Traditional Medicine and Demand for Modern Healthcare

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September 23, 2025

Abstract

Traditional medicine is common across Africa. In both rural and urban areas, people report visiting traditional healers for consultation on physical, emotional and spiritual problems. This large and mostly informal market for healthcare is not well understood by policy makers or researchers. We lack quantitative evidence on the characteristics of providers, their services or the demand for their expertise. In this paper we provide descriptive evidence on the demand and supply side of the traditional medicine market in Inhambane province, Mozambique from household and provider-level surveys. We document extensive demand for traditional medicine. People hold disease and symptom specific beliefs about the spirituality of different illnesses. Traditional healers are generally less educated and wealthier than average households. Healers show high trust in conventional doctors, and often refer their patients to hospitals and clinics.

1 Introduction

Traditional medicine is a primary source of healthcare in sub-Saharan Africa. Around 80% of Africans depend on traditional medicine to meet their basic health needs, according to an often-cited WHO statistic. The term “traditional medicine" covers an array of herbal treatments, spiritual consultations, and rituals motivated by indigenous beliefs and administered by either professional traditional healers or knowledgeable amateurs (WHO, 2013). For households living far from medical facilities, healers practicing traditional medicine may offer the most accessible form of healthcare. Yet despite anecdotal evidence on the widespread use and importance of traditional medicine, little is known about the extent of this market, the services it offers, or how people trade off between “conventional" medicine (i.e.

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biomedicine or modern medicine) and traditional medicine when seeking healthcare (Leonard, 2003; Lowes and Montero, 2019).[1]

Traditional medicine is generally practiced by dedicated traditional healers. Often these traditional healers are community members trained in the practice by other healers. Their training may be marked by an apprenticeship, a spiritual experience, community rituals or a passing down of oral traditions. In addition to physical or "naturally caused" illnesses, traditional healers may also address illnesses of supernatural or spiritual origin. Across societies there is variation in the perceived root cause of disease. Even with the recognition that illnesses have physical origins, disease is viewed as "the outcome of imbalances in human society and inimical social relations" (Pearce, 2000). Thus, traditional healers' role may differ from that of conventional doctors. Traditional healers are tasked with not only improving the health of the patient, but also "re-establishing social and emotional equilibrium based on traditional community rules and relationships" (Hillenbrand, 2006; Lowes and Montero, 2019).

Many African governments have sought to integrate traditional healers into the formal healthcare sector, either through licensing of healers, medical trainings, or the employment of herbalists in government clinics and hospitals (WHO, 2024; Boum et al., 2021). The implicit belief is that traditional medicine can serve as a complement to the convetional medical sector, rather than a competitor or substitute. Justifying this belief requires an understanding of how people trade-off between visiting traditional or convetional providers. Traditional medicine may serve as a market substitute for modern medicine in poor areas with low healthcare access or high medical mistrust (Lowes and Montero, 2019, 2021). However, it may also effectively complement modern healthcare if patients visit traditional healers for some diseases and conventional medicine for others – particularly for those disease for which conventional medicine is not available (Stanifer et al., 2015).

This project hopes to fill the gap on systematic data related to traditional medicine use. We collect detailed granular data on the use of both conventional and modern medicine in representative household sample of Inhambane Province, Mozambique. We collect data on household medical histories, health-seeking behaviors, beliefs about the origin of different illnesses, and beliefs about the efficacy of conventional and traditional medicine. We also survey 169 healers working in the areas of our sampled villages. We collect data on their medical knowledge, services, healthcare beliefs and relationship with conventional providers. Lastly, we map access to both traditional and conventional medicine for the communities in our sample, focusing on geographic distance, services offered, market density, and prices.

The survey evidence allows us to explore whether traditional medicine and conventional medicine are

[1] Note, throughout the proposal we will refer to modern or biomedicine as conventional medicine, which is the terminology used in our setting.

substitutes or complements, as well as provide descriptive evidence on who uses traditional medicine and under what circumstances. We find that the majority of households in our sample report having visited a traditional healer. Men were more likely to visit a healer (68%) than women (56%). Propensity to visit a healer is weakly positively correlated with distance to the nearest hospital, and strongly postively correlated with income. The use of conventional medicine appears to depend on the beliefs about the origin of the illnesses, which varies widely across disease types. Preeclampsia, epilepsy, asthma and mental illnesses are the most likely diseases to be considered “spiritual" and require traditional medicine. Healers are majority male (70%), and wealthier than average households. They show high trust in conventional medicine, and the majority report having referred patients to government hospitals or clinics.

2 Existing Evidence on Traditional Medicine Use

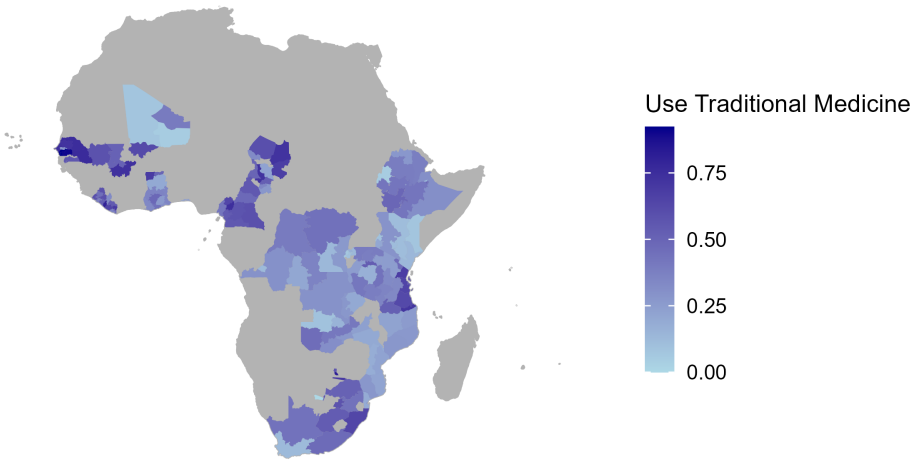
Use of traditional medicine is believed to be widespread, but granular data on its use is limited. For example, a common source of data on health and well-being for many sub-Saharan African countries is the Demographic and Health Surveys (Boyle et al., 2022). These surveys provide detailed information on use of conventional medicine as well as health knowledge questions. However, as described below, they do not include any detailed questions on traditional medicine use.

2.1 Evidence from the Pew Research Center

We can glean some evidence of the importance of traditional medicine using data from the Pew Research Center. A public opinion survey on religious life in Africa asks respondents whether they or their family members have ever visited a traditional healer when in need of healthcare (Lugo et al., 2010). Figure 1 presents these data for 19 countries in sub-Saharan Africa, representing over 23,863 respondents. The average use is lower than the WHO’s figure of 80%, which is an older data point first cited in 1983 (Msonthi, 1984). Still the data suggest that a large share of individuals report using a traditional healer. The median value is 40 percent, but in some places it is as high as 73 percent. Thus, traditional medicine seems to be an important source of healthcare for respondents across sub-Saharan Africa.

We can also use the survey data from Pew to examine some of the correlates of having visited a traditional healer. We estimate an OLS regression, controlling for country fixed effects, a rural indicator, and respondent gender and age. We report these correlations in Table 1. These correlations provide some initial evidence on who may be using traditional medicine. First, Individuals in rural areas are more likely to use a traditional healer. Second, once we control for level of education, women may be slightly less likely to report using traditional medicine. Third, those with lower levels of education and

Figure 1: Share of Individuals Who Have Used Traditional Healers



Notes: The figure presents the share of individuals who report using a traditional healer when they or a family member is sick. The data comes from surveys conducted by the Pew Research Center between December 2008 and April 2009 (Lugo et al., 2010). The survey question is the following "Do you or your family ever use traditional religious healers when someone is sick?".

who report holding supernatural beliefs are more likely to use traditional medicine. Additionally, those with lower incomes – and therefore perhaps more vulnerable – are also more likely to use traditional healers. And finally, those who report struggling to meet health costs are also more likely to report using a traditional healer.

Table 1: Correlates of Traditional Medicine Use: Evidence from Pew

	OLS, Dep. Var.: Has Used Traditional Healer (0/1)					
	(1)	(2)	(3)	(4)	(5)	(6)
Female	-0.005	-0.013**	-0.005	-0.006	-0.006	-0.012*
	(0.006)	(0.006)	(0.006)	(0.007)	(0.006)	(0.007)
Rural (0/1)	0.034***	0.021***	0.033***	0.031***	0.030***	0.023***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.008)
Level of education [1-3]		-0.047***				-0.038***
		(0.005)				(0.005)
Belief in witchcraft (0/1)			0.153***			0.144***
			(0.007)			(0.008)
Level of income [1-4]				-0.008**		0.005
				(0.003)		(0.003)
No money for health (0/1)					0.061***	0.044***
					(0.006)	(0.007)
Observations	23,720	23,286	22,663	20,030	23,323	18,842
Mean Dep. Var.	0.424	0.423	0.421	0.423	0.424	0.419

Notes: The data are from the Pew Forum on Religion & Public Life Survey (2008-2009). Robust standard errors in parentheses. All columns include controls for age, a rural indicator, and country fixed effects. *Has Used Traditional Healer* is an indicator variable equal to 1 if the respondent or family member has ever used a traditional healer. *Female* is an indicator variable equal to 1 if the respondent is female. *Rural* is an indicator for the respondent being in a rural enumeration area. *Level of education* is a variable ranging from 1 to 3, where 1 indicates having completed primary or less, 2 indicates some secondary or completed secondary, and 3 indicates post-secondary and higher. *Witchcraft* is an indicator variable equal to 1 if the respondent reports believing in witchcraft. *Level of income* is a 1 to 4 variable where 1 indicates the lowest level of income and 4 the highest level. *No money for health* is an indicator variable equal to 1 if the respondent reports that there was a time in the last year when their family did not have enough money to pay for health care. * p < 0.1; ** p < 0.05; *** p < 0.01

2.2 Evidence from the Demographic and Health Surveys

The Demographic and Health Surveys (DHS), though a rich source of information on use of the conventional medical sector, has very limited coverage of traditional medicine use. The main questions that have some information on use of traditional medicine are those that ask respondents about where they sought care when their child had diarrhea and fever.[2] For these questions, one of the response options is traditional doctor. There are some country-specific questions about seeking care for other medical events like convulsions, sexually transmitted infections (STI), and malaria. Additionally, as a proxy for holding supernatural beliefs, some survey waves also ask about whether HIV can be caused by witchcraft.

Table 2 reports the results from an OLS regression of each measure on country fixed effects, a rural

[2]Specifically, the question is: "Did you seek advice or treatment for the diarrhea/fever from any source? Where did you seek advice or treatment?"

indicator, and respondent gender, wealth level and age[3]. The results are broadly similar to the PEW results. Individuals in rural areas are more likely to have sought treatment from a traditional doctor if their child experienced fever or cough or for STI treatment. Those with higher levels of education and wealth are less likely to have sought treatment from a traditional doctor when their child had a cough or fever. Finally, individuals with higher levels of education and wealth and those in urban areas are less likely to hold beliefs about the supernatural origin of HIV.

Table 2: Correlates of Traditional Medicine Use and Beliefs: Evidence from the DHS

	OLS				
	(1) Diarrhea: TD (0/1)	(2) Fever/Cough: TD (0/1)	(3) STI: TD (0/1)	(4) Malaria: TM (0/1)	(5) HIV Supernatural Origins (0/1)
Rural (0/1)	0.002	0.006***	0.003*	0.002	0.013***
	(0.003)	(0.002)	(0.001)	(0.002)	(0.002)
Level of education [0-3]	-0.004***	-0.003***	0.004***	-0.001**	-0.025***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Level of wealth [1-5]	-0.004***	-0.003***	-0.000	-0.000	-0.009***
	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)
Observations	51,825	88,999	33,988	17,891	304,284
Mean Dep. Var.	0.031	0.029	0.004	0.004	0.189

Notes: The data are from the most recent Demographic and Health Survey from 37 countries in Sub-Saharan Africa. Robust standard errors in parentheses. All columns include controls for age and country fixed effects. *Diarrhea: TD* is an indicator variable equal to 1 if the respondent has sought help from a traditional doctor when her child had diarrhea. *Fever/Cough: TD* is an indicator variable equal to 1 if the respondent has sought help from a traditional doctor when her child had fever or cough. *STI: TD* is an indicator variable equal to 1 if the respondent has sought advice or treatment of sexually transmitted infections (STI) from a traditional doctor. *Malaria: TM* is an indicator variable equal to 1 if the respondent has taken traditional medicine to prevent malaria. *HIV Supernatural Origins* is an indicator variable equal to 1 if the respondent believes it is possible to get HIV by witchcraft or supernatural origins. *Level of education* is a variable ranging from 0 to 3, where 0 indicates no education, 1 indicates having completed primary, 2 indicates some secondary or completed secondary, and 3 indicates post-secondary and higher. *Level of wealth* is a 1 to 5 variable where 1 indicates the lowest quintile of wealth and 5 the highest quintile within country. * p < 0.1; ** p < 0.05; *** p < 0.01

Beyond the scarcity of information, these measures present several potential problems. First, the questions ask about traditional medicine use for specific illnesses for which the perceived effectiveness of traditional medicine is unclear. From focus groups conducted in Mozambique and in the Democratic Republic of the Congo, respondents rarely, if ever, report using traditional medicine for the treatment of child illnesses such as malaria or diarrhea. Thus, this is unlikely to be a good proxy for traditional medicine use more broadly. Second, these inquiries are directed only to a subset of women whose children have experienced those particular illnesses. Third, these data do not allow us to shed light on under what circumstances traditional medicine is sought out relative to conventional medicine.

[3]For individual i in country s and traditional medicine outcome y_i, we estimate $y_i = \alpha + \beta_1 Rural_i + \beta_2 Education_i + \beta_3 Wealth_i + \beta_4 Age_i + \gamma_s + \epsilon_i$. Each outcome is a dummy indicator.

2.3 Evidence from the Standard Cross-Cultural Sample

Additional evidence on traditional beliefs about illness origins comes from the Standard Cross-Cultural Sample (SCCS), compiled by Murdock and White (1969) and widely used in comparative research. The SCCS consists of systematically coded ethnographic information for a sample of pre-industrial societies, covering over 2,000 variables published in World Cultures. The data are historical, reflecting beliefs and practices recorded by ethnographers over the past century. Figure 2 summarizes the prevalence of different theories of illness origin across societies in the SCCS. Spiritual or supernatural causes, such as spirit aggression, sorcery, mystical retribution, and witchcraft, were frequently considered important or predominant causes of illness. In contrast, physical causes such as infection and contagion were often regarded as absent or minor. These historical patterns indicate that, across a wide range of societies, illness was commonly perceived to have spiritual origins, and physical explanations were not always universally accepted. This motivates our focus on how individuals today navigate between traditional and conventional healthcare options, depending on the perceived cause of illness.

3 Evidence from Mozambique

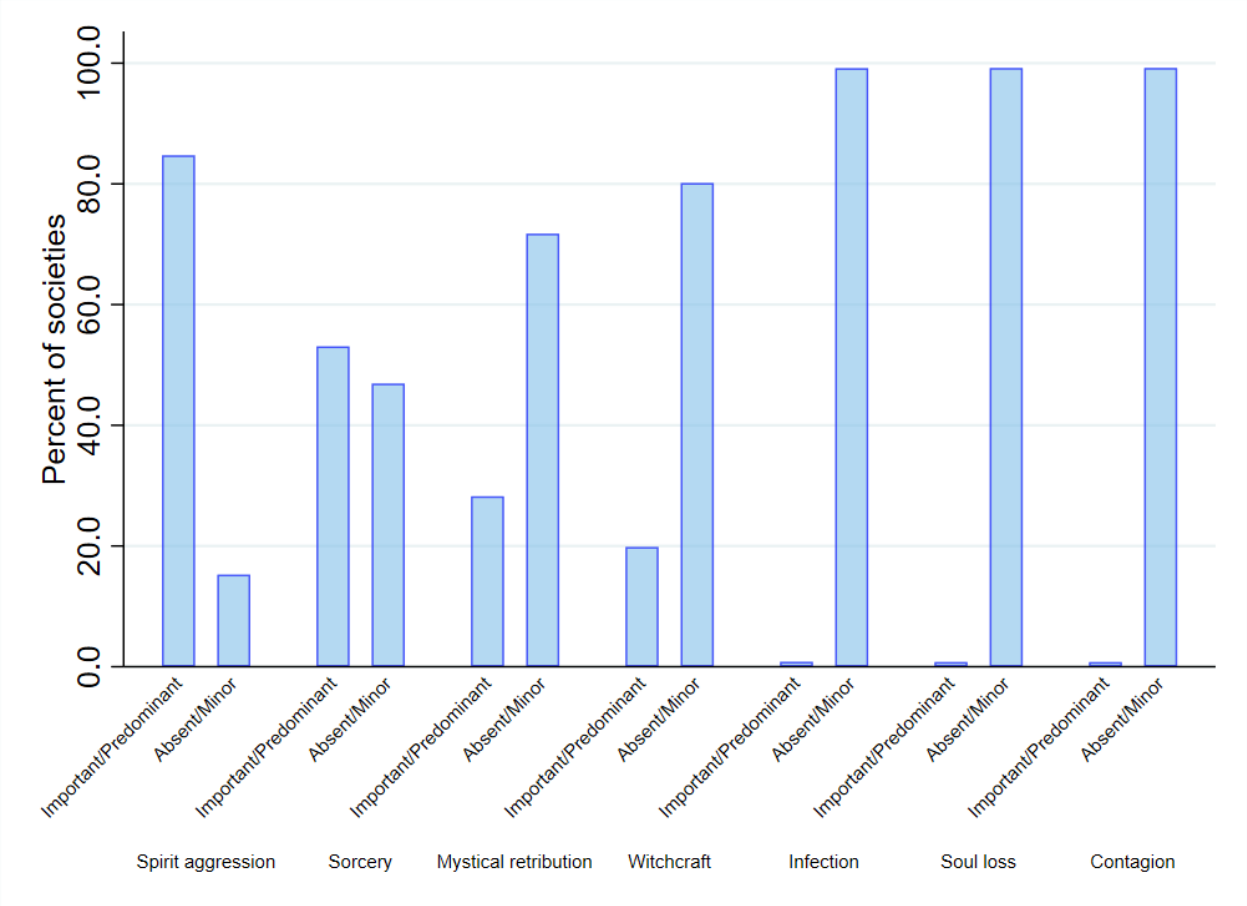
3.1 Setting Background

To motivate the study of traditional medicine and to highlight the potential for working with traditional healers, we undertook an exploratory survey in Mozambique. We focus on Mozambique for several reasons. First, the use of traditional medicine is widespread. Second, traditional healers are formally organized as members of the Association of Traditional Medics of Mozambique (AMETRAMO). AMETRAMO is a government-regulated body that grants traditional healers a proof of membership and ensures the legal performance of their activity. It was founded in 1990 with the aim of endorsing the work of traditional healers, as well as creating standards for care and behavior. AMETRAMO brings together healers who work through herbal and oracle rituals, incorporation of guides, invocation of ancestor spirits and animal sacrifices (Jozane, 2020).

Additionally, traditional healers are represented in the Ministry of Health in the National Department of Traditional and Alternative Medicine. This ministry aims to ensure a safe and sustainable practice of traditional medicine through appropriate regulations and support for research.

Mozambique exhibits some of the worst health indicators in Africa. There are only 9 doctors per 100,000 people - a proportion that is among the lowest in the world (CIA, 2023). HIV remains the primary cause of mortality in Mozambique, particularly among individuals aged 15 to 49. According to the estimates of the Ministry of Health, 2.4 million people were living with HIV in the country in 2022.

Figure 2: Historical Prevalence of Theories about Illness Origins



Notes: The figure presents data from the Standard Cross-Cultural Sample (SCCS), compiled by Murdock and White (1969). Each pair of bars show the predominance of a particular theory of illness origin, including malevolent spirits, sorcery, mystical retribution, witchcraft, soul loss and contagion. The first bar in each pair represents the share of societies in the sample for which the origin is predominant/important. The second bar in each pair measures the share of societies in the sample for which the origin is minor/absent.

Just 73% of HIV-positive men are aware of their serostatus, and 83% of HIV-positive men are undergoing treatment, as opposed to 88% and 91% of women, respectively (MISAU, 2022). Mozambique has a maternal mortality rate of 127 per 100,00 live births; preeclampsia is the third largest cause of maternal mortality (WHO, 2020; Boene et al., 2016). Malaria accounts for 42% of children under-5 mortality (Avanceña et al., 2022).

3.2 Data Collection

To explore the importance and use of traditional medicine, we collect survey data in Inhambane province, Mozambique. We randomly sample 36 villages across 4 localities in 2 districts (see Figure 3). We col-

lect preliminary survey data from 722 households, 169 traditional healers, and 13 conventional medical facilities. Villages were chosen following a 2-step cluster randomization. Localities within the 2 target distrits were randomly chosen, and then villages within those localities were chosen through a list randomization of village names.

Our provider sample was gathered in two steps. First, the local leader or chief of each target village was interviewed. Leaders were asked to identify all healers they could name working in the area of the village. Two healers from this provided list were then randomly chosen to be interviewed. We then supplemented this sample by interviewing healers at a central gathering of AMETRAMO for the province. This supplementary sample is somewhat selected, as it only included healers officially registered to AMETRAMO. In addition we surveyed one nurse or doctor from each conventional clinic and hospital operating in the vicinity of the village (within 20km).

In the household survey we collect data on household medical histories, health-seeking behaviors, beliefs about the origin of different illnesses, and beliefs about the efficacy of conventional and traditional medicine. We also ask questions about distance to nearest hospitals and healers. For past medical events, we ask individuals how much they paid and who they sought care from, as well as any follow-up visits or treatments. The provider surveys with traditional healers and conventional medicine practitioners collected data on medical knowledge, the scale of services, healthcare and spiritual beliefs, trust in conventional and traditional medicine, and referrals to other providers.

3.3 Healers and Healthcare Services

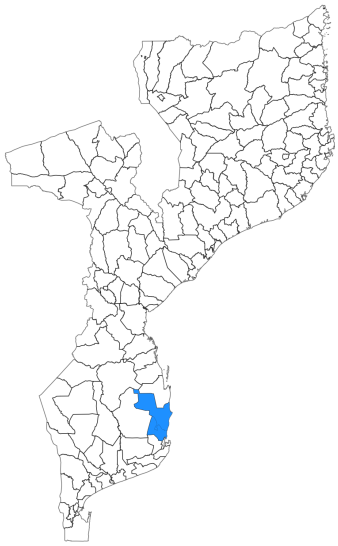
Traditional healers are abundant throughout our study sample; individuals say they know on average 1.4 healers that serve people in their village. Healers range in formality, with some providing a regular, paid service while others only provide services on occasion. Individuals seek out healers to cure an illness, to ward off bad spirits or curses, and to receive good luck. A first visit is called a “consultation", which typically costs a standard fee of 500 MZN (about 8 USD), in which the healer diagnoses the patient’s illness. To determine whether an illness is of spiritual origin the healer will perform a ritual such as tossing bones while asking a series of biographical questions. For spiritual illnesses, treatments often involve drinking or bathing with a curated selection of herbs. Payment for treatment is separate from the consulting fee, and varies based on the duration of the treatment. The contracts also vary, with some healers charging for treatment up front, while others only take payment after the patient is cured.

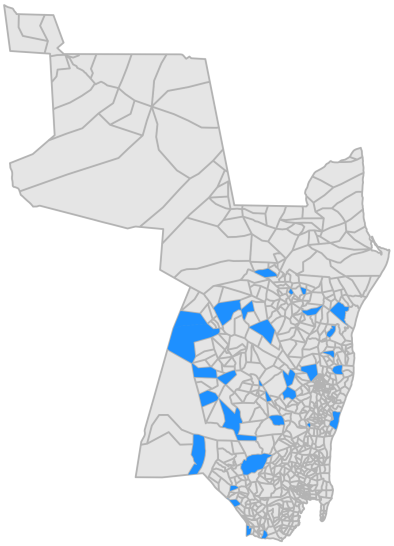
During focus groups, traditional healers often describe how they came into their role following a calling, frequently experienced in a dream. They then apprentice under an experienced healer, although there is no standard list of treatments or methods that all healers use, even within the formally regis-

Figure 3: Sample Map

(a) Sample Districts

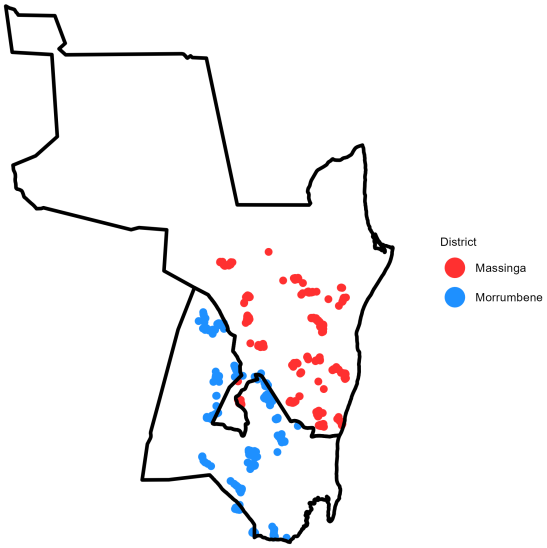
(b) Sample Communities

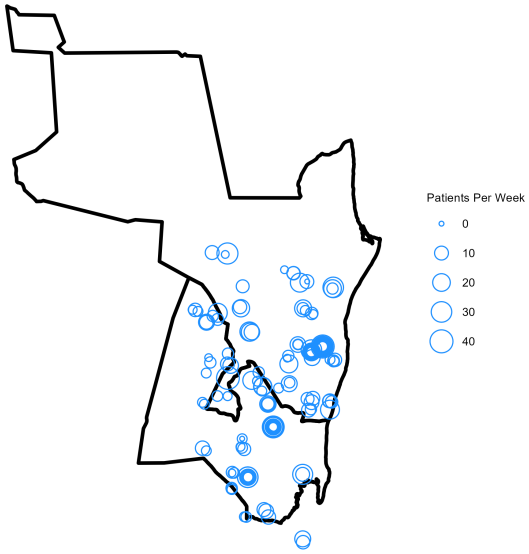




(c) Sampled Households

(d) Sampled Healers





Notes: Panel A shows the sample districts in Inhambane Province in southern Mozambique, called “Massinga" and “Morrumbene". Panel B presents the geographic boundaries of sampled comunidades, which are collections of villages and the lowest administrative sub-unit. Panel C shows the georeferenced location of interviewed households, and Panel D shows the sampled location of interviewed healers, where each ring represents and interviewed healer, sized by average reported patient traffic. Some of the interviewed healers were interviewed inside of our sample districts, but permanently reside in other parts of the province.

tered members of AMETRAMO. Traditional healers are considered capable of performing witchcraft or placing curses, but these practices are frowned upon by healers and outright banned by AMETRAMO (Jozane, 2020).

Table 3 compares the services of traditional healers relative to conventional medical facilities. Conventional medicine in rural areas consists of small public health centers with limited capacity, and district hospitals. While conventional medicine in the public sector is free, individuals may pay costs for drugs at private pharmacies, transport, and incentives or bribes. Panel A includes variables measured at the individual level. We estimate providers costs from reports of illness events experienced in the past 6 months by our household sample. For households that report an illness event, they are asked about whether they sought care from traditional or conventional medicine. We ask about both first providers visited and second provider visited, if the household sought a second opinion. Additional information on this illness event data is described in the “Analysis by Medical Episode" section. For each provider visited, households are asked to estimate the total cost of their care in meticais. Estimates of traditional healer cost range widely, from 250 to 30000 MTZ. We also ask households to estimate the distance to the nearest traditional healer and hospital they can think of. Distances are recorded in terms of travel time in hours by any mode. The costs of visiting a healer are significantly higher than the costs of visiting a hospital. Individuals report traveling about an hour further to visit a hospital or clinic rather than a healer. We report stars at conventional thresholds from a t-test comparison of the averages across provider types.

Panel B reflects variables collected directly from providers including the nature of payment and referral behavior. Healers often refer patients to conventional medical practitioners, but not vice versa. Occasionally, healers refer patients to other healers. Only a fraction of healers request payment up front for their services (34%), while the rest seek payment after some time or after being cured.

Panel C presents data from a test of provider’s medical knowledge in the form of a symptom-listing exercise for major illnesses. To provide evidence on whether traditional healers and medical practioners are knowledgeable of common illnesses, we asked providers to list common symptoms of major illnesses. Scores are in terms of the share of common symptoms the provider was able to list in an open-ended verbal listing. Healers were on average able to identify 36% of major HIV symptoms, relative to 58% in the conventional medicine provider sample. Similarly, for the other illnesses, traditional healers were less able to report the common symptoms for malaria and tuberculosis (TB). Because our sample of conventional medicine provider interviews is small, we can’t make strong statistical inferences about the magnitude of these differences. However we report statistically significant difference in knowledge scores from t-test comparisons by provider type.

In addition to the symptom listing exercise, we also presented healers with two hypothetical vignettes

Table 3: Medical Services

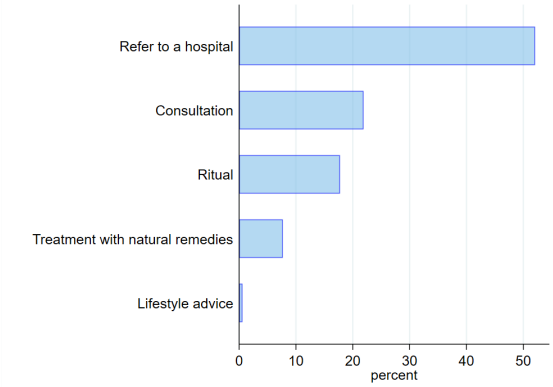
	Provider Type	
	Traditional Healers	Conventional Medicine
	Panel A: Household Survey	
Cost of Care (MZN)	3579.03***	129.45
	(7074.31)	(837.14)
Avg. Travel Distance (hours)	1.81**	2.92
	(6.38)	(6.49)
Household Observations	699	699
	Panel B: Provider Survey	
Consult Fee (MZN)	475.75	NA
	(339.78)	
Pay up Front (0/1)	0.34	NA
Referrals to Healers (0/1)	0.07	0.00
Referrals to Conventional Medicine (0/1)	0.88	1.00
	Panel C: Provider Knowledge Test	
HIV (0/1)	0.36**	0.58
	(0.31)	(0.31)
Malaria (0/1)	0.41***	0.69
	(0.21)	(0.23)
Tuberculosis (0/1)	0.52***	0.81
	(0.27)	(0.21)
Provider Observations	169	13

Notes: This table compares costs, services and knowledge of traditional healers to conventional medicine. Panel A represents data collected from households during the household-level survey. Each household is asked if someone in the household experienced an illness in the past 6 months. For households that report an illness event, they are then asked about whether they sought care from traditional or conventional medicine. For each provider, households are asked to estimate the total cost of their care in meticais. “Average Travel Distance" represents the average reported travel time by any mode to the nearest traditional healer or nearest hospital. The majority of respondents reported both travel times in terms of walking. Panel B is data collected directly from providers. Traditional healers are asked for their average 1-time consultation fee. Public hospitals do not charge such a fee. Each provider was asked whether they charge for treatment up front, whether they have ever given a referral to a traditional healer, and whether they have ever given a referral to a conventional provider. Panel C represents scores from a symptom-listing exercise given to both sets of providers. Providers were asked an open ended question, “What are the common symptoms of X?". Knowledge scores are measured as the proportion of common symptoms identified by the provider in an open-ended verbal listing. Standard deviations are in parentheses for continuous variables. Stars in column represent significance results from t-test comparisons by provider type. * p< 0.1; ** p<0.05 ; *** p<0.01.

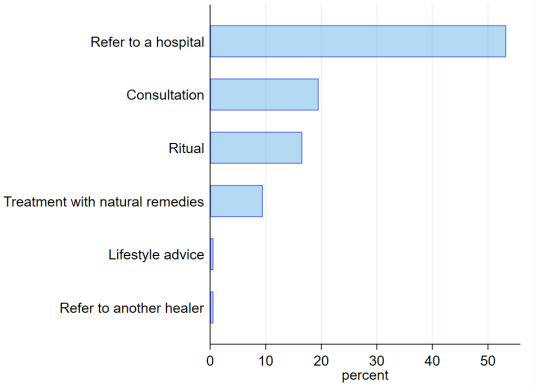
of patient cases. In the first vignette, a mother complains of a young child at home with diarrhea. In the second, a 35-year old man complains of a cough and fever. In both vignettes, healers are asked how they would treat the patient. Figure 4 shows the healer responses to these vignettes. In general, the majority of healers show a willingness to refer patients to conventional doctors. Approximately half of healers saw a reason to treat the vignette patient with a consultation, herbal remedy or other ritual.

Figure 4: Healthcare Vignette

(a) Diarrhea Vignette



(b) TB Vignette



Notes: The figure presents healer responses to two vignette cases. In the first, a mother asks for help with her young child's diarrhea. In the second, an adult man complains of a fever and cough, resembling tuberculosis. Healers are asked how they would approach the patient's case. Possible answers include spiritual consultation, ritualistic treatment, herbal treatment, referral to healer or hospital, or lifestyle advice.

Table 4 presents characteristics of healers compared to the average characteristics of our household sample. We find that on a wide variety of characteristics, healers are quite different than average village households. Healers have fewer years of education, more wives, larger households, and greater monthly income than the average survey respondent. Healers also report greater strength of spiritual belief, as measured by the first principle component of a battery of beliefs questions related to witchcraft, curses, and the influence of ancestors[4] Interestingly, healers do not show lower levels of trust in formal medical doctors.

[4]Individuals are asked a series of questions about their spiritual beliefs, including binary questions "Can ancestors or spirits affect your life?" and "Have you or anyone in your household been bewitched or cursed?". We also ask 4-point likert scale questions from "not very much" to "completely" including "How strongly do you believe in spiritual forces, such as witchcraft?" and "Do you worry that you could be harmed by spiritual powers, such as witchcraft, in the future?". Lastly we ask "In your opinion, how effective is witchcraft for harming others?" from (1) very ineffective to (5) very effective. These questions are aggregated in a first principle component that is then standardized to create a measure of "Spiritual Beliefs Strength".

Table 4: Healer Characteristics

	Healers	Household Survey	Difference	p-value
Male (0/1)	0.69	0.35	0.33***	0.000
Age	54.52	46.17	8.35***	0.000
School Years [0-12]	3.11	3.78	-0.67**	0.020
Mother's Education [0-2]	0.21	0.34	-0.13***	0.006
Married (0/1)	0.90	0.68	0.22***	0.000
Num. Wives	2.80	1.94	0.87***	0.001
HH Size	9.64	5.30	4.34***	0.000
Num. Children	8.38	3.80	4.58***	0.000
Speaks Portuguese (0/1)	0.25	0.32	-0.07*	0.087
Monthly Income (MZN)	6092.36	2575.25	3517.11***	0.000
Wealth Index (SDs)	0.73	-0.29	1.02***	0.000
Owns Plot (0/1)	0.71	0.56	0.15***	0.000
Believes in God (0/1)	0.99	1.00	-0.01**	0.039
Spiritual Beliefs Strength (SD)	0.44	-0.11	0.55***	0.000
Trust in Doctors [1-4]	3.63	3.57	0.06	0.296
Observations	169	722		

Notes: This table compares characteristics of healers with those of individuals from randomly sampled households. P-values record t-test comparisons of traditional healers to members of random households for the given characteristic. Note that the majority of respondents of the household survey were women, as men tend to migrate for work. Strength of spiritual belief is measured as a first principle component of a set of questions related to witchcraft, curses, and the influence of ancestors. For example, individuals are asked "do you believe in witchcraft" or "has anyone in your household been cursed?". This principle component is reported in standard deviation unites. Wealth is captured as a standardized first principle component of a battery of questions related to durable assets like television and car ownership, and housing characteristics like the floor and roof material. Trust in doctors is reported as a 4-point likert scale from (1) "not at all" to (4) "completely".

3.4 Correlates of Traditional Medicine Use

We now turn to examining the correlates of traditional medicine use. We find several important correlations in our preliminary data. Consistent with the Pew data, use of traditional medicine appears to be widespread. We find that 61% of our sample has ever sought assistance from traditional healers. Of this group, 90% visited a healer to cure an illness or injury, and 31% had visited a healer to protect from curses and witchcraft.

Interestingly, traditional medicine use differs significantly by gender, with 56% of women and 68% of men reporting that they have visited a traditional healer (see Figure 5). This suggests an interesting fact – men may be more likely to seek the consultation of a traditional healer.

In Table 5, we show correlates of beliefs in traditional medicine. We define beliefs in traditional medicine across several categories, including having ever visited a healer, and likert scale questions about trust in healers. The third column outcome is a “probability of spiritual origin" measure. Individuals are asked across a wide range of illnesses, “what is the probability that this illness is supernaturally caused, as opposed to naturall caused?" A higher average probability indicates that the survey taker thinks that a given illness is more likely to have a spiritual or supernatural origin. Details on this question are presented in Figure 6a. The fourth column outcome is a “average healer effectiveness" score. Among the same list of illnesses, individuals are asked how effective healers are in treating it, relative to conventional providers. Higher values indicate a higher perceived effectiveness of healers for a given illness. Details on this question are presented in Figure 6b.

Surprisingly, wealth, education and distance to the nearest hospital are not consistently predictive of beliefs in or use of traditional medicine. While this may be partly driven by low variation in our small study area, it may also reflect that use of traditional medicine is not fully explained by lack of access to conventional medicine.

3.5 Beliefs about the Causes of Illness

Supernatural beliefs are prevalent and important for understanding the origins and nature of illness (Le Rossignol et al., 2022). In the PEW data, 69% of individuals hold supernatural beliefs in Mozambique. In our sample, we find 92% of individuals believe illnesses can have a supernatural or spiritual origin. However, the likelihood of supernatural origin varies by disease. While 98% of respondents consider malaria to be a naturally caused illness, 23% of respondents believe asthma can be supernaturally caused (they report a probability of spiritual origin greater than zero), and 36% of respondents believe epilepsy can be supernaturally caused.

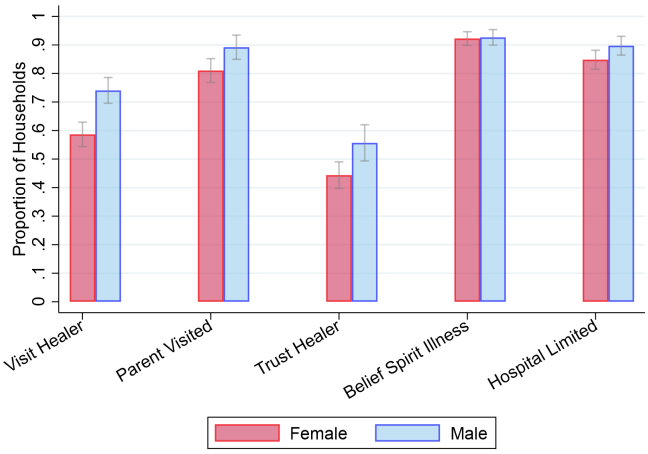
Figure 6a plots the likelihood of supernatural origin by disease type. Survey takers were asked, “Con-

Table 5: Predictors of Beliefs about Traditional Medicine

	Traditional Belief Measure			
	Visit Healer	Trust Healer	Prob. Spiritual	Healer Effective
			Demographics	
Age	0.004***	0.001	0.000	0.001***
	(0.00)	(0.00)	(0.00)	(0.00)
	894	690	894	894
Male (0/1)	0.154***	0.314***	0.017*	0.031***
	(0.03)	(0.09)	(0.01)	(0.01)
	904	699	904	904
Num. Children	0.016***	0.020	-0.000	0.001
	(0.00)	(0.01)	(0.00)	(0.00)
	903	699	903	903
			Socioeconomic	
School Years [0-12]	-0.003	0.002	-0.001	-0.007***
	(0.00)	(0.01)	(0.00)	(0.00)
	894	693	894	894
Wealth Index (SDs)	0.040**	-0.011	-0.001	-0.008
	(0.02)	(0.04)	(0.00)	(0.01)
	872	670	872	872
Monthly Income (1,000 MZN)	0.006**	0.003	0.001**	-0.000
	(0.00)	(0.01)	(0.00)	(0.00)
	887	683	887	887
			Access	
Hours to Healthcare Center	0.014	-0.046	-0.001	0.008*
	(0.01)	(0.03)	(0.00)	(0.00)
	816	677	816	816
Hours to Hospital	0.020*	0.020	0.004	0.009**
	(0.01)	(0.03)	(0.00)	(0.00)
	793	657	793	793
Limited Seasonal Access (0/1)	0.035	-0.109	-0.000	-0.017
	(0.04)	(0.09)	(0.01)	(0.01)
	771	642	771	771
Num. Healers in the Village	-0.001	0.015	0.001	-0.001
	(0.00)	(0.01)	(0.00)	(0.00)
	816	677	816	816
			Beliefs	
Spiritual Beliefs Strength (SD)	0.137***	0.213***	0.019***	0.050***
	(0.02)	(0.05)	(0.00)	(0.01)
	672	498	672	672
Trust in Doctors [1-4]	-0.012	0.034	0.010	-0.025***
	(0.02)	(0.06)	(0.01)	(0.01)
	884	681	884	884
Mean Dependent Variable	0.65	2.20	0.14	0.37

Notes: This table shows correlations of respondent characteristics on beliefs about traditional medicine. Coefficients are from individual regression of a measure of healer beliefs on the the independent variable. *Visit healer* is a binary indicator for having ever visited a traditional healer. *Trust healer* is reported as a 4-point likert scale from (1) “not at all" to (4) “completely". *Prob. Spiritual* is the average probability of an illness having a spiritual origin across a range of illnesses for a given respondent. *Healer Effective* is the proportion of illnesses that the respondent said could be treated as or more effectively by traditional medicine. See Figure 6a and Figure 6b for the list of illnesses asked about. Distance measures are given in hours of travel by foot, as reported by respondents. Strength of spiritual belief is measured as a first principle component of a set of questions related to witchcraft, curses, and the influence of ancestors. Wealth is captured as a standardized first principle component of a battery of questions related to durable assets like television and car ownership, and housing characteristics like the floor and roof material. Trust in doctors is reported as a 4-point likert scale from (1) “not at all" to (4) “completely". Standard errors are in parentheses. Third row gives observation numbers.

Figure 5: Traditional Medicine Use by Gender



Notes: The figure presents different measures of traditional medicine beliefs by gender. Each survey question captures a measure of spiritual beliefs, coded as a % of respondents. The first two columns capture whether the respondent ever visited a healer, and whether a parent has visited a healer. The third column asks repsondents if they trust traditional healers, with a "1" coded as trusting healers. *Belief Spirit Illness* asks individuals if they believe some illnesses can be spiritual. The last column *Hospital Limited* asks whether individuals believe hospitals are unable to treat spiritual illnesses. Confidence intervals are presented as gray error bars.

sider 10 patients who have illness X. How many are likely to have had this illness through supernatural or spiritual origin?". These results are in line with recent work from the DRC, which finds that epilepsy is frequently believed to have supernatural origin (Sievert, 2023).

The beliefs about the origins of illness has important implications for the perceived efficacy of conventional relative to modern medicine. For those diseases that may be caused through supernatural or spiritual means, traditional medicine is preferred and believed to be a more effective form of treatment. Figure 6b presents the perceived efficacy of traditional medicine relative to conventional medicine. In line with the perceived causes of illness, traditional medicine is perceived as more effective for those illnesses that are thought to have a supernatural or spiritual origin.

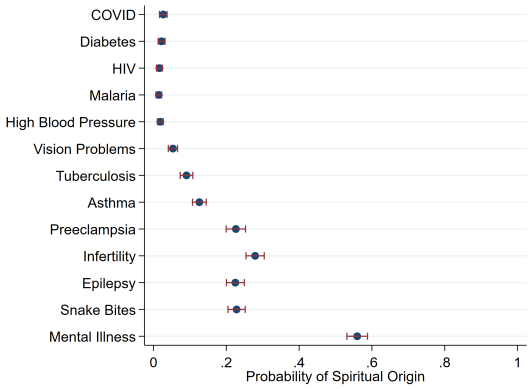
However, beliefs about the origins of illness does not explain all perceived efficacy. There are some illness that even though they are not perceived to have supernatural origin, traditional medicine is believed to be more effective. For example, a large share of respondents believe traditional medicine is as or more effective in the treatment of asthma, even though asthma may be naturally caused.

3.6 Analysis by Medical Episode

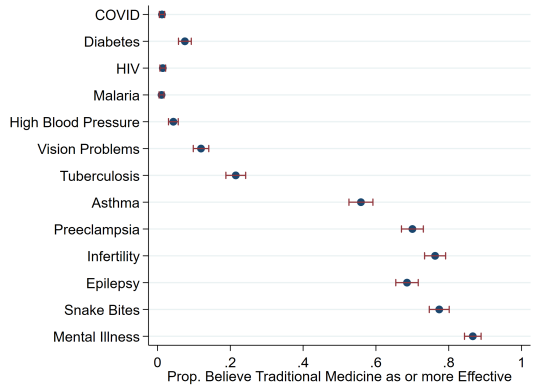
We collected detailed information on recent health episodes for the household. This allows us to explore what choices individuals made for health care for recent health episodes. Households were asked to describe illnesses that had occured in the household in the last 6 months, as well as any major illnesses

Figure 6: Origins of Illness and Efficacy of Traditional Medicine

(a) Beliefs About Illness Origin



(b) Beliefs About Effective Care



Notes: The figure presents respondent's illness specific beliefs. Panel (a) presents responses to the question: out of 10 patients diagnosed with this illness, how many are likely to be supernaturally caused? Respondents who say an illness can only be naturally caused are coded as 0. Panel (b) presents the proportion of people who say traditional medicine is either as or more effective than conventional medicine for treating that illness.

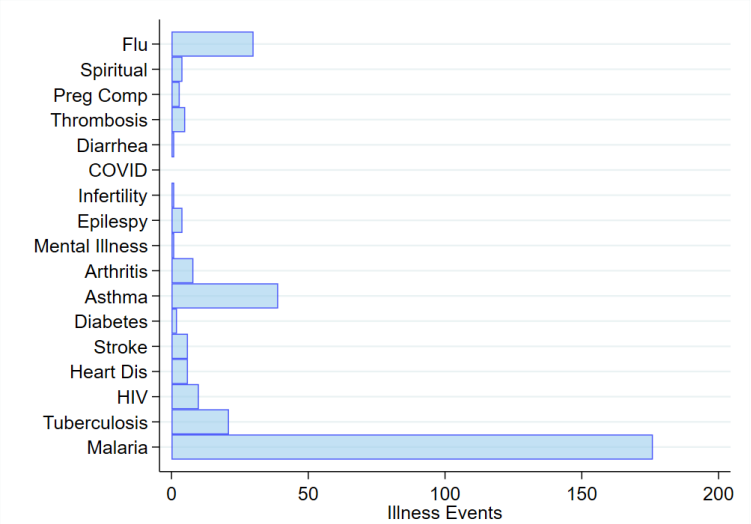
that had occured in the household at any time. 571 illness events are reported across 465 households, with an avg of 1.3 illnesses reported per household. Figure 7 provides a description of the most common illnesses cited by households in the health episode recall. As expected, the most common events were malaria and asthma cases, which are both prevalent in the region.

For each medical episode, households were asked about the healthcare they sought. Most individuals reported first visiting a conventional hosptial or clinic (95%). However, among those that sought a second opinion or follow-up visit, most went to a traditional healer (68%). Under what conditions do people seek a second visit for their illness? Figure 9 plots the reasons given for first and secondary provider visits. Most secondary provider visits are the result of reported dissatisfaction.

This pattern was unexpected, as most people anecdotally suggested that its most common to visit traditional healers as a first line of care. The assumption is that healers are more accessible than doctors, as evidenced by the average travel times we collected for both provider types. It's possible that social desirability bias leads to mismeasurement of people's healthcare behaviors.

To better understand whether using traditional medicine is stigmatized, we ask households about norms around traditional medicine use. Figure 10 shows household answers to questions related to the stigma attached to visiting healers for different reasons. While visiting a healer in the interest of getting rich is considered highly inappropriate, only about half of our sample considered seeking healthcare from a traditional healer to be socially inappropriate. Given these results, its possible some of our survey takers were not forthcoming in the extent of their use of traditional medicine, meaning our estimates

Figure 7: Common Illnesses in Surveyed Households

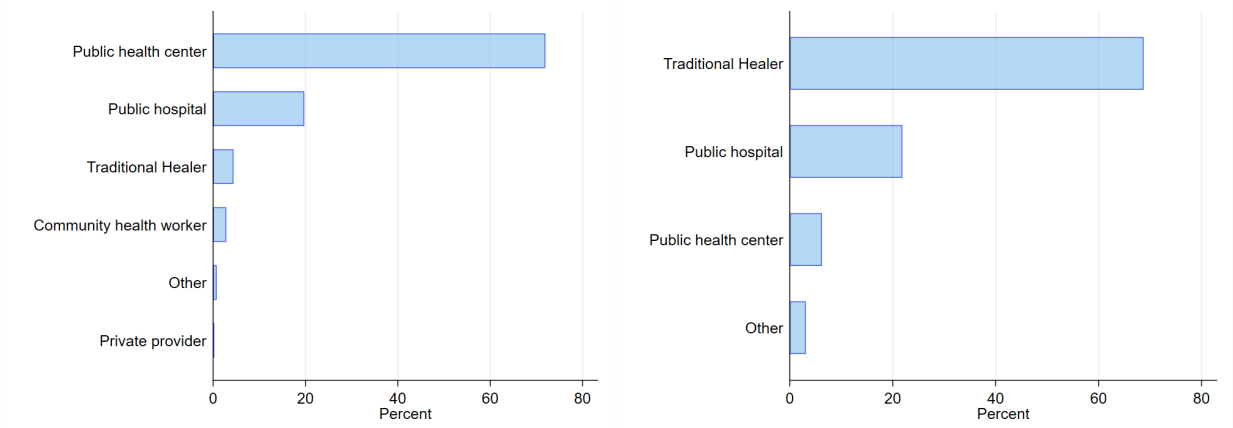


Notes: This figure shows the illnesses reported by households, by frequency of reporting. Households were asked to describe illnesses that had occured in the household in the last 6 months, as well as any major illnesses that had occured in the household at any time. 571 illness events are reported across 465 households, with an avg of 1.3 illnesses reported per household.

Figure 8: Medical Episodes by Provider

(a) First Provider visited

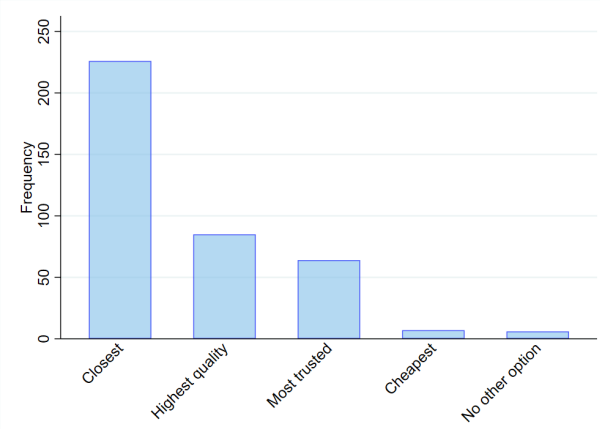
(b) Second Provider Visited



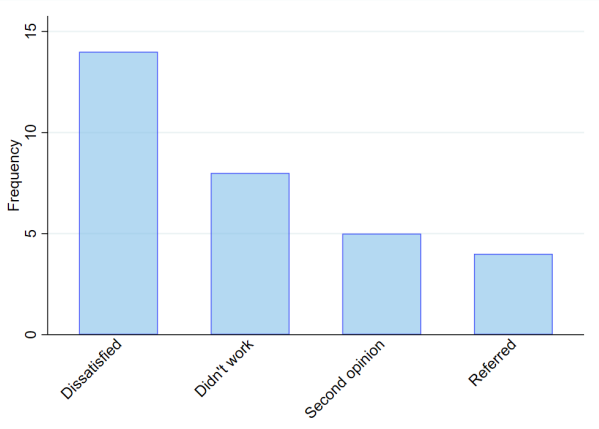
Notes: This figure shows the chosen provider visited for each health episode reported by households. Panel A shows where people sought care first. Approximately 10% of the sample sought additional care after the first healthcare visit. Panel B reports from which providers this subset sought additional care.

Figure 9: Medical Episodes Reason for Visiting Provider

(a) Why First Provider visited



(b) Why Second Provider Visited



Notes: This figure shows the reasons given for visiting a particular provider, including the first visit and the secondary provider visited.

could be a lower bound.

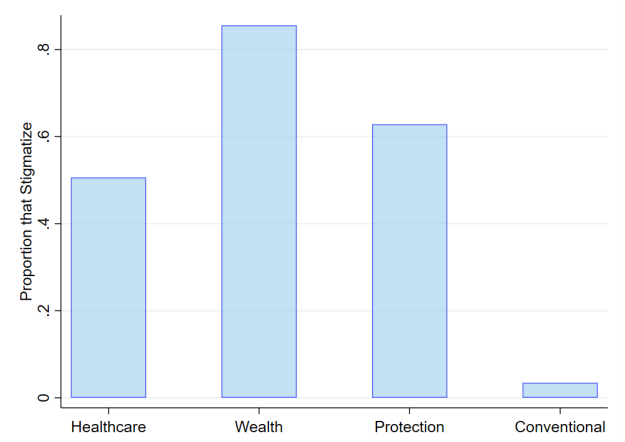
In summary, our preliminary evidence suggests that use of traditional medicine is widespread. Men are particularly likely to use traditional medicine. Additionally, individuals perceive traditional medicine to be as or more effective than conventional medicine for the treatment of many illnesses. We document signficant heterogeneity in beliefs about the potential spiritual causes of illness by disease type. Certain illnesses like preeclampsia, epilepsy, tuberculosis and asthma are considered the most likely to benefit from a traditional healer visit. Diseases like malaria and HIV are generally not considered to be spiritually caused, and are perceived to be “naturally caused" illnesses that benefit from conventional medicine.

4 Conclusion

Many people in sub-Saharan Africa make use of traditional medicine, but we have a very limited understanding of when and how it is used. Our study aims to fill this gap by exploring how access, beliefs, prices, and trust affect the use of traditional and conventional medicine in rural Mozambique. Understanding how individuals think about the origins of disease, and the relationship of beliefs to healthcare demand is important for understanding phenomenon such as vaccine hesitancy and use of alternative medical care sources.

This paper studies the market for traditional medicine in 2 districts of Inhambane, Mozambique. We find widespread demand for traditional healers, and document extensive beliefs related to the supernatural origins of certain illnesses. In our household survey we identify a few specific diseases that are

Figure 10: Stigma Towards Traditional Healer Vists



Notes: This figure shows the proportion of people who deemed a set of behaviors as "socially inappropriate", as opposed to appropriate. Households were asked whether visiting a traditional healer was appropriate when seeking (1) healthcare (2) luck in accumulating wealth (3) protection against a curse. As a baseline, we also asked whether visiting a conventional doctor would be appropriate or inappropriate. That answer is provided in the last bar.

believed to be supernaturally caused such as asthma and preeclampsia. Households believe that these diseases are also more likely to require a traditional healer for treatment. We find that access to conventional hospitals and clinics is not a strong predictor of traditional medicine demand, and wealthy individuals are in fact more likely to visit healers.

Among traditional healers, we document moderate knowledge of common illnesses and their symptoms. Healers show high trust in conventional medicine, and often refer their patients to hospitals and clinics. These results are encouraging for future work aimed at better integrating these informal providers into the conventional healthcare system. Our documentation of heterogeneity in supernatural beliefs by disease type points to the potential for illness or symptom specific interventions where traditional and conventional medicine can effectively complement each other to the benefit of patients.

References

Avanceña, Anton LV, Angie Miller, Neide Canana, Janeth Dula, Abuchahama Saifodine, Baltazar Cadrinho, and Elisa M Maffioli, "Achieving malaria testing and treatment targets for children under five in Mozambique: a cost-effectiveness analysis," *Malaria Journal*, 2022, *21* (1), 1–10.

Boene, Helena, Marianne Vidler, Charfudin Sacoor, Abel Nhama, Ariel Nhacolo, Cassimo Bique, Pedro Alonso, Diane Sawchuck, Rahat Qureshi, Eusébio Macete et al., "Community perceptions of pre-eclampsia and eclampsia in southern Mozambique," *Reproductive health*, 2016, *13* (1), 27–37.

Boum, Yap, Sylvie Kwedi-Nolna, Jessica E Haberer, and Rose RG Leke, "Traditional healers to improve access to quality health care in Africa," *The Lancet Global Health*, 2021, *9* (11), e1487–e1488.

Boyle, Elizabeth Heger, Miriam King, and Matthew Sobek., "IPUMS-Demographic and Health Surveys: Version 9 [dataset]," Technical Report Version 9, Minnesota Population Center and ICF International 2022.

CIA, "World Factbook 2023," 2023. Accessed on Dec 18 2023.

Hillenbrand, Emily, "Improving Traditional-Conventional Medicine Collaboration: Perspectives from Cameroonian Traditional Practitioners," *Nordic Journal of African Studies*, 2006, *15* (1), 1–15.

Jozane, Tibúrcio, "Desafios para regulamentação das práticas da medicina tradicional e alternativa no Sistema Nacional de Saúde em Moçambique: documento provisório." PhD dissertation, Universidade Eduardo Mondlane 2020.

Le Rossignol, Etienne, Sara Lowes, and Nathan Nunn, "The Social Consequences of Traditional Religion in Contemporary Africa," 2022.

Leonard, Kenneth L, "African traditional healers and outcome-contingent contracts in health care," *Journal of Development Economics*, 2003, *71* (1), 1–22.

Lowes, Sara and Eduardo Montero, "Traditional Medicine in Central Africa," *American Economic Association Papers and Proceedings*, 2019, *109*, 516–20.

__ and __ , "The legacy of colonial medicine in Central Africa," *American Economic Review*, 2021, *111* (4), 1284–1314.

Lugo, Louis, Alan Cooperman, and Brian J Grim, "Islam and Christianity in sub-Saharan Africa," in "Washington, DC: Pew Research Center and the Pew Forum on Religion and Public Life" 2010.

MISAU, "Relatório das Actividades Relacionada ao HIV/SIDA," 2022.

Msonthi, Jerome D, "Traditional Medicine and Health Care Coverage: a reader for health administrators and practitioners edited by Robert H. Bannerman, John Burton, and Chen Wen-Chieh Geneva, World Health Orgnisation, 1983. Pp. 342. Sw. F. 35.00.," *The Journal of Modern African Studies*, 1984, *22* (4), 695–696.

Murdock, George P and Douglas R White, "Standard cross-cultural sample," *Ethnology*, 1969, *8* (4), 329–369.

Pearce, Tola Olu, "Death and Maternity in Nigeria," in Meredith Turshen, ed., *African Women's Health*, Trenton, NJ: African World Press, Inc., 2000.

Sievert, Clara, "Supernatural Beliefs about Illness and Modern Medicine Use: Evidence from the DRC," October 2023.

Stanifer, John W, Uptal D Patel, Francis Karia, Nathan Thielman, Venance Maro, Dionis Shimbi, Humphrey Kilaweh, Matayo Lazaro, Oliver Matemu, Justin Omolo et al., "The determinants of traditional medicine use in northern Tanzania: a mixed-methods study," *PloS one*, 2015, *10* (4), e0122638.

WHO, "Mozambique Key Indicators," 2020.

_ , "View from Ghana: why integration of TCIM with primary health care services is key," 2024.

WHO, World Health Organization, *WHO traditional medicine strategy: 2014-2023*, World Health Organization, 2013.

A Additional Tables & Figures

Table A1: Predictors of Beliefs about Traditional Medicine: Pooled Regressions

	Traditional Belief Measure			
	Visit Healer	Trust Healer	Prob. Spiritual	Healer Effective
Age	0.005***	-0.000	-0.000	0.001
	(0.00)	(0.00)	(0.00)	(0.00)
Male (0/1)	0.030	0.133	0.019*	0.028*
	(0.04)	(0.11)	(0.01)	(0.02)
Wealth Index (SDs)	0.077***	0.006	-0.006	0.015*
	(0.02)	(0.07)	(0.01)	(0.01)
Monthly Income (1,000 MZN)	0.002	0.009	0.002***	0.000
	(0.00)	(0.02)	(0.00)	(0.00)
School Years [0-12]	0.012*	0.006	-0.001	-0.007***
	(0.01)	(0.02)	(0.00)	(0.00)
Num. Children	-0.003	0.008	-0.001	-0.004**
	(0.00)	(0.02)	(0.00)	(0.00)
Spiritual Beliefs Strength (SD)	0.155***	0.264***	0.018***	0.050***
	(0.02)	(0.05)	(0.01)	(0.01)
Trust in Doctors [1-4]	-0.022	-0.012	0.008	-0.034***
	(0.03)	(0.08)	(0.01)	(0.01)
Hours to Healthcare Center	0.006	-0.112**	-0.005	0.001
	(0.02)	(0.05)	(0.01)	(0.01)
Hours to Hospital	0.023	0.090*	0.005	0.010
	(0.02)	(0.05)	(0.01)	(0.01)
Limited Seasonal Access (0/1)	-0.033	-0.164	-0.003	-0.020
	(0.04)	(0.12)	(0.01)	(0.02)
Num. Healers in the Village	0.004	0.011	0.000	-0.000
	(0.01)	(0.02)	(0.00)	(0.00)
Mean Dependent Variable	0.65	2.20	0.14	0.37
Observations	522	419	522	522
R2	0.17	0.08	0.06	0.15

Notes: This table shows correlations of respondent characteristics on beliefs about traditional medicine. This table reports the coefficients from the pooled regression of all independent variables on the measures of healer beliefs. *Visit healer* is a dummy for having ever visited a traditional healer. *Trust healer* is a 4-point trust scale towards healers. *Prob. Spiritual* is the average probability of an illness having a spiritual origin across illnesses for a given respondent. *Healer Effective* is the proportion of illnesses that the respondent said could be treated as or more effectively by traditional medicine. Distance measures are given in hours of travel by foot, as reported by respondents. Standard errors are in parentheses.

Table A2: DHS Country Sample

Country	HIV Supernatural	Diarrhea	Fever	Malaria	STI	Wave
Angola		X	X			7
Burkina Faso		X	X			8
Benin	X	X	X			7
Burundi	X	X	X			7
Democratic Republic of the Congo	X	X	X			6
Central African Republic		X	X			3
Republic of the Congo	X	X	X			6
Côte d'Ivoire		X	X			8
Cameroon	X	X	X		X	7
Ethiopia						7
Gabon	X	X	X			7
Ghana	X	X	X			6
Gambia	X	X	X			7
Guinea	X	X	X	X		7
Kenya		X	X			8
Comoros	X	X	X			6
Liberia	X	X	X			7
Lesotho	X	X	X			6
Madagascar		X	X			7
Mali	X	X	X	X		7
Mauritania	X	X	X			7
Malawi	X	X	X			7
Mozambique	X	X	X			6
Nigeria	X	X	X			7
Niger	X	X	X			6
Namibia	X	X	X			6
Rwanda	X	X	X			7
Sierra Leone	X	X	X			7
Senegal		X	X			7
Eswatini	X	X	X			5
Chad	X	X	X			6
Togo	X	X	X			6
Tanzania		X	X			8
Uganda	X	X	X			7
South Africa		X	X			7
Zambia	X	X	X			7
Zimbabwe	X	X	X			7

Notes: This table shows the DHS country-waves included in the analysis. "X" marks that the country-wave contains the relevant survey question. The first column refers to a question about whether HIV can have a supernatural origin. The second column asks whether a traditional doctor was visited for a child's diarrhea. The second column asks whether a traditional doctor was visited for a child's fever. The fourth column asks whether a traditional medicine was taken for a child's malaria. The fifth column asks whether the mother visited a traditional doctor for STI. The last column marks the DHS wave.