she told me that one of the phones was her husband's. Her husband was recently paralyzed and at home, so she was able to use his phone while working. But discussing this with me was distressing for Bharati. We were the first out of all the link workers to arrive back at the clinic, and as the other health workers came in, they saw her distress and comforted her as they took their seats next to her.

5.5.2 Coordination across agencies

In addition to collaborating with each other, CHWs also had to collaborate with workers from other government agencies. The Indian government has several parallel programs across different departments that address shared issues, such as maternal and childhood health. Child care centers known as Anganwadi centers share or support some of the responsibilities that health centers have. For example, Anganwadi centers (AWC's) host health outreach and education activities with both male and female JHAs. The AWC's host these events because the centers are already important locations of care and education in the community. As I observed Angawadi centers and as participants described their relationships with Anganwadi workers (AWWs), I was surprised to see how much overlap there had with CHWs. The distinction between AWWs and CHWs can sometimes be so fuzzy that the Indian government issued a document attempting to more formally clarify the roles between the two cadres of workers /citepMinistryofWomenandChildDevelopment:2013wv. The key distinction that is called out in this document is that AWWs focus on managing holistic development of the child through nutrition, health, and education and connecting the children to resources as necessary. CHWs provide health-focused support such as immunizations and treatment. Nevertheless, the document still recognizes that AWWs and CHWs need to work together even if that leads to the duplication of work.

CHWs viewed this overlap as an important resource. Because AWWs collect similar data about the health of children in the community, health workers and AWWs rely on each others records to help them gaps they might have.

During my visit to the Kanakapura CHC, Vinata, a female JHA, Jaya, another female JHA, and Kiran, an ASHA, took me to visit the AWC in Kiran's village. Vinata described some of the overlap between the AWW and Jaya, showed me some of the registers that contain similar information to each other but are maintained separately.

> "Both [ASHA and AWW] will attend the mothers meeting and nutrition meeting. They are going to the VHS, Village Health and Sanitation committee meeting also, they are conducting. Cleanliness, health education, IUC [intrauterine contraception] activities. Sometimes they will go together with home visit also. If she [the AWW] gets births and deaths, she will tell to her [the ASHA]. If she [the ASHA] gets a birth, she will give to her [the ANM] also. They are coordinating for all things." (Vinata, female JHA, Kanakapura CHC)

Vinata characterizes the work of ASHAs and AWWs as being highly aligned and collaborative. They attend and manage the same events, sometimes make home visits together, and they collect the same data. Thus, they are also trusting in using one another's records.

5.5.3 Collaboration with the community

Participants additionally collaborate with members of the community to encourage community members to come to the clinic, to learn about the broader health needs in the community, and to get information about specific members. At the Ramanagara PHC, Sangita explained how it was her responsibility to collect sputum samples from community members at home, deliver the samples to the clinic, get the results after testing, deliver the final results to the community member, and provide follow-up care as needed. Sagittas coordinating work meant that community members could engage a series of health services without needing to visit the clinic.

The CHWs in this study recognize how important the role was connecting patients with the health center for which they work, as well as with the broader health system. But in order to accomplish this, they first had to build trust and credibility. Participants described how important it was for them to be available and to listen to the patients and their needs, even when they could not directly address those problems. Several participants discussed how they needed to spend time listening to domestic issues and financial troubles of households they visited. And they did this in order to build trust.

Meera, a female JHA from the Tumkur PHC, explained how trust helps her provide better care to the community.

> *"You need a lot of patience and you need to be virtuous. Even to not only understand the health problems you need to understand the personal problems also, because that sometimes is the root of the health problems. You need to be patient, you need to understand them and you need to develop that attachment with them, chemistry with them, they so that they actually follow your advice."* (Meera, female JHA, Tumkur PHC)

Meera points out that to be an effective healthcare provider, CHWs have to take the time to learn about the community and be willing to help them on personal problems as well as their health problems. Meera later describes that that trust also needs to cultivated across a community member's entire family.

> "There are some problems where you need to not just ask the person who is undergoing the procedure, you need to take the opinion of the husband, and then the father-in-law, mother-in-law, some far relative." (Meera, female JHA, Tumkur PHC)

The trust that CHWs build with community members through meaningful interactions is paramount in being able to serve them.

Most participants leveraged the trust they have built with community members to help them with collecting data and sharing information. CHWs also played a valuable role in connecting community members to a broader set of health services. CHWs at the Kanakapura CHC and the Tumkur PHC described that they queried about the broader health needs of the community while doing visits for specific programs.

> "We will go to [the community member's] house for ANC (antenatal care) or PNC (postnatal care) visits and ask them 'Is there anyone who is suffering from fever, or cold, or loose diarrhea, or anything like that?' They will tell us 'Yes, some neighbor was suffering from this or that.' They will tell us this during the ANC or PNC visit." (Sangita, female JHA, Ramanagara PHC)

Sangita describes that when she is making specific ANC and PNC visits, she also asks about other health issues that she should be aware of. She uses the community as an additional set of eyes and ears to keep her updated on what is going on in the community when she is unable to visit each household individual. This expands her ability to respond to the community's needs without requiring her to visit every home.

CHWs also relied on neighbors in the opposite case of getting information for a specific kind of visit. For example, CHWs do not visit each of their villages or neighborhoods daily, and it could take up to a month before they are able to return. If the CHW is conducting a specific program visit to a community member, but the member is not home, the CHW sometimes need to collect provisional information that they can verify the next time they are able to visit a patient. Once again, I return to my field observations with Bharati to illustrate an example of this information exchange.

> We visit one home. Bharati looks at her register and determines that an expectant mother lives there. Bharati knocks on the door, but nobody is home.

> A female neighbor across the street sees us knocking, and Bharati goes to speak with her. The neighbor tells us that the resident just delivered a baby boy yesterday and provides details about the childs birth. Bharati dutifully writes this down in her register.
>
> I am surprised that she writes this down in her register since this is second-hand information. When we visit the next home, she asks the neighbor about the details of the birth with the next house she visits, and is satisfied with the information shes collected.

When I asked Bharati how the neighbors know, she tells me that the resident's mother-in-law came back after the delivery and shared the news and details with the neighbors. On her next visit to the neighborhood, next month, Bharati will confirm the information using the mother's records.

This encounter demonstrates how CHWs can rely on the community for collecting and verifying provisional information. In the neighborhood where we were conducting these visits, Bharati explained how people are often at work or are moving from the area. Because the information is provisional and she does not want to document incorrect information, even if it is provisional, she triangulates the information by asking another neighbor to confirm the details. She is then able to make a note to herself in her register reminding her to check on that information the next time shes able to visit the new mother.

In the examples described above, CHWs improvise outside the workflows that are structured by the programs they are asked to focus on. Sangita and other CHWs take advantage of their program-specific visits at specific households to learn about the broader health needs in the community, and thus work beyond the scope of those programs. In Bharati's example, she is using the neighbor to triangulate information about a specific visit.

5.5.4 Collaboration as task shifting

In Chapter 4, I describe how staffing and supervisory constraints at health centers led to situated task shifting, or the movement of responsibilities of one group of workers to another group of workers. In this chapter, I have explored how collaborative practices enable CHWs to meet the needs to fulfill their institutional duties and the emergent needs of their community. These two sets of findings together suggest that task shifting can thus be viewed as a precursor and kind of collaborative practices.

In this study, situated task shifting as the means of collaborative practice emerged in four ways. First, responsibilities might have been moved down the hierarchy, meaning a health worker might have to assume the responsibilities of someone above them. Second, responsibilities might have been moved laterally, meaning the responsibilities of one health worker were moved to another health worker in a similar position. Third, the health worker might take on new roles and responsibilities that go beyond what is expected of anyone at the health center. Finally, the health worker might have to shirk responsibilities that are otherwise ascribed to them.

As described in Chapter 4, most study sites suffered from a lack of manpower and supervision. Consequently, supervisory responsibilities had to be transferred to patients lower in the hierarchy. These relationships are informal in the sense that there is no official designation of supervision, but they are very much enacted in practice. The role of the supervision entails both managing and monitoring the workload of other employees, but also includes having the authority to manage and serving as the point of contact for health center programs. Most often, these responsibilities fall to the most senior male health worker. At the already reduced staff at the Outer Ring PHC, Manoj, the sole male JHA, was responsible for managing all of the 24 NRHM programs at his clinic. This responsibility typically falls to the medical officer, but since his PHC did not have one the responsibility fell to him.

Similarly, the Ramanagara PHC does not have an LHV, and so the responsibility falls to Sanjay, one of two male JHAs. He has only been working as a junior health assistant for four years.

> *"There are couple of roles who are not here, one is the lady health visitor. That staff person is missing. She's responsible for maintaining [pause]... she is the ANM supervisor. She is missing. There's also a senior health worker. Those guys are supposed to be present here... Even though those posts are missing I have to do all this work... I'm acting as the senior health worker. There's supposed to be senior health worker who all of them are supposed to report to, but because that post is missing, he's taken over that role."* (Sanjay, male JHA, Ramanagara PHC)

Manoj and Sanjay agree to take on a more central role in the workflows of their health centers, which also requires the cooperation and agreement of their coworkers. At the Outer Ring PHC, I observed Manoj actively assist the female JHAs in the administration of their programs even though they are beyond what is asked for of a male KHA.

Work is shifted laterally when the responsibilities of a missing health worker are shifted to another health worker in a similar position. This occurred when the roster of postings for a specific position were not completely filled. At the Kanakapura CHC, Vinata, a female JHA explained that she had to cover two subcenters instead of one. This was because the center had a vacant position for the female JHA who would be responsible for that area. Thus, Vinata had to cover those responsibilities.

Adding new responsibilities happened when there are tasks that needed to be completed for which nobody originally had responsibility. Kalindi, the staff nurse at Ramanagara PHC, described how she the clinic provides after-hour non-emergency care for patients, even though the clinic provides only after hour care on an emergency basis. The responsibility of seeing patients after hours usually falls to Kalindi since she lives closest to the clinic. She explains that patients will go directly to her house when they see that nobody is out the clinic. Even though she doesn't enjoy this part of her work, she finds that it's still important. So she will coordinate with the others CHWs to be available in case she is not around.

Putting in a stopgap happened when CHWs had to prioritize some tasks at the expense of others. Examples of this included asking AWWs to do tasks that are typically handled by CHWs, such as notifying mothers about upcoming immunizations.

5.6 Discussion

In this discussion, I reflect on how health workers employed various collaborative practices in order to overcome the challenges of their daily work. In framing this discussion, I turn to the critical theory introduced in Chapter 2. These theories included feminist standpoint theory, De Certeau's concepts of strategies and tactics from the practice of everyday life, and Suchman's invisible work. Using these critical theories provide a productive lens for understanding these challenges and why collaborative practice is the primary mechanism through which health workers can confront these challenges. The Health workers in this study rely on collaboration in order to get their work done. They leverage their collective expertise to complete tasks and provide coverage to the community that they otherwise can't.

5.6.1 Social support enables collaboration

Participants at all study sites described the relationships that they had with co-workers and community members, and how these relationships help them accomplish their work. Given my workplace focus of this study, participants' descriptions focused on the productive character of these collaborations, such as how they help each other out or complete work together. But this would be an incomplete characterization of their relationships as it fails to consider the social support that health workers provide one another.

The value of social support was best revealed during my encounter with Bharati at the Nandini UFWC. There, I observed how the other link workers arrived from their visits in the field and upon seeing Bharati upset, sat with her to both comfort her as well as minimize the potential disruption. Bharati's coworkers also try to protect her. The link workers protected her first by physically providing a safe and accepting space for her to be at work. While they were comforting Bharati, the co-workers continue their work. This has the effect of minimizing any potential disruption. Bharati's co-workers also minimize the potential disruption by escorting me, the instigator of the disruption, to another area of the clinic. One of the maintenance workers at the clinic escorted me to wait in another room, away from Bharati and her co-workers.

This particular incident reveals the multivalent nature of relationships between health workers. Health workers not only provide professional support to each other through collaboration, but they also provide emotional support to support to each other. This incident suggests that professional support and social support reciprocally enable each other.

But it also shows us how social support has professional consequences. The health workers helped to shape an environment that would help distance Bharati from the emotional disruption that I had unwittingly instigated. In doing so, Bharati and her co-workers could continue their workday.

My encounter at the Nandini UFWC was the most pronounced example of health workers providing social support, but the social support was hinted at from the other centers in other ways. This was evident in small ways; such as how female health workers would refer to each other as "sisters during interviews. This was also evident when participants acknowledged the heavy workloads of their peers.

Understanding how social support and professional support influence one another highlights opportunities for improving the kinds of collaborations that health workers have with one another, and it can highlight opportunities for amplifying future collaborations and improving motivation.

5.6.2 Bringing coherence to health care

Bardzell and Bardzell remark that a feminist approach in HCI means that HCI researchers should strive for "strong objectivity (Harding, 1992)" that incorporates many perspectives to generate a nuanced and qualified account of what is "known."

So one theme that emerges from the findings in this chapter is that CHWs have to make sense of the community in ways that are meaningful to the CHWs, but also legible and acceptable to health institutions. This “truth-making work” requires that they reconstructing and reconciling different forms of knowledge of the community. These disparate forms of knowledge are the product of collaboration: their first-hand observations and accounts of community members, second-hand observations from community members and peers, and different written documents which may come from different locations. Only after a CHW integrates these different forms of knowledge can she assess how she can best serve the needs of the community and meet the duties of her job.

CHWs have to initiate this effort because the broader context in which they work is fractured. As described in Chapter 3, the tools, resources, and infrastructure have resulted in a setting where CHWs are equipped to deal with the health needs of the community on a piece-by-piece basis in accordance with the programs she supports. At the same time, these programs may not directly match the needs she sees in her community.

The work that CHW’s do to cohere different kinds of health knowledge and experience exemplifies a unique kind of expertise for which instrumentally focused technology design does not consider.

5.6.3 The visibility of collaboration

This chapter also described forms of collaboration that may be largely invisible to health institutions.

First, the study found that health workers have different ways to enlist the help and cooperation of other community workers, such as AWWs. As described here, the boundaries between a CHWs work and an AWWs work is vague (and, as described in Chapter 2, vague even to the India government).

This haziness of responsibility brings up a concern about what kinds of collaboration are condoned or forbidden. CHWs and AWWs rely on each other to complete their work. Specifically, I described in this study how CHWs and AWWs sometimes share records they hold in common, such as growth charts, or ANC and PNC registers. Sharing records was common among participants, but was otherwise not made explicit in government guidelines.

There are multiple ways to understand this particular practice. From a supervisory, institutional perspective, we might interpret the practice of sharing registers as a form of shirking responsibilities. The CHW is documenting information she has not collected herself.

But the information is valid and acceptable because it is collected by a trusted health worker. But we might understand this particular practice as a tactic for CHWs trying to make the most within the constraints she has to work with. Many participants conveyed a perceived lack of institutional support that was demonstrated through inadequate staffing and material resources.

When information is not shared by a trusted government community worker, CHWs take additional precautions. When CHWs collect provisional information from community members, they still triangulate and later verify that information.

No participants directly described these practices as being shortcuts, but rather described them as matters of fact. This could mean that these kinds of invisible collaborations are ways for CHWs to accomplish what they need to do.

5.6.4 Understanding task shifting as collaboration

Finally, this chapter shows how health workers engaged in task shifting to reconfigure how work is accomplished. This included shifting work down the staff hierarchy so that non-supervisory staff took on supervisory roles, shifting work laterally from one peer to another, adopting new responsibilities when the situation calls for it, and putting in a stopgap when not all the work could be completed.

This study strengthens our understanding of task shifting by framing it as an inherently collaborative practice. This extends the description of task shifting in Chapter 4, where it is described as being both an institutional mechanism as well as a more situated response. However, this initial description did not elaborate on how these are inherently collaborative. But here I have described how CHWs rely on others so that they can cope with the strains additional responsibilities.

Collaboration is inherently about sharing work. Task shifting, then, is just a more specific way of doing that. Understanding task shifting as collaborative and relational brings forward a different set of design considerations for designers as they try to digitize and simplify work.

5.6.5 Providing care or collecting data?

Participants from many health centers described the problem of getting community to go to their public health center instead of private health centers. Participants described community members' perception that the quality of care at the public health centers was lower than at public centers. Many participants described this perception as inaccurate. Community members *could* get quality care at their health centers. But in analyzing the responsibilities that health workers had, the responsibilities of collecting data about the community competes with the responsibility of providing care to the community. The aspects of a home visit that are prioritized are those that most directly pertain to the data which health workers want to collect.

This puts health workers in a vicious circle: in order to understand the needs of the community, the needs of the community need to be documented, and so much of their work focuses on data collection. But the effort of documentation blocks their ability to provide care. Which responsibilities health workers prioritize is unfortunately determined by their performance measures.

The collaboration and sharing of responsibilities was one tactic with which health workers were able to address this. Data collection and care are shared up, decreasing the time spent collecting data and improving the timeliness of care.

Still, performance is tied to the data collected. Until these dependencies on the data can be resolved, it seems unlikely that health workers will be able to go beyond their responsibilities as data extractors. This tight coupling between data collection and performance has the unfortunate consequence narrows the focus of healthcare work from providing holistic care to an ever-narrowing scope of responsibility.

One possible reason as to why the contradiction imposed by data collection has not yet been resolved is that the structure of accountability is not yet fully resolved. But to whom they are not directly accountable are the community members themselves. An implication of this finding suggests that policymakers and designers should reconsider the prominence of data collection. If service provision is a priority, tools for data collection should help shift data collection to the background for health workers, rather than be the focus.

5.7 Summary

In this chapter, I described the findings related to my second research question. I described the responsibilities of the different kinds of health workers in this study, paying special attention to how these responsibilities center around data collection. I then described some the barriers that participants described in their work. Next, I explored how health workers navigated these challenges through various kinds of collaborative practices with each other and with the community. I concluded this chapter with a discussion that links the findings with the broader theoretical themes of this study.

Chapter 6

INFORMATION TOOLS AND ARTIFACTS

The previous two chapters served to provide overall context and understanding across the different study sites. Chapter 4 provided a narrative of the study site and study participants. Chapter 5 described the study participants, as well as discussion of how these participants manage the demands of their work.

In this chapter, I will detail some of the key information tools and artifacts that community health workers use in their work, how health workers use them, and how the practice of health workers are shaped by them. The design, use, and appropriation tools can reflect the broader sociotechnical healthcare setting. In other words, focusing on information tools provides a lens into the strategic influences and tactical practices intrinsic to community health work.

This chapter does not focus on other tools such as medical instruments, specimen collection tools, or laboratory testing equipment. While still important, these non-information tools are less shaped by institutional strategies and less adapted by health workers for use in tactical practice.

I first provide and describe a high-level typology of tools and artifacts, drawing distinctions among those that are official and unofficial, digital and analog. Next, I delineate and describe examples of several tools and artifacts as they fit within this typology of tools. Then, I provide a study of how these different tools are deployed within the context of supporting specific health programs. Finally, I conclude this section by discussing how tactics, strategies, and social relationships are embedded and reflected in the use of these tools and artifacts.

6.1 Typology of information tools

The information tools that health workers used to accomplish their work and fulfill their responsibilities can be divided. These information tools can be categorized along two primary dimensions: official versus unofficial and analog versus digital.

The use of both mobile phones and computers often played an important part in the work of most community health centers. In this section, I describe how health workers used mobile phones and computers, and their attitudes and challenges they expressed toward these technologies.

6.1.1 Dimension #1: Official vs. Unofficial

Official tools are tools that are formally provided by the institution or institutions for which a health worker works. Examples of this include the health registers that health workers use in the field or the Thayi card given to new and expectant mothers.

The key distinguishing feature of official information tools are that the data they contain represent an official source of record, so they are subject to review by a supervisor, such as the medical officer at a primary health center. The data within official information tools are the data that are directly aggregated into health reports submitted to the health ministry.

Another key feature of official information tools is that they are also highly structured, supporting the collection and presentation of only certain sets of data and information.

While official information tools are often professionally printed and pre-formatted, they are sometimes made from more readily available supplies such as student composition books where they are then formatted to collect structured data.

In contrast, *unofficial tools* do not serve as an official source of record and, consequently, are not reviewed by a supervisor. A key example of unofficial tools includes the personal diaries that allow health workers to write extemporaneously in an unstructured format.

6.1.2 Dimension #2: Digital vs. Analog

Digital tools, in the context of this study, refers specifically to desktop computer-based and mobile-phone based technologies. Analog tools refer to paper-based tools, which comprise the majority of the information tools used by health workers.

6.1.3 Where tools fit in this typology

Most of the information tools encountered can be easily categorized as being either analog and digital. For example, a health register is an official analog tool because it is a paper-based record-keeping document that is reviewed regularly by supervising staff, and used in the generation of monthly health center reports.

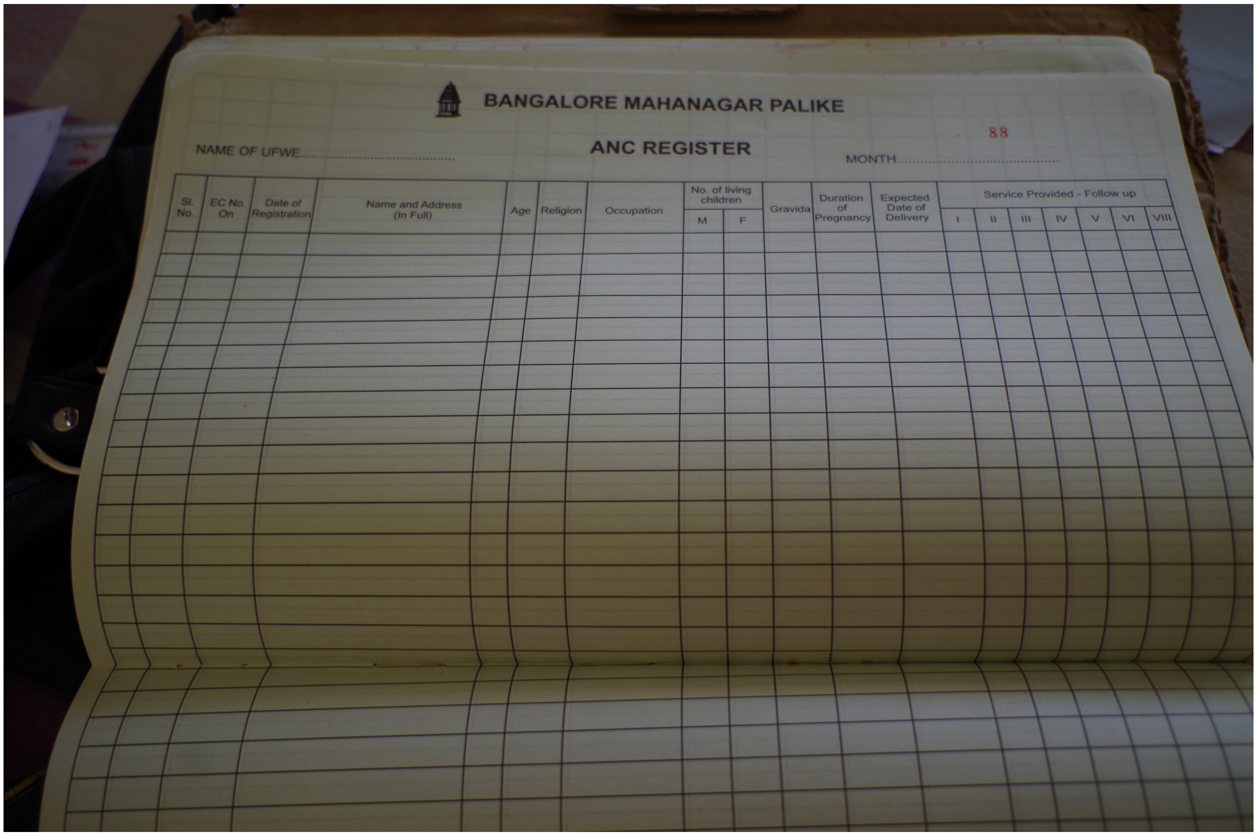
The distinction between official and unofficial use, especially for digital tools, remains a little less clear. Thus, some tools can exist somewhere in the middle of this continuum. A prominent example of this is the use of mobile phones, whose use is both official and unofficial. They are official in that for many field workers, the government provides a SIM card that allows them to contact a strictly controlled group of other field workers, as well as send SMS updates to a government database. But they are unofficial in that health workers also use the phones to communicate with patients at their own expense.

All participants used mobile phones, and all of those phones were their personal phones. However, all of the field workers except those at Nandini UFWC were also provided a government-issued SIM card that allowed them to freely make calls between other field workers and with the medical officer.

6.2 Information tools used by CHWs

6.2.1 Paper-based Registers

The most common tool observed across study sites was the paper-based register. Registers are a record-keeping tool used and maintained by health workers. Registers are one of the most important forms of documentation maintained by all staff members at the health



BANGALORE MAHANAGAR PALIKE

88

NAME OF UFWE..

ANC REGISTER

MONTH..

Sl. No.	EC No. On	Date of Registration	Name and Address (In Full)	Age	Religion	Occupation	No. of living children		Gravida	Duration of Pregnancy	Expected Date of Delivery	Service Provided - Follow up						
							M	F				I	II	III	IV	V	VI	VIII

Figure 6.1: An example page of an ANC paper register from the Nandini UFWC. Each line represents one mother. A female JHA completes the fields over the course of her visits to the mother.

centers. Each register is effectively a lined ledger,. Registers are used to document a range of activities and issues. Some registers are maintained because they document programmatic activities for government programs that are carried out by health workers, where the data collected in the registers will be aggregated and reported. Other registers are used specifically at the clinic for managing day-to-day operations. These kinds of registers are used for documenting activities such as cleaning schedules and when supplies were ordered. Thus, the number of registers that need to be maintained by an organization can be quite substantial.

The layout of the registers is highly structured, although each kind of register has its own structure. Each page portrays on a large table to be filled out by hand by the health worker. Each line within the registers can represent a single patient or a single household, depending on the purpose of the register. collect important health details about a patient. Depending on the unit of reporting that is important to the health worker, one line represents either an individual patient or a household.

One quality that makes registers unique is that their ownership is assigned to specific health care workers. Thus, it becomes a core part of the health care workers responsibility to make sure that the records are accurately maintained and reviewed. For the registers used in field health work, this responsibility falls to their official supervisors (that is, lady health visitors or senior health inspectors) and unofficial supervisors (that is, male JHAs put in charge). During multiple interviews with participants, the phrase "I am responsible for these registers was shorthand for declaring that they are responsible for the day-to-day management of the programs that those registers represent.

The registers fulfill several simultaneous roles. These roles include providing an auditable and official source of record, assisting in the planning of delivering care and services, and as a source of raw data to aggregate in monthly reports.

The registers comprise the official record of care provided or tasks completed by clinic staff. Unlike other record keeping tools that health workers might use, such as the personal diaries described below, registers are reviewed, stamped, and signed by a health worker's supervisor (such as the lady health visitor, senior male health inspector, or the health center medical officer). In other words, the register is the auditable paper trail and official source of record for activities carried out.

As an official source of record, participants might use the register as a record to reference back to depending on whether there was ongoing care concerning the community members in the record. But in practice, participants did not rely on the registers to refer back to previous work, especially work from a long time prior. Instead, participants referred to their personal diaries, which contained an unstructured, but chronological and sorted by day, account of their activities. An example of this is described in the next section.

Other participants also relied on their memory and experience. I asked Sangita, a female JHA from the Ramanagara PHC, how she used her ANC register. She explained that it's hard to use because there is not enough space to document everything.

> "For weekly visits, I won't enter that visit in that register. Once I get to know that she is pregnant, I will enter the name, and that I will keep. The thing is now that the pages are not enough for a weekly entry. When I give the [tetanus] injections, first and second one, at that time, they will enter into the register." (Sangita, female JHA, Ramangara PHC)

The register can't capture all the visits she might make to a mother. Each line of her register is one mother, and each field is one specific kind of visit, such as the tetanus injections. She is unable to use the register to document any visits beyond that scope. I asked her how she keeps track of whom she needs to visit and what kinds of visits she needs to make. Her response:

> "Strictly from the memory, that's it. I won't write or she wont keep a track of that. I will keep in her head. That's it." (Sangita, female JHA, Ramangara PHC)

Sangita the paper register because it was her responsibility to monitor whether mothers were getting the care recommended by the government. But she doesn't use it to plan anything beyond that.

This wasn't the case for all participants, however. Others used the registers to remind participants what kinds of care they need to provide to community members. During my visit to Kanakapura CHC, Jaya and Kiran, a female JHA and ASHA respectively, referred to the register to identify which homes or individuals they needed to visit next and for what reasons.

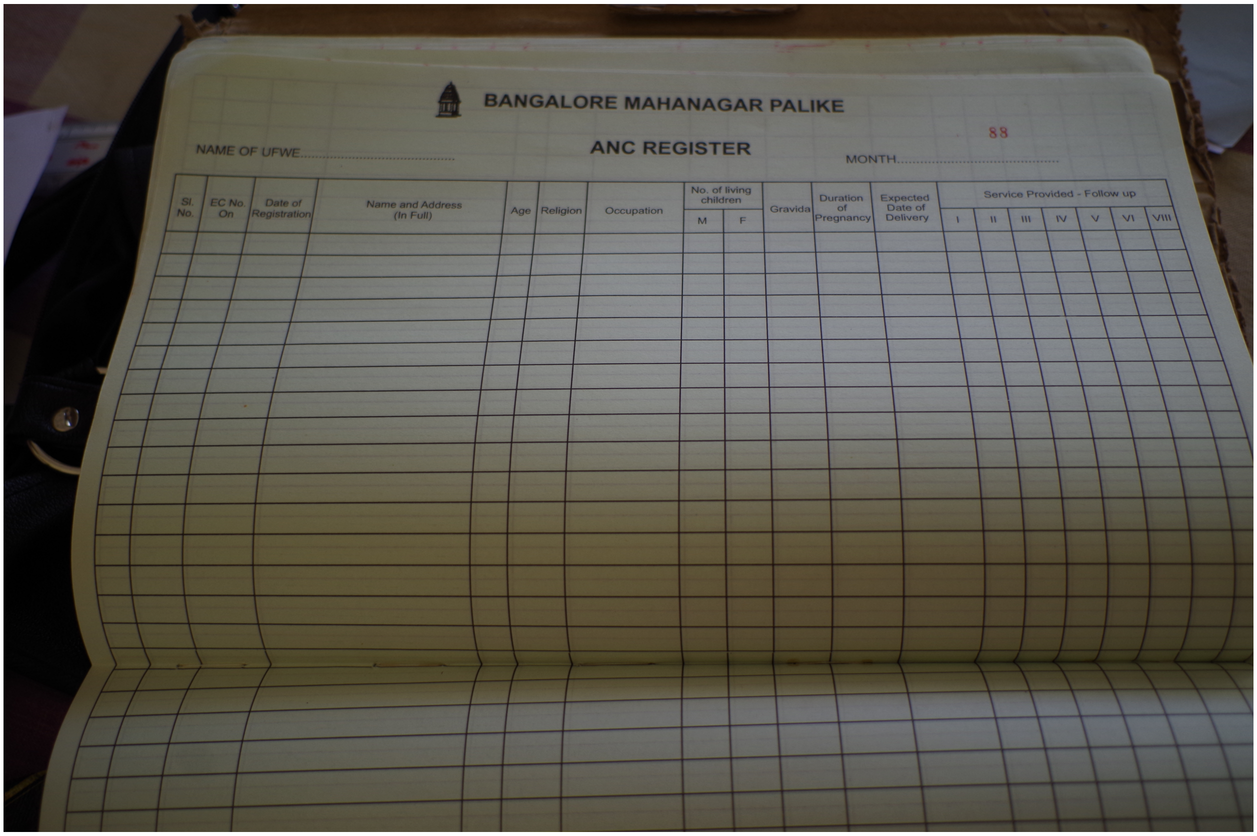
Other participants largely discussed registers as strictly about documentation. For them, the registers are important because as they facilitate aggregating reports. At both weekly meeting and monthly meetings, CHWs transfer the household and individual-level data in their registers into handwritten reports.

6.2.2 Personal Diaries

In addition to annotating their registers with provisional information, I also observed that many CHWs brought with them personal diaries. CHWs used personal diaries to document additional information about their work that could not be captured by the structure of the registers. As described earlier, registers are large ledgers of structured information. How these records are ordered can vary. For example, they can be ordered serially by patient when the patient first gets documented in the register, such as a prenatal care register where mothers are added and numbered as they get identified. Or it might be ordered by address, such as a register for documenting activities that are conducted for house to house visits, such as used when making home visits to eligible couples all along a specific road.

This rigid ordering and specificity of the registers do not always follow the structure of the activities of a health worker, such as when they are conducting multiple kinds of visits at a home, such as PNC and TB (which would require documentation across these two registers), or when they are doing a number of activities that do not overlap programmatically.

Sanjay, a male junior health assistant used his personal diary to document the names of patients he will need to do some follow-up visits with, notes on conversations he might have



BANGALORE MAHANAGAR PALIKE

88

NAME OF UFWE..

ANC REGISTER

MONTH..

Sl. No.	EC No. On	Date of Registration	Name and Address (In Full)	Age	Religion	Occupation	No. of living children		Gravida	Duration of Pregnancy	Expected Date of Delivery	Service Provided - Follow up						
							M	F				I	II	III	IV	V	VI	VIII

Figure 6.2: A page from an LHV's register containing aggregated figures from the registers of the CHWs she supervises.

had with members in the community, and a listing of the activities he did that day or what he still needs to do. Figure 6.3 shows some pages from his diary. When asked to describe a typical day for a field worker, he explained that he will work in a specific region where he might do a home visit to provide monitoring or health education for a patient with HIV, visit ASHAs to see if they need any additional supplements such as iron and folic acid tablets, and check a home's water storage for suspected contamination. The official documenting of these activities is spread across various registers, but by putting it in a personal diary they can be ordered and arranged in a way that meaningfully supports the male JHAs actual sequence of activities.

The temporal organization of personal diaries supported different activities that were difficult to accomplish in the individual and household-centered organization of the register. Information about the visits they performed is spread across multiple registers. Each register collects information about specific types of visits, but CHWs conduct multiple kinds of visits in day. Thus, diaries provide a consolidated place to document information chronologically and in one place. Personal diaries are not official records like registers, but still act as an important tool for allowing CHWs to confirm with supervisors what activities they did as well as capture incidental and provisional information that could help them complete the data they need to record in their registers.

CHWs could use the dated pages to discretely plan activities for the future. Similarly, CHWs could go back on the dated pages to easily review work they conducted in the past. This was important when supervisors had questions about their work, or when they needed to retrieve details about a visit. Third, the diaries provided more flexible ways of collecting notes about his visits that could be later be reviewed, followed-up on, and transferred into the structured format of registers.

6.2.3 The Thayi Card

Structured data collection is promoted at both the worker-side and the patient-side. For example, new mothers are provided a document called a Thayi card. Thayi cards are small

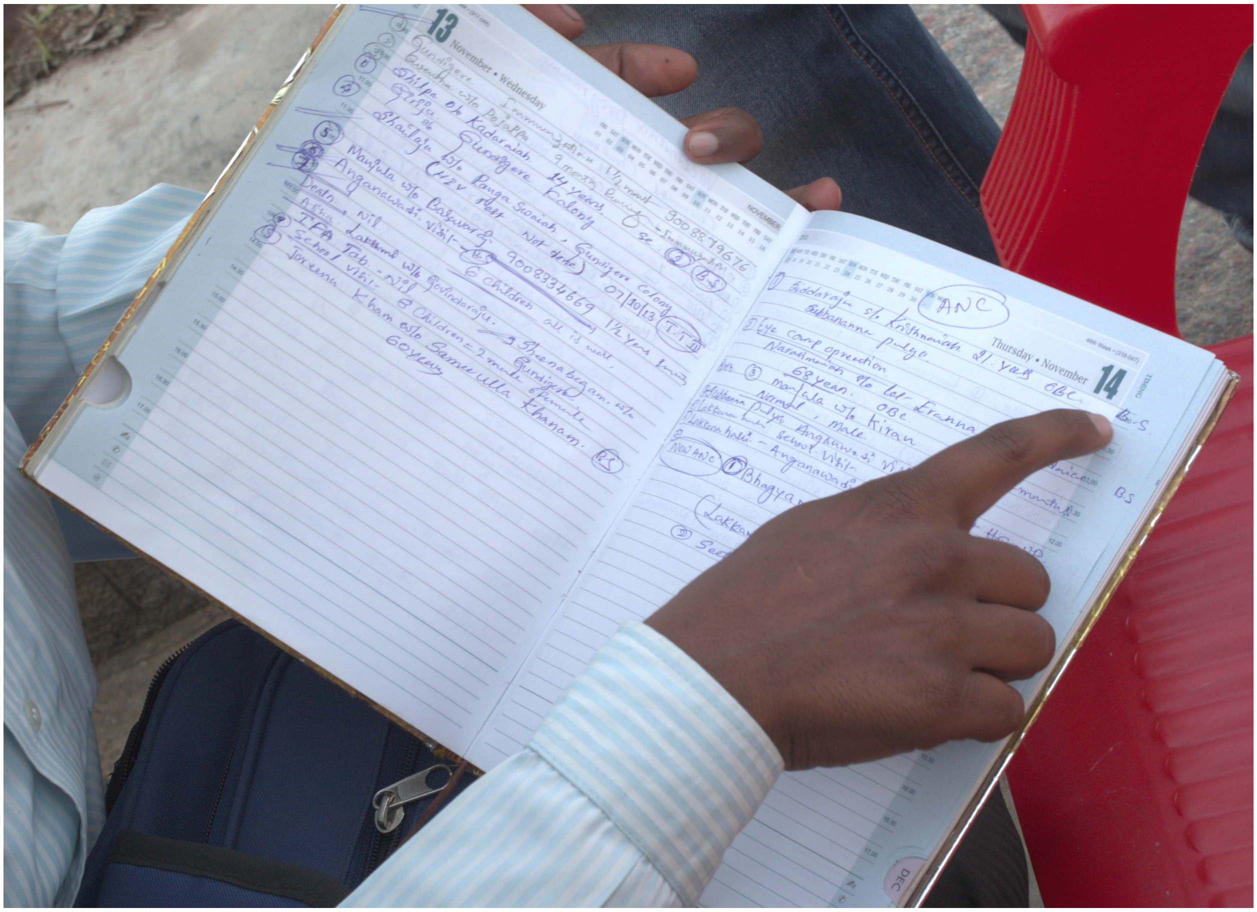
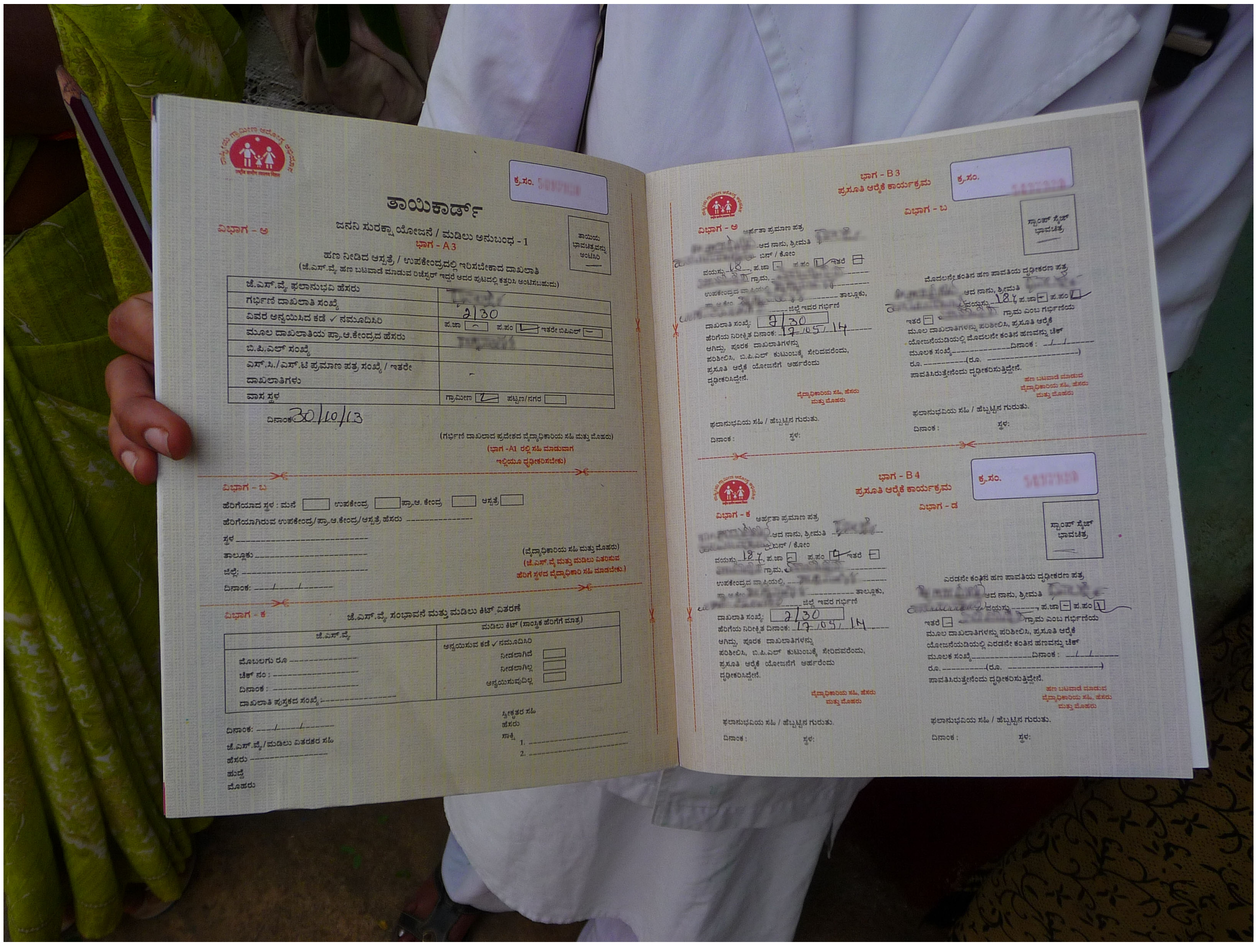


Figure 6.3: A rural male JHA shows his personal work diary. The checked-off list on the left-side page indicate the activities that he had planned and had accomplished. His notes provide important context that he is unable to capture in his registers.



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ಭಾಗ - B3
ಪ್ರಸೂತಿ ಆರೈಕೆ ಕಾರ್ಯಕ್ರಮ

ಕ್ರ.ಸಂ. [redacted]

ವಿಭಾಗ - ಅ

ಅರ್ಹತಾ ಪ್ರಮಾಣ ಪತ್ರ

[redacted] ಆದ ನಾನು, ಶ್ರೀಮತಿ [redacted] [redacted] ಬಿನ್ / ಕೋಂ [redacted] ವಯಸ್ಸು 18, ಪ.ಜಾ ☐ ಪ.ಪಂ ☑ ಇತರೆ ☐ [redacted] ಗ್ರಾಮ, [redacted] ಉಪಕೇಂದ್ರದ ವ್ಯಾಪ್ತಿಯಲ್ಲಿ [redacted] ಪ್ರಾ.ಆ.ಕೇಂ [redacted] ತಾಲ್ಲೂಕು, [redacted] ಜಿಲ್ಲೆ ಇವರ ಗರ್ಭಿಣಿ ದಾಖಲಾತಿ ಸಂಖ್ಯೆ: 2/30 ಹೆರಿಗೆಯ ನಿರೀಕ್ಷಿತ ದಿನಾಂಕ: 17/05/14 ಆಗಿದ್ದು, ಪೂರಕ ದಾಖಲಾತಿಗಳನ್ನು ಪರಿಶೀಲಿಸಿ, ಬಿ.ಪಿ.ಎಲ್ ಕುಟುಂಬಕ್ಕೆ ಸೇರಿದವರೆಂದು, ಪ್ರಸೂತಿ ಆರೈಕೆ ಯೋಜನೆಗೆ ಅರ್ಹರೆಂದು ದೃಢೀಕರಿಸಿದ್ದೇನೆ.

ವೈದ್ಯಾಧಿಕಾರಿಯ ಸಹಿ, ಹೆಸರು ಮತ್ತು ಮೊಹರು

ಫಲಾನುಭವಿಯ ಸಹಿ / ಹೆಬ್ಬೆಟ್ಟಿನ ಗುರುತು.
ದಿನಾಂಕ : ಸ್ಥಳ:

ವಿಭಾಗ - ಬ

ಸ್ಟಾಂಪ್ ಸೈಜ್ ಭಾವಚಿತ್ರ

ಮೊದಲನೇ ಕಂತಿನ ಹಣ ಪಾವತಿಯ ದೃಢೀಕರಣ ಪತ್ರ

[redacted] ಆದ ನಾನು, ಶ್ರೀಮತಿ [redacted] [redacted] ವಯಸ್ಸು 18, ಪ.ಜಾ ☐ ಪ.ಪಂ ☑ ಇತರ ☐ [redacted] ಗ್ರಾಮ ಎಂಬ ಗರ್ಭಿಣಿಯು ಮೂಲ ದಾಖಲಾತಿಗಳನ್ನು ಪರಿಶೀಲಿಸಿ, ಪ್ರಸೂತಿ ಆರೈಕೆ ಯೋಜನೆಯಡಿಯಲ್ಲಿ ಮೊದಲನೇ ಕಂತಿನ ಹಣವನ್ನು ಚೆಕ್ ಮೂಲಕ ಸಂಖ್ಯೆ---------------- ದಿನಾಂಕ : ---/---/------ ರೂ. ------------(ರೂ. ----------------) ಪಾವತಿಸಿರುತ್ತೇನೆಂದು ದೃಢೀಕರಿಸುತ್ತಿದ್ದೇನೆ.

ಹಣ ಬಟವಾಡೆ ಮಾಡುವ ವೈದ್ಯಾಧಿಕಾರಿಯ ಸಹಿ, ಹೆಸರು ಮತ್ತು ಮೊಹರು

ಫಲಾನುಭವಿಯ ಸಹಿ / ಹೆಬ್ಬೆಟ್ಟಿನ ಗುರುತು.
ದಿನಾಂಕ : ಸ್ಥಳ:

ಭಾಗ - B4
ಪ್ರಸೂತಿ ಆರೈಕೆ ಕಾರ್ಯಕ್ರಮ

ಕ್ರ.ಸಂ. [redacted]

ವಿಭಾಗ - ಕ

ಅರ್ಹತಾ ಪ್ರಮಾಣ ಪತ್ರ

[redacted] ಆದ ನಾನು, ಶ್ರೀಮತಿ [redacted] [redacted] ಬಿನ್ / ಕೋಂ ವಯಸ್ಸು 18, ಪ.ಜಾ ☐ ಪ.ಪಂ ☑ ಇತರೆ ☐ [redacted] ಗ್ರಾಮ, [redacted] ಉಪಕೇಂದ್ರದ ವ್ಯಾಪ್ತಿಯಲ್ಲಿ, [redacted] ಪ್ರಾ.ಆ.ಕೇಂ [redacted] ತಾಲ್ಲೂಕು, [redacted] ಜಿಲ್ಲೆ ಇವರ ಗರ್ಭಿಣಿ ದಾಖಲಾತಿ ಸಂಖ್ಯೆ: 2/30 ಹೆರಿಗೆಯ ನಿರೀಕ್ಷಿತ ದಿನಾಂಕ: 17/05/14 ಆಗಿದ್ದು, ಪೂರಕ ದಾಖಲಾತಿಗಳನ್ನು ಪರಿಶೀಲಿಸಿ, ಬಿ.ಪಿ.ಎಲ್ ಕುಟುಂಬಕ್ಕೆ ಸೇರಿದವರೆಂದು, ಪ್ರಸೂತಿ ಆರೈಕೆ ಯೋಜನೆಗೆ ಅರ್ಹರೆಂದು ದೃಢೀಕರಿಸಿದ್ದೇನೆ.

ವೈದ್ಯಾಧಿಕಾರಿಯ ಸಹಿ, ಹೆಸರು ಮತ್ತು ಮೊಹರು

ಫಲಾನುಭವಿಯ ಸಹಿ / ಹೆಬ್ಬೆಟ್ಟಿನ ಗುರುತು.
ದಿನಾಂಕ : ಸ್ಥಳ:

ವಿಭಾಗ - ಡ

ಸ್ಟಾಂಪ್ ಸೈಜ್ ಭಾವಚಿತ್ರ

ಎರಡನೇ ಕಂತಿನ ಹಣ ಪಾವತಿಯ ದೃಢೀಕರಣ ಪತ್ರ

[redacted] ಆದ ನಾನು, ಶ್ರೀಮತಿ [redacted] [redacted] ವಯಸ್ಸು------, ಪ.ಜಾ ☐ ಪ.ಪಂ ☑ ಇತರೆ ☐ [redacted] ಗ್ರಾಮ ಎಂಬ ಗರ್ಭಿಣಿಯು ಮೂಲ ದಾಖಲಾತಿಗಳನ್ನು ಪರಿಶೀಲಿಸಿ, ಪ್ರಸೂತಿ ಆರೈಕೆ ಯೋಜನೆಯಡಿಯಲ್ಲಿ ಎರಡನೇ ಕಂತಿನ ಹಣವನ್ನು ಚೆಕ್ ಮೂಲಕ ಸಂಖ್ಯೆ---------------- ದಿನಾಂಕ : ---/---/------ ರೂ. ------------(ರೂ. ----------------) ಪಾವತಿಸಿರುತ್ತೇನೆಂದು ದೃಢೀಕರಿಸುತ್ತಿದ್ದೇನೆ.

ಹಣ ಬಟವಾಡೆ ಮಾಡುವ ವೈದ್ಯಾಧಿಕಾರಿಯ ಸಹಿ, ಹೆಸರು ಮತ್ತು ಮೊಹರು

ಫಲಾನುಭವಿಯ ಸಹಿ / ಹೆಬ್ಬೆಟ್ಟಿನ ಗುರುತು.
ದಿನಾಂಕ : ಸ್ಥಳ:

Figure 6.4: Pages from a Thayi card booklet. CHWs use the Thayi card to document antenatal and postnatal care that a mother receives. The card is a mutual source of record for both CHW and mother.

booklets with fields that document which wellness visits a mother has received during the course of her pregnancy, wherever she may get that care. These cards are part of a national incentive program called Janani Suraksha Yojana, or “Mother Security Scheme” in English. As part of this program, a BPL mother is eligible to receive between Rs. 500-700 for each of the first two children she delivers.

The mother holds on to this, but the health worker will ask information about it. During field visits where we accompanied CHWs, we observed mothers readily provide their Thayi card to workers and the health workers annotating this information in her register. The Thayi card and the information within it help to structure the patient-CHW encounter.

Though described by participants as a card, the Thayi is a colorful, graphic-driven multi-page booklet that is divided into different sections for each of the phases of maternal care (prenatal, antenatal, and postnatal). Each of these sections contains a grid of services and dates. As these services get completed, a health worker will document that service has been completed directly on the card before giving it back to the mother. In addition to the information, the Thayi card also requires passport-sized photographs to be pasted on the card itself as a concrete way of confirming a mothers identity.

The Thayi card is a reliable source of record for the CHW. While the mother holds on to the card, it is the various care providers who she sees that complete it. Depending on the situation, such as whether she is getting immunized at the clinic or at a community center, the Thayi card ends up being the source of record that unifies a mothers experience across different health care settings. CHWs are responsible for reconciling the information that the patient possesses with the information that is collected at the PHC.

The paper-based data systems in PHCs support recording and documenting data from patients, but they have limited support in recalling information about patients. Data are logged serially, and so is centered on the date a visit is conducted rather than on the individual for whom the service was performed.

The use of the Thayi card also represents a decentralized system of health records. Unlike in the United States, health records for the clients of PHCs are decentralized, meaning that the management of a patients health records is the responsibility of the patient. Consequently, rather than having a centralized system of information that one could access to cross-reference or verify health information, it was the patient who was responsible for doing this information collation.

During visits to patients home in both an urban and rural clinic, I saw what this system looked like for patients when they were asked about whether they had gotten immunizations for the patients or what kinds of visits they had recently made with their doctors. Patients would then need to provide some sort of documentation so that the health care worker could verify that these visits happened.

Here, I recall the field visit I first described in Chapter 5. I accompanied a female JHA while as she conducted an antenatal care visit at the home of a mother:

> The female JHA asked about what immunizations the child had received, so the mother went back into her home. She looked under a seat in her home, visible from the doorway, and pulled out a soft, flat, plastic shopping bag. She brought it to the door, and pulled out a stack of different papers, all health records, that she showed to the JHA. The JHA pulled out a green immunization card where we could see a list of the immunizations and when they were administered that her infant had received. The JHA reviewed the card and transferred the types of immunizations and the dates of immunization into her official register.
>
> I was surprised to see only this card, because at some of the previous households that we visited, where mothers handed over their Thayi cards which served as a complete record for the different types of health care encounters that a mother might during the prenatal, antenatal, and postnatal care. Instead, the mother had to keep a collection of documents [describe these], through which the JHA still had to sort through in order to get the information she needed.

As we departed from the house, I learned from my translator that the likely reason the mother did not have a Thayi card was because she was not BPL, an acronym meaning "below the poverty line." When I asked him how he knew this, he pointed to the water well on the property, the variety of crops that were drying in front of the house, and the size of the property. Thus, the Thayi was only really concerned with accounting for a very specific subset of the population.

The Thayi card is a record-keeping artifact given to BPL mothers to document and keep track of their eligibility for receiving a number of cash incentives if they obtain health care services throughout the prenatal, antenatal, and postnatal periods. Each Thayi card is uniquely assigned to a mother, preprinted with a unique serial number, called the Thayi card number, that must be registered to a mother and child pair prior to being handed out. For the mother, the Thayi card is tied to a series of cash incentives and serves as the proof that a mother needs to submit to the health center to obtain her cash incentive. Consequently, the Thayi card has monetary value for mothers, meaning it has to be accurate and documented.

In the urban clinic, I observed a mother who came to clinic looking to submit her Thayi card in the afternoon, around the time that the ASHAs at this PHC have completed their rounds in the morning and are completing their paperwork. The mother came into the room, when one of the ASHAs looked up from paperwork to greet the mother. The mother explained that she was there to submit a completed Thayi card.

The process of verifying a mother's Thayi card is not complicated or lengthy, but it still entails some paperwork for the mother (as is common for almost all the activities of health care workers). When The ASHA at KR Puram received the Thayi card from the mother, she went through several verification steps. First, she went to a locked cabinet and pulled out a large register that included the names, addresses, and photographs that matched the photograph on the Thayi card itself. After confirming the mother's identity, the ASHA then reviews the Thayi card itself to make sure each section has been completed as required to receive the incentive. After this thorough review of the Thayi card, the ASHA goes back to the locked cabinet. She pulls out the appropriate amount of money, and asks the mother to initial the register before giving the mother the incentive. In combination with the verification process, the Thayi card increased the expediency with which a mother was able to receive her incentive.

Thus, the Thayi card also reveals collaboration between the patient and the provider, but for different reasons. The provider consolidates and refers to the Thayi card to simplify her reporting processes. Meanwhile, the patient needs to make sure it is complete in order to get the financial incentives. One possible motivation for instituting this patient-managed health record is to recognize that patients may seek health care in a variety of settings, but she needs to be able to convey her care needs in a standardized manner.

But it also suggests that in systems where health data infrastructure is poor and health systems are poorly integrated, this extra work needs to be done in order to help create a complete picture of a patient with respect to a specific health issue, or more importantly, to collect the data that the government is most interested in collecting by the audience that is most responsible for collecting it. Thus, the data collection performed by a CHW may be redundant but it become a form of reconciliation between the activities that a mother conducts and what the primary health center views its main responsibility is, which is to track the health of the members in its community. The CHW re-documents information of activities that have already occurred, including those that might have occurred at the PHC she works at.

A large challenge that was revealed during our observations during home visits is the heterogeneity that comprises a patients information. We saw patients use documents such as standalone immunization cards, cards confirming the income status, and health records from other health facilities. And the heterogeneity reflects the number of different institutions of which health care workers need to reconcile.

6.2.4 Mobile Tools

While mHealth tools have been deployed around the world and widely touted, they have not yet seen widespread use at the sites in this study. exception is the Mother Child Tracking System (MCTS), described below.

All of our participants had mobile phones, and but only a small handful of participants

ANC.NO

ANM PW
PNC1Pentavaisent1
o pv 8 10 13
[redacted]

To: ANC.NO

Figure 6.5: A female JHA shows the dual-SIM phone she uses to send SMS updates to the Mother Child Tracking System. Dual-SIM phones allow the simultaneous use of two SIM cards. Many field workers use dual-SIM to use a government provisioned SIM card and a personal SIM card.

had smart phones. Most of the phones were either basic phones that supported text messaging and voice calls, or feature phones that had additional multimedia capabilities. OF these capabilities, being able to play music and take pictures were the most popular. Participants had to purchase their own phones, but CHWs were also given SIM cards by the government that allowed them to make calls free of charge to other CHWs or the clinic. These SIM cards could not be used to make calls at home, so CHWs either carried additional personal phones or used phones capable of holding multiple SIM cards. In the cases where participants owned smart phones, they did not use them for work purposes nor did they use them for their more advanced features. Several participants expressed having no time, patience, or interest in learning how to use a smart phone.

Mobile phone usage was common and frequent among participants. Here, I describe the kinds of mobile phones participants owned, the arrangements and provisions of the local mobile phone network, and the kinds of work practices that include or require their use. All participants in this study owned at least one mobile phone. CHWs in the field regularly used their phones for work, while those working in the clinic did not use their phones regularly for work. While this study was not an exhaustive sample, participants showed a few general trends regarding the use of phones. All of the male participants owned smart phones, while only roughly one-third of female participants owned smart phones.

The Mother-Child Tracking System (MCTS)

With regard to work, participants primarily use mobile phones was to make phone calls to other CHWs and to patients. Only one mHealth tool was observed in the study, an SMS-based system called the Mother-Child Tracking System (MCTS). The MCTS is an SMS-based tool for female JHAs used to document antenatal and postnatal care for new mothers. Female JHAs share data to a statewide database by using their government issued SIM card to send an SMS message to the MCTS phone number. CHWs submit a structured SMS to a government phone number. Coded in the SMS is information about what kind of visit was performed (for example, ANC or PNC), what care was provided during the visit (for example, vaccination), the date of the visit, and the patient's identification number. Each MCTS registration is directly tied to a Thayi card and do a female JHA's phone number. Each Thayi card contains a pre-printed registration number that is also used as a patient identification number in the MCTS. Registering a mother for a Thayi card also registers her for MCTS.

MCTS has been deployed to in Karnataka to health centers operating under the NRHM, but at the time of this study it was not yet deployed for any NUHM sites. Consequently, I observed the of the MCTS at all study sites except for the Nandini UFWC.

The Government of India introduced the MCTS to improve the quality of data being collected by health workers and to facilitate the monitoring of pregnant and new women by delivering timely reminders. But participants explained that incorporating the MCTS is challenging.

One complaint shared by participants was how the SMS-based data submission distracted from the actual flow of their work and added to their overall workloads. None of the participants who talked about MCTS submitted data to MCTS in real time. Instead, they document the information about their visits in their paper registers. Only at the end of the workday do participants send their SMS messages in bulk. For example, the CHWs at the Outer Ring PHC submit their SMS updates in the afternoon. This process takes them three hours between going through their paper registers and submitting the SMS data. One CHW even asked her son to enter the data for her since she was not comfortable sending SMS messages on her phone. Submitting data via SMS requires the CHWs to manage multiple information systems separately — one for the collection of data, another for the submission of data. The process of collection and submission are conducted separately in space and time.

At the Tumkur PHC, reporting on the MCTS would directly interfere with the quality of the service that patients received. At the Tumkur PHC, Meera, a female JHA and Padma, a pharmacist, explained that on immunization days they cannot document and the registers the immunizations as they are happening, and have to do so after the fact. The practice is quite involved. Indra told me that before going to do new immunization day, she will review her register, identify all the children to be immunized that day, and transfer of that information to a separate piece of paper or her personal diary. She has to do this ahead of time because in order to maintain the viability of the vaccines, she has to complete the vaccinations in two hours. Meera transfers that information into her paper register and to MCTS, but she may not get to doing this until Saturday, two days after delivering the care.

Another challenge is the considerable amount of administrative upkeep needed to add patients and submit data to the system. The MCTS relies on online registration when a Thayi card is delivered. This must be done on a personal computer on the government's official web portal. But as was described in Chapter 4, computer access and internet connectivity was scare. At the Ramanagara PHC, Varun is responsible for entering new registrations. Although the PHC has a computer, connectivity is unreliable. To enter data on the portal at the PHC takes him three to four hours, versus thirty minutes using a more reliable connection at the district hospital. However, Varun has to leave the community and the PHC and head to the district hospital 30 kilometers (18 miles) away, which takes him one hour of travel time each way by bus. In either case Varun has to spend a considerable amount of effort to administer the system. As described earlier in Chapter 4, CHWs at the Outer Ring PHC end up having to registering their own patients into MCTS, and do so at their own expense at a local cybercenter. Indra, a female JHA at the Tumkur PHC, explained that she has her son or her husband send the SMS messages to the MCTS since she is not familiar with how to send SMS messages in general.

The final challenge expressed by participants about MCTS is that the reminders were not useful because they were sent to the CHWs only after care is overdue. Sangita, a female JHA at Ramanagara PHC, explains how she prefers to avoid relying on the reminders altogether.

> "We wo not wait for the reminds. We will do our work. I do not need reminders. I will look after this [work]. I wo not wait for the reminders. I come daily and will be getting to know when to [do the work] there." (Sangita, female JHA)

Sangita does not feel that the reminders from the MCTS are valuable for her work. She relies on her relationships and expertise to motivate her in providing timely care to her community.

The theme across these challenges that is that the MCTS is disconnected from the work. The MCTS requires CHWs to significantly change their work flows or add to their workloads. Finally, even though participants are submitting a lot of data via the MCTS, they do not seem to directly benefit from the system in planning and monitoring the health of their community.

Closed User Groups (CUG's)

CHWs at almost all sites are enrolled in what is known as closed user groups (CUG's). CUG's are a closed network of employees who can call each other without cost to the callers. CUG's common to many departments in the government of India and are arranged through the national telephone companies. In the context of health centers, the purpose of the CUG's is to allow CHWs to get in touch with other field workers and with the clinic. Members of the CUG's are typically restricted to the CHWs (that is, male and female junior health assistants, and male and female senior health assistants) and the medical officer. The only site that did not have CUG's was the Nandini UFWC.

Health workers who were on CUG's are issued special government SIM cards that allowed the staff of a health center to call each other. Phones are not provided, so workers have to install the SIM cards in their personal phones. This meant that a variety of phones are used, including dual-SIM phones which allow participants to install and switch between the government-issued CUG SIM card as well as their own personal SIM card.

CUG's do not include ASHAs, AWWs, and non-field working clinic staff such as the staff nurse, pharmacist, administrator, or the lab technician. But this was a problem since clinic staff rely and field staff still needed to collaborate, particularly when the clinic needed to provide updates to community members. Deepti, the lab technician from Ramanagara PHC explained that when she has test results from a field test, such as a blood smear for a suspected case of malaria, she needs to contact the field worker who delivered the slide.

> "The blood smear slides are from the field work, and the ANM [a still commonly used older term for female JHA] gives that to me. If I find something serious or positive, I directly call the ANM, and then the ANM calls and informs the patient." (Deepti, lab technician, Ramanagara PHC)

The current process of communicating lab results depends on the CHW to be the intermediary. Blood smears are essentially de-identified when they get to Deepti. The only information Deepti collects about the slide is the slide number and the name of the CHW who delivered it. The CHW documents the personal details of whom the slide belongs in his or her own register.

Deepti later explained that she herself does not own a mobile phone, and that when she does call, she has to ask another clinic employee to use his personal phone to make the call. When Deepti has results, she has him call the CHW, and the CHW is then responsible for communicating those results to the patient.

This example underscores that while the closed user group may be a well-intentioned way to enable collaboration, it supports only certain kinds of professional relationships. It provides a channel for certain field workers to communicate with each other and the medical officer, but it overlooks the collaboration that CHWs have with other workers at the clinic, other community workers such as ASHA's and AWWs, as well as communication with community members. In order to contact community members, participants and other workers have to make calls using their personal SIM cards and at their own expense.

6.2.5 Home Markings

Community health workers use small figures on the wall to communicate which houses they have visited. Most of these were written lightly in pencil which is able to leave a mark on the painted doorways of the homes. These light marks are not easily seen unless you were standing right at the door.

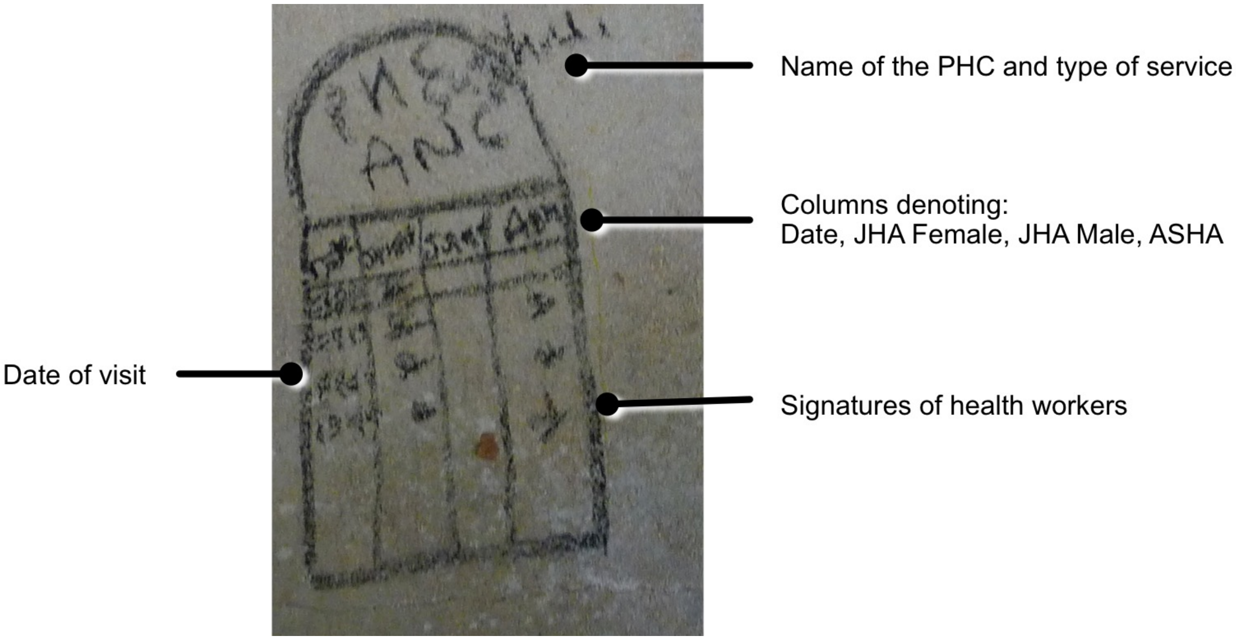

Figure 6.6: CHW marking on a home served by the Ramanagara PHC.

The following excerpt from my field notes at the Ramangara PHC describes one way the house markings are used to support collaboration between health workers.

> I meet Priya, a female JHA, and Rinku, an ASHA, for the first time on the main road of the village. After introducing ourselves to each other, Sangita leads us down a side street, to a small concrete home. Sangita calls into the house, and a moment later an older man comes to the doorway. He holds a blue scarf around his nose and mouth. A young adult man and a young adult woman follow him, the woman appearing to be pregnant. After greeting the household, Sangita takes a box out of her backpack, opens it, and gives the man some medication. She watches closely as he takes it. After this, Priya and Rinku both have a short conversation with the woman. Priya and Rinku then write something on the doorway. I see that there are two small, tombstoned shaped markings on the door — one with a header marked RNTCP, another with a header marked ANC.

> Priya writes her name and date under the one marked RNTCP, and they both write their names under the one marked ANC.

I observed these kinds of marking repeatedly as we visited additional households near the Ramanagara PHC. I asked Priya to explain what she had just written, and she explained that the marking contains five pieces of information: the nature of the health visit (noted in the header), and a column for the date of the visit, and a column each for the female JHA, male JHA, and the ASHA.

When asked to describe the purpose of this marking, different health workers provided different accounts of what this marking represented. For Priya, the marking was a means of accountability. She explained how the marking would allow a health official to know that she had visited a patient to give him his medication — in this case, a TB patient who required regular and long-term monitoring.

Priya's co-worker, Sangita, dismissed the use of the markings as a supervision tool. In her six years of working at the PHC, she had not seen one health official review the markings. But she still found the marking useful. Instead of visible accountability, the marking was a mechanism of coordination between different health workers. The markings were useful for collaborating and communicating *between* CHWs, and the markings were a symbolic handoff that helped community health workers know what needed to be handled next. As described in Chapter 5, male and female JHAs have complementary roles, especially with respect to communicating along gender lines. ASHA's complement the work of JHAs by providing supplementary education and monitoring in the community. If an ASHA can see that a household has been visited by a JHA, she can then follow-up with that household to provide education or encourage them to use some of the services for which they are incentivized to bring patients to.

Finally, the marking represented a means for health workers to communicate with patients that they were actually there. A version of this marking was also used by CHWs at the Tumkur PHC. At the Tumkur PHC, the house markings were no longer a routine practice.

But Meera, a female JHA, reappropriated the house marking not just to notify patients, but as a way of deflecting claims of negligence.

> "Now we are no longer [using the house markings]. We're not supposed to do that. Only in special cases, like when the patients will complain when [the patient] is not there in the home. When we go to the home, the patient will be not there, but later the patient will complain that we have not came to their home., that we will not come to them. In that case, we will write there on the door." (Meera, female JHA, Tumkur PHC)

When patients complained or accused her of not making an expected visit, she used the markings as physical proof, for all to see, that she did stop by. Sometimes field workers would make household visits when nobody was available, and they used the marking as a way to inform the household that someone actually arrived for a visit.

Thus, the house marking is used for at least three distinct collaboration purposes: to communicate to superiors, to communicate to other workers as a signal to them of where to carry on, and finally, as a way to communicate to patients that they have been visited.

6.2.6 Maps

Maps featured prominently at all the study sites. They were painted on to the walls of health centers, printed on sheets of paper that were posted on the walls, or hand-drawn and slipped into registers. The maps were very simple. They showed the main roads, a few dots indicating the location of a subcenter, and sometimes a few local landmarks. As an outsider, I could not understand the purpose of the maps. The maps do not show where people live, or any minor roads. The maps do not show any concrete details any information about the health of the community, or how well the health center serves them. I found it difficult to understand their purpose or its audience. CHWs have firsthand knowledge of the geography of their community by virtue of their daily field work. As Darshan, the senior male health assistant at Nandini UFWC explains, "Actually, we are already known the area, so it is not

Figure 6.7: Painted and handwritten maps of the communities that are served by the health centers.(Top) shows a map painted on the wall of the Ramanagara PHC. (Bottom left) A hand-drawn map in one CHWs personal diary from the Nandini UFWC. (Bottom right) A photo-copied map from the Outer Ring PHC.

necessary for us [health center staff] to take a map. For us, it is not necessary. We know each and every area, it is not necessary." He repeats that he and his co-workers already know the ins-and-outs of the community.

But their simplicity belied a much more sophisticated purpose. As I asked participants about their work more in general, they would often show me a map. At the Outer Ring PHC, Sita, the lady health visitor, showed me the hand-drawn map she kept in her personal diary. She used it to show the names and locations of the areas her PHC was responsible for, and where the subcenters were located. Surrounding some maps are demographics about the area.

Thus, the maps are a supplementary tool for communicating their expertise of the community and for illustrating health center's network of relationships in the community. CHWs use them to easily point which areas are their responsibility. Even if there are no figures surrounding the map, CHWs are still able to provide the details represented by it: how many people lived in an area and what the demographics there are. Some of the more detailed maps also illustrated important locations for the community, such as schools and temples. Thus, maps also were a way for health workers to represent their relationship to the community.

6.3 Discussion

In this discussion, I reflect on the broader themes related to the findings on the use of tools by community health workers. I review these findings using the concept of boundary objects, first introduced in Chapter 2. Specifically, I use boundary objects to understand how information tools represent the tensions between health institutions and CHWs, and how these tools support collaborations among CHWs, and between CHWs and community members.

The boundaries that these information tools span are complex. Boundary objects are often described as objects that settle smooth coordination across multiple groups of users and stakeholders. The tools that health workers use represent three main groups of stakeholders: CHWs, health institutions, and community members. We can further our framing of boundary objects as objects used to renegotiate and resettle power dynamics. The tools that health workers use fit this extended description of boundary objects because they are being used to simultaneously enforce the interests of health institutions and enable the situated practices of health.

The official tools provided by health institutions **prescribe** certain kinds of health worker practice. Official tools prescribe practice through the physical forms they possess, the kinds of data they demand, and the forms of data they accept. Official tools also attempt to enforce these institutional interests at scale; to be used across numerous health workers providing service to large and diverse populations.

Across the different tools described in this chapter, there are a few general patterns on how different forms prescribe specific uses. Paper-based tools, like registers and diaries, are portable and tangible. These tools can be easily read and reviewed, and data can be quickly entered. Digital tools, like mobile phones, require strict and structured syntax, as well as strong technical expertise. Tools displayed in public, such as house markings and maps, are declarative to multiple audiences.

The paper-based registers, for example, take the form of a paper logbook to be carried with CHWs on their visits to the community. The pages are formatted as a ledger: each row sequentially represents one household or one individual, and each column represents a discrete piece of data about that household or individual. The size of each field suggests what that field can contain. In looking at all of these characteristics as a whole, one can see how the registers lays out the ordering in which she should conduct her visits, what information is important for that visit, and how she should expect to collect that information.

The Mother-Child Tracking System (MCTS) is even more prescriptive than the registers. CHWs have to use a structured syntax to report on who received care, what kinds of care were received, and when that care was received. If CHWs did not submit a report when expected, the MCTS sent warning SMS messages about missing data, thereby providing an additional interaction to steer health workers.

But the practices prescribed by tools are not insurmountable. CHWs different ways to use their tools in ways that go beyond the prescriptions embedded in the tools. CHWs did this through three kinds of practice: *reappropriation*, *using secondary tools*, and *intermediation.*

Reappropriation describes when a CHW uses an official tool in an unintended way in order to respond to the contingencies of their daily work. Sometimes reappropriation is legible by looking at the tool itself. This was observed when health workers wrote in the margins of their paper-based registers to capture provisional data. CHWs worked around the structure of the data field in the register to better match their reality in collecting data in the community.

Sometimes reappropriation was not observable in the tools themselves, but was then made clear after discussing them with participants. This was the case with the house markings. At the Ramanagara PHC, the CHWs provided different accounts on how they used the markings. The house markings were ostensibly used so that CHW supervisors and health officials could visually verify whether a home was visited, but the CHWs reappropriated the markings by using them as a way to communicate with each other instead. At the Tumkur PHC, CHWs also used house markings even though they were no longer required to use them by their PHC. The CHWs used the markings selectively on the homes of community members they had problems working with. The CHWs took advantage of the institutional authority these markings communicated, even though the markings themselves were not officially sanctioned.

Using secondary tools was another practice that CHWs use to work beyond the prescriptions of their tools. This strategy was directly related to using unofficial tools. CHWs needed to use unofficial tools to do work that was difficult or impossible for their existing tools to support directly. One prominent example of this was the widespread use of personal diaries. The personal diaries provided a form that better corresponded to the daily contingencies that health workers encountered. The diaries allowed health workers to document their work temporally, to take notes and observations, and to plan future work – all of these were activities that were not easily supported through the use of their official registers. Another example of this was the use of dual-SIM mobile phones. CHWs needed phones with dual-

SIM capabilities so that they could install their own SIM cards that they could then use to contact patients since their health center-issued SIM cards were restricted.

Intermediation describes when health workers asked others to use tools on their behalf. For example, some participants who lacked technical expertise asked family members to submit data to the MCTS. This involved communicating the health data they collected to someone not affiliated with the health center. By intermediating their use of the MCTS tool, CHWs were able to keep up with the responsibilities of their work without needing to build the technical expertise that using the tools required.

Understanding tools as boundary objects can clarify how these practices demonstrate the power dynamics between health institutions and individual CHWs. The two sides of the boundary are not equal. Health institutions issue official tools but do not use them, and thus the tools can be interpreted as an exertion of power and control. Rather, health institutions are most interested the products of these tools.

A consequence of this disconnect is the unintentional overhead it introduces. Unintentional overhead refers to the maintenance and administrative activities that are borne out of the introduction of new tools and systems. This was demonstrated most prominently with the MCTS. The work necessary to maintain this system is substantial. It builds on previously existing community health work practices of surveillance, outreach, and monitoring, while adding additional tools and processes to make that work more accessible to supervisions and institutions. But putting data into MCTS has not eliminated the work and contingencies that go into collecting that data, such as the willingness or availability of community members to engage with local community health centers, the relationship building necessary to engender trust in the health institution, or the impacts of otherwise competing institutions.

If it were designed iteratively and collaboratively, the MCTS might be an effective tool in providing feedback and motivation for health workers. For example, it can be better used to plan more effective coverage tactics, or be designed in a way that reduces administrative load on health workers so that they can spend more time in the community. But its implementation and intent at the time of this study existed wholly separate and outside of that purpose, thus resulting in extra maintenance, at worst, or an unhelpful nuisance at worst.

But for the MCTS and the other tools in this study, the two sides of the boundary are inaccessible to each other. Health workers do not participate in the creation of the tools or in the broader policies that shape them. Conversely, health institutions are not directly privy to the ways that CHWs reappropriate the tools, create new tools, or intermediate their use.

The mutual inaccessibility points out a significant disjuncture between health institutions and CHWs, but this disjuncture is perhaps what key that enables CHWs to navigate the challenges and constraints of their daily work. When their work is inscrutable, CHWs have the freedom for developing and deploying these practices. This freedom also better supports health workers in using their tools to collaborate with each other and with the community.

6.4 Summary

This chapter explored the findings related to my third research question. I categorize the information tools that CHWs use that categorizes tools as being either official or unofficial, and digital or analog. I provide descriptions of how several of these tools are used, and how they conform to idealized health worker practices. I concluded this chapter with a discussion on how the concept of boundary objects can be used to understand how these tools simultaneously enforce institutional conceptions of idealized practice while also enabling situational day-to-day use by CHWs.

Chapter 7

DISCUSSIONS, IMPLICATIONS, CONCLUSIONS

7.1 Introduction

In the previous chapters I progressively move from understanding the context, environment, and capabilities of each site, the roles, responsibilities, barriers, and motivations of individual workers; to a more detailed look at the information tools and practices core to these workers practice. Chapter 4 describes, compares, and contrasts the structural environment of each of these study sites. Chapter 5 describes the roles and responsibilities of CHWs, and how they engage in a variety of collaborative practices to simultaneously meet their responsibilities and respond to the emergent needs in the community. Chapter 6 explores how the information tools are used as boundary objects among CHWs, the institutions they work for, and the communities they served.

In this conclusion, I reflect across this study's findings to apply frame of strategies and tactics introduced in the conceptual framework. I do so by introducing a typological framework that better inform technology design for CHWs. Next, I summarize the answers to the research questions and review the findings. Finally, I suggest areas for future research.

7.2 Toward a typology of tactics

The theoretical lenses of hidden work, De Certeau's concepts of strategies and tactics, and feminist standpoint theory are collectively powerful for identifying the power tensions inlaid in practice. This study focuses on health centers as the sites of power negotiation (between global and local institutions, CHWs, and community), and particularly on how CHWs are agents of power in these dynamics. By focusing on power, these theories generate design recommendations for marginalized populations, or groups which traditionally have the least power.

One of the contributions of this study is the introduction of strategies and tactics as an analytic frame for better understanding work. The conceptual framework of this study integrates concepts from hidden work, Feminist Standpoint Theory, and De Certeau's concepts of strategies and concepts. Using them in concert shapes a specific frame of interpretation that recognizes the ingenuity and marginality of health workers.

Interpreting the data of this study principally through the lens of hidden work might have sensitized me to many of the work-arounds and work practices that health workers demonstrated and described. Hidden work privileges a situated understanding of work, where, to understand the work, you need to both observe how work is done and understand how it is described. The tension that hidden work is most interested in unpacking is the tension between *how work is described* and *how work is done*.

Chapter 2 previews the institutions and politics that undergird the origins and the practice of primary health care. Chapter 4 further describes the specific structural and human resource conditions of each study site. Together, these two chapters highlight the ways that institutions constrain and define work. While hidden work can help us understand how work really happens, understanding this institutional relationship brings attention to one of the influences to change it.

To analytically address this institutional component, I complement hidden work with the concepts of strategies and tactics. Strategies and tactics most directly recognizes the tension between health workers and institutions as inherently resistive and antagonistic. Under the framing of strategies and tactics, health institutions seek to control while health workers seek to exert their agency. Additionally, the data from this study support the presence of this tension.

Understanding the tension introduced by strategies and tactics contributes to design because it brings attention back to the health worker, their experience, and their priorities and perspectives. In other words, it's about more than the work and understanding how it gets done. It's about the relationships, priorities, negotiations, and compromises in which health workers engage to complete their work. Applying these theoretical lenses to the findings to creating a typology of tactics. This typology can be used to guide research and design in several ways. First, it characterizes CHW work practice as activities of resistance against institutions. In doing so, the typology recognizes that CHW practice is negotiated and situated. Resistance, in De Certeau's sense, is not strictly about forceful opposition, but about the struggle that individuals face in shaping their situated practice, *despite* what's expected of them externally.

7.3 Tactics in community health work

In unpacking the practices described in this study, we can understand tactics as centering on four themes: resistance, making meaning, self-representation, and reconfiguring responsibility. In this section, I define these themes and use them as a guide for understanding the findings presented in the earlier chapters. While these three roles are distinct, they are also interrelated. And individual tactical practices can span multiple types.

7.3.1 Resistance

First, tactics as construed by De Certeau are about how ordinary individuals resist the deterministic influence of institutions that shape and structure their practice. The character of this resistance varies, but they are usually not direct acts of defiance that would jeopardize the jobs of health workers. Resistance is not simply overt displays of defiance. Instead, tactical acts of resistance are subtle ways of acting beyond the prescribed expectations of the health institutions for which they work. As was often observed in this study, tactics are often only perceptible by those engaged with it in this study.

To illustrate how tactics can be both subtle and resistant, De Certeau discusses the idea of *la perruque*, which translated from French into English as "the wig." *La perruque* refers to the practice of disguising personal enjoyment as doing work. De Certeau provides the example of a secretary chatting with a friend using the phone at her desk. Because chatting on the phone is a central part to a secretary's job, the secretary is able to provide the illusion that she is fulfilling her responsibilities.

Such examples the shared working time at the end of the day during which health workers would gather at the clinic to complete their paperwork, socializing in the meantime. It also includes those moments when CHWs gossip and catch up with community members in the field.

While these are example of using work time for personal leisure, it would be premature to call this disruptive or counterproductive to the overall goal of serving the community. On one hand, these efforts can be understood as a way to make the work more enjoyable, and thus more motivating for community health workers to do their work. On the other hand, these leisure moments provide a space for health workers to strengthen their relationships with each other and with community members, thereby amplifying their impact and influence in the community.

Thus, these resistant acts are often relationship-building acts. As described in more detail in Chapter 5, relationships and collaboration enable CHWs to extend the reach of their work in ways beyond what their tools were created to support.

7.3.2 Making work meaningful

The second category of tactics are about making their work personal and meaningful. Many participants expressed altruistic motives and desires. Numerous participants disclosed that they are motivated by being able to serve the community. But the confluence of resource constraints at their health centers, negative response in the community described in Chapter 5, and the burden of using their tools often mean that community health workers are often unable to provide the kinds of care that they believe their communities require. Doing community health work in this environment was demotivating for some participants.

But throughout the study, participants provided examples in which they have tried to reclaim meaning and purpose within their work. Tactics provide an outlet to recharacterize the work so that it can once again be aligned with their original motivations. The consequence of doing these changes is that the work becomes less burdensome and more bearable for them to do.

One way of making work more meaningful through reappropriation has been to provide multiple and alternative meanings to the practices that they must do as part of their work. One example of a practice that carries with it multiple meanings is the marking of community health worker visits on patients' homes as I observed in during my field visit at Ramanagara PHC. There, I observed female JHAs, male JHAs, and ASHAs notate the program and visit times directly on the home of the community members they visit. As described further in Chapter 6, the house markings were a mechanism of public accountability for CHWs to demonstrate their work to their supervisors above what could be tracked through an information tool like a register. Instead, she explained that the markings were more effective as a tool for communicating with her coworkers.

7.3.3 Self-representation

Tactical practices of self-representation are practices where CHWs manage how they are seen, or rendered legible, to health institutions and communities. The underlying goal of self-representation is to perceptibly assert the competence and expertise valuable to these two groups, while still acting within the broader framework of the responsibilities described by their institutions and expected by the community. CHWs build this expertise through their daily living and working in the community, anticipating and attending to the broader needs and concerns of its members, and performing activities that cultivate trust. How CHWs demonstrate their expertise is different across different groups. For the community, CHWs can demonstrate their expertise through direct and indirect interaction in the community.

For health institutions, CHWs demonstrate their impact through the data they collect. The data reflect their expertise in two ways: first, the data itself, such as the number of homes visited or the number of TB cases being managed, are interpreted as the impact that CHWs have on the community. This understanding of expertise is perhaps the most obvious because it is easy to understand that the data that CHWs collect are measuring *something*, including how well of a job the CHW is doing. A theme that carries across the findings chapters is the increased selectivity of primary care: shaped through structural conditions, enabled through specific and structured programs, and enacted through data collection in official tools. The facts and figures that CHWs collect, then, are read by health institutions as a reflection of a CHWs work.

This study also uncovers a second kind of expertise that wasn't about the meaning of the data, but about the fluency of the data collected. At all the study sites, health workers readily share their demographics of their community, such as the size of their specific patient population, how community members are divided geographically, how many are men, how many are women, how many are "eligible couples. This fluency was most often demonstrated when participants shared their maps. The figures they recalled are generated through their data collection work and internalized through their reporting. Readily reciting these facts and figures is most directly a signal for how they fulfill these particular responsibilities, but indirectly a signal of their broader expertise in the community.

Expertise by proxy is also demonstrated by the prevalence of maps painted on clinic walls, photocopied on to clinic reporting forms, and hand-drawn in CHWs registers and diaries. Tools such as maps provide scaffolding on which CHWs showcase their expertise. CHWs walk the same routes and visit the same villages and regions regularly. Thus, the wayfinding value of the maps should diminish over time. And even in this case, the details in the maps are rough and unrefined. Instead, maps represent the ownership and expertise that CHWs have over their communities.

This second way that CHWs demonstrate expertise is tactical because it allows CHWs to showcase their mastery of one kind of knowledge of the community, and convey the scale in which they are asked to work. However, these facts and figures occlude the view to the other challenges that undermine their efficacy. These facts are not descriptive of the households having problems that a CHW is not equipped or able to address, or the patients that a CHW isn't able to visit as often as he or she would like.

7.3.4 Reconfiguration

This last category of tactical practice is reconfiguration. These are practices in which CHWs reconfigure their responsibilities and the responsibilities of others to accomplish their work. Reconfiguration is how CHWs alters the relationship among official responsibilities, community needs, and what resources are available.

Reconfiguration encompasses task shifting that is both externally imposed by health institutions, and formally codified in role descriptions, training, and tools, as well as situated, improvised, and collaborative. But reconfiguration also takes into account the broader means through which CHWs share their work.

For example, one mode of reconfiguration that emerged in this study was the delegation of responsibilities to peers. CHWs change the nature of their responsible so that it can be shared rather than be individual. For example, as previously described in chapter 5, CHWs needed to divide their work across gender boundaries in order to be culturally appropriate for the community. Male JHAs, for example, sometimes asked female JHAs or Link workers to speak to female patients about their health, even though there is no formal gender separation in their roles.

7.4 Tactical Affordances

In order to operationalize the typology of tactics described above, I propose a concept of tactical affordances. Affordances refers to those properties of a design that convey the possibilities of how the design can be used (Norman, 1999). Because affordances are an inherent property of the design, well-designed objects have clear affordances and can be easily used by users.

Building on this notion of affordances, tactical affordances are affordances that support tactical practices. To illustrate tactical affordances, we can compare two data collection tools: paper registers and the SMS-based Mother Child Tracking System (MCTS). As described in Chapter 6, paper registers are highly structured record-keeping books used by CHWs.

I observed how one participant took advantage of the margins of the register to allow her to collect unofficial, provisional information in her official register. The paper register's ability to create marginalia was a tactical affordance that enables her to reconfigure how she documents knowledge about the community and how she plans future interactions. In contrast to the paper register, the MCTS lacks tactical affordances. The MCTS captures similar health information as the paper register, but the strict SMS syntax is unforgiving in how data are entered, and the lack of visibility of what data has been entered limits how the tool can be used.

Tactics are demonstrations of individual agency. These demonstrations allow the individuals enacting them to reclaim their stake in shaping the world to better meet their desires. When a CHW reappropriates a tool or leverages her relationships in the community to act as extra sets of eyes and ears, she is enacting her agency to redefine her working conditions to work for her.

As technology designers in ICTD, we can make supporting tactical practice an implicit goal of design rather than an incidental consequence of it. Designing tactical affordances means designing tools that empower.

7.5 Designing for Tactics

A key component of design that supports tactical affordances is recognizing and characterizing the tension between individuals and structures. In this section, I draw upon the theoretical and empirical contributions of this study to propose a series of activities that can provide framework for designing affordances. I propose a process of designing for tactics in several sequential phases, including 1) collecting idealized and represented models of work; 2) mapping the stakeholders of the workplace; 3) understanding actual practice; 4) identifying opportunities to design for tactics.

7.5.1 Collect the idealized and represented models of work

As Suchman (1995) explains, representations of work are not objective portrayals of actual practice, but instead are intentional abstractions that support the interests of those creating the representations. In this study, representations of work came in the forms of job descriptions, first and secondhand accounts from interviews with participants, and also directly within the tools that health workers use.

As demonstrated in this study, idealized practice is both explicit and implicit. Idealized practice is explicit in documents that describe rules and responsibilities, such as the primary health centre guidelines created by the government. Idealized models of work are also explicit as descriptions generated by workers themselves, their peers, and their supervisors. Idealized practice is expressed implicitly in the design of the official tools and artifacts that workers use. For example, as described in depth in Chapter 6, the Mother-Child Tracking System requires certain kinds and certain forms of data that require health workers.

Developing a model of the ideal practice provides insight into the normative intentions of structures. Idealized models of work implicitly enact mechanisms through which institutions exert their power over health workers. Generating an idealized model also provides the baseline for understanding tactics are able to occur. Each deviation from ideal practice can be further analyzed as an example of what it means

In this study, I used different methods to generate different kinds of representations. This includes analysis of texts and artifacts, as well as conducting interviews with different stakeholders to elicit their interpretations of idealized practice.

Here are guiding questions that a researcher might try to answer in order to understand idealized models of work:

1. How do workers describe a typical workday?
2. What are the official tools that workers are required to use?
3. What kinds of work are health workers asked to report or document?
4. What criteria are used to evaluate the performance of workers?

7.5.2 Mapping the stakeholders of the workplace

After collecting and analyzing the idealized models of work, one can map the relationship between the stakeholders. To map the power structure, one should look at the models and answer what are the different roles represented in these models, with whom do individuals in these roles interact, as well as who manages or evaluates these roles. After the stakeholders have been mapped, we need also to understand their interests, their role in the getting the work accomplished, and the institutional interests they represent. In a work setting, identifying these tensions can be done by tracing the dynamics of power and of supervision.

Mapping the stakeholders is an established exercise for human-centered design processes (for example, Eason (1987); Friedman et al. (2002)). But in the context of designing for tactics, stakeholder mapping serves as an accessible proxy to map the institutional power structures. By mapping practice alongside the power structures meant to enable them, designers and researchers can identify potential friction points for tactical practice to occur.

These guiding questions can help identify stakeholders and trace power dynamics.

1. Who are the creators of these of these idealized models of work?
2. Who is responsible for evaluating the work?
3. Who receives the outcomes of those evaluations?
4. Where are the intersections between different roles and responsibilities?
5. What is the organizational structure of the workplace?
6. What is the organizational structure of organizations?

7.5.3 Understand actual practice

The goal of understanding actual practice isto render existing practice visible so designers can design for and around these practices. But more important, understanding actual practice can bring forth the various forms of tactical resistance that workers deploy in their daily practice.

Understanding actual practice is an ongoing and recursive process. This study used both interview and observations because using any single method offers only a partial glimpse of actual practice. Participants sometimes freely described actual practice, sometimes, sometimes participants described as a side comment to their descriptions of idealized practice, and other times participants would only describe it after specific probing.

Understanding actual practice can be the beginning of the process, but it is perhaps most productive after analyzing idealized practice and its complementary power structures. These two activities provide a lens for interrogating actual practice, and for uncovering new design opportunities for introducing tactical affordances or amplifying existing tactics. This analysis serves as a productive lens because it reveals potential tensions between institutions and individuals, and thus permits researchers and designers a way to structure their investigation of actual practice.

Actual practice is not a singular description, but a multitude of descriptions because actual practice is different for different people in different situations. Practice may sometimes be inconsistent, or even contradictory between participants. The inconsistencies and the differences reveal the textured nature of practice which can further highlight new opportunities for design. Thus, it is more productive to strive for a diversity of perspectives.

The following questions can help structure investigation of actual practice:

1. From observation, when does actual practice depart from idealized practice?
2. What are the reasons for these departures?
3. What social relationships does each worker manage or maintain for their work?
4. What is the nature of these relationships?
5. What kinds of work advice do workers give to their peers, particularly novice workers?
6. What are the unofficial tools that workers introduce to their work?

7.5.4 Identifying opportunities to design for tactics

Opportunities for design often reveal themselves after developing an intimate understanding of both actual practice and intimate practice. Additionally, the tactics that arise in actual practice are situational, that is, tactics are a nimble and specific response to particular and relatively static institutional conditions. In generating opportunities to design for tactics, I find it helpful to refer to Toyama's reading of technology has an amplifier of existing capacities. Thus, designing for tactics should focus on finding ways to amplify or augment existing tactical practice.

Example guiding questions for identifying opportunities to design for tactics.

1. When actual practice departs from idealized practice, what is the tactical character of these departures?
2. Do these departures involve reappropriation, redefinition, or reconfiguration of work?
3. How do existing tools enable tactical practice?
4. How do existing tools suppress tactical practice?

7.6 Revisiting the Research Questions and Findings

In this section, I revisit the main findings and research questions that guided this study.

7.6.1 Key Finding 1: Staffing shortages at health centers were related to informal task shifting at the health centers.

How are the activities of community health workers determined by the structural conditions of their workplace?

In asking this question, I was looking to understand how different factors drive work practices at different health centers that are embedded within a shared policy context. PHCs, CHCs, and UFWCs are each designated a unique role within a shared institutional vision on how to improve access to health care to the people of India.

In Chapter 4, I described the structural environment of each study site and related those to the capacities of each of those sites.

Two main patterns emerged. First, the staffing and supervisory structure of a health center was related to how task shifting occurred at those sites. Having a limited number of staff meant that other workers had to increase their workloads and take on responsibilities that weren't part of their current roles. But at sites with a strong supervisory structure, even with limited staff, responsibilities did not shift between roles. Second, health centers with a broad network institutional relationships tended to provide a more narrowed scope of services.

7.6.2 Key Finding 2: Health workers rely on collaboration with the community in order to meet their responsibilities and address community needs.

How do health workers reconcile the contradiction between their prescribed roles and responsibilities and the emergent needs of the communities they serve?

Much of a health worker's responsibility revolved around data collection. In order to keep up with these data collecting responsibilities and their servicing providing responsibilities, CHWs engaged in different kinds of collaborative relationships to understand the emergent needs of the community and then meet those needs. These collaborative relationships were with other health workers, with other community workers such as AWWs, and directly with community members. Collaborations allowed health workers to share and shift work to others to extend, seek social support, and help make sense of different kinds of knowledge of the health the community.

7.6.3 Key Finding 3: Information tools act as boundary objects that can support collaboration

How do health workers' information tools reflect and shape their idealized and actual practice with respect to how they engage with their colleagues and communities?

The information tools that health workers used in this study can be best understood as boundary objects among health workers, the community, and health institutions. Highly structured, official tools such as paper registers and the MCTS prescribed idealized practice which did not match actual practice. This led participants to rely on less-structured, flexible tools like personal diaries as a means to better support their work. But health workers also use tools in surprising ways. For example, they used maps not to illustrate the physical boundaries of their health center, but as a token to demonstrate their deeper expertise of the community to others.

7.7 Implications

The findings of this study could help researchers and designers better serve the needs of health workers in global health. By highlighting some of the institutional frictions that exist in the current sociotechnical context of health workers in India, we can better anticipate the kind of work that needs to be done to support an intervention that is beyond the technical components of an intervention itself. This requires a multifaceted approach that begins first with understanding and building empathy with the users and proactively confronting their experience, their expertise, and their motivations. While the instrumental goals of a technology may be valuable, such as with the Mother-Child Tracking System, intent and technology alone cannot overcome the lack of a unified infrastructure, easily reshape existing and ingrained patterns of work, or improve waning motivation among workers.

In order to overcome these barriers, a design approach needs to recognize them. One way to do recognize these barriers is to understand how existing practice is tactical. The typology of tactics generated in this study can sensitize researchers and designers in finding these barriers. The typology can be used as a generative tool for analyzing workflows, observations, and conducting investigative interviews.

A more considered design approach is one that balances the administrative, institutional, and technical needs without eroding the importance of supporting human agency and human needs. People are resilient and resourceful when their work is meaningful to them, as demonstrated repeatedly by the participants of this study, and thus will do what they can in the face of inefficiency and challenges.

7.8 Directions for Future Research

I envision three directions of research to expand the empirical, theoretical, and practical contributions of this study. The first is to widen the scope of empirical investigation to include other kinds of community workers. AWW, for example, were relied upon quite heavily by the CHWs in this study, but none were recruited to participate. Gaining a firsthand perspective on how AWWs and other community-based workers understand their work could greatly supplement the CHW-focused findings of this study.

An additional area of future research is to refine the theoretical work that was started in this study. I use strategies and tactics as a way to frame practice, but this study focuses on tactics. The concept of tactics exists as a counterpoint to the concept of strategies. Thus, gaining a better understanding of institutional strategies could generate a more nuanced and sophisticated understanding of how tactical practices emerge. Additionally, I expand and explore the concept of task shifting within its original context of health care, but the concept could be investigated in other collaborative resource-constrained environments. For example, it would be valuable to understand what task shifting looks like at a non-health related non-profit organization.

The last area of future research is to investigate how tactics and tactical affordances can be intentionally integrated with design. While I conducted this study in a particular context and institutional environment, the tactical categories developed from this study should be validated and refined through introduction in a design process. One direction is to apply these ideas is to evaluate how a current technology is used, and to evaluate whether these concepts can be productive and generative in practice.

7.9 Final Reflections

As I bring this dissertation to a close, I want to reflect on my journey completing it. Here, I will reflect on figuring out what this study was really about and learning to conduct research empathetically.

The most transformative moment of this study was the moment when I realized that what I thought I was originally studying was not what the study ended up being about. My study was first about the technology. What I would learn about the people who I would meet and interview would be translated into personas that would then inform the design of tools for mobile health. The design personas were one way that would make the mobile-based health project a user-centered one.

But almost immediately in the field, I quickly became aware that these original objectives were misaligned with what participants were most concerned about. Participants brought up themes of overcoming community distrust, bureaucratic procedures, and health institution policies. I arrived to understand the design space for creating tools, and the problems they were bringing up didn't have anything to do with tools at all.

And I wanted clarification on whether another mobile-based tool would help them do their work. Because what I wanted to study did not seem to be what participants found most important, I grappled with the conflict of whether I was even supporting user-centered design at all.

After I completed my data collection, I grappled for a long time to figure out what my study would be about. I first wanted to make this a project about technology, a project that would clearly carve out a design space for mobile-based health technology. But when it became clear that the narrative that I thought I would find didn't cleanly match the narrative that my participants cared about, I found myself struggling to understand what my dissertation would ultimately be about. This work needed to focus first on conveying the work of community health workers to force a more pointed reflection on the role technology might play.

Turning to theory provided the necessary scaffolding to structure how I could understand more systematically the kind of data that I ultimately collected. When my advisor, Beth Kolko, suggested Feminist Standpoint Theory and the work De Certeau, my study took on a new meaning. These two bodies of theory resonated with me because they were able to give rich, theoretical language not only to my own observations, but also provided a scholarly outlet for describing how I was already thinking about my participants, their relationships, and their stories. Reaching this point was a milestone in conceiving of the dissertation itself.

In addition to changing the direction of my research, this study also has shaped how I view myself as a researcher. My time with participants stretched my capacity to conduct research empathetically. My protocols did not prepare me for when Bharati explained her husband's debilitating injuries, or when Jyoti described the lack of loyalty she felt from the Indian government, or the plaintive tone that Vinata used to express how heavy the workloads at her health center had become, or when Anand described his physical fight with the community member who was trying to discredit his PHC.

My time with Bharati in particular still has a strong impression on me even several years later. Seeing her own emotional reaction as she was telling it made me appreciate the privileged position I am as a researcher. When we interview participants, we are able ask a lot of them, but there is no reciprocal expectation that we do the same. I can only guess why Bharati chose to share such personal story with me, but when she did I tried to my best to share my own difficult experience in caring for a loved one. Judging by her retreat, and because of the language barrier, I may not have been successful in doing so.

Now, I better appreciate the importance of having empathy as a researcher. Methodologically, it can level out the power distance between participants and me, but that is only relevant to the few moments you spend interacting. The more important lesson, however, is that empathy helped me feel more secure in my role as an advocate for my participants.

Getting to this point was important because I worried that my research would be beneficial only to me, and possibly a nuisance to my participants. I felt guilty that my interviews or field visits would add extra burden to already understaffed clinics, and I wanted to make my impact as minimal as possible. However, Anand from the Tumkur PHC appreciated my being there because someone was willing to listen and understand the environment in which he worked, something he said his local health officials did not take the time to do. I had to weigh my own discomfort of asking too much of participants with my participants' desire to be heard. My encounter with Anand has made me think more thoroughly about considering what reasons might have for participating. My role as a researcher was not simply to collect and report on data, but also to serve as an advocate for my participants.

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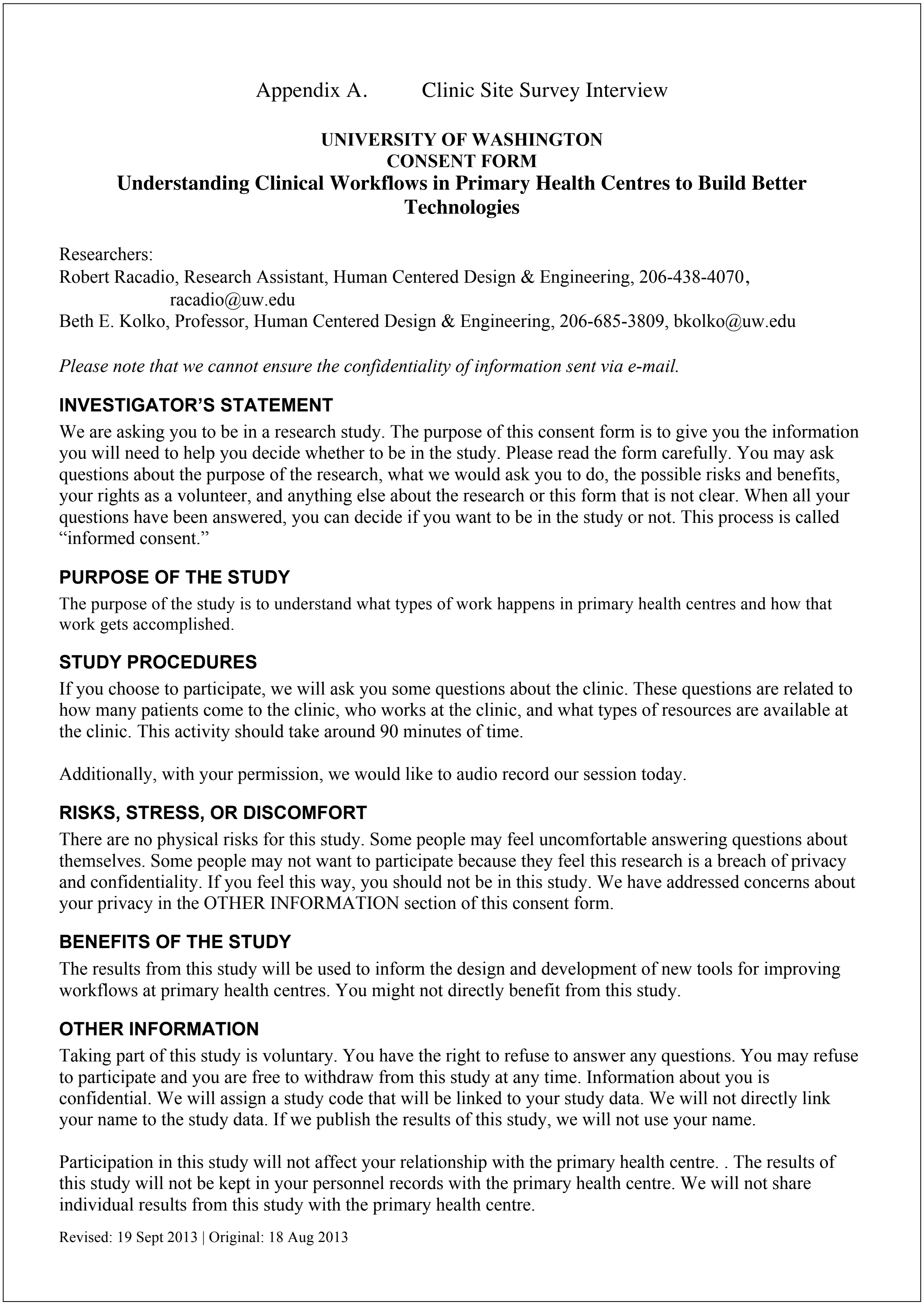
Appendix A

CLINIC SITE SURVEY CONSENT - ENGLISH AND KANNADA



Appendix A. Clinic Site Survey Interview

UNIVERSITY OF WASHINGTON
CONSENT FORM
Understanding Clinical Workflows in Primary Health Centres to Build Better Technologies

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Robert Racadio, Research Assistant, Human Centered Design & Engineering, 206-438-4070, racadio@uw.edu
Beth E. Kolko, Professor, Human Centered Design & Engineering, 206-685-3809, bkolko@uw.edu

Please note that we cannot ensure the confidentiality of information sent via e-mail.

INVESTIGATOR’S STATEMENT

We are asking you to be in a research study. The purpose of this consent form is to give you the information you will need to help you decide whether to be in the study. Please read the form carefully. You may ask questions about the purpose of the research, what we would ask you to do, the possible risks and benefits, your rights as a volunteer, and anything else about the research or this form that is not clear. When all your questions have been answered, you can decide if you want to be in the study or not. This process is called “informed consent.”

PURPOSE OF THE STUDY

The purpose of the study is to understand what types of work happens in primary health centres and how that work gets accomplished.

STUDY PROCEDURES

If you choose to participate, we will ask you some questions about the clinic. These questions are related to how many patients come to the clinic, who works at the clinic, and what types of resources are available at the clinic. This activity should take around 90 minutes of time.

Additionally, with your permission, we would like to audio record our session today.

RISKS, STRESS, OR DISCOMFORT

There are no physical risks for this study. Some people may feel uncomfortable answering questions about themselves. Some people may not want to participate because they feel this research is a breach of privacy and confidentiality. If you feel this way, you should not be in this study. We have addressed concerns about your privacy in the OTHER INFORMATION section of this consent form.

BENEFITS OF THE STUDY

The results from this study will be used to inform the design and development of new tools for improving workflows at primary health centres. You might not directly benefit from this study.

OTHER INFORMATION

Taking part of this study is voluntary. You have the right to refuse to answer any questions. You may refuse to participate and you are free to withdraw from this study at any time. Information about you is confidential. We will assign a study code that will be linked to your study data. We will not directly link your name to the study data. If we publish the results of this study, we will not use your name.

Participation in this study will not affect your relationship with the primary health centre. . The results of this study will not be kept in your personnel records with the primary health centre. We will not share individual results from this study with the primary health centre.

Revised: 19 Sept 2013 | Original: 18 Aug 2013

If you consent to being recorded, you will be permitted to review the recording and request any portions that you desire to be erased. The recording will be stored electronically in an encrypted file. The recording will be analyzed and destroyed within twelve months of this interview.

Government or university staff sometimes reviews studies such as this one to make sure they are being done safely and legally. If a review of this study takes place, your records may be examined. The reviewers will protect your privacy. The study records will not be used to put you at legal risk or harm.

Printed name of study staff obtaining consent	Signature	Date

Participant's statement

This study has been explained to me. I volunteer to take part in this research. I have had a chance to ask questions. If I have questions later about the research, I can ask one of the researchers listed above. If I have questions about my rights as a research subject, I can call the Human Subjects Division at (206) 543-0098. I will receive a copy of this consent form.

I agree to be audio recorded:

- ☐ Yes
- ☐ No

Printed name of participant	Signature of participant	Date

ಅನುಬಂಧ - A ಪ್ರಾಥಮಿಕ ಆರೋಗ್ಯ ಕೇಂದ್ರದ ಸಮೀಕ್ಷೆ ಹಾಗೂ ಸಂದರ್ಶನ

ವಾಶಿಂಗ್ಟನ್ ವಿಶ್ವವಿದ್ಯಾಲಯ

ಒಪ್ಪಿಗೆ ಪತ್ರ

ಪ್ರಾರ್ಥಮಿಕ ಆರೋಗ್ಯ ಕೇಂದ್ರಗಳ ಕಾರ್ಯನಿರ್ವಾಹಣೆಗೆ ಉತ್ತಮ ತಂತ್ರಜ್ಞಾನವನ್ನು ಒದಗಿಸುವ ಬಗ್ಗೆ

ಸಂಶೋಧಕರು

ರಾಬರ್ಟ್ ರಾಖೇಧಿಯೊ, ಸಂಶೋಧನಾ ಸಹಾಯಕರು, ಮಾನವ ಕೇಂದ್ರಿತ ವಿನ್ಯಾಸ ಹಾಗೂ ತಂತ್ರಜ್ಞಾನ, 206-438-4070, racadio@uw.edu

ಬೆತ್ ಕೋಳ್ಕೋ, ಪ್ರಾಧ್ಯಾಪಕರು, ಮಾನವ ಕೇಂದ್ರಿತ ವಿನ್ಯಾಸ ಹಾಗೂ ತಂತ್ರಜ್ಞಾನ, 206-685-3809, bkolko@uw.edu

ಸೂಚನೆ: ನಾವು ಇ-ಮೈಲ್ ಮೂಲಕ ನಡೆಯುವ ಸಂವಾದದ ಗೌಪ್ಯತೆಯ ಖಾತ್ರಿ ನೀಡಲಾಗುವುದಿಲ್ಲ.

ವಿಚಾರಕರ ಹೇಳಿಕೆ

ನೀವು ಈ ಸಂಶೋಧನಾ ಅಧ್ಯಾಯನದಲ್ಲಿ ಭಾಗವಹಿಸುವರೆಂದು ನಾವುಗಳು ಬಯಸುತ್ತೇವೆ. ಈ ಸಂಶೋಧನಾ ಅಧ್ಯಾಯನದಲ್ಲಿ ತಮ್ಮ ಪಾಲ್ಗೊಳ್ಳುವಿಕೆಯ ಬಗ್ಗೆ ಈ ಪತ್ರವು ಹೆಚ್ಚಿನ ಮಾಹಿತಿ ನೀಡುತದೆ. ಈ ಅಧ್ಯಾಯನದ ಉದ್ದೇಶ, ರೀತಿ-ನೀತಿಗಳು, ಲಾಭ-ನಷ್ಟಗಳು ಹಾಗೂ ಅಧ್ಯಾಯನದಲ್ಲಿನ ನಿಮ್ಮ ಪಾಲ್ಗೊಳ್ಳುವಿಕೆಯ ಬಗ್ಗೆ ತಮಗೆ ಯಾವುದೇ ಪ್ರಶ್ನೆ ಅಥವಾ ಸ್ಪಷ್ಟೀಕರಣ ಬೇಕಿದ್ದಲ್ಲಿ ನಮಗೆ ನಿಸಂಕೋಚವಾಗಿ ಕೇಳಿರಿ. ತಾವುಗಳು ಈ ಸಂಶೋಧನೆಯಲ್ಲಿ ತಮ್ಮ ಸ್ವಸಮ್ಮತಿಯಿಂದ ಭಾಗವಹಿಸುತ್ತಿದ್ದೀರಿ. ನೀವು ಈ ಸಂಶೋಧನೆಯಲ್ಲಿ ಭಾಗವಹಿಸಲು ಇಚ್ಛೆಯಿಲ್ಲದಲ್ಲಿ ಯಾವುದೇ ಒತ್ತಾಯವಿರುವುದಿಲ್ಲ. ಇದನ್ನು "ಮಾಹಿತಿಯುಕ್ತ ಸಮ್ಮತಿ" ಎಂದು ಕರೆಯುತ್ತಾರೆ.

ಅಧ್ಯಾಯನದ ಉದ್ದೇಶ:

ಪ್ರಾರ್ಥಮಿಕ ಆರೋಗ್ಯ ಕೇಂದ್ರಗಳ ಕಾರ್ಯನಿರ್ವಾಹಣೆ ಹಾಗೂ ಅದರ ರೀತಿ-ನೀತಿಗಳ ಬಗ್ಗೆ ತಿಳಿದುಕೊಳ್ಳುವುದು.

ಅಧ್ಯಾಯನದ ಕಾರ್ಯವಿಧಾನಗಳು:

ನೀವು ಈ ಅಧ್ಯಾಯನದಲ್ಲಿ ಭಾಗವಹಿಸಲು ಇಚ್ಛಿಸಿದ್ದಲ್ಲಿ , ನಿಮ್ಮ ಈ ಕೇಂದ್ರದ ಕಾರ್ಯನಿರ್ವಹಣೆ, ವಿಧಾನಗಳು, ಕೆಲಸ, ಕೇಂದ್ರದ ಸಂಪನ್ಮೂಲಗಳು, ಕೇಂದ್ರಕೆ ಬರುವ ರೋಗಿಗಳ ಬಗ್ಗೆ ಕೆಲವು ಪ್ರಶ್ನೆಗಳನ್ನು ಕೇಳುತ್ತೇವೆ. ಈ ಚಟುವಟಿಕೆಗೆ

ಸುಮಾರು ೯೦ ನಿಮಿಷಗಳು ಬೇಕಾಗಬಹುದು. ಇದು ನಮ್ಮ ಅಧ್ಯಾಯನಕ್ಕೆ ಉಪಯೋಗವಾಗಲಿದೆ. ಅಧ್ಯಾಯನವನ್ನು ದಾಖಲಿಸುವದಕ್ಕಾಗಿ ನಾವು ಆಡಿಯೋ ರೆಕಾರ್ಡ್ ಮಾಡಬಹುದು. ಈ ರೀತಿ ಸಂಘ್ರಹಿಸಿದ ವಿಷಯಗಳನ್ನು ಗೌಪ್ಯವಾಗಿ ಇಡಲಾಗುವುದು.

ಒತ್ತಾಯ, ಅಪಾಯ ಹಾಗೂ ಮುಜುಗರ:

ಈ ಅಧ್ಯಾಯನದಲ್ಲಿ ನೀವು ಸ್ವಸಮ್ಮತಿಯಿಂದ ಪಾಲ್ಗೊಳ್ಳುತ್ತಿದೀರಿ. ಈ ಅಧ್ಯಾಯನದಲ್ಲಿ ಯಾವುದೇ ವಯುಕ್ತಿಕ ಅಪಾಯವಿರುವುದಿಲ್ಲ. ತಮಗೆ ಕೇಳುವ ಪ್ರಶ್ನೆ ಅಥವಾ ಅಧ್ಯಾಯನದ ಯಾವುದೇ ವಿಧಾನಗಳು ಮುಜುಗರ ಉಂಟುಮಾಡಿದ್ದಲ್ಲಿ ತಾವುಗಳು ವಿಚಾರಕರಿಗೆ ತಿಳಿಸಿ. ತಮ್ಮ ಹಾಗೂ ತಾವುಗಳು ಒದಗಿಸುವ ಮಾಹಿತಿಯ ಗೌಪ್ಯತೆಯ ಬಗ್ಗೆ ಇತರೆ ಮಾಹಿತಿಗಳು - ಈ ಭಾಗದಲ್ಲಿ ಹೆಚ್ಚಿನ ವಿವರಗಳನ್ನು ನೀಡಲಾಗಿದೆ.

ಅಧ್ಯಾಯನದ ಉಪಯೋಗಗಳು:

ಈ ಅಧ್ಯಾಯನದಿಂದೊದಗಿದ ಮಾಹಿತಿ ಹಾಗೂ ಪಲಿತಾಂಶಗಳು ನಮಗೆ ಉತ್ತಮ ಆರೋಗ್ಯ ಕೇಂದ್ರಗಳ ನಿರ್ಮಾಣ ಹಾಗೂ ಆರೋಗ್ಯ ಕೇಂದ್ರಗಳ ಕಾರ್ಯನಿರ್ವಹಣೆಯನ್ನು ಅಭಿವೃದ್ದಿಪಡಿಸಾಲು ಸಬಲಗೊಳಿಸುತದೆ. ಈ ಅಧ್ಯಾಯನದಿಂದ ತಮಗೆ ಯಾವುದೇ ರೀತಿಯ ನೇರ ಲಾಭವಿಲ್ಲದಿರಬಹುದು.

ಇತರೆ ಮಾಹಿತಿಗಳು:

ನೀವುಗಳು ಸ್ವಯಂಪ್ರೇರಿತರಾಗಿ ಈ ಅಧ್ಯಾಯನದಲ್ಲಿ ಭಾಗವಹಿಸುತಿದ್ದೀರಿ, ಈ ಅಧ್ಯಾಯನದಲ್ಲಿನ ಪಾಲ್ಗೊಳ್ಳುವಿಕೆಯಲ್ಲಿ ಯಾವುದೇ ಬಲವಂತವಿರುವುದಿಲ್ಲ.

ನಾವು ಕೇಳುವ ಪ್ರಶ್ನೆಗೆ ಉತ್ತರಿಸದಿರುವ ಅಧಿಕಾರ ನಿಮಗಿರುತ್ತದೆ. ನಿಮ್ಮ ಗುರುತು ನಮ್ಮಲ್ಲಿ ಗೌಪ್ಯವಾಗಿರುತದೆ. ಈ ಅಧ್ಯಾಯನದ ಕೋಡ್ನನ್ನು ನಾವು ನಿಮ್ಮ ಬಳಿ ಹಂಚಿಕೊಳ್ಳುತ್ತೇವೆ. ಈ ಅಧ್ಯಾಯನದ ಮಾಹಿತಿಯನ್ನು ನಾವು ಪ್ರಕಟಿಸಿದ್ದಲ್ಲಿ ನಾವು ನಿಮ್ಮ ಹೆಸರನ್ನು ಎಲ್ಲೂ ಬಳಸುವುದಿಲ್ಲ.

ನಿಮ್ಮ ಈ ಅಧ್ಯಾಯನದಲ್ಲಿನ ಬಾಗವಹಿಸುವಿಕೆ, ನಿಮ್ಮ ಮತ್ತು ಆರೋಗ್ಯ ಕೇಂದ್ರದ ಸಂಬಂಧದ ಮೇಲೆ ಯಾವುದೇ ಪರಿಣಾಮ ಬೀರುವುದಿಲ್ಲ. ನೀವು ಈ ಅಧ್ಯಾಯನದ ವೇಳೆ ನೀಡಿದ ಮಾಹಿತಿಯನ್ನು ನಿಮ್ಮ ಆರೋಗ್ಯ ಕೇಂದ್ರದಲ್ಲಿನ ನಿಮ್ಮ ದಾಖಲೆಯೊಂದಿಗೆ ಇಡಲಾಗುವುದಿಲ್ಲ ಹಾಗೂ ಆರೋಗ್ಯ ಕೇಂದ್ರದೊಡನೆ ಹಂಚಿಕೊಳ್ಳಲಾಗುವುದಿಲ್ಲ.

ನೀವು ಆಡಿಯೋ ರೆಕಾರ್ಡ್ಗೆ ಸಮ್ಮತಿಸಿದ್ದಲ್ಲಿ, ನೀವು ಈ ರೆಕಾರ್ಡ್ನನ್ನು ವಿಮರ್ಶಿಸಲು ಹಾಗೂ ತೃಪ್ತಿಯಿಲ್ಲದಿದ್ದಲ್ಲಿ ರೆಕಾರ್ಡ್ನನ ಯಾವುದೇ ಭಾಗವನ್ನು ಆಳಿಸಿಹಾಕಲು ಕೋರಬಹುದಾಗಿದೆ. ರೆಕಾರ್ಡ್ನನ್ನು ನಾವು ಎನ್‌ಕ್ರಿಪ್‌ಶನ್ ಮೂಲಕ ಡಿಜಿಟಲ್ ರೀತಿಯಲ್ಲಿ ಸಂಗ್ರಹಿಸುತ್ತೇವೆ. ರೆಕಾರ್ಡ್ನನ್ನು ವಿಶ್ಲೇಷಿಸಿದ ನಂತರ, 12 ತಿಂಗಳ ಒಳಗೆ, ರೆಕಾರ್ಡ್ನನ್ನು ನಾಶಪಡಿಸಲಾಗುವುದು.

ಈ ಬಗೆಯ ಅಧ್ಯಾಯನಗಳನ್ನು ಸರ್ಕಾರ ಹಾಗೂ ವಿಶ್ವವಿದ್ಯಾನಿಲಯ ಕೆಲವೊಮ್ಮೆ ಅದರ ರೀತಿ-ನೀತಿಗಳ ಕಾನೂನುಬದ್ಧತೆಯನ್ನು ವಿಶ್ಲೇಷಿಸಬಹುದು. ಈ ಅಧ್ಯಾಯನವು ಈ ರೀತಿಯ ವಿಶ್ಲೇಷಣೆಗೆ ಒಳಗಾದಲ್ಲಿ ವಿಮರ್ಶಕರು ನಿಮ್ಮ ಗೌಪ್ಯತೆಯನ್ನು ರಕ್ಷಿಸುತ್ತಾರೆ ಮತ್ತು ನೀವು ಕಾನೂನಿನ ಅಥವಾ ಇತರ ಹೊಣೆಗಾರಿಕೆಯಿಂದ ಮುಕ್ತರಾಗಿರುತ್ತೀರಿ.

ಅಧ್ಯಾಯನದ ಕಾರ್ಯನಿರ್ವಾಹಕರ ಹೆಸರು	ಸಹಿ	ದಿನಾಂಕ

<u>ಭಾಗವಹಿಸುವವರ ಹೇಳಿಕೆ:</u>

ನಾನು ಈ ಅಧ್ಯಾಯನದ ರೀತಿ-ನೀತಿಗಳನ್ನು ತಿಳಿದಿರುತ್ತೇನೆ ಮತ್ತು ಸ್ವಯಂಪ್ರೇರಣೆಯಿಂದ ಈ ಅಧ್ಯಾಯನದಲ್ಲಿ ಭಾಗವಹಿಸುತ್ತಿದೇನೆ. ನಾನು ಕೇಳಿರುವ ಪ್ರಶ್ನೆಗಳನ್ನು ವ್ಯವಸ್ಥಾಪಕರು ಉತ್ತರಿಸಿದ್ದರೆ.

ನನಗೆ ಮುಂದಿನ ದಿನಗಳಲ್ಲಿ ಈ ಅಧ್ಯಾಯನದ ಬಗ್ಗೆ ಯಾವುದೇ ಪ್ರಶ್ನೆಗಳಿದಲ್ಲಿ ನಾನು ಮೇಲಿನ ಸಂಶೋಧಕರನ್ನು ಸಂಪರ್ಕಿಸಬಹುದಾಗಿದೆ. ನಾನು ಸಂಶೋಧನೆ ವಿಷಯವಾಗಿ ನನ್ನ ಹಕ್ಕುಗಳ ಬಗ್ಗೆ ಪ್ರೆಶ್ನೆಗಳಿದಲ್ಲಿ ನಾನು ಹ್ಯೂಮನ್ ಸಬ್ಜೆಕ್ಟ್ ಡಿವಿಷನ್ನನ್ನು ಸಂಪರ್ಕಿಸಬಹುದಾಗಿದೆ - ದೂರವಾಣಿ ಸಂಖೆ +1 (206) 543-0098 / +91 080 66586000.

ಆಡಿಯೋ ರೆಕಾರ್ಡ್ಗೆಗೆ ಸಮ್ಮತಿ ಇದೆ

ಹೌದು ☐

ಇಲ್ಲ ☐

ನನಗೆ ಈ ಒಪ್ಪಿಗೆ ಪಾತ್ರದ ಒಂದು ಪ್ರತಿಯನ್ನು ಒದಗಿಸಲಾಗಿದೆ.

ಭಾಗವಿಸುವವರ ಹೆಸರು	ಸಹಿ	ದಿನಾಂಕ

Appendix B

CLINIC WORKFLOW DIRECT CONSENT - ENGLISH AND KANNADA

Appendix B. Direct Observation Consent

UNIVERSITY OF WASHINGTON
CONSENT FORM

Understanding Clinical Workflows in Primary Health Centres to Build Better Technologies

Researchers:
Robert Racadio, Research Assistant, Human Centered Design & Engineering, 206-438-4070, racadio@uw.edu
Beth E. Kolko, Professor, Human Centered Design & Engineering, 206-685-3809, bkolko@uw.edu

Please note that we cannot ensure the confidentiality of information sent via e-mail.

INVESTIGATOR'S STATEMENT

We are asking you to be in a research study. The purpose of this consent form is to give you the information you will need to help you decide whether to be in the study. Please read the form carefully. You may ask questions about the purpose of the research, what we would ask you to do, the possible risks and benefits, your rights as a volunteer, and anything else about the research or this form that is not clear. When all your questions have been answered, you can decide if you want to be in the study or not. This process is called "informed consent."

PURPOSE OF THE STUDY

The purpose of the study is to understand what types of work happens in primary health centres and how that work gets accomplished.

STUDY PROCEDURES

If you choose to participate, we will observe and shadow you as you do your work over the next one or two days in the clinic. We're mostly here just to watch and learn about the types of work that you do as you do your daily tasks. Occasionally we may ask you questions about what you are doing. While we observe, we may take notes or photographs of what you are doing and what tools you are using to help us document what is going on. We will avoid taking pictures where you can be identified. We will treat these notes and photographs as confidential, and won't collect any identifiable information about you.

RISKS, STRESS, OR DISCOMFORT

There are no physical risks for this study. Some people may feel uncomfortable being observed by others or by answering questions about themselves. Some people may not want to participate because they feel this research is a breach of privacy and confidentiality. If you feel this way, you should not be in this study. We have addressed concerns about your privacy in the OTHER INFORMATION section of this consent form.

BENEFITS OF THE STUDY

The results from this study will be used to inform the design and development of new tools for improving workflows at primary health centres. You might not directly benefit from this study.

OTHER INFORMATION

Taking part of this study is voluntary. You have the right to request that the researcher not observe what you are doing at any time. You have the right to refuse to answer any questions. You may refuse to participate and you are free to withdraw from this study at any time. Information about you is confidential. We will assign a study code that will be linked to your study data. We will not directly link your name to the study data. If we publish the results of this study, we will not use your name.

To protect your anonymity, we will blur or conceal your face in any photos that we take within 12 months of the study's conclusion.

Participation in this study will not affect your relationship with the primary health centre in any way. The results of this study will not be kept in your personnel records with the primary health centre. We will not share individual results from this study with the primary health centre.

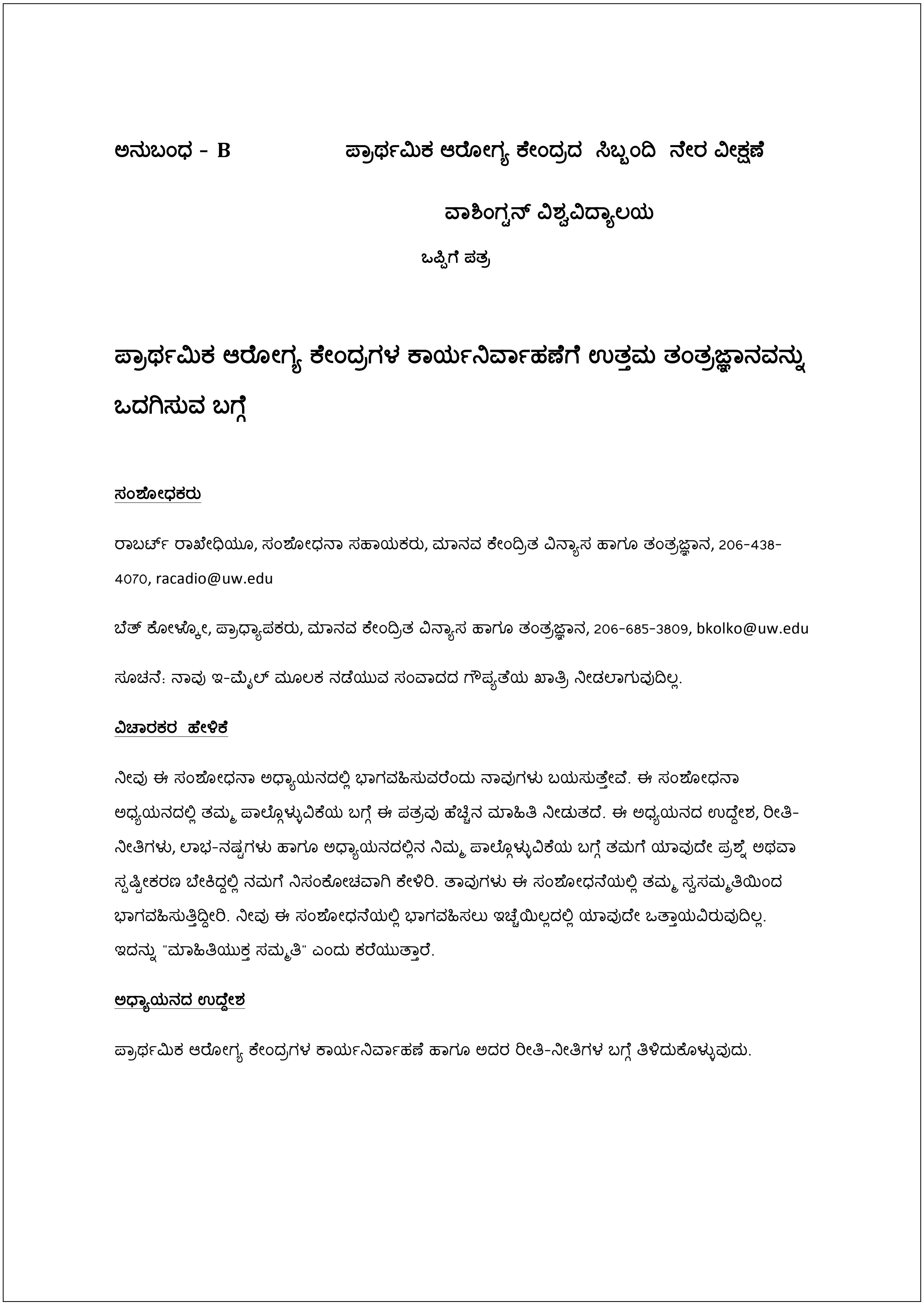
Government or university staff sometimes reviews studies such as this one to make sure they are being done safely and legally. If a review of this study takes place, your records may be examined. The reviewers will protect your privacy. The study records will not be used to put you at legal risk or harm.

Printed name of study staff obtaining consent Signature Date

Participant's statement

This study has been explained to me. I volunteer to take part in this research. I have had a chance to ask questions. If I have questions later about the research, I can ask one of the researchers listed above. If I have questions about my rights as a research subject, I can call the Human Subjects Division at (206) 543-0098. I will receive a copy of this consent form.

Printed name of participant Signature of participant Date



ಅನುಬಂಧ - B ಪ್ರಾರ್ಥಮಿಕ ಆರೋಗ್ಯ ಕೇಂದ್ರದ ಸಿಬ್ಬಂದಿ ನೇರ ವೀಕ್ಷಣೆ

ವಾಶಿಂಗ್ಟನ್ ವಿಶ್ವವಿದ್ಯಾಲಯ

ಒಪ್ಪಿಗೆ ಪತ್ರ

ಪ್ರಾರ್ಥಮಿಕ ಆರೋಗ್ಯ ಕೇಂದ್ರಗಳ ಕಾರ್ಯನಿರ್ವಾಹಣೆಗೆ ಉತ್ತಮ ತಂತ್ರಜ್ಞಾನವನ್ನು ಒದಗಿಸುವ ಬಗ್ಗೆ

ಸಂಶೋಧಕರು

ರಾಬರ್ಟ್ ರಾಖೇಧಿಯೂ, ಸಂಶೋಧನಾ ಸಹಾಯಕರು, ಮಾನವ ಕೇಂದ್ರಿತ ವಿನ್ಯಾಸ ಹಾಗೂ ತಂತ್ರಜ್ಞಾನ, 206-438-4070, racadio@uw.edu

ಬೆತ್ ಕೋಳ್ಕೋ, ಪ್ರಾಧ್ಯಾಪಕರು, ಮಾನವ ಕೇಂದ್ರಿತ ವಿನ್ಯಾಸ ಹಾಗೂ ತಂತ್ರಜ್ಞಾನ, 206-685-3809, bkolko@uw.edu

ಸೂಚನೆ: ನಾವು ಇ-ಮೈಲ್ ಮೂಲಕ ನಡೆಯುವ ಸಂವಾದದ ಗೌಪ್ಯತೆಯ ಖಾತ್ರಿ ನೀಡಲಾಗುವುದಿಲ್ಲ.

ವಿಚಾರಕರ ಹೇಳಿಕೆ

ನೀವು ಈ ಸಂಶೋಧನಾ ಅಧ್ಯಾಯನದಲ್ಲಿ ಭಾಗವಹಿಸುವರೆಂದು ನಾವುಗಳು ಬಯಸುತ್ತೇವೆ. ಈ ಸಂಶೋಧನಾ ಅಧ್ಯಯನದಲ್ಲಿ ತಮ್ಮ ಪಾಲ್ಗೊಳ್ಳುವಿಕೆಯ ಬಗ್ಗೆ ಈ ಪತ್ರವು ಹೆಚ್ಚಿನ ಮಾಹಿತಿ ನೀಡುತದೆ. ಈ ಅಧ್ಯಯನದ ಉದ್ದೇಶ, ರೀತಿ-ನೀತಿಗಳು, ಲಾಭ-ನಷ್ಟಗಳು ಹಾಗೂ ಅಧ್ಯಾಯನದಲ್ಲಿನ ನಿಮ್ಮ ಪಾಲ್ಗೊಳ್ಳುವಿಕೆಯ ಬಗ್ಗೆ ತಮಗೆ ಯಾವುದೇ ಪ್ರಶ್ನೆ ಅಥವಾ ಸ್ಪಷ್ಟೀಕರಣ ಬೇಕಿದ್ದಲ್ಲಿ ನಮಗೆ ನಿಸಂಕೋಚವಾಗಿ ಕೇಳಿರಿ. ತಾವುಗಳು ಈ ಸಂಶೋಧನೆಯಲ್ಲಿ ತಮ್ಮ ಸ್ವಸಮ್ಮತಿಯಿಂದ ಭಾಗವಹಿಸುತ್ತಿದ್ದೀರಿ. ನೀವು ಈ ಸಂಶೋಧನೆಯಲ್ಲಿ ಭಾಗವಹಿಸಲು ಇಚ್ಚೆಯಿಲ್ಲದಲ್ಲಿ ಯಾವುದೇ ಒತ್ತಾಯವಿರುವುದಿಲ್ಲ. ಇದನ್ನು "ಮಾಹಿತಿಯುಕ್ತ ಸಮ್ಮತಿ" ಎಂದು ಕರೆಯುತ್ತಾರೆ.

ಅಧ್ಯಾಯನದ ಉದ್ದೇಶ

ಪ್ರಾರ್ಥಮಿಕ ಆರೋಗ್ಯ ಕೇಂದ್ರಗಳ ಕಾರ್ಯನಿರ್ವಾಹಣೆ ಹಾಗೂ ಅದರ ರೀತಿ-ನೀತಿಗಳ ಬಗ್ಗೆ ತಿಳಿದುಕೊಳ್ಳುವುದು.

ಅಧ್ಯಾಯನದ ಕಾರ್ಯವಿಧಾನಗಳು:

ನೀವು ಈ ಅಧ್ಯಾಯನದಲ್ಲಿ ಭಾಗವಹಿಸಲು ಇಚ್ಚಿಸಿದ್ದಲ್ಲಿ , ನಾವುಳು ನಿಮ್ಮ ದೈನಂದಿಕ ಕೆಲಸಗಳು ಹಾಗೂ ಕಾರ್ಯವೈಕರಿಯನ್ನು , ನಿಮ್ಮ ಜೊತೆಯಲ್ಲಿದು ಗಮನಿಸುತ್ತೇವೆ. ಈ ವೇಳೆಯಲ್ಲಿ, ತಮ್ಮ ಒಪ್ಪಿಗೆ ಮೇರೆಗೆ, ನಾವು ತಾವು ಮಾಡುವ ಕೆಲಸದ ಬಗ್ಗೆ ಕೆಲವು ಪ್ರಶ್ನೆಗಳನ್ನು ಕೇಳಬಹುದು. ಇದು ನಮ್ಮ ಅಧ್ಯಯನಕ್ಕೆ ಉಪಯೋಗವಾಗಲಿದೆ. ಈ ಅಧ್ಯಯನವನ್ನು ದಾಖಲಿಸುವದಕ್ಕಾಗಿ ನಾವು ಕೆಲವು ಛಾಯಾಚಿತ್ರಗಳನ್ನು ತೆಗೆದುಕೊಳ್ಳಬೇಕಾಗಬಹುದು.

ಈ ರೀತಿ ಸಂಫ್ರಹಿಸಿದ ವಿಷಯಗಳನ್ನು ಗೌಪ್ಯವಾಗಿ ಇಡಲಾಗುವುದು.

ಒತ್ತಾಯ, ಅಪಾಯ ಹಾಗೂ ಮುಜುಗರ:

ಈ ಅಧ್ಯಯನದಲ್ಲಿ ನಿಮ್ಮ ಪಾಲ್ಗೊಳ್ಳುವಿಕೆ ಸ್ವಸಮ್ಮತಿಯಿಂದ ಪಾಲ್ಗೊಳ್ಳುತ್ತಿದೀರಿ. ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಯಾವುದೇ ವಯುಕ್ತಿಕ ಅಪಾಯವಿರುವುದಿಲ್ಲ. ತಮಗೆ ಕೇಳುವ ಪ್ರಶ್ನೆ ಅಥವಾ ಅಧ್ಯಯನದ ಯಾವುದೇ ವಿಧಾನಗಳು ಮುಜುಗರ ಉಂಟುಮಾಡಿದ್ದಲ್ಲಿ ತಾವುಗಳು ವಿಚಾರಕರಿಗೆ ತಿಳಿಸಿ. ತಮ್ಮ ಹಾಗೂ ತಾವುಗಳು ಒದಗಿಸುವ ಮಾಹಿತಿಯ ಗೌಪ್ಯತೆಯ ಬಗ್ಗೆ ಇತರೆ ಮಾಹಿತಿಗಳು - ಈ ಭಾಗದಲ್ಲಿ ಹೆಚ್ಚಿನ ವಿವರಗಳನ್ನು ನೀಡಲಾಗಿದೆ.

ಅಧ್ಯಯನದ ಉಪಯೋಗಗಳು:

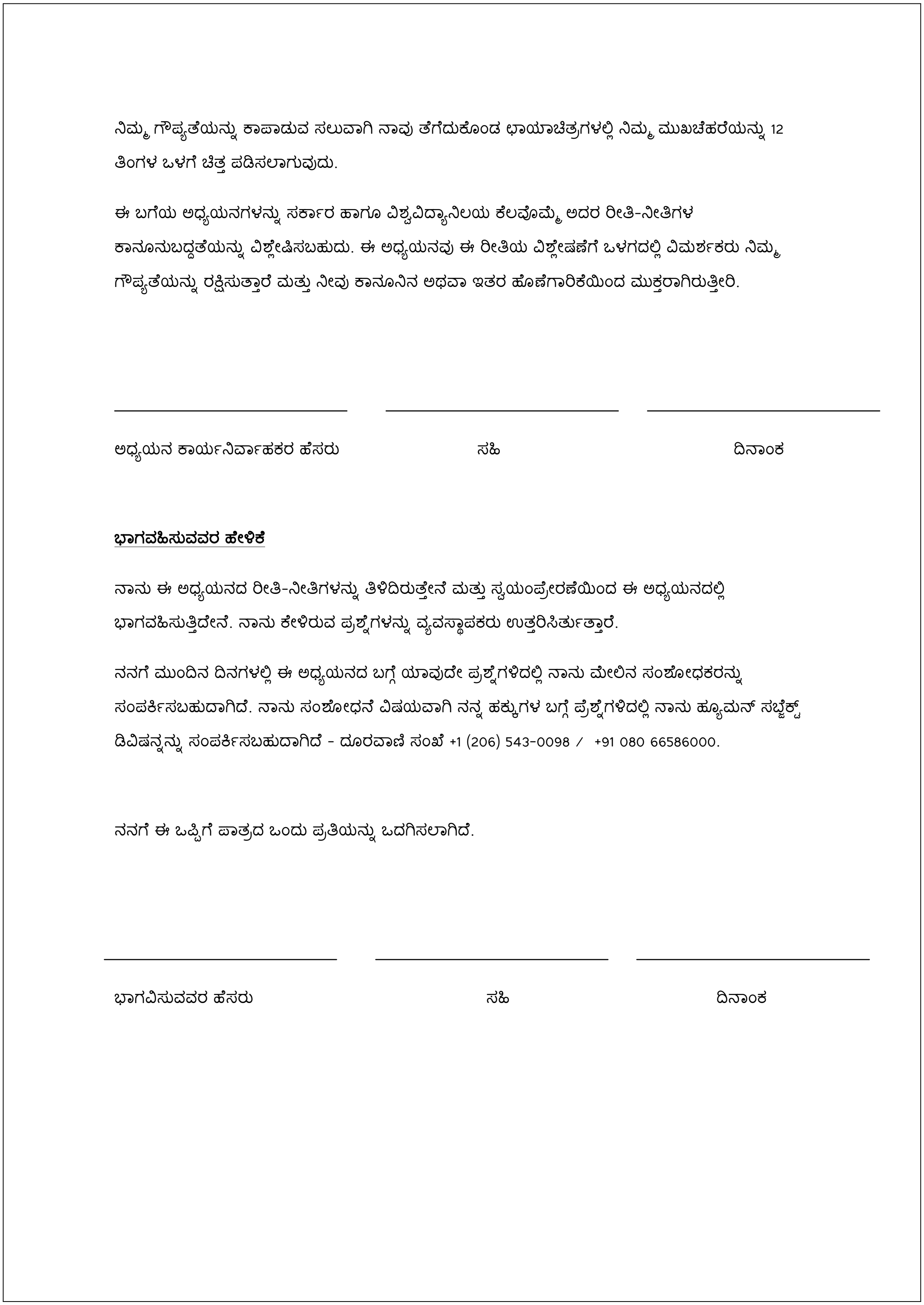
ಈ ಅಧ್ಯಯನದಿಂದೊದಗಿದ ಮಾಹಿತಿ ಹಾಗೂ ಪಲಿತಾಂಶಗಳು ನಮಗೆ ಉತ್ತಮ ಆರೋಗ್ಯ ಕೇಂದ್ರಗಳ ನಿರ್ಮಾಣ ಹಾಗೂ ಆರೋಗ್ಯ ಕೇಂದ್ರಗಳ ಕಾರ್ಯನಿರ್ವಹಣೆಯನ್ನು ಅಭಿವೃದ್ಧಿಪಡಿಸಲು ಸಬಲಗೊಳಿಸುತದೆ. ಈ ಅಧ್ಯಯನದಿಂದ ತಮಗೆ ಯಾವುದೇ ರೀತಿಯ ನೇರ ಲಾಭವಿಲ್ಲದಿರಬಹುದು.

ಇತರೆ ಮಾಹಿತಿಗಳು:

ನೀವುಗಳು ಸ್ವಯಂಪ್ರೇರಿತರಾಗಿ ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸುತಿದ್ದೀರಿ, ಈ ಅಧ್ಯಯನದಲ್ಲಿನ ಪಾಲ್ಗೊಳ್ಳುವಿಕೆಯಲ್ಲಿ ಯಾವುದೇ ಬಲವಂತವಿರುವುದಿಲ್ಲ.

ನಾವು ಕೇಳುವ ಪ್ರಶ್ನೆಗೆ ಉತ್ತರಿಸದಿರುವ ಹಾಗೂ ತಮ್ಮ ಕಾರ್ಯವೈಕರಿಯನ್ನು ಗಮನಿಸುವುದಕ್ಕು ಅನುಮತಿನೀಡದಿರುವ ಅಧಿಕಾರ ನಿಮಗಿರುತದೆ. ನಿಮ್ಮ ಗುರುತು ನಮ್ಮಲ್ಲಿ ಗೌಪ್ಯವಾಗಿರುತದೆ. ಈ ಅಧ್ಯಯನದ ಕೋಡ್ನನ್ನು ನಾವು ನಿಮ್ಮ ಬಳಿ ಹಂಚಿಕೊಳ್ಳುತ್ತೇವೆ. ಈ ಅಧ್ಯಯನದ ಮಾಹಿತಿಯನ್ನು ನಾವು ಪ್ರಕಟಿಸಿದ್ದಲ್ಲಿ ನಾವು ನಿಮ್ಮ ಹೆಸರನ್ನು ಎಲ್ಲೂ ಬಳಸುವುದಿಲ್ಲ.

ನಿಮ್ಮ ಈ ಅಧ್ಯಯನದಲ್ಲಿನ ಬಾಗವಹಿಸುವಿಕೆ, ನಿಮ್ಮ ಮತ್ತು ಆರೋಗ್ಯ ಕೇಂದ್ರದ ಸಂಬಂಧದ ಮೇಲೆ ಯಾವುದೇ ಪರಿಣಾಮ ಬೀರುವುದಿಲ್ಲ. ನೀವು ಈ ಅಧ್ಯಯನದ ವೇಳೆ ನೀಡಿದ ಮಾಹಿತಿಯನ್ನು ನಿಮ್ಮ ಆರೋಗ್ಯ ಕೇಂದ್ರದಲ್ಲಿನ ನಿಮ್ಮ ದಾಖಲೆಯೊಂದಿಗೆ ಇಡಲಾಗುವುದಿಲ್ಲ ಹಾಗೂ ಆರೋಗ್ಯ ಕೇಂದ್ರದೊಡನೆ ಹಂಚಿಕೊಳ್ಳಲಾಗುವುದಿಲ್ಲ.



ನಿಮ್ಮ ಗೌಪ್ಯತೆಯನ್ನು ಕಾಪಾಡುವ ಸಲುವಾಗಿ ನಾವು ತೆಗೆದುಕೊಂಡ ಛಾಯಾಚಿತ್ರಗಳಲ್ಲಿ ನಿಮ್ಮ ಮುಖಚೆಹರೆಯನ್ನು 12 ತಿಂಗಳ ಒಳಗೆ ಚಿತ್ತ ಪಡಿಸಲಾಗುವುದು.

ಈ ಬಗೆಯ ಅಧ್ಯಯನಗಳನ್ನು ಸರ್ಕಾರ ಹಾಗೂ ವಿಶ್ವವಿದ್ಯಾನಿಲಯ ಕೆಲವೊಮ್ಮೆ ಅದರ ರೀತಿ-ನೀತಿಗಳ ಕಾನೂನುಬದ್ಧತೆಯನ್ನು ವಿಶ್ಲೇಷಿಸಬಹುದು. ಈ ಅಧ್ಯಯನವು ಈ ರೀತಿಯ ವಿಶ್ಲೇಷಣೆಗೆ ಒಳಗದಲ್ಲಿ ವಿಮರ್ಶಕರು ನಿಮ್ಮ ಗೌಪ್ಯತೆಯನ್ನು ರಕ್ಷಿಸುತ್ತಾರೆ ಮತ್ತು ನೀವು ಕಾನೂನಿನ ಅಥವಾ ಇತರ ಹೊಣೆಗಾರಿಕೆಯಿಂದ ಮುಕ್ತರಾಗಿರುತ್ತೀರಿ.

________________	________________	________________
ಅಧ್ಯಯನ ಕಾರ್ಯನಿರ್ವಾಹಕರ ಹೆಸರು	ಸಹಿ	ದಿನಾಂಕ

ಭಾಗವಹಿಸುವವರ ಹೇಳಿಕೆ

ನಾನು ಈ ಅಧ್ಯಯನದ ರೀತಿ-ನೀತಿಗಳನ್ನು ತಿಳಿದಿರುತ್ತೇನೆ ಮತ್ತು ಸ್ವಯಂಪ್ರೇರಣೆಯಿಂದ ಈ ಅಧ್ಯಯನದಲ್ಲಿ ಭಾಗವಹಿಸುತ್ತಿದೇನೆ. ನಾನು ಕೇಳಿರುವ ಪ್ರಶ್ನೆಗಳನ್ನು ವ್ಯವಸ್ಥಾಪಕರು ಉತ್ತರಿಸಿರ್ತುತ್ತಾರೆ.

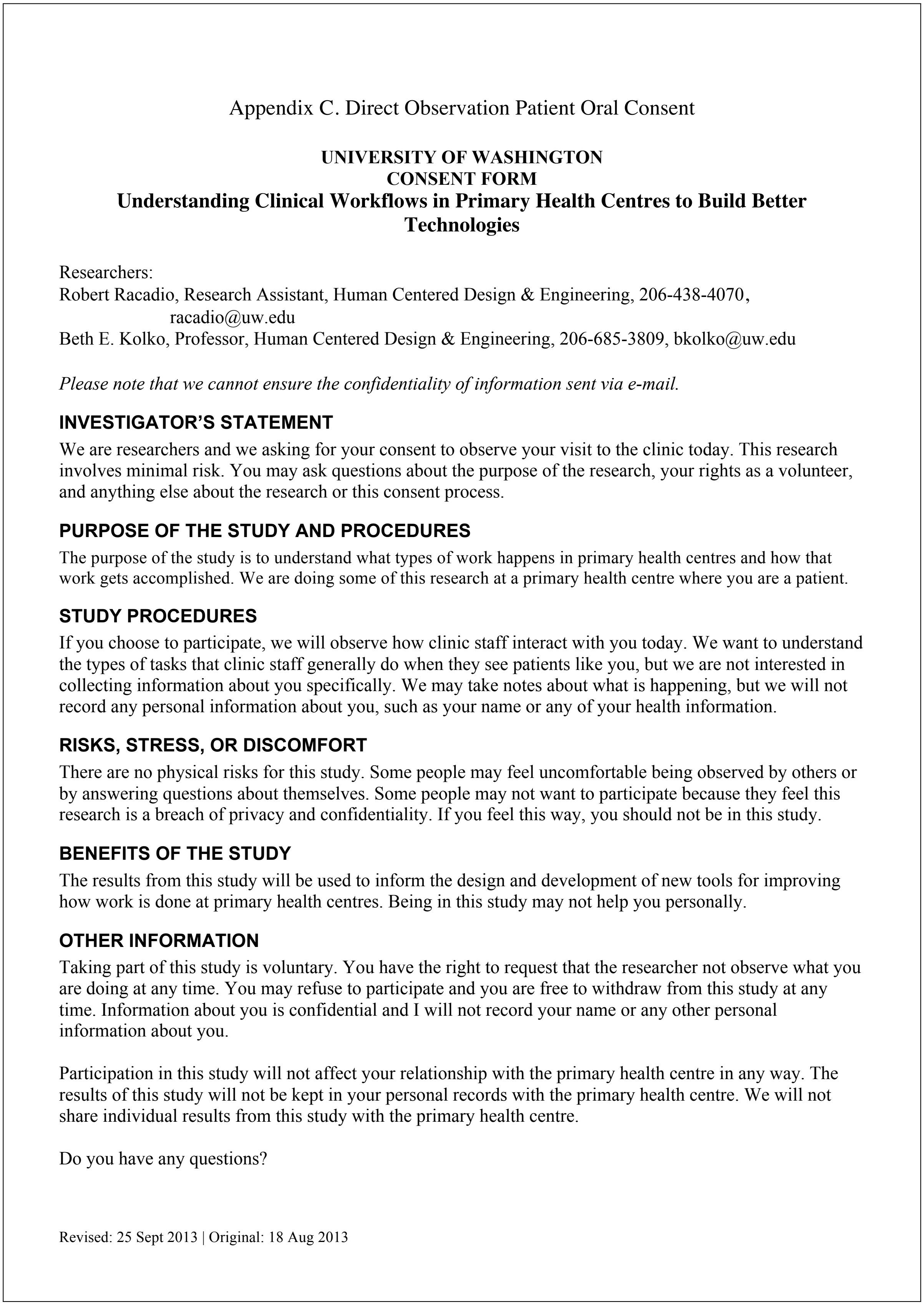
ನನಗೆ ಮುಂದಿನ ದಿನಗಳಲ್ಲಿ ಈ ಅಧ್ಯಯನದ ಬಗ್ಗೆ ಯಾವುದೇ ಪ್ರಶ್ನೆಗಳಿದಲ್ಲಿ ನಾನು ಮೇಲಿನ ಸಂಶೋಧಕರನ್ನು ಸಂಪರ್ಕಿಸಬಹುದಾಗಿದೆ. ನಾನು ಸಂಶೋಧನೆ ವಿಷಯವಾಗಿ ನನ್ನ ಹಕ್ಕುಗಳ ಬಗ್ಗೆ ಪ್ರಶ್ನೆಗಳಿದಲ್ಲಿ ನಾನು ಹ್ಯೂಮನ್ ಸಬ್ಜೆಕ್ಟ್ ಡಿವಿಷನ್ನನ್ನು ಸಂಪರ್ಕಿಸಬಹುದಾಗಿದೆ - ದೂರವಾಣಿ ಸಂಖೆ +1 (206) 543-0098 / +91 080 66586000.

ನನಗೆ ಈ ಒಪ್ಪಿಗೆ ಪಾತ್ರದ ಒಂದು ಪ್ರತಿಯನ್ನು ಒದಗಿಸಲಾಗಿದೆ.

________________	________________	________________
ಭಾಗವಿಸುವವರ ಹೆಸರು	ಸಹಿ	ದಿನಾಂಕ

Appendix C

CLINIC WORKFLOW DIRECT OBSERVATION PATIENT INFORMATION STATEMENT - ENGLISH AND KANNADA



Appendix C. Direct Observation Patient Oral Consent

UNIVERSITY OF WASHINGTON
CONSENT FORM

Understanding Clinical Workflows in Primary Health Centres to Build Better Technologies

Researchers:
Robert Racadio, Research Assistant, Human Centered Design & Engineering, 206-438-4070, racadio@uw.edu
Beth E. Kolko, Professor, Human Centered Design & Engineering, 206-685-3809, bkolko@uw.edu

Please note that we cannot ensure the confidentiality of information sent via e-mail.

INVESTIGATOR'S STATEMENT

We are researchers and we asking for your consent to observe your visit to the clinic today. This research involves minimal risk. You may ask questions about the purpose of the research, your rights as a volunteer, and anything else about the research or this consent process.

PURPOSE OF THE STUDY AND PROCEDURES

The purpose of the study is to understand what types of work happens in primary health centres and how that work gets accomplished. We are doing some of this research at a primary health centre where you are a patient.

STUDY PROCEDURES

If you choose to participate, we will observe how clinic staff interact with you today. We want to understand the types of tasks that clinic staff generally do when they see patients like you, but we are not interested in collecting information about you specifically. We may take notes about what is happening, but we will not record any personal information about you, such as your name or any of your health information.

RISKS, STRESS, OR DISCOMFORT

There are no physical risks for this study. Some people may feel uncomfortable being observed by others or by answering questions about themselves. Some people may not want to participate because they feel this research is a breach of privacy and confidentiality. If you feel this way, you should not be in this study.

BENEFITS OF THE STUDY

The results from this study will be used to inform the design and development of new tools for improving how work is done at primary health centres. Being in this study may not help you personally.

OTHER INFORMATION

Taking part of this study is voluntary. You have the right to request that the researcher not observe what you are doing at any time. You may refuse to participate and you are free to withdraw from this study at any time. Information about you is confidential and I will not record your name or any other personal information about you.

Participation in this study will not affect your relationship with the primary health centre in any way. The results of this study will not be kept in your personal records with the primary health centre. We will not share individual results from this study with the primary health centre.

Do you have any questions?

Revised: 25 Sept 2013 | Original: 18 Aug 2013

CONFIRMATION OF VERBAL CONSENT

Please tell me if you choose to be in this study or not. I will mark my choice below. Please make sure you have asked any questions you want to ask before you make your choice.

If you have any questions about the research, you can contact the researchers who are listed at the beginning of this document.

If you have questions about your rights as a research subject, you can call the Human Subjects Division at (206) 543-0098. You will receive a copy of this consent form.

Do you agree to be in this research study?

☐ Yes
☐ No

RESEARCH TEAM MEMBER CONFIRMATION

Signing my name below means I have explained this research study to you and answered your questions to the best of my ability.

Printed name of study staff obtaining consent	Signature	Date

ಅನುಬಂಧ - C ಪ್ರಾರ್ಥಮಿಕ ಆರೋಗ್ಯ ಕೇಂದ್ರದ ರೋಗಿಯ ನೇರ ವೀಕ್ಷಣೆಗೆ ಮೌಖಿಕ ಸಮ್ಮತಿ

ವಾಶಿಂಗ್ಟನ್ ವಿಶ್ವವಿದ್ಯಾನಿಲಯ

ಒಪ್ಪಿಗೆ ಪತ್ರ

ಪ್ರಾರ್ಥಮಿಕ ಆರೋಗ್ಯ ಕೇಂದ್ರಗಳ ಕಾರ್ಯನಿರ್ವಾಹಣೆಗೆ ಉತ್ತಮ ತಂತ್ರಜ್ಞಾನವನ್ನು ಒದಗಿಸುವ ಬಗ್ಗೆ

ಸಂಶೋಧಕರು

ರಾಬರ್ಟ್ ರಾಖೇಧಿಯೂ, ಸಂಶೋಧನಾ ಸಹಾಯಕರು, ಮಾನವ ಕೇಂದ್ರಿತ ವಿನ್ಯಾಸ ಹಾಗೂ ತಂತ್ರಜ್ಞಾನ, 206-438-4070, racadio@uw.edu

ಬೆತ್ ಕೋಳ್ಕೋ, ಪ್ರಾಧ್ಯಾಪಕರು, ಮಾನವ ಕೇಂದ್ರಿತ ವಿನ್ಯಾಸ ಹಾಗೂ ತಂತ್ರಜ್ಞಾನ, 206-685-3809, bkolko@uw.edu

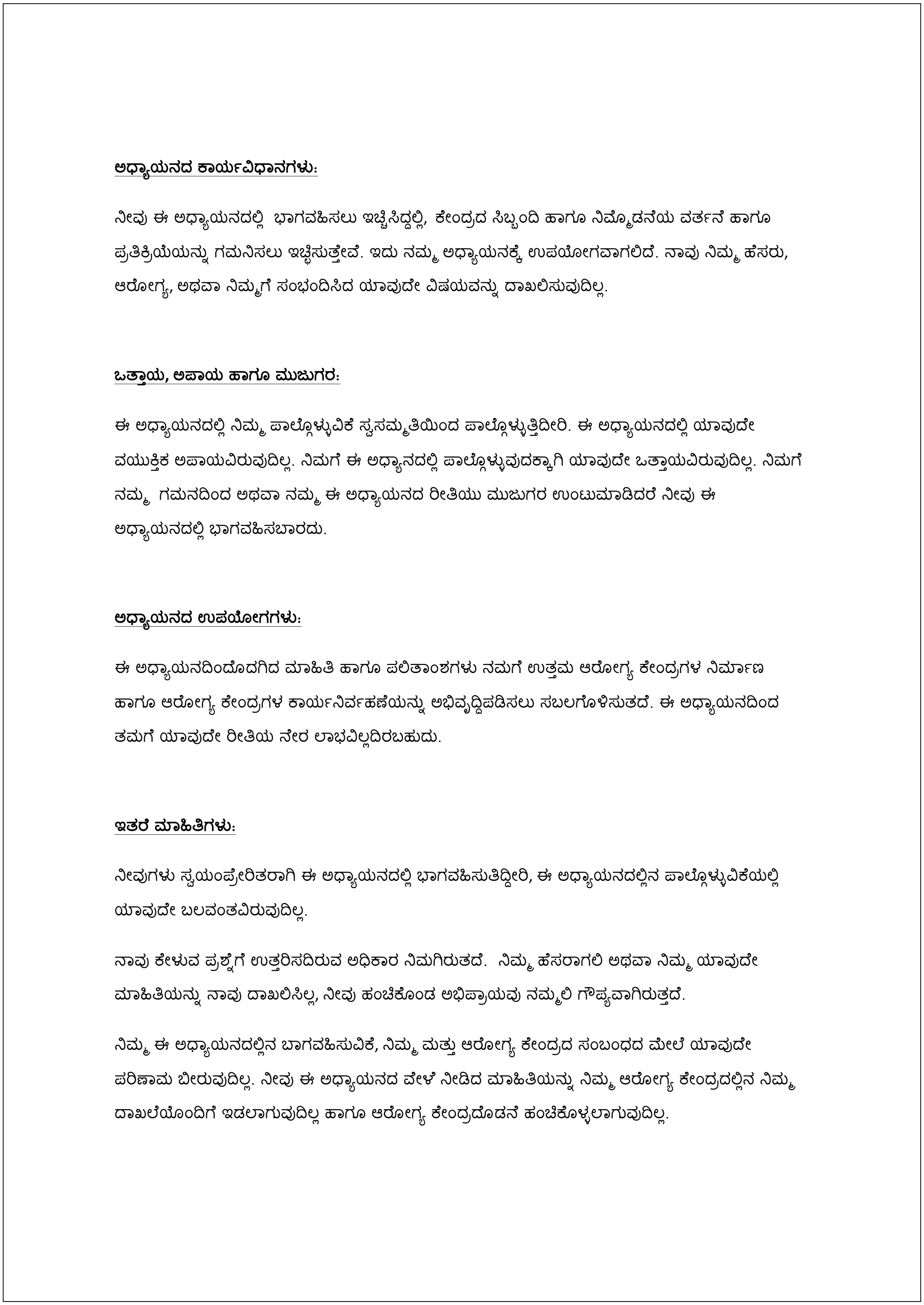
ಸೂಚನೆ: ನಾವು ಇ-ಮೈಲ್ ಮೂಲಕ ನಡೆಯುವ ಸಂವಾದದ ಗೌಪ್ಯತೆಯ ಖಾತ್ರಿ ನೀಡಲಾಗುವುದಿಲ್ಲ.

ವಿಚಾರಕರ ಹೇಳಿಕೆ

ನೀವು ಈ ಸಂಶೋಧನಾ ಅಧ್ಯಾಯನದಲ್ಲಿ ಭಾಗವಹಿಸುವರೆಂದು ನಾವುಗಳು ಬಯಸುತ್ತೇವೆ. ಈ ಸಂಶೋಧನಾ ಅಧ್ಯಾಯನದಲ್ಲಿ ತಮ್ಮ ಪಾಲ್ಗೊಳ್ಳುವಿಕೆಯ ಬಗ್ಗೆ ಈ ಪತ್ರವು ಹೆಚ್ಚಿನ ಮಾಹಿತಿ ನೀಡುತದೆ. ಈ ಅಧ್ಯಾಯನದ ಉದ್ದೇಶ, ರೀತಿ-ನೀತಿಗಳು, ಲಾಭ-ನಷ್ಟಗಳು ಹಾಗೂ ಅಧ್ಯಾಯನದಲ್ಲಿನ ನಿಮ್ಮ ಪಾಲ್ಗೊಳ್ಳುವಿಕೆಯ ಬಗ್ಗೆ ತಮಗೆ ಯಾವುದೇ ಪ್ರಶ್ನೆ ಅಥವಾ ಸ್ಪಷ್ಟೀಕರಣ ಬೇಕಿದ್ದಲ್ಲಿ ನಮಗೆ ನಿಸಂಕೋಚವಾಗಿ ಕೇಳಿರಿ. ತಾವುಗಳು ಈ ಸಂಶೋಧನೆಯಲ್ಲಿ ತಮ್ಮ ಸ್ವಸಮ್ಮತಿಯಿಂದ ಭಾಗವಹಿಸುತ್ತಿದ್ದೀರಿ. ನೀವು ಈ ಸಂಶೋಧನೆಯಲ್ಲಿ ಭಾಗವಹಿಸಲು ಇಚ್ಛೆಯಿಲ್ಲದಲ್ಲಿ ಯಾವುದೇ ಒತ್ತಾಯವಿರುವುದಿಲ್ಲ. ಇದನ್ನು "ಮಾಹಿತಿಯುಕ್ತ ಸಮ್ಮತಿ" ಎಂದು ಕರೆಯುತ್ತಾರೆ.

ಅಧ್ಯಾಯನದ ಉದ್ದೇಶ:

ಪ್ರಾರ್ಥಮಿಕ ಆರೋಗ್ಯ ಕೇಂದ್ರಗಳ ಕಾರ್ಯನಿರ್ವಾಹಣೆ ಹಾಗೂ ಅದರ ರೀತಿ-ನೀತಿಗಳ ಬಗ್ಗೆ ತಿಳಿದುಕೊಳ್ಳುವುದು.



ಅಧ್ಯಾಯನದ ಕಾರ್ಯವಿಧಾನಗಳು:

ನೀವು ಈ ಅಧ್ಯಾಯನದಲ್ಲಿ ಭಾಗವಹಿಸಲು ಇಚ್ಚಿಸಿದ್ದಲ್ಲಿ, ಕೇಂದ್ರದ ಸಿಬ್ಬಂದಿ ಹಾಗೂ ನಿಮ್ಮೊಡನೆಯ ವರ್ತನೆ ಹಾಗೂ ಪ್ರತಿಕ್ರಿಯೆಯನ್ನು ಗಮನಿಸಲು ಇಚ್ಛಿಸುತ್ತೇವೆ. ಇದು ನಮ್ಮ ಅಧ್ಯಾಯನಕ್ಕೆ ಉಪಯೋಗವಾಗಲಿದೆ. ನಾವು ನಿಮ್ಮ ಹೆಸರು, ಆರೋಗ್ಯ, ಅಥವಾ ನಿಮ್ಮಗೆ ಸಂಭಂದಿಸಿದ ಯಾವುದೇ ವಿಷಯವನ್ನು ದಾಖಲಿಸುವುದಿಲ್ಲ.

ಒತ್ತಾಯ, ಅಪಾಯ ಹಾಗೂ ಮುಜುಗರ:

ಈ ಅಧ್ಯಾಯನದಲ್ಲಿ ನಿಮ್ಮ ಪಾಲ್ಗೊಳ್ಳುವಿಕೆ ಸ್ವಸಮ್ಮತಿಯಿಂದ ಪಾಲ್ಗೊಳ್ಳುತ್ತಿದೀರಿ. ಈ ಅಧ್ಯಾಯನದಲ್ಲಿ ಯಾವುದೇ ವಯುಕ್ತಿಕ ಅಪಾಯವಿರುವುದಿಲ್ಲ. ನಿಮಗೆ ಈ ಅಧ್ಯಾನದಲ್ಲಿ ಪಾಲ್ಗೊಳ್ಳುವುದಕ್ಕಾಗಿ ಯಾವುದೇ ಒತ್ತಾಯವಿರುವುದಿಲ್ಲ. ನಿಮಗೆ ನಮ್ಮ ಗಮನದಿಂದ ಅಥವಾ ನಮ್ಮ ಈ ಅಧ್ಯಾಯನದ ರೀತಿಯು ಮುಜುಗರ ಉಂಟುಮಾಡಿದರೆ ನೀವು ಈ ಅಧ್ಯಾಯನದಲ್ಲಿ ಭಾಗವಹಿಸಬಾರದು.

ಅಧ್ಯಾಯನದ ಉಪಯೋಗಗಳು:

ಈ ಅಧ್ಯಾಯನದಿಂದೊದಗಿದ ಮಾಹಿತಿ ಹಾಗೂ ಪಲಿತಾಂಶಗಳು ನಮಗೆ ಉತ್ತಮ ಆರೋಗ್ಯ ಕೇಂದ್ರಗಳ ನಿರ್ಮಾಣ ಹಾಗೂ ಆರೋಗ್ಯ ಕೇಂದ್ರಗಳ ಕಾರ್ಯನಿರ್ವಹಣೆಯನ್ನು ಅಭಿವೃದ್ದಿಪಡಿಸಲು ಸಬಲಗೊಳಿಸುತದೆ. ಈ ಅಧ್ಯಾಯನದಿಂದ ತಮಗೆ ಯಾವುದೇ ರೀತಿಯ ನೇರ ಲಾಭವಿಲ್ಲದಿರಬಹುದು.

ಇತರೆ ಮಾಹಿತಿಗಳು:

ನೀವುಗಳು ಸ್ವಯಂಪ್ರೇರಿತರಾಗಿ ಈ ಅಧ್ಯಾಯನದಲ್ಲಿ ಭಾಗವಹಿಸುತಿದ್ದೀರಿ, ಈ ಅಧ್ಯಾಯನದಲ್ಲಿನ ಪಾಲ್ಗೊಳ್ಳುವಿಕೆಯಲ್ಲಿ ಯಾವುದೇ ಬಲವಂತವಿರುವುದಿಲ್ಲ.

ನಾವು ಕೇಳುವ ಪ್ರಶ್ನೆಗೆ ಉತ್ತರಿಸದಿರುವ ಅಧಿಕಾರ ನಿಮಗಿರುತದೆ. ನಿಮ್ಮ ಹೆಸರಾಗಲಿ ಅಥವಾ ನಿಮ್ಮ ಯಾವುದೇ ಮಾಹಿತಿಯನ್ನು ನಾವು ದಾಖಲಿಸಿಲ್ಲ, ನೀವು ಹಂಚಿಕೊಂಡ ಅಭಿಪ್ರಾಯವು ನಮ್ಮಲಿ ಗೌಪ್ಯವಾಗಿರುತ್ತದೆ.

ನಿಮ್ಮ ಈ ಅಧ್ಯಾಯನದಲ್ಲಿನ ಬಾಗವಹಿಸುವಿಕೆ, ನಿಮ್ಮ ಮತ್ತು ಆರೋಗ್ಯ ಕೇಂದ್ರದ ಸಂಬಂಧದ ಮೇಲೆ ಯಾವುದೇ ಪರಿಣಾಮ ಬೀರುವುದಿಲ್ಲ. ನೀವು ಈ ಅಧ್ಯಾಯನದ ವೇಳೆ ನೀಡಿದ ಮಾಹಿತಿಯನ್ನು ನಿಮ್ಮ ಆರೋಗ್ಯ ಕೇಂದ್ರದಲ್ಲಿನ ನಿಮ್ಮ ದಾಖಲೆಯೊಂದಿಗೆ ಇಡಲಾಗುವುದಿಲ್ಲ ಹಾಗೂ ಆರೋಗ್ಯ ಕೇಂದ್ರದೊಡನೆ ಹಂಚಿಕೊಳ್ಳಲಾಗುವುದಿಲ್ಲ.

ಮೌಖಿಕ ಒಪ್ಪಿಗೆ ಧೃಢೀಕರಣ:

ದಯವಿಟ್ಟು ನೀವು ಈ ಅಧ್ಯಾಯನದಲ್ಲಿ ಪಾಲ್ಗೊಳ್ಳಲು ಇಚ್ಛಿಸುವಿರಾ? ಎಂದು ನಮಗೆ ತಿಳಿಸಿ. ನಿಮಗೆ ಅಧ್ಯಾಯನದ ಸಂಬಂಧದ ಯಾವುದೇ ಪ್ರಶ್ನೆ ಇದ್ದಲ್ಲಿ ಕೇಳಿ.

ಪಾಲ್ಗೊಳ್ಳಲು ಇಚ್ಛಿಸುವಿರಾ?

ಹೌದು ☐

ಇಲ್ಲ ☐

ನಿಮಗೆ ಮುಂದಿನ ದಿನಗಳಲ್ಲಿ ಈ ಅಧ್ಯಾಯನದ ಬಗ್ಗೆ ಯಾವುದೇ ಪ್ರಶ್ನೆಗಳಿದಲ್ಲಿ ನಾನು ಮೇಲಿನ ಸಂಶೋಧಕರನ್ನು ಸಂಪರ್ಕಿಸಬಹುದಾಗಿದೆ. ನಾನು ಸಂಶೋಧನೆ ವಿಷಯವಾಗಿ ನನ್ನ ಹಕ್ಕುಗಳ ಬಗ್ಗೆ ಪ್ರಶ್ನೆಗಳಿದಲ್ಲಿ ನಾನು ಹ್ಯೂಮನ್ ಸಬ್ಜೆಕ್ಟ್ ಡಿವಿಷನ್ನನ್ನು ಸಂಪರ್ಕಿಸಬಹುದಾಗಿದೆ - ದೂರವಾಣಿ ಸಂಖೆ +1 (206) 543-0098 / +91 080 66586000..

ಸಂಶೋಧನಾ ತಂಡದ ಸದಸ್ಯರ ಧೃಢೀಕರಣ

ನಾನು ಈ ವ್ಯಕ್ತಿಗೆ ಅಧ್ಯಾಯನದ ಬಗ್ಗೆ ನನ್ನ ತಿಳುವಳಿಕೆ ಮೇರೆಗೆ ಅಗತ್ಯ ಮಾಹಿತಿಯನ್ನು ನೀಡ್ಡಿದೆನೆ ಎಂದು ಧೃಢೀಕರಿಸುತ್ತೇನೆ.

______________________	______________________	______________________
ಸಂಶೋಧಕ ಸಿಬ್ಬಂದಿ ಹೆಸರು	ಸಹಿ	ದಿನಾಂಕ

Appendix D

CLINIC STAFF INTERVIEW CONSENT FORM - ENGLISH AND KANNADA

Appendix D. Clinic Staff Interview Consent

UNIVERSITY OF WASHINGTON
CONSENT FORM

Understanding Clinical Workflows in Primary Health Centres to Build Better Technologies

Researchers:
Robert Racadio, Research Assistant, Human Centered Design & Engineering, 206-438-4070, racadio@uw.edu
Beth E. Kolko, Professor, Human Centered Design & Engineering, 206-685-3809, bkolko@uw.edu

Please note that we cannot ensure the confidentiality of information sent via e-mail.

INVESTIGATOR'S STATEMENT

We are asking you to be in a research study. The purpose of this consent form is to give you the information you will need to help you decide whether to be in the study. Please read the form carefully. You may ask questions about the purpose of the research, what we would ask you to do, the possible risks and benefits, your rights as a volunteer, and anything else about the research or this form that is not clear. When all your questions have been answered, you can decide if you want to be in the study or not. This process is called "informed consent."

PURPOSE OF THE STUDY

The purpose of the study is to understand what types of work happens in primary health centres and how that work gets accomplished.

STUDY PROCEDURES

If you choose to participate, we will ask you some questions about your daily tasks and work at the health centre. For example, we may ask you to describe some of the tasks that you did today.

This interview should take about an hour of time. Additionally, with your permission, we would like to audio record our session today.

RISKS, STRESS, OR DISCOMFORT

There are no physical risks for this study. Some people may feel uncomfortable answering questions about themselves. Some people may not want to participate because they feel this research is a breach of privacy and confidentiality. If you feel this way, you should not be in this study. We have addressed concerns about your privacy in the OTHER INFORMATION section of this consent form.

BENEFITS OF THE STUDY

The results from this study will be used to inform the design and development of new tools for improving workflows at primary health centres. You might not directly benefit from this study.

OTHER INFORMATION

Taking part of this study is voluntary. You have the right to refuse to answer any questions. You may refuse to participate and you are free to withdraw from this study at any time. Information about you is confidential. We will assign a study code that will be linked to your study data. We will not directly link your name to the study data. If we publish the results of this study, we will not use your name.

Participation in this study will not affect your relationship with the primary health centre.

If you consent to being recorded, you will be permitted to review the recording and request any portions that you desire to be erased. The recording will be stored electronically in an encrypted file. The recording will be analyzed and destroyed within 12 months of this interview.

Participation in this study will not affect your relationship with the primary health centre in any way. The results of this study will not be kept in your personnel records with the primary health centre. We will not share individual results from this study with the primary health centre.

Government or university staff sometimes reviews studies such as this one to make sure they are being done safely and legally. If a review of this study takes place, your records may be examined. The reviewers will protect your privacy. The study records will not be used to put you at legal risk or harm.

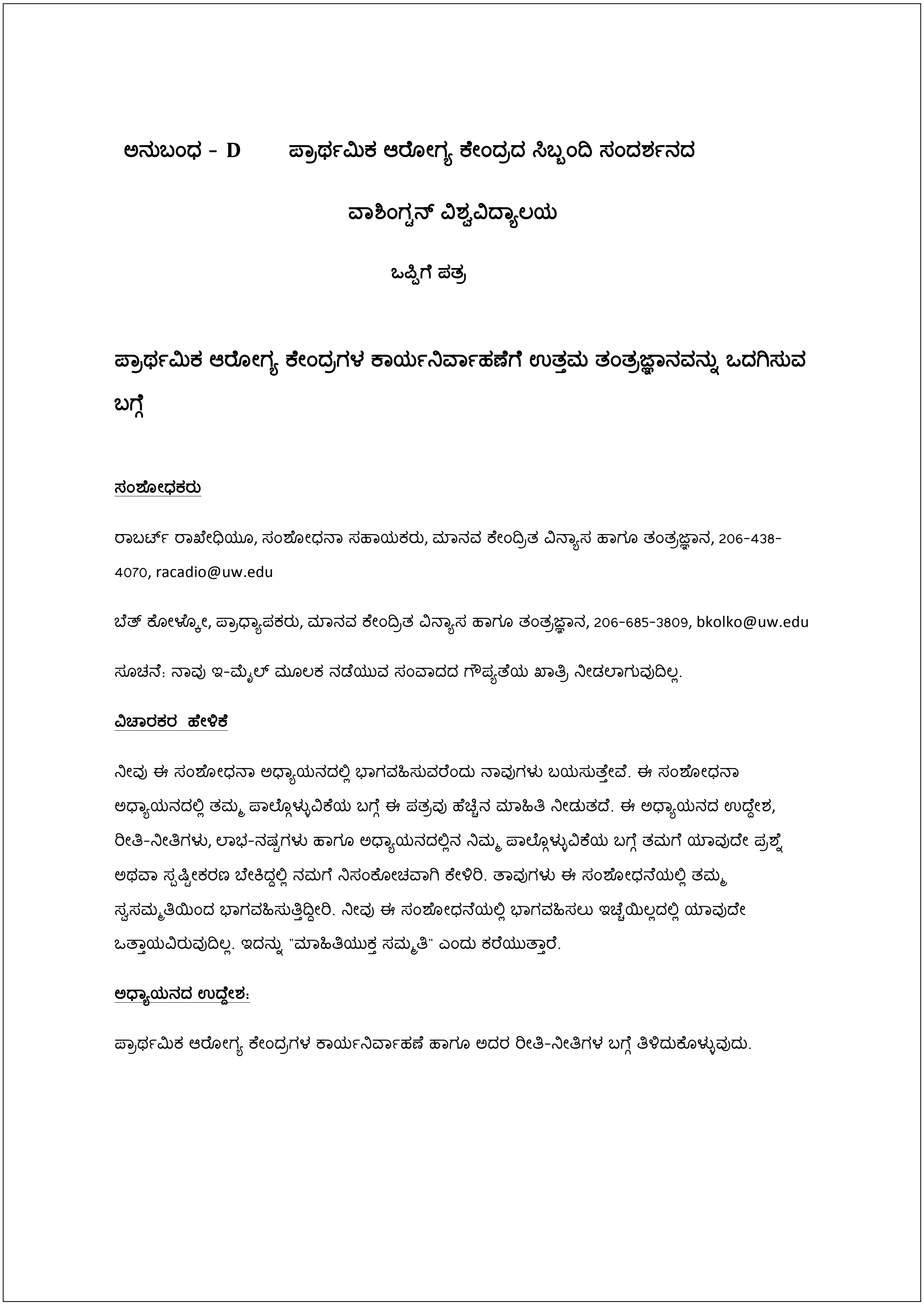
Printed name of study staff obtaining consent	Signature	Date

Participant's statement

This study has been explained to me. I volunteer to take part in this research. I have had a chance to ask questions. If I have questions later about the research, I can ask one of the researchers listed above. If I have questions about my rights as a research subject, I can call the Human Subjects Division at (206) 543-0098. I will receive a copy of this consent form.

I agree to be audio recorded:
- ☐ Yes
- ☐ No

Printed name of participant	Signature of participant	Date



ಅನುಬಂಧ - D ಪ್ರಾರ್ಥಮಿಕ ಆರೋಗ್ಯ ಕೇಂದ್ರದ ಸಿಬ್ಬಂದಿ ಸಂದರ್ಶನದ

ವಾಶಿಂಗ್ಟನ್ ವಿಶ್ವವಿದ್ಯಾಲಯ

ಒಪ್ಪಿಗೆ ಪತ್ರ

ಪ್ರಾರ್ಥಮಿಕ ಆರೋಗ್ಯ ಕೇಂದ್ರಗಳ ಕಾರ್ಯನಿರ್ವಾಹಣೆಗೆ ಉತ್ತಮ ತಂತ್ರಜ್ಞಾನವನ್ನು ಒದಗಿಸುವ ಬಗ್ಗೆ

ಸಂಶೋಧಕರು

ರಾಬರ್ಟ್ ರಾಖೇಧಿಯೂ, ಸಂಶೋಧನಾ ಸಹಾಯಕರು, ಮಾನವ ಕೇಂದ್ರಿತ ವಿನ್ಯಾಸ ಹಾಗೂ ತಂತ್ರಜ್ಞಾನ, 206-438-4070, racadio@uw.edu

ಬೆತ್ ಕೋಳ್ಕೋ, ಪ್ರಾಧ್ಯಾಪಕರು, ಮಾನವ ಕೇಂದ್ರಿತ ವಿನ್ಯಾಸ ಹಾಗೂ ತಂತ್ರಜ್ಞಾನ, 206-685-3809, bkolko@uw.edu

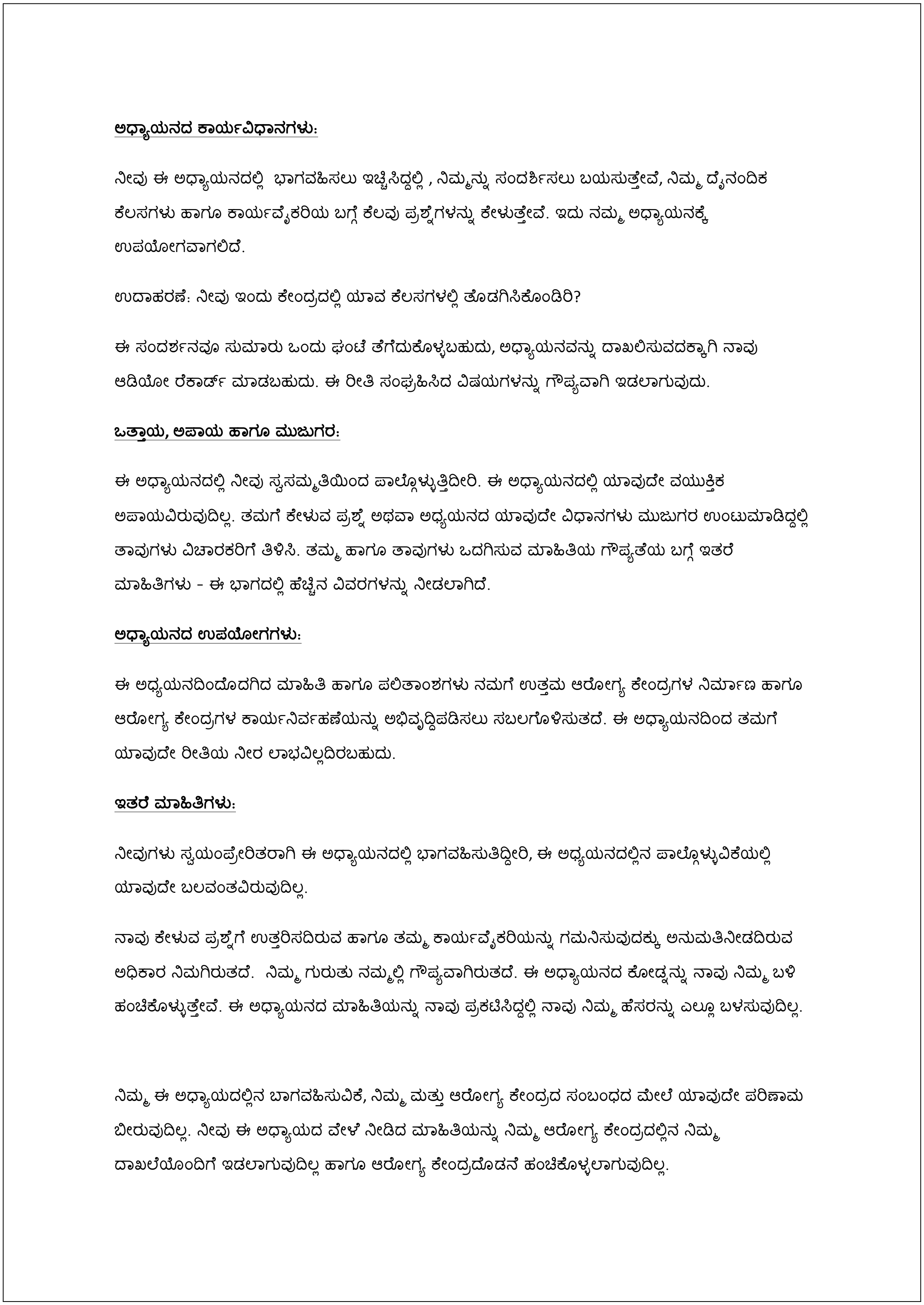
ಸೂಚನೆ: ನಾವು ಇ-ಮೈಲ್ ಮೂಲಕ ನಡೆಯುವ ಸಂವಾದದ ಗೌಪ್ಯತೆಯ ಖಾತ್ರಿ ನೀಡಲಾಗುವುದಿಲ್ಲ.

ವಿಚಾರಕರ ಹೇಳಿಕೆ

ನೀವು ಈ ಸಂಶೋಧನಾ ಅಧ್ಯಾಯನದಲ್ಲಿ ಭಾಗವಹಿಸುವರೆಂದು ನಾವುಗಳು ಬಯಸುತ್ತೇವೆ. ಈ ಸಂಶೋಧನಾ ಅಧ್ಯಾಯನದಲ್ಲಿ ತಮ್ಮ ಪಾಲ್ಗೊಳ್ಳುವಿಕೆಯ ಬಗ್ಗೆ ಈ ಪತ್ರವು ಹೆಚ್ಚಿನ ಮಾಹಿತಿ ನೀಡುತದೆ. ಈ ಅಧ್ಯಾಯನದ ಉದ್ದೇಶ, ರೀತಿ-ನೀತಿಗಳು, ಲಾಭ-ನಷ್ಟಗಳು ಹಾಗೂ ಅಧ್ಯಾಯನದಲ್ಲಿನ ನಿಮ್ಮ ಪಾಲ್ಗೊಳ್ಳುವಿಕೆಯ ಬಗ್ಗೆ ತಮಗೆ ಯಾವುದೇ ಪ್ರಶ್ನೆ ಅಥವಾ ಸ್ಪಷ್ಟೀಕರಣ ಬೇಕಿದ್ದಲ್ಲಿ ನಮಗೆ ನಿಸಂಕೋಚವಾಗಿ ಕೇಳಿರಿ. ತಾವುಗಳು ಈ ಸಂಶೋಧನೆಯಲ್ಲಿ ತಮ್ಮ ಸ್ವಸಮ್ಮತಿಯಿಂದ ಭಾಗವಹಿಸುತ್ತಿದ್ದೀರಿ. ನೀವು ಈ ಸಂಶೋಧನೆಯಲ್ಲಿ ಭಾಗವಹಿಸಲು ಇಚ್ಛೆಯಿಲ್ಲದಲ್ಲಿ ಯಾವುದೇ ಒತ್ತಾಯವಿರುವುದಿಲ್ಲ. ಇದನ್ನು "ಮಾಹಿತಿಯುಕ್ತ ಸಮ್ಮತಿ" ಎಂದು ಕರೆಯುತ್ತಾರೆ.

ಅಧ್ಯಾಯನದ ಉದ್ದೇಶ:

ಪ್ರಾರ್ಥಮಿಕ ಆರೋಗ್ಯ ಕೇಂದ್ರಗಳ ಕಾರ್ಯನಿರ್ವಾಹಣೆ ಹಾಗೂ ಅದರ ರೀತಿ-ನೀತಿಗಳ ಬಗ್ಗೆ ತಿಳಿದುಕೊಳ್ಳುವುದು.



ಅಧ್ಯಾಯನದ ಕಾರ್ಯವಿಧಾನಗಳು:

ನೀವು ಈ ಅಧ್ಯಾಯನದಲ್ಲಿ ಭಾಗವಹಿಸಲು ಇಚ್ಚಿಸಿದ್ದಲ್ಲಿ , ನಿಮ್ಮನ್ನು ಸಂದರ್ಶಿಸಲು ಬಯಸುತ್ತೇವೆ, ನಿಮ್ಮ ದೈನಂದಿಕ ಕೆಲಸಗಳು ಹಾಗೂ ಕಾರ್ಯವೈಕರಿಯ ಬಗ್ಗೆ ಕೆಲವು ಪ್ರಶ್ನೆಗಳನ್ನು ಕೇಳುತ್ತೇವೆ. ಇದು ನಮ್ಮ ಅಧ್ಯಾಯನಕ್ಕೆ ಉಪಯೋಗವಾಗಲಿದೆ.

ಉದಾಹರಣೆ: ನೀವು ಇಂದು ಕೇಂದ್ರದಲ್ಲಿ ಯಾವ ಕೆಲಸಗಳಲ್ಲಿ ತೊಡಗಿಸಿಕೊಂಡಿರಿ?

ಈ ಸಂದರ್ಶನವೂ ಸುಮಾರು ಒಂದು ಘಂಟೆ ತೆಗೆದುಕೊಳ್ಳಬಹುದು, ಅಧ್ಯಾಯನವನ್ನು ದಾಖಲಿಸುವದಕ್ಕಾಗಿ ನಾವು ಆಡಿಯೋ ರೆಕಾರ್ಡ್ ಮಾಡಬಹುದು. ಈ ರೀತಿ ಸಂಘ್ರಹಿಸಿದ ವಿಷಯಗಳನ್ನು ಗೌಪ್ಯವಾಗಿ ಇಡಲಾಗುವುದು.

ಒತ್ತಾಯ, ಅಪಾಯ ಹಾಗೂ ಮುಜುಗರ:

ಈ ಅಧ್ಯಾಯನದಲ್ಲಿ ನೀವು ಸ್ವಸಮ್ಮತಿಯಿಂದ ಪಾಲ್ಗೊಳ್ಳುತ್ತಿದೀರಿ. ಈ ಅಧ್ಯಾಯನದಲ್ಲಿ ಯಾವುದೇ ವಯುಕ್ತಿಕ ಅಪಾಯವಿರುವುದಿಲ್ಲ. ತಮಗೆ ಕೇಳುವ ಪ್ರಶ್ನೆ ಅಥವಾ ಅಧ್ಯಯನದ ಯಾವುದೇ ವಿಧಾನಗಳು ಮುಜುಗರ ಉಂಟುಮಾಡಿದ್ದಲ್ಲಿ ತಾವುಗಳು ವಿಚಾರಕರಿಗೆ ತಿಳಿಸಿ. ತಮ್ಮ ಹಾಗೂ ತಾವುಗಳು ಒದಗಿಸುವ ಮಾಹಿತಿಯ ಗೌಪ್ಯತೆಯ ಬಗ್ಗೆ ಇತರೆ ಮಾಹಿತಿಗಳು - ಈ ಭಾಗದಲ್ಲಿ ಹೆಚ್ಚಿನ ವಿವರಗಳನ್ನು ನೀಡಲಾಗಿದೆ.

ಅಧ್ಯಾಯನದ ಉಪಯೋಗಗಳು:

ಈ ಅಧ್ಯಯನದಿಂದೊದಗಿದ ಮಾಹಿತಿ ಹಾಗೂ ಪಲಿತಾಂಶಗಳು ನಮಗೆ ಉತ್ತಮ ಆರೋಗ್ಯ ಕೇಂದ್ರಗಳ ನಿರ್ಮಾಣ ಹಾಗೂ ಆರೋಗ್ಯ ಕೇಂದ್ರಗಳ ಕಾರ್ಯನಿರ್ವಹಣೆಯನ್ನು ಅಭಿವೃದ್ಧಿಪಡಿಸಲು ಸಬಲಗೊಳಿಸುತದೆ. ಈ ಅಧ್ಯಾಯನದಿಂದ ತಮಗೆ ಯಾವುದೇ ರೀತಿಯ ನೀರ ಲಾಭವಿಲ್ಲದಿರಬಹುದು.

ಇತರೆ ಮಾಹಿತಿಗಳು:

ನೀವುಗಳು ಸ್ವಯಂಪ್ರೇರಿತರಾಗಿ ಈ ಅಧ್ಯಾಯನದಲ್ಲಿ ಭಾಗವಹಿಸುತಿದ್ದೀರಿ, ಈ ಅಧ್ಯಯನದಲ್ಲಿನ ಪಾಲ್ಗೊಳ್ಳುವಿಕೆಯಲ್ಲಿ ಯಾವುದೇ ಬಲವಂತವಿರುವುದಿಲ್ಲ.

ನಾವು ಕೇಳುವ ಪ್ರಶ್ನೆಗೆ ಉತ್ತರಿಸದಿರುವ ಹಾಗೂ ತಮ್ಮ ಕಾರ್ಯವೈಕರಿಯನ್ನು ಗಮನಿಸುವುದಕ್ಕು ಅನುಮತಿನೀಡದಿರುವ ಅಧಿಕಾರ ನಿಮಗಿರುತದೆ. ನಿಮ್ಮ ಗುರುತು ನಮ್ಮಲ್ಲಿ ಗೌಪ್ಯವಾಗಿರುತದೆ. ಈ ಅಧ್ಯಾಯನದ ಕೋಡ್ನನ್ನು ನಾವು ನಿಮ್ಮ ಬಳಿ ಹಂಚಿಕೊಳ್ಳುತ್ತೇವೆ. ಈ ಅಧ್ಯಾಯನದ ಮಾಹಿತಿಯನ್ನು ನಾವು ಪ್ರಕಟಿಸಿದ್ದಲ್ಲಿ ನಾವು ನಿಮ್ಮ ಹೆಸರನ್ನು ಎಲ್ಲೂ ಬಳಸುವುದಿಲ್ಲ.

ನಿಮ್ಮ ಈ ಅಧ್ಯಾಯದಲ್ಲಿನ ಬಾಗವಹಿಸುವಿಕೆ, ನಿಮ್ಮ ಮತ್ತು ಆರೋಗ್ಯ ಕೇಂದ್ರದ ಸಂಬಂಧದ ಮೇಲೆ ಯಾವುದೇ ಪರಿಣಾಮ ಬೀರುವುದಿಲ್ಲ. ನೀವು ಈ ಅಧ್ಯಾಯದ ವೇಳೆ ನೀಡಿದ ಮಾಹಿತಿಯನ್ನು ನಿಮ್ಮ ಆರೋಗ್ಯ ಕೇಂದ್ರದಲ್ಲಿನ ನಿಮ್ಮ ದಾಖಲೆಯೊಂದಿಗೆ ಇಡಲಾಗುವುದಿಲ್ಲ ಹಾಗೂ ಆರೋಗ್ಯ ಕೇಂದ್ರದೊಡನೆ ಹಂಚಿಕೊಳ್ಳಲಾಗುವುದಿಲ್ಲ.

ನೀವು ಆಡಿಯೋ ರೆಕಾರ್ಡ್ಗೆ ಸಮ್ಮತಿಸಿದ್ದಲ್ಲಿ, ನೀವು ಈ ರೆಕಾರ್ಡ್ನ್ನು ವಿಮರ್ಶಿಸಲು ಹಾಗೂ ತೃಪ್ತಿಯಿಲ್ಲದಿದಲ್ಲಿ ರೆಕಾರ್ಡ್ನ ಯಾವುದೇ ಭಾಗವನ್ನು ಆಳಿಸಿಹಾಕಲು ಕೋರಬಹುದಾಗಿದೆ. ರೆಕಾರ್ಡ್ನ್ನು ನಾವು ಎನ್‌ಕ್ರಿಪ್‌ಶನ್ ಮೂಲಕ ಡಿಜಿಟಲ್ ರೀತಿಯಲ್ಲಿ ಸಂಗ್ರಹಿಸುತ್ತೇವೆ. ರೆಕಾರ್ಡ್ನ್ನು ವಿಶ್ಲೇಷಿಸಿದ ನಂತರ, 12 ತಿಂಗಳ ಒಳಗೆ, ರೆಕಾರ್ಡ್ನ್ನು ನಾಶಪಡಿಸಲಾಗುವುದು.

ಈ ಬಗೆಯ ಅಧ್ಯಾಯಗಳನ್ನು ಸರ್ಕಾರ ಹಾಗೂ ವಿಶ್ವವಿದ್ಯಾನಿಲಯ ಕೆಲವೊಮ್ಮೆ ಅದರ ರೀತಿ-ನೀತಿಗಳ ಕಾನೂನುಬದ್ಧತೆಯನ್ನು ವಿಶ್ಲೇಷಿಸಬಹುದು. ಈ ಅಧ್ಯಾಯವು ಈ ರೀತಿಯ ವಿಶ್ಲೇಷಣೆಗೆ ಒಳಗದಲ್ಲಿ ವಿಮರ್ಶಕರು ನಿಮ್ಮ ಗೌಪ್ಯತೆಯನ್ನು ರಕ್ಷಿಸುತ್ತಾರೆ ಮತ್ತು ನೀವು ಕಾನೂನಿನ ಅಥವಾ ಇತರ ಹೊಣೆಗಾರಿಕೆಯಿಂದ ಮುಕ್ತರಾಗಿರುತ್ತೀರಿ.

ಅಧ್ಯಾಯದ ಕಾರ್ಯನಿರ್ವಾಹಕರ ಹೆಸರು	ಸಹಿ	ದಿನಾಂಕ

ಭಾಗವಹಿಸುವವರ ಹೇಳಿಕೆ

ನಾನು ಈ ಅಧ್ಯಾಯದ ರೀತಿ-ನೀತಿಗಳನ್ನು ತಿಳಿದಿರುತ್ತೇನೆ ಮತ್ತು ಸ್ವಯಂಪ್ರೇರಣೆಯಿಂದ ಈ ಅಧ್ಯಾಯದಲ್ಲಿ ಭಾಗವಹಿಸುತ್ತಿದೇನೆ. ನಾನು ಕೇಳಿರುವ ಪ್ರಶ್ನೆಗಳನ್ನು ವ್ಯವಸ್ಥಾಪಕರು ಉತ್ತರಿಸಿರ್ತುತ್ತಾರೆ.

ನನಗೆ ಮುಂದಿನ ದಿನಗಳಲ್ಲಿ ಈ ಅಧ್ಯಾಯದ ಬಗ್ಗೆ ಯಾವುದೇ ಪ್ರಶ್ನೆಗಳಿದಲ್ಲಿ ನಾನು ಮೇಲಿನ ಸಂಶೋಧಕರನ್ನು ಸಂಪರ್ಕಿಸಬಹುದಾಗಿದೆ. ನಾನು ಸಂಶೋಧನೆ ವಿಷಯವಾಗಿ ನನ್ನ ಹಕ್ಕುಗಳ ಬಗ್ಗೆ ಪ್ರೆಶ್ನೆಗಳಿದಲ್ಲಿ ನಾನು ಹ್ಯೂಮನ್ ಸಬ್ಜೆಕ್ಟ್ ಡಿವಿಷನ್ನನ್ನು ಸಂಪರ್ಕಿಸಬಹುದಾಗಿದೆ - ದೂರವಾಣಿ ಸಂಖೆ +1 (206) 543-0098 / +91 080 66586000.

ಆಡಿಯೋ ರೆಕಾರ್ಡ್ಗ್ಗೆ ಸಮ್ಮತಿ ಇದೆ

ಹೌದು ☐

ಇಲ್ಲ ☐

ನನಗೆ ಈ ಒಪ್ಪಿಗೆ ಪಾತ್ರದ ಒಂದು ಪ್ರತಿಯನ್ನು ಒದಗಿಸಲಾಗಿದೆ.

ಭಾಗವಿಸುವವರ ಹೆಸರು	ಸಹಿ	ದಿನಾಂಕ

Appendix E

CLINIC SITE SURVEY INTERVIEW PROTOCOL

Appendix E. Clinic Site Survey Interview

UNIVERSITY OF WASHINGTON
CLINIC SITE SURVEY INTERVIEW
Understanding Clinical Workflows in Primary Health Centres to Build Better Technologies

Researchers:
Robert Racadio, Research Assistant, Human Centered Design & Engineering, 206-438-4070, racadio@uw.edu
Beth E. Kolko, Professor, Human Centered Design & Engineering, 206-685-3809, bkolko@uw.edu

Note: We will select from the following list of questions depending on the functions of the clinic where we are doing research.

Staffing and Patient Load

1. How many patients used the out-patient services of the health centre in the past quarter?
2. How many patients were women?
3. How many patients were children?
4. How many are below the poverty line?
5. How are generic drugs prescribed?
6. How many of the following types of staff are currently employed by the PHC?
   - Medical Officer – MBBS
   - Medical Officer - AYUSH
   - Accountant / Data Entry Operator
   - Pharmacist
   - Nurse-midwife
   - Health worker
   - Health Assistant. (Male)
   - Health Assistant (Female) / Lady Health Visitor
   - Health Educator
   - Laboratory Technician
   - Cold Chain & Vaccine Logistic Assistant
   - Multi-skilled Group D worker
   - Sanitary work / Watchman

Availability of medicines

1. Is anti-snake venom regularly available in the PHC?
2. Is the anti-rabies vaccine regularly available in the PHC?
3. Are the drugs for Malaria regularly available in the PHC?
4. Are the drugs for tuberculosis regularly available in the PHC?
5. Are drugs for treatment of Leprosy (MDT Blister Packs) and its complications regularly available in the PHC?
6. Are all medicine given free of charge in the PHC?
   ☐ Yes, all the medicines are given free of charge.
   ☐ Some medicines are given free of charge while others have to be brought from medical store.
   ☐ Most of the medicines have to be bought from medical store.

☐ No information.
7. Which medicines have to bought from the medical store?

Availability of curative services

8. Is the primary management of wounds done at the PHC? (stitches, dressing, etc.)
9. Is the primary management of fracture done at the PHC?
10. Are minor surgeries like draining of abscess etc. done at the PHC?
11. Is the primary management of cases of poisoning done at the PHC?
12. Is the primary management of burns done at PHC?
13. Availability of Reproductive and Child Health Services
14. Are Ante-natal clinics organized by the PHC regularly?
15. Is the facility for normal delivery available in the PHC for 24 hours?
16. Are deliveries being monitored through Partograph?
17. How many deliveries conducted in the past quarter?
18. How many of them belong to SC, ST and other backward classes?
19. Is the facility for tubectomy and vasectomy available at the PHC?
20. Is the facility for internal examination for gynaecological conditions available at the PHC?
21. Is the treatment for gynaecological disorders like leucorrhea, menstrual disorders available at the PHC?
    ☐ Yes, treatment is available.
    ☐ No, women are referred to other health facilities.
    ☐ Women do not disclose their illness.
    ☐ No idea.
22. Is there any fixed day health services for adolescent Health?
23. Is there any fixed day heath services for family planning?
24. If women do not usually go to the PHC, then what is the reason behind it?
25. Is the Counseling for Family Planning given during MCH Services.
26. Is the facility for Medical Termination of Pregnancy (MTP) (abortion) available at the PHC?
27. Is there any pre-condition for doing MTP such as enforced use of contraceptives after MTP or asking for husband's consent for MTP?
    ☐ No precondition.
    ☐ Precondition only for some women.
    ☐ Precondition for all women.
    ☐ No idea.
28. Do women have to pay for Medical Termination of Pregnancy?
29. Is treatment for anaemia given to both pregnant as well as non-pregnant women?
    ☐ All women given treatment for anaemia.
    ☐ Only pregnant women given treatment for anaemia.
    ☐ No women given treatment for anaemia.
30. Are the low birth weight babies managed at the PHC?
31. Is there a fixed immunization day?
32. Are BCG and Measles vaccine given regularly at the PHC?
33. Is the treatment of children with pneumonia available at the PHC?
34. Is the management of children suffering from diarrhoea with severe dehydration done at the PHC?

Availability of laboratory services at the PHC

35. Is blood examination for anaemia done at the PHC?

36. Is detection of malaria parasite by blood smear examination done at the PHC?
37. Is sputum examination done to diagnose tuberculosis at the PHC?
38. Is urine examination for pregnant women done at the PHC?

Original: 18 Aug 2013

Appendix F

DIRECT OBSERVATION GUIDE

Appendix F. Direct Observation Guide

UNIVERSITY OF WASHINGTON
DIRECT OBSERVATION GUIDE
Understanding Clinical Workflows in Primary Health Centres to Build Better Technologies

Researchers:
Robert Racadio, Research Assistant, Human Centered Design & Engineering, 206-438-4070, racadio@uw.edu
Beth E. Kolko, Professor, Human Centered Design & Engineering, 206-685-3809, bkolko@uw.edu

Activities:
- What are the types of activities that clinic staff are responsible for?
- What is the overall sequence of activities for health centre employees and providers during patient visits?
- What is the overall sequence of activities for patients during their visits at the clinic?

Environments:
- What is the overall layout of the facility?
- What is the layout of tools and implements in the room?
- What types of activities occur in each space?

Interactions:
- What interactions are routine for clinic staff?
- What interactions are not routine for clinic staff?
- What information is shared between clinic staff? How is that information shared?
- What information is shared between clinic staff and patients? How is that information shared?
- What information is collected from patients? How is that information collected?

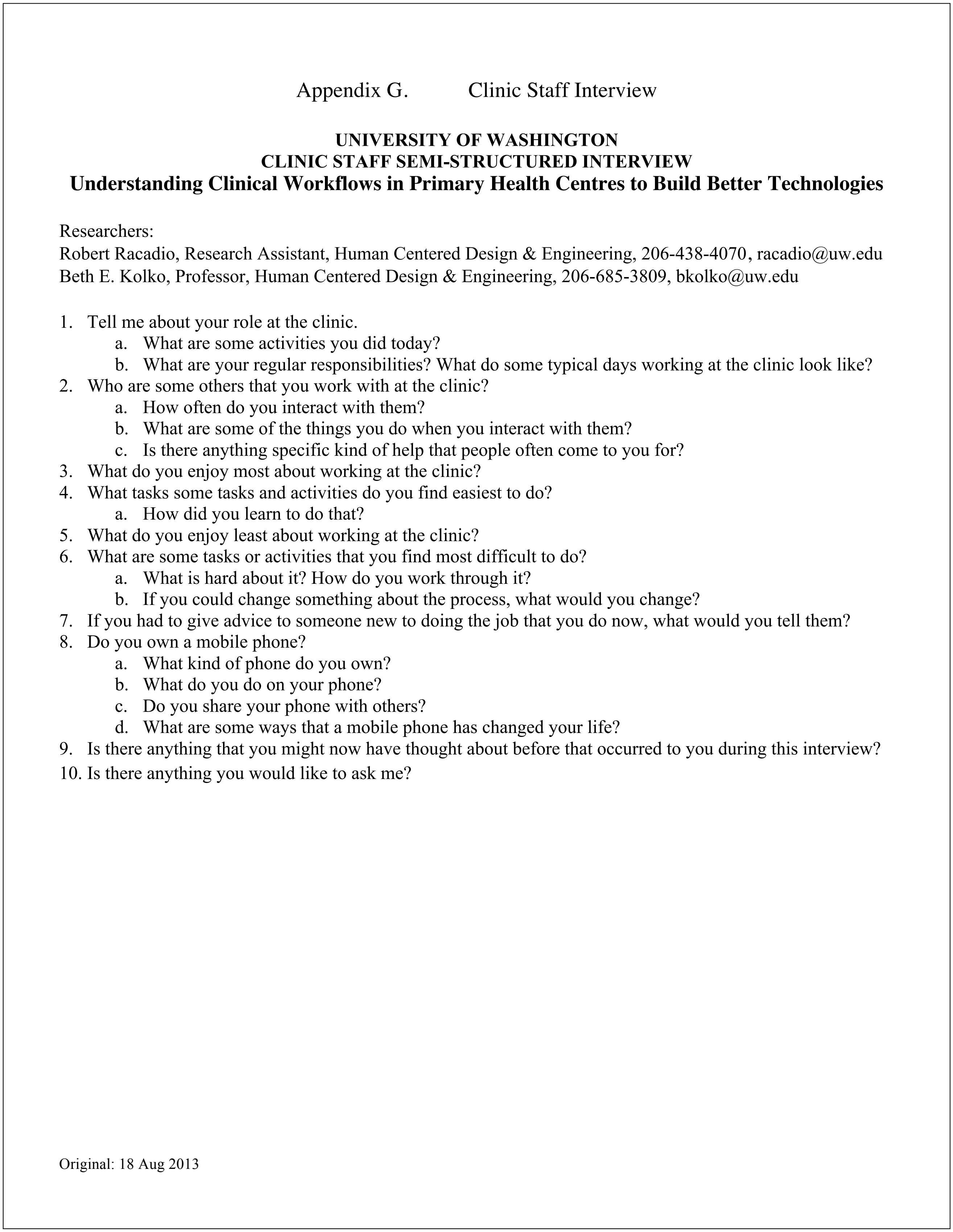
Objects:
- What tools and artifacts do health centre staff and providers use to help them track and manage their daily work? When do they use them? How do they use them?
- What tools and artifacts do health centre staff and providers use when interacting with patients? When do they use them? How do they use them?
- What tools and implements do health centre staff and providers use when interact with each other? When do they use them? How do they use them?
- What artifacts do patients bring with them when visiting the health centre? When do they use them? How do they use them?

Users:
- How many people work at the clinic? When are they there? What is the nature of their relationship with other employees?
- Are there more staff present in the mornings, afternoons, or is there no difference?
- What types of patients come to visit the clinic? What are their needs and concerns?

Original: 18 Aug 2013

Appendix G

CLINIC STAFF SEMI-STRUCTURED INTERVIEW PROTOCOL - ENGLISH AND KANNADA



Appendix G. Clinic Staff Interview

UNIVERSITY OF WASHINGTON
CLINIC STAFF SEMI-STRUCTURED INTERVIEW
Understanding Clinical Workflows in Primary Health Centres to Build Better Technologies

Researchers:
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1. Tell me about your role at the clinic.
    a. What are some activities you did today?
    b. What are your regular responsibilities? What do some typical days working at the clinic look like?
2. Who are some others that you work with at the clinic?
    a. How often do you interact with them?
    b. What are some of the things you do when you interact with them?
    c. Is there anything specific kind of help that people often come to you for?
3. What do you enjoy most about working at the clinic?
4. What tasks some tasks and activities do you find easiest to do?
    a. How did you learn to do that?
5. What do you enjoy least about working at the clinic?
6. What are some tasks or activities that you find most difficult to do?
    a. What is hard about it? How do you work through it?
    b. If you could change something about the process, what would you change?
7. If you had to give advice to someone new to doing the job that you do now, what would you tell them?
8. Do you own a mobile phone?
    a. What kind of phone do you own?
    b. What do you do on your phone?
    c. Do you share your phone with others?
    d. What are some ways that a mobile phone has changed your life?
9. Is there anything that you might now have thought about before that occurred to you during this interview?
10. Is there anything you would like to ask me?

Original: 18 Aug 2013

ಅನುಬಂಧ - G ಪ್ರಾರ್ಥಮಿಕ ಆರೋಗ್ಯ ಕೇಂದ್ರದ ಸಿಬ್ಬಂದಿಯ ಸಂದರ್ಶನ

ವಾಶಿಂಗ್ಟನ್ ವಿಶ್ವವಿದ್ಯಾನಿಲಯ

ಒಪ್ಪಿಗೆ ಪತ್ರ

ಪ್ರಾರ್ಥಮಿಕ ಆರೋಗ್ಯ ಕೇಂದ್ರಗಳ ಕಾರ್ಯನಿರ್ವಾಹಣೆಗೆ ಉತ್ತಮ ತಂತ್ರಜ್ಞಾನವನ್ನು ಒದಗಿಸುವ ಬಗ್ಗೆ

ಸಂಶೋಧಕರು

ರಾಬರ್ಟ್ ರಾಖೇಧಿಯೂ, ಸಂಶೋಧನಾ ಸಹಾಯಕರು, ಮಾನವ ಕೇಂದ್ರಿತ ವಿನ್ಯಾಸ ಹಾಗೂ ತಂತ್ರಜ್ಞಾನ, 206-438-4070, racadio@uw.edu

ಬೆತ್ ಕೋಳ್ಕೋ, ಪ್ರಾಧ್ಯಾಪಕರು, ಮಾನವ ಕೇಂದ್ರಿತ ವಿನ್ಯಾಸ ಹಾಗೂ ತಂತ್ರಜ್ಞಾನ, 206-685-3809, bkolko@uw.edu

1) ಆರೋಗ್ಯ ಕೇಂದ್ರದಲ್ಲಿ ನಿಮ್ಮ ಪಾತ್ರದ ಬಗ್ಗೆ ತಿಳಿಸಿ?
    a) ನಿಮ್ಮ ದೈನಂದಿಕ ಚಟುವಟಿಕೆಗಳ ಬಗ್ಗೆ ತಿಳಿಸಿ?
    b) ಆರೋಗ್ಯ ಕೇಂದ್ರದಲ್ಲಿ ನಿಮ್ಮ ಸಾಮಾನ್ಯ ಜವಾಬ್ದರಿಗಳ ಬಗ್ಗೆ ತಿಳಿಸಿ?

2) ಆರೋಗ್ಯ ಕೇಂದ್ರದ ನಿಮ್ಮ ಸಹುದ್ಯೋಗಿಗಳ ಬಗ್ಗೆ ಹೇಳಿ?
    a) ನಿಮ್ಮ ಸಹುದ್ಯೋಗಿಗಳೊಡನೆ ದಿನದಲ್ಲಿ ಎಷ್ಟು ಬಾರಿ ಪ್ರತಿಕ್ರಿಯಿಸುತಿರಿ?
    b) ಸಾಮಾನ್ಯವಾಗಿ ನಿಮ್ಮ ಪ್ರತಿಕ್ರಿಯೆ ಯಾವುದರ ಬಗ್ಗೆ ಇರುತ್ತದೆ?
    c) ಸಾಮಾನ್ಯವಾಗಿ ಜನರು ಯಾವ ಸಹಾಯಕಾಗಿ ಆರೋಗ್ಯ ಕೇಂದ್ರಕ್ಕೆ ಬರುತಾರೆ?

3) ಆರೋಗ್ಯ ಕೇಂದ್ರದ ಯಾವ ಕೆಲಸಗಳು ನಿಮಗೆ ತೃಪ್ತಿ ನೀಡುತದೆ?

4) ನಿಮ್ಮ ಕೆಲಸದ ಯಾವ ಭಾಗಗಳು ಮತ್ತು ವಿಷಯಗಳು ನಿಮಗೆ ಸುಲಬವೆನಿಸುತ್ತದೆ?
    a) ನೀವು ನಿಮ್ಮ ಕೆಲಸವನ್ನು ಹೇಗೆ ಕಲಿತಿರಿ?

5) ಆರೋಗ್ಯ ಕೇಂದ್ರದ ಯಾವ ಕೆಲಸಗಳು ನಿಮಗೆ ತೃಪ್ತಿ ನೀಡುವುದಿಲ್ಲ?

6) ನಿಮ್ಮ ಕೆಲಸದ ಯಾವ ಅಂಶಗಳು ನಿಮಗೆ ಕಷ್ಟವೆನಿಸುತ್ತದೆ?
    a) ಆ ಅಂಶಗಳು ಯಾವ ಕಾರಣಕ್ಕಾಗಿ ನಿಮ್ಮಗೆ ಕಷ್ಟವೆನಿಸುತ್ತದೆ?
    b) ನಿಮ್ಮ ಕಾರ್ಯವೈಕರಿಯಲ್ಲಿ ಬದಲಾವಣೆಗಳು ತರಬಹುದಾದರೆ, ಯಾವ ಬದಲಾವಣೆಗಳನ್ನು ಬಯಸುತ್ತೀರಿ?

7) ಹೊಸ ನೇಮಕದ ವ್ಯಕ್ತಿ ಆರೋಗ್ಯ ಕೇಂದ್ರದಲ್ಲಿ ನಿಮ್ಮ ರೀತಿಯ ಜವಾಬ್ದರಿಗಳನ್ನು ನಿಬಾಯಿಸಬೇಕಾದಲ್ಲಿ, ಅವರಿಗೆ ಯಾವ ಸಲಹೆಗಳನ್ನು ನೀಡುವಿರಿ?

8) ನಿಮ್ಮ ಬಳಿ ಸೆಲ್ ಫೋನ್ ಇದೆಯೇ?
    a) ನೀವು ಯಾವ ಸೆಲ್ ಫೋನ್ ಮಾಡೆಲ್ ಉಪಯೋಗಿಸುತ್ತೀರಾ?
    b) ನಿಮ್ಮ ಸೆಲ್ ಫೋನ್ನನ್ನು ಯಾವ ಕಾರ್ಯಗಳಿಗಾಗಿ ಉಪಯೋಗಿಸುತ್ತೀರಿ?
    c) ನಿಮ್ಮ ಸೆಲ್ ಫೋನ್ನನ್ನು ಬೇರೆಯವರೊಡನೆ ಹಂಚಿಕೊಳ್ಳುತ್ತೀರ?
    d) ಸೆಲ್ ಫೋನ್ ನಿಮ್ಮ ಜೀವನದಲ್ಲಿ ಯಾವ ಬದಲಾವಣೆಗಳನ್ನು ತಂದಿದೆ?

9) ನೀವು ನಮಗೆ ಈ ಸಂದರ್ಶನದ ಬಗ್ಗೆ ಏನಾದರೂ ಹೇಳಬಯಸುತ್ತೀರ?

10) ನಮಗೆ ನಿಮ್ಮಿಂದ ಯಾವುದಾದರೂ ಪ್ರಶ್ನೆಗಳಿವೆಯೇ?

Appendix H

RECRUITMENT SCRIPTS

Appendix H. Recruitment Script

UNIVERSITY OF WASHINGTON
Recruitment Script

Understanding Clinical Workflows in Primary Health Centres to Build Better Technologies

Researchers:
Robert Racadio, Research Assistant, Human Centered Design & Engineering, 206-438-4070, racadio@uw.edu
Beth E. Kolko, Professor, Human Centered Design & Engineering, 206-685-3809, bkolko@uw.edu

Recruitment Script / Clinic Site Survey

Hello:

My name is Robert Racadio. I am a graduate student from the University of Washington. I am conducting a research project to understand what kind of work happens in primary health centres and how that work gets accomplished.

My colleagues at PATH have identified your PHC as a potential site for conducting my research.

Because you are one of the directors of this PHC, I would like to invite you to participate in an interview that will help me understand more about your PHC, such as learning more about what types of services your PHC offers and how many patients come to visit.

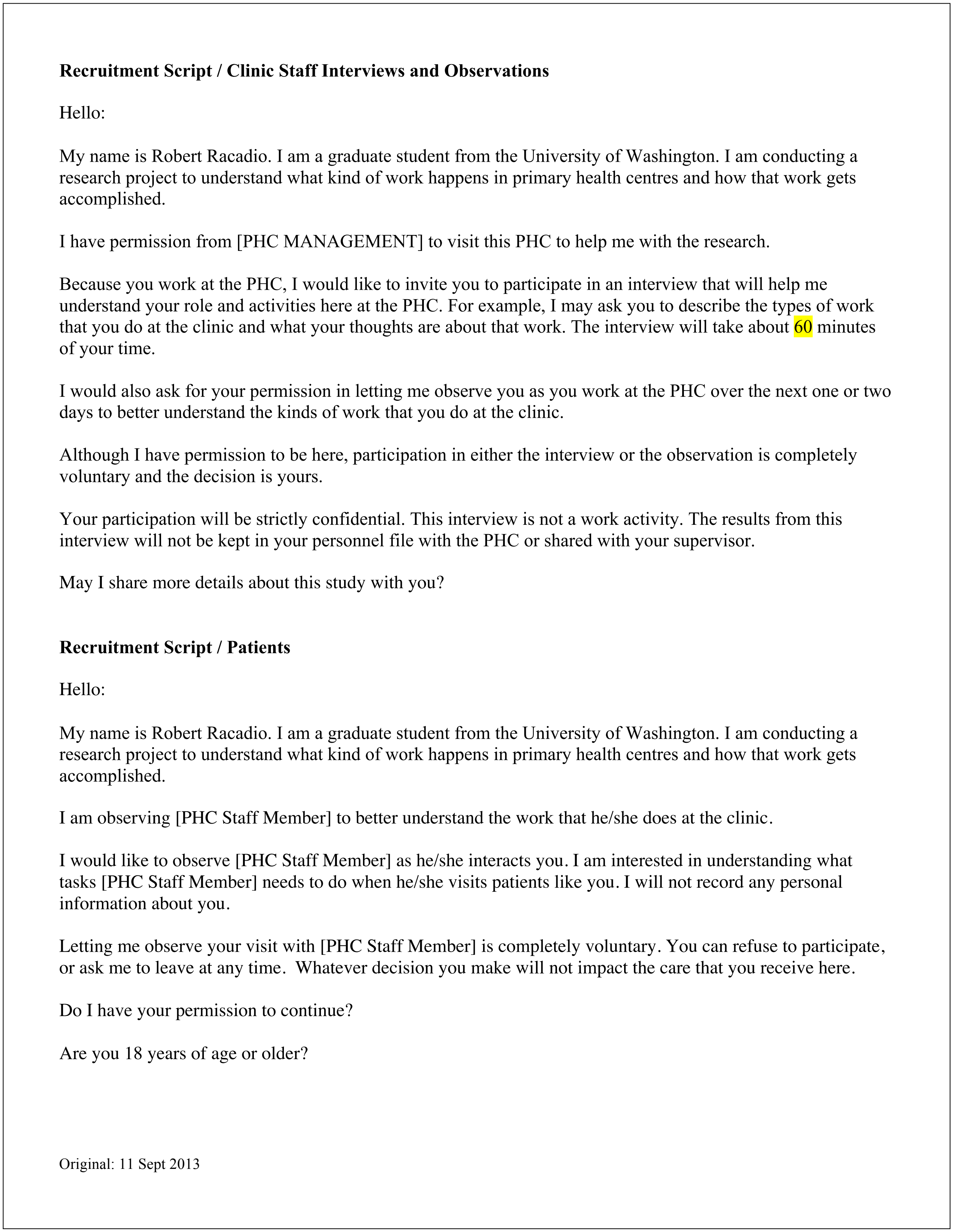
This interview will take about 90 minutes of your time.

Participation in this interview or the observation is completely voluntary and the decision to participate yours.

Your participation will be strictly confidential. This interview is not a work activity. The results from this interview will not be kept in your personnel file with the PHC.

May I share more details about this study with you?

Original: 11 Sept 2013



Recruitment Script / Clinic Staff Interviews and Observations

Hello:

My name is Robert Racadio. I am a graduate student from the University of Washington. I am conducting a research project to understand what kind of work happens in primary health centres and how that work gets accomplished.

I have permission from [PHC MANAGEMENT] to visit this PHC to help me with the research.

Because you work at the PHC, I would like to invite you to participate in an interview that will help me understand your role and activities here at the PHC. For example, I may ask you to describe the types of work that you do at the clinic and what your thoughts are about that work. The interview will take about 60 minutes of your time.

I would also ask for your permission in letting me observe you as you work at the PHC over the next one or two days to better understand the kinds of work that you do at the clinic.

Although I have permission to be here, participation in either the interview or the observation is completely voluntary and the decision is yours.

Your participation will be strictly confidential. This interview is not a work activity. The results from this interview will not be kept in your personnel file with the PHC or shared with your supervisor.

May I share more details about this study with you?

Recruitment Script / Patients

Hello:

My name is Robert Racadio. I am a graduate student from the University of Washington. I am conducting a research project to understand what kind of work happens in primary health centres and how that work gets accomplished.

I am observing [PHC Staff Member] to better understand the work that he/she does at the clinic.

I would like to observe [PHC Staff Member] as he/she interacts you. I am interested in understanding what tasks [PHC Staff Member] needs to do when he/she visits patients like you. I will not record any personal information about you.

Letting me observe your visit with [PHC Staff Member] is completely voluntary. You can refuse to participate, or ask me to leave at any time. Whatever decision you make will not impact the care that you receive here.

Do I have your permission to continue?

Are you 18 years of age or older?

Original: 11 Sept 2013