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Patient and provider perspectives on how patient trust within the patient-provider relationship influences maternal vaccine acceptance among pregnant women in Kenya

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ABSTRACT

Background: altered immune systems during pregnancy and the inability to vaccinate newborns until they are at least 6 weeks old puts both mother and child at high risk of infections. Maternal immunization is therefore critical for the safety of pregnant women and newborns everywhere. This study aimed to find out how the patient-provider relationships impacts maternal vaccine uptake, particularly in the context of developing countries where limited literature exists.

Methods: In-country research team conducted semi-structured, in-depth narrative interviews. Both providers and pregnant women were interviewed from four different sites in Kenya: Kisumu, Nairobi, Mombasa and Marsabit. Interviews were conducted in either English or, when needed, in one of the local regional languages and translated to English.

Results: we found that patient trust in health care providers (HCPs) is integral to vaccine acceptance among pregnant women in Kenya. Theirs is a fiduciary relationship whereby the patients' trusts is primarily rooted in the provider's social position as a person who is highly educated in matters of health. Furthermore, patient health education and provider attitudes are crucial for reinstating and fostering that trust, especially in cases where trust is impeded by rumors and religious / cultural factors.

Conclusion: Patient trust in providers is a strong facilitator for vaccine acceptance among pregnant women in Kenya. To maintain / increase this trust, providers must foster a positive environment that allows for positive interactions and patient health education. This includes improving provider attitudes towards patients and learning effective risk communication.

KEY WORDS: Maternal Immunization; Health Care Providers; Pregnant Women; Kenya; Attitudes; Developing Countries.

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Chapter 1
INTRODUCTION

Topic: Patient and provider perspectives on how patient trust within the patient-provider relationship influences maternal vaccine acceptance among pregnant women in Kenya

Needs and Goals:

Needs: There is a need to assess the effects of the patient-provider relationship on vaccine acceptance among pregnant women in Kenya.

Goals: The goal of this thesis was to evaluate the impact of trust within the patient-provider relationship on maternal vaccine acceptance among pregnant women in Kenya in order to prime for the introduction of new maternal vaccines to the schedule

Aims:

1. To identify the themes within the patient-provider relationship that constitute patient trust
2. To analyze how these themes influence maternal vaccine uptake among pregnant women
3. To identify ways that patient trust could be used to improve maternal vaccine acceptance

Thesis argument: Patient trust in providers is a strong facilitator for vaccine acceptance among pregnant women in Kenya. Nurturing and enhancing this relationship should therefore be one of the key strategies for introducing vaccines or increasing vaccine acceptance.

Research Problem / Introduction

There is a high mortality rate from preventable disease among infants under 6 weeks, particularly in developing countries in sub-Saharan Africa, South Asia and the Middle East. The introduction of vaccines has helped reduce mortality rates in these regions. However, due to low vaccine coverage in these countries, the decline in these mortality rates is incredibly slow. At a declining rate of an average three percent per year, it would take over a century “before an African newborn baby has the same survival probability as one born in Europe or North America in 2013 – three times longer than this decline took in industrialized countries before neonatal intensive care began (Wilson et. al, 2015).” Additionally, with the exception of Hepatitis B and BCG, vaccines cannot be administered until the child is 6- 8 weeks old and the full dose of basic vaccinations are not completed until infants are at least 6 months old (CDC, Omer, 2017). This presents an immunity gap that can be filled through the use of maternal vaccines which have been shown to strengthen the infant’s immune systems (Omer, 2017).

Unfortunately, there are gaps in research relating to maternal vaccine coverage and acceptance, particularly in the context of developing countries. For reference, we can look to a literature review conducted in 2015 on factors influencing maternal vaccines: out of more than 1200 articles on vaccines, only 155 articles were eligible for their analysis (Wilson et. al., 2015). 113 of those 155 articles focus on Influenza (73 / 113 were conducted in North America), 16 on tetanus, 7 on dTap/IPV, two on GBs, and 17 on any vaccine. Of the 16 articles on tetanus, 8 were focused on vaccination in Asia, and 4 in Africa (Wilson et. al, 2015).

There is a lot research that attributes stagnant vaccine rates to vaccine hesitancy, but Dube et. al. (2013) advises against using this term as an explanation. Vaccine hesitancy, as described by Dube et. al (2013), applies to the group of individuals found in the middle of the

vaccine continuum ranging from those who actively demand for vaccines to those who refuse all vaccines: “Vaccine hesitant individuals may refuse some vaccines, but agree to others; they may delay vaccines or accept vaccines according to the recommended schedule, but be unsure in doing so (Dube et. al., 2013).” Vaccine hesitancy is therefore broad term that includes a variety of factors including past experiences and historical, political and socio-cultural contexts (Dube et. al, 2013). With that in mind, this analysis will look specifically at the role that trust in providers plays in maternal vaccine acceptance. As will be illustrated in the literature review, maternal vaccines are highly beneficial for newborn survival rates. It is therefore imperative that we increase maternal vaccine coverage and explore the barriers and facilitators to vaccine acceptance prior to their introduction. Our research aims to help fill the gaps in research investigating factors pertaining to maternal vaccines by looking at the impact of trust within the patient-provider relationship on maternal tetanus acceptance in Kenya.

Chapter 2

LITERATURE REVIEW

Background and Literature Review

1. Maternal Vaccines

In order to understand why we need maternal vaccines, we must first understand what they are and how they work. This section will describe the importance of maternal vaccines and provide a synopsis of the research that has already been done.

1.1 Need for maternal vaccines

Due to altered immune systems, pregnant women and newborns are highly susceptible to infections and suffer high morbidity and mortality rates. This is illustrated by a persistent high mortality rate among newborns despite there being an overall drop in mortality rates in children aged 5 or younger. According to the Lancet, 2.6 million children out of the 5.8 million deaths reported in children under 5 in 2015, died during the neonatal period (0-27 days). Furthermore, the 2009-2010 H1N1 pandemic and outbreaks of pertussis outbreak resulted in increased infant deaths across several countries despite there already being high vaccine coverage (Vojetk et. al, 2018). In an effort to reduce these mortality rates, researchers turned to maternal immunization for a solution.

Although the drop in childhood mortality has largely been attributed to increased uptake of vaccines, infants and pregnant women provide a unique situation. Despite the mother's immune system being affected by immunological and physiological changes, her immune system is still expected to support both herself and her child. Children are protected by their mothers through the transfer of maternal immunoglobulin G (IgG) antibodies during the gestation period. These antibodies are retained after birth and provide the neonates with extra defenses during a time when their immune system hasn't fully developed. Unfortunately, the levels of maternal

specific antibodies gradually decline over the course of 6 months leaving the neonate vulnerable to illnesses (Vojetk et. al, 2018). Vaccines can help strengthen the immune system during this period however, with the exception of Hepatitis B and BCG, vaccines cannot be administered to the child until they are 6- 8 weeks old (CDC). Furthermore, the first set of basic vaccinations are not completed until infants are at least 6 months old (Omer, 2017). This presents an immunity gap for children under 6 weeks old that makes neonates and young infants extremely vulnerable to numerous diseases during their first few months of life. Fortunately, researchers have found that maternal vaccines can help mitigate the negative effects resulting from this gap.

Recent findings show that maternal immunization increases the concentration of maternal origin antibodies that can be transferred from mother to child during pregnancy (Vojtek et. al, 2018). Increased levels of antibodies means that there is increased protective immunity transferred from mother to child that will last longer. Thus maternal immunization end up not only protecting mother and child during pregnancy, but continue to strengthen the child's birth post birth.

1.2 Available maternal vaccines

There are currently four main diseases against which mothers are vaccinated: diphtheria, tetanus, influenza, and pertussis. The vaccines offered to counter these diseases vary by country. The Influenza and Tdap/ dTap (diphtheria/ tetanus/ ascellua pertussis/inactivated polio vaccine) vaccines are offered in the US (Omer, 2017). The dTaP/ Tdap vaccine is offered in Australia, Belgium, Canada, China, France, Germany, India, Mexico, the Netherlands, Poland, Spain, Slovenia, Switzerland, Turkey, and the UK (Wilson et. al, 2015). The monovalent maternal tetanus vaccination is the only vaccine offered in most developing countries (Wilson et. al, 2015). Some researchers have proposed the inclusion of vaccines against meningococcal disease,

cholera, Japanese encephalitis, and Hepatitis A & B vaccine to the maternal vaccine schedule in western countries (Vojtek et. al, 2018). Group B streptococcus (GBS), respiratory Syncytial virus (RSV) and cytomegalovirus (CMV) are also under development for use in pregnant women (Wilson et. al, 2015).

Though there are other maternal vaccines are available in Kenya, the monovalent tetanus vaccine is the only vaccine on the official, government approved, maternal vaccine schedule. Most women in Kenya therefore only receive the tetanus vaccine as it is the only vaccine offered at public health facilities.

1.3 Current maternal vaccine coverage

Measurement of maternal tetanus includes tetanus acceptance during pregnancy or within 6 weeks at the end of pregnancy, as well as neonatal tetanus (Thwaites, 2015). The CDC reported that only 23% of pregnant women during the 2014-2015 flu season received the Tdap Vaccine in the US (Bernstein, 2017). In 2007, neonatal tetanus accounted for 5-7% of neonatal mortality worldwide. Most of these deaths were concentrated in 48 countries predominantly located in Africa and Asia (Roper et. al, 2007). Thanks to increased coverage of vaccines, this number had dropped to 24 countries by June 2014 (Thwaites et al, 2015). Nonetheless, maternal and neonatal mortality from tetanus continue to still be an issue in developing countries, particularly in the rural areas where access to health care facilities is extremely low. 52% of reported deaths from tetanus among adults came from Africa and Asia, while 3% - 88% neonatal mortality were reported from these regions (Thwaites et. al, 2015). According to the WHO, the global vaccination coverage of DPT has stalled at 86%; 19.5 million infants worldwide either did not receive or complete all three doses of this basic life-saving immunization. This means that

about 1 in 10 infants were at risk of dying from preventable diseases (WHO). UNICEF reported that 34,000 newborns died from neonatal tetanus in 2015 alone (elimination of….).

1.4. Major factors influencing vaccine uptake/ acceptance

As previously stated, while there has been a lot of research being done to explore the role of vaccines and vaccine hesitancy, few researchers have looked specifically at vaccine acceptance and uptake among pregnant women specifically. The Vaccine Confidence Project found that only 42 out of 1164 articles focused on vaccination during pregnancy while writing their own literature review in 2012. Furthermore, there had only been four systematic literature reviews conducted focusing on vaccine uptake during pregnancy by 2015, all of which focused on influenza vaccine (Wilson et. al., 2015). Because there is so little research on maternal vaccines, we have to look at factors influencing vaccine acceptance for both maternal and childhood vaccines in order to get a comprehensive understanding of some of the factors influencing vaccine hesitancy and acceptance.

A literature review examining factors that influence low coverage of childhood vaccines in developing countries found that research cited 7 main reasons: 1) distance/ travel conditions / access to vaccination cite, 2) poor staff competence and attitudes, 3) vaccine stock-outs at facilities, 4) myths and misconceptions about when and how much to vaccinate a child, 5) parent's positive views on vaccines, 6) fear of side effects, and lastly 7) conflicting priorities between sustenance/ cultural practices and vaccination (Favin et. al, 2012).

The previously cited literature review by Wilson et. al., (2015) looked at factors influencing maternal vaccine acceptance from both pregnant women and health care workers and found similar results (Wilson et. al, 2015). Using 155 eligible articles for their review, they found that pregnant women were firstly worried about the safety, efficacy or need for the

vaccine. The second biggest category of issues was the role of healthcare professionals. They found that healthcare professionals largely influenced people's perceptions on vaccines and could greatly increase vaccine uptake by simply recommending the vaccines to pregnant women. Other barriers to vaccine uptake included access/ availability, cost and religion (Wilson et. al, 2015).

2. Patient-Provider Relationship

Because our research examined the role of the patient-provider relationship on vaccine acceptance, it is important that we also examine and understand the different types of patient-provider relationships and identify which one closest pertains to our context in Kenya.

2.1 Types of patient- provider relationships:

> "The patient-physician relationship is at heart a moral relationship and a proper
> Understanding of it is important for a robust morality in medical practice.
> (Marcum, J.A., 2008)"

In his book *An introductory philosophy of medicine: Humanizing modern medicine (2008),* Marcum identified three major models of the patient- provider relationship: Physician centered models, patient centered models, and mutual models. These models are further subdivided into more direct models and will be presented below.

2.1.1 Physician- centered models

The first model Marcum described is the physician-centered model. According to him, patients in this model "remain largely passive and powerless...Physicians dominate agenda settings goals and decision-making in regard to both information and services (Marcum, J.A, 2008)." He continues to explain that the patient's voice remains absent due to the physician

belief that they are the only ones knowledgeable enough to make appropriate decisions about health. In this relationship, the "patient is dependent, and physician is in a superordinate position (Marcum, J.A, 2008)" This model is further subdivided into the authoritarian model and the mechanistic model.

2.1.1.1 Authoritarian models

Considered to be the oldest and best known models of the patient-physician relationship, this model is based on the "authority granted by patients to physicians to practice medicine (Marcum, J.A, 2008)." The classical definition of authority is the right to influence and direct behavior. When tailored to the medical field, authority is defined as "the patient's grant of legitimacy to the physician's exercise of power on the assumption that it will be benevolent (as cited in Marcum, J.A, 2008)." Within the authoritarian model lie the paternalistic and priestly model. According to Marcum, the paternalistic model is fashioned after the parent-child relationship whereby the provider takes on the role of the parent. The provider chooses what they believe to be the best choice for their patient regardless of whether or not it opposes the patient's own value system. The patient on the other hand is willing to give up their autonomy and obey their physician without question in exchange for better health. There are two types of paternalism: weak paternalism where action is taken against a person's will but only because their decision making abilities are somehow incapacitated, and strong paternalism where one's will and autonomy is violated even though their decision making abilities are uncompromised. Incapacitation can be caused by "some defect, encumbrance, or limitations in decision making or acting (Marcum, J.A, 2008)." While weak paternalism is deemed permissible because it does not violate a person's autonomy, strong paternalism is considered unjustifiable and a violation of the Hippocratic Oath.

Thought of as the oldest model, the priestly model bases its trust on the patient's faith in the priest/ sherman's gift to heal from God. Although now shunned by modern medicine, contemporary physicians continue to serve 3 ministerial roles: the first is the physician's duty to serve, the second is the physician's ability to heal, and the last is the physician's oath to stay loyal to the patient. Overall, this model's core value is to "benefit and do no harm to the patient (Marcum, J.A, 2008)." It however is still considered paternalistic because of the provider's role as a father/ caretaker.

2.1.1.2. Mechanistic models

Marcum states that this model emphasizes the mechanistic nature of the human body and the physician's ability to fix it a la technician, mechanic or engineer. The physician's obligation therefore stems from their expert, technical knowledge. This expertise is the basis of the trust found within this fiduciary relationship between the patient and the provider. "The patient must trust the physician because the physician is an expert. This trust is not dissimilar to that of the child in the paternalistic relationship except that the physician is a competent mechanic…. The physician's "clinical gaze" is frequently myopic - focused only on the diseased body art, to the exclusion of the patient's overall experience (Marcum, J.A, 2008)." Much like robots in an assembly machine, doctors are taught to "detach from the vagaries of ordinary human ties... The outcome of the biomedical pedagogy is a physician who only connects minimally, if at all with a patient's existential concerns and angst (Marcum, J.A, 2008)." The physician under this model is only concerned with scientific facts and often ignores patient's values in favor of making an efficient and scientifically accurate diagnosis. Of all the models described in this book, this is the one most fitting in our research in Kenya.

2.1.2 Patient-centered Models

The second main model is the Patient-Physician model. In this model, the power swings to the patient who sets the goal and agenda of the visit, and takes sole responsibility for decision making. This model is also further subdivided into 2 models: the legal models, and the business models. According to Marcum, these models empower the patient through contractual agreements that allow the patient to seek help elsewhere if their needs aren't met (Marcum, J.A, 2008).

2.1.2.1 Legal models

These models protect both the patient and provider through legal standards. Though contractual agreements typically protect both parties, this model differs from common contracts for other goods because the patient has the upper hand. "The medical or healing contract often involves a patient's rights and a physician's duties to respect those rights (Marcum, J.A, 2008)." Critics have raised a number of issues with this model, the largest being that it leads to defensive medicine in an effort to avoid a malpractice lawsuit. Another criticism was that the model "relies too narrowly on rights and permission and overlooks other important goals and duties such as compassion and trust (Marcum, J.A, 2008)." As a response to these criticisms, Marcum quotes Howard Bordy who counters that this could be avoided by switching to a contractual model based on statutory status model, which is rooted in responsibility. "From the point of view of patients, the status model emphasizes their responsibility to treat patients in an appropriate fashion for a reasonable fee. From the point of view of patients, this model emphasizes their responsibility to seek the best medical treatment required to maintain the highest level of health possible (as cited in Marcum, J.A, 2008)."

2.1.2.2 Business models

This model is largely practiced in the US where the healthcare industry has commercialized health. The 'big-business style' of the commercialization of health began with the consumerism movement in the 1960s. In this model, the patient becomes the buyer of the healthcare goods and services while the physician is the seller. This shifts the balance in power to the patient who can now challenge the provider and demand to be included in the decision making process. Instead of trust, this model is built on distrust. The assumption behind this model is a free market that guarantees fair exchange between parties: The patient is motivated to find the nest healthcare possible at the best price while the provider is motivated by money or prestige. One criticism facing this model is the assumption of equality. True equality between patient and provider is dubious given the doctor's social standing as someone who is highly knowledgeable in medicine. Another major issue with this model is its competitive nature which directly conflicts with the ethics of medicine. This is especially bad for critically ill patients. "Patients, especially with debilitating diseases may not fare well because the crises under which many patients press for medical services do not always provide them with the leisure or the calm required for discretionary judgment (as cited in Marcum, J.A, 2008)."

2.1.3 Mutual Models

Power within these models is equitably distributed between the patient and the physician and is based on the principle of informed consent. Within this model lays the partnership model, the covenant model, and the friendship model.

2.1.3.1 Partnership model

According to Marcum, this model was created by the President's Commission for the Study of Ethical Problems in Medicine and Biomedical and Behavioral Research in 1982. In the commission's report, they stated that they wanted to create "a model that cultivates a relationship

between patients and professional characterized by mutual participation and respect and by shared decision-making (as cited in Marcum, 2008)." This model is composed of a family of models and contains three key features: "the participants 1) have approximately equal power, 2) be mutually interdependent, and 3) engage in activity that will be in some ways satisfying to both (as cited Marcum, 2008)." To describe the expectations of this model, Marcum pulls from a variety of sources. They all seemed to add up to Veatch's description: "the patient-physician relation ought to be one in which both parties are active moral agents articulating their expectations of the interaction, their moral frameworks, and their moral commitments. This should result in a partnership grounded in a complex contractual relation of mutual promising and commitment (as cited in Marcum, 2008)." At its core, the partnership model is one of reciprocity where both parties are bound to fidelity, honesty and not trying to take advantage of each other. The patient has to understand that physicians are limited in their technical abilities and the provider has to share information and decision-making in part of the patient's health. This model is perceived to be adequate because it mitigates the patient's anxiety. Marcum quotes Ballard- Reisch to emphasize this point: "Structured, participative decision making offers advantages to both members of the doctor-patient dyad, including higher quality decisions, greater commitment to decisions, increased satisfaction with interaction and increased compliance with treatment (as cited in Marcum, 2008).". Communication is a critical component of this relationship.

2.1.3.2 Covenant model

Although similar to a contractual model (legal and business models), this differs from the legal and business models as it calculates both parties' interests and leads to an agreement that gives them equivalent benefits for goods contributed by both. The covenant comes from the

basic understanding that they both need each other and are therefore indebted to each other. William May described it has having three components: "1) an original experience of gift between soon-to-be covenanted partners; 2) a covenant promise based on this original or anticipated exchange of gifts, labors, or services; and 3) the shaping of subsequent life for each partner by promissory event (as cited in Marcum, 2008)." Contracts requires some sort of exchange that keep it biding. In this model, trust is the binding agent. "A major function of the physician in this model is to teach their patients how to transform their lives in order to heal and remain healed (Marcum, J.A, 2008)." The patient has to trust in the provider and the provider has to be able to deliver. Thus trust is fundamental to the patient -provider relationship within this model because without it, the relationship "dissolves into an ineffectual or dysfunctional relationship with the patient being harmed further (Marcum, J.A, 2008)."

2.1.3.3 Friendship model

According to Marcum, this model is has been observed among the ancient Greeks and Romans. Friendship was important in ancient times because it promoted "freedom in which both parties enter into a relationship as equals for the mutual good of each other, even though the goods are not identical (Marcum, J.A, 2008)." There are two types of friendship models: the first is fueled by the provider's moral desire to befriend a patient for the patient's benefit, i.e. to relieve pain and suffering. The second is motivated by the patient's assumed compliance and satisfaction with a friendly provider. While some believe that this model is great because it elicits a cooperative rather than adversarial environment, others argue that it's unnecessary because patients care more about their provider's competency than their friendship.

2.2 Effects of the patient provider relationship on vaccine acceptance

As has already mentioned, research on maternal vaccine acceptance in a low-middle income countries context is scarce. Thus below is a brief synopsis of some of the articles that have examined the role of trust and the patient- provider relationship in both maternal and childhood vaccine acceptance globally.

2.2.1 Patient trust in providers as a facilitator for acceptance

Using qualitative methods, Benin and his colleagues researched the factors influencing parental vaccine acceptance for infants in the US. They found that vaccine acceptance among vaccine hesitant mothers was overwhelmingly attributed to patient's trust in their provider (Benin et. al., 2005). As was previously defined, vaccine hesitant mothers are those in the middle of the vaccine continuum. For many of the mothers in this study, hesitancy was attributed to not knowing who to trust for information on vaccines. Providers were able to form that trust by providing consistent information and being able to answer their patient's questions (Benin et. al., 2005). For late vaccinating and rejecting mothers, feeling isolated and misunderstood by the medical community hindered their ability to foster trusting relationships with their providers even though they wished to have trusting relationships (Benin et. al., 2005). In order to foster these relationships, Benin et. al. recommended that providers create relationships that allow for open discussions about vaccines. They recommend that providers communicate the risks and benefits of vaccines as this information can help buffer hesitancy during scandals that proliferate rumors against vaccines (Benin et. al., 2005)

In Kenya, the importance of trust in vaccine acceptance was illustrated by a study on perceptions of malaria vaccines in the Coastal and Busia regions in Kenya. In this article, Ojakaa et.al. (2011) report that providers were highly regarded by the community and were therefore key influencers, especially in areas with low level of health awareness/ literacy on vaccine

acceptance. Parents reported refusing to go to the facilities because they were scared of being reprimanded providers for various reasons eg: appearance of child, not previously going for ANC, using traditional health services, giving birth at close intervals, being pregnant while still breastfeeding, etc. However, although provider attitudes towards patients affected their health seeking behavior, parents still allowed their children to be vaccinated once at the facility because they trusted the providers.

2.2.2 Provider Attitudes / patient voice as a function of patient trust

As illustrated by both Marcum and Benin et. al, a major component of the patient-provider relationship is how providers treat their patients. Streefland and his colleagues briefly addressed how provider attitudes towards their patients influence vaccine acceptance in their 199 article. Using data from Bangladesh, Ethiopia, India, Malawi, The Netherlands and The Philippines, Streefland et. al. (1999) found that parents cited intimidating or coercive behavior as some of the reasons why they would refuse to vaccinate their children, especially when accompanied by an environment filled with rumors about possible negative side effects. Although they found that existing trust in expert systems overpowered the effects of bad clinic experience in India and Bangladesh, they also acknowledged that the opposite was true: “this trust is not absolute. Giddens points out that ‘respect for technical knowledge usually exists in conjunction with a pragmatic attitude towards abstract systems, based upon attitudes of scepticism or reserve’ and that bad experiences can lead to cynicism or withdrawal (Streefland et. al., 1999).”

The importance of HCW attitudes on trust was further echoed in Holt et. al’s (2016) paper research examining the role of patient voice in vaccine acceptance in the UK. Patient voice was not actually defined in this article, but it seems to include proactive risk communication and

active listening from the provider. According to this article, creating an environment that allowed for open communication and decision making increased patient's trust in providers. Holt et. al. (2016) noted that facilitating patient voice will continue to be increasingly important in a post-trust environment (Holt et. al., 2016). The shift in patient empowerment and self-governance has led to reduced patient trust. However, they advise that trust can be maintained by allowing patients to voice their concerns and addressing them through effective communication and messaging (Holt. et. al., 2016).

Mirroring the importance of patient voice and decision making on vaccine uptake, a study looking at tetanus vaccine update in Kenya found that "women who reported their involvement in making health related decisions jointly with their partners or with another person increase the odds of having sufficient TT immunizations compared to women whose health-related decisions are made only by their partner or other person (Hailey et. al 2012)." They found that Health education/ knowledge / information were positive correlators for vaccine utilization and advised for providers to educate women on importance of getting immunized.

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Chapter 3
MANUSCRIPT

Patient and provider perspectives on how patient trust within the patient-provider relationship influences maternal vaccine acceptance among pregnant women in Kenya

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ABSTRACT

Background: altered immune systems during pregnancy and the inability to vaccinate newborns until they are at least 6 weeks old puts both mother and child at high risk of infections. Maternal immunization is therefore critical for the safety of pregnant women and newborns everywhere. This study aimed to find out how the patient-provider relationships impacts maternal vaccine uptake, particularly in the context of developing countries where limited literature exists.

Methods: In-country research team conducted semi-structured, in-depth narrative interviews. Both providers and pregnant women were interviewed from four different sites in Kenya: Kisumu, Nairobi, Mombasa and Marsabit. Interviews were conducted in either English or one of the local regional languages when needed and translated to English.

Results: we found that patient trust in health care providers (HCPs) is integral to vaccine acceptance among pregnant women in Kenya. Theirs is fiduciary relationship whereby the patients' trusts is primarily rooted in the provider's social position as a person who is highly educated in matters of health. Furthermore, patient health education and provider attitudes are crucial for reinstating and fostering that trust, especially in cases where trust was impeded by rumors and religious / cultural factors.

Conclusion: Patient trust in providers is a strong facilitator for vaccine acceptance among pregnant women in Kenya. To maintain / increase this trust, providers must foster a positive environment that allows for positive interactions and patient health education. This includes improving provider attitudes towards patients and learning effective risk communication.

KEY WORDS: Maternal Immunization; Health Care Providers; Pregnant Women; Kenya; Attitudes; Developing Countries.

INTRODUCTION

Pregnant women and infants under 6 months are highly susceptible to adverse outcomes. The fetus's immune system does not fully develop until well after birth while pregnancy leads to physiological and immunological changes that alter the mother's immunes system and lessen her ability to effectively respond to several infections[12]. Prenatal vaccination presents an opportunity to address this immunity gap by reducing morbidity and mortality from vaccine-preventable illnesses in pregnant women and infants.

With the exception of Hepatitis B and BCG, vaccines cannot be administered until the child is 6- 8 weeks old[4]. Furthermore, the full dose of basic vaccinations are not completed until infants are at least 6 months old[4]. The threat posed by this immunity gap was illustrated by the 2009-2010 H1N1 pandemic and the pertussis outbreak that resulted in increased infant deaths across several countries[12]. Additionally, of the 5.4 million child deaths reported in 2015, 2.6 million died during the neonatal period (0-27 days) [12].These deaths can be reduced by current and future vaccines that protect both the newborn and the mother during pregnancy. This is because vaccines increase the concentration of immunoglobulin G (IgG) antibodies transferred from mother to child thus strengthening the child's immunity[12]. Although there are several maternal vaccines offered globally, the monovalent maternal tetanus vaccination is the only vaccine offered in most developing countries[11].

Despite there being a global surge to increase vaccine access and acceptance, low vaccine coverage, particularly in developing countries in Africa and Asia, continues to pose a threat to mothers and infants. Current vaccines are used sub optimally. Many countries have not introduced maternal influenza vaccine partially due to concerns about low demand and acceptance. This hesitancy has largely been attributed to concerns about maternal and infant

safety. Many mothers are ill informed about vaccines, their purpose and their efficacy. There are promising new vaccines that are in the pipeline and that have the potential to reduce these mortality rates including group B streptococcal vaccine, herpes simplex virus and cytomegalovirus vaccine and respiratory syncytial virus vaccine[12].Successful introduction of these vaccines would require a nuanced understanding of factors influencing vaccine demand and acceptance of current maternal vaccines.

While researchers have previously explored the role of vaccines and vaccine hesitancy, few researchers have looked specifically at vaccine hesitancy among pregnant women and the role that providers play. There continues to be gaps in research describing the effects of patient trust within the patient-provider relationship, particularly in the context of maternal immunization in low income countries.

False claims about the effects of the maternal tetanus vaccination led to a decline in acceptance rates in Kenya[10, 3]. The goal of this project was to conduct an in-depth, country-level, mixed-methods, multi-tiered study that examined evidence-based determinants of maternal immunization acceptance. This understanding informed demand creation strategies for the introduction of new maternal vaccines in Kenya, and potentially, other similar countries. We used qualitative research methods to analyze the role of patient trust in vaccine acceptance from the perspective of both pregnant women and health care providers.

METHODS

This research was part of a larger national study that sought to understand the social determinants of maternal immunization acceptance among pregnant women in Kenya. This paper focuses on the findings garnered from the pregnant women and HCP interviews data sets. It

specifically elaborates on how patient trust within the provider-patient relationship affects maternal vaccine acceptance among pregnant women.

Study Sites

Several factors made Kenya the optimal study site for this project, the first being the recent increase in vaccine hesitancy resulting from the re-emergence of anti-vaccine rhetoric against the tetanus vaccine. Secondly, Kenya has a large birth cohort (over 1.5 million births in 2012) and, due its long standing history / partnership with the CDC and existing surveillance system, has been an early adopter of new vaccines. Lastly, Emory has strong existing relationships with in- country and global organizations working within the maternal and child health sector. In partnership with KEMRI- CDC (Kenya Medical Research Institute - Center for Disease Control and Prevention), four field sites were selected to represent both the urban and rural settings (Table A). They provided access to various populations around the country to highlight and examine county differences, cultural differences and religious differences.

Participants

Both pregnant women and healthcare providers at clinical facilities were selected through convenient sampling methods (Table B). A total of 328 pregnant women and 112 health care providers (HCPs), including nurses and clinical officers, were interviewed; Of the 112 HCPs, 42 HCPs worked in public facilities while the rest worked at private facilities.

Interview Protocol

Semi- structured, in-depth interview guides were designed using grounded theory for each set of participants. These interview guides were developed by the study's lead anthropologist with input from the study team, in country partners, and a scientific advisory

committee. The guides were reviewed, revised, and updated as new themes emerged during initial phase of data collection. This iterative process allowed for exploration of additional themes that emerged throughout data collection. In- country research team members were trained by an expert anthropologist trained in qualitative methods including protocol adherence, screening, consenting, qualitative interview methods, transcription and translation. All interviews were conducted in either English, Swahili, Kikuyu, Luo, or Kiborana depending on site and preference of the interviewee. Interviews lasted approximately 30 to 60 minutes, depending on the extent of the discussion, and were audio recorded. Interviews were conducted in teams of two, allowing for an interviewer and note taker. The research team contacted all study sites ahead of time to brief clinic staff on research protocols and activities. Interview protocol can be found in Table B. Both KEMRI IRB and Emory IRB approval was sought for all study materials and research tools before they were used in data collection.

To understand the social determinants of maternal immunization acceptance among pregnant women in Kenya, the open-ended questions explored socio-cultural practices customs, values and beliefs.

Pregnant women: Interview guide for women included discussions on the following topics: (a) have they had a checkup in the last year; (b) have they received any vaccines that they can recall; (c) if they have received vaccines, they will be asked about their understanding of the vaccines they received [e.g., do they know what the vaccine prevents against, did they get the vaccine just because their parent/doctor told them to]; (d) comfort discussing sensitive topics with their doctor and parents; (e) awareness of maternal vaccines; (f) information from peers about maternal vaccines [friends' vaccination status, anecdotal side effects, discussions on social

media, reasons to get it/not get it]; (g) discussions with parents/guardians about maternal vaccines; and (h) motivating factors to be vaccinated.

Health providers: The semi-structured interview guide for providers included discussions on the following topics: (a) proportion of patients they estimate have received or refused maternal vaccines; (b) times at which they recommend maternal vaccine; (c) practices regarding immunization history verification (e.g. immunization information system); (d) barriers or reasons for refusal cited by parents/patients; (e) perceived ability and methods used to address these barriers/refusals; (f) comfort discussing vaccine recommendations with their patients;(g) existing efforts of reminder/recall for maternal vaccinations; and (h) knowledge of Tdap vaccine effectiveness and safety.

Analytic Approach

Interviews were recorded, transcribed and translated (when necessary), for analysis using NVivo 11.0 qualitative data analysis software. Both the recordings and the transcripts were de identified to keep participants' identity confidential.

Prior to coding, two codebooks were developed by the US- based team. Once the codebooks were completed, the team used these codes to code the transcribed interviews and later develop themes. An inter-reliability coders test was performed to ensure good reliability between coders. A randomly selected sample of 12 HCP transcripts and 30 pregnant women transcripts (10%) representing each site was used to run the test. Overall kappa coefficient scores of 83% and 88% were achieved respectively. (All research tools including interview guides and codebooks can be found in the appendix.)

RESULTS

Seven major themes emerged from coding HCP interviews: (a) access, (b) positive and open attitudes toward vaccines, (c) culture and religion as both barriers and facilitators, (d) additional resources needed to facilitate vaccination, (e) positive and open attitudes toward vaccines, (f) patient- provider relationship, and (g) variations in provider knowledge. Eight themes from pregnant women data were: (a) patient-provider relationship, (b) patient agency, (c) institutional trust, (d) health communication strategies, (e) personal and social responsibility, (f) accessibility of vaccines, and (g) education, and religious, cultural and social influences that explain health seeking behaviors and beliefs. This article will focus on the themes and subthemes pertaining to trust and the patient-provider relationship. The quotes corresponding to the themes and subthemes are depicted in tables 1, 2, 3, and 4.

HCP Perspective

1. Patient trust in providers and resulting ethos

Numerous providers reported that their patients would accept whatever they recommended because their patients had complete trust in them (Table 1). Providers believed that this trust was primarily rooted in the provider's social position as a learned professional holding a great deal of knowledge about health. Additionally, providers believed that patients trusted that the providers would always do what was right for them (Table 1). This perception of trust resulted in two approaches; those who were presumptive and administered the vaccine without communicating what it was, and those who thought it still important to inform their patients what they were receiving prior to administering the vaccine. For example:

"They have no choice, we just tell them it is mandatory and it is good for them."

VS.

"I think, when women come to the health care provider they have trust in them. Since they trust us, they will also trust what we tell them. It is now our work as the health care providers to give convenient information to these women so that they can go back to their homes satisfied."

In both examples, both providers explicitly or implicitly expressed perceived trust from their patients. However, the first provider expressed the need to inform their patients while the latter had a more paternalistic view. Ultimately, regardless of their personal belief systems, all providers recognized the amount of power this trust bestowed upon them and believed patients would not typically refuse to adhere to their recommendations (Table 1).

2. Provider attitudes towards patients (respect and approachability)

Although patient trust was implicit and very few providers reported having ever had patients actually refuse to be vaccinated, providers universally acknowledged the importance of personal attitudes on patient trust and vaccine acceptance when addressing pregnant women (Table 2). While some providers still practiced old-school authoritative approaches, others heeded that the expectation of patient deference was no longer universal.

Nowadays, people do not harass mothers like in the previous years… In the past, people used to be blasted by the nurses or whoever was giving the services whenever they asked questions. Those days are long gone. It is always good to ask why you are being injected.

Providers noted a shift in the evolution of the patient-provider relationship to one that needed open communication and respect for continued trust and acceptance of vaccines (Table 2). Majority of the providers said that patients would prefer to be consulted and informed prior to administering the vaccines (Table 2). However, even while acknowledging the need for positive

attitudes and educating their patients on what they were receiving, many reported not being able to always brief their patients in practice; largely due to a heavy workload and time constraints.

"Maybe when a health care provider is in a hurry or is being overworked. You may find a long que at the ANC waiting for vaccination. The nurse there may not have time to discuss much with every client about the vaccines. Sometimes they issue orders for the mothers to que and get vaccinated. These are situation which may happen when there are several mothers at the clinic. This can cripple vaccine uptake since there is no time for explanations."

3. Patient education

Providers reported various religious and cultural barriers to vaccine uptake. However, providers highlighted the negative impact of recent controversial remarks by religious and political communities about vaccines. False allegations claiming that the tetanus vaccine led to decreased fertility resulted in increased vaccine hesitancy (Table 3). When asked how to mitigate these effects, providers touted the importance of health education as a way through which they could dispel these rumors and increase acceptance.

"Yes, most of these mothers would not come to the ANC they would only come to deliver. But with continuous education given, the posters, you find that the number that come to access vaccination is high. For example, if you forget to give they will ask you for the vaccine."

Although these rumors reduced patient trust in both providers and vaccines, provider responses suggested that there was still enough trust left among pregnant women to allow for the use of health education as a reinforcement tool.

"They always appreciate as long as the information that is being given to them is from somebody from a medical profession and whom trust."

According to the providers, educating the patients about the importance of vaccines would not only increase vaccine acceptance but it also reinforced patient trust in providers and reinstating it in situations where it had dissipated. Additionally, providers reported that health education reduced default for subsequent vaccination and could also promote communal buy-in in cases where these women became vaccine advocates within their community (Table 3).

Pregnant Women Perspective

1. Expressed patient trust

Pregnant women largely supported HCP views on trust. They explicitly said that they would accept whatever is recommended by HCPs, even if they didn't know what it was. There were multiple women who reported not knowing what was administered to them but accepting it anyways because it came from a "doctor."

It is us who need it, and we don't know why we need it, so there is no way we can refuse. In addition, you cannot dispute what a doctor tells you, especially on something that he has taken years to train for. Even if they inject you with poisons or any other substance other than the vaccine, you wouldn't know and you won't have any say."

Doctors/ providers as discussed by pregnant women include healthcare volunteers, doctors, nurses, chemists, and outreach healthcare workers. Pregnant women did not always differentiate one from the other but when they did, they would often use the hospital as an identifying marker between providers. They would either describe the provider as the doctor walking around the

estate, or as the doctor in the hospital. For the pregnant women who made a distinction between the two, trust was sometimes expressed more towards those providers who worked at the hospital.

> *"I believe it is safe if it is from health centers but not out there because you may not know who sent them and their motives. I would rather come to the hospital to confirm if there is a vaccine being given".*

When asked why they trusted HCPs, pregnant women replied that they trusted providers because 1) providers are learned about health and are the only ones who can decipher their illnesses and treat them accordingly, 2) providers have institutional authority from the government to guard their health, and 3) providers are healers and caregivers with honest motives (Table 4).

2. Provider attitudes towards patients (respect and approachability)

Once again, though trust in providers was consistently expressed, pregnant women also spoke about the importance of provider attitudes on facilitating trust and vaccine acceptance. Mirroring HCP views on provider attitudes, pregnant women shared that attitudes greatly contributed to where and when they would choose to go seek medical care.

> *"Personally I would not have come back here if it were not for my condition because of my first experience here. Because when you come to the clinic, you expect to find friendly people who are ready to help you. But if you come and find somebody who is arrogant, one who has I do not care attitude and it is like you are bothering them, I will prefer to go somewhere else where I will find somebody who will understand my condition."*

It is however important to note that provider attitudes were mostly considered by participants living in urban areas where there is an abundance of facilities available; Most

participants living in rural areas often reported having little choice in where to go and considered distance and cost much more than they did provider attitudes (Table 2).

3. Patient education

Women corroborated HCPs notions about the importance of health education in their decisions to accept the vaccines. While there were many who did not know what was being administered and did not care about knowing more about the vaccine, many others reported that having more information about what was being administered increased trust in their provider as well as the vaccine.

> *I come here because of the services they provide but mostly I like the guidance and counseling they provide (MBT-0006)*

On the other hand, there were many more pregnant women who wanted more information but could not receive it due provider attitudes towards them. When asked why they didn't inquire about what they were receiving, patients report either being scared of being punished for speaking up / asking questions, or not having an opportunity to ask questions die to time constraints (Table 3). The lack of information and poor provider attitudes may have not hindered vaccine acceptance for most women, but some did say that it lessened their trust in HCPs:

> *"Even if it were you, you would be scared. We believe that if you are a know-it-all, they may even harm you. It is like telling the doctor 'you did this and it is not done like that.' You are sure that is not how it is done but because he/she wants to show you that he/she is there for that job and knows more than you do people say that he/she can harm you because you do not know what you are being injected with."*

DISCUSSION

Our analysis covered HCP and pregnant women perspectives on the impact of the patient-provider relationship on vaccine acceptance. Our results showed that, due to high patient trust towards providers in Kenya, providers, and by the extension the patient-provider relationship, are a key component to increasing maternal vaccine acceptance among pregnant women. However, increasing misconceptions held and disseminated by some religious and political leaders has led to increased vaccine hesitancy and mistrust in providers in Kenya. According to the WHO, there was a 16% decrease in women who had booster doses in 2016 (61%) as compared to the last Kenya Demographic Health survey in 2014 (77%)[6]. Given its importance in vaccine acceptance, it is crucial that we ensure that the patient- provider relationship is strengthened/ maintained. We identified two main factors that could be utilized to increase this trust: patient health education and improved patient- provider interactions.

The association between patient trust, provider attitudes towards patients, and patient health education is cyclic. Both pregnant women and providers expressed that there was a desire for knowledge on vaccines among pregnant women, and that patient health education can increase trust in both the provider and the vaccine itself. On the other hand, pregnant women conveyed that they only trust vaccine information if it is relayed by providers. Meanwhile, the amount of trust that is inherently present between patients and providers is reportedly being hampered poor provider attitudes towards patients. To improve trust, we must first identify the type of patient-provider relationship present in this context.

Both providers and pregnant women stated that inherent patient trust was rooted in a paternalistic, fiduciary relationship: patients trust that providers know more about health and consequently transfer autonomy to the provider. A fiduciary relationship as defined by James Marcum is one where trust stems from the provider's expert and technical knowledge[8]. According

to him, this relationship is part of the mechanistic model whereby the "physician's 'clinical gaze' is frequency myopic- focused only on the diseased body art, to the exclusion of the patient's overall experience[8]." In this model, the physician is concerned with scientific facts and sometimes ignores patients' values in favor of making efficient and scientifically accurate diagnosis. This was evident in HCP data where we saw providers assume authority over the patients' health decision because they knew pregnant women trusted them wholeheartedly.

Although patients were not opposed to providers making health decisions for them, they expressed that they were sometimes bothered by how the providers treated them. Many women shared that staff attitudes greatly contributed to where and when they would choose to go seek medical care. Similar findings were previously reported in a study that looked at patterns of vaccines acceptance in studies from Malawi, India, Ethiopia and the Philippines[7]. Malawi, India and the Philippines have since seen a decline in tetanus booster doses[6.]

These attitudes also hampered effective health communication between patients and providers. When asked why they didn't ask for more information, many pregnant women expressed being scared of interacting with providers and asking questions. Pregnant women reported rude and intimidating behavior from providers that hindered their willingness to ask questions or come back for subsequent treatment. Providers corroborated this view and attributed this behavior to historically paternalistic approaches and heavy workloads/ time constraints. To mitigate the negative impact of poor attitudes on trust, providers recommended increasing the number of staff members as it would allow for improved interactions between patients and providers. With more providers at hand, providers wouldn't be overwhelmed and would have enough time to educate pregnant women about what they were receiving.

Although educating patients about vaccines is important, the right type of communication is needed. We know that most women seem to trust the information coming only from providers but simply trying to debunk myths and misconceptions is not the solution. Researchers have found that rather than correcting misinformation, health messaging must focus on disease salience[5]. Researchers such as Bouder (2015) have written about the importance of effective risk communication on reducing vaccine hesitancy and recommend that the messaging appeals to both fear and agency; patients should leave understanding the risks but also informed about how they can protect both themselves and their children from harm[1].

In addition to trusting the provider because they are highly knowledgeable, pregnant women said they trusted providers because they had governmental authority. Pregnant women believed that providers would not administer anything that was harmful because the government wouldn't harm them. Sometimes this trust extended to the types of health facilities they chose to frequent: pregnant women showed more trust towards public health institutions than private health institutions. This is an important revelation given that low trust in governments, as seen in countries such as the United States, is considered to have contributed to the global hesitancy of vaccination.

Limitations:

One of our limitations is sampling bias. The pregnant women in our study were recruited during their antenatal care visits at the health facilities. By virtue of them already being at the hospital, one can assume that they already have relatively high trust /little resistance to seeking care. Additionally, most public health care providers were on strike during this phase of our research which delayed our data collection. The strike could have influenced some of the answers. Pregnant women as may have had negative feelings about care because hospitals were closed and nobody

could receive services. Providers were interviewed during the strike outside the study sites which could have also influenced their answers.

Conclusion:

Our study shows that the patient- provider relationship is an especially strong facilitator for maternal vaccine acceptance in Kenya. Subsequently, trust is extremely important for maintaining this relationship and enhancing patient compliance. Health care systems need to recognize that the reliance on patient deference for treatment compliance continues to be challenged in a post-trust environment[2]. Thus it is important for health systems seeking to introduce or increase maternal vaccine acceptance to focus on nurturing this trust and fostering this relationship.

We have shown that patient education and provider attitudes towards patients are imperative for the growth of this trust and are interrelated in a cyclic fashion; patient health education reinforces patient trust in providers while providers' attitudes towards their patients can either reinforce or hamper that trust. Providers can help by being more respectful towards their patients, and improving their health communication channels to facilitate open and honest dialogue with patients. This promotes the patient's knowledge and self-efficacy which, as evidenced by the health belief model, improves health outcomes[9].

We recommend that, in addition to improving attitudes, providers should learn affective risk communication and how to facilitate open communication. Governments can facilitate these changes by including modules on patient health communication during continued medical education (CMEs) for providers. Additionally, given our data's illustration of the impact of provider time constraints on both patient and provider attitudes, it is important that governments help health facilities lighten providers' workload by increasing staff.

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TABLES

Table A: Site Descriptions

Site	Description
Mombasa	Once a major tourist area, Mombasa is located in the south east of Kenya and represents a semi urban setting. Accessibility to healthcare facilities differs on proximity to Mombasa town; Health facilities included Coast General Provincial Hospital (a KEMRI/ CDC influenza site). It is the second largest public hospital in Kenya with a bed capacity of 672. There are about 80 healthcare staff members working in child and maternal health. In 2015, the maternal clinic saw 1882 new patients and 4226 returning patients. This hospital is part of the influenza surveillance platforms.
Nairobi	As the capital city of Kenya, Nairobi represents the urban setting. Accessibility to different types of health facilities (private/ public) is higher in Nairobi than anywhere else in the country. Health facilities included Mbagathi District Hospital which is located in Nairobi right next to KEMRI and CDC Kenya. This hospital has a bed capacity of 320. There are about 53 healthcare workers handling maternal and children issues (From MCH to Maternity). The average number of pregnant women seen per month at the hospital is 500.
Marsabit	Located in Northern Kenya, it is a vast hard to reach and sparsely populated area, it is the most unique of all four locations as it is primarily composed of a nomadic community. Accessibility to any health care facilities is poor. Health facilities included Marsabit District Hospital which is located in the north Eastern part of Kenya. The hospital has a capacity of 86 beds. This location will allow the team to access a different population seen at the other hospitals.

Siaya	Located in Western Kenya and close to Kisumu, Siaya represents the rural setting. Accessibility to healthcare facilities differs depending on proximity to Kisumu which is another major city in Kenya. Health facilities included Siaya County Referral Hospital which serves a large number of rural and low social economic patients. The bed capacity is 200. There are 26 health care workers within the maternal clinic that care for and see about 300 to 400 new and returning pregnant women. It is located about 72 Km from The Centre for Global Health Research at KEMRI Kisumu Field Station

Table B: Interview Protocol

Pregnant women: pregnant women waiting for their scheduled antenatal care visits at the clinics were approached by research members and asked if they willing to participate in the study. If they were willing, they were taken to a private room/office designated by the hospital for confidential consenting and interviewing. After allowing time for consent review and answering questions, the study team recorded each interview. • **Inclusion criteria:** Women aged 15 -40 · Women in any trimester; Patient at health facility included in the study; Be willing to converse with others in a focus group format (only for message testing phase); Able to provide informed consent (If participant is illiterate, procedures to ensure full understanding of the research and consent process will be implemented according to international and federal guidelines). • **Exclusion criteria:** have previously participated in this study; Those who do not or cannot provide consent; Failure to meet other inclusion criteria
HCPs: providers working at the antenatal care were contacted ahead of time to arrange interviews for times that would work best for them. During this phase of data collection, HCP were on a nationwide strike. To mitigate the effects of delayed data collection, study team members organized interviews outside of clinic • **Inclusion Criteria:** Currently working at the selected study sites; Current physician, nurse, nurse midwife, community health worker; Able to provide informed consent

• **Exclusion Criteria:** Those who do not or cannot provide consent; Failure to meet other inclusion criteria.
Participant observation and Facility Profiles: Non-structured observation of pregnant women and HCPs were also conducted within the clinic. The research staff took detailed field notes to examine patient-administration, patient-patient, patient-provider relationships, dynamics of provider-government officials, and provider-provider, provider-patient, and provider-administration interactions within each of the selected sites. Interview notes and observations notes were used to edit the guide as needed. Notes about each facility, e.g. patient flow, vaccine storage and supply chain, etc. were also typed up over the course of interviews.

Table 1: Patient trust and views on patient autonomy – HCP Perspective

Subtheme	***Quote***
Expressed Trust	*"When they come, they just accept what the doctor gives them because they believe the doctor is always right. They have never challenged us by asking 'why are you giving me this vaccine and not the other one?'"* *"May be sometimes they do not have that chance to say no because they look at me as their savior, the last person for them and everything I tell them they do believe is right"* *"Actually, patients just come for ANC clinics and it is us, the health care providers who decide what is deemed fit for them; they do not ask for anything."*
Respect for autonomy	*"We believe that the client is always right. Therefore, after taking our time and proving a detailed health talk and a woman still refuses to be vaccinated, we do not force them. Clients have the right to accept of refuse medication. We honor their requests and what they believe in. we always give them a lot of information anyway."* *"Most of the mothers who come here for the vaccine know that they have to be injected. Others had not received the tetanus vaccines in their previous pregnancies so they do not see the importance of the vaccine. We explain to them the importance and tell them to go think about it and come back because we cannot force them."*

	"Normally after you have done all the necessary services you will tell the mother now it is time to give you the vaccine we normally tell the mother that " I want to give you a tetanus injection" during that time she has the right to tell you if she does not want the injection or she just accepts. However, we have never had a case in which a mother declines."
Authoritative approach	*"We tell them what they need to have so I do not think decision-making is on their side so they just receive it."* *"**I:** Okay, once you make available, vaccines in your facility especially the tetanus vaccines, do you think mothers get ample time to make a timely decision whether or not to receive the vaccines in your facility?* ***P:*** *They have no choice, we just tell them it is mandatory and it is good for them."*
Sources of trust 1. Education 2. Altruism	*"Yes, they normally have time to accept because by the time they leave their homes to come to the clinic, they are very sure the doctors or the nurses or health care providers know more than they do, so they will just do what the health care ask them to do"* *"I think it is the norm of the clients where you find that patients always feel that the doctor is the one who knows what she should receive as they believe the doctor will do the right thing."*

Table 2: Provider Attitudes towards patients (approachability)

HCP PERSPECTIVE	
Subtheme	***Quote***
Impact of attitudes towards patients	*"The other reason* [barrier] *could be maybe the way you talk to them when they come for their clinic here. For instance, if you talk to them rudely, they may not come back her."* *"I think that is attributed the service we provide. We talk to them politely. Even if the client is unhappy with you, you must find a way of working towards that. In my facility, we sometimes provide tea, snacks and water for clients."*

	"The nurse kept accosting the patient about the time of coming for ANC clinic and her age. A lot of words were told to this the teenage mum that made me doubt if she would dare come back for the services though eventually got the services and ANC book provided." *"For one is the attitude of the caregiver, the availability of the vaccines and the availability of time and staff. If we are many we will shorten the waiting time. And my attitude also if I have a poor attitude, I will discourage them but if it is good, they will encourage others to come"*
Evolution of patient-provider relationship	*"Uptake depends on the attitude of the healthcare provider. Most mothers have issues at home and how you handle them matters a lot. When a mother walks into your clinic, they are walking to someone they believe in their heart will help them. The information you give this mother may change or break her. I believe it is all about the attitude and approach towards these clients and the education you give them."* *"These cultural practices are still there but there was a lot of force from the administration chiefs ensuring they are given by force, which should not be the case. The community should be taught then consent after understanding and receive the vaccines."* *"Some of them [providers] would be hindrances because they would not engage mothers when they are making decisions concerning vaccines dates. Some will put vaccine date to their convenience without considering the mother's side. Those are open hindrances. There are some people who say on giving vaccines on specific working days without taking care of mothers who work from Mondays to Fridays."*
Patient's desire for information	*"They will say it is new, we want to know its constituents."* *"They normally ask the importance of those vaccines, how the vaccines help them, if there is any adverse effects and what would be done in such a situation."* *"They ask on why we give the vaccines and what they prevent against. Therefore, whenever we give vaccine, we first seek their consent, give the reason for administering and talk about their importance."*
Effect of Time - constraints on education	*"For now, I can say they do not get enough time since I am alone, overwhelmed and take shortest time possible with them. They do not get enough time."* *"So I am the type of person who has to give the mother the information she needs. So I cannot know whether my colleague in the other room is*

<table>
<tr><td></td><td>giving that information. Sometimes I cannot blame them because you find that three benches are already full and all the women are waiting for that one person to attend them. You will find that things there are not going as intended. The education is usually not there as such. But if we had enough time... so even if there is no ample time you have to give information of the very important things which the mother has to take home from that room.”</td></tr>
<tr><td colspan="2">PREGNANT WOMEN PERSPECTIVE</td></tr>
<tr><td>Subtheme</td><td>Quote</td></tr>
<tr><td>Importance of provider attitudes on trust as expressed by facility choice</td><td>“I focus on the reputation of the hospital and the way the doctors treat people.”

“I look at how patients are being treated. You will come to a certain hospital after you have heard people praising it.”

“P: The staff here are very kind and attend to us well. Their services are also good.
I: What about [name] Hospital?
P: Sometimes the nurses are very harsh which makes us feel uncomfortable”

“You know there are places that you can go to and you are attended to in a hurry and maybe you have a particular problem. Instead of somebody listening to you, he/she starts despising you.”

“I: What is it that will motivate you to go for vaccine?
P: Pregnant mothers are sometimes turned away from hospitals when they go to deliver if they never attended the antenatal clinic (MDH-0091).”</td></tr>
<tr><td>Preference for closer hospitals over provider attitudes in rural areas.</td><td>“Well actually the distance from our home to this place is quite long, but I have no choice but to come here. Clinic services for pregnant women are available only in a large facility like this and not in small health centers and dispensaries like the one in our location.”

“In case you become sick, and you want to go to the hospital, what can you put into consideration?
P: When I become sick and I want to go to the hospital?
I: Yes.
P: I must have means of transport to the hospital. (Laughs).”</td></tr>
</table>

	"However, this side you must be sick is when you come or when your day for clinic reaches is when you come, a times you are sick and the place is far you will just be force to persevere." *"I just go to the hospital that is close to me."* *"Yes, this general hospital is closer to me than the others are."* ***"I**: Okay, and what do you do if you get sick?* ***P**: I go to the hospital* ***I**: Which hospital* ***P**: Any that is close to me"* *"You go to the nearest hospital when you are sick."* *"**I**: why this one? What attracts you here?* ***P**: It is near where I stay"*

Table 3: Patient Health Education

HCP PERSPECTIVE	
Subtheme	***Quote***
Myths and misconceptions ("Rumor mill')	*"We recently had a challenge with polio and other vaccines that were being said to bring infertility. Those who do not get a chance to talk to a healthcare professional to enlighten them about these myths end up believing what they are told out there. The public sector has these challenges."* *"For example, sometimes back, there was a serious debate between the ministry of health and Catholic church. The church was against the tetanus toxoid. The catholic church argued that the vaccine was meant to sterilize female populations. The issue was all over the internet and social applications. I think vaccination efforts did not reach their targets. There are some who also complicated the issue justly to scare more people away from vaccination."*
Education as a tool for demand creation and reinforcing/ building trust	*"When communicating to them we need to tell them about the importance of vaccines and insist for them to receive. If you do not tell them about the importance, then they will not take. As you know that the patients normally believe in doctors and they will do whatever the health care provider suggest to them to do."*

	"We should have somebody at the triage, one in the child welfare clinic, one in the ANC clinic, one in the family planning clinic and one in the PMTCT. This would help us give mothers time to ask questions and also give as time to address them. This will also make the mothers to be comfortable with us since I will not be rushing through but will have adequate time to give the mother's health information. Pregnant mothers need a lot of information and especially first time mothers who could be having wrong or outdated information" "*There are pamphlets with pictorials about the effects of tetanus infection. When we show women such pictures, they understand the importance of tetanus vaccine and accept vaccination. You realize that TT uptake is increased. They are confident with what we tell them and we are also confident that their attitude is positive. This is evident in the fact that they come in numbers for the vaccines. In some cases, they come from other hospitals. They trust us."* *"The first thing, which I appreciate about health information given to the mothers; is that at least they know that there is an antigen which they should be given and they appreciate about that antigen. Secondly, they know the importance of attending the ANC clinic because if you ask them why they always come to the clinic, they will tell you that "I come because I need to be given tetanus" so basically, the message you give them has a positive impact."* *"Barriers. Mostly because most of the issues that normally come up are always myths, we try to debunk them by trying to tell them the facts. Like somebody believing that when they are pregnant they can't get injected, you talk to them, you tell them the importance and we also expose them to know the side effects though in most cases the side effects are always very minor and I have never met an adverse reaction with the vaccines. So we always try to talk to them. We let them know the facts so that they make an informed decision. Some come when they have bad opinion about vaccines but they end up getting it, having been given the facts."* *"Basically, it is the health information. We give them a group health talk outside then when they come in, we have one on one health talk. However short it is we make sure we tell them the importance. By the way, I have realized they know the importance of tetanus. Once we give them the information on the importance of the vaccine so we do not expect refusals."*
Community buy-in	*"More publicity. These can be done by women who have received vaccination telling fellow women, pregnant and non-pregnant alike about the importance of vaccines. Government officials like chiefs and village elders can also play their part by organizing barazas-*

	(Gatherings/meetings organized by the local chiefs to address issues) for all women where they will be educated on vaccines." *"They should also have the information because one mother will tell another and that is how information flows."* *"The moment they know what we are doing, they become our ambassadors in most cases. They take that message home. When you do something right to one patient, you will help like five of them because when she goes out there, most of them share their experiences."*
PREGNANT WOMEN PERSPECTIVE	
Subtheme	***Quote***
Importance of education on vaccine acceptance	*"Yes, the information on children's vaccines was helpful. When the healthcare providers came administering the measles vaccine, a measles outbreak had just occurred. The healthcare providers informed us that those who will get the vaccine before contracting measles will be safe. And because of this information, even those who had never been vaccinated before came for vaccination."* *"Why I received the tetanus vaccine was, it was well publicized, the information that came with it was okay, those people who were also giving it out, I believe they were professionals because they also had tags. Before they give you the vaccine, they had to explain what would also be compared with the information we had before; to me that was okay, I did not even need a second thought about it, yes."* *"Mothers should be educated on vaccines first and then they can choose. As I told you earlier, some mothers refuse vaccines because of some misconceptions they hear about vaccines. There was a time everyone thought that polio vaccines would kill a child. I do not think the government can kill all the children in Kenya, I believe there have a conscious too."* *"They said that children will be prevented from serious physical handicaps and polio. Since I do not have more knowledge than doctors, I accept to have my kids vaccinated."* ***"I**: Let us say she refuses and the child happens to be infected by the disease that would have been prevented and remember the child has no capacity to take her/himself to the facility for the services, so what do you suggest to be done to such a parent?* ***P**: Just give her good pieces of advice."*

Desire for health education	*"I come here because of the services they provide but mostly I like the guidance and counseling they provide."* *"AMREF together with the nurses usually go round the villages to vaccinate the children so I ask them about it that is where I learnt from. I have to ask because I will find myself in that situation where my child has to be vaccinated so I need to know."* *"I think you should put more advertisements on radio and television. There should also be caregivers to teach us when we come here in the morning. But you find that when you come to the clinic, you might sit at the reception for even an hour without anybody attending to you. When they finally attend to you, you just go home. Ever since I started coming here, we have only been educated once. Maybe it is me who comes early and they do it later."* *"For example, I went to a private hospital but I was not given any vaccine or advice as a pregnant woman. I was also not asked any question as a pregnant woman. They only tested me and filled the form and by that time I was in great pain. That is all they did. So I thought that if I come to Mbagathi Hospitals, I will get vaccinated and get advised. Like today I have been advised to start preparing for the delivery of my baby. I have been told to have a razor blade, string and money. I have received advised which I would not have received in private hospital. I have also been told that I need to eat well as a pregnant mother and to also use folic tablets for me to have enough blood in the body. I would not have received such advice in a private clinic."* *"**I**: Between government hospitals and private hospitals, where would you prefer to be vaccinated?* ***P**: Government hospitals because they educate a lot on vaccines."*
Fear of reproach	*"There are some doctors that when you ask them questions, they will also ask you, if you came to be treated or for questions; it becomes difficult to interact with such ones."*
Time constraints	*"I do not ask because I find many women on the queue. You do not have the time to ask why do you so you just agree to be injected so that you go home."*

Table 4: Expressed patient trust - Pregnant women perspective

Subtheme	***Quote***

Explicit trust	***"I**: Why would you trust the doctor?* ***P**: If there could be no doctors I could not be even a live. They have really help me."* *"Since I am sick, I will trust no one but the doctor, he will screen me and then tell me what the problem is."* *"You see you can discuss with people from home but they are not doctors, they will listen to your issues and at long last refer you to go and see the doctor because they have no knowledge on the same. At the hospital, the doctor will examine, test and know the cause of the problem while at home people will tell you it is just malaria; I think that seeing the doctor is the best thing."*
Direct impact of trust on acceptance	*"I will comfortably receive vaccines here at the hospital because it has the right personnel. I will not take it anywhere else where there are no experts."* *"I believe that anyone who gives me vaccines knows why he is doing that; I believe he/she has gone to school and understands this issue better than I, and I have no reason to refuse as long as the vaccine does not kill me, and as long as my health improves."* *"**I**: why wouldn't you refuse to receive vaccines?* ***P**: This is because it is important to our body and especially if it's given by healthcare providers who are experts and informed then I cannot refuse."* *"I will accept because it is recommended by the doctor since that is their profession hence they have knowledge as to why they bring that new vaccine."* *"Some people even think if they are vaccinated they would come impotent like in men even women would not give birth like the case of tetanus, what other women used to say is that women have born a lot of children in Kenya, so that vaccine is a way of birth control that was going around which I also heard but I said if it is so that is what the government is planning which I don't think is true, so me I just went ahead and received. It has not stopped me from conceiving, yes."*
Reasons for trust 1. Respect for provider's education	*"I trust them because these are people who have knowledge in that line, it is something they have studied, yes, they have been tested on that so they stand to convince me that I can rely on them."* *"I will accept because it is recommended by the doctor since that is their profession hence they have knowledge as to why they bring that new vaccine."*

	"I will rank the hospital as the first, because the information you get from the doctor has no doubt since the doctor has the knowledge."
2. Government authority	*"I will still admit because it is a government command"* *"Yes, I do believe that vaccines are safe because the government cannot bring something that will harm us."* *" So I knew it was something that was initiated by the government so I did not see the need to debate it that is why I went ahead and took it, yes."* *"Because I know that when the Community Health Workers comes they come with the doctors and secondly when I'm in the hospital I trust all of them because I have never seen a doctor without a tag and that will prove that what they are doing is what has is authorized by the government."*
3. Belief in provider's altruistic motives	*"However, you cannot refuse yet it has been rolled out by the government and doctors. A doctor cannot prescribe harmful drugs, unless a quack."* *"I know the doctor is the one who treats people so if he gives me the vaccine I know it's a correct thing, because the doctor cannot wish to harm anyone."* ***"I**: You have said you trust the doctor why do you trust the doctor?* ***P**: Because they have already devoted to help people."*

Chapter 4

PUBLIC HEALTH IMPLICATIONS

Our study shows that the patient- provider relationship is an especially strong facilitator for maternal vaccine acceptance in Kenya. Subsequently, trust is extremely important for maintaining this relationship and enhancing patient compliance. Patient education and provider attitudes towards patients are crucial for the growth of this trust and are interrelated in a cyclic fashion; patient health education reinforces patient trust in providers while providers' attitudes towards their patients can either reinforce or hamper that trust. With this in mind, we have three recommendations for health systems looking to introduce or increase maternal vaccine acceptance in similar contexts.

1. Include patient health communication modules during continued medical education (CME's)

Both pregnant women and providers recognized that pregnant women desired a relationship that fostered health education from their providers. This is because patients already have a base- level of trust in their providers. Through the health communication modules, providers can learn how to improve their communication channels to facilitate open and honest dialogues with patients. They can also learn how to disseminate information using language that is easy to understand and reinforces the importance of vaccines by focusing on disease salience messaging. Both cohorts acknowledged that patient vaccine education would increase pregnant women's trust in both the provider and the vaccine.

2. Providers need to be more respectful towards their patients.

Both pregnant women and providers spoke about the impact of one-on-one interactions with providers and staff on trust. Patients want to be respected and informed about what they are receiving. This increases trust in their providers as well as compliance.

3. Increase patient- provider interaction time by increasing staff

Our data showed that time constraints were the main cause of poor provider, and sometimes patient, attitudes. It is therefore important that governments aid the public facilities in lightening the workload by increasing staff. This reduces wait times and also allows for increased patient-provider interactions. Given that this would require a restructuring of the health system, this is also the hardest recommendation to attain.

APPENDIX

APPENDIX A: PREGNANT WOMEN INTERVIEW GUIDE

Creating Evidence Base for Determinants of Maternal Immunization Acceptance in Kenya

Anthropologic Data Collection Narrative Interview Guide

Pregnant Women

Introductory Questions:

1. How old are you?

2. What is your current profession?

What makes your day

What do you do for daily income?

Who provides for you?

OR ***Probes: how do you get daily bread/provision/who provides for you***

3. What is the highest level of education you have completed?

Probe: completed the mentioned level?

Elicitation of information on beliefs, attitude and immunization behavior in the context of values and motivational factors

1. What are the most important factors you consider when you are making health decisions?

Probe: Probe depending on profession, cultural, family matters, economic, diet, according to response in Q2 above, home remedies, black magic. Why choose a hospital, attitude at hospital, what being healthy means, what to do to remain healthy, who guides your health decision? Is pregnancy a factor to consider while making health decisions?

2. Who do you trust regarding information relating to your health?

PROBE: Healthcare provider, Family, Peers, Media, Ask why participant trusts the mentioned source

3. Before this visit, have you seen a healthcare provider for your own health in the last year?

Reasons for seeking health care, number of visits, connect with vaccines, where the healthcare provider was seen, number of hospitals visited

4. What do you know about vaccines?

Define, examples, purpose of vaccines, why are vaccines used.

5. Have you ever received a vaccine before?

If yes:

a. Which one/s?

b. Do you know what the vaccine prevents again?

c. Why did you receive the particular vaccine/s?

PROBE: doctor/family told you to, Vaccines received, other vaccines, what vaccines do, name of vaccines.

6. Where do you receive your vaccination information from?

What was it about, include mobile applications e.g WhatsApp, why liked, separate the quiz for adverts and informational items.

Creating Evidence Base for Determinants of Maternal Immunization Acceptance in Kenya Protocol V1.3 English interview guide

7. Are there any particular advertisements or informational items that you particularly liked related to vaccinations?

PROBE: Where did they see it?

PROBE: Who was it targeted for?

8. Have you ever refused vaccine for yourself before?

Probe: Why?

Probe: Why not?

9. Do you believe that vaccines are safe?

PROB: kinds of illnesses shots prevent, side effects, immunity development through shots, are there too many/too few shots, fear that shots might not be as effective in preventing disease, Why, diseases they prevent, side effects, complains from others, afraid of vaccines may not work, action of vaccine on immunity,

10. Do you know anyone who had a bad reaction to vaccines?

11. Do you think (or know of others who think) vaccines themselves make you sick?

(Separate the question)

12. Would you rank 3 main reasons for you to decide (or not) to get the vaccines?

(Separate the quiz)

PROB: Factors/concerns that motivate or demotivate her. Nature of the vaccine/route of administration, culture, religion (injections, oral, sweet, bitter)

Maternal and infant Vaccine Questions:

1. What do you know about vaccinations in pregnancy and vaccines for infants?

Name of vaccines, diseases preventing against, why important

2. Where did you receive this information from?

3. Would you rank the top 3 most trusted sources of information relating to vaccinations?

PROBE: Liked the information, importance of the information

4. Would you get a vaccine for your infant? Why? Why not?

Rank with reasons, Religious, cultural, traditional beliefs.

5. Who would you discuss getting your child vaccinated with?

PROBE: Family, Healthcare Provider, Peers,

Probe: why discuss with the mentioned person

6. Do you believe that children should receive vaccines? Why? Why not?

Creating Evidence Base for Determinants of Maternal Immunization Acceptance in Kenya Protocol V1.3 English interview guide

7. Do you believe some mothers should have the liberty to choose NOT to vaccinate themselves and their children? Why? Why not?

8. How would you feel if your child caught a severe illness from another child who was unvaccinated?

What would you do, can it change your attitude towards vaccines

Closing Questions:

1. Do you have anything else to say regarding vaccinations?

2. Do you have any questions or comments?

These are all the questions I have for you today. Thank you for taking the time to meet with me today.

APPENDIX B : HEALTH CARE PROVIDER INTERVIEW GUIDE

Anthropologic Data Collection Narrative Interview Guide

Healthcare Providers

Introductory Questions:

1. What is your job description?
   PROBE: What are your responsibilities or your day-to-day activities?

2. What is the highest level of education you have completed?
   PROBE: What is your specialty or what are you trained in?

Current Vaccine Information:

1. Which maternal vaccines do you offer here at the clinic?
   If yes, they do carry specific vaccine (for example, TT Vaccine),
   PROBE: Why do you offer it?
   PROBE: How long have you offered this vaccine?
   PROBE: Do patients ask for these specific vaccines?

2. Do you feel you have enough demand to suggest vaccines to pregnant women?
   PROBE: If yes, why?
   PROBE: If no, why?
   PROBE: Ask for specific examples

3. What types of resources does your clinic have to deliver vaccines?
   Reminder: Make sure you ask about both, educational and logistical and any additional resources the respondent mentions.
   Educational Probes for providers: Do providers have support and education?
      PROBE: Provider-focused resources?
      PROBE: Education on how to deliver vaccines to patients?
      PROBE: Education on how communicate vaccines to patients?
   Logistical Probes: (number of vaccines, storage for vaccines)
      PROBE: Vaccine delivery

4. What additional resources do you think you would need?
   PROBE: Financial resources?
   PROBE: Human resources?

5. At what times do you start talking with your patients about maternal vaccines?
   PROBE: Gestational age
   PROBE: Health education sessions provided by the clinic
   PROBE: How do you provide this information

6. Do you feel you have enough information to confidently discuss vaccines with your pregnant patients?
   PROBE: What components are included (example: uptake, safety, effectiveness)
   PROBE: Give me example of each

7. Are there vaccine-related educational resources that you provide to pregnant women?
   PROBE: If yes, which ones? (examples: Posters, MCH Book, brochures)
   PROBE: Get examples.
   PROBE: If no, what resources would you like to see or have to provide?

8. Do you normally provide vaccines or vaccine related information to pregnant women?
   PROBE: If yes, How do you provide this information?
   PROBE: Get examples of how they do this.
   PROBE: Is this information enough?
   PROBE: If no, what do you think can be done?
   REMINDER: Use your personal experience in interviewing pregnant women

9. What do you feel is the impact of these materials on your patients?
   PROBE: What is the patient's reaction?
   PROBE: Do you think these materials work?
   PROBE: How do you know these materials work?
   PROBE: What are the indicators?
   PROBE: If no, why not?

10. When you make vaccines available at your practice, for example the tetanus vaccine – do you think women get enough time to review the information on these vaccines and then make a timely decision to receive or refuse these vaccines?

Patient attitudes:

1. What proportion of patients do you estimate have received or refused maternal vaccines?
   PROBE: Barriers or reasons for refusal cited by patients.
   PROBE: Perceived ability and methods used to address these barriers/refusals.

2. What specific questions are the frequently asked by pregnant women regarding vaccines in pregnancy, vaccine preventable diseases, and maternal and childhood vaccines?
   PROBE: Are women asking for new vaccines, which ones?

Vaccine knowledge of healthcare providers:

1. What are your opinions about maternal vaccines?
   PROBE: Do you think maternal vaccines are beneficial? Why or why not?
   PROBE: Do you think maternal vaccines are harmful? Why or why not?
   PROBE: Do you feel all healthcare providers feel the same way as this?

2. What do you know about the Tetanus vaccine?
   PROBE: Effectiveness and safety.
   PROBE: Knowledge of Td or Tdap vaccine.
   PROBE: General knowledge and for pregnant women

3. What do you know about the flu vaccine?
   PROBE: Effectiveness and safety.
   PROBE: General knowledge and for pregnant women

4. Do you think there should be more recommended vaccines for pregnant women? Why or why not?
   PROBE: Other vaccine preventable diseases.
   PROBE: Td or Tdap?
   PROBE: Flu?

5. What do you think will create demand for new vaccines in the public and among pregnant women?
   PROBE: What actors (government, NGOs, community members) might be involved?
   PROBE: Are there any opportunities you have to facilitate this demand?
   PROBE: What would be some of the barriers?
   PROBE: What could potentially discourage vaccine acceptance or demand at your practice?
   PROBE: Where is this demand coming from?

These are all the questions I have for you today. Thank you for taking the time to meet with me today.

APPENDIX C: PREGNANT WOMEN CODEBOOK.

CODEBOOK

CODE	DEFINITION	NOTES FROM TEAM	Example Quotes
1. Trust in HCP	Implicit or explicit belief in knowledge, best interest, and ability of HCPs to provide adequate care.		
1.1 Trust (urban)			
a. Different Providers		If there is no differential terms used for the different providers, use the main codes, not sub codes here.	
i. Community Health Workers and Outreach Workers from Facility	*Nurses, Clinical Officers that go out to the community during campaigns, ALSO,* Members that live in the community and that are trained in healthcare	Differential terms for how to tell who is clinically trained or not in colloquial and/or local terms.	"Sometimes I see SHOFCO staff volunteering to go from home to home vaccinating children. When they know it is something serious, they just administer to the children without consulting parents as long as the child is within a certain age." (TBT-0087)
ii. Professionally trained (doctors/nurses at facility)			"Nobody can know your health information unless you go to the hospital so the doctor will tell you that what you are suffering from. Sometimes even yourself cannot know what is ailing you." (SYA-044)
iii. Interns/Students (at facility)		Untrained vs trained personal concerns have come up in the data	"Yes, and because offered me poa (good) services when I came to deliver my first child. Even the watoi (watoi is slang for children but the participant was referring to students) from medical training colleges also offer medical services. Once you trust a place, you will always go back." (MDH-0104)
iv. Chemists		Not for serious matters – just seek out pain relievers	"There is a chemist near my place. I am not sure if the owner works at Kenyatta National Hospital…but he owns it. Sometimes he can refuse to give me painkillers. When I was two months pregnant, I used to feel headache. When I went to him for painkillers, he refused to give me. Instead, advised me to relax and get over the stress which was related to first pregnancy which was still at early stage. The headache just ended." (TBT-0082)

vi. TBAs (Traditional birth attendant)			
1.2 *Trust (rural)*			
a. Different Providers		** Questions – Who gets badges to identify different providers (CHWs and doctors)?	
i. Community Health Workers and Outreach workers from the facility	*Nurses, Clinical Officers that go out to the community during campaigns, ALSO,* Members that live in the community and that are trained in healthcare	Differential terms for how to tell who is clinically trained or not in colloquial and/or local terms.	"The one I trust is the community health worker because they get their instructions from the doctors" (SYA-032)
ii. Professionally trained (doctors/nurses at facility)			I only trust the doctor fully…because if I go to him and explain my problem he will give me medicine and after taking the medicine I will have difference." (SYA 031)
iii. Interns/Students (at facility)			
iv. Chemists		Only seen in rural settings – more common in rural settings	
vi. Herbalist			
vii. Traditional Birth attendant			
2. Facility Choice	Factors that influence preference of facility for healthcare		
2.1 *Public*			
a. Trust/mistrust in institution	Implicit and/or explicit belief in institution of choice for care.	Also includes hygiene	"There is a time my child was very sick and I took my child to the chemist and I paid a lot of money but at long last the chemist people told me to take the child to Marsabit referral hospital because the child did not recover from the medication they give. So after I took my child to Marsabit Referral HospitaL, the child got treated and finally healed" (MBT-011)
b. Cost	Financial burden		"Private hospitals are expensive and public hospitals have doctors that are trained by the

			government and have better qualifications as compared to the staff in private hospitals. Private hospitals are in business" (MDH-0113)
c. Convenience	Distance, accessibility, wait times, and office hours of the institution		" Mlaha is not that close but I chose it because if you go there because you do not overstay in the hospital. because sometimes if you are very sick you can be bored with the hospital and you end up coming out of the hospital without being treated. Like I have once left my hospital book in the hospital just because of overstaying in the hospital - (SYA-031)"
d. Services available	Laboratories, delivery, vaccines and pharmacy services of the institution		" They do thorough investigation and checkups and their service is great"(MBT-011)
e. Attitude of staff	Bedside manner of providers, and other staff.		"I: Mbagathi is your facility of choice for the ANC. What exactly attracted you here? P: They are so welcoming. I: Okay, is there anything else besides them being welcoming? P: My aunt who has already delivered came here and she told me it is a nice place, and that she was treated well." (MDH-0101)
f. Social circle	Family, friends, peers, social media groups – 'referrals'	Look for, 'strong voice from the husband'	
h. Government	Government recommendation		
2.2 *Private*			
a. Trust in institution	Implicit and/or explicit belief in institution of choice for care.	Also includes hygiene	"In terms of services the public hospitals are good than private hospital because like for family planning, when you go to private they give you medicine that has already expired but after like two months you are pregnant and if you go to the public hospital it is rare for you to find such case." (MBT-04)
b. Cost	Financial burden		" Private hospitals are expensive as compared to here, like now they ask for consultation fees whether you are assisted or not and you must pay." (MSA-10)
c. Convenience	Distance, accessibility, wait times, and office hours of the institution		"When you go there [private hospital] they ask for your book and then they will ask you why you have you have left there [Siaya County Referral Hospital] and you have come here [Private hospital]. They might have a lot of questions." (SYA-037)

d. Services available	Laboratories, delivery, vaccines and pharmacy services of the institution		"I am attended to faster, prescriptions are available and provided to us. In other places they can write all the prescribed drugs but are not provided for the sick person. They advise patients to buy for themselves. Sometimes you may not have the money o buy them. That means suffering even more." (TBT-0055)
e. Attitude of staff	Bedside manner of providers, and other staff.		"We are not taught anything in the government hospitals but private hospitals create time for you to teach you and allow you to ask questions. Government hospitals have very many people so you cannot ask questions." (MDH-0120)
f. Social circle	Family, friends, peers, social media groups – 'referrals'		
3. Perceptions of Health	An individual's conceptualization of a healthy mind, body, spirit, and environment.		
3.1 General			
a. Knowledge/Information	Correct knowledge vs. misconceptions, formal vs. informal	Look for questions that ask "What is" or "What you know?"	"Health is when you are sick you should know your health, and go to the hospital to know your health. " (SYA-031)
b. Practices/Sources	Application of knowledge in behaviors	Look for "What do you do" or "What have you done"	"As a diabetic, I avoid alcohol and roasted meat. When I avoid fatty foods, I avoid things like obesity." (MDH-0120)
i. Rejection			"I understand this person was crossing the road with a motorbike and got hit by a vehicle. When his fellow worshipers arrived, they took home for prayers instead of the hospital. They said that they believed he would get healed since bleeding had stopped. It forced a neighbor to intervene by calling police officers to carry him to hospital. He was taken to hospital yesterday but one." (TBT-0082)
ii. Acceptance			" Only that when you are sick you come for treatment and you will feel better." (SYA-031)
iii. Indecision	"Fence-sitters"		
c. Attitudes/Motivations			

i. Active			"If for example your head is aching or your body is so weak, and you can no longer do house chores, you need to see the doctor. When it is stress and headache you need to know what brings them then you avoid it." (MSA-010)
ii. Passive			"[for emotional] I pray" (SYA-044)
3.2 Vaccines			
a. Knowledge/Information	Correct knowledge vs. misconceptions, formal vs. informal		" Even recently they just inject me and never told me what it was." (SYA 031) "Vaccines help. If a you do not get vaccines they cannot have good health or a child cannot grow well. The child might be lame or cannot have good health. I only know that" (SYA-036)
i. Perceived risks		If it's low or no risk, it is also included here.	"I understand it that if something injures your leg and causes a wound, if you have the ***sindan [injection]*** you shall find that the wound shall not ***nyanyre [become septic]*** and end up cancerous leading to amputation." (TBT-0079)
ii. Perceived benefits			"Therefore, if you have a wound, you can visit the hospital for treatment. The treatment may be ***yien [medicine]*** or ***sindan [injection].*** There are wounds that may look small but if you are not vaccinated, it will be easy to contract tetanus which will make treating the wound difficult. The wound may spread to the rest of the body forcing the leg to be amputated." (TBT-0079)
iii. Lack of Information	Incomplete or missing information		
b. Practices/Sources	Application of knowledge in behaviors	Includes vaccine delivery concerns. *** May become its own grandfather node.	"If I know its (the new vaccine's) purpose well, I will accept it." (SYA-044)
i. Rejection			" I refused because I was busy and I did not have interest for the mothers' vaccines" (MSA-07)
ii. Acceptance			"I can accept because it can protect me against a lot of things" (SYA-036)
iii. Indecision	"Fence-sitters"		**I:** Which kind of information is your mother sharing with you? Is she sharing with you reasons for not getting you

			vaccinated? **P:** I think she was just indifferent or uninterested. I doubt if she had proper reason." (TBT-0079)
c. Attitudes/Motivations			
i. Active			"Just injections (would make me refuse vaccines). . Maybe if there were another method of administering it would have been easy. There are times like now I do not want medicine or injections so it is hard." (MSA-07)
ii. Passive			" I: According to you, were you expecting the nurse to give you any information on vaccines as a pregnant woman today? P: No. I thought the first one was necessary and I think they assume that you already know when you come for your second dose. I: But you said that you cannot remember anything about the information your given when you went for your first dose. P: Yes. I cannot remember." (MDH-0113)
3.3 Pregnancy			
a. Knowledge/Information	Correct knowledge vs. misconceptions, formal vs. informal		" Based the information I was given; I am supposed to eat certain foods like calcium-containing food, take a lot of greens like spinach, do exercise and avoid a lot of work." (MDH-0113)
b. Practices/Sources	Application of knowledge in behaviors		"I have a problem with sinuses and they hurt when it is cold so I have decided to start eating healthy, exercising and just be positive because I am tired of going to hospital" (MDH-0116)
i. Rejection			
ii. Acceptance			"I: How was the experience after vaccination? P: I did not feel anything on that particular day but painful and itchy the following day until I could not lift my hand. The pain subsided after two days. I: Did that discourage you from getting vaccinated? P: No. I: Do you think that that discourages other women from getting vaccines?

			P: I do not think so because it is not an everlasting pain and we also believe that it is beneficial to our health." (MDH-0119)
iii. Indecision	"Fence-sitters"		
c. Attitudes/Motivations			
i. Active			**"I:** Like today, why did you come to the hospital?" "P: I was not feeling well in accordance to my condition [***pregnancy***]." (TBT-0060)
ii. Passive			"I: Were you given any information on that before it was administered? P: No. I was just told that it is tetanus vaccine and that it is painful but I was not given extra information on it. I: Do you think that you needed to ask? P: I later asked my sister while at home about the vaccine. I: Why did you not ask the nurse? P: I thought she was busy because she needed to attend to other people" (MDH-0115)
4. Sources of Information on Vaccination and health	Where individuals receive or discuss information about vaccines e.g. doctors and other HCPs, media, posters, internet, social circles, family, family friends, peers, religious leaders, chiefs, community leaders	If it is maternal vaccines/pregnancy vaccines, double code it under pregnancy AND vaccines.	
4.1 General Health			
a. HCPs (at facility/outreach workers)	Professionals primarily associated with healthcare facility		**I:** Who do you trust regarding information relating to your health? **P:** I trust the doctor. (TBT-0057)
b. *CHWs*	Individuals primarily viewed as community members trained in healthcare		
c. *Media*	Radio, television, posters, internet, newspapers, books (Also includes social media like WhatsApp, Facebook, etc)	These are connected to the government. Info from NGOs haven't been mentioned	
d. Social Circle	Family, Friends, Coworkers, Peers		**I:** Okay. Is there anyone else you trust? **P:** My parents.

			I: Why do you trust your parents? **P:** They cannot lie to me. (***Laughs***) **I:** (***Laughs***) are there people who lie? **P:** Not everyone is good. There are people you can trust then lie to you but your parents and doctor cannot. **I:** Whom would you trust and tell it you had a problem? **P:** My husband. **I:** Why your husband? **P:** He should know everything. (***Laughs***) I cannot lie to him because we live together so if there is any problem he will see it and do something about it. **I:** Your husband has the solutions. **P:** Yes. **I:** Is there anyone else you would trust? **P:** I do not think so. Neighbors are not good. **I:** Why? **P:** No. They are not good. **I:** So, you would only trust your husband. **P:** Yes, let me remain with him. (MDH-0127)
e. *Religious or community leaders*	Priests, Imans, Chiefs		
f. *TBA (Traditional birth attendant)*		These are untrained – once they are considered trained – then they become CHWs	
g. *Education*	Learned at school or in a formal setting (such as trainings)		**I:** You shared with me about school and job. Where do you get your health information from? **P:** Here ***[at Tabitha clinic].*** **I:** Here right? **P:** Yes. Not only here but there is also counselling. **I:** Who counsels guys? **P:** May be ***group ya madem [slang for an organized group of girls].*** **I:** Do you belong to a ***group ya madem [slang for an organized group of girls]?***

			P: Yes. **I:** What is its name? **P:** There is Carolina for Kibera, we attend seminars. **I:** That is interesting. **P:** ***(Laughs).*** **I:** Which kind of health information do you get from the ***group ya madem [slang for an organized group of girls]?*** **P:** We get so many things. **I:** Share with me what you get ***(light laughter).*** **P:** We taught so many things like…I am forgetting. (TBT-0056)
h. *self*		Individual research or person with prior experience (different from personal autonomy)	
4.2 During Pregnancy			
a. HCPs (at facility/outreach workers)	Professionals primarily associated with healthcare facility		"They were the doctors who go round in vehicles and Nyamrerwa (CHW) who had earlier told me about the service that they would give vaccines door to door " (SYA-032)
b. CHWs	Individuals primarily viewed as community members trained in healthcare		"I: Which would you say you trust the most? P: The health educators because they will explain exclusively and give you a chance to ask questions until you understand." (MDH-0111)
c. Media	Radio, television, posters, internet, newspapers, books (Also includes social media like WhatsApp, Facebook, etc)	These are connected to the government. Info from NGOs haven't been mentioned	"I: Okay. Is there any other source? P: Governments books. I: Which ones have you come across? P: I do not know the names but they are usually in health facilities mostly about PMTCT and HIV targeting women and children." (MDH-0116) "Yes, like on Facebook there is a group of women who are pregnant that I am a member. You know women say, "Oh I am from getting an injection…" So you get curious "Oh people get injected?" "How many weeks are you?" You share information with other women who are going through the same. (MDH-0083)

d. Social Circle	Family, Friends, Coworkers, Peers		"**I:** Why do you trust your aunt regarding information relating to your health? **P:** Because she is always close to me and free with me." (TBT-0060)
e. Religious or community leaders	Priests, Imans, Chiefs		
f. TBA (Traditional birth attendant)		These are untrained – once they are considered trained – then they become CHWs	
g. Education	Learned at school or in a formal setting (such as trainings)		
h. self		Individual research or person with prior experience (different from personal autonomy)	
4.3 Childhood vaccines			
a. HCPs (at facility/outreach workers)	Professionals primarily associated with healthcare facility		"I: Can you trust him [doctor] when it comes to vaccinating your child? P: We have never talked about vaccines but I trust him." (MDH-0104)
b. CHWs	Individuals primarily viewed as community members trained in healthcare		"I would visit my relatives during the holidays when I was younger who took their children for vaccines and sometimes there would be door-to-door campaigns so I learnt. I have never received any information from a professional." (MDH-120)
c. Media	Radio, television, posters, internet, newspapers, books		"I: How do you get vaccination information, for example like a parent how would know when the children are to be vaccinated? P: We see from posters pinned by the roads, there are those people charged to do announcements at the villages, adverts are put across the TV and radios." (TBT-0061)
d. Social media	WhatsApp, Facebook, etc		
e. Social Circle	Family, Friends, Coworkers, Peers		"When I see it on TV I will first discuss with my mzee [Mzee is Swahili for old but was used to mean husband] then go to the center." (MDH-0094)

f. Religious or community leaders	Priests, Imams, Chiefs		"I trust government hospitals and the clinic I am attending. We are also taught at the mosque and when there is a campaign, they go round teaching and before they administer the vaccine you have the right to ask." (MDH-0094)
g. TBA (Traditional Birth attendant)			
h. Education	Learned at school or in a formal setting (such as trainings)		
i. self		Individual research or person with prior experience (different from personal autonomy)	
5. Communication strategy	Preferred means of passing information to the target population	Understanding of the materials, appeal and effectiveness (Includes preferences or suggestions for improvement as well)	
5.1 Effective		Color of posters, etc.	
5.2 Ineffective		Posters not in local language	
6. Religious, Moral, and Cultural Factors		Specifically related to vaccines	
5.1 Barriers			
a. Familial Practices	"we didn't do this in the past"		"You know the elderly people are lucky because they never got the polio vaccine but they were never attacked by polio. Some of them will argue that "if I was never attacked then what will make my child get the attack"" (MDH-0113)
b. Chiefs	Provincial administration – Barazas – meetings to address issues in communities and pass information	Cabinet members or elected members (Also see 5.2b)	
c. Religious Leaders (Imans and/or Priests)/Beliefs/Practices	Anti-vaccination, family planning rumors, shunning of healthcare		" You know they don't go to the hospital, they just believe that even that vaccine doesn't help

			they know that if they pray, they get well they are even disturbing people where am coming from." (SYA-031)
d. Traditional medicine	Home remedies, prayer, faith healers – anything other than medical sciences		"There those traditions that say they only trust in herbal medicine, they do not trust drugs from the hospital. The old women say that in the past we lived without those things(vaccines) why should we get them now." (MSA-07)
e. Community Norms	Most community members accept vaccine		"There is one recently that women were being injected but I was not injected, I ignored because some people were saying some of the vaccines are making women not give birth or other things." (MSA-07)
f. Belief in personal autonomy (MFT)			"No need to force them because mothers need to do it willingly since vaccines benefits their children" (MBT-011)
5.2 Facilitators	Facilitators that assist in vaccination		
a. Familial Practices			
b. Chiefs	Provincial administration – Barazas – meetings to address issues in communities and pass information	Chiefs – government associated – chief is the face of the government in the community. NOT a political position	"even where am coming from there are some who doesn't want [to get vaccinated] to an extent that chief must walk with doctors when their children are vaccinated.(SYA-031)
c. Religious leaders/beliefs/practices			
d. Status of HCP, CHWs	Fear of looking stupid or being reprimanded for asking questions/ appearing to challenge the HCP's knowledge		"Even if it were you, you would be scared. We believe that if you are a know-it-all, they may even harm you. It is like telling the doctor 'you did this and it is not done like that.' You are sure that is not how it is done but because he/she wants to show you that he/she is there for that job and knows more than you do people say that he/she can harm you because you do not know what you are being injected with. It can even be poison. There was I time I took my first-born to St. Mary's Hospital in Lang'ata [Lang'ata is an estate in Nairobi] and they drew blood from her hand. Usually they give spirit to wipe the area but the doctor did not so there was blood everywhere and when I asked the doctor he/she said I should hold the baby. I asked him what to use and requested for cotton

			wool. He told me to get out and that I am one of those who pretend to know everything, so I was forced to use my handkerchief. I was still young since it was my first child and I got scared such that even when I got my second child I was still afraid of asking about the two shots." (MDH-0094)
e. Community Norms	Most community members do not accept vaccine		What can motivate me is that it is used by many people in an area and something that is used by many people cannot be bad. So if I hear that there is a vaccine I also go for it." (SYA-032)
f. Ideas of Fairness/Reciprocity (MFT)			"Because when a human big is sick, they are Kenyans, even when a child dies. The life of every human being is beneficial to the world. When some are sick and others healthy, that is not good news to the government. The government will be happy seeing her people healthy. They would therefore not like such a situation thus get everyone vaccinated." (TBT-0086)
g. Ideas of Care/Protection from Harm (MFT)			"First of all, you think that a child is a gift from God and you have to take care of it. From my perspective, I will do it because I was done for without those vaccines who knows who I could be." (MDH-0121)

APPENDIX D: HEALTHCARE PROVIDER CODEBOOK

Code	Definition	Notes	Example Quotes
1. Resources For Vaccine Delivery	Physical and human resources, activities related to vaccine distribution and delivery from depot to client		
A. Human Resources	Personnel needed for vaccine delivery		"I: How about the delivery or shortage of vaccine, is response positive or, what are the channels do you use to get more or new vaccines? P: I would not say that we never ran short of vaccines but the challenges that we face is that the same person administering vaccine is the same person who is supposed to go to public health department and order the vaccines, when there is shortage we will have to leave the client first and restock." -MSA-003
B. Equipment	Refrigerators, carriers, vaccines themselves etc.		"I: What types of resources do you have here to help you in the delivery of vaccines? P: We have the refrigerators, cool boxes. We normally put them in cool boxes that are lined with ice bags in case of power outage that last for long. We also have vaccine carriers that we use to carry vaccine when going to the maternity. We also line them with ice bag" -MDH-0001
C. Logistics and Operations	Transportation, how long vaccines can be out, requirements for dissemination		"I: Let me take you back a bit to the logistics part of it. Where do you usually get your vaccines from? P: We normally get them from the depot. We are lucky to have the sub-county depot in our building. Each sub-county

	only how the vaccines are distributed, stored		in Nairobi has a vaccine depot which receives vaccines from the national level. I think you know where the depot is." -MDH 0001
D. Vaccine procedures/ protocols	The process or procedure by which vaccines are offered at the facility	Should apply to instances when they are talking about how they give it in conjunction with ARVs or maternal visits, etc	"We normally start immunization at six weeks but remember that mothers are usually ready to deliver when we are through with them. We usually go to the maternity for immunization every day in the morning when there is no strike." -MDH 0001
2. Patient Education Efforts	Activities and resources used by the facility and/or provider to educate patients about vaccines about maternal vaccines only		
A. Available Materials & Resources	Physical educational resources e.g. posters, pamphlets, videos		"I: Is there any material that you give them to know the vaccine, say like getting the information from friends, media? P: These mothers have booklets, we issue them with booklets, mother-child booklets which have this information inside; we also at times give health education in the morning before we set off for the day, just to inform the mothers on it, in our session we indicate the importance of TT vaccine." -MSA 003
B. Needed Resources or Recommendations	Desired resources or recommendations for strategies for vaccine education	Only for education efforts, not for vaccine delivery	"I: Now in terms of teaching material as you would want references because in medicine knowledge is dynamic, do you have such like items?

			P: I think in that, we always use the mother-child booklet that is available for every client but I do not think that is enough, we should have a flow chart, flip chart that can be used to teach client one on one and fliers to teach our clients most of the time." -TBT-003
C. In Clinic	Education efforts occurring at the facility		"I: What areas do you usually address when you are talking to mothers during the health talks or when you are having a one on one session with them? P: We start by telling them what maternal vaccines are, the mode of action, who should get them and at what gestation, the intervals at which a mother should get them and how they prevent the baby from tetanus toxoid. We also address the benefits and the side effects of the vaccines. We then allow them to ask questions or talk about the misconceptions that they have about them. You are able to know their thoughts on the vaccine and address them when they ask questions." -MDH-0001
D. Outreach	Education efforts in the community		"I: When interviewing pregnant women, they would say they did not know that they had received the tetanus vaccine until we asked them if they received an injection on the arm and they would say yes. They would say the injection was given as a routine and no information was given by the doctor. P: They may say anything but before you give it within the communities, there is usually information given to them, through the media, through the chief barazas. Sometime back, we would go to schools within the communities like every two years and give those between 15 to 49 years. You cannot give the vaccine surely without telling them what is all about, how it works and what we expect."

			-MSA 003
E. Impact	The perceived effect of vaccine education efforts on pregnant women		"I: Do you therefore feel that the posters on the wall have a big impact on the mothers? P: Yes. Some will tell you that I have seen this and that but contrary to what women say I have read this. Then you get a chance to give her the correct information. You now tell her that that the information on the poster is the correct one and to avoid the wrong information that she gets from people out there. You will find a mother telling you that she was told a coil can disappear and go to the heart. You will even find out that the person saying that is not even a user of the coil. You then tell her to ask somebody who has used it for years if it has ever gone to the heart. It is only somebody who is against family planning who will tell you that the pills will pile up in the intestines and make your stomach big. They talk about so many bad things." - MDH 0001
3. Patient-Provider Relationship	Ways in which the interactions between patients and providers influence vaccine uptake		
A.Time Constraints/Workload	Provider overwork/patient time as a limiting factor in provision of education		"I: You have just told us that you normally give information to first time mothers, do you think they normally have time to digest the information before they are vaccinated? P: Sometimes you might not have the time because of the workload. We normally rush through because of the long queue. That is why I was saying that we need additional staff. We like giving them time to prepare themselves psychologically."

			-MDH 0001
B. Unwillingness to challenge HCPs	Patients accept vaccines without question because of fear of reprisal from HCP		
C. Perception of Patient Trust	Provider perception of patient's' confidence in their knowledge		"...they normally have time to accept because by the time they leave their homes to come to the clinic, they are very sure the doctors or the nurses or health care providers know more than they do, so they will just do what the health care ask them to do." TBT-0007
D. Providers' Attitude Toward Patients	Positive or negative interactions as a facilitator or barrier to vaccine uptake		"I: Mothers have reasons for loving this place, as a healthcare provider, why do you think mothers love this facility? P: We also ask them that because profiles are not charged at the health centers but they are charged here. They told us that they feel safe in our hands since there is a gynecologist and obstetrician who can handle them in case of any complication. Others think that they must be clients in this clinic for them to deliver at Mbagathi but we tell them that you can go to other clinics but still come for delivery here as long as they produce their books." MDH-0001
4. Provider Attitudes and Knowledge	Facts and opinions regarding maternal vaccination	answers to "are they safe?, "are they beneficial", "should there be more", otherwise it's just facts	

A. Attitude	What are your opinions on maternal vaccines? Do you think there should be more / less?		
I. Positive/Open	Belief that vaccines are safe/beneficial or there should be more		"I: You have sad that they normally ask for Hepatitis B which you think they should be given. Why do you think so? P: Many people are suffering from Hepatitis B already. Hepatitis B is a viral disease that will affect even the baby. It is not curable and it will affect her liver. The outcome of the mother and the baby will not be good and we are looking for healthy outcomes for both of them. All pregnant women should have at least Hepatitis B vaccination." MDH-001
II. Negative/Closed	Belief that vaccines are harmful or ineffective		
III. Unsure/Indecision	Indecision when it comes to vaccines being harmful or helpful.		"I: Do you think they could be harmful in anyway? P: I am not sure about that because all the women whom we have vaccinated and have delivered do not have any issue, neither are their babies. Most the immunizations that we give have been tested and have been found to be safe. That is what we also tell the mothers when they are skeptical about the vaccines. There are days that babies are given oral vaccine and three jabs which makes mothers ask us how safe they are on the baby. We tell them that they have been tested through clinical trials and the Ministry knows that it will be held accountable in case of anything. The Ministry cannot allow something that has not been tested and found to be safe for use to be administer on people. Tetanus toxoid has been found to be safe for mothers. "

			MDH-0001
B. Knowledge	Facts about vaccines	In terms of actual facts or information pertaining to vaccines	
I. Current Knowledge	Facts about vaccines the provider knows	Including what vaccines are offered, when and how. About maternal vaccines only	"I: Okay why do you offer TT alone? P: Just to ensure our mothers are protected from tetanus, which is very fatal especially to their children. When they come, we monitor their progress though their antenatal clinic, but we also know there is a chance of these mothers having their babies anywhere because labor can start anytime, anywhere, so we give them to make sure that mothers and their children are protected from tetanus." MSA-003
II. Gaps in Knowledge	Facts the provider does not have or would like to have		"I: Do these CHVs have enough knowledge for the task? P: They have little knowledge on vaccines and before we bring them on board, we first train them and if there is any information we want them take to the community, we call them and enlighten them on whatever they should know at their level." TBT-0003
6. Barriers	Factors decreasing vaccine uptake		
A. Patient Knowledge & Attitude	Negative opinions, misinformation, or lack of knowledge preventing patients from receiving vaccines		"I: What specific questions do mothers ask frequently regarding vaccines during pregnancy? P: They ask what vaccines are, whether they are necessary and whether they can opt out. Some tell us they will deliver

			in hospitals and there is therefore no need of them having tetanus vaccine. They ask about what will happen to their babies if they are not given the vaccine." MDH-0001
B. Patient Agency	Personal autonomy to choose to reject vaccines		"May be Nairobi is different from other places because we normally hear about mothers refusing immunizations in other places. You can find a situation where maybe a mother had gone maybe to the washrooms, when she comes back and hears that babies have been vaccinated, she will want to follow us to bring the baby to be vaccinated. She is then told to wait until the following day but sometimes we are called by the nurses and told that there is a woman who is saying that her baby was not vaccinated. You cannot immunize a baby without the mother's consent simply because you are immunizing babies. You must get her consent first. If she is not there for whatever reason, you just skip the baby but notify the mother that the baby needs to be immunized." MDH-0001
C. Rumors/Perceived Risks	Concerns about safety or side effects	E.g. birth control rumors, pain at injection site, etc.	"I: Do pregnant women ask for this specific vaccine? P: Yes, some will come asking for them, some will tell you they have not been vaccinated. Most of women know about this vaccination, although they fear the pain that comes along as a result of the injection." MSA-003
D. Migration	Client migration and inability to track them (could be due to insufficient record keeping ability)		"..especially mothers who stay here in this community of kibera slums, sometimes there is too much migrations from kibera to other places, and sometimes you find they are migrating and their tetanus vaccine date is reached and where she is going to settle you find that she is not familiar with the area and does not know where to go and get the tetanus vaccine. So she will end up defaulting." (H-TBT-

			0007)
E. Access	Cost, distance to facility, limited days where clinic offers vaccine, time constraints, availability of vaccines		"I: What do you think would discourage the vaccines? P: The distance from the community to delivery points, that is, when the consumers use a lot of money for long distance to get the services, staffing within the health facilities, that they come and find few health service providers, hence taking too long to get the service." (MSA-003)" Now, with the tetanus toxoid, it is about sixty percent; it should be eighty and not sixty percent because whenever they come, we have to talk about it and offer the services. In other facilities it will depend on the logistics and catchment area like in Turkana, you will find a woman not attending the ANC so it will be unfortunate that this mother will miss the information and services." TBT-0003
F. Supply	Not enough vaccine available at facility	How does this differ from access? I think these differ enough that we can separate them; "supply" means the facility lacks the vaccines, whereas "access" means the facility has vaccines but the patient can't get them	
G. Religion & Culture	Religious/cultural leaders, beliefs, and practices		"I: What do you think are the likely barriers to the process of demand creation? P: Cultural factors and propagandists who spread propaganda on vaccines. I remember when we started the

			program "Kick polio out of Kenya", people said that we had put somethings in the vaccines. I am not sure if religion is part of it. The other issue is when you do not educate the people well, when people do not have information or when we do not do it the right way by instilling fear instead of giving facts." MDH-0001
H. Patient-Provider Relationship	Negative interactions between patients and HCPs in relation to vaccines	Double coded with "Patient-provider relationship" subnodes	"I: Do you think attitude of the service provider may affect the vaccines uptake? P: The attitude of the health provider, yes can affect because you cannot find it easy to use something on others before you understand its benefits. You might have the attitude that might make the uptake to take too long." TBT-0003
7. Facilitators	Factors increasing vaccine uptake		
A. Patient Knowledge & Attitude	Positive opinions or knowledge of vaccine benefits		
B. Patient Agency	Patient's actively seeking vaccines or more knowledge about vaccines		
C. Ideas of Care and Protection from Harm/Perceived Benefits	Desire to protect or care for the unborn child	only as it relates to facilitating uptake among mothers, so the sentiment should come from the mother	"I: Are there mothers who normally refuse to have their babies immunized with the BCG vaccine that you give out in the morning? P: I have been here for almost two years but I have never seen a mother refusing. I think our people are getting enlightened and they know its importance. In fact, one thing that I have realized is that our mothers are very careful with their babies. They would not want anything to happen to their babies. Even mothers who are uncooperative during

			labor cooperate when you tell them that what they are doing will harm their babies." MDH-001
D. Partners and Stakeholders	People and organizations supporting vaccine distribution/education		"I: You have just mentioned that women normally ask for it, that is kind of a demand. According to you, do you think you have enough demand for vaccines to suggest vaccines to pregnant women or suggest to the Ministry that women are asking for it? Do you think you can suggest that you need more vaccines based on their demand? P: Yes, but I am really grateful to the government because we have enough. We do not run short of it even if we get people from other small facilities and private clinics. We also have enough immunizations for the babies." MDH-0001
E. Access	Cost, distance to facility, vaccines are offered every day, supply		"I: You have just mentioned that women normally ask for it, that is kind of a demand. According to you, do you think you have enough demand for vaccines to suggest vaccines to pregnant women or suggest to the Ministry that women are asking for it? Do you think you can suggest that you need more vaccines based on their demand? P: Yes, but I am really grateful to the government because we have enough. We do not run short of it even if we get people from other small facilities and private clinics. We also have enough immunizations for the babies. I do not know if it is because I am in a district hospital and we have a depot just next to us here. We do not run out of these things." MDH-0001

F. Religion & Culture	Religious/cultural leaders, beliefs, and practices		
G. Patient-Provider Relationship	Positive interactions between patients and HCPs in relation to vaccines	Almost always double coded with "Patient-provider relationship" subnodes	"I: What areas do you usually address when you are talking to mothers during the health talks or when you are having a one on one session with them? P: We start by telling them what maternal vaccines are, the mode of action, who should get them and at what gestation, the intervals at which a mother should get them and how they prevent the baby from tetanus toxoid. We also address the benefits and the side effects of the vaccines. We then allow them to ask questions or talk about the misconceptions that they have about them. You are able to know their thoughts on the vaccine and address them when they ask questions."
8. Demand Creation	Activities and stakeholders involved in creating demand for new vaccines		
A. Need & Sources	The source of the demand, and demonstrated need for the vaccines	Bottom-up or top-down	"I: What do you think would create demand for new vaccines in the public and specifically for pregnant women? P: Like I said, clients keep asking for them and then the outcomes of those who received the vaccines will be better than those who did not receive them. We know that mothers are given these vaccines in private hospitals and studies need to be done to show outcomes of those who have received versus those who have not received to show that those who have received them have better outcomes."

			MDH-0001
B. Opportunities available for demand creation	Potential demand creation strategies for introduction of new vaccines	Top-down (future vaccines)	"I: What do you think will create demand for new vaccine in the public and among pregnant women? P: Maintaining a good number of those that are specific and keeping the information of those that we had." MSA-003