The London School of Economics and Political Science

Rationales for Traditional Medicines utilisation and its Equity Implications: the case of Ghana

Azusa Sato

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Declaration

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I confirm that Chapters 2 and 4 were jointly co-authored with Dr Joan Costa-i-Font, who provided the theoretical ideas and guidance on econometric modelling. The literature background, econometrics analysis, discussion and conclusion were all written and carried out by me.

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Abstract

Individuals all over the world continue to utilise traditional health care, but there is very little understanding of why this is the case, especially in light of increased availability and accessibility of effective pharmaceutical medicine and other modern technologies. The overarching objective of this thesis is to investigate rationales for utilisation of traditional medicines, using Ghana as a case study. This thesis argues that institutional constraints and cultural preferences inherited from the past shape pluralistic health systems and, consequently, individual health-seeking behaviour. The thesis fuses investigative approaches from different disciplines (e.g. anthropology, economics, psychology) and uses statistical methods to analyse four aspects of medicines utilisation: the role of culture, income, the possibility of a placebo effect in use and finally, the distributional consequences manifested in utilisation inequities. Findings indicate that cultural attitudes and income constraints are associated with use of traditional systems, and users report high rates of satisfaction that are attributable to procedural factors. Inequities are shown to differ according to whether traditional medicines are included in analysis. Generally, this thesis advocates a holistic approach with respect to health systems, as opposed to interpreting traditional systems as simply appendages to modern health care systems; the latter perspective is liable to yield observers only a partial story of medicines utilisation and its impact on equity.

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Abbreviations

CMS	Central Medical Store
CMP	Chinese Medicine Practitioners
CHAG	Christian Health Association of Ghana
CHPS	Community-based Health Planning and Services
CAM	Complementary and Alternative Medicines
CI	Concentration Index
DHS	Demographic Health Survey
DMHIS	District Mutual Health Insurance Scheme
ETEN	Equal Treatment for Equal Needs
EML	Essential Medicines List
EQ5D	EuroQol 5 Dimensions
FBH	Faith Based Healers
5YPOW	Five Year Plan of Work
FDB	Food and Drugs Board
Ghc	Ghana cedi (also denoted cedi)
GHS	Ghana Health Service
GLSS	Ghana Living Standards Survey
GSS	Ghana Statistical Service
GPS	Global Positioning System
GA	Greater Accra
GDP	Gross Domestic Product
GNI	Gross National Income
HAI	Health Action International
HK	Hong Kong
HI	Horizontal Inequity
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
IV	Instrumental Variables
IMF	International Monetary Fund
IMR	Inverse Mills Ratio
KNUST	Kwame Nkrumah University of Science and Technology
LCS	Licensed Chemical Sellers
LPM	Linear Probability Model
MeTA	Medicines Transparency Alliance
MDGs	Millennium Development Goals
MOH	Ministry of Health
MC	Modern Care
MAM	Muslim Ahmadiyya Mission
NDP	National Drugs Policy
NHIA	National Health Insurance Authority
NHIS	National Health Insurance Scheme
NHS	National Health Service

NIE	New Institutional Economics
NGO	Non-Governmental Organisation
OECD	Organisation for Economic Cooperation and Development
OU	Outcome Utility
OTC	Over-the-Counter
PC	Pharmacy Council
PCA	Principal Component Analysis
PU	Procedural utility
RAWP	Resource Allocation Working Party
SSM	Sample Selection Models
SK	South Korea
SSA	Sub Saharan Africa
SSNIT	The Social Security National Insurance Trust
TAMD	Traditional and Alternative Medicine Directorate
TBA	Traditional Birth Attendants
TC	Traditional Care
TH	Traditional Healers
TMPC	Traditional Medicine Practice Council
TMP	Traditional Medicine Practitioners
TM	Traditional Medicines
TM/H	Traditional Medicines/Healers
UW	Upper West
VIF	Variance Inflation Factors
WB	World Bank
WHO	World Health Organisation
WHS	World Health Survey

Note on the structure of the thesis

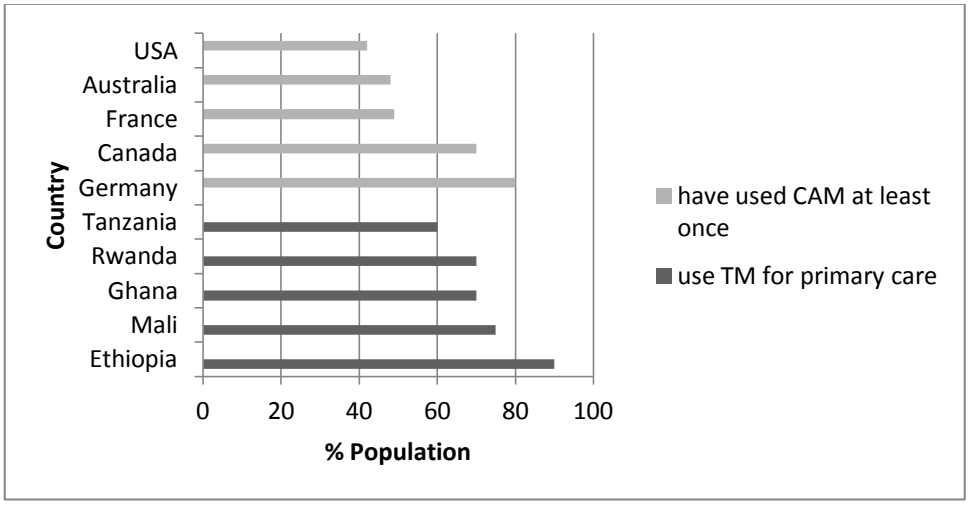
This thesis conforms to the requirements of a doctoral thesis from the London School of Economics and Political Science. Guidelines state a minimum of three papers of publishable standard – in addition to introduction and concluding Chapters – not exceeding 100,000 words. Accordingly, this thesis presents an introductory Chapter, the first half of which gives an overview, motivation and objectives, and background on Ghana. The second half provides a theoretical and conceptual framework and a description of methodology, followed by research questions. Chapters 2, 3, 4 and 5 - all of which are presented in the style of a journal article and are thus termed 'papers' - form the main body of the thesis. The thesis additionally contains material from a published paper, Sato (2012c) 'Revealing the popularity of traditional medicine in light of multiple recourses and outcome measurements from user's perspective in Ghana' (*Health Policy and Planning*) [relevantly cited throughout]. Chapters 2 and 4 are under consideration by different journals, and both are published as LSE Working Papers (no. 27 and 28). Chapter 3 is published in *Social Science and Medicine* (Sato,2012b). Chapter 5 is a published paper in *World Development* (Sato,2012a). Chapter 6 brings together key findings with an emphasis on practical policy recommendations. Finally, methodological issues are examined and future research agendas are suggested.

Introduction

1.1 Introduction

Individuals all over the world continue to utilise traditional medicines (TM), as primary or complementary sources of health care. The World Medicines Situation report (World Health Organization,2011, p. 3) estimates that between 70 and 95% of the population in developing countries consume TM and that every country in the world uses it in 'some capacity' (see Figure 1 for illustration using selected countries)[1]. High utilisation rates are reflected in the rapid growth in number of herbal outlets, clinics and hospitals (Bloom & Standing,2001; van der Geest & Whyte,1988), and a significant world market worth an estimated $83 billion in 2008 (World Health Organization,2011, p. 3). Such figures are evident despite rapid economic and social development, through which countries have experienced improved financial and political capabilities to provide modern public health systems. This begs the question, 'why do people continue to utilise TM when modern medicines are available'? Specifically, what kinds of economic, social and procedural rationales can explain this behaviour? And what are the implications for the distribution of health services among the population?

Figure 1 - Utilisation of TM and CAM in selected countries



**Source: World Health Organisation (2011, p. 5)*

[1] The label 'complementary and alternative medicines' (CAM) is used in systems in which health care is predominantly 'modern'; WHO thus uses 'TM' for countries in Africa, Latin America, South East Asia and the Western Pacific, whereas 'CAM' is used for Europe, North America and Australia (World Health Organization,2002, p. 1).

Various explanations for high utilisation rates of traditional medicines/healers (TM/H) have been put forward. Scholars point to an individual's economic rationality – that TM/H are more accessible, readily available and affordable than modern drugs (Leonard,2003; World Health Organization,2002), which remain unobtainable for two thirds of the sub-Saharan population (UN Millennium Project,2005). For example, a study in Uganda estimated there is one healer per two to four hundred people, in sharp contrast to one modern practitioner for 20,000 people (World Health Organization,2002, p. 12). Further, TM tend to be more affordable because herbal products are cultivated locally, reducing both direct and indirect costs and individuals can self-apply (van den Boom, Nsowah-Nuamah, & Overbosch,2008). Healers are also known to charge based on ability to pay and accept different modes of payment (in-kind, by instalments and so on) (Asenso-Okyere,1995) rather than by a flat rate payable in advance as is often the case when visiting a physician or using modern providers (Hausmann Muela, Mushi, & Ribera,2000). Yet, besides accessibility, availability and affordability, what other reasons can explain continued utilisation?

In addition to economic reasons, anthropological perspectives partly explain TM utilisation. Anthropologists offer historical circumstance, cultural acceptability and sociological motivations focusing on perceptions of illness and disease as key reasons in determining health care-seeking behaviour (Evans-Pritchard,1937; Foster,1984; Hielscher & Sommerfeld,1985; Kleinman,1980). From a historical perspective, TM were the default form of care. For example, in Ghana, populations were entirely reliant on TM until modern medicines were introduced into the country by British medical officers during colonisation (Twumasi,1979a). In any population – but especially in populations where exposure to modern systems remain low – illness and disease concepts are shaped by physiologic or psychological factors. Moerman and Jonas (2002) argue that an individual's perception of treatment efficacy and understandings of illness are shaped by their culture and social environments, and health-seeking behaviour is an example of a 'meaning response', such that people respond according to how they interpret illness. For example, for some, epilepsy in Zambia is believed to be caused by witchcraft and thus the appropriate response is treatment with plant and animal products (Baskind & Birbeck,2005). Similarly, malaria – carried by mosquitos- is believed by some people to be due to excessive contact with external heat which unbalances 'blood equilibrium' (Agyepong,1992) and an individual's illness can even be interpreted as a collective problem requiring societal

actions and involvement for recovery. In such cases, healers can take into account social contexts of disease to provide holistic, culturally sensitive care (Kleinman,1980)[2].

Economists and anthropologists, however, largely remain confined within their own disciplines in both their approach and their method. Health care economics has, to date, ignored social values and informal institutions (Davis,2001) while anthropological methods stop short of econometric modelling and quantification. Yet, the potential to draw from and amalgamate different perspectives, thereby speaking to a wider social science audience, is significant. Thus, the thesis investigates rationales for TM utilisation and its equity implications, in countries with pluralistic health systems[3]. The thesis fuses approaches from anthropology, economics and psychology, following institutional economists like Eggleston (2008). The topic is explored empirically by drawing upon Ghana as a case study; each paper contained uses self-collected data and econometric methods. The thesis framework draws heavily on the work of Douglass North who coined the phrase, 'institutions matter' (North,1990) and applied an institutional framework to explain differing rates of economic change. Institutionalist approaches to the study of health suggest that market and state failures result from asymmetries of information and incomplete contracts (for health example, see Bloom, Standing, & Lloyd,2008). The problem of asymmetrical market information is more acute in developing countries, where the institutional capacity of the formal (modern) sector is weak: instead, the prevailing and relatively strong informal (traditional) sector mainly serves local needs. TM can therefore be understood as a type of social contract underpinned by shared behavioural norms (Bloom, et al.,2008), and its utilisation results from institutional legacies and cultural preferences. Thus, Ghana's current health system and health-seeking behaviour of its citizens should be considered within a broader political economy.

[2] The thesis therefore considers 'care' and 'cure' to be separate entities, the former emphasising personal or affective interactions (whether physician, healer, friends or family) while the latter sees instrumental dimensions as predominantly important (De Valck, Bensing, Bruynooghe, & Batenburg,2001).

[3] By 'pluralistic health systems', I mean systems where there is more than one main type of medical system (Wade, Chao, Kronenberg, Cushman, & Kalmuss,2008) and many providers offer their own way of explaining, diagnosing and treating ill health (Helman,2000). In this thesis's context pluralism implies the prevalent use of both modern and traditional systems. For more on the emergence of pluralistic health systems and the changing role and nature of health providers see Bloom and Standing (2001).

Characterising traditional medicines and healers

A widely used, all-encompassing definition of TM is: 'the diverse health practices, approaches, knowledge and beliefs incorporating plant, animal and/or mineral based medicines, spiritual therapies, manual techniques and exercises applied singularly or in combination to maintain well-being, as well as to treat, diagnose or prevent illness' (World Health Organization,2001, pp. 1-2). Another similar definition is: 'the sum total of knowledge, skills and practices based on the theories, beliefs and experiences indigenous to different cultures that are used to maintain health, as well as to prevent, diagnose, improve or treat physical and mental illnesses' (World Health Organization,2002). In this thesis, TM/H denotes 'traditional medicines/healers', collectively referred to as traditional care (TC). TM refer mainly to 'herbal medicines' including 'herbs, herbal materials, herbal preparations, and finished herbal products that contain parts of plants or other plant materials as active ingredients' (World Health Organization,2008a). In many cases, this means self-medication[4] by plants obtained from within the community or from an informal (unregulated/untrained) vendor. TM are distinguished from modern, scientific medicines typically produced by pharmaceutical companies[5]. TH are defined as individuals who provide traditional health services to the public and the term is used interchangeably with 'traditional medicine practitioners' (TMP) or 'faith based healers' (FBH). Such practitioners typically have little or no 'training' from formal institutions but are typically recognised by local communities (Helman,2000). TH may or may not employ TM and use a wide variety of healing techniques according to their line of work. Some TH use the trade as a second or third job while for others it is a full time (albeit largely informal) occupation.

The classification of TH remains somewhat unclear, with only rudimentary, conflicting definitions available (for example Stekelenburg et al.,2005; Twumasi,1979b). However, they can broadly be categorised into four broad groups: herbalists; diviners; fetish priests; and healers classed according to their specialism. Herbalists are the most common type of healer; usually men who primarily use medicinal plants but occasionally also use animal

[4] Self medication is medication without prescription or consultation from a health professional. For modern (self med_modern), this includes pharmacies (where consultations are not likely to be thorough or necessitate a medical examination) and drugs obtained within the household, for TM (self TM) usually herbs from the garden or vendor. Figure 4 serves to illustrate this.

[5] These terms are not intended to imply 'backwardness', or 'them versus us' inferiority/superiority. The Ghanaian Ministry of Health refers to modern and traditional medicines as 'pharmaceuticals' and 'traditional medicines' respectively (Ministry of Health,2004a). The related literature also uses the term 'orthodox' interchangeably with 'modern'.

parts and minerals. Herbalists can be non-spiritual or spiritual: non-spiritual herbalists do not link their trade to divine or religious elements while the latter incorporate religious aspects such as rituals into their consultations. In this sense, non-spiritual herbalists are the group most closely aligned to modern practitioners. The distinction between the spiritual herbalist and diviner is subtle, but diviners are usually women and were 'chosen' or encouraged to take up the practice through a dream or a 'calling' (Twumasi,1979b). Often diviners belong to a revival sectarian or African-based syncretic church (Dixon,2008) and an increasing number of 'church camps' claim to heal some illnesses, including impotence, infertility and mental illness, by communicating with the supernatural (Twumasi,1979b). Fetish priests, in turn, are similar to diviners but diagnose illnesses via deities by acting as an agent between the patient and the supernatural (gods or ancestors, for example). Sometimes a shrine can be found in villages or towns to honour these deities and locals offer gifts in return for their safekeeping (own observation). In addition to health, therefore, some TH are claimed to play a greater protective role in society. Finally, some practitioners are classified by their particular specialism. This includes traditional birth attendants (TBA) (the equivalent of midwives), bonesetters (the equivalent of orthopaedics) and circumcisers[6].

1.2 Motivation and objectives

Despite the known popularity and significance of TM/H (Sato,2012c) there are limited data available at the household, micro (individual) level, resulting in an incomplete analysis of health-seeking behaviour. In pluralistic systems, individuals are faced with a multitude of health care providers which gives rise to numerous behavioural reactions and utilisation patterns. Further, most existing quantitative studies to date have focused on modern medicines use alone and previous surveys have tended to see TM/H as an appendage (something used by few and therefore warranting very little survey space), largely

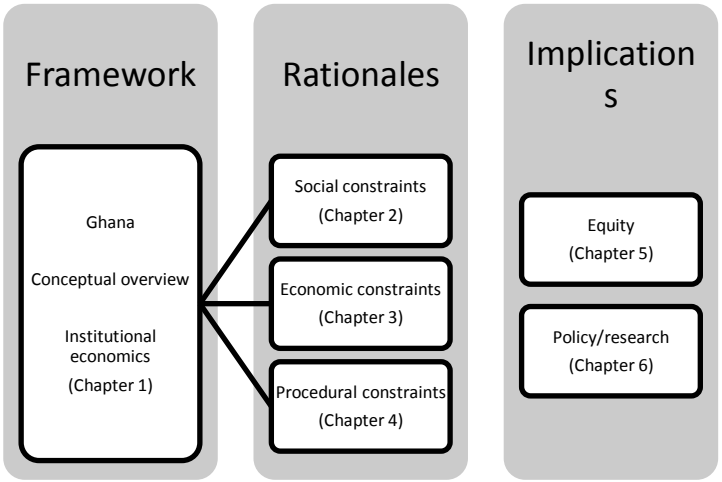
[6] For the purposes of this thesis, the distinction between different types of healers is largely ignored, especially because the classification system is unclear and inconsistent across different regions of Ghana and the world. Only curative, rather than preventive, practices of acute and chronic illnesses are evaluated, therefore TBA are excluded from analysis. Further, it is taken as given that TM/H and modern practices operate within their own system, thus no TM/H are utilised in the modern system (TM cannot be prescribed by public providers unless patients specifically request them), and vice versa, modern drugs are not used by TH. The latter was ascertained within the collected data, which showed the vast majority of visits to healers resulted in TM use rather than modern drug use. However, it is acknowledged that an increasing number of 'neo-herbalists' have started to operate in Ghana. 'Neo herbalists' take elements of TM and fuse them with modern practices. For example, herbal practitioners have been known to wear white coats (Dixon,2008).

ignoring the topic. This is perhaps partly owing to the relative resource intensity of acquiring individual level data in rural areas where TM/H are most likely to be used, but it is also the result of an emphasis (particularly among development partners) placed on formal, rather than informal systems of care. This paucity in research, in turn, is reflected in policy recommendations (Laing, Hogerzeil, & Ross-Degnan,2001) which aim to improve access to medicines without mentioning TM/H.

The thesis contributes to the literature by applying the theory of institutional economics in order to address the polarity of anthropologic and economic approaches (Kroeger,1983a; Sachs & Tomson,1992). In so doing, the thesis reaches out to a broader social science audience and analyses self-collected data to build upon already existing household surveys (Appendix 1). The thesis presents a user's perspective on the continued use of TM within the framework of existing modern health systems. By placing TM/H on equal footing with modern health care utilisation and allowing for multiple sources of care for a given episode, individuals were more inclined to mention it and therefore reveal its significance.

The overarching objective of this thesis is to investigate rationales for TM utilisation and its equity implications using Ghana as a case study. The proposed process to address this objective is given below in Figure 2. An institutionalist approach and conceptual overview provide the framework in the first Chapter. Three rationales are then explored in subsequent Chapters (2, 3 and 4) and impacts on equity are presented in Chapter 5. The final Chapter (6) then puts forward key research and policy implications.

Figure 2 - Broad thesis outline



**Source: author's own*

The thesis aims to address sceptics' concerns about TM utilisation by highlighting that similar constraints (particularly cultural – [Chapter 2] - and economic – [Chapter 3]) may also deter utilisation of modern medicines. Similarly, many of the same factors that explain TM use - such as availability, accessibility, affordability and acceptability - influence utilisation of modern medicines (Anyinam,1987). Even where TM are utilised and individuals are satisfied, such use may be due to utility gained from processes, such as the nature of service provision, rather than health outcomes per se (Chapter 4). Yet, one consequence is the unequal distribution of health care service utilisation (Chapter 5). As such, it is suggested that even sceptics not interested in TM per se would do well to consider them to understand utilisation of modern medicines in countries like Ghana.

Aspects of utilisation are topical, owing to the increasingly available data on access to modern medicines and renewed policy push to reach Millennium Development Goals (MDG) (United Nations,2008)[7]. For many years, international bodies such as the World Health Organisation (WHO) have made concerted efforts to integrate modern and traditional systems in a culturally acceptable manner, particularly at the primary level: back in 1977, WHO first declared serious collaborative efforts between TH and modern practitioners and accordingly, the Alma-Ata Declaration (1978) emphasised how primary health care at the local level 'relies…on health workers…as well as traditional practitioners as needed, suitably trained socially and technically to work as a health team and to respond to the expressed health needs of the community' (World Health Organization,1978a). Further, in 1995, WHO produced a guidance using country case studies (of which Ghana was one) on how best to train traditional practitioners as primary health care workers (World Health Organization,1995). Yet, thirty years later, the 2008 Beijing Declaration still urges member states to 'respect, preserve and widely communicate, as appropriate, the knowledge of traditional medicine, treatment and practices…on evidence of safety, efficacy and quality', pointing to the persistent gaps in policy and regulation. In particular, it recommends strengthening relations between TMP and modern medicine professionals through better communication and cooperation. Importantly, it recognizes that healers should be licensed and trained, in order for them to 'upgrade their knowledge and skill in collaboration with relevant health providers, *on the basis of traditions and customs of peoples and communities*' (World Health Organization,2008a, p. 20 emphasis added).

[7] Eight developmental goals set out by the United Nations, to be achieved by 2015.

Within the past few years WHO has also produced a number of documents on: safety and monitoring (World Health Organization,2004); registration and regulation (World Health Organization,2001, 2005); advice for users (World Health Organization,2004b); methodology for research and evaluation (World Health Organization,2000a); training for practitioners (World Health Organization,1995); and most notably, a 'Traditional Medicines Strategy' (World Health Organization,2002). This last document underscores four objectives: to integrate TM with the national health system; assure its safety, efficacy and quality; increase availability and affordability especially for the poor and promote rational use (World Health Organization,2002, p. 43). All this indicates policy interest in the arena of TM, but the focus is predominantly on supply, rather than demand, factors.

The following sections present an overview of Ghana. Reasons for using Ghana as a case study and main health and TM policies are outlined. A summary of the health systems, including descriptions about structural resources, pharmaceutical sector, health and medicines expenditure and financing is provided.

1.3 Ghana

1.3.1 Case study

Ghana was chosen as a country case study for theoretical and practical reasons. Theoretically, being the first country in sub Saharan Africa (SSA) to gain independence, it has had a long period of time to evolve its economic and health systems (for details of relevant governance indicators please see Appendix 2). Importantly to this thesis, formal institutions and general infrastructure are strong: the health system is well developed, offering a (British styled) National Health Insurance Scheme (NHIS) that aims for free health care at the point of use. Yet, nearly ten years after the initial launch of NHIS, traditional systems continue to be used.

Secondly, development partners, both bilateral and multilateral, are clamouring to offer grants, research monies and aid to Ghana. Many health projects in the country are increasingly focussed on collecting household level data on modern health service and medicine utilisation (e.g. Demographic Health Survey (DHS), Medicines Transparency Alliance (MeTA)). It therefore seems appropriate to have complementary data on TM utilisation to build upon this new data. It is hoped that one contribution of the present

research will be to paint a picture of TM utilisation for policymakers in Ghana and international organisations.

Ghana was also an ideal country for practical reasons. Its medium size allowed for largely trouble-free data collection while ensuring a diverse set of economic and cultural backgrounds. Politically the country is not in danger of any major civil wars (bar the north eastern corner which suffers from ethnic in-fighting). Being a democratic country with stable formal institutions, collaborating and working with policymakers and academics proved fairly straightforward once networks were formed[8]. Similarly, ethical clearance was obtainable without too many barriers. The training of research assistants and subsequent translations were effectively achieved as the working language in Ghana is English.

1.3.2 Policy goals

Health policy

The Ghanaian government recognises the importance of good health for its citizens within the national agenda. Back in 2007, the Ministry of Health (MOH) set a policy goal to reach middle income status by 2015 through its 'Health for Wealth' Five Year Plan Of Work[9] (5YPOW) (Ministry of Health,2007). Accordingly, poverty reduction strategies have concentrated energy and resources to successfully attain this goal in the past few years. However, Ghana still faces numerous developmental and societal challenges and the ministry advocates health as a key tool to overcome them. The government further endorses health as an intrinsic goal, with equity at its heart. The main health sector objectives, as outlined in the 5YPOW (Ministry of Health,2007, p. 4) are:

- ''To ensure that people live long, healthy and productive lives and reproduce without risk of injuries or death'';
- ''To reduce the excess risk and burden of morbidity, mortality and disability especially in the poor and marginalized groups''; and
- ''To reduce inequalities in access to health, population and nutrition services and health outcomes''

[8] Prior to the first trip contact was made with collaborators at Legon (Ghana) University and Kwame Nkrumah University of Science and Technology (KNUST).
[9] A document setting out health policy priorities, using a five year budgetary constraint.

Similar health policy goals are outlined in the National Drugs Policy[10] (NDP) (Ministry of Health,2004a), in the recognition that pharmaceutical products contribute greatly to the health of the nation. However, the MOH increasingly acknowledges the role of the traditional sector to achieve these goals (Ministry of Health,2007, p. 11).

Traditional Medicines policy

Laws and regulations on TM are closely aligned with that of modern medicines and have been in place since 1992 (World Health Organization,2005, p. 75). Compared to other countries in SSA - and even more developed countries - Ghana's TM system is relatively well established to the extent that in recent years, TM have been incorporated into the national programme[11] (in 2000) and the national policy (in 2002). Thus, the Ghanaian MOH believes TM/H to be an asset to the country, but struggles to ascertain the volume, nature and characteristics of traditional practitioners. While acknowledging that mistrust between traditional and modern systems exist, collaboration with TH is listed as a priority activity and one explicit programme objective aims to 'continue to promote traditional and alternative practice in the country' (Ministry of Health,2007, p. 27). Ultimately, the MOH aspires that, 'TM shall be provided in all public health institutions' and works toward 'the development of a holistic, integrated and seamless health care service comprising allopathic and traditional health care providers' (Ministry of Health,2007, p. 11). Yet, much like WHO's stance toward TM, these objectives are set without deep understanding of health care-seeking behaviour or demand side perspectives, mainly concentrating on macro, supply side factors such as research and development, improving the regulatory environment and formalizing the system.

The MOH also recognises gaps in policy that hamper these goals. Current safety assessments include use without demonstrated excessive harmful effects, reference to research on similar products and phytochemical analysis. The certification of the sale of TM is carried out by the Food and Drugs Board (FDB) and Traditional and Alternative Medicine Directorate (TAMD), an arm of the MOH in charge of coordinating activities related to TM. As of 2005, there were 340 registered herbal medicines in Ghana, but none

[10] Among other issues, the NDP promotes rational use, targets quality assurance, evaluates financing mechanisms and looks at the supply and management of drugs.

[11] Defined as 'any programme performed at local or national level by the Ministry of Health, other ministries or local bodies, whose mandate is to take specific action in order to achieve objectives in line with national policy or legislation' (World Health Organization,2005, p. 28).

were on the National Drugs List[12] (NDL) (World Health Organization,2005) and many TM are consequently sold over the counter (OTC)[13] in herbal outlets and by licensed chemical sellers (LCS)[14]. As a result herbal products are marketed privately and individuals increasingly pay out-of-pocket for these commercial goods (Bloom & Standing,2001). However, in most cases, utilisation is casual, and individuals obtain medicines in raw plant form then use them without clinical guidance (World Health Organization,2005). Documentation about herbal medicines and their active ingredients remains scant and opaque, and despite good intention, there is still a lack of scientific understanding in this area.

Attempts have been made to fill knowledge gaps related to herbal medicines. The Ghanaian government has taken steps to promote research and development of herbal medicines, for example, through the WHO-affiliated Centre for Scientific Research into Plant Medicine. The centre was founded in 1975 to test substances, and also dispenses herbal products (own observation). More recently higher education has also been targeted, with the introduction of specialist graduate level programmes in pharmacology and plant medicines. Further, the government has created the Traditional Medicine Practice Council (TMPC) to register all TMP where possible, and to support training and foster inter-departmental relations (Bodeker, Ong, Grundy, Burford, & Shein,2005).

In the following section, an overview of Ghana's health system is provided (for a country overview including details on the economy and key health and population indicators, please see Appendix 3).

1.3.3 Health systems overview

There are four main categories of health care providers in Ghana: public, private-not-for-profit, private-for-profit, and traditional (Ghana Health Service,1995b). All systems formally operate under and are ultimately responsible to the MOH, but day-to-day

[12] A list of all essential pharmaceutical products, potentially eligible for reimbursement (Ministry of Health,2010).
[13] Can be sold without prescription.
[14] Legally authorised vendors of non-prescription medicines.

management and administration of all state owned facilities (excluding teaching hospital and some quasi-government institutions[15]) are handled by the Ghana Health Service (GHS).

The public sector is neatly classified into first, second and third tiers. At all tiers, five levels of care are operated, from grassroots community (Community-based Health Planning and Services, CHPS), sub district, district, regional, to the largest and most comprehensive, national level teaching hospitals. Accordingly, lower levels provide primary care services while those at the top focus on secondary care. Teaching hospitals concentrate on tertiary services, specialised clinical and maternity care, academic research and training of medical personnel. The tiers operate in conjunction and are modelled on a referral system that encourages use of bottom levels before higher levels. In 2007, 1313 facilities were publicly ('fully governmentally') owned across ten regions (GSS, personal communication, April 2010).

The private-not-for-profit/mission sector reportedly provides 42% of Ghana's health care services (MeTA Ghana,2010). This sector is informally headed by the Christian Health Association of Ghana (CHAG), a mission based organisation run by sixteen Christian Churches, in addition to the Islamic equivalent, Muslim Ahmadiyya Movement (MAM). Both CHAG and MAM focus on remote and rural regions and in some areas the number of beds provided by CHAG exceeds those provided by government (Ballou-Aares et al.,2008, p. xxi). In 2000, some CHAG hospitals were awarded district hospital status, extending the reach of the public health system to non-governmental organisations (NGO) and thus in practice many institutions are found labelled as 'CHAG/GHS'. The government's coalition with CHAG encompasses financial assistance through enablement of reimbursement under NHIS, provision of personnel, and payment of salaries and other significant costs. MAM, on the other hand, operates without government support and actively encourages TM use through traditional healers (Center for Pharmaceutical Management,2003, p. 8). At last count, 218 clinics were CHAG owned and 11 belonged to MAM (GSS, personal communication, April 2010).

Private-for-profit operators serve wealthier individuals as 'Private Medical and Dental Practitioners' and constitutes smaller privately owned practices, health centres and clinics,

[15] All quasi-governmental institutions surveyed for this thesis were of district hospital status, thus government run.

and specialist facilities. Around 654 facilities are privately owned, but more than half are located in Greater Accra and Ashanti regions (GSS, personal communication, April 2010).

In addition to the mainstream health sectors mentioned above lies an often overlooked category, traditional providers. There are very few accurate statistics available but the MOH estimates 22,000 registered traditional practitioners, 367 TBA, plus approximately 200,000 other personnel are employed within the industry (Ghana Health Service,2007c, p. 17). However, owing to the informal nature of the sector and reliance on verbal communication rather than record-keeping, such figures are extrapolative, speculative and unreliable.

Distribution of health facilities

Across the country as a whole, there are 2279 (modern) health facilities, which equates to approximately 11,000 people per facility[16]. Lower level clinics and health centres make up the vast majority of the total health facilities in the country. Over half of all hospitals are located in one of two regions, Ashanti and Greater Accra. However, once population density is taken into account, the population-to-facility ratio indicates that along with Northern and Brong Ahafo regions, Greater Accra and Ashanti have the greatest number of people sharing any given facility. However, it is difficult to ascertain the geographic spread of facilities within region: it is likely that most health services are concentrated in the urban areas even if the majority of people live in more rural areas. An outline of the distribution of health facilities by region and ownership is given in Appendix 4 and Appendix 5, respectively. Further structural statistics are found in Appendix 6.

Pharmaceutical sector

Ghana's total market value for pharmaceuticals is estimated to be over $300m and growing. The majority (70%) of this consists of prescription drugs while 30% of the total market is attributed to OTC sales (Seiter & Gyansa-Lutterodt,2009). The public sector dispenses the bulk (around 55%) of modern pharmaceutical products while private systems supply the rest. Among 1,592 privately owned pharmacies registered with the Pharmacy Council (PC) and 10,000 LCS, a fraction (about 530) have been accredited to dispense under the National Health Insurance Scheme (NHIS) (MeTA Ghana,2010). Based on the most recently available data, 87% of pharmacies are located in Greater Accra and

[16] Using population estimates of 24.2 million.

Ashanti regions (Ballou-Aares, et al.,2008, p. xix) although LCS are more evenly dispersed. The popularity of self-medication serves to sustain these retail outlets, with one estimate citing a 10% annual growth rate (Ballou-Aares, et al.,2008, p. xix). This is seemingly made possible by less stringent laws that allow LCS to operate without necessarily being staffed by qualified pharmacists. LCS have also been known to illegally dispense prescription-only drugs (Seiter & Gyansa-Lutterodt,2009).

Health and medicine expenditures

Total health expenditures amount to 8.3% of GDP, which is roughly equivalent to 52 cedi[17] per capita per annum (MeTA Ghana,2010, p. 13). Just over half (51.6%) of total expenditure is accounted for by government, while private expenditures constitute the rest (MeTA Ghana,2010, p. 13). The MOH spends around 9.5% (MeTA Ghana,2010, p. 20) of its budget on medicines, however, as around 70% of medicines are imported into the country (Seiter & Gyansa-Lutterodt,2009, p. 10), much of the cost is due to import duty.

Prices of modern and traditional medicines

Prices of modern medicines are largely unaffordable for much of the Ghanaian population (Health Action International & World Health Organization,2005; MeTA Ghana,2010; World Health Organization,2002): one recent survey carried out by MeTA suggests that packs of medicines for common illnesses are often priced above or close to the minimum wage (currently 3 Ghc per day). Margins are also frequently higher for medicines purchased in the private-for-profit sector than in the public sector, as Table 1 illustrates. For chronic illnesses requiring full treatment courses, costs are substantial even in the public sector: treating child respiratory infection with Cotrimoxazole requires 0.3 days' wages of the lowest paid government worker; and hypertension tablets (Atenolol) would cost 0.8 days' worth (MeTA Ghana,2010, p. 45). To treat hypercholestrol in the private sector, 10.1 days' worth of wages is required (MeTA Ghana,2010, p. 45)[18]. However, such high prices may not be a surprise given that there are no price regulations at the manufacturer's level and the additional mark ups when medicines are imported (MeTA Ghana,2010). Regardless of nominal cost, however, the National Health Insurance Scheme (see section below) should have negated payment at the point of use. Yet, the MeTA survey reports that only 39% of

[17] During fieldwork £1= 2.20 cedi ($1.14). At the time of writing £1=3 cedi ($1.55).
[18] For a less recent overview of prices (but covering a wider range of medicines and sectors), see HAI/WHO (2005).

all households obtained free medicines at public health care facilities when needs arose (MeTA Ghana,2010, p. 45).

Table 1 - Median prices of lowest price generics, by sector

Medicine, strength, formulation	Public (Ghc)	Private-for-profit (Ghc)
Salbutamol 0.1mg/dose Inhaler	4.20	5.70
Glibenclamide 5 mg Capsule/tablet	1.20	1.20
Atenolol 50 mg Cap/tab	1.80	1.80
Simvastatin 20 mg Capsule/tablet	-	22.80
Ciprofloxacin 500 mg Capsule/tablet	2.80	2.10
Cotrimoxazole 8 + 40 mg/ml Suspension	0.70	1.05
Amoxicillin 500 mg Capsule/tablet	1.05	1.47
Ceftriaxone 1 g/ vial Injection	4.68	4.50

Source: (MeTA Ghana,2010, p. 33)

Prices of TM/H, on the other hand, appear mixed and subject to affordability criteria. Although precise or up-to-date information on costs is difficult to ascertain, evidence from some studies are available. For example, one survey in Kenya found that TH were more expensive than private health care facilities (Mwabu,1986), while another study in Zimbabwe reports the median cost of TH to be Z$23, which was 23 times greater than a visit to the government clinic. While a few studies show that costs of herbalists are low (Ahorlu, Dunyo, Afari, Koram, & Nkrumah,1997), it is arguably the capacity for healers to take into account their clients' ability or willingness to pay which characterises their service provision. Thus, payment to healers may be outcome contingent (Leonard,2003), made in instalments, in-kind or in exchange for services (Stekelenburg, et al.,2005). Stekelenburg (2005), for example, shows that two thirds of all TH users paid an animal (in most cases a cow, the value of which is estimated to be between $65 and $130). Where money was paid, the majority of individuals did not pay more than $3.5, whereas fixed hospital costs were found to vary from just under $1 for registration to over $3 for major

surgery. On the other hand, individuals who can identify the necessary herbs from local areas will be able to pick these freely.

Insurance

Between 1990 and 2003[19], Ghana's pharmaceutical system operated under a national revolving fund scheme known as 'Cash and Carry'. Under this system, initial seed funding or drug supply was gifted by the government to the Central Medical Store (CMS)[20], who then sold to individual facilities, whereupon users would pay for drugs as needed. The loop was completed when more drugs were purchased and stored as necessary. This was largely user-financed and aimed to recover costs while sustaining an efficient but affordable drug supply system. It is generally agreed that medicines supply improved; in 1992 only 22% of medicines on the Essential Medicines List[21] (EML) was available at the CMS, but by mid-1993 this had risen to 62% (Asenso-Okyere, Osei-Akoto, Anum, & Adukonu,1999). However, access to medicines was not necessarily enhanced because those unable to afford or gain physical access to stores were excluded. Special provisions were established to create access for the poor, but this was determined subjectively by local officials. The system was criticised as unsustainable in an environment where self-medication was common (and hence out-of-pocket expenditures were high) and equal access to care was deemed a basic human right (Asenso-Okyere, et al.,1999).

Accordingly, the NHIS (also known as the District Mutual Health Insurance Scheme, DMHIS), run under the auspices of the National Health Insurance Authority (NHIA), was established in 2003 and today, approximately 62.3% of Ghana's population is covered by health insurance (MeTA Ghana,2010, p. 13)[22]. The stated goal of the NHIS is 'to ensure equitable universal access for all residents of Ghana to an acceptable quality of essential health services without out-of-pocket payments being required at the point of service use' (MOH 2004 cited by Mensah, Oppong, Bobi-Barimah, Frempong, & Sabi,2010, p. 19). The

[19] Cash and carry began in 1990 in Greater Accra and Volta regions and was extended nationwide in 1992, before being disbanded in 2003.
[20] The country's main distribution centre for pharmaceuticals.
[21] A list of medicines considered 'essential' and recommended for reimbursement by WHO. The NDL is most often based on this master list and therefore the acronyms are often synonymous.
[22] The majority of those insured are covered by NHIS but there are two other, smaller categories of health insurance in Ghana: private commercial insurance; and mutual health insurance (privately formed groups of individuals who pool funds, for example church members or village groups)[22]. Private commercial insurance schemes are mostly limited to wealthier Ghanaians, expatriates or those employed in the formal sector and therefore covered by employee insurance schemes.

NHIS covers in- and out-patient services, oral health, eye care, emergencies and maternity care (Mensah, et al.,2010, p. 21) but a list of exclusions also apply. As of March 2011, 552 medicines covering around 95% of the most prevalent disease conditions in Ghana (e.g. malaria, Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome (HIV/AIDS), tuberculosis) were included in the reimbursement package (Daily Graphic,2011; Mensah, et al.,2010, p. 21). Individuals are required to register and pay a registration fee and premium at a DMHIS office or through a local NHIS agent to become eligible. Currently (2012) the minimum annual premium is 7.2Ghc, and the maximum 48Ghc (National Health Insurance Authority,2011a) depending on financial status. The scheme classes citizens into four categories of ability to pay: the core poor/indigent (those without income, fixed residence and without support from other persons); the poor and very poor; middle class; rich and very rich. People working in the formal sector automatically contribute 2.5% of their monthly pay to the Social Security and National Insurance Trust (SSNIT) however, dependants (under 18 years old), core poor, indigents, pensioners, and those above the age of 70 are exempt from the premium. Since 2010 pregnant women and children under five are also exempt from payment. This schema is further outlined in Appendix 7.

All public facilities are eligible for automatic accreditation to NHIS, but private facilities must apply to gain this status. As of June 2010, 145 DMHISs were in operation and 5000 service providers were accredited (Jehu-Appiah et al.,2011), including around 1551 private providers (figures for 2008). In 2008, the NHIA spent over $140 million (Seiter & Gyansa-Lutterodt,2009, p. 19), of which a large fraction, around 40%, was for pharmaceuticals alone (Seiter & Gyansa-Lutterodt,2009, p. 5). As such, cost savings are crucial for the scheme and the NDP stipulates compulsory generic substitution (Ministry of Health,2004a).

As of 2010, nearly 60% of the populace held NHIS cards (National Health Insurance Authority,2011b) although such figures do not reflect the uneven distribution across the country (Witter & Garshong,2009). Moreover, holding an insurance card does not necessarily equate to free services. There are many reasons for this; a chosen provider may not be accredited with NHIA; fraud and corruption divert resources; the provider may not stock prescribed drugs; or prescribed drugs may not be on the reimbursement list (Seiter & Gyansa-Lutterodt,2009). Thus, although NHIS coverage may be increasing, the

end goal of equity and providing free access to good quality health care and medicines is still out of sight. Indeed, although utilisation of health facilities has increased in line with the introduction of NHIS, nine years on, the NHIA is facing severe financial difficulties. Prominent problems for both the NHIA and providers include: overuse (for example due to polypharmacy, a situation in which one individual utilises many different types of medicines); misuse (over prescription of certain drugs such as antibiotics); and delay in payments owing to incorrect or inappropriate claims processing (Seiter & Gyansa-Lutterodt,2009). Problems are magnified because there are no national guidelines for medicine price monitoring at the retail/patient level (Arhinful,2009). Health Action International (HAI), an NGO with which WHO has strong ties, has recently disseminated pricing studies which have increasingly been used in policymaking (Health Action International & World Health Organization,2005), but surveys investigating individual medicines spending are scarce.

In the following section, the conceptual framework is described in detail. Firstly, the theory of institutional economics is explained, followed by existing empirical studies on the role of institutions. The theory is then applied to TM. Utilisation models are then outlined to frame statistical methods.

1.4 Conceptual framework

1.4.1 Institutional economics

Economists have conventionally used principles of neoclassical economics to model the state of the world.[23] Structural adjustment policies and similar programmes targeting developing countries were predicated on the assumption that man is rational, guided first and foremost by price signals and the market mechanism. Neoclassical theory, however, has failed to fully explain the resulting suboptimal economic outcomes and, in particular, why developing countries that have imitated western policies have not achieved similar growth rates. In the 1980s, New Institutional Economics (NIE) sought to revive Veblen's (1998; reprint version) proposal that 'institutions matter', an idea that has now even been accepted by the World Bank (WB) and International Monetary Fund (IMF) (Stein 2008, cited by Chang,2010). Within development studies, the re-awakening of institutional

[23] E.g. neoclassical growth theory (Solow,1956) and endogenous growth theory (Lucas,1988; Romer,1986) both assume perfect coordination of agents and the former does not even include technological advances into modelling growth.

economics was a major step forward because prior to this, development economists had always treated the state (and other institutions) as exogenous[24].

As it stands, health care economics also largely ignores social values and informal institutions (Davis,2001). Yet, health care is subject to three unique characteristics which necessitates a framework that extends beyond neoclassical economics (Davis,2001; Hodgson,2008): firstly, both health and health-seeking behaviour are heavily influenced by cultural norms and beliefs; secondly, medicine has experienced rapid technological change that disrupts these norms and beliefs and thirdly, market failures are hugely problematic in health care financing and delivery (Arrow,1963). Institutionalists therefore build upon neoclassical economics principles – such as scarcity and competition - but abandon instrumental rationality to contend that ideas, ideology, and institutions matter: economies are not efficient (price alone cannot determine outcomes and uncertainties abound) because individuals are not equipped with perfect or full information and have limited 'mental capacity' (Denzau & North,1994). Instead, 'mental models' are used to guide actions, which in turn are culturally derived by intergenerational transfer of knowledge, values, and norms. Institutions therefore create a stable, less uncertain environment in which individuals can make decisions but all such transactions carry costs and 'when it is costly to transact, institutions matter' (North,1993, p. 4).

Greif (2006, p. 30) defines institutions as 'a system of beliefs, norms and organisations that together generate a regularity of social behaviour'. Similarly, North argues institutions are 'the humanly devised constraints that structure political, economic and social interaction' (North,1990, p. 3), and are defined by organisations or groups of individuals bound by a common purpose (be it economic, political or social). Constraints can be classified into two types: formal and informal. The former are exemplified by publicly governed rules of political and economic behaviour such as laws and legislations, enforced by public authorities. The latter are private rules of behaviour that do not necessarily require legal enforcement as rules are sanctioned privately or are self-enforcing (where self-interest drives individual action). They are thus considered the 'unwritten rules' of society and are theorised to be the modification or extension of formal rules, combining to represent an 'institutional matrix' depicting the nature of the choice set faced by an individual

[24] In many ways institutional economics serves as a bridge between economics and other social sciences (sociology, anthropology, political science), in what Mantzavinos terms the 'enlightened homo economicus' (Mantzavinos,2001, p. 56).

(North,1990, p. 136). Examples of informal constraints include sanctions, customs, traditions and taboos. Informal constraints are typically developed only gradually, spontaneously over time and inter-generationally, because they are endogenously shaped by society. All informal constraints emerge as a result of socially transmitted information and the capabilities of the mind to process this through mental maps. North and others (Boyd & Richerson,1985; North,1990) argue that language-based 'culture' provides the foundation for the diffusion of this information, such that culture is 'the transmission from one generation to the next, via teaching and imitation, of knowledge, values and other factors that influence behavior' (Boyd & Richerson,1985, p. 2).

In this sense, human beings can be seen as utility maximising individuals driven to solve problems, and their motivations are shaped by the cultural and social environment. Plattner (1989) argues that individuals are 'rational' in the sense that their solutions to economic problems reflect constraints (social, cultural, cognitive)[25]. Mantzavinos (2001, p. 21) builds on this idea thus:

P1→ TS → EE → PP2, where P1 is an initial problem, TS is the tentative solution, which is considered to have some error and therefore EE represents the individual's attempt to eliminate error, which then leads to a new set of problems, PP2. PP2 is subsequently formed of its own historical path (i.e. P1, TS and EE). Aligned with North's (1990) idea of mental maps, Mantzavinos (2001) also recognizes that human brains are limited in their learning capacity, so cognition and learning take place according to the 'if-then' rule: '*if* this happens', '*then* I will do this'. Individuals devise general strategies ('heuristics') to solve problems with little effort using a ready-made solution, which direct individuals such that they can 'blindly follow without rethinking the problem each time anew' (Mantzavinos,2001, p. 100). Thus, when an individual is faced with making choices, he uses mental maps and heuristics to form conjectures about possible future outcomes, according to the expected gain in utility. This deliberation process can be intuitive, by way

[25] In economics, relational goods describe goods that increase an individual's utility as consumption increases and the consumption of some specific other person (of a defined set of people) increases. Examples of utility arising as a result of jointness of consumption include: social approval; solidarity; desire to experience one's history; desire for acceptance; desire to maintain an identity; and fulfillment of a social or cultural norm. Relational goods therefore model an individual who is perfectly rational yet also motivated by their relationship with others, providing an alternative tool for analysing the relationship between the collective and the individual (Uhlaner,1989). For further examples and discussion of relational goods see Gui (2004), Lo Verso and Prestano (2003) Brunori (2003).

of imagination, or the individual may choose to take the already constructed - culturally shaped – pre-approved alternative from their social environment (Mantzavinos,2001).

There are three cultural aspects of institutions: values, norms and conventions (Groenewegen, van den Berg, & Spithoven,2010). Values are a general coordinating mechanism directing individuals on how to behave (Hodgson,1998), whereas norms characterize ways in which individuals behave as a group member in society. Conventions are defined as the practical rules that structure behaviour. When society concurs about the values, norms and conventions, and individuals act in their own interest, they will spontaneously follow them and are said to have 'internalised' or 'embedded' (Granovetter,1985, 2005) values, norms and conventions into their own code of conduct[26] such that: actions automatically become an inherent, natural way of thinking and people will act in the prescribed manner 'if only to avoid a guilty feeling, or ostracisation' (Groenewegen, et al.,2010). Plattner (1989, p. 209) writes; 'not every actor actively thinks about each strategy every day, but rationality of behaviour might be labelled 'habit', 'custom', or 'tradition''. If successfully applied and perceived as utility maximising, the same behavior will be imitated by others. Learning by imitation, in turn, is what outsiders observe as socially driven behaviour and any deviation from the social norm is seen as harmful for the group as a whole (Mantzavinos,2001): 'people have a preference to live in a predictable environment , and whenever their expectations regarding behaviour of others are disappointed, they tend to have a feeling of uneasiness' (Mantzavinos,2001, p. 122).

Such aspects of institutions are argued to be self-enforcing because the individual lacks incentive to change strategy and similarly, wishes for other players to continue with their strategy too. The notion of institutional equilibrium is presented by North (1990), who describes this very scenario using game theory, under which no player would find it advantageous to change their strategy. This does not imply that people would not want to change, nor that everyone is content with the existing structure, but rather, that there are no incentives to alter the game because the benefits of sticking with the current strategy outweigh the costs of divergence. North (1990) additionally attributes the slow evolution of informal institutions to the incremental way in which cultural traits are transmitted,

[26] Granovetter (1985) distinguishes between 'undersocialised' individuals who purely use rational choice as the guiding principle, versus 'oversocialised' actors who behave mostly according to social norms. In economic anthropology a parallel distinction is made between 'formalists' and 'substantivists'.

unlike formal rules which are implemented suddenly. Importantly, this implies that any abrupt changes in formal rules may result in disequilibrium because they do not necessarily consider cultural constraints.

Under what circumstances do formal and informal behaviours, or 'contracts', thrive? In smaller communities where social networks are typically dense, individuals easily amass information about each other and are repeatedly involved in transactions. Under such scenarios, exchange behaviours are informal in nature and transaction costs are low because individuals predominantly rely on personal and social ties. Any deviation from the norm is punishable by ostracism or similar social sanction. As a result, formal contracting is unnecessary, rare or inadequate to meet the perceived needs of the population. On the other hand, more developed economies are characterised by impersonal exchange, often without guarantee of repeated business. Gains from cheating and opportunism exceed the gains from cooperation and as such, individuals rely on formal institutions with its high transactions and enforcement costs to ensure compliance. By adhering to institutions, individuals are said to be playing by the 'rules of the game of a society' (North,1990, p. 3). For institutions to be 'effective', two conditions must be fulfilled:

- Firstly, a sufficient proportion of the society must share the beliefs and adhere to the institution. By definition, 'any single individual is born into a pre-existing institutional world which confronts him or her with its rules and norms' (Hodgson,2006, p. 7), thus it is the degree of acceptance and continuation of these norms that shape outcomes.
- Secondly, these institutions need to be credible, so sanctions (positive or negative) can be carried out to discourage deviance from the norm. Enforcement of rules, by the threat and extent of punishment, are therefore central to the effectiveness of institutions.

If informal institutions are developed only gradually and spontaneously and are self-enforcing, they are akin to being 'path dependent' (Arthur,1994; David,1985). Path dependency supposes that history cannot be neglected and today's decisions are formed as a result of, and reflecting, past decisions: 'institutions are the carriers of history' (David 1994 Mantzavinos,2001, p. 173)[27]. The path dependency idea shows how, even out of self-

[27] Hayek's (1964) description of the evolution of a footpath in the woods depicts path dependence perfectly: ''*At first everyone will seek for himself what seems to him the best path. But the fact that*

interest, the independent actions of individuals lead to outcomes that affect the behaviour of other self-interested individuals at a later point in time (Pierson 1997). Yesterday's outcome impacts today's, and patterns are reinforcing. Although many outcomes are possible (e.g., many tracks could be made in the woods), the further down the path one lies, the less likely a different route will be taken. This is true even where outcomes are inefficient – for example, there may be shorter routes through the woods – but individuals are 'locked in' as diverging from the path would give rise to aforementioned sanctions. In this manner, actions of individuals are not only predetermined but the inertia to change behaviour fore-determines the actions of consequent generations, giving rise to increasing returns and 'cumulative causation' or 'agglomeration effects' (Pierson,2000).

1.4.2 Previous empirical studies on the role of institutions

Numerous economists have ascertained the importance of institutions for economic outcomes. Acemoglu et al's (2001) widely quoted study shows how past institutions (colonialism) shape economic outcomes today. Using mortality data of European colonialists, they provide statistical evidence of colonialism shaping the demographic structure of colonised countries: in countries with high mortality, colonialists were unable to settle and were thus more likely to set up extractive institutions plagued by poor property rights and government expropriation. Countries in which colonialists led healthier, longer lives were more likely to be endowed with stronger institutions and higher growth rates. Banerjee and Iyer (2005) also argue that differences in historical property rights in India have influenced economic outcomes today. Areas in which property rights were assigned to landlords experienced lower agricultural investment and productivity in the post-independence period, whereas areas in which rights were given to cultivators typically show better outcomes. In both studies, historical influences on institutions are argued to reflect today's institutions and the path dependency phenomenon, the consequence being divergence in economic growth rates.

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such a path has been used once is likely to make it easier to traverse and therefore more likely to be used again; and thus gradually more and more clearly defined tracks arise and come to be used to the exclusion of other possible ways. Human movements through the region come to conform to a definite pattern which, although the result of deliberate decision of many people, has yet not be consciously designed by anyone'' (Hayek,1964, p. 40).

Greif (1993, 1994) also demonstrates how historical institutions, path dependency and cultural traits all combine to influence economic outcomes. Using a case study, Greif (1993) shows that economic outcomes and even wealth distribution are culturally and institutionally driven. In medieval times, trading systems relied on sharing business information between individuals. Maghribi (Muslim) traders were largely collectivist, formed of segregated groups and enforced contracts through informal economic and social institutions. Genoese (Latin/European) traders, on the other hand, were individualist in nature, transacting among people of different cultural backgrounds and enforcement was via formal organisations such as courts. This divergence in social structures and cultural beliefs is argued to have led to different trading patterns. Common religion, language and familiarity among the Maghribis ensured that they regularly shared information, and any deviant behaviour was verifiable and subject to collective punishment. On the other hand, Genoese culture was inhospitable to sharing information, as self-reliance was highly valued. However, Edwards and Ogilvie (2008) have repudiated his findings, claiming that based on secondary literature, Maghribis rules were in fact founded on law rather than the informal rules of behaviour as advocated and defended by Greif (1993, 2008). The importance of informal institutions is also demonstrated by Putnam (1993), who argues that growth rates of north and south Italy diverge because of different rates of social capital (informal constraints), and Ensminger (1994) who notes how Orma pastoralists in Kenya overcome transaction costs through the use of informal networks[28].

In an example from health care, Eggleston (2008) illustrates how historical and comparative institutional analysis can aid the understanding of Chinese health care delivery today. She writes;

> *''in health care, as in other arenas of human endeavor, individuals and organisations respond to the institutional structure of incentives. To understand the adaptive efficiency of health care systems, it can be valuable to consider economic incentives in their historical context, drawing from related contributions in anthropology, sociology, medicine, public health, and area studies. Yet this economic approach of comparative and historical institutional analysis has virtually never been used in theoretical studies of health care incentives'' (Eggleston,2008, p. 1).*

[28] Trust, another informal constraint, is similarly considered vital for economic outcomes (Knack & Keefer,1997).

Specifically, Eggleston (2008) demonstrates how physician dispensing (rather than the separation of prescribing from dispensing) has become the dominant form of obtaining medicines. She argues that physician dispensing is a self-enforcing institution because the longer this system is in place, the higher the costs to society of supplier-induced demand, thus blocking any attempts at separation. By outlining the historical background on the culture of healing in China, Eggleston (2008) writes that historically, herbal practitioners saw dispensing medicines as the cultural norm. In fact, throughout Asia doctors considered charging for diagnosis alone as inappropriate, so selling medicines was central to their trade. Following the path dependency argument, these cultural traits were transmitted inter-generationally, such that historical interactions have left their mark on today's incentive structures within the health care system even while recognising that such systems are not necessarily optimal. Eggleston (2008) argues that only improved technology, insurance or rise of the welfare state will break down these institutional arrangements[29].

Many authors have similarly used historical arguments to explain health outcomes today. For example, Turshen (1977) shows how health systems in Tanzania under colonialism catered for the economic, social and political requirements of German and British colonial rulers rather than the needs of locals, such that long lasting effects on health and health services can be seen in the population today. Similarly, Kale (1995a, 1995b) argues that health inequalities can be attributed to historical settings, for example the apartheid system in South Africa forced different races to use different health systems, leading to divergent health outcomes today. By so doing, both authors have (inadvertently or otherwise) used the institutional, evolutionary framework to illustrate the resilience of institutions.

Critics of institutional economics point to the difficulty of ascertaining causality. Chang (2010), while believing that institutions are important, argues that the causality is more likely to run the other way, thus development leads to 'better', or stronger, institutions. He contends that many empirical studies look only within-country at one point in time, with authors assuming a linear relationship, leading to an unrealistic model of events. His argument asserts the necessity, where possible, to check endogeneity issues within econometric modelling.

[29] Eggleston also explores explanations linked to rent-seeking and the wider political economy to explain why countries like Singapore have failed to separate prescribing from dispensing.

From a policy perspective, institutional economics is a tremendous contribution because it explains why countries with similar policies fail to grow or develop at similar rates and in identical manner, and does so without abandoning historical precedents. North's (1990) theory, among others, suggests that societies that adopt formal rules from another society will have different outcomes to the original country because informal rules and environmental characteristics differ. Institutional economics therefore shows the effects of 'institutional transplantation', whereby influences have been imposed or adopted from abroad, and lends an argument to those who believe the prescriptive 'one size fits all' policies of formal institutions such as the WB and IMF can be ineffective and damaging. It suggests that for successful reform, both institutions and belief systems specific to the context must be evaluated.

1.4.3 Traditional medicines as an informal institution

In this section the theoretical underpinnings of institutional economics are applied to TM/H utilisation in Ghana. Under what circumstances does the utilisation of TM, as opposed to modern medicines, pertain? To answer this question it is necessary to take a historical perspective and recognise the pluralistic health care system as the sum of its past, and incorporate institutional explanations.

In pre-colonial times (before 1844), the only (and therefore default) medical care available was what we today term 'traditional': herbal remedies and services of TH. Illnesses were commonly explained as both physical afflictions to the body and arising from magico-religious elements arising from supernatural powers or higher deities, which only healers could purge (Kleinman,1980; Rivers,1924; Twumasi,1979b). Unlike modern medicines, traditional systems are lauded for being holistic in nature and treatments can involve the patient, their family or even the surrounding community when illnesses were considered to be ailments of society. Staugard (cited by DeJong,1991, p. 4) writes; 'the traditional healer in the Tswana village – in common with healers in other parts of southern Africa - is not only medicine man. He is also a religious consultant, a legal and political advisor, a police detective, a marriage counsellor and a social worker'. These beliefs and value systems are socially derived – society determines which values to uphold, or what role a healer plays in creating a harmonious environment – and consequently, socially maintained.

During colonialism the traditional system was outlawed by colonial administrators and the modern health care system was introduced (Anyinam,1987; DeJong,1991; Twumasi,1979b). Colonialists saw the traditional system as backward, inferior and superstitious, banning indigenous practices and beliefs and persecuting TH[30]. By so doing, colonial authorities became arbiters of 'good' and 'bad' medicine. Newer, scientific European medicines were primarily set up for, and spearheaded by, state actors (Porter,1999), and areas in which colonial powers dominated tended to be more urbanised and therefore benefited from better infrastructure (Aidoo,1982; Yeboah,2006). Government institutions were later joined by mission agencies which operated in rural areas, but served only a small fraction of the local population. In Ghana, by 1878, colonialists and missions held considerable control over the functioning of health systems and in many places 'western' values were so strong such that ''the imperialism latent in western medicine…aimed to establish rights over the bodies of the colonized'' and by 1920 all British African colonies had prohibited witchcraft (Porter,1999, p. 482). World War II then spurred the commercialisation of modern medicines, with the mass production of penicillin and anti-bacterials (Sykes,2001). Despite these events, traditional systems continued to be popular and relied upon by many, maintaining a central role within the health care system.

After the departure of the colonialists (around 1957), both systems remained intact, and although today formal modern institutions form the bulk of health care, these services fail to reach a significant proportion of the population. For most, the utilisation of TM/H is therefore the combined result of the lack of access to modern medicines and historical evolution. If newer systems are unable to penetrate into the current, older systems will necessarily prevail, and moreover, remain continually accepted: incentive structures within which TM are embedded exhibit path dependence, and any changes will be constrained by inherited norms and beliefs (Eggleston,2011). For example, in Nigeria, the poor lack trust in formal institutions of the state, preferring instead to use traditional

[30] Ironically herbal products like quinine helped relieve colonisers of malaria, facilitating the invasion of West Africa. Ultimately, much of modern medicine is based on herbal products. Further, in Europe in the 18th century religious healing, prayers for patients to protect against evil spirits, fairies and witches were common and unauthorised healing was rife, the success of healers depending on their ability to satisfy the public (rather than emphasising science) (Porter,1999). Porter (1999) also offers explanations about different types and concepts of medicines from a historical perspective.

associations (Ayoola, Aina, Mamman, & Nweze,2000). At the extreme, to diverge from the norm of traditional medicines is to ascribe to the doctrine of the west.

TM/H can therefore be understood as resilient informal social institutions that have survived many different pre-colonial, colonial and post-colonial influences. Given this, neoclassical economics alone is insufficient to explain utilisation of TM when historical and societal influences are incorporated. This is particularly the case where some illnesses are considered to be caused by social ills requiring reciprocity or social (rather than individual) action[31] (Evans-Pritchard,1937; Rivers,1924). Rivers (1924) and Evans-Pritchard (1937) also saw indigenous medical systems as social institutions, by which native medical practices followed rationally from the culture at large. Thus, carrying out actions that are aligned with informal social institutions also reinforce the idea of belonging. In line, Twumasi (1979a, p. 29) writes;

> *''in Ghana, norms are enshrined in tradition. The best way to act is the way the ancestors have ordained; that which is legitimate is that which had been prescribed in the past…the institution of traditional medicine emerged from the cultural material of Ghanaian society; social institutions arise fundamentally to meet social needs. Human behaviour and hence the institutions that organize the behaviour of its members…arise from the culture of the people…scientific medicine operates within a formal institutional context, with its bureaucratic norms and procedures. However, Ghana is a society in which informal relationships take precedence''.*

Informal relationships, in turn, are 'sustained by the value of future relationships' and are therefore self-enforcing (Baker, Gibbons, & Murphy,2002, p. 39). Baker et al (2002) use the notion of 'relational contracting' for theorising the behaviour of firms, but this idea can easily be applied to TM/H. Successful interactions between healers and individuals, and individuals and society - just as between some firms - rely on informal agreements. Specifically, relational contracts allow for credible contracts if individuals value their reputations and the benefits accrued from utilisation of TM, and further, it is costly to renege from the strategy. Society, and individuals within, appears to place value on traditional systems of care per se, as well as because of failures of formal institutions.

[31] Alternatively TM/H might be seen as relational goods (please see footnote no.23) giving rise to utility for rational individuals who follow the social or cultural norm. Relational benefits can therefore be accrued even in the absence of face-to-face contact with others, if an individual thinks they belong to a certain group (Uhlaner,1989).

In areas where access to modern care is lacking, or where modern systems cannot address all health needs, informal institutions become paramount. This is reflected, for example, in the high rates of self-medication and self-care in developing countries (Goodman et al.,2007; van den Boom, et al.,2008), the persistently high numbers of healers found in certain areas of the world (World Health Organization,2002), and the ability to remain popular even when most healers are not formally trained and TM are not proven scientifically effective (thus reliance is solely on social recognition that healers are able to solve problems, mostly after years of building trust among society, and trial-by-error in knowing which herbs to use for any given symptom). TM as an informal, social institution is illustrated by Leonard and colleagues (Leonard,2003; Leonard & Zivin,2005) who argue that TH address market imperfections (in particular, the principal agent problem[32]) because they allow patients to pay retrospectively, depending on outcome, quality of care received and ability to pay. Outcome-contingent contracts are successfully applied because most transactions are made locally and 'within-group', reflecting strong social ties. Further, the utilisation of healers arises because of cultural beliefs and norms (such as the belief that healers are agents of spiritual powers to whom they are held accountable [see description of TH in section 1.1]). This threat of sanctions makes contracts highly enforceable, which in turn incentivises healers to self-regulate and provide high quality care consistent with efficient outcomes. Bloom and colleagues (2001; 2008) argue that these unorganised setups remain the predominant form of care in developing countries where personal and social links influence health care provider choice and utilisation.

Traditional systems therefore persist for cultural reasons, as well as imperfections in the market that curtail access to modern medicine especially for the poor. Modern medicines, especially under systems where out-of-pocket payments are common, do not take into account an individual's ability to pay and rarely favour the poor. Further, the utilisation of modern services requires the individual to ascertain new information (for example, about physician skills, bedside manners and waiting times), and with limited mental maps, this information is costly to acquire especially by vulnerable groups (the poor, women, less educated). Eggleston (2011) argues that it is only with the introduction of health insurance or other major reforms that health systems are jolted into taking a different path. In Ghana, health insurance (see section 1.3.3) has influenced health-seeking behaviour (Ministry of Health,2007) but failures are evident. Health insurance has: limited

[32] Patients are unable to evaluate the physician's/healer's level of effort.

coverage, both in depth and breadth; prohibitive registration and renewal fees; been unable to identify properly those who should be exempt from payments (Oxfam,2011). Broader infrastructural problems (costs to reach modern facilities are expensive, drugs are often unavailable and suffer from long stock-out durations, inefficient drug management systems and so on) (Center for Pharmaceutical Management,2003) mean the associated costs of utilising modern medicines is high enough for TM utilisation to persist. Accordingly, until these costs are lowered significantly, and the potential loss of surplus from failing to use modern care increases, traditional care will prevail.

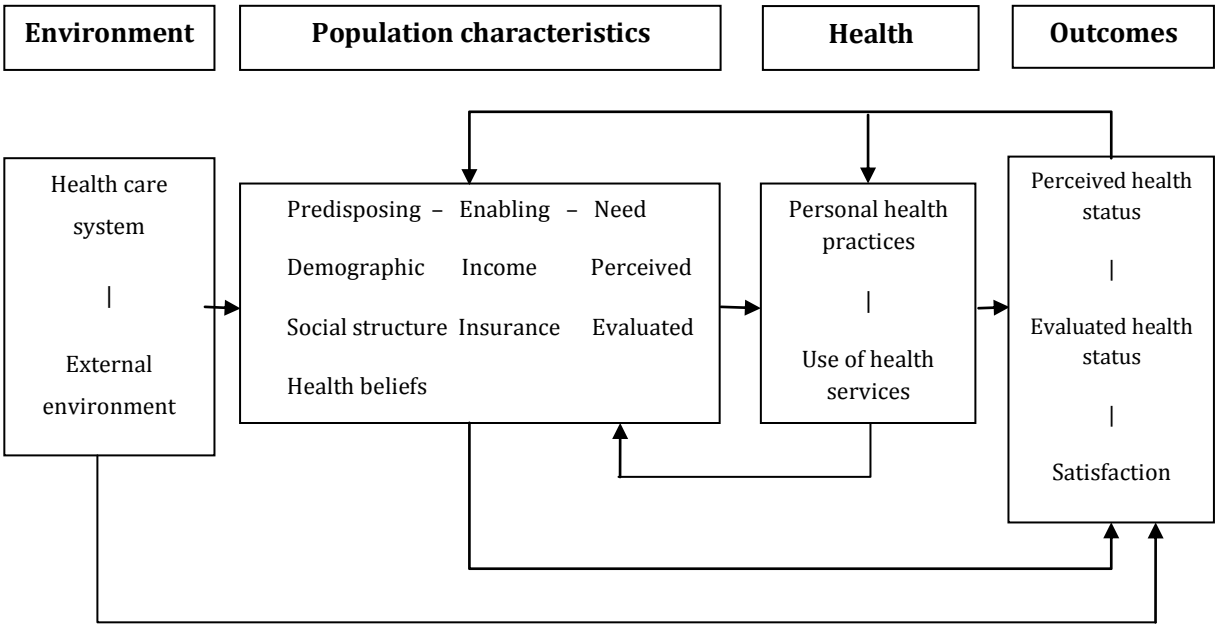
1.4.4 Utilisation models

Original utilisation models consider individuals to vary health-seeking behaviours according to predisposing characteristics (demographic, social structures, health beliefs), enabling resources (personal/family, community) and need for care (perceived, evaluated) (Andersen,1968; Andersen & Newman,1973). Predisposing characteristics include demographic traits such as age, gender and other biological factors influencing need, in addition to 'social structures' (which describes an individual's status within society), their ability to cope with presenting health needs and their physical environment. Typically social structures are measured through educational achievements, occupation and ethnicity. Health beliefs are attitudes and values people hold about health and health services, which in turn affect perceived need and utilisation of care. Enabling resources describe availability of facilities and associated infrastructure (community resources), personal means and know-how to access them. Frequently used indicators include income, health insurance, travel and waiting times. Together, enabling resources may be seen as affecting 'potential access', as increasing enabling resources will increase the likelihood of utilisation, whereas 'realised access' is the actual use of services (Donabedian,1988). Finally, equitable access can be evaluated by balancing the predisposing, enabling and need factors alongside value judgements on what is 'fair'. Traditionally, access is equitable if demographic and need variables account for all or most of the variation in utilisation (Andersen,1968).

Andersen and colleagues have since built upon this original framework (Aday & Andersen,1974; Andersen,1995; Andersen & Newman,1973). The subsequent framework ('Phase two') attempted to incorporate better the supply side ('health care system') which included national health policy, resources and their organisation as additional

determinants of utilisation. A direct outcome measure, consumer satisfaction, was also added. This measured satisfaction according to convenience, availability of providers, financing mechanisms, provider characteristics and overall quality. 'Phase three' saw further expansion with the inclusion of the external environment (physical, political, economic) and personal health practices (diet, exercise, self-care) as potential influences on health care use. Finally, in 'Phase four', Andersen (1995) allows for a dynamic model in which multiple influences and health statuses are depicted. Thus, the utilisation model supposes that health-seeking behaviour is not a one shot game, rather sequential, with present day behaviour dependent on past behaviour and outcomes. Figure 3 shows the sum of Andersen's phases. Arrows indicate feedback loops, for example outcomes re-affect predisposing factors and perceived need and subsequently health-seeking behaviour.

Figure 3 - Andersen's 'Phase four' utilisation model



**from Andersen (1995, p. 8)*

Andersen and others' (Andersen,1968, 1995; Andersen & Newman,1973) important contribution is clear: the evolving models allow for inter-disciplinary and non-static approaches to modelling health behaviour. The final model also provides a framework upon which others can bring their own ideas and niches. Andersen's models have the differential ability to explain utilisation depending on the type of service evaluated, and as

such, the same framework can be used to model modern and traditional health care utilisation alike, although Andersen (1968) originally envisaged his model to be used for evaluating formal health services. Further, in appending the environment as a potential influence on health-seeking behaviour, Andersen (1995) has explicitly allowed for social factors to be analysed. This is particularly appropriate for modelling TM, which are often used in areas where societal or local community influence is strong and formal services weak. Kroeger (1983a, 1983b) attempted to incorporate such ideas as an offshoot to the Andersen model (Andersen & Newman,1973) by combining socio-medical with anthropological approaches, promoting that: 'different disciplines who classically prefer their own specific variable should act with their research like instruments in an orchestra' (Kroeger,1983a, p. 147). He continues that there is:

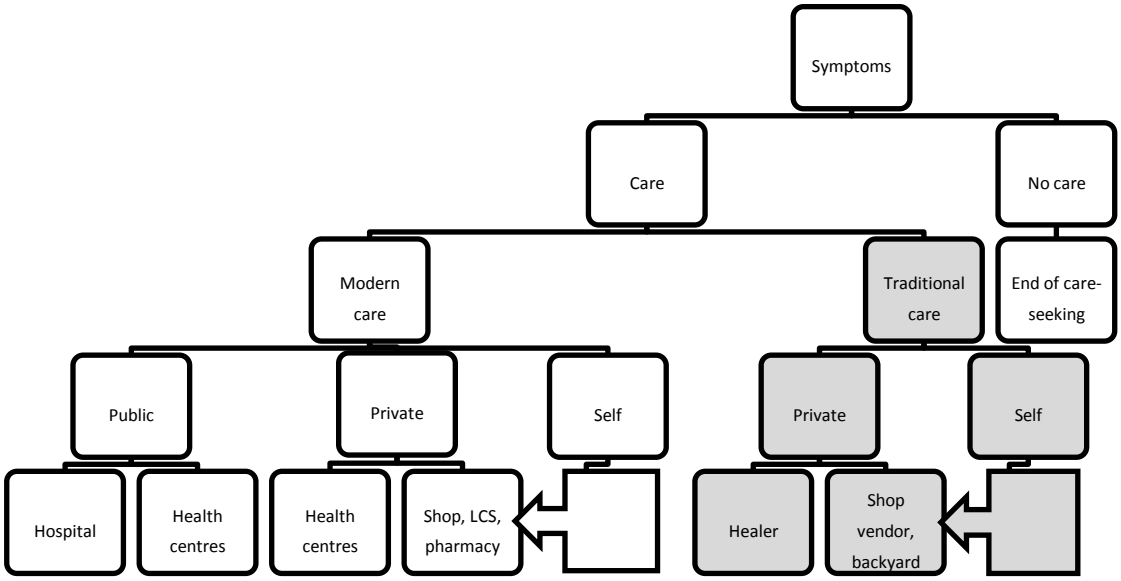
> *''a division of scholars into two camps: some authors have stressed particularly the importance of predisposing factors...whereas others have pointed to the particular importance of enabling factors...this perceived antagonism has diminished opportunities for common approach and mutual understanding'' (Kroeger,1983a, p. 157).*

In many developing countries cultural change and illness concepts affect health-seeking behaviour and individuals can choose from a wide range of health services. Further, social and family bonds drive the 'collective orientation' of medicine, whereby individuals often determine illness behaviour according to social norms and frequently rely on social support (Helman,2000; Kleinman,1980). Kroeger's (1983a) model therefore presents an advance on the original model by including traditional modes of care as a possible health resource but fails to explore outcomes such as satisfaction or equity in utilisation. Further, while the model is theoretically attractive, most authors continue to use either a qualitative or quantitative approach rather than both together (Weller, Ruebush, & Klein,1997).

Most utilisation studies therefore account for modern medicines use only, omitting traditional medicines. This omission is depicted in Figure 4: under the 'unshaded box' scenario, at the onset of symptoms individuals choose to seek some care ('care') or no care ('no care'). Seeking modern care is considered to be the 'gold standard', and frequently, the only standard. Accordingly, individuals can then choose from public, private or self-medication options and subsequent routes. Under the 'unshaded box' scenario, the lack of modern care is considered to be lack of care per se. Thus, the 'no care' frequency is often significant. The inclusion of TM/H (as indicated by the shaded boxes) within the

framework would no doubt serve to lower this 'no care' statistic. Finally, once care is sought from a provider (including self), the cycle begins again according to need – if individuals still display symptoms, they revert to the second row and choose between care and no care. This is in line with pathway models (Suchman,1965) which stress how the process of illness behaviour is a logical sequence of steps by which an individual evaluates and re-evaluates their situation. This thesis therefore aims to model modern medicines utilisation vis-à-vis TM and considers multiple sources of treatment[33]. Ultimately, it argues that policy formed without taking into account TM/H would represent an incomplete and misleading picture of medicine utilisation in countries with pluralistic systems of care.

Figure 4 – Potential health providers, one cycle of care-seeking behaviour



**source: author's own*

It should be stressed that this type of classification is one of many. In medically pluralistic societies the characteristics distinguishing between 'private' and 'public' is becoming increasingly complicated. Bloom and Standing (2001) argue that the terms 'organised' and 'unorganised' may be a better classification, taking into account the growing number of transactions which take place in a marketised, yet unregulated manner. They propose that the number of private suppliers (e.g. drug peddlers, vendors) has grown because public

[33] For example, Paper 2 reveals the external structure of the logic given certain levels of income.

health services have failed to meet expectations and with this, health care has become commercialised. Traditional practitioners are using modern techniques and similarly individuals are gaining health knowledge privately and then selling their services. In this manner, health systems are becoming more segmented as these different sectors merge. Nonetheless, the inclusion of TM/H in analyses is the crucial aspect, as it allows for a deeper understanding of how, starting with only TM in existence, systems have evolved into the pluralistic system seen today.

The next section explains briefly the methodology and data used in this thesis, followed by research questions and descriptions of papers.

1.5 Methodology and data

This thesis combines a literature review of both qualitative and quantitative works (taken from, among others, fields of economics, health economics, health policy, anthropology and psychology), with quantitative analysis of survey data collected from 772 households in Ghana in late 2010[34]. A standardised method for household selection was used as the guiding foundation and is suitable for use in situations where household enumeration is difficult (for example, the most recent Census of 2010 is yet to be published). The method has most recently been adopted by WHO to evaluate access to medicines in Ghana[35] (Arhinful,2011; TCM - Department of Technical Cooperation for Essential Drugs,2007). The basic method was altered to reflect the slightly different aim of this survey, namely that it is not intended to be representative of Ghana as a whole, but rather, regions were purposively chosen to reflect the vast difference in urbanity, population characteristics, demographic and socioeconomic disparities. Accordingly, two distinct regions (Greater Accra (GA) and Upper West (UW)) were purposively selected.[36] Within each region, two districts were chosen for their contrasting characteristics. A comparison of sampling for this thesis and that used by WHO in Ghana, socioeconomic indicators for the two regions, the total number of households interviewed and research assistant criteria are given in Appendix 8.

[34] During and after fieldwork data were entered into Microsoft Excel and Stata (versions 9 and 11) by the author. Data were checked for inconsistencies and all questionnaires were scanned for electronic access. All hard copies have since been destroyed.

[35] Arhinful is the author of evaluated surveys using WHO methods and works closely with TCM of WHO.

[36] GA is more urban than UW. While Northern and Upper East regions also are rural, there were several districts within both which were considered to be unsafe for research purposes. GA and UW are also among the two chosen purposively by WHO.

Selection of public health facilities

A broad outline of the sampling method is given below.

- Within each region, record population and number of public health (reference) facilities by district. Health facilities range from health centres to regional hospitals.
- Choose two districts within each region. The first district is the regional capital (Accra Metropolitan in GA; Wa Central in UW). The second district selected is the least populous district.[37] For the purposes of sampling households following the prescribed methodology, one caveat is that there must be at least four reference facilities.
- From each district, choose four reference facilities from a complete list of public health facilities: in the regional capital the largest regional hospital plus 7 others (3 more in regional capital plus 4 in most 'rural' area) are randomly picked from a master list and random number generator in Microsoft Excel. If facilities selected happen to fall in the same area, regenerate in order to avoid overlap as far as possible. Additionally, backup choices are also made for each district in case a reference facility is not accessible.

Selection of households

From each reference facility, approximately 16 households are selected in clusters in each of three radii (0.5-5km, 10 households within 5-10km, 10 in the 10km+)[38], circumstances allowing. In sum, 48 households per reference facility are sampled, using 8 reference points per region with an even urban/rural split.

Households were selected according to the following selection alogarithm:

- Stand outside public health facility and spin a bottle to find two compass directions

[37] In UW the least populous district is Lambussie, formerly Jirapa Lambussie. Since 2009 the two districts have become distinct from one another. Sissala East, Sissala West and Lambussie all have populations which are marginally smaller than Jirapa, but were not chosen owing to differences in dialect/translation issues.
[38] All distances were measured using a Global Positioning System (GPS) and calculated in a straight line, as the crow flies.

- Proceed away 0.5km-5km[39] in one of the directions (where this is not possible due to road conditions or lack of clear paths, proceed in the nearest direction possible)
- Stop at the first settlement
- Observe the most common type of housing and select one at random. This is the starting point
- Identify if the household is eligible (criteria below); if not, select the nearest one that is and start survey
- Choose 15 other households in the vicinity, using households at least 5 apart
- The other couple will do the same in the opposite direction
- Repeat steps for 5-10km then 10km+[40]

Household sampling technique, one region

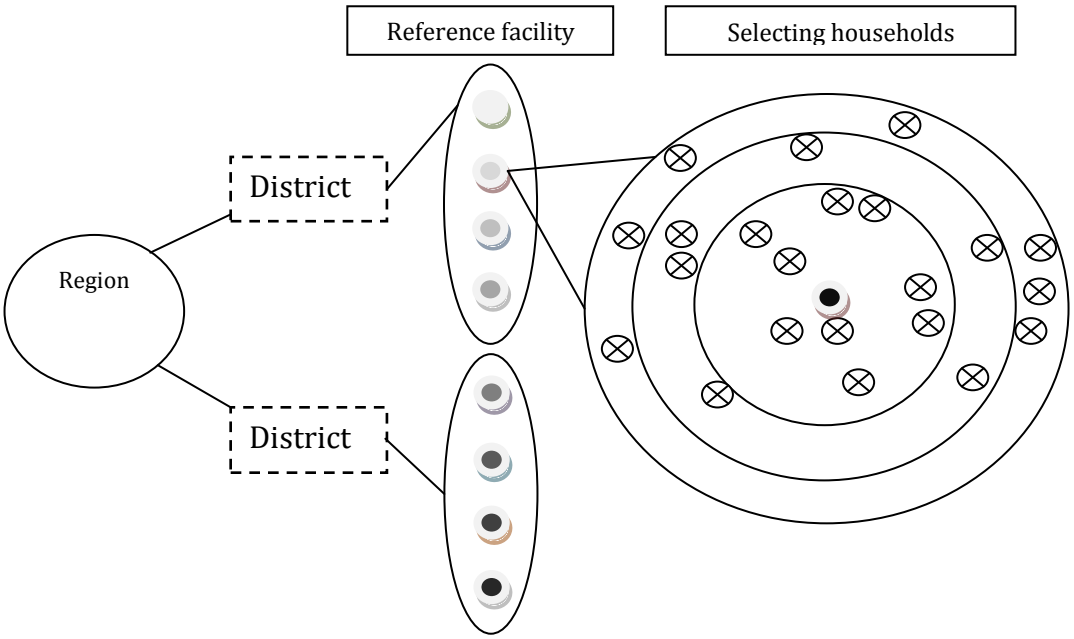


**Diagram based on WHO Level II Facility survey operating manual (World Health Organization,2007)*

[39] A distance of 0.5km is suggested in order to move away from the boundaries of reference facilities to start sampling.

[40] GPS coordinates and every junction at which research assistants are dropped off to start sampling were noted for every reference facility, however for purposes of analyses these were not used. Instead, radii clusters and district/regions indicators were created. By using GPS, it was also possible to avoid overlap of sampling clusters. The furthest household cluster was approximately 20km away from the facility.

Household eligibility: what is a household?

A household consists of a person or group of related or unrelated persons, who live together in the same housing unit, share same housekeeping and cooking arrangements and acknowledge one person (usually an adult) as its head. In a compound housing unit (where a group of households exist), research assistants were guided to survey one household within to represent all units and then move to another compound. This lessens issues of clustering and possible double counting of persons. Practical rules to follow were:

Externally

- Exclude sampling of public buildings, e.g.: hotels, boarding houses, hostels, jails, military barracks or nursing homes etc. (these would be excluded by default anyway given the household selection process whereby researchers must look for 'the most common type of housing' as a starting point)
- Exclude the 'floating population' (those who are not settled permanently)

Internally

- Include all those who have been residing in the household for at least the past consecutive month (unless new-born)
- Exclude foreign nationals without citizenship

Selection of respondents

Once a household has been chosen one main respondent is selected to answer the majority of questions[41]. The main respondent must consent to the interview by way of signature or fingerprint and should fulfil at least three of the following criteria:

- Main health care decision maker
- Most knowledgeable about health of household members
- Most knowledgeable about health expenditures of the household
- Most knowledgeable about health utilisation by household members
- Designated care giver for sick household members

[41] Where certain individuals were better able to answer some questions (e.g. questions about their own illness or household expenditures) multiple respondents were allowed.

Briefly, data collected - in order - included: information on socio-demographics; household health needs[42]; sources and order of all providers used; nature of service provision (e.g. whether rituals were carried out); satisfaction rates; perceived health outcomes; attitudes and beliefs about TM/H and household wealth and expenditure. Descriptions of households (full sample and by region) and respondents surveyed are outlined in Appendix 9. Respondents answered the majority of the survey, (including socio-demographic information of household members, health beliefs and attitudes and household expenditures), but where other individuals in the household were able to contribute (for example, in filling out modules related to their illness), they too were allowed to participate.

As part of the ethical consent, at minimum every respondent was informed that participation was voluntary, not all questions were required to be answered and they were free to ask for clarification or stop when they wished. Respondents were asked to anticipate between 20 minutes to an hour of their time, the exact duration dependant on health care needs of their household.

Three months prior to the survey, a pilot study in Kumasi, Ashanti region, was carried out to test the tool and inform the author of necessary minor changes. At this stage translations and back translations were made for the main language, Twi. Lessons were also learnt for training and selecting data collectors for the study. Further, field tests during training and selection allowed for final alterations before all questionnaires were printed for data collection. Ethical clearance for fieldwork was obtained from the Committee on Human Research Publication and Ethnics, School of Medical Sciences at Kwame Nkrumah University of Science and Technology (KNUST), Kumasi, Ghana, and the Research Degrees Unit at LSE, London UK.

TM continue to play an important role in Ghana's health care system despite the existence of established modern health care systems (as described in section 1.3.3). Why is this so? Although existing literature partially provide disparate answers, very few integrate economic with anthropological perspectives. Thus, economic works largely turn to accessibility, availability and affordability as central reasons for continued use, while

[42] Every episode of illness was recorded, even where individuals had more than one. Upon disclosure that there was a health need, RAs noted all sources and the order of use in a blank box within the questionnaire module.

separately anthropological works generally argue that social and cultural constraints shape health-seeking behaviour. It follows that disparities in utilisation of different providers must also exist. This gives rise to this thesis's central research question:

What are the rationales for traditional medicines utilisation and its equity implications?

From this central research question, four key questions and sub-questions arise. The following section briefly outlines the questions, gaps in literature, how questions fit within the conceptual framework, main methods, findings and contributions (an overview table is found in Appendix 10). Separate introductions, backgrounds, empirical strategies, results, discussions and conclusions are given in the actual papers.

Paper 1 - How do cultural attitudes toward TM affect its utilisation?

First, the thesis examines culture[43] as one explanation for utilisation. Until very recently, economic research on culture has been scant owing to the complexity and controversy surrounding the definition and measurement of culture. Studies examining the relationship between culture and economic growth or outcomes are leading the field (Fernandez & Fogli,2009; Guiso, Sapienza, & Zingales,2006; Tabellini,2010), but to date there has not been any research looking at the statistical relationship between culture and health care utilisation.

The framework for Paper 1 is partly represented within Andersen's (1995) utilisation model (Figure 3). Predisposing characteristics, including an individual's demographic characteristics (e.g. ethnicity), sit alongside enabling resources (income, insurance) and need for health care to influence health behaviour, realised as personal health practices and ultimately utilisation of health services. In Andersen's model health beliefs (considered as a predisposing characteristic) are directly shaped by the existing health care system and external environment. Paper 1 therefore considers predisposing characteristics and the individual's environment to be important in shaping health-seeking behaviour, and the paper presents Ghana's pluralistic health care system as influenced by institutional elements inherited from the past. Beliefs and attitudes about TM are shaped by the social environment within which an individual lives and thus gives more weight on informal institutions than the Andersen model.

[43] A further discussion of terminology is given in Chapter 2.

The paper draws upon an array of opinions about TM to evaluate how certain attitudes affect utilisation. The empirical method also allows for other predisposing, enabling and need characteristics in line with Andersen's (Andersen,1995) model. Key questions are given below.

a. What sort of attitudes and beliefs influence utilisation of TM/H?
b. Do cultural explanations remain valid even when income and insurance status are taken into account?

At the outset the paper shows that differences in cultural attitudes toward TM/H (as measured by opinions on a 5 point scale) explain variations in utilisation. This is modelled using a logit model. Of particular interest are variables capturing levels of trust, perceived healer knowledge and ability to cure. The paper then shows these results to hold even for richer individuals and those who hold insurance. Further, to take into account issues of endogeneity, a cultural index is created, and used alongside ethnicity as an 'instrument'. Robustness checks are carried out using wealth as an alternative indicator for income and by re-categorising attitudes and beliefs. Key contributions of the paper are the collection and analysis of data on beliefs about TM/H, and attempting to control for endogeneity using the cultural index.

Beyond culture, are there income-related rationales impelling an individual to utilise TM? The analysis presented in Paper 1 demonstrates that although culture provides one explanation, income also plays a significant role in predicting utilisation.

Paper 2 - Does income explain use of modern and traditional health care services?

Paper 2 explores utilisation patterns of both traditional and modern health care according to income. While many previous studies have looked at one or the other, they have failed to take into account the pluralistic nature of health systems and consequently model individuals to use 'either/or', rather than jointly. In reality, many individuals choose more than one provider of medicines, and patterns of resort differ according to income levels. The paper therefore traces an individual's care-seeking behaviour by modelling up to four possible sources of care utilised and ascertains the role of income in revealed provider choice.

The paper draws upon Andersen's framework (particularly phase four) by modelling health care decisions as a series of events rather than a one shot game. Individuals are modelled to use up to four sources of care (multiple care-seeking) for one illness episode as per the feedback loop. However, Andersen fails to translate this conceptual model into a full illustration involving different types of care providers. This is therefore additionally provided in the self-constructed tree diagram (Figure 4), which depicts an individual's care-seeking pathway (single source only). The tree is not exhaustive, but derives from raw data collected and thus groups the most prominent care providers together. At the beginning when an individual experiences symptoms, they either take some form of care, or seek no care at all. Conventional analysis excluding TM/H would deem individuals using TM/H to have sought no care at all. By including TC, however, increased numbers of providers and possible sequences of care are revealed. Similarly, health status is assumed to change incrementally (i.e. individuals take another step only if health does not improve) and individuals re-evaluate their symptoms to choose the next course of action (more care, no care).

In modelling, emphasis is on enabling characteristics (income) while controlling for predisposing and need variables. The paper uses two different models. The first is a biprobit model, in which individuals are assigned to one of four categories according to providers utilised over the one illness episode – none whatsoever, traditional and modern care together, only modern care, or only traditional care. The second model takes advantage of the information available on multiple sources of care by modelling choices as ordered preferences. Thus, if the individual chose to use a certain provider first, this is modelled as the 'most preferred' choice. Contrarily, if the provider was not chosen at all, this is modelled as the 'least preferred' choice. Key questions are:

a. When modern and traditional medicine utilisation are modelled together does income affect choice of provider?
b. How do patterns of health-seeking behaviour differ across income groups?

Results suggest that income is central in the choice ordering of certain providers, whether an individual uses either modern or traditional care, at all or in sequence. Many individuals seek care from multiple providers for one given episode of ill-health, thus highlighting the importance of looking at health-seeking behaviour as a chain of events. Generally, individuals with higher incomes use fewer providers and use modern medicines

earlier while individuals of lower income status have a greater likelihood of using many sources and tend toward TC. In both lower and higher income groups, however, TM/H use tends to be revealed only after modern medicines as a first source has failed to fulfil needs. The key contributions of this paper are the joint modelling of modern and traditional sources of care and analysis of provider choice in order of utilisation.

Paper 3 - What explains variations in levels of satisfaction following TM/H utilisation?

The penultimate paper considers procedural factors associated with utilisation of TM/H. The current literature looking at modern health care utilisation fails to distinguish between utility arising from outcomes (that of health benefits) and processes (service-related aspects). Moreover, there has been no study measuring both these dimensions within TM/H utilisation. The paper postulates that with TM/H, the variation in levels of satisfaction experienced by users can partly be attributed to procedural elements such as the quality of healer-patient interaction - manifested in accompanying rituals and other healing processes - over and above any perceived biomedical benefits. Thus, the paper argues that TM raises individuals' levels of well-being not only due to the conventionally measured outcome utility but also because of procedural utility.

Andersen's framework explicitly focuses on outcome indicators, including perceived and evaluated health statuses, consumer satisfaction and indirectly, external environmental and population characteristics influence outcomes too. However, nothing is said about how, or why, individuals gain satisfaction from rituals or other healing processes because the framework is predominantly for modern systems. Thus, the conceptual framework is expanded with the addition of another dimension under 'outcomes' in Andersen's model, as it was proposed that there were two possible sources of satisfaction: one pertaining from (typically measured) outcome utility (OU, which may be subjective or objective) and the other from procedural utility (PU). Questions addressed in the paper include:

a. How satisfied are users of TM/H?
b. Is there procedural utility in the utilisation of TM/H?

For this paper, individuals were asked whether any rituals or healing processes were carried out when utilising TM. This binary indicator is then regressed against life satisfaction scores using ordered probit modelling. Findings show that overall, users are

highly satisfied with TM/H, but those who experience rituals and other healing processes are more likely to report higher levels of satisfaction. This is strongly indicative of procedural utility, termed the 'hedonic placebo effect' in the paper. OU is then measured as five dimensions of perceived health outcomes, and added as extra independent variables to provide a direct test of procedural utility and outcome utility. Procedural utility holds even when outcome utility is controlled for and other robustness checks are carried out. To date there has been no empirical investigation of procedural utility in TM utilisation, nor have any surveys questioned perceived health benefits from TM/H on five dimensions of health. These aspects are considered as the main contributions to literature.

Paper 4 - How do inequalities in health care utilisation change when we take into account TM?

The final paper considers the unequal distribution of health care as one consequence of TM/H utilisation and draws from Paper 2 by taking as its starting point the finding that income is an important determinant of utilisation patterns. Conventional studies do not take TM into account, nor break down the inequity measures into their constituent parts. If income is an important factor toward health care utilisation, the rich must be utilising certain medicines providers more than the poor, and vice versa, inequalities are likely to fall when TM utilisation is accounted for. The paper calculates the level of horizontal inequity (defined as unequal utilisation of treatment for equal needs) and decomposes elements contributing to the inequity. Research to date has been limited to analysing formal care providers only (public, private, types of services etc.) owing to lack of data on informal providers (TM/H utilisation). Subsequently studies find high levels of inequality because the poor have lower utilisation rates, or do not use modern medicines at all. By taking into account TM/H use, however, inequality should decrease as lower income groups' utilisation patterns can be incorporated in calculations. Inequity is also likely to be sensitive to different sub-categories of care providers within the two systems: for example, the wealthy will use private physicians more whereas the poor use TH. Additionally, it is possible to quantify the contribution of income to inequity, alongside other 'need' (age, gender, illness characteristics) and 'non-need' (income, location) variables.

Equity is analysed in the framework as the balance between predisposing characteristics (demographics especially gender and age), enabling resources (income, insurance) and need for health care. Utilisation is considered inequitable if enabling resources (also

termed 'non-need factors') outweigh 'need' factors. Andersen's model is a good starting point to analyse equity because it clearly lists the variables to be considered. Using simple regression methods it is possible to attribute the magnitude and direction of effect of each individual variable, ceteris paribus. However, such methods do not allow for the 'standardisation' of need variables. For example, it may not be considered inequitable if people of older generations were utilising more care, simply because they are in greater need than younger cohorts. In order to take this and similar points into account, it is possible to calculate a relative index of inequity under the so-called 'ECuity' method (O'Donnell, van Doorslaer, Wagstaff, & Lindelow,2008; Wagstaff et al.,2001). Components of inequity are then further decomposed to show non-need variables play a disproportionate role in explaining inequity. A fourth set of questions - addressed in Paper 4 - is outlined below:

a. What is the degree of inequality and horizontal inequity for both modern and traditional care?
b. Do results change when we look at sub-categories of care?
c. What is the contribution of income to inequity, and other factors aside from income?

In line with Paper 2, Paper 4 demonstrates that inequality declines slightly when TM are taken into account as poor individuals tend to concentrate utilisation toward this mode of care. Broadly speaking, modern medicines are pro-rich (biased toward utilisation by the rich), while traditional forms of care are pro-poor. However, when these larger categories of providers are broken down into sub groups (public, private, self-medication with modern, self-medication with TM, TH), the inequities calculated show a more nuanced picture: although modern public services are pro-poor and private services pro-rich, surprisingly, TM use (by oneself) is also pro-rich. Self-medication - using modern or TM - is similarly biased toward the rich, perhaps reflecting the necessity of out-of-pocket expenditures. On the other hand, use of TH is pro-poor. Thus, it is necessary to break down the broader picture to reveal distinctions in utilisation patterns. When inequity is disaggregated into its parts, it is found that non-need factors (income and geographic location being the most prominent) especially contribute to inequity, more so than need factors. The major contribution of this paper is the inclusion of TM into analyses of inequality.

1.6 Summary

This Chapter has provided an introduction to TM, including possible rationales for its continued use and equity implications. Motivations and objectives were explained before a country overview was provided. The Chapter then argued that disparate explanations for TM utilisation can be reconciled by employing an institutionalist framework and Andersen's utilisation model. The methodology was briefly stated, after which four key research questions and descriptions by paper were given. In what follows, the structure of each paper is identical. First, papers present an abstract and introduction to the topic in question. Second, background literature is provided, within which the gap in current research is pinpointed. Thirdly, data from the master dataset are drawn upon and main methods are outlined. Fourth, results from statistical analysis are explained. Fifth, a discussion section is given before brief conclusions are drawn.

Social constraints

How do cultural attitudes toward traditional medicines affect its utilisation?[44]

Abstract

Why do individuals still use traditional medicines when modern treatments are available? This paper uses a unique dataset which elicits various opinions on traditional medicines to argue that cultural attitudes and beliefs can explain variation in utilisation. Specifically, trust toward healers, their ability to cure and perceived knowledge are significant factors. These results hold even when control variables such as income and insurance are included, suggesting the robustness of cultural interpretations to economic aspects. Policies which consider seriously these particular dimensions and amalgamate them into modern systems are likely to provide the most user-friendly and culturally acceptable services and thus induce utilisation.

[44] This Chapter is based upon a co-authored paper (with Joan Costa-i-Font) which appears as part of the LSE Working Paper Series (no.27). The paper is also under review.

2.1 Introduction

The utilisation of TM/H is widespread in SSA, where up to 80% of the population rely on it for a variety of health needs (WHO 2002:1). Affordability, accessibility and availability have all been put forward as key reasons for utilisation (Anyinam,1987; World Health Organization,1978b) and accordingly quantified (for example, Hausmann Muela, et al.,2000; Leonard & Zivin,2005; Peltzer,2009). Yet, very few econometric studies have explored the cultural acceptability dimension, perhaps owing to difficulties in defining and measuring the concept of 'culture'. In this study, culture is defined as 'customary beliefs and values that ethnic, religious and social groups transmit fairly unchanged from generation to generation'[45] (Fernandez & Fogli,2006; Guiso, et al.,2006) and is measured by a series of attitudes and beliefs held by individuals about the use of TM/H. This definition is employed alongside a unique dataset to econometrically test how culture affects TM/H utilisation in Ghana.

This paper is primarily designed to examine empirically the effect that different cultural attitudes have on TM/H use and analyse which values matter most. Cultural attitudes are also computed into one index in order to use techniques which control for endogeneity. All regressions take into account relevant covariates including insurance coverage, socio-economic status, measures of health care need, other individual characteristics and healer supply variables.

The rest of the paper is divided into four main sections. Section two introduces the idea of culture and how theoretical models explain culture's relation to action, and extrapolates on existing economic and anthropological literature on TM/H use, followed by a brief explanation of the existing health system in Ghana. In section three, empirical strategies are outlined. The fourth and fifth sections respectively present results and discussions. Section six provides a brief summary of key findings.

[45] There is no one concrete definition of 'culture'. Indeed, over 154 definitions under sub-headings of: descriptive, historical, normative, psychological, structural and genetic exist (Kroeber, Kluckhohn, & Peabody Museum of Archaeology and Ethnology.,1952). The common aspect of most definitions, however, is the recognition that culture embeds learned (and therefore taught) behaviours universal to particular segments of society, transmitted through common knowledge and ideas. The notion of 'relationality', social recognition, belonging and conformity is also emphasised (Rao & Walton,2004).

2.2 Background

2.2.1 Culture and traditional medicine utilisation

Many existing studies investigating the role of culture and TM utilisation are anthropological in nature and evaluate health-seeking behaviour within a social constructivist framework (Anyinam,1987; Evans-Pritchard,1937; Hielscher & Sommerfeld,1985; Mechanic,1986; Press,1978; Rivers,1924; Stoner,1986; Tsey,1997; Turner,1968; Twumasi,1979b; Young,1982). Culture is central to anthropological approaches, because individual behaviour is influenced by preconceptions, including those related to illness (Winkelman,2009). Rivers (1924) argues that we must first start with an understanding of how an individual perceives disease before we can understand observed actions: all health-seeking behaviour is the result of a process involving identification of causation, followed by aetiology, diagnosis then prognosis. While biomedical diagnoses would consider disease to be caused by, or the result of, biological, physical or chemical abnormalities within the body (informed in large part but not exclusively by germ theory), anthropological understandings would deem illness to involve more than simply a biomedical explanation, placing the individual within a societal context.

Rivers (1924) illustrates differences in interpretation by depicting a person falling from a tree. Modern medicine would characterise this as an accident, perhaps owing to a loose branch or carelessness whereas traditional explanations would blame a sorcerer or spirit for loosening a branch. In these two scenarios, given that the theory of causation differs, it naturally follows that the appropriate treatment, or response, is divergent. In one causal schema, often found in folk theories of causation in Africa and elsewhere, societal ills can also manifest within an individual, at which point social responses are crucial (Hevi,1989). Thus, legitimacy of medicinal products is attributed to local communities, institutions, and symbolic values (van der Geest & Whyte,1988; van der Geest, Whyte, & Hardon,1996).

In another example, Bierlich (1999) and Kirby (1997) both demonstrate how Ghanaians ascribe colours to medicines to distinguish their potency, type and use, and to label various stages of illness. At the start of an illness, the 'white' stage, individual self-help is the dominant action. If the situation worsens, the colour 'red' is assigned and society is expected to step in with prescribed and agreed upon interventions. Further, it is believed that some plants are inactive as medicines until prayers and libations to ancestors are

carried out. Under such scenarios healers would be important sources of care for their perceived 'ability to cure' and complementary rituals.

Many anthropologists who research cultural influence on utilisation of TM would thus concur that biomedical explanations are just one of many used by individuals to evaluate disease and illness in the context of the specific cultural framework they inhabit and which forms their particular epistemological and ontological theories. Such explanations are neither superior nor more valid, but merge with existing systems. Consequently, even where newer medicines have become available, traditional systems will remain important for some because of cultural beliefs. Accordingly, a process of 'acculturation' occurs in an open, medically pluralistic system (Twumasi,1979b): ideas are assimilated, not displaced; outside knowledge is allowed to penetrate but not necessarily replace (Hausmann Muela, Ribera, Mushi, & Tanner,2002; Hielscher & Sommerfeld,1985; Owusu-Daaku & Smith,2005). The result is a syncretic set of beliefs, a set which is not necessarily internally consistent.

There are only very few studies which use econometric techniques to test cultural attitudes and beliefs toward TM/H from a demand perspective. Peltzer et al (2008) show perceived benefits toward herbal products, barriers to modern health services and severity can influence utilisation but fail to use multivariate regressions including other control variables and do not consider multicollinearity or endogeneity. Instead, studies which look at TM/H utilisation usually cite pragmatic reasons based on individual and household characteristics (Ademuwagun,1976; Bernstein, Stibich, & LeBaron,2002; Ceylan et al.,2009; Flatie, Gedif, Asres, & Gebre-Mariam,2009; Kroeger,1983a; Macfarlane & Alpers,2009; Peltzer,2009; Pillay,1996; Sydara et al.,2005; Wong, Wong, & Donnan,1995). Other works are qualitative in nature (Ae-Ngibise et al.,2010; Tabi, Powell, & Hodnicki,2006).

The idea that cultural beliefs linger and evolve only slowly, however, is documented. Some argue that when individuals emigrate, people hold ethnically-linked beliefs over their lifetime. Owusu-Daaku and Smith (2005) show that Ghanaian women who have moved to the UK uphold Ghanaian perspectives about health and illness while adapting to the British system. Barimah and Teijlingen (2008) study attitudes toward TM of Ghanaians living in Canada and find that 73% of respondents had not changed their views about TM as a result of emigration. There were no significant differences in results between individuals who had been abroad for a long and short period of time and individuals show strong acts of

agency, whereby Ghanaians import TM back to Canada from their homeland in order that supplies do not run out. Ransford et al (2010) highlight the importance of cultural alternatives for Mexican immigrants as a result of belief and structural barriers to accessing formal health care in the United States. Sometimes, cultural alternatives were shown to be a coping strategy (i.e. a preference was held for modern care but were not used), but similarly individuals had considerable control over their health and explicitly chose TM. However, cultural beliefs are not always the dominant force for explaining utilisation of health facilities[46]. Jenkins et al (1996), for example, show no significant associations between traditional beliefs held by Vietnamese immigrants and access to modern preventive care. Additionally, Young and Garro (1994) examine medical choices made in two Mexican villages to find that, despite similar attitudes and beliefs toward traditional and folk medical knowledge, the village with better accessibility (easier transport links and cheaper cost of care) utilised physicians significantly more than the village with poor accessibility. Young and Garro calculate that only a fifth of traditional care users stated cultural preference as a key reason for utilisation, compared to half who stated transport issues as their primary reason. It therefore appears important to evaluate healer supply factors as covariates[47].

Brief structure of the health system in Ghana

The pluralistic health system in Ghana follows that of many low and middle income countries (World Health Organization,2002) and is characterised by four largely separate but intertwined sectors: public, private not for profit, private for profit and traditional (Ghana Health Service,1995a). Bloom et al (2008) argue that in countries with weak formal sectors, individuals make informal arrangements, or 'social contracts' – exemplified by TM utilisation - to fill gaps in provision.

[46] For other examples of the effect of health beliefs on modern medicines utilisation, see Horne (2004) and Peltzer (2000).

[47] It is possible that people in the sample are choosing to visit a healer who lives close by, or simply because there are many in the vicinity. Controlling for supply side factors also accounts for healers having similar characteristics as users (i.e. belonging to the same ethnic groups and holding similar cultural attitudes). If it is found that cultural attitudes are still significant in explaining TM/H utilisation, it would seem reasonable to conclude that despite supply and related healer characteristics, individuals value traditional practices for their perceived benefits alone rather than because one culture receives better care because of what healers from their culture have to offer (thus, the utilisation effect is through demand, not supply).

2.3 Empirical strategy

2.3.1 Data collection and description

A total of 772 households - consisting of 4713 individuals – were surveyed using WHO approved methodology (Arhinful,2011). Specifically, this involved cluster sampling in two, purposely chosen regions of Ghana (GA and UW). Using public health facilities as reference points, household clusters were randomly selected in three radii (0.5-5km; 5-10km; 10km+). Within households one respondent answered the majority of questions except when individuals were able to answer questions of their own experiences. The respondent fulfilled at least three of the following criteria: main health care decision maker; most knowledgeable about health of household members; most knowledgeable about health expenditures of the household; most knowledgeable about health utilisation by household members; designated care giver for sick household members.

Data description

The data (Appendix 11) comprise 741 individuals with health care needs. Need is self-evaluated, for all acute episodes in the past two weeks and previously diagnosed chronic illnesses[48] (for which actions taken in the past month were recorded). The dependent variable, tradever, is a dummy variable indicating utilisation (0=no utilisation; 1=utilisation) of TM/H. Key independent variables were opinions on TM/H, where the household representative indicated their level of agreement (using a Likert scaled from 1 to 5, where 1 indicates strong agreement and 5 strong disagreement) on six statements ('cultural attitudes and beliefs') related to TM/H utilisation. The questions were created using ideas from anthropological literature which suggested there were cultural reasons for why individuals continue to utilise TM. Many of these reasons were based around the degree to which TM were culturally acceptable : 'THs are knowledgeable about illnesses that doctors do not know about' (knowledge); 'some diseases can only be cured by TH' (cure); 'I trust TH' (trust); 'in this region, TH are well accepted' (accept); 'TM are safer to use than modern medicines' (safety); 'TM can be used without a TH' (without). Additionally information on financial background (income - proxied by equivalised monthly expenditure using an Organisation for Economic Cooperation and Development (OECD) formula and split into quintiles, insurance), disease characteristics (whether

[48] A chronic illness is described to the respondent as 'an illness which will not go away after a long time', and does not necessarily have to be diagnosed by a health provider.

chronic or not, severity), socio-demographic background (age, sex, education and occupation of head of the household, religion), and supply characteristics (closeness to healers according to an individual's guestimate, urbanity) were collected as control variables.

2.3.2 Models

Probit models using standard maximum likelihood estimators allow for binary response for the outcome variable, the probability of use of traditional medicines (y_i =1 or 0). The probit distribution was chosen over the logit distribution for ease of comparison when applying instrumental variables probit (ivprobit). The baseline probit and multivariate probit models, respectively, are as follows:

$$P(y_i|need) = \Phi (X'_i \beta + \varepsilon_i)$$

$$P(y_i|need) = \Phi (X'_i \beta + Y'_i \gamma + D'_i \delta + S'_i \tau + U_i \omega + \varepsilon_i)$$

Where X' denotes a vector of the main variables of interest (cultural attitudes and beliefs), Y' represents financial background, D' represents disease characteristics, S' represents socio-demographic characteristics, U' represents supply characteristics, ε_i represents errors and Φ (.) is the standard normal cumulative distribution function.

All cultural attitudes and beliefs are first included in regressions as separate independent variables and then variance inflation factors (VIF) checked for multicollinearity. Polychoric[49] principal components analysis (PCA) is then used to reduce attitudinal indicators into one composite cultural index ('cultural index'). PCA reduces multiple variables into a few uncorrelated indices (or 'components'), where each is a linear weighted combination of the original variables (Vyas & Kumaranayake,2006). The weights of each component are given by the eigenvectors of the correlation matrix (covariance matrix if data are not standardised) and the variance for each component is given by the eigenvalue of the corresponding eigenvector. Principal components are extracted based on associated eigenvalues being greater than one and the 'elbow' on a screeplot. A loading plot then shows the loading-vector of each principal component, on which variables with similar characteristics are shown to cluster together. Further discussion of PCA is given in

[49] Appropriate for categorical responses (Kolenikov & Angeles,2004).

Filmer and Pritchett (2001); Kolenikov and Angeles (2004); Moser and Felton (2007) and Njong and Ningaye (2008).

In subsequent analysis, ivprobit and a cultural index are drawn upon to test for endogeneity[50]. If not all ethnicities are not associated with utilisation, the variable can be used as an instrument for culture. Three steps are necessary for this to be valid: first, people of different ethnicities hold different attitudes and beliefs (for example, see Horne, et al.,2004; Roy, Torrez, & Dale,2004). In turn, cultural attitudes and beliefs must be associated with outcomes (actual utilisation). Third, ethnicity is used as an instrument to isolate the exogenous variation in culture from the endogenous variation due to unobserved error terms (Guiso, et al.,2006, p. 3)[51]. The instruments should be uncorrelated with the error term in the final output regression, tested using the Wald test of exogeneity.

2.4 Results

Descriptive data

Approximately a third (231/741, 31.2%) of the sample stated that they had used TM/H, the most common sources being self-medication by herbs or the use of non-spiritual herbalists. Table 2 shows the distribution of TM/H use by variables as described in section 2.3. Column totals, by variable, are presented for both users and non-users. Opinions on healer knowledge are not uniform among users and non-users. For example, 35.4% of

[50] Such methods are strongly influenced and therefore closely mirror the work of Guiso et al (2006), Fernandez and Fogli (2006); Arruñada (2010); Tabellini (2010) who all investigate the role of culture on economic outcomes. These authors control for endogeneity by using either epidemiological or historical proxies as instrumental variables (IV). An epidemiological approach typically uses data from immigrants (or descendants) and compares these to outcomes for natives to verify the relative importance of genetics versus environment (thus ruling out the possibility of epigenetics). Historical approaches employ indicators from the past: for example, Tabellini (2010) uses literacy rates at the end of the 19th century and political institutions from 1600-1850 to proxy for culture, and finds them to be significantly associated with current per capita GDP. Such studies show how some cultural attributes (for example low levels of trust) are associated with poor economic growth, and some go far as to conclude that conformity and obedience to certain cultural traits stunts economic growth (Granato, Inglehart, & Leblang,1996).

[51] The key assumption here is that ethnicity is an immutable, path dependent trait (David,2007), hard to change or defect from (within a generation, for example). IV use only the part of the variability in culture – a part that is uncorrelated with the omitted variables – to estimate the relationship between culture and TM use (Angrist & Krueger,2001). IV therefore solve the omitted variables problem and measurement error issues, to produce estimators that are consistent (converges to the true value as sample size increases) and unbiased (mean value equals the true value of the quantity it estimates).

non-users agreed that healers were knowledgeable about illnesses that doctors do not know about, but fewer users (29.1%) agreed with the same statement. Over half of all users strongly agreed that TM/H had powers to cure illnesses, and no one categorised as a user strongly disagreed that TM/H could cure. Users of TM/H generally expressed a stronger level of agreement when asked whether they trusted healers, although even non-users were inclined to concur with this question.

Traditional practices were generally thought to be well accepted in the regions surveyed. Interestingly, neither group thought TM were necessarily safe to use, with the majority expressing neutrality, disagreement or strong disagreement with that particular statement. Further, most thought that TM could be used without visiting healers, with 83.8% of non-users and 86.1% of users agreeing or strongly agreeing with this statement. Income is a good indicator of use; the poorer tend to use TM/H more than the rich. Both the insured and non-insured display quite high likelihoods of utilising TM/H. Chronic illness sufferers, and individuals who classify their sickness as 'serious' appear to have tried TM/H more than non-chronic sufferers and individuals who perceive their illnesses to be less serious. Older individuals, females and the less educated seem to use TM/H more than the highly educated. Those with labour-intensive work (farmers/fishermen/manual labourers) have larger propensities to use than those of other occupations. The majority of users were Christian (68.8%), followed by Muslim (21.6%). Individuals who have a healer within 15 minutes' walk are as likely to utilise as not, and urban location does not have a clear effect on utilisation.

Table 2 - Summary statistics, by TM/H use

Tradever		**did not use**		**used**		**Total**
		n	**(%)**	**n**	**(%)**	**n**
Knowledge						
1	strongly agree	80	15.9	33	14.8	113
2	agree	178	35.4	65	29.1	243
3	neutral	85	16.9	41	18.4	126
4	disagree	114	22.7	60	26.9	174
5	strongly disagree	46	9.1	24	10.8	70
Cure						
1	strongly agree	185	36.6	119	52.7	304
2	agree	204	40.3	81	35.8	285
3	neutral	38	7.5	11	4.9	49

Tradever		did not use		used		Total
		n	(%)	n	(%)	n
4	disagree	57	11.3	15	6.6	72
5	strongly disagree	12	2.4	0	0	12
Trust						
1	strongly agree	91	17.8	53	22.9	144
2	agree	194	38.0	102	44.2	296
3	neutral	102	20.0	53	22.9	155
4	disagree	86	16.9	16	6.9	102
5	strongly disagree	37	7.3	7	3.0	44
Region						
1	strongly agree	195	38.3	115	49.8	310
2	agree	230	45.2	93	40.3	323
3	neutral	59	11.6	16	6.9	75
4	disagree	20	3.9	5	2.2	25
5	strongly disagree	5	1.0	2	0.9	7
Safety						
1	strongly agree	22	4.4	14	6.1	36
2	agree	94	18.8	37	16.2	131
3	neutral	185	37.1	110	48.0	295
4	disagree	155	31.1	52	22.7	207
5	strongly disagree	43	8.6	16	7.0	59
Tmwithout						
1	strongly agree	127	25.1	55	23.9	182
2	agree	297	58.7	143	62.2	440
3	neutral	35	6.9	13	5.7	48
4	disagree	32	6.3	15	6.5	47
5	strongly disagree	15	3.0	4	1.7	19
Income						
1	poorest	70	15.6	48	23.6	118
2	poor	76	17.0	51	25.1	127
3	mid	94	21.0	30	14.8	124
4	rich	93	20.8	32	15.8	125
5	richest	115	25.7	42	20.7	157
Insurance						
0	none	188	36.9	95	41.1	283
1	insured	322	63.1	136	58.9	458
Chronic						
0	not chronic	341	66.9	99	42.9	440
1	chronic	169	33.1	132	57.1	301
Severity						
1	serious	148	29.0	82	35.5	230

Tradever		did not use		used		Total
		n	(%)	n	(%)	n
2	mid	331	64.9	143	61.9	474
3	low	31	6.1	6	2.6	37
Gender						
0	male	214	42.0	92	39.8	306
1	female	296	58.0	139	60.2	435
Education						
0	None	187	36.9	109	47.8	296
1	primary	161	31.8	73	32.0	234
2	junior+	159	31.4	46	20.2	205
Occupation						
1	farmer	165	32.4	94	40.7	259
2	employed	64	12.5	19	8.2	83
3	own business	146	28.6	68	29.4	214
4	None	135	26.5	50	21.6	185
Religiousgroup						
1	Christian	349	68.4	159	68.8	508
2	Muslim	137	26.9	50	21.6	187
3	Other	15	2.9	7	3.0	22
4	None	9	1.8	15	6.5	24
Tmpclose						
0	does not have TMP within 15 mins walk	60	13.3	32	14.2	92
1	has TMP within 15 mins walk	391	86.7	193	85.8	584
Urban						
0	not urban location	239	46.9	128	55.4	367
1	urban location	271	53.1	103	44.6	374

Probit models

Table 3 shows the results for a baseline probit model with (model I) and without control variables (model II). All coefficients are marginal effects, so outputs are given as percentage changes and standard errors are corrected for clustering by radius. For all attitudes and beliefs, the omitted category is 'strongly agree'. Model I shows that the likelihood of TM/H utilisation rises with increasing disagreement about healer knowledge; thus, individuals who disagree with the statement that 'healers are knowledgeable about diseases that doctors do not know about' are more likely to utilise TM/H. This suggests that people do not necessarily dismiss modern health systems, but that even users of TM acknowledge that healers are limited in their knowledge of certain diseases. This suggests

a transformation of 'traditional' medicines to 'complementary', whereby users pick and choose, sometimes using both, according to perceived need.

Belief that some diseases can only be cured by healers, in contrast, is strongly associated with utilisation. Specifically, compared to individuals who state they strongly agree, individuals in the 'agree', 'neutral' and 'disagree' categories are 8.5, 16.0, and 9.0 percentage points less likely to utilise TM/H, respectively. Generally, trust is also associated with utilisation: the more one disagrees that healers cannot be trusted, the likelihood of utilisation declines. Turning to perceived acceptability of TM/H within region, individuals who disagreed that TM/H were well accepted were on the whole less likely to utilise. Individuals who strongly agreed that TM were safer to use than modern medicines were more likely than any other category to utilise TM/H, by nearly as much as 10 percentage points. Finally, people who did not strongly agree (agreed, felt neutral or disagreed) that TM could be used without a healer were generally more likely to utilise TM.

Table 3 - Probit models: utilisation and cultural attitudes

Dependent var is Tradever	I No controls	II All
Knowledge_2	0.059	0.160***
	[0.038]	[0.049]
Knowledge_3	0.151***	0.323***
	[0.045]	[0.030]
Knowledge_4	0.179**	0.314***
	[0.071]	[0.055]
Knowledge_5	0.198***	0.336***
	[0.027]	[0.057]
Cure_2	-0.085***	-0.016
	[0.021]	[0.014]
Cure_3	-0.160***	-0.145**
	[0.022]	[0.070]
Cure_4	-0.090***	-0.005
	[0.033]	[0.052]
Trust_2	-0.021	-0.003
	[0.055]	[0.019]
Trust_3	-0.074	-0.098
	[0.069]	[0.074]
Trust_4	-0.176***	-0.181***
	[0.041]	[0.035]
Trust_5	-0.148	-0.116
	[0.157]	[0.198]

Dependent var is Tradever	I No controls	II All
Accept_2	-0.015	-0.006
	[0.022]	[0.056]
Accept _3	-0.058	-0.064
	[0.038]	[0.052]
Accept _4	-0.017	-0.032
	[0.078]	[0.056]
Accept _5	0.043	0.192
	[0.208]	[0.224]
Safe_2	-0.072*	-0.041
	[0.041]	[0.070]
Safe_3	-0.023	0.002
	[0.055]	[0.088]
Safe_4	-0.097	-0.087
	[0.110]	[0.098]
Safe_5	-0.066	-0.113
	[0.054]	[0.093]
Without_2	0.046**	-0.01
	[0.022]	[0.040]
Without_3	0.06	0.053
	[0.125]	[0.110]
Without_4	0.084*	0.076
	[0.048]	[0.066]
Without_5	-0.021	0.021
	[0.156]	[0.163]
Income quintile_2		-0.061
		[0.132]
Income quintile_3		-0.201***
		[0.063]
Income quintile_4		-0.207***
		[0.067]
Income quintile_5		-0.155***
		[0.035]
Insurance		-0.051
		[0.092]
Chronic		0.133***
		[0.033]
Serious		-0.074
		[0.067]
Not serious		-0.268***
		[0.028]
Age		0.005***

Dependent var is Tradever	I No controls	II All
		[0.001]
Female		0.012
		[0.038]
Religiousgroup_2_muslim		-0.081
		[0.060]
Religiousgroup_3_other		-0.107*
		[0.056]
Religiousgroup_4_none		-0.013
		[0.038]
Education_primary		0.078**
		[0.034]
Education_other		-0.017
		[0.043]
Occupation_formal sector		0.037
		[0.050]
Occupation_ownbusiness		-0.004
		[0.046]
Occupation_none		-0.095
		[0.059]
Tmpclose		0.049
		[0.051]
Urban		-0.013
		[0.069]
Pseudo R2	0.045	0.153
Observations	701	578

Robust standard errors in brackets; marginal effects are presented;

** significant at 10%; ** significant at 5%; *** significant at 1%;*

Reference categories: 'strongly agree' for all attitudes; income quintile 1; no insurance; no chronic illness; very serious illness; male; Christian; no education; farmer; no healer close; not urban;

Tmpcure5 category automatically dropped as there were no observations for TM/H users.

Model II largely confirms findings from model I. When controls are added, the magnitudes of the effects of some attitudes and beliefs (e.g. healer knowledge, ability to cure) change slightly but on the whole signs remain constant. Of the control variables, income is of particular interest, as it would be expected that income can increase access to modern providers. Indeed, the likelihood of TM/H utilisation falls for individuals in higher income quintiles: belonging to the second, third, fourth and fifth quintiles reduces the likelihood of TM/H utilisation by 6.1, 20.1, 20.7 and 15.5 percentage points, respectively, as compared

to the lowest income group. Holding insurance also reduces utilisation rates, but the coefficient is not significant, perhaps because income effects override that of insurance. The probability of utilisation increases with age and being female or having a chronic illness. This last finding is perhaps due to people having exhausted alternatives, or using TM/H in conjunction with modern medicines. People with chronic illnesses will additionally seek substitutes if marginal costs – direct or indirect - to obtain constant supplies of modern medicines are large, or if they consult friends and family who encourage self-medication by tried and tested herbal remedies. Individuals with less serious conditions are less likely to use TM/H than those with very serious conditions. This is unexpected, but individuals may have conflated severity with duration.

The effect of education is mixed, as results show those with a little more than 'no education' have a slightly higher propensity to utilise TM/H, but those with the higher types of education appear to use less. Both these results are insignificant, reflecting the somewhat inconclusive findings of studies looking at associations between education and traditional medicines use (Ceylan, et al.,2009; Kim et al.,2009; Peltzer, et al.,2008; Singh, Raidoo, & Harries,2004; Stekelenburg, et al.,2005; Tabi, et al.,2006). Some of these studies also suggest that the more educated are more self-confident and thus inclined to know better how to self-medicate (Okumura, Wakai, & Umenai,2002), and this may include TM. An individual whose household head has their own business or is not in employment is less likely than households headed by farmers/fishermen/manual labourers to utilise TM/H. This is unsurprising as households living and working in the countryside will tend to have better access to, and possibly knowledge about, herbal medicines. Supply characteristics show that having a healer within 15 minutes' walking distance and living in an urban area also increases likelihood of use. The latter result perhaps reflects urbanites being able to afford multiple forms of care.

Models I and II were both checked for multicollinearity and all variables in both models display VIF under 10. However, in order to carry out ivprobit, attitudes and beliefs were compiled into one single index[52] by PCA. Accordingly, Table 4, model III (the first column) models culture as an index, rather than separate indicators of attitudes and beliefs. Culture

[52] Although the screeplot (Appendix 12) shows an elbow at the third component (thus, not more than three components account for the majority of variance), only one component is extracted because the ivprobit command (used in robustness checks) does not allow for multiple variables. The loading plot (Appendix 13) suggests that healer knowledge and safety display similar characteristics.

is significantly associated with TM/H use: as individuals disagree more about given statements on TM/H, the probability of utilisation is expected to fall. This result is significant at the 1% level. In model IV (the second column), control variables are included. The impact of culture falls but the coefficient still has a significantly negative effect on utilisation. Income still remains an important predictor, alongside age, being slightly educated, suffering from a chronic illness and having a low severity illness.

Table 4 - Cultural index models

Dependent var is Tradever	III	IV
Cultural index	-0.040***	-0.020***
	[0.008]	[0.002]
Income quintile_2		0.014
		[0.127]
Income quintile_3		-0.133**
		[0.065]
Income quintile_4		-0.143**
		[0.059]
Income quintile_5		-0.113***
		[0.040]
Insurance		-0.086
		[0.084]
Chronic		0.140***
		[0.048]
Serious		-0.019
		[0.067]
Not serious		-0.244***
		[0.035]
Socio-demographic characteristics	*no*	*yes*
Supply factors	*no*	*yes*
Pseudo R2	0.013	0.109
Observations	712	584

*Robust standard errors in brackets; marginal effects are presented; *significant at 10%; ** significant at 5%; *** significant at 1%.*

Robustness checks

Three main robustness checks are carried out: firstly, the endogeneity of culture and utilisation is tested using ethnicity as an instrument for the cultural index. Again, all results are given as marginal effects (first stage and second stage outputs are respectively given in Appendix 14 and Appendix 15). As before, culture displays a negative coefficient,

thus, as individuals state stronger disagreement with given statements on TM/H, they are less likely to utilise them. The null hypothesis of exogeneity (indicated by the Wald test) shows a p value of 0.04, thus H0 is rejected and it is plausible to conclude that error terms in the probit and the instrumented regression are correlated and therefore instrumenting is a valid procedure[53].

Secondly, the variability of results using wealth instead of income is tested (Appendix 16). In the main body of the paper, income was used as the main indicator, but doing so reduced the number of observations as not all respondents were willing to share this information. Wealth - which is frequently used to proxy income (Falkingham & Namazie,2002)- on the other hand, was simpler to elicit by asking respondents to indicate ownership of 14 items[54]. By taking a simple sum of these assets and then spitting into tertiles (low, mid, high), it was possible to substitute for income and rerun regressions. Wealth also has significantly negative impacts on utilisation, but original results hold, (i.e. cultural attitudes hold no matter how the socioeconomic gradient is measured), with knowledge, ability to cure and trust being important influences on utilisation.

Thirdly, in the main analysis, attitudes and beliefs were categorised into five groups (those who responded 'strongly agree', 'agree', 'neutral', 'disagree' or 'strongly disagree'). Here, they are instead collapsed into three categories (1:'strongly agree and agree'; 2:'neutral', and 3:'disagree and strongly disagree') and regressions are rerun for the partial correlations with and without control variables and then as a newly created culture index (Appendix 17 columns 1, 2 and 3 respectively). Evaluation by 5 or 3 categories largely gives the same output and all models confirm the original results namely that cultural attitudes significantly affect utilisation, income is a strong predictor and that disease characteristics play an important role.

2.5 Discussion

This paper has found empirical evidence to suggest that cultural attitudes and beliefs influence the utilisation of TM/H. By using a unique survey eliciting attitudes and beliefs, it

[53] The estimated rho coefficient, at 0.17, indicates that there is a positive correlation between the errors in both estimated equations; unmeasured factors making it more likely for culture to be prominent also make it more likely that an individual will utilise TM/H, conditional on other variables.

[54] The list includes electricity, air conditioning, tap with running water, own toilet, TV, fridge, mobile phone, radio, bed, car, tractor, motorbike, bicycle, another property (eg shop, second home) and was extracted from readily available and pretested household surveys in Ghana (Arhinful,2011).

was possible to model how utilisation of TM reflects the traditional views of illness, in line with numerous anthropological studies. Individuals who agreed more strongly with favourable statements on: healer service; trust toward TH; TM/H's ability to cure illnesses; perceived safety and acceptance within region, were more likely to utilise TM/H. This was true even after controlling for other factors - financial background (income, wealth, insurance); disease characteristics (severity and type); socioeconomic variables (age, gender, religion, education, and occupation), supply factors (closeness of healers, urban location). On the other hand, individuals did not necessarily use TM/H because they thought healers had good knowledge (indicated by positive coefficients); rather, it was suspected that people thought doctors were knowledgeable also and would turn to them should healers prove inadequate.

The six amalgamated dimensions of attitudes and beliefs used to proxy for culture suggest that TM/H might be considered an example of a 'relational good' (Uhlaner,1989, p. 254), defined as 'goods (that) arise as a function of a relationship with others'. That is to say, cultural attitudes are most likely formed because others in surrounding areas influence individual perception and consequently, utility levels. In visiting a healer, individuals may be able to maintain an identity, gain social approval or fulfil a norm. Thus, 'joint consumption' is intrinsically valuable.

Each of these cultural dimensions have intuitive explanations toward rationalising an individual's decision. Descriptive data show that whether TM/H had been used or not, the majority of individuals believed they were well accepted in their region, perhaps because TM have been used for hundreds of years (thus individuals are familiar with how and when to take TM) and healers are well-liked, integrated members of society (DeJong,1991; Kayombo, Mbwambo, & Massila,2005). Results on the perception of TM/H safety suggest that individuals generally believe TM/H are less safe than modern medicines. This reflects the concerns of many who often critique TM/H as poorly regulated and under-tested for scientific efficacy (Gort,1989; Mills, Cooper, & Kanfer,2005), rather than the popularly cited reason that TM are 'natural' and therefore safe to use (Chi,1994; Lhamo & Nebel,2011; World Health Organization,2008b). Such beliefs, however, appear to fail to take into account the large quantities of counterfeit and substandard medicines available in developing countries (Kaur et al.,2008). Descriptive statistics also suggest that most individuals believed that TM could be consumed without visiting healers. This result

concurs with studies which suggest individuals will usually try to take care of themselves or ask friends and relatives for advice before turning to outside care (Kleinman,1980) and points to the popularity of self-diagnosis and medication (van den Boom, et al.,2008).

The top three dimensions with significant coefficients in regressions are discussed in detail. Firstly, individuals who claimed the highest levels of trust toward healers were most inclined to utilise TM/H. Trust is arguably a driving force of strong relationships between patients and health care providers in imperfect markets and under asymmetry of information, and is a mechanism for reducing transaction costs (Hall, Dugan, Zheng, & Mishra,2001; Mechanic,1998)[55]. Hall (2001) and Helman (2000) further show that trust can mediate outcomes across cultures and account for differential effects of treatment among patients. Trust indicates cooperation, mutual exchange and 'the optimistic acceptance of a vulnerable situation in which the truster believes the trustee will care for the truster's interests' (Hall, et al.,2001), such that trust enables interpersonal bonding (as opposed to formal institutional or organisational relations). Areas with lower levels of institutional infrastructure are more likely to be reliant on informal systems of care (Lyon,2000), reinforcing the importance of interpersonal networks. In Sri Lanka, weak patient-provider relations are found to be a large push factor for the poor to visit private providers (Russell,2005), whereas in Nigeria, traditional associations are preferred over formal state institutions (Ayoola, et al.,2000). Trust is also found to be an important determinant of health care provider choice, both public and private, in Cambodia, where characteristics such as honesty, sincerity, confidentiality and gentleness are listed as top reasons for the patient's choice of provider (Vincent & Furnham,1996). Mechanic (1998) argues that trust may be elicited through organisational approaches (surveying patient satisfaction, being responsive to community needs), improving communication – including taking patients' perspective and involving them in decision making - and formal regulatory measures.

Secondly, users of TM/H were confident of its ability to cure, a finding supported by a study from Trinidad that shows 87% of herb users perceive herbal medicines to be more efficacious than modern medicines and therefore continue to utilise them (Clement et

[55] Mechanic (1998) argues that trust stems from technical and interpersonal competence, physician agency, physician control, confidentiality, open communication and disclosure.

al.,2007). In TM, however, the conceptualisation of efficacy is not necessarily aligned with that presented in biomedicine (Audu et al.,2002; Waldram,2000). Illness meanings and interpretations differ according to cultural systems, to the extent that within the realm of TM/H, elimination of disease is not always the end goal but treatment in itself is valued (Audu, et al.,2002; Waldram,2000). Chi (1994) shows that in Asia, perceptions of efficacy differ depending on the type and nature of illness. For example, modern medicines are perceived to work faster than Chinese medicines, but Chinese medicines are thought to be more effective in treating the 'root cause' of diseases and equated more 'holistic', patient-oriented treatment. Such beliefs were attributed to cultural, rather than economic, backgrounds: 'most TM are an integral part of their socio-cultural environments, which also developed their own world views and philosophies. Such world views and philosophies are inseparable from their medical systems, which defines the meaning of health and illness' (Chi,1994, p. 317).

Ability to cure is therefore a subjective term, defined in terms of the individual's perceptions and interpretations, which are in turn formed by surroundings and the environment (for a detailed exposition, see Audu, et al.,2002 and discussion in Chapter 1). It may be the case that individuals are impressed by the level of care and attention provided by healers, who typically afford them long consultation times, special treatment such as divination and other 'holistic' services not provided in the modern health care sector (Astin,1998b; Stekelenburg, et al.,2005). Further, services are likely to be imparted in a more user-friendly manner when settings are informal and localised. Individuals holding positive views on healers' ability to cure clearly see them as professionals much as believers of modern systems would biomedical doctors. Thus, while individuals are potentially 'cured' by either form of medicine, traditional systems offer individuals a culturally more acceptable outlet; individuals appreciate that they can talk to somebody they trust and who shares the same view of illness and health.

Thirdly, users did not necessarily agree that healers were more knowledgeable about certain illnesses than doctors. This suggests that on the whole, people consider modern systems to have better trained personnel, perhaps reflecting the perceived merit of compulsory qualifications. Healers, on the other hand, are largely informal and can practise without certification or training. However, the type of knowledge acquired in both systems differs significantly, with healers frequently learning by doing, or through the

teachings of older family members: one study in Bolivia predicts that healers with extensive family history in TM practice have greater knowledge about medicinal plants (Vandebroek, van Damme, van Puyvelde, Arrazola, & De Kimpe,2004). On the whole, the positive coefficient may be indicative of individuals expressing their support for modern systems which require formal education and training, and their belief that traditional systems are insufficient alone.

By using supply side variables, it has also been possible to proxy for locality, and in line, that healers themselves might exhibit similar cultural characteristics to users. This is comparable to Leonard (2003), who argues that healers and users depend on cultural norms for outcome-contingent payment systems to be successful, as levels of trust and ability to enforce unwritten contracts are high in small scale communities. In Leonard's model, culture is modelled as a supply variable (with healers' characteristics) whereas here, the emphasis is more on users' demand. Controlling for disease characteristics also demonstrates individuals with chronic illnesses and those who rate their illness as less severe (perhaps as a result of normalisation), have a larger likelihood of using TM/H. This is highly suggestive of the fact that individuals with longer lasting illnesses are likely to try as many alternative modes of therapy as possible in the search for a remedy. Such findings complement studies on multiple treatment-seeking behaviour and polypharmacy (Astin,1998a; Clement, et al.,2007; Singh, et al.,2004; Turshen,2001) and points to the need for further analysis of utilisation patterns.

There are several limitations to this study. First, this study used a common, but not universally accepted definition of culture. Sociologists like Swidler (1986) argue that cultural values are not drivers of action directly, but indirectly so, by equipping individuals with 'a 'tool kit' of habits, skills and styles from which people construct 'strategies of action'. Thus, it is by linking many sub strategies that people are able to organise end goals (Swidler,1986, pp. 273, 277). The upshot of this is that one cultural system can lead to a large number of outcomes and actions, not necessarily consistent with one another and constantly changing over time. Bibeau (1997) has similarly argued that actions precede beliefs; just because an individual is seen to act a certain way, this does not preclude individuals from acting in a seemingly contradictory manner. As such, the paper is limited to proxying culture by value statements rather than actual behaviour.

There are also some methodological limitations. Critics of PCA argue that the method is arbitrary (from the choice of indicators to the number of components retained), but PCA is an efficient method of grouping independent variables with similar characteristics. A second limitation is with regards the instrumentation of culture. It is arguably very difficult to find appropriate instruments for culture and results for endogenous models must be interpreted with caution. Indeed, an alternative approach would be to use data on immigrants to analyse whether cultural beliefs are retained even as individuals experience different formal institutions (further discussed in Chapter 6), although unfortunately this particular dataset does not allow for this. Finally, analyses may be sensitive to regional disparities, which were accounted for by clustering rather than dividing the sample[56].

Policy implications are briefly discussed. On a broader level, it is unlikely that TM/H will be supplanted simply by increasing access to modern drugs, as individuals do not necessarily see them to be substitutes - the two systems exhibit divergent logic. Modern medicines have failed to completely displace TM and a process of 'acculturation' (Twumasi,1979b), in which different cultures merge, has occurred. Consequently, modern and traditional systems coexist, but do so while retaining distinct characteristics and older, traditional systems will remain important for its users. Indeed, this study suggests that users may be turning to both traditional and modern systems, judging for themselves which is most appropriate for given symptoms. Accordingly, strategies which advocate 'integration' to place TM within a biomedical framework (World Health Organization,2002) will not succeed if the demand side of the equation is sidestepped. Instead, policy transferring dimensions of cultural beliefs that matter most (for example, trust) into existing modern systems will achieve more user-friendly and culturally acceptable practices.

2.6 Conclusion

This study has examined dimensions of culture and TM/H utilisation. This study adds impetus to the view that individuals not only use healers because they are poor, uninsured or lack access to modern medicines. Although poorer individuals in Ghana appear to record higher TM/H use than the rich, cultural explanations can also be drawn upon to understand health-seeking behaviour. While higher levels of trust and 'ability to cure'

[56] There were insufficient observations to divide the sample and including a regional dummy resulted in multicollinearity problems.

were strongly associated with utilisation, individuals do not think that healers necessarily have greater knowledge than modern practitioners, suggesting that choice of provider is shaped by perceived need and on an 'if and when' basis. Further, those with greatest access to modern medicines due to income or wealth are less likely to use TM/H. Overall, findings indicate that cultural explanations offer one reason for the continued utilisation TM/H but deeper analysis according to economic status is required to fully understand patterns of health-seeking behaviour.

Economic constraints

Does income explain use of modern and traditional health care services?[57]

Abstract

Although income is acknowledged to be an important determinant of modern health care utilisation, most analyses to date have failed to include traditional systems as alternative, or joint, providers of care. In developing countries, where pluralistic care systems are common, individuals can use multiple sources of health care, and the order in which systems are chosen is likely to vary according to income. This paper uses self-collected data from households in Ghana and econometric techniques (biprobit modelling and ordered logit) to show that rising income is associated with modern care use while decreasing income is associated with traditional care use. When utilisation is analysed in order, results show rising income to have a positive effect on choice of modern care as a first provider, while choosing it second, third or never is associated with decreasing income. The effects of income on utilisation patterns of traditional care are stronger: as income rises, utilisation of traditional care as a first choice decreases. Policies that increase income may encourage wider utilisation of modern over traditional care, while high levels of poverty will see continued use of traditional care.

[57] This Chapter is based on a paper of the same title at 'revise and resubmit' stage to appear in *Social Science and Medicine.*

3.1 Introduction

Governments and international bodies such as the WHO have long recognised the importance of access and utilisation of health care services especially for the poor, who typically exhibit a heavier burden of disease, benefit from fewer resources, expenditures and subsidies, and generally spend more out-of-pocket for medicines and care as a proportion of their income than the rich (Gwatkin et al.,2007; Hanney, Gonzalez-Block, Buxton, & Kogan,2003; UN Millennium Project,2005). Similarly, the pluralistic nature of health care systems (where modern and traditional systems sit side-by-side) in developing countries has previously been acknowledged: back in 1978, the Alma-Ata Declaration emphasised how primary health care at the local level 'relies…on health workers…as well as traditional practitioners as needed, suitably trained socially and technically to work as a health team and to respond to the expressed health needs of the community' (World Health Organization,1978a). Yet, such co-existing systems are rarely evaluated together, with studies to date mainly pinpointing determinants of modern (for example Anyanwu,2007; Sahn, Younger, & Genicot,2003) *or* traditional (for example Peltzer, et al.,2008; Tsey,1997) care utilisation. Further, while it is noted that socioeconomic status is an important factor in explaining health care utilisation (Gwatkin, et al.,2007), there is a lack of knowledge about how variations in income explain the type and order of providers individuals choose to utilise. Indeed, it is highly likely that multiple sequencing patterns exist and utilisation of providers is segregated by income. For policymakers, such information would be vital in ascertaining how changes in income (especially at the individual level) potentially affect health-seeking behaviour.

This paper seeks to fill this gap and provide policymakers with a more complete picture of health-seeking behaviour by providing answers the following questions:

a. When modern and traditional medicine utilisation are modelled together does income affect choice of provider?
b. How do patterns of health care-seeking behaviour differ with income?

3.2 Background

The utilisation of health care and related services can be seen as behaviour resulting from individual and/or societal characteristics (Andersen & Newman,1973). Utilisation has been identified to be determined by a range of non-mutually exclusive factors such as

costs, ease of geographic access and supply characteristics like quality, as well as social, cultural and interpersonal reasons (Lindelow,2005; Sachs & Tomson,1992; Shariff & Singh,2002). Although the Andersen framework is originally designed to model utilisation of modern care, it can be applied to any type of health care, including traditional care. Utilisation is modelled to be a function of predisposing, enabling and need factors. Predisposing factors include demographic influences (age, sex), social structures (education, religion) and health beliefs (values, attitudes). Enabling factors include family and community influences, which can include income and costs of care, insurance, and location of households to medical facilities. Need factors incorporate disease characteristics such as symptoms and severity. Appendix 18 and Appendix 19 outline examples of predisposing and enabling determinants of utilisation alongside some empirical evidence.

A large body of literature considers income, wealth or socioeconomic status to be fundamental to health-seeking behaviour and utilisation, most of which concentrate on utilisation of modern providers. Data from Burkina Faso show how the most disadvantaged group sought care from modern providers at half the rate as all the other socioeconomic groups combined (Develay, Sauerborn, & Diesfeld,1996, p. 1616). Similarly, a study from Tanzania finds that non-poor households living in areas of low poverty concentration have better service utilisation rates than persons residing in higher poverty areas (Khan, Hotchkiss, Berruti, & Hutchinson,2006). Accordingly, the 'inverse care law' hypothesises that despite the heavier burden of disease and illness among the poor, it is this very group who access fewer health resources and utilise less formal care (Preker & Carrin,2004). In Namibia, the rich are 30% more likely to use formal maternal services than the poor (Zere et al.,2010). Gwatkin (2000, p. 721) provides further evidence from 44 countries in Africa, Asia and Latin America, to show that uptake for oral rehydration therapy was 10-20% higher for the upper classes, and immunisation rates for the poor were only around half that of the rich. Kiwanuka et al (2008) review utilisation of health care services by the poor in Uganda, and confirm that the poor have greater burden of disease but worse access to health services. Schellenberg et al (2003) argue that carers of children in rich families know better symptoms of dangerous illnesses, are more likely to take the children to a health facility, and to receive drugs than the poor. The rate of hospital admissions in the lowest income quintile was almost half that of the highest, even where likelihood of falling ill is similar.

The quantitative literature on income affecting TM use is less advanced and somewhat limited. Some authors have argued that TM are more affordable because herbal products are cultivated in surrounding areas, reducing both direct and indirect costs and individuals can self-apply (van den Boom, et al.,2008). One key reason for TH use by the poor is the healers' competence in ascertaining clients' ability to pay, such that payment modes include payment-in-kind, by instalment or are outcome-contingent (Anyinam,1987; Asenso-Okyere,1995; Hausmann Muela, et al.,2000; Leonard,2003; Leonard & Zivin,2005; Stekelenburg, et al.,2005) in contrast to modern services where individuals are charged a flat rate regardless of socioeconomic status (Hausmann Muela, et al.,2000). This is confirmed in a recent survey undertaken by MeTA (Arhinful,2011) in Ghana, which shows that only 18% can get credit from private pharmacies if needs arise and 23% agreed that 'in public facilities, health providers take into account our ability to pay when they decide which medicines to prescribe'. Peltzer et al (2008) argue that individuals with enough money or other sources of income asides from their main salary are less likely to use traditional forms of care, a finding echoed by Tabi et al (2006) who find poverty prevents the utilisation of modern drugs, and pushes people to use traditional herbs instead. Thus, the potentially low costs and flexible financing offered in traditional systems are important factors when considering utilisation especially by the poor (Ndubani & Höjer,1999; Stekelenburg, et al.,2005).

Not all believe income to be an important determinant of utilisation. Lindelow (2005) uses statistical methods to show that the effect of income is small and/or insignificant in explaining utilisation of curative care in Mozambique, compared to other variables such as physical access and education. Kim et al (2008) and Singh et al (2004) also find income is not a significant or strong predictor of TM use in Korea and South Africa, respectively. The 'bypassing' phenomenon (Akin & Hutchinson,1999) is also evidence that income and prices do not necessarily dictate choice of provider. Bypassing describes a situation whereby people walk by their nearest provider to use facilities that are actually farther away, for a variety of reasons. They find that bypassing behaviour does not differ much according to income group, and the severely ill are more likely to travel beyond their nearest clinic than those who are less severely ill, indicating that individuals made a needs-based assessment in choosing their provider.

The preference for certain providers has been explored in the literature as alternative choices using multinomial logit modelling techniques (Habtom & Ruys,2007; Kazembe, Appleton, & Kleinschmidt,2007) but without deep analysis of choice by income. If multiple providers exist, an individual may select providers in an order of preference or according to a hierarchy, especially if income is a constraint. This is termed 'doctor shopping', or 'healer shopping' when applied to the traditional sector (de Graft Aikins,2005; Kroeger,1983a) and is known to be a common occurrence (Mwabu,1986). Schwartz (1969, p. 204) hypothesised two patterns in health-seeking behaviour: the first is labelled 'acculturative', where modern medicine is chosen first and traditional medicines second, while 'counter-acculturative' describes the opposite trend. Reasons for multiple provider use include previously failed diagnosis or treatment (Moses et al.,1994) or search for better quality (Bhatia & Cleland,2001), but Schwartz does not believe it can be attributed to economic status as she argues that if that were true, people would move from cheaper to more expensive treatment modalities and would exhaust home remedies before turning to outside care, yet she does not find this to be the case. Rather, individuals try only one home remedy and then turn immediately to outside care. She writes; 'laypeople act as if they are seeking variety. Under conditions of uncertainty, such a sampling approach is a sound strategy' (Schwartz,1969, p. 223) implying that people spread their risk by trying as many providers as possible.

Indeed, utilisation of multiple (and mixed types of) providers is common (Ahmed, Sobhan, Islam, & Barket-e-Khuda,2001). This is particularly marked where individuals believe some illnesses cannot be cured by modern medicine, illnesses are long-term (Ngalula, Urassa, Mwaluko, Isingo, & Boerma,2002) or locality and immediate needs simply do not allow for utilisation of modern care (Forjuoh, Guyer, & Strobino,1995; Ndyomugyenyi, Neema, & Magnussen,1998). Ryan (1998) explores 'patterns of resort' and suggests that individuals in a rural Cameroonian village consistently delay treatment-seeking as part of the decision process but once treatment was sought, home remedies and TH were popular choices. Mwabu (1986) explores up to four providers of care for each individual's illness episode, and finds that while treatment from government clinics, pharmacies and mission clinics are highly favoured as first choices, in subsequent rounds of care, traditional systems were commonly cited. Mock et al (2001) also show that in Ghana, individuals with injuries receive formal care only half of the time, with TM being utilised in 84% of all cases studied. Of all people with health needs, 62% used TC alone, 11% used traditional before

formal care and 27% used TC after formal care (Mock, et al.,2001, p. 24). In another study in Ethiopia, 24.2% of TM users claimed to do so because modern medicine had failed, and 1.9% said it was due to lack of access to modern medicine which forced them to use TM (Flatie, et al.,2009, p. 4). However, in India, a study incorporating both modern and TM use found that while the vast majority of modern health care users claimed this as first choice, under half (42%) of the traditional users stated that it was their first choice, and 57% of the traditional group used modern medicines simultaneously (Phillips, Hyma, & Ramesh,1992). These studies do not elaborate on the role of income in choice ordering.

3.3 Empirical strategy

3.3.1 Data

Data are selected from household questionnaires written by the author and rolled out in two regions of Ghana in late 2010. Sampling methodology closely followed pre-approved WHO methods (Arhinful,2011) and ethical approval was gained prior to data collection (please see Appendix 8 for methodology and Appendix 9 for data overview). Respondents were asked about medicines utilisation for self-reported acute illnesses in the two weeks preceding survey and actions taken in the past month for previously diagnosed chronic illnesses. In sum, 741 health needs across 772 households were noted. Respondents could select up to four successive points of care, but only few used four sources so up to three actual uses (given need) are analysed here, with the addition of a fourth choice of 'never' having utilised.

Dependent variables - biprobit

The biprobit requires specification of two dependent, binary variables so sub-categories of care are amalgamated to two broader groups. The first, MC, denotes an individual who has used modern medicines, acquired from the following institutions: public and private hospitals, public and private health care centres, private pharmacies, licensed drug sellers and self-medication by modern medicines. The second dependent variable, TC, denotes individual utilisation of TM obtained through TH (spiritual herbalists, herbalists, fetish priests, spiritual churches) or by oneself with herbs.

Dependent variables - ologit

New variables are created to denote the point at which modern care and traditional care respectively were chosen. Accordingly, each individual is assigned the following codes for each variable: "1" for 1st choice; "2" for 2nd choice; "3" for 3rd choice; or not chosen at all "4".

Independent variables (further details in Appendix 20)

The main independent variable is logged equivalised expenditure, serving as a proxy for income. Monthly household expenditures are calculated and equivalised using an OECD formula[58]. In addition to income, four variables are chosen to control for health needs: 1) sex; 2) age, stratified in groups; 3) self-reported severity of disease/illness (very serious, serious, not serious, not serious at all); 4) whether illness is chronic. Further, nine 'non-need' control variables are added: whether the individual is insured; education level of the head of household; whether the individual is Christian; whether the head of household is a farmer; whether an individual is married; a cultural index indicating attitudes toward TM/H (increasing value indicates decreasing approval; for further details please see Paper 1); whether the household is located in an urban area (defined as the regional capital); whether the household has a modern health facility (including pharmacies, health centres, hospitals) within 30 minutes' walk from home. Finally a dummy (Greater Accra) is included to control for regional effects. It is expected that biprobit results for MC will show a positive coefficient, indicating greater use of MC among richer individuals. Contrarily, in the TC equation, income is expected to show a negative coefficient, with utilisation of traditional systems declining with increasing income. Needs variables and insurance are also likely to have significant impacts on utilisation patterns.

3.3.2 Models

In modelling the use of health care traditional models assume that individuals either use or do not use health care. However, when multiple health care systems are available, modelling becomes slightly more complex, a joint estimation method is more appropriate. In these models, individuals have the option to utilise both traditional and modern care and common unobservable variables are allowed for.

[58] $(\alpha + \beta K)^{0.75}$ where α is the number of adults; K the number of children; β is set to 0.3.

If it is accepted that an individual potentially has a choice of providers and such choices may be determined by, among other things, income, it is possible to model this using existing theories which acknowledge that providers of care are used in sync, or one after another. Here, two models are drawn upon: the complementary model and compensatory model[59]. If an individual views modern and traditional care as complementary, they will use both at the same time especially if needs are extremely high or one system is deemed insufficient. In this instance, both systems should be modelled with interdependency, thus the biprobit model is used. In the compensatory model (Cantor,1979), a choice ordering is observed: an individual has a preference for certain providers first, and exhausts each before moving onto the next one[60]. This can be tested using ordered logit.

Biprobit model

In the biprobit framework, the dependent variables (outcomes) are modelled to be interdependent, representing two inter-related decisions. This allows for joint distribution of the two normally distributed variables, where an individual chooses MC, TC or both. Errors and probabilities between TC and MC are thus correlated in biprobit (Greene,2003). The following is adapted from Rahman (2008) who uses bivariate probit for modelling cropping choice methods in Bangladesh, which in turn is based on original analysis by Greene (2003).

MC and TC are assigned values of p=1 for use and p=0 for no use. The underlying utility function is assumed to be made up of need factors and non-need factors (Z, including income).

$U_{1i}(Z) = \beta_1 Z_i + \varepsilon_{1i}$ for use, and
$U_{0i}(Z) = \beta_0 Z_i + \varepsilon_{0i}$ for non-use

The ith person will use a system only if utility derived from use if greater than non-use: $U_{1i} > U_{0i}$. In probability terms:

[59] Complementary model: Chappell and Blandford (1991)show this to be a blend of the substitution and compensatory models. Two further models are proposed but not explored here: Substitution model (Greene,2003) – as modern care use increases traditional care decreases (uses simultaneous equations). Task specific model Litwak (1985) – choice of care depends on task /e.g. nature of disease and individual needs) involved. Litwak argues that the compensatory model is just a special case of Task Specific Model.

[60] This is similar to the substitution model in which individuals substitute one mode of care for another.

$p(1) = p\ (U_{1i} > U_{0i})$

$p(1) = p\ (\beta_1 Z_i + \varepsilon_{1i} > \beta_0 Z_i + \varepsilon_{0i})$

$p(1) = p\ (\varepsilon_{0i} - \varepsilon_{1i}) < (\beta_1 Z_i - \beta_0 Z_i)$

$p(1) = p\ (\varepsilon_{1i} < \beta Z_i)$

$p(1) = \Phi\ (\beta Z_i)$

where Φ denotes the cumulative distribution function (here, the normal distribution) and ε denotes error. For a given individual, the probability of using MC is:

$$\Phi_{\mathrm{MC}}\ (\beta Z_i) = \int_{-\infty}^{\beta Z i} \frac{1}{\sqrt{2\pi}} \exp\left(\frac{-t^2}{2}\right) dt;$$

and the probability of using TC is:

$$\Phi_{\mathrm{TC}}\ (\beta Z_i) = \int_{-\infty}^{\beta Z i} \frac{1}{\sqrt{2\pi}} \exp\left(\frac{-t^2}{2}\right) dt$$

These two equations can be estimated with consistent single equation probit if errors (ε_{MC}) (ε_{TC}) were uncorrelated, but if error terms are correlated, these estimates would not be efficient (Greene 2003) and the biprobit is etimated thus:

$$f(MC, TC) = \frac{1}{2\pi\sigma_{MC}\sigma_{TC}\sqrt{1-\rho^2}}\, e\left[-\frac{1}{2}\left(\frac{\varepsilon_{MC}^2 + \varepsilon_{TC}^2 - 2\rho\sigma_{MC}\sigma_{TC}}{1-\rho^2}\right)\right]$$

$$\varepsilon_{MC} = \frac{MC - \mu_{MC}}{\sigma_{MC}} \ and\ \varepsilon_{TC} = \frac{TC - \mu_{TC}}{\sigma_{TC}}$$

Where ρ is the 'tetrachoric' correlation between MC and TC (if this is 0, distributions are independent and the model reduces to two probit models). When ρ <0, MC and TC are substitutes; if >0, they are complements. Covariance: $\sigma_{MC,TC} = \rho\sigma_{MC}\sigma_{TC}$; while μ_{MC}, μ_{TC}, σ_{MC}, σ_{TC} are the means and standard deviations of the marginal distributions of MC and TC, respectively.

Results are presented for both probit (where rho is zero) and biprobit models (where rho is not zero). In estimating the biprobit, individuals are designated to one of four categories indicating no use or use of MC and TC. For example, (0,0) denotes no care from either MC or TC, (1,1) means the individuals has used both, (1,0) suggests MC only and (0,1) suggests

TC only. Coefficient estimates for biprobit are presented where MC has been used (MC column) or TC has been used (TC column), irrespective of the four separate categories, whereas marginal effects of all possible for biprobit outcomes are shown. Estimation is carried out using maximum likelihood using Stata version 9.

Additionally, as confirmatory analysis, results are presented as income elasticities to measure the responsiveness of the demand for a good given changes in income. This information is useful to characterise goods. A negative income elasticity describes goods for which demand will fall when income rises (inferior goods) whereas a positive income elasticity will result in a rise in demand when income rises and are known as normal goods (specifically, elasticity<1=necessity; >1=luxury).

Ordered logit

The ordered logit model allows for multiple, ordered dependent variables (Greene 2003, Jones 2007). In the case of choice ordering, 4 choices measured on an ordinal scale are used to express an underlying latent variable y*, where y* infers the individual's 'true choice'. Threshold values (τ_i) represent cut-off points where an individual moves from belonging in one choice group to another. Where the lowest (highest) possible value of the threshold is minus (plus) infinity, and a constant term is suppressed, it is possible to model a four category ordered logit thus:

$$P(y_i = 1|x_i) = \wedge (\tau_1 - x_i\beta)$$

$$P(y_i = 2|x_i) = \wedge (\tau_2 - x_i\beta) - \wedge (\tau_1 - x_i\beta)$$

$$P(y_i = 3|x_i) = \wedge (\tau_3 - x_i\beta) - \wedge (\tau_2 - x_i\beta)$$

$$P(y_i = 4|x_i) = 1 - \wedge (\tau_3 - x_i\beta)$$

Where βs and τs are to be estimated and $\wedge$ represents the standard logistic function and estimation is by maximum log likelihood.

By modelling choices for a particular provider in preference order, it is possible to see what role income plays in determining at which stage (if any) an individual seeks care from either modern or traditional provider. The same variables as biprobit are used, but in addition to coefficients and marginal effects, predicted probabilities are graphed to show differing probabilities of choosing modern care and traditional care as income varies.

A positive (negative) income coefficient means that an increase in income is expected to be associated with an individual choosing the particular provider later (earlier). For example, a positive income coefficient in the TC ordered logit means richer individuals will tend to choose TC 3rd or never rather than 1st or second. Similarly, a negative income coefficient in the MC ordered logit means richer individuals will tend to choose MC first, or early on in their treatment-seeking behaviour pattern. Richer individuals are hypothesised to choose higher order choices for TC (signifying that they will typically only use it as a last resort, or will never choose this mode of care), while poorer individuals will choose lower order choices for TC (signifying that they will turn to these providers sooner). Conversely, the rich will tend to have lower ordering choices for MC and the poor, higher orderings.

3.4 Results

3.4.1 Descriptive data

Patterns of health care-seeking behaviour

Patterns of health care-seeking behaviour favours modern sources as a first choice but the popularity of TC intensifies as second or third sources are chosen[61]. Table 5 shows that over 83% first choose MC, while only 12% use TC, and the remainder either seeking no care whatsoever, or seek care from unclassified sources. At the second choice, there is an even split between the two types of care and by the third choice traditional care appears to be more popular than modern care. Thus, inclusion of multiple sources of care within analysis is important to understand fully the complete health-seeking behaviour.

Table 5 - Provider choices, by type and choice order

		First choice	%	Second choice	%	Third choice	%
Other/none		31	4.2	0	0.0	1	1.9
Modern	Public	351	47.4	83	32.1	16	30.2
care (MC)	Private	56	7.5	13	5.0	3	5.7
	Self_modern	214	28.9	33	12.7	3	5.7
Traditional	Self_TM	41	5.5	64	24.7	8	15.1
care (TC)	TH	48	6.5	66	25.5	22	41.5
Total		741	100	259	100	53	100

**Source: author's own*

[61] This is discussed further in Sato (2012c).

The negative coefficients in the correlation matrix (Table 6) indicate that in general, providers are substitutes (an increase in the use of one type is associated with a reduction in the use of another) except for the combination of self-medication with herbs and private sector care and TH with public sector care.

Table 6 - Correlation matrix for provider types

	Public	Private	Self_modern	Self_TM	TH
Public	1				
Private	-0.2963*	1			
Self_modern	-0.5304*	-0.0818*	1		
Self_TM	-0.1272*	0.0099	-0.0250	1	
TH	0.0988*	-0.0816*	-0.2148*	-0.1369*	1

Self_modern indicates self-medication using modern drugs; Self_TM indicates self-medication using herbal products; TH indicates healer use;
**indicates significance at 5%.;*
**Source: author's own*

Health care-seeking patterns and income

Table 7 depicts utilisation of providers for all sources ever used across income quintiles. Data show utilisation of different types of providers fluctuates considerably across expenditure quintiles. Public sector care is patronised by all, with a slight bias toward poorer quintiles. Unsurprisingly, private care is rarely used by the bottom three quintiles, with the top 40% dominating its use. Self-medication by modern medicines is more popular among the rich than the poor. Overall, MC tends to be used by the top quintiles more than the bottom. Turning to TC, self-medication by herbs is fairly evenly distributed by income, except for people in the second quintile who use a little less in comparison. The trend for healer use is clear, however, with a third of all those in the bottom quintile ever using healers, compared with under 11% for individuals in the top quintile. Care-seeking from other unclassified sources, or no care-seeking whatsoever, tends to be higher in the lower quintiles but there were not many individuals belonging to this last category, indicating that given some health need, on the whole, individuals were able to obtain medicine.

Table 7 - Utilisation of modern and traditional care, by income quintile, all sources

	None/other		Modern Care						Traditional care			
			Public		Private		Self modern		Self_TM		TH	
Quintile	**n**	**% of quintile**	**n**	**% of quintile**	**n**	**% of quintile**	**n**	**% of quintile**	**n**	**% of quintile**	**n**	**% of quintile**
1	7	5.6	76	60.3	2	1.6	29	23.0	18	14.3	40	31.8
2	9	7.1	78	61.9	2	1.6	38	30.2	10	7.9	30	23.8
3	0	0.0	82	63.6	6	4.7	44	34.1	24	18.6	14	10.9
4	4	3.2	57	45.6	27	21.6	46	36.8	18	14.4	12	9.6
5	2	1.6	65	52.9	15	12.2	42	34.2	22	17.9	13	10.6
	22		358		52		199		92		109	

**Source: author's own*

The same table is presented for first choice providers only to illustrate how revealed preferences differ at the first and second stages of care-seeking (Table 8). The pattern for MC is similar to the overall picture of Table 7, but as expected, figures for TC indicate that in all quintiles, this form of care does not tend to be the first choice. However, utilisation is still highest among the poorer quintiles, with use around twice as much for the bottom two quintiles versus the top two quintiles, for both self-medication with herbs and visits to healers.

Table 8 - Utilisation of modern and traditional care, by quintile, first choice only

	None/other		Modern Care						Traditional care			
			Public		Private		Self modern		Self_TM		TH	
Quintile	**n**	**% of quintile**	**n**	**% of quintile**	**n**	**% of quintile**	**n**	**% of quintile**	**n**	**% of quintile**	**n**	**% of quintile**
1	7	5.6	66	52.4	1	0.8	27	21.4	8	6.4	17	13.5
2	8	6.4	65	51.6	2	1.6	36	28.6	1	0.8	14	11.1
3	0	0.0	74	57.4	5	3.9	36	27.9	7	5.4	10	7.8
4	4	3.2	46	36.8	24	19.2	45	36.0	4	3.2	6	4.8
5	2	1.6	62	50.4	13	10.6	39	31.7	1	0.8	10	8.1
	21		313		45		183		21		57	

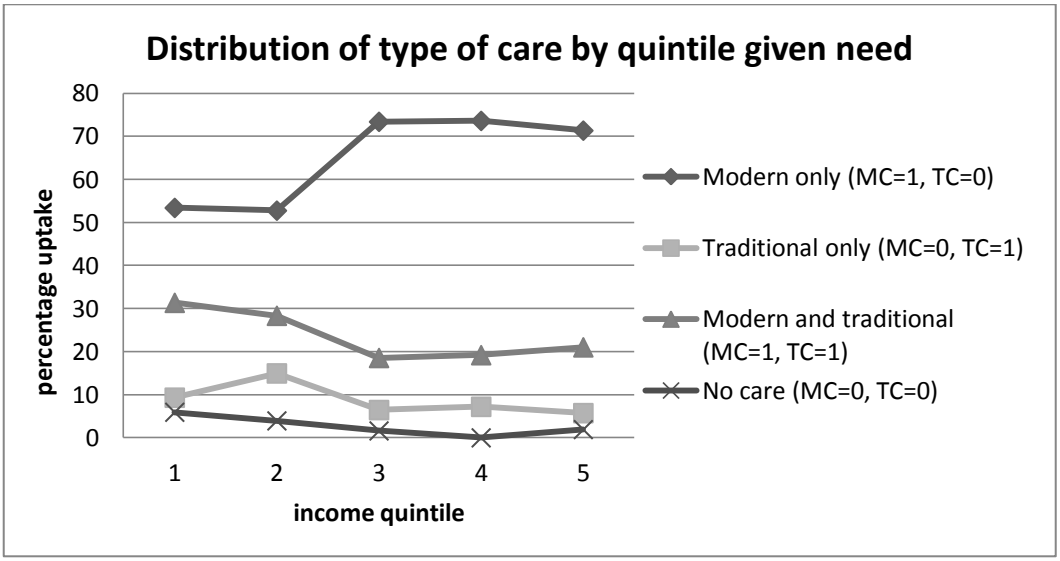
**Source: author's own*

3.4.2 Joint estimation of traditional and modern health care use

Subsequently, traditional and modern care are jointly modelled (Figure 5). There are 20 individuals in category (0,0) indicating neither MC nor TC were utilised, 150 used both TC

and MC, 411 used only modern care and 53 used traditional care only. Means and standard deviations, in addition to descriptions of variables used and predicted results of all samples, are given in Appendix 20. These descriptive statistics suggest mean income is highest for those who use only modern care, followed by both forms of care, TC only and the lowest income levels are for those who seek no care whatsoever. Use of TC is highest among lower income quintiles but is prevalent – even at low rates – among the rich.

Figure 5 - Distribution of type of care sought, by income



**Source: author's own*

Probit and biprobit results

Results are presented for both probit (the case where rho is zero) and biprobit models. Coefficients for biprobit are presented where MC has been used (MC column), or TC has been used (TC column), irrespective of the four separate categories. The main variable of interest, income, is shown to be both significant and associated with MC and TC in the expected way, in both models. The coefficients in Table 9 demonstrate that as income rises, MC use rises. Similarly, rising income is associated with reduced use of TC. The positive age coefficients on TC use also signify that older generations are more likely to use TC. Those who assessed their health status as serious, not serious or not serious at all are less likely to use both MC and TC than those who classed their illness as being 'very serious' (the omitted category). Chronic disease sufferers were significantly more prone to utilise TC and those covered by insurance inclined to turn to MC rather than TC. Education

appears to play an important role, as those with more than junior level education sought MC. An individual whose head of house is a farmer has a higher propensity of using TC, and the presence of a modern facility within 30 minutes' walk had positive effects on MC use. Religion and marital status did not have any significant impact on utilisation of either types of care. Culture (measured as an index, with higher values indicating increasing negativity toward TM/H) showed negative coefficients. This implies that as negativity toward TC increases, utilisation decreases. Unexpectedly, this was also the case for MC. However, neither coefficient was significantly different from zero. Finally, a dummy variable for the richer GA region was included in the specification, but had no significant effects on utilisation.

The significant value of rho ($p<0.001$) confirms the appropriateness of using biprobit modelling, and the negative sign (-0.64) suggests that MC and TC are substitutes/compensatory – or, put another way, as the use of one form of care rises, use of the other decreases. Thus, there may be some 'crowding out', or displacement, of MC by TC, or vice versa.

Table 9 - Probit and biprobit results, coefficients

	Probit		**Biprobit**	
	MC	**TC**	**MC**	**TC**
Logincome	0.184**	-0.129*	0.191**	-0.129*
	[0.087]	[0.071]	[0.086]	[0.071]
Sex (female)	0.005	0.108	0.038	0.116
	[0.159]	[0.123]	[0.155]	[0.122]
Age 12-17	-0.337	0.273	-0.324	0.279
	[0.277]	[0.224]	[0.283]	[0.225]
Age 18-34	-0.341	0.422**	-0.359	0.432**
	[0.242]	[0.192]	[0.233]	[0.192]
Age 35-54	-0.006	0.618***	-0.085	0.630***
	[0.281]	[0.215]	[0.262]	[0.214]
Age 55+	-0.201	0.542**	-0.249	0.546**
	[0.286]	[0.213]	[0.272]	[0.213]
Serious	-0.223	-0.119	-0.21	-0.12
	[0.162]	[0.122]	[0.162]	[0.122]
Notserious	-0.279	-0.11	-0.274	-0.114
	[0.203]	[0.162]	[0.197]	[0.162]
Notseriousatall	-0.155	-0.706**	-0.053	-0.680**

	Probit		Biprobit	
	MC	**TC**	**MC**	**TC**
	[0.411]	[0.354]	[0.473]	[0.333]
Chronic	-0.066	0.383***	-0.048	0.382***
	[0.162]	[0.136]	[0.154]	[0.135]
Insurance	0.342**	-0.245**	0.377**	-0.249**
	[0.145]	[0.117]	[0.146]	[0.116]
Educprimary	0.153	0.033	0.146	0.054
	[0.220]	[0.169]	[0.221]	[0.170]
Educjuniorplus	0.396**	-0.189	0.394**	-0.176
	[0.162]	[0.131]	[0.160]	[0.131]
Educother	0.154	-0.132	0.169	-0.106
	[0.289]	[0.229]	[0.298]	[0.225]
Christian	-0.138	0.152	-0.121	0.155
	[0.167]	[0.133]	[0.168]	[0.129]
Farmer	-0.132	0.405*	-0.086	0.408*
	[0.255]	[0.214]	[0.248]	[0.210]
Married	-0.273	0.079	-0.271	0.067
	[0.183]	[0.144]	[0.174]	[0.144]
Culture	-0.033	-0.015	-0.028	-0.015
	[0.022]	[0.023]	[0.022]	[0.025]
Urban	-0.049	0.015	-0.026	0.008
	[0.150]	[0.116]	[0.155]	[0.114]
Modernfacility	0.352*	-0.163	0.341*	-0.162
	[0.181]	[0.160]	[0.183]	[0.155]
Greater Accra	0.017	-0.135	0.04	-0.14
	[0.224]	[0.177]	[0.219]	[0.178]
Constant	0.466	-0.278	0.346	-0.303
	[0.494]	[0.393]	[0.476]	[0.394]
Observations	629	629	629	629
Pseudo R2	0.091	0.110		
Rho	0	0		-0.640327
prob>chi2	0.010	0.000		0.000
LL	-195.787	-351.988		-517.6715
AIC	435.5735	747.9755		1125.343
BIC	533.3444	845.7464		1325.329

Robust standard errors in brackets

** significant at 10%; ** significant at 5%; *** significant at 1%*

In order to quantify the magnitude of each variable on utilisation, it is necessary to calculate marginal effects. Table 10 shows marginal effects for independent probits and

four biprobit models (calculated at sex=1 (i.e. males)), each presenting the possible outcomes following estimation. The probit results suggest that a one percent rise in income increases the likelihood of utilisation of MC by 3.0 percentage points, and similarly, decreases the likelihood of using TC by 4.5 percentage points. Age has a greater impact, with those in age categories 18-34, 35-54 and 55+ being 15.4, 22.9, and 20.1 percentage points more likely to use TC than those aged under 12, respectively, suggesting that individuals making choices on behalf of children preferred them to utilise modern medicines over TM. Illness severity is an important variable, with those classed as not-serious-at-all being 19.6 percentage points less likely than those with very serious illnesses to use TC. Chronic illness sufferers have a 13.5 percentage point greater probability of using TC. Insurance has a smaller effect, with a positive impact of 5.9 percentage points and negative effect of 8.7 percentage points for MC and TC, respectively. Higher levels of education are associated with higher utilisation of MC, and belonging to a farmer headed household increases the chances of using TC by 15.1 percentage points. Having a modern facility within 30 minutes' walk is associated with a 6.7 percentage point rise in utilisation of MC.

The biprobit models largely confirm the results in the probit models. In Table 10, biprobit 2 and biprobit 3 represent marginal effects for purely MC and TC use respectively. In these two models, income shows the expected signs, with a one percent rise in income associated with 5.0 percentage point rise in MC and 2.5 percentage point fall in TC. Age plays an important role in explaining modern care use, where older persons are less likely to use MC. No self-reported severity measures were significant. Chronic illness sufferers were 11.9 percentage points less likely to use modern care when utilisation of TC was nil. Insurance plays the expected role in MC and TC utilisation, with a 9.9 percentage point increase in MC utilisation when one is insured. As before, being educated to junior level or over is associated with less TC utilisation, by around 4.5 percentage points, compared to the omitted, 'no education' group.

Biprobits 1 and 4 depict marginal effects for when both MC and TC are utilised and when neither are utilised, respectively. As income rises, individuals use both types of care (MC=1, TC=1) less. This effect is small and insignificant. Older people over 35 are up to 19.7 percentage points more likely to have used both sources of care than younger cohorts, while having less serious illnesses are associated with decreased chances of using both MC

and TC. Unsurprisingly, chronic sufferers are expected to turn to more sources of care. Most marginal effects in biprobit 4 (no utilisation at all) are negligible or very small.

Table 10 - Probit and biprobit results, marginal effects

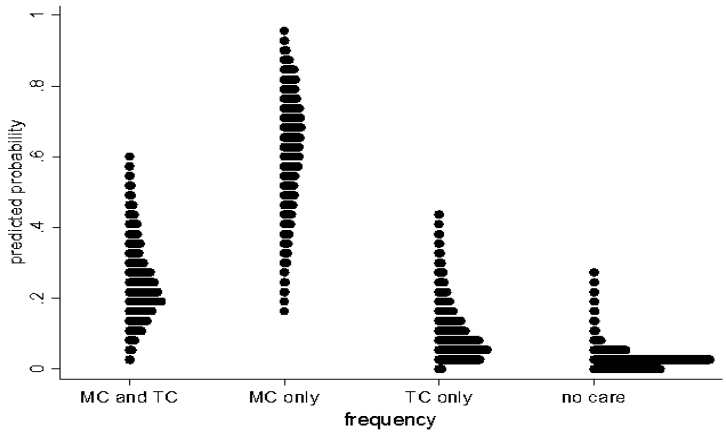
Probit and biprobit results, marginal effects						
	Probit		Biprobit 1 (11)	Biprobit 2 (10)	Biprobit 3 (01)	Biprobit 4 (00)
	MC	TC	MC=1, TC=1	MC=1, TC=0	MC=0, TC=1	MC=0, TC=0
Logincome	0.030**	-0.045*	-0.019	0.050*	-0.025*	-0.007
	[0.014]	[0.025]	[0.021]	[0.023]	[0.010]	[0.005]
Sex	0.001	0.038	0.039	-0.033	0.000	-0.006
	[0.026]	[0.043]	[0.033]	[0.039]	[0.018]	[0.010]
Age 12-17	-0.065	0.1	0.046	-0.109	0.053	0.010
	[0.062]	[0.085]	[0.068]	[0.083]	[0.049]	[0.020]
Age 18-34	-0.063	0.154**	0.091	-0.159*	0.062	0.005
	[0.050]	[0.073]	[0.057]	[0.071]	[0.041]	[0.014]
Age 35-54	-0.001	0.229***	0.197**	-0.211**	0.030	-0.016
	[0.046]	[0.082]	[0.071]	[0.081]	[0.039]	[0.010]
Age 55+	-0.035	0.201**	0.146*	-0.191*	0.051	-0.006
	[0.054]	[0.082]	[0.069]	[0.080]	[0.046]	[0.013]
Serious	-0.036	-0.042	-0.057	0.023	0.017	0.017
	[0.027]	[0.042]	[0.034]	[0.041]	[0.019]	[0.011]
Notserious	-0.051	-0.037	-0.062	0.011	0.024	0.026
	[0.041]	[0.054]	[0.040]	[0.053]	[0.027]	[0.018]
Notseriousatall	-0.028	-0.196***	-0.154**	0.145	-0.026	0.035
	[0.079]	[0.071]	[0.048]	[0.084]	[0.034]	[0.056]
Chronic	-0.011	0.135***	0.111**	-0.119**	0.019	-0.011
	[0.027]	[0.048]	[0.040]	[0.046]	[0.020]	[0.008]
Insurance	0.059**	-0.087**	-0.033	0.099*	-0.052**	-0.015
	[0.026]	[0.042]	[0.034]	[0.039]	[0.019]	[0.010]
Educprimary	0.023	0.012	0.031	-0.009	-0.013	-0.009
	[0.031]	[0.060]	[0.049]	[0.058]	[0.024]	[0.009]
Educjuniorplus	0.061**	-0.065	-0.013	0.075	-0.045*	-0.017
	[0.024]	[0.045]	[0.036]	[0.043]	[0.019]	[0.009]
Educother	0.023	-0.045	-0.015	0.040	-0.019	-0.006
	[0.039]	[0.075]	[0.063]	[0.070]	[0.028]	[0.014]
Christian	-0.022	0.052	0.033	-0.053	0.018	0.002
	[0.026]	[0.045]	[0.038]	[0.041]	[0.018]	[0.010]
Farmer	-0.023	0.151*	0.124	-0.139	0.024	-0.009
	[0.047]	[0.083]	[0.071]	[0.077]	[0.035]	[0.012]
Married	-0.047	0.028	-0.010	-0.038	0.032	0.015
	[0.034]	[0.051]	[0.040]	[0.048]	[0.023]	[0.012]

Probit and biprobit results, marginal effects						
	Probit		Biprobit 1 (11)	Biprobit 2 (10)	Biprobit 3 (01)	Biprobit 4 (00)
	MC	TC	MC=1, TC=1	MC=1, TC=0	MC=0, TC=1	MC=0, TC=0
Culture	-0.005	-0.005	-0.007	0.003	0.002	0.002
	[0.004]	[0.008]	[0.007]	[0.008]	[0.003]	[0.002]
Urban	-0.008	0.005	0.000	-0.004	0.003	0.001
	[0.024]	[0.040]	[0.034]	[0.038]	[0.018]	[0.009]
Modernfacility	0.067*	-0.059	-0.008	0.074	-0.048	-0.017
	[0.040]	[0.059]	[0.047]	[0.053]	[0.029]	[0.017]
Greater Accra	0.003	-0.047	-0.037	0.044	-0.009	0.003
	[0.036]	[0.061]	[0.052]	[0.057]	[0.025]	[0.013]

**marginal effects for biprobit calculated for sex==1 (male); Robust standard errors in brackets*
** significant at 10%; ** significant at 5%; *** significant at 1%*

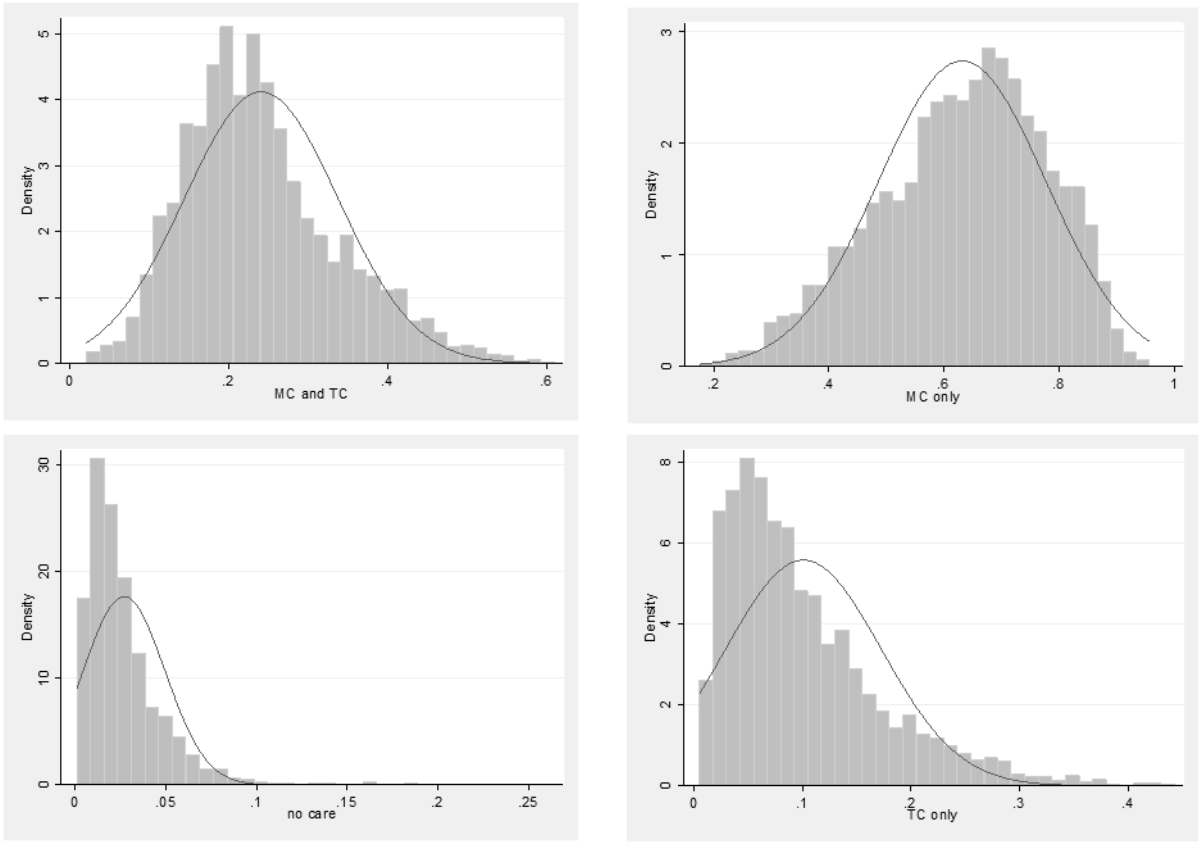
A dotplot of bivariate outcomes is given in Figure 6 which illustrates how the probability of using different combinations of care differs among the sampled population. Given need, the probability of using only MC is highest, followed by use of MC and TC together, then TC only. The likelihood of using no care is very low, shown as a high frequency of zero probabilities. The raw data confirm this to be the case; of 741 individuals with need for care, only 20 did not obtain any form of care (representing 2.7% only). The same idea is represented in Figure 7 (average effect of income on the predicted probability of utilisation of various types of care) in which histograms show right skews for no care and TC only, a left skew for MC only, and a slightly right skew for use of both MC and TC.

Figure 6 - Dotplot of predicted probabilities for types of care



**Source: author's own*

Figure 7 - Histograms for density plots for types of care



**Source: author's own*

As a further confirmation of responsiveness of utilisation according to income, elasticities were calculated following the probit and biprobit models (Appendix 21). In the probit model, MC, both with and without control variables, display positive income elasticities and TC have negative income elasticities. This strongly suggests that modern care is a normal and necessary good, as rising income is associated with rising utilisation. On the other hand, TC is an inferior good, indicating that as income rises, utilisation falls. The results from the biprobit model also show this, as, excepting one case (MC=1, TC=1 with controls), those utilising any form of traditional care and no care from any source display negative income elasticities while those who utilise modern care generally view this as a normal good.

Ordered logit results

When utilisation of MC is analysed by choice order, results suggest rising income to have a positive effect on choice of MC as a first provider, while choosing it second, third or never

is associated with decreasing income (results not presented here). However, only education and age are shown to have significant effects. Specifically, older groups are up to 14.4 percentage points less likely to use modern care as a first choice than the omitted age group (under 12), but as second and third choices MC is favoured, as denoted by positive coefficients. Moreover, younger age groups (12-17; 18-34) have the highest chances of not using MC, although this trend is not linear as the oldest group also has a high probability of not using any MC.

Turning to marginal effects for TC (Table 11), the importance of income is clear. As income rises, the likelihood of TC as a first choice decreases; with every one percent rise in income, the likelihood of using TC first falls by 1.9 percentage points. This pattern holds for second and third choices also, and is confirmed by the positive coefficient on having never chosen TC. TC is more often utilised as a first choice for older populations, in particular those aged 35-54 and 55+, with 9.6 and 8.1 higher percentage points than the under 12 category respectively. Children under 12 are therefore inclined not to use TC at all. This is an interesting finding because adults, who are the main care takers of children, appear to be taking dissimilar actions to that of their children. The severity variables show those categorised as having diseases with the least severity are less inclined than those with very serious illnesses to use TC in the first, second or third instances. In fact, those with illnesses that are not serious at all are 17.5 percentage points more likely to have never chosen TM than their very serious counterparts. Individuals with chronic illnesses seem to turn to TC more than those without, suggesting that they are willing to try multiple sources of care when illnesses are predicted to have long term consequences. Unlike the MC results, education does not seem to have any significant effects on choice ordering, but signs are suggestive of higher education levels being associated with less possibility of TC as a first source. All other predictors of utilisation show expected signs, but are not statistically significant from zero. Rather than being of intrinsic interest per se, these variables are included as controls and demonstrate that income is still strongly associated with choice ordering. The model passes the Brant test for 'parallel slopes'[62] of coefficients.

[62] The ologit model specification implies that each 'model' can be estimated one at a time, each with its own constant term and therefore the same slope vector (Greene,2003).

Table 11 - Marginal effects of ordered choice, TC

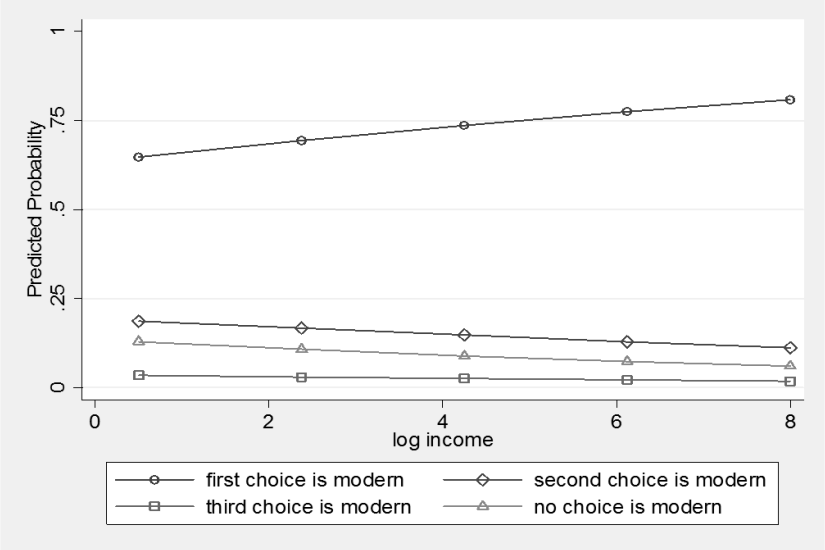
TC	1st choice		2nd choice		3rd choice		Never chosen	
	Margeff.	Std. err.	Margeff.	Std. err.	Margeff.	Std. err.	Margeff.	Std. err.
Logincome	-0.019*	0.009	-0.027*	0.012	-0.005*	0.002	0.052*	0.023
Sex	0.011	0.016	0.016	0.022	0.003	0.004	-0.030	0.041
Age 12-17	0.050	0.045	0.060	0.046	0.009	0.006	-0.119	0.096
Age 18-34	0.058	0.034	0.072	0.037	0.012*	0.006	-0.141	0.075
Age 35-54	0.096*	0.041	0.108**	0.039	0.016**	0.005	-0.219**	0.082
Age 55+	0.081*	0.039	0.093*	0.038	0.014**	0.005	-0.188*	0.080
Serious	0.000	0.015	0.000	0.021	0.000	0.004	0.001	0.040
Notserious	0.005	0.022	0.007	0.030	0.001	0.005	-0.014	0.057
Notseriousat	-0.057**	0.021	-0.096*	0.042	-0.022	0.012	0.175*	0.074
Chronic	0.047**	0.018	0.063**	0.023	0.011*	0.005	-0.121**	0.043
Insurance	-0.031	0.016	-0.042	0.022	-0.008	0.004	0.081	0.041
Educprimary	0.005	0.021	0.007	0.029	0.001	0.005	-0.012	0.055
Educjunior+	-0.019	0.016	-0.027	0.022	-0.005	0.004	0.051	0.043
Educother	-0.009	0.025	-0.014	0.038	-0.003	0.007	0.026	0.071
Christian	0.023	0.015	0.033	0.021	0.006	0.004	-0.062	0.040
Farmer	0.058	0.037	0.069	0.036	0.010*	0.005	-0.138	0.076
Married	0.006	0.017	0.008	0.023	0.002	0.004	-0.016	0.045
Culture	-0.002	0.003	-0.002	0.005	0.000	0.001	0.005	0.009
Urban	-0.007	0.014	-0.010	0.020	-0.002	0.004	0.019	0.038
Modernfac	-0.019	0.024	-0.026	0.030	-0.005	0.005	0.050	0.058
Greater Accra	-0.005	0.021	-0.007	0.029	-0.001	0.005	0.014	0.055
N	629		629		629		629	

Robust standard errors presented

** significant at 10%; ** significant at 5%; *** significant at 1%*

The results from the ordered logit analysis are perhaps more intuitively depicted as connected scatter graphs. Predicted probabilities for choice ordering of MC and TC are plotted at evenly selected points of log income in Figure 8 and Figure 9 respectively. Overall, individuals are most likely to utilise MC, and the probability of using it first rises with income. The probability of using MC second is not as high as using it first, and appears to decrease marginally with income. Generally, the choice not to use MC at all is more likely than using it as a third choice, and probabilities of both decrease with income, thus poorer individuals are more likely to use MC second, third or never rather than first (as is the case for the rich).

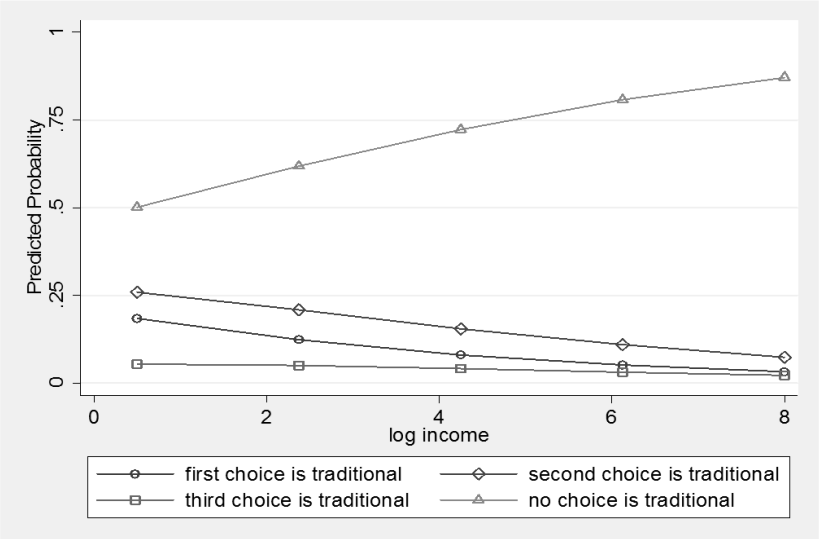
Figure 8 - Predicted probabilities, MC



**Source: author's own*

The overarching line at the top of the Figure 9 shows how the probability of choosing no TC is high for everyone, whether poor or rich, but the likelihood rises with income. Even among users, TC utilisation is mostly used as a second choice rather than a first, confirming the descriptive analysis. The probabilities of utilisation first, second and third all fall with income but the decreasing gradient is steepest for utilisation second, which signifies the importance of TC as a back-up option for the poor, more so than for the rich.

Figure 9 - Predicted probabilities, TC



**Source: author's own*

3.5 Discussion

This study found income to be significantly associated with MC and TC utilisation. It has also shown that modelling the two systems together is more methodologically and theoretically sound in medically pluralistic societies. In the biprobit, rising income is associated with MC use while decreasing income is associated with TC use - a one percent rise in income associated with 5 percentage point rise in MC and 2.5 percentage point fall in TC. Moreover, as income rises, individuals are less likely to use both types of care simultaneously. If the systems are seen to be substitutes, an increase in utilisation of one type of care decreases the utilisation of the other. More specifically, as income rises the utilisation of MC is more likely, whereas the probability of TC falls. This is confirmed by income elasticities of utilisation, which show MC to be a normal and necessary good, whereas TC is an inferior good. If, on the other hand, systems are seen to be compensatory, it is possible to take the analysis one step further to show patterns of health-seeking, whereby people will exhaust certain systems first before moving onto the next. In this case, rising income is associated with the increased likelihood of using MC first as opposed to second, third or never, and similarly increases the probability of never using TC. In fact, Chappell and Blandford (1991) argue that a third type of model, the complementary model, can be seen as a blend of substitute and compensatory models because both systems are used when one proves insufficient. These results illustrate well how different types of care interact in medically pluralistic societies.

Perhaps surprisingly the analysis has also shown that for any given level of income (including poorer quintiles), TC is not the first choice, but becomes more frequently used once second and third order choices are taken into account. Similar patterns of resort have been found by Mwabu (1986). This ordering shows the clear rationality of people's health-seeking behaviour, in that the poor recognise modern medicines are likely to be more effective but in the absence of being able to afford it multiple times, opt for TC. Thus, the rich are more likely to utilise MC, owing to their greater means to access (Khan, et al.,2006; UN Millennium Project,2005). The study also supports the 'healer shopping' phenomenon (de Graft Aikins,2005), as it is evident that an array of different providers is called upon for a given illness. The probability of using only MC is highest, followed by use of MC and TC together, then TC only. Optimistically, the likelihood of using no care is very low, although it may be the case that there is some recall bias (where individuals remember better

having an illness if they utilised some care), such that levels of need were higher than actually recorded.

In addition to income, other variables of interest include age, severity of disease and whether the illness is chronic. These are vital 'need' factors, so called because the nature and incidence of illness and subsequent utilisation are principally determined by age (younger and older people tend to be more vulnerable), severity (displaying severe symptoms might encourage an individual to seek care from certain sources, or more immediately than otherwise) and chronic illness (longer term conditions equate larger direct and indirect costs of medicines utilisation, which may push people to seek alternative forms of care). It is therefore unsurprising that these variables are significantly associated with utilisation of either type of care, and the importance of income with respect to these need variables should be further explored. Non-need factors such as insurance and distance from modern facility are also strong predictors of provider choice, which indicates some inequities in utilisation even when need variables are controlled for.

Care-seeking from multiple providers is common (Ahmed, et al.,2001) and thought to arise from previously failed diagnosis or treatment (Moses, et al.,1994), and search for better quality (Bhatia & Cleland,2001). However, by using many providers, individuals are engaging in polypharmacy (consumption of multiple drug regimens). Asides from 'pill burden' (hassle of having to take multiple regimens), polypharmacy potentially leads to dangerous side effects/adverse drug reactions and inhibits the effectiveness of some drugs (eg Mills, et al.,2005; Winslow & Kroll,1998). Such issues are especially acute for individuals with many medical conditions or those on long term medication. Further, studies have shown the rate of compliance falls as individuals take more medicines (Zarowitz, Stebelsky, Muma, Romain, & Peterson,2005), ultimately leading to wasted medicines and greater pressure on both individual and national finances. With levels of spending on medicines already reaching very high proportions of household expenditure (Xu et al.,2003) policymakers must search for ways to pinpoint sources of dissatisfaction with different providers to reduce the number of sources and increase effective choices.

The question remains as to why utilisation of TM/H generally increases at the second or third source. Three explanations are offered by Sato (2012c). Firstly, the revelation of TM/H use is closely guarded. People commented that doctors do not like or think lowly of traditional or herbal practices which discouraged revelation. Secondly, some do not see it

as a 'source' at all because it is already part of their daily lives – many use TM as vitamins or dietary supplements – so may fail to mention it. Thirdly, the use of medicines is known to be disease-specific so the use of TM is directly related to the symptoms experienced. All of these reasons could have led to under-reporting. Further investigations looking at disease or need standardised choices and reasons for dissatisfaction with first providers would partly answer these queries.

The study has shown that it is predominantly the poor who use TC. In light of disproportionate spending on MC which is biased against the poor (Gwatkin, et al.,2007; Gwatkin,2000), this gap may further widen, to a point where users of MC are predominantly rich and the poor exclusively use TC. To avert such widening inequalities, urgent diversion of resources toward increasing access to MC for the poor is required.

3.6 Conclusion

In conclusion, this study has shown that when MC and TC utilisation are modelled together, income affects choice of provider, with rising income associated with greater use of MC and decreased use of TC. Patterns of health care-seeking behaviour differ with income, as individuals choose providers in a sequential manner: both the poor and rich most frequently seek care from modern sources first, but the poor are more likely to turn to TC for the second source. Given these findings, it is imperative that future research takes into account the depth, or degree, of inequality of utilisation of MC/TC across income groups. Such research would be of even more merit if panel data or longitudinal data were used to map changes over time.

Procedural constraints

What explains variations in levels of satisfaction following TM/H utilisation?[63]

Abstract

While TM are widely used and popular in many parts of the world, little is known about why this is the case, especially given lack of scientific evidence of its efficacy. This paper explores the possibility of hedonic placebo effects within traditional medicines, defined as subjective well-being effects from the *processes* of utilisation, namely the rituals and healing processes carried out that accompany consumption. Findings show that well-being effects of processes of medicine consumption hold even after controlling for self-reported health. Results are tested for robustness through sample selection models (SSM) and alternative outcome measurements.

[63] This Chapter is based upon a co-authored paper entitled 'The hedonic placebo effect of traditional medicines' in the LSE Health Working Papers Series (no.28, with Joan Costa-i-Font). The paper is also under review at *Rationality and Society*.

4.1 Introduction

TM/H play a very important role within health care systems of many developing countries (World Health Organization,2002). A large proportion of SSA continues to utilise this form of care for a variety of reasons, despite the fact that most medicines consumed are not scientifically tested or approved. This has led to a division within both policy and research arenas, between those who claim TM are used by people who fail to access, afford or find available modern medicines (Willcox & Bodeker,2004), and those who argue that TM can never be replaced by modern medicines given cultural constraints (Helman,2000; Kleinman,1980; Rivers,1924). This paper shows that these divergent views might partially be reconciled if we take into account the utility ('subjective well-being') people gain from the processes involved in the consumption of TM/H. This is termed the 'hedonic placebo effect'[64], through which people who decide to act by sourcing TM are more likely to feel satisfied to have done something, even if they experience little or no utility from self-reported health outcomes. In the case of untested, unregistered and unregulated TM, this concept rings even truer: taking action, in and of itself, appears to have some value, in addition to (somewhat indeterminate) health benefits.

This method of analysing satisfaction is a clear departure from conventional studies in two ways: firstly, instead of focusing on satisfaction derived from outcomes (level of outcome utility, OU), emphasis is placed on the utility gained from the process. This follows closely the work of Frey and colleagues (Frey, Benz, & Stutzer,2004; Frey & Stutzer,2005) who measure and coin the term 'procedural utility'[65] (henceforth PU). The process in question here is whether, in addition to consuming herbal medication, an individual has undertaken other rituals or healing processes such as prayers, incantations, meditation, massage, touch therapies, religious activities, body-mind therapy or folk therapy. Such processes are argued to be an important aspect of utility for sick individuals, and shown to be evidence of the service provided by healers. To the authors' knowledge this is the first study to have quantified this aspect of TM

[64] The 'placebo effect' term is borrowed from medical literature. Under the placebo effect, inert substances have psychological effects, inducing individuals to report that they feel better or relived of symptoms. We are grateful to an anonymous reviewer for suggesting the 'hedonic placebo effect' term as applied here.

[65] Frey et al are among the first to quantify, though not conceptualise: the idea of procedural justice is old, harking back to Bentham (1789).

utilisation. Secondly, the study takes advantage of outcome measures, as measured by five dimensions on health, as OU controls. Previous studies exploring satisfaction with TM have merely asked for satisfaction rates without quantifying health dimensions, making it difficult to differentiate between sources of satisfaction. Adopting these methods allows for the analysis of TM/H from a previously unexplored angle.

Data collected from households in two regions of Ghana are used to elucidate these points. Using satisfaction with life as a proxy for utility from utilisation, individuals attain higher levels of subjective well-being if rituals or healing processes have been carried out. This PU is directly measured against OU, through which we can determine some evidence of a hedonic placebo effect. Even after controlling for severity of illness, financial capabilities, societal environment and locational characteristics (collectively termed 'control variables'), the significance of PU pertains. Results also remain largely robust to sensitivity checks in which different outcome and satisfaction measures are tested. The study has important policy implications for the measurement and analysis of satisfaction and the foundation of medicines policies, which are currently based on proving scientific merit rather than recognising that individuals gain utility from the processes involved in its consumption (Ministry of Health,2007; World Health Organization,2002).

The following section provides the background to TM utilisation and the concept of PU, with examples to illustrate. The application of PU to TM utilisation is provided within. Section 4.3 outlines the empirical strategy, which includes the statistical model and data description. Results are discussed in section 4.4, alongside an array of robustness checks. Discussions and policy implications are presented in section 4.5 before the paper concludes in section 4.6.

4.2 Background

The literature has previously explored possible reasons for the continued use of TM/H. Among the more prominent are explanations linked with better accessibility, acceptability, affordability and availability over modern medicines (Anyinam,1987; World Health Organization,2002). The acceptability component presents the view that illness is conceptualised according to health beliefs, opening up the possibility that causes and cures may differ from that offered by modern medicines. Indeed, the

anthropological literature is awash with explanations to support this view (Evans-Pritchard,1937; Kleinman,1980; Rivers,1924; Twumasi,1979b).

Healers and TM are sometimes purposively chosen for particular conditions for which skills and/or medicines are effective at relieving symptoms. Examples of this include herbal remedies for malaria (Willcox & Bodeker,2004), HIV (Mills, et al.,2005) and lower back pain (Gagnier, van Tulder, Berman, & Bombardier,2007). Indeed, two extremely common pharmaceutical products, quinine and artemisinin, originate from indigenous medical systems (Muthaura, Keriko, Derese, Yenesew, & Rukunga,2011) and roughly 25% of all modern medicines are derived from herbal/medicinal plants[66] (World Health Organization,2011, p. 3), serving to illustrate the biomedical properties of some plants. Yet, for the most part, biomedical evidence on the efficacy of TM is patchy, with a significant body of literature pointing out the dangerous effects of TM/H (Dada, Yinusa, & Giwa,2011; Liu,2007; Smyth, Martin, & Cairns,1995). As such, to date, literature fails to capture completely why people continue to use TM when most remedies are not scientifically proven effective.

Studies on satisfaction from utilisation also give rise to mixed evidence. One report analysing satisfaction with health providers in Ghana, as measured by the 'percentage of patients who report being satisfied with the services received at last visit' indicates that TH attendees were most satisfied (65%), followed by private sector patients (56% for private doctor, 51% private facility) while public facilities were rated less highly (49% public hospital or clinic) and mission hospitals fared the worst (39%) (Center for Pharmaceutical Management,2003, p. 43). On the other hand, Peltzer et al (2008) show non-herb users have slightly higher levels of satisfaction than herb users, a finding reflected by Stekelenburg et al (2005) who report an 89% satisfaction rate after hospital treatment versus 74% after utilisation of TH. Ezeome and Anarado (2007) report that in Nigeria, 68.3% of TM/H users were disappointed, with over 21% of users reporting various unwanted effects. However, levels of satisfaction with TM/H use are not necessarily related to perceived or actual effectiveness. A study in Pakistan shows 84% of patients using TM/H were satisfied or very satisfied, but only 57% thought treatment was effective (Tovey, Broom, Chatwin, Hafeez, & Ahmad,2005, p. 246). Further, compared to medical specialists who scored 96% for satisfaction and

[66] The figure is 60% for anti-tumoral and antimicrobial medicines (World Health Organization,2011, p. 3).

94% for effectiveness, TM/H fares badly for outcome. Overall, such studies give rise to divergent satisfaction rates because they are measuring different aspects of satisfaction and are thus unable to separate between utility gained owing to health outcomes and utility gained from the service provided by healers.

This paradox of the users' 1) inability to qualify and quantify scientifically the merits of TM/H; and yet 2) still reporting persistent use alongside varied satisfaction rates, highlights the need to look for sources of utility other than from aspects related to outcome. PU is here offered as a possible tool of analysis.

Within economics, PU has been tested by the likes of Bruno Frey for whom not merely the 'ends', but 'means' - the 'how' as well as the 'what' - are valuable in their own right. This is in contrast to the positivistic movement of the 1930s in which only tangible outcomes were all that mattered in explaining well-being. Frey et al (2004) suggest three ways in which PU differs from 'conventional' OU: firstly, at the core of PU is its hedonic nature, in which 'utility is understood as well-being, pleasure and pain, positive and negative affect or life satisfaction' (Frey, et al.,2004, p. 379). As such, the existing work on the economics of subjective well-being (Easterlin,1973; Layard,2006; Oswald,1997; Stevenson & Wolfers,2008) is very much in line with PU in that this body of literature equates subjective well-being with utility. Secondly, people have a sense of 'reflexive consciousness' so care about how they are perceived and in turn, how they perceive others. In essence this means that assessments are endogenous to an individual's utility function (Frey & Stutzer,2001). Thirdly, PU incorporates a non-instrumental aspect, where people amass utility according to how they are treated (with respect, or with equal rights, for example). This is in sharp contrast to traditional utility measurement which takes into account solely instrumental values. These three dimensions amalgamate to define PU as 'the hedonic well-being people gain from the quality of treatment in institutionalised processes as it contributes to a positive sense of self' (Frey, Benz, & Stutzer,2002, p. 4). Examples from the fields of politics and economics are found in Benz and Stutzer (2004); Benz and Frey (2008); Stutzer and Frey (2006) and Lind and Tyler (1988).

It follows that theories from cognitive behavioural theory/social psychology are central to understanding where people derive utility from, and how intrinsic motives serve these needs. In self-determination theory, Deci and Ryan (2000) put forward

three motives: autonomy, relatedness and competence. Autonomy ('rule by self') refers to the value an individual attaches to be 'psychologically free': an individual appreciates the ability to express his own feelings and wants, to pursue personal interests but all the while maintaining social support[67]. Relatedness describes the need of individuals to feel wanted and connected, 'feeling loved and cared for'. Utility is accrued from social connections and overt ability to 'fit in' with society. Thus, individuals conforming to the social norm are likely to feel higher levels of relatedness particularly in societies with strong localised communities or where societies are closely integrated. Competence is the intrinsic motivation gained through positive affirmation of oneself by others, such as encouragement or supportive feedback. Deci and Ryan (2000, p. 231) state that the satisfaction of these three needs are; 'essential for the healthy development and well-being of all individuals regardless of culture'. These three motives may therefore be seen as the underlying traits of PU, because individuals inherently try to fulfil these needs and, in line, gain utility according to whether they have been satisfied.

The placebo effect

The placebo effect purports individuals experience perceived or actual improvement in health following consumption of inert substances. Common explanations for the effect include psychological benefits (positive thinking and instilling hope and expectation) and neurological responses such as the release of endorphins (natural pain killers in brain) or dopamine ('fight or flight' reaction) (Benson & Friedman,1996; de la Fuente-Fernandez et al.,2001; Wampold, Minami, Tierney, Baskin, & Bhati,2005). In the mid twentieth century, Beecher (1955) evaluated from 15 studies an average 35% of 'medical effectiveness' of drugs were due to the placebo effect, while Moerman (1983) similarly evaluates 31 studies on ulcer treatment and claims figures of up to 90%. Another, more recent study, found that patients showed signs of improvements in health even when told the pill was placebo ('honest placebo') (Kaptchuk et al.,2010). These studies show that the total effectiveness of drugs is the sum of much more than just its pharmacological properties. For example, individuals may value good quality patient-practitioner interactions (the 'practitioner effect'), or other processes involved in utilisation.

[67] Thus, autonomy does not mean independence per se, as it relies on social backing and endorsement.

However, the placebo concept itself is not without criticism. Kienle and Kiene (1997) argue that a range of factors can explain why individuals feel better for having used inert substances. Among these, spontaneous improvement, fluctuation of symptoms, additional treatment and neurotic or psychotic misjudgement serve as possible biological explanations, while statistical and methodological issues are also raised in the form of: irrelevant response variables; answers of politeness; and conditioned answers. Although these ideas fall outside the scope of this study, placebo effects – both biological and psychological in nature - are a possible source of utility especially for TM/TH use which remains largely clinically untested.

PU and traditional medicines

Adler and Hammett (1973, p. 595) argue that much of the placebo effect in healer use is psychological and arises due to individuals' need for 'participation in a shared cognitive system' and 'access to a relationship with a culturally sanctioned parental figure' because individuals to place symbolic and psychological values to medicine and healing (Adler & Hammett,1973; Helman,2000). The continued utilisation of TM/H can partly be attributed to healers' culturally sensitive approaches to treatment and ability to align themselves with the 'cultural outlook' of their patients, often referred to as 'holistic' in nature (van der Geest,1997). Frequently healers are personally invested and involved, willing to spend much time and effort to understand all aspects of an individual's life and not merely acting as an agent in the identification of illness or disease (Helman,2000) such that visiting a healer can be seen as a social function. Healers are often highly respected individuals who occupy a social niche and instil trust in others (see Paper 1; Adler & Hammett,1973). Examples of healer care beyond provision of herbal products include religious and non-religious acts such as: prayers, incantations, bloodletting, animal sacrifice, divination, speaking in tongues and in the case of spiritual illness, standing as an intermediary between the individual and spirit (Rivers,1924; Stekelenburg, et al.,2005; Tabi, et al.,2006; Winkler et al.,2010). Such rituals and healing processes provide a mechanism to explain and control the unknown (Adler & Hammett,1973). Additionally, some plants must be prepared specially by healers to make the herbs effective, even when the actual substance remains unchanged (see Kareru et al, 2007). For example, Yoruba practitioners in Nigeria must sing to their medicines before administration (from van der Geest, et

al.,1996) and further, medicines are unusable unless individuals believe that they will work (Tabi, et al.,2006). All these processes contribute to increasing an individual's faith in the healing power of TM/H.

The utilisation of TM/H therefore fulfils psychological, social and protective functions (Adler & Hammett,1973). TM/H users experience peace of mind, emotional and spiritual well-being, over and above possible health benefits of the herbal products (Winkler, et al.,2010) and having an understanding and empathic healer is an important aspect of TM/H utilisation (Adler & Hammett,1973; Moerman,1979; Price,1984; van der Geest, et al.,1996). This is corroborated in a study that reveals, even having controlled for baseline quality of life scores and heterogeneous variables across sites, individuals taking medication for HIV/AIDS from TH report higher quality of life than those who sought drugs at a western medical infrastructure. The authors suggest that healers are better able to 'provide psychosocial support and a familiar cultural context for health care' (Taylor, Dolezal, Tross, & Holmes,2008, p. 555). Such reasons also likely explain the popularity of TM as a backup option, used when other treatments have proved ineffective or deficient (Sato,2012c): palliative care and sympathy are more likely to be forthcoming from healers who have extensive knowledge of the patient and are socially invested in them.

The nature of interaction between patient and healer extends to mode of payment. Healers are known to provide different payment contracts based on ability to pay (Asenso-Okyere,1995; Hausmann Muela, et al.,2000) and outcomes (Leonard & Zivin,2005), as they are able to exploit the informal networks within which they work: societies in which mutual accountability is high are amenable to TM/H use and further, such arrangements are shown to be economically rational. Whether due to culture or payment flexibility, the upshot is identical: when individuals use TM/H, some utility is gained from certain processes involved in its consumption that would otherwise not pertain from modern systems. Rather than utility from health outcomes per se, there is some value specific to the process of utilising TM.

The above discussion suggests that intrinsic concerns and PU therefore arising are of greater concern over OU and a testable hypothesis can be formulated:

The utility derived from utilising TM/H with rituals leads to greater levels of satisfaction than without, because individuals recognise PU. Such PU pertains even when controlling for OU, giving rise to a hedonic placebo effect.

4.3 Empirical strategy

4.3.1 Data

Data are sourced from household questionnaires undertaken by research assistants in late 2010 in two regions of Ghana. A standardised sampling methodology, approved and frequently used by the World Health Organisation, was used (see Appendix 8). In each region, two districts are selected (district capitals plus the least populous), from which references points are chosen. Using each reference as the centre, three clusters ('radii') are mapped according to distance, and household clusters are targeted for interviews. Researchers travel in random directions within radius clusters, and choose households common to the area and in line with other specified criteria. A representative household is then labelled as the starting point, and subsequent households are interviewed so long as they were: at least five apart; similar to the representative household; private, not public buildings; and in separate compounds. Researchers must return at least once to empty or busy households and obtain information from an appropriate respondent.

In sum, information on 4713 individuals from 772 households was collected, using 16 reference points. For the purposes of this paper, relevant data include health needs, socio-demographic information, sources and nature of treatment, and various dimensions of self-reported satisfaction.

Dependent variables – life satisfaction

The measurement of utility using self-reported satisfaction is increasingly accepted in economic literature (Ferrer-i-Carbonell & Gowdy,2007; Kahneman, Wakker, & Sarin,1997). Life satisfaction is measured for all users of TM/H by asking respondents the following question: 'on a scale of 0 to 10, where 0 indicates absolute dissatisfaction and 10 indicates absolute satisfaction, please indicate (*first name*)'s overall level of satisfaction with life after utilising TM/H'. Respondents were aided by a horizontal visual representation of the scale, but more importantly, the question was thoroughly

explained by a trained research assistant to entice accurate answers from respondents, and internally validated through the use of multiple alternative, similar questions.[68] The answer was then taken to be a proxy for utility (subjective well-being).

Independent variables

The main independent procedural variable is termed 'ritual', denoted '1' if the respondent answered, given need, 'yes' to the question: 'did you/the TH carry out any rituals or healing processes?' (acupuncture, meditation, incantations, massage, touch therapies, religious activities, body-mind therapy, folk therapy) and '0' otherwise.

The main independent outcome variables of interest are obtained from indicators collectively referred to as EuroQol 5 Dimensions (EQ5D), which enquires about 5 dimensions of health: mobility, self-care, usual activities, pain/discomfort and anxiety/depression, on three possible levels – none (level 1), some (level 2) and severe (level 3) – before and after utilisation. For the purposes of this study, one indicator for the main model plus two additional indicators are derived to test for robustness: firstly, whether the individual felt better following utilisation, per dimension, where '0' indicates no change or individual got worse (e.g. individual stated level 2 before and level 2 after, or individual stated level 1 before but level 3 after) and '1' indicates that the individual felt better (e.g. individual stated level 2 before, and level 1 after). The second indicator states the absolute level of problem, where '0' indicates no problems at all (level 1) and '1' indicates some or severe problems (levels 2 or 3). These variables are termed 'mobility_abso'; 'selfcare_abso'; 'activity_abso'; 'pain_abso'; and 'anxiety_abso'. The third indicator is an attempt to arrive at a single utility score combining these five dimensions. As there are 3 possible choices per dimension, an individual can be assigned a corresponding score based on a 'tariff' (see Szende, Oppe, Devlin, & EuroQol Group.,2007) where '0' indicates a state 'as death' and '1' shows full health. Although considerable debate surrounds the specificity and appropriateness of using pre-assigned value sets for differing

[68] For example, 1) 'how satisfied was (*first name*) with the outcome? With answers ranging from very satisfied to very dissatisfied and 2) please indicate (*first name*)'s overall level of satisfaction with health after utilising the TM/H. A very high correlation between all three answers were achieved, indicating that asking the same question in different ways did not yield dissimilar results.

populations (Parkin, Rice, & Devlin,2010), it is used here only as an additional robustness check[69].

A brief outline of remaining control variables is given here, with fuller descriptions and explanations to be found in Appendix 22. Two dummy variables characterising illnesses are included: 'severity' serves as a proxy for self-reported health (denoted 1 if individuals believed the symptoms to be very serious; 2 serious; 3 not serious or not serious at all) and type of illness (chronic or not). Two measures of *financial capability* are additionally included; log equivalised income, calculated using a formula taking into account number of children and adults in the household, and a dummy to indicate whether the individual holds health insurance. Indicators of *societal environment* are also added: 'culture' indicates an index of cultural attitudes and beliefs toward TM/H[70], while 'community group' asks whether anyone in the household belongs to a community group ('0' no '1' yes) in order to assess the level of social interaction. Other *socio-demographic* variables include: sex ('0' male '1' female); highest level of education completed or currently attaining ('education_cat'; '0' none, '1' primary, '2' junior, '3' senior+); occupation ('occupation'; '1' farmer, '2' office worker, '3' own business owner or '4' unemployed); religion ('religion': '1' Christian, '2' Muslim, '3' other or '4' none), the age group within which the individual falls ('ageg': '1' 0-11; '2' 12-17; '3' 18-34; '4' 35-54; '5' 55+), whether the individual is married ('married' '0' no '1' yes) and the relationship to the head of the household ('head_cat': '1' head; '2' spouse; '3' child; '4' other). Finally, two *locational dummies* are incorporated into the model: 'urban', denoted '1' if the household is located in one of two district capitals and '0' otherwise and lastly, a regional dummy ('0' GA; '1' UW).

4.3.2 Model

An ordered probit specification that allows for multiple, ordered dependent variables assuming a normal distribution (Greene,2003; Jones,2007) is employed. This is appropriate when outcomes can be viably classed in a natural order. Life satisfaction

[69] There are no existing value sets for Ghana, so Zimbabwe's is borrowed to be indicative of sub Saharan value sets. In Zimbabwe's tariff, a 33333 problem set (i.e. individual has severe problems in every dimension) corresponds to a utility score of -0.145 and 11111 is assigned the value 1.

[70] Individuals were asked to rate their level of agreement about certain attitudes and beliefs related to TM/H and this was made into an index. Higher values indicate more negative cultural attitudes toward TM/H.

is scaled between zero and ten, with zero representing 'absolute dissatisfaction' and are measured on an ordinal scale, used to express an underlying latent variable y*, where y* infers the individual's 'true satisfaction'. This assumes ordinal interpersonal comparability, whereby someone who answers '8' is happier than someone answering '4', but not necessarily twice so (Ferrer-i-Carbonell & Gowdy,2007). Threshold values (τ_i) represent cut-off points where an individual moves from belonging in one satisfaction level to another. Where the lowest (highest) possible value of the threshold is minus (plus) infinity, and a constant term is suppressed[71], it is possible to model an eleven (0-10 inclusive[72]) category ordered probit thus:

$P(y_i = 0|x_i) = \phi(\tau_0 - x_i\beta)$

$P(y_i = 1|x_i) = \phi(\tau_1 - x_i\beta) - \phi(\tau_0 - x_i\beta)$

$P(y_i = 2|x_i) = \phi(\tau_2 - x_i\beta) - \phi(\tau_1 - x_i\beta)$

$P(y_i = 3|x_i) = \phi(\tau_4 - x_i\beta) - \phi(\tau_3 - x_i\beta)$ .... for every y_i until

$P(y_i = 10|x_i) = 1 - \phi(\tau_9 - x_i\beta)$

βs and τs are to be estimated with robust standard errors (clustered by radius to account for sampling methodology), ϕ represents the probit link function, and estimation is by maximum log likelihood. Coefficients have a qualitative interpretation only: a positive coefficient indicates an individual will display higher latent satisfaction and is therefore more likely to report higher levels of satisfaction whereas a negative coefficient implies the opposite. To quantify magnitudes, marginal effects for any level of outcome can be calculated, with regressors set at mean values. Specifically, a one unit increase in the variable (or being in the category as opposed to the omitted counterpart(s) if it is a dummy variable) is associated with changes - in percentage point terms – of achieving a certain level of satisfaction. Additionally, the change in probability for any given points of an independent variable can be derived and plotted. For example, it is possible to calculate the change in probability of attaining any outcome level when an individual hypothetically moves from not having rituals or healing processes (rituals=0) to having some (rituals=1).

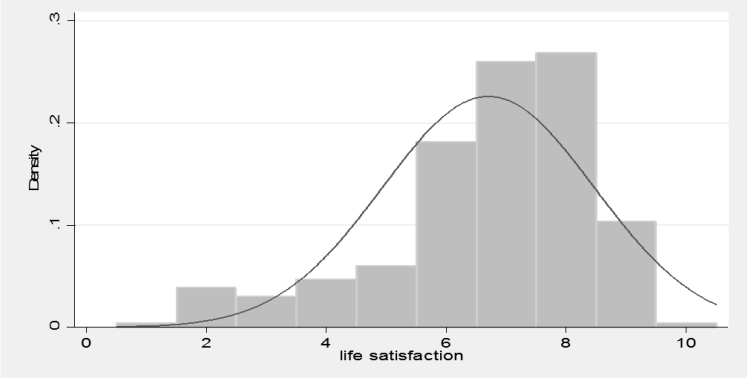
[71] Alternatively the first threshold could be set to zero.
[72] Although no zero values were actually observed.

4.4 Results

4.4.1 Descriptive data

On the full scale, satisfaction levels of 8, 7 and 6 are the most commonly stated numbers and mean life satisfaction is 6.7. A histogram of the main dependent variable, life_satisfaction, is plotted in Figure 10. The distribution is therefore skewed to the left, as the normal curve depicts.

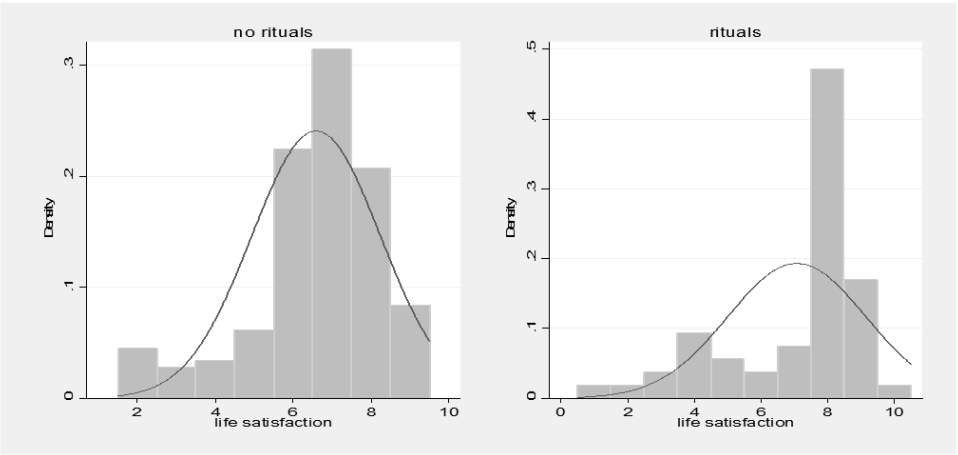
Figure 10 - Life satisfaction after TM/H utilisation



**Source: author's own*

Of those who used TM/H, 26% had rituals carried out, while 74% did not. Overall, those who have rituals show greater levels of subjective well-being, stating an average score of 7.08 as opposed to 6.59 for those without rituals. Histograms reflecting satisfaction scores for individuals with and without rituals are presented in Figure 11.

Figure 11 - Life satisfaction according to rituals



**Source: author's own*

4.4.2 Ordered probit

Ordered probit results confirm the positive value of rituals and healing processes on life satisfaction. The first column in Table 12 displays the baseline ordered probit in which only the variable 'rituals' is regressed. Only marginal effects for reaching satisfaction level 8[73] are reported. The positive and significant coefficient indicates satisfaction increases when individuals have utilised TM/H with rituals. Individuals with rituals are associated with an 8.3 percentage point higher likelihood of achieving satisfaction 8 than individuals without rituals. This can be taken as the first sign of PU.

Table 12 - Effects of procedural utility

	I	II	III	IV
Rituals	0.083***	0.105***	0.187*	0.164***
	[0.025]	[0.034]	[0.101]	[0.047]
Illness characteristics				
Mild severity		-0.027	0.232	-0.117**
		[0.065]	[0.235]	[0.059]
Low severity		0.033	0.156	-0.059
		[0.113]	[0.270]	[0.105]
Chronic		0.018	0.043	0.0003
		[0.051]	[0.086]	[0.033]
Financial capability				
Insurance		-0.039	-0.143	-0.079***
		[0.039]	[0.161]	[0.025]
Income		0.033	0.019	0.020
		[0.026]	[0.030]	[0.028]
Societal environment				
Culture		-0.009	-0.178**	0.065**
		[0.017]	[0.072]	[0.027]
Communitygroup		0.067	0.142	0.088***
		[0.043]	[0.119]	[0.018]
Socio-demographic characteristics				
Female		-0.005	0.125**	-0.051***
		[0.039]	[0.061]	[0.015]
Education_primary		0.072**	0.086	0.093
		[0.029]	[0.068]	[0.057]
Education_junior		0.039	0.138	0.036
		[0.050]	[0.138]	[0.041]

[73] Level eight was chosen as representative of high satisfaction, as there were very few observations for levels 9 and 10.

	I	II	III	IV
Education_senior+		-0.010	0.226***	-0.012
		[0.054]	[0.024]	[0.155]
Occupation_office		0.059	-0.204***	0.066***
		[0.071]	[0.037]	[0.018]
Occupation_business		0.070	-0.302***	0.135***
		[0.093]	[0.115]	[0.023]
Occupation_none		0.025	-0.116	0.016
		[0.039]	[0.102]	[0.088]
Religion_Muslim		-0.068	-0.276***	-0.021
		[0.063]	[0.071]	[0.115]
Religion_other		0.035	-0.057	0.103***
		[0.073]	[0.122]	[0.023]
Religion_none		0.025	-0.221***	0.079
		[0.055]	[0.050]	[0.085]
Age__12-17		0.084	-0.167**	0.089**
		[0.060]	[0.084]	[0.041]
Age_18-34		-0.002	-0.352***	-0.134
		[0.094]	[0.065]	[0.153]
Age_35-54		0.029	-0.450***	-0.034
		[0.135]	[0.104]	[0.218]
Age_55+		-0.011	-0.394***	-0.072
		[0.106]	[0.095]	[0.180]
Married		-0.017	-0.264	0.072
		[0.067]	[0.165]	[0.049]
Spouse		0.033	0.357***	-0.014
		[0.028]	[0.090]	[0.055]
Child		0.004	0.198	0.052***
		[0.030]	[0.186]	[0.005]
Other_relation		-0.012	0.089	-0.064*
		[0.023]	[0.213]	[0.037]
Locational characteristics				
Urban		0.033	0.272***	0.087
		[0.043]	[0.043]	[0.076]
Upper West region		0.141**		
		[0.062]		
Chi2(deg freedom)	10.02 (1)	0.837 (2)	9.404 (2)	0.767 (2)
R2	0.009	0.050	0.225	0.099
N	231	189	70	119

Marginal effects for satisfaction level 8 are presented;
Robust standard errors in parentheses.
****significant at 1%; ** 5%; * 10%*

Controls are then included to test whether other non-procedural variables override the effect of procedural factors (column 2). Even including controls, rituals have strong and positive effects on subjective well-being. However, the significance of other variables appear over-ridden by the regional dummy and as such, it is informative to split the sample according to region.

Columns 3 and 4 present results for GA and UW respectively. Even when analysing results by region and including all controls, the effect of rituals still hold. Size effects appear larger for GA, though greater statistical significance arises from UW. Both regions show that by undertaking rituals, the proportion of people indicating satisfaction level 8 increases by between 16.4-18.8 percentage points. These regions also display differences in the relative importance of other indicators of satisfaction. For example, the signs on severity of illness are positive and insignificant for GA but negative for UW. Belonging to a community group in UW has significantly positive effects on achieving high satisfaction, possibly because individuals feel supported by those living within the same social circles. This latter result serves to validate that, to a certain extent, those with higher social capital reach higher levels of satisfaction, consistent with social capital theory (Helliwell & Putnam,2000) and is a sign of subjective well-being resulting from greater interconnectedness, interaction and interdependence. This concurs with a study from America which suggests that – controlling for demographics and health needs - individuals with a positive sense of community are less likely to report problems with health care costs, choice, access and satisfaction (Ahern, Hendryx, & Siddharthan,1996).

While in GA, there appear to be no significant effects of insurance on satisfaction, in UW there are significantly negative effects. The sign on the insurance coefficient suggests that individuals with insurance are less likely to achieve satisfaction level 8 than those without. Although this is counterintuitive, it must be borne in mind that the indicator distinguishes between insurance holders and non-holders only, rather than whether they have utilised insurance for their illnesses. Further, many individuals expressed dissatisfaction with high registration costs and yearly payable premia to keep a validated card. Users of TM/H (and therefore those who could reveal satisfaction levels) would not have been able to use insurance for TC, thus effectively nullifying its worth and in fact, are burdened with an extra outlay in ensuring its

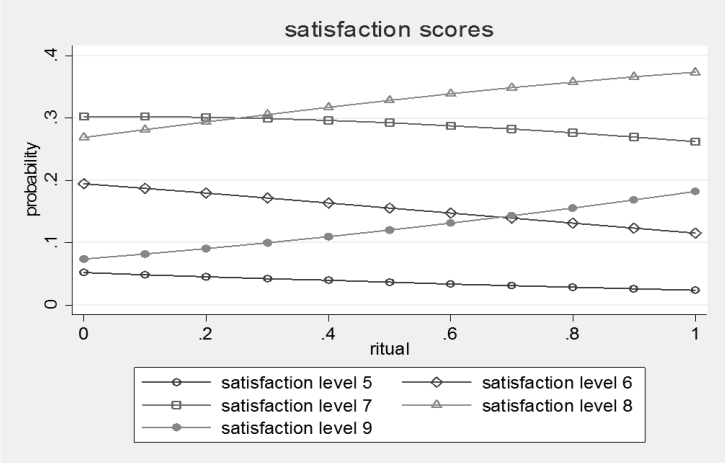
validity. Previous research also indicates that health insurance coverage does not ensure high satisfaction levels with a health system (Blendon, Leitman, Morrison, & Donelan,1990).

Another significant variable includes cultural attitudes and beliefs, with individuals in GA showing that having negative attitudes is associated with 17.8 percentage point less likelihood of achieving level 8 satisfaction[74]. Socio-demographic indicators such as gender, level of education, occupation, religious affiliation, age and relationship to the head of the household are additional important indicators of satisfaction.

Ordered probit estimations can be graphed by calculating the changes in probability for purposively chosen satisfaction levels between individuals with rituals versus those without, given the full range of control variables. In Figure 12, the probabilities of attaining satisfaction levels 5, 6, 7, 8 and 9 are plotted for every 10 percentage point increment between ritual=0 (no ritual) and ritual=1 (ritual). For example, when an individual does not have a ritual, the probability of attaining satisfaction level 8 is calculated as 0.269. As the probability of having a ritual increases, the probability of attaining satisfaction level 8 also rises, to reach 0.373 where ritual=1. The difference in these two probabilities, 0.105, is the resulting marginal effect for satisfaction level 8 in column two, Table 12. On lower probability levels (satisfaction levels 5, 6 and 7), decreasing trends (negative differences) are plotted. All corresponding changes in probability used to construct the graph are given in Appendix 23.

[74] Differences in signs across regions may be due to the particular level of satisfaction chosen (i.e. people in UW maybe less likely to report level 8, but more likely to report another level instead).

Figure 12 - Change in probability from no rituals to rituals, selected scores



**Source: author's own*

4.4.3 Direct test: procedural versus outcome utility

A direct test of PU versus OU is possible if outcome indicators are included in regressions. Table 13 sees the addition of five variables directly measuring the health effects of TM/H utilisation and thus capture OU. These five variables indicate changes in utility accrued to individuals who report improvements in mobility, self-care, daily activities, pain and anxiety. If it is the case that these outcomes are of greater importance than processes, the marginal effect on the variable 'ritual' would be rendered insignificant or reduced, and the coefficient on the outcome variables would prove significant. Results are given for the full sample (column 1) and by region (columns 2 and 3) [75] and show that even with outcome variables included, carrying out rituals has large marginal effects: an individual who uses TM/H with rituals is 11.2 percentage points more likely to be on satisfaction level 8 than someone without (versus 10.5 percentage points without outcome variables in model two, Table 12). Regional sub samples also confirm positive effects of PU (23.3 and 15.6 percentage points for GA and UW, respectively), despite controlling for OU.

The marginal effects on the outcome variables for the full sample suggest three dimensions are particularly important: activity, pain and anxiety. Specifically, an individual who states improvements in activity, pain and anxiety is expected to raise their likelihood of reaching level 8 satisfaction by 21.9, 17.9 and 16.7 percentage

[75]Only shorter tables (without displaying controls) are presented henceforth.

points respectively. Mobility and self-care have smaller but still significant effects on satisfaction. In GA, the effect of PU seems to override OU, except in the case of pain. In UW, improvements in activity have a particularly sizeable and significant effect on satisfaction (29.2 percentage points). The corresponding graph for changes in probability associated with satisfaction once controlled for OU, for the full sample, is given in Appendix 24.

Table 13 - Direct test of PU vs OU

	I OU	**II** OU_GA	**III** OU_UW
Rituals	0.112***	0.233*	0.156***
	[0.021]	[0.141]	[0.021]
Outcome measurements			
Mobility	0.035***	-0.04	0.124*
	[0.010]	[0.049]	[0.064]
Selfcare	-0.103***	0.004	-0.202***
	[0.026]	[0.068]	[0.025]
Activity	0.219***	0.181	0.292***
	[0.019]	[0.140]	[0.088]
Pain	0.179*	0.143**	0.206
	[0.103]	[0.065]	[0.187]
Anxiety	0.167***	0.063	0.236***
	[0.045]	[0.123]	[0.089]
Illness characteristics	*Yes*	*Yes*	*Yes*
Financial capabilities	*Yes*	*Yes*	*Yes*
Societal Environment	*Yes*	*Yes*	*Yes*
Socio-demographics	*Yes*	*Yes*	*Yes*
Locational dummies	*Yes*	*Yes*	*Yes*
Chi2 (dof)	0.866 (2)	4.404 (2)	2.118 (2)
R2	0.143	0.272	0.187
N	189	70	119

Marginal effects for satisfaction level 8 are presented;
Robust Standard errors in parentheses;
****significant at 1%; ** 5%; * 10%;*
Standard controls are included but not presented.

4.4.4 Robustness checks

Results are checked using a variety of sensitivity analyses. The most important of these is the test for sample selection (Heckman,1979). Given that only satisfaction scores for users of TM/H are ascertained, inferences about the population of non-users cannot be made directly. If there are systematic differences between users and non-users, there exists a problem of identification and consequent 'selection bias'

(Heckman,1979). In such cases it is possible instead to estimate the probability of utilisation conditional on explanatory variables, and then estimate the expected satisfaction scores conditional on use. This is known as the two-step procedure for sample selection, in which the first step is to estimate a probit model for utilisation by identifying an 'exclusion restriction' – where an explanatory variable is chosen for being associated with TM/H utilisation but not satisfaction directly. An inverse mills ratio (IMR) is then calculated and added as an extra variable in the second stage regression and significant IMR is seen to be indicative of sample selection problems. One possible candidate for this explanatory variable is an indicator measuring the presence more than one herbalist within an hour's walk[76], the rationale being, having more herbalists within the locality is likely to increase access probability and hence utilisation, but satisfaction with the particular healer used or processes involved in consumption does not necessarily change because extra healers are available. This variable is tested for significant and insignificant relationships with utilisation and satisfaction respectively. In practice, finding an appropriate variable fulfilling such identification restrictions is difficult and it is common to find sample selection models (SSM) in which the same set of regressors are used for both steps (Jones,2007). Here, in addition to presence of extra herbalists, all variables from the first-step regression are included in the second stage.

In Table 14 and Table 15, SSM for regressions without and with outcomes, respectively, for full samples and regional sub-samples, are given. The first row of Table 14 shows marginal effects of achieving life satisfaction 8 in the SSM is comparable to the original estimates. Sample selection is not of concern (as indicated by insignificant IMR) for the full sample and UW, but results for GA should be interpreted with care given its significant IMR. Even when outcomes utilities are accounted for, rituals appear significant and sizeable. Sample selection appears problematic for regional, but not full, samples. Overall, the general finding that rituals are associated with attainment of higher satisfaction levels, holds.

[76] How many of the following types of TMP/TH do you have within one hours' walk (<1) from your home? (of which non-spiritual herbalist was one category): 0,1,2,3,4,5+. Only non-spiritual herbalists are included here.

Table 14 - Sample selection models

	I SSM	**II** SSM _GA	**III** SSM_UW	**IV** SSMOU	**V** SSM OU_GA	**VI** SSM OU_UW
Rituals	0.106***	0.266	0.165***	0.113***	0.284**	0.157***
	[-0.033]	[-0.105]	[-0.048]	[-0.017]	[-0.137]	[-0.020]
Outcome measurements						
Mobility				0.032***	-0.043	0.132**
				[-0.004]	[-0.050]	[-0.067]
Self care				-0.103***	0.005	-0.203***
				[-0.027]	[-0.066]	[-0.026]
Activity				0.219***	0.170	0.288**
				[-0.019]	[-0.139]	[-0.095]
Pain				0.181*	0.137*	0.204
				[-0.102]	[-0.071]	[-0.188]
Anxiety				0.167***	0.073	0.239***
				[-0.048]	[-0.148]	[-0.089]
Illness characteristics	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Financial capabilities	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Societal environment	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Socio-demographics	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Locational dummies	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Region	0.152**			0.071		
	[-0.065]			[-0.059]		
Invmills	0.08	0.661***	-0.0151	0.070	0.460**	-0.102***
	[-0.185]	[-0.246]	[-0.139]	[-0.172]	[-0.188]	[-0.024]
Chi2 (df)	0.232 (2)	5.418 (2)	0.652 (2)	1.428 (2)	2.199 (2)	1.797 (2)
R2	0.050	0.241	0.099	0.143	0.281	0.187
N	189	70	119	189	70	119

Marginal effects for satisfaction level 8 are presented;

Robust standard errors in parentheses;

****significant at 1%; ** 5%; * 10%;*

Standard controls are included but not presented.

Additional robustness tests are carried out using alternative outcome variable measurements: absolute level of each EQ5D (Table 15); derived utility scores from value sets (Table 16 columns I-III) and both value sets plus positive changes in each EQ5D (Table 16 columns IV-VI). All alternatives are aligned with original results, namely that PU is

gained through rituals over and above any effects on health: from using OU as controls, it is possible to conclude that there are hedonic placebo effects from the consumption of TM/H.

Table 15 - Absolute levels of satisfaction

	I absolute	**II** absolute_GA	**III** absolute_UW
Rituals	0.096***	0.332*	0.154**
	[0.026]	[0.192]	[0.065]
Outcome measurements			
Mobility_abso	-0.042	0.199	-0.086
	[0.072]	[0.256]	[0.094]
Selfcare_abso	-0.044	-0.202***	-0.040
	[0.028]	[0.063]	[0.188]
Activity_abso	-0.201***	-0.139	-0.317***
	[0.047]	[0.096]	[0.101]
Pain_abso	-0.060 0.015	-0.415	0.015
	[0.061]	[0.141]	[0.069]
Anxiety_abso	-0.1568	-0.178***	-0.142
	[0.085]	[0.067]	[0.100]
Illness characteristics	*Yes*	*Yes*	*Yes*
Financial capabilities	*Yes*	*Yes*	*Yes*
Societal Environment	*Yes*	*Yes*	*Yes*
Socio-demographics	*Yes*	*Yes*	*Yes*
Locational dummies	*Yes*	*Yes*	*Yes*
Chi2 (dof)	0.013 (2)	3.580 (2)	0.067 (2)
R2	0.137	0.308	0.187
N	189	70	119

Marginal effects for satisfaction level 8 are presented;
Robust Standard errors in parentheses;
****significant at 1%; ** 5%; * 10%*
Standard controls are included but not presented.

Table 16 - EQ5D utility scores

	I Score	**II** Score_GA	**III** Score_UW	**IV** Score_OU	**V** ScoreOU_GA	**VI** ScoreOU_UW
Rituals	0.091***	0.268*	0.149***	0.097***	0.300*	0.138***
	[0.030]	[0.156]	[0.057]	[0.018]	[0.181]	[0.030]
Outcome measurements						
EQ5D_score	0.837***	0.945**	0.960**	0.596**	0.902***	0.722*
	[0.324]	[0.482]	[0.413]	[0.268]	[0.298]	[0.421]
Mobility				0.03	-0.057	0.117
				[0.030]	[0.046]	[0.093]
Selfcare				-0.083***	0.069	-0.181***
				[0.023]	[0.057]	[0.022]
Activity				0.182***	0.138	0.236*
				[0.024]	[0.131]	[0.124]
Pain				0.092	-0.086	0.113
				[0.075]	[0.144]	[0.135]
Anxiety				0.092***	0.010	0.127
				[0.031]	[0.064]	[0.093]
Illness characteristics						
	Yes	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Financial capabilities						
	Yes	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Societal Environment						
	Yes	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Socio-demographics						
	Yes	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Locational dummies						
	Yes	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Chi2 (dof)	23.010 (2)	1.654 (2)	13.140 (2)	18.140 (2)	4.803 (2)	4.871 (2)
R2	0.146	0.304	0.194	0.174	0.320	0.222
N	189	70	119	189	70	119

Marginal effects for satisfaction level 8 are presented;
Robust Standard errors in parentheses;
****significant at 1%; ** 5%; * 10%*
Standard controls are included but not presented.

4.4.5 Caveats

Questions on satisfaction are inevitably open to subjectivity as it measures personal preferences, expectations and actual care experienced (Donabedian,1988; Schommer & Kucukarslan,1997; Ware, Davies-Avery, & Stewart,1978) [for review see (Sitzia & Wood,1997)]. For example, Jackson et al (2001) find unmet expectations are a strong predictor of dissatisfaction among walk-in patients of a clinic in USA. In turn, expectations may be culturally embedded[77]. To the extent that respondents were answering on behalf of household members, satisfaction levels may be inaccurate if people are not able to empathise with the individual in question. To mitigate this, where possible, the individual in question was called upon. Further, the timing of questioning also appears important. Jackson's study finds on average individuals state higher levels of satisfaction 3 months after care was sought because while satisfaction immediately after the visit reflects merely the advice or solution received from the physician, by 3 months scores more likely reflect the symptomatic impact of the solutions offered. In this study, satisfaction was measured for acute illnesses in the past two weeks, and chronic illness experiences within the last month preceding the survey to counteract recall bias. Satisfaction was also measured in multiple ways (verbally, numerically and worded differently) to check for internal consistency, with open ended questions to comprehend opinions fully. Additionally, to counter social desirability bias (reluctance to express dissatisfaction) interviewers were trained to make clear to the respondent that all answers were confidential and anonymous. The questionnaire was also designed to ask for overall satisfaction measures before health outcome measures so satisfaction scores were not driven by the ordering of questions.

When sample selection modes are run, the nature of the instrument gives rise to slightly different estimates. Unfortunately, with limited data, it is not possible to find alternative, perhaps more appropriate, instruments. This also restricts the possibility of testing for omitted variable bias and endogeneity. To the extent that this paper is the first to measure PU in the utilisation of traditional health care, it would be useful to incorporate other instruments within questionnaires in order that testing for these dimensions is made possible in the future.

[77] For example, it is not unusual for people in developing countries to have to supply their own injections, bedding and food for hospital visits, so expectations for hospitals to supply these items might be fairly low, leading to high satisfaction rates where they are provided.

4.5 Discussion

This paper has shown that individuals value procedures involved in consuming TM in and of themselves, suggesting the existence of a hedonic placebo effect: PU is accrued as a result of rituals such as incantations and prayers, irrespective of outcome measures including improvements in mobility, ability to self-care, activity, pain and anxiety. In this respect, the paper presents a paradox, in which scientific evidence on TM is scant and under-developed, yet, individuals continue to use them. By mobilising the idea of PU, these two opposing views can be reconciled, as it suggests that individuals like to 'do something rather than nothing' in response to symptoms, even if there is no clear impact on health outcomes.

To understand better why PU is gained when utilising TM, some discussion of the nature of healing processes vis-à-vis modern medicines is required. There are two broad explanations, one at the individual level and another at the societal level (Adler & Hammett,1973). On the individual level, it is widely acknowledged that the patient-healer relationship is unique and quite apart from the doctor-patient relationship seen within the modern system. Healers are known to provide a more holistic experience through psychological, in addition to physical or biological, care (Busia,2005; Chi,1994; DeJong,1991; Hevi,1989; van der Geest,1997), thus creating a therapeutic relationship with individuals and allowing for more in-depth interaction. In this respect, traditional forms of care provide a relationship of equals, in which patients play an active role rather than the 'expert-patient' relationship seen in modern facilities. Evidence of this has been found in developed countries by users of complementary and alternative medicines, who have stated their appreciation for therapeutic processes, irrespective of treatment efficacy. Individuals claim such processes raise energy levels, facilitate coping mechanisms, enhance self-awareness (Cartwright & Torr,2005), and increase self-control (Furnham & Bhagrath,1993). O'Callaghan and Jordan (2003) show that values and dissatisfaction with doctor-patient relationships, rather than discontent with biomedical outcomes, drive individuals to seek care from alternative sources. Differences in mode and nature of payment 'contracts' in the two systems can even be attributed to interaction effects (Leonard & Zivin,2005). Arguably, this increased involvement creates a sense of control and is itself a source of PU, especially when illnesses are not curable or psychosomatic (Abbo,2011; Anyinam,1987).

PU also stems from divergent explanatory frameworks between traditional and modern systems (Kleinman,1980). Chi argues 'the efficacy of medicine is dependent on what people are looking for, and how to evaluate them' (Chi,1994, p. 317). For example, modern medicines are perceived to work faster than Chinese medicines, but the latter are thought to be more effective in treating the 'root cause' of diseases and are culturally valued: 'most TM are an integral part of their socio-cultural environments, which also developed their own world views and philosophies. Such world views and philosophies are inseparable from their medical systems, which defines the meaning of health and illness' (Chi,1994, p. 317). Van der Geest et al (1996, p. 167) similarly write that the effects of any medication are 'social, cultural, psychological, and even metaphysical' such that medicines possess social and symbolic characteristics, and the 'charm is in their concreteness…in them healing is objectified' (van der Geest & Whyte,1991, p. 345). This view is likely to be the same for users of TM/H, for whom the charm lies in the consumption processes, rather than the herbal product itself, and TM has the capacity to carry meanings as well as perceived biomedical powers (Moerman & Jonas,2002). Efficacy, then, might be considered a cultural construction and the 'total drug effect' depends also on nonchemical attributes such as beliefs and expectations and quality of patient-practitioner interaction.

As such, treatment incorporates not only individual, but also sociocultural and social-psychological, factors (Adler & Hammett,1973; Astin,1998a; Helman,2000; Kale,1995b; Kleinman,1980; Mechanic,1986). The surrounding environment and societal relations are vital to an individual's health decisions and outcomes, in what Lash (2000) and Mackian (2004) call 'reflexive communities': health decisions are not merely the result of one's own information and knowledge about illness, but reflects an individual's emotional and practical concerns in the context of societal constructions and interactions. In this sense, the structure of networks and type of advice relayed are also crucial to health-seeking behaviour (Berkanovic, Telesky, & Reeder,1981). Given TM/H's social dimensions, conforming to societal values and following cultural norms can also be driving a positive sense of community which in turn affects utility. Thus, the satisfaction arising from utilising TM can also be seen as a way of behaviour which conforms to society's rules (copying the most prevalent, or 'pro social' behaviour) (Torgler, Frey, & Wilson,2009). This also reflects the deep embeddedness of TM/H within society. After all, the label itself reflects many hundreds – if not thousands – of years of existence and use: in times before pharmaceutical companies and science laboratories, populations were entirely reliant on

herbal remedies to cure ailments (Busia,2005; Porter,1999) and in Ghana today, the utilisation of TM/H is perfectly in line with societal norms and traditions[78] such that even the recognition of the 'correct' plants rests solely on local information obtained through generations of 'learning by doing' and hearsay (Vandebroek, et al.,2004).

In this respect, PU may be seen as the product of individual and societal benefits. Individuals who hold a strong sense of self efficacy[79] in socially valued pursuits mix ideas from society (e.g. cultural value systems) with own judgement and experiences (Oettingen,1995) and are able to translate this into higher levels well-being (Bandura,1995). An individual's social surroundings are central to supporting self-efficacy: individuals have more self-belief when they see similar others experiencing success and are socially persuaded of positive effects by others around them. Bandura argues that participation and representation in community structures and norms alone empowers individuals and promotes health. Individuals learn by observing and interacting with others in society and are rewarded with positive reinforcement, which may account for a part of the satisfaction gained. This is also in line with literature looking at how identity, defined as 'a person's sense of self', impacts economic outcomes and further, that defecting from one's identity can lead to negative utility (Akerlof & Kranton,2000).

The policy implications of this paper are threefold. Firstly, there is a distinct need to recognise PU within the traditional system. To date, TM are evaluated solely through OU in the form of scientific evidence from randomised control trials. Yet, individuals clearly continue to consume TM/H because of the positive experiences associated with utilisation, whether through interactions with healers or conforming to societal norms. By distinguishing between 'care' and 'cure', and paying closer attention to PU, it would be possible to evaluate closer intermediate processes, including dimensions such as increased involvement, control, sense of purpose and mutual respect, all of which are valuable in their own right. If care components are determined to be important, this has knock-on consequences for health care management and the organisation of the health system as a whole. The consideration of PU thus gives ammunition to proponents of TM/H

[78] The flip side of not following social norms is internal sanctions (guilt, remorse) or social sanctions (alienation) (Torgler, et al.,2009).
[79] Bandura (1995, p. 2) defines self-efficacy as 'beliefs in one's capabilities to organize and execute the courses of action required to manage prospective situations'.

policymakers who have long argued that TM/H are appreciated for holistic reasons even if the science behind TM is still in its infancy.

Secondly, the paper calls for an alternative approach to the measurement and quantification of satisfaction. Within modern medicines, it has become standard practice to use objective measures to evaluate patient satisfaction through the use of questionnaires and relevant instruments (Coulter,2006; Leonard,2008) but this has not extended fully to developing countries and certainly not for TM/H use. This is partly because studies of healer-patient interactions have largely remained in the domain of anthropology or sociology rather than health economics. Yet, this is a severe shortcoming as it is known that patients often withhold criticism (Bernhart, Wiadnyana, Wihardjo, & Pohan,1999) and as such, it is difficult to determine how to improve provider performance, or which aspects of care matter most to patients. If questionnaires allowed for objective feedback about healing processes and other related practices carried out by healers and then measured this against satisfaction levels, specific elements could be pinpointed as providing high levels of utility.

Thirdly, in areas where access to pharmaceutical medicines is impeded, the significance of utility gained from TM utilisation is appealing. This is not to nullify the provision of public and formal systems - users of these systems may well attain even higher OU and PU than TM/H users, but it does suggest that the preservation, safeguarding and documentation of TM, especially in more culturally accepted areas, is essential (WHO is currently proposing a global database starting with some developed countries) because individuals are still able to gain utility from TM in modern health care deficient areas. Relatedly, even if modern medicines were more widely available, people may not necessarily switch to these sources if they do not gain as much satisfaction from the processes involved. In this respect, it would be important to consider the most PU-enhancing aspects from TM/H within modern medicines to induce the highest possible levels of satisfaction.

4.6 Conclusion

This paper has argued that rituals and related healing processes involved in the utilisation of TM are an important source of PU. Through rituals, individuals gain control over their illnesses and can exploit a unique patient-healer relationship. They also increase subjective well-being by conforming to social norms and acting out pro-social behaviour.

These results hold even when controlling for self-reported outcome measures, which suggests the existence of a hedonic placebo effect. Key results are checked using SSM in addition to alternative measures of satisfaction and OU. Future research looking at different types of healing processes and intermediary processes, such as degree of control, management of illness, involvement or other measures of patient-healer interaction, would allow for more in-depth analysis of the exact sources of PU.

Equity implications

How do inequalities in health care utilisation change when we take into account traditional medicines?[80]

Abstract

When measuring equity in health care utilisation, conventional studies typically disregard the use of TM. Therefore, it is assumed that the failure to use modern health care is equivalent to not receiving any health care at all. This paper hypothesises and finds evidence for reductions in inequality estimates once TM are taken into account. Further, it explores inequities in utilisation of modern medicine (from public institutions, private sources and by self) and TM (by self and through healers) and finds the former to be pro-rich whereas the latter is pro-poor. These figures are then decomposed into socioeconomic determinants to show non-need factors to be significant contributors of horizontal inequity (HI).

[80] This Chapter forms the basis of an accepted paper entitled 'How do inequalities in health care utilisation in developing countries change when we take into account traditional medicines' in *World Development*: (Sato,2012a).

5.1 Introduction

One of the primary objectives of health system reform throughout the world is to guarantee that use of health care is as high for the poor as it is for the most affluent in society, once need is controlled for (horizontal equity). The WHO judges health systems according to evidence on such inequalities (World Health Organization,2000b). However, in measuring equality and equity in the use of health care, studies typically disregard the use of TM, automatically assuming that failing to receive modern health care is equivalent to not using any health care at all. Given that TM have the potential to provide relief and cure and are commonly used - especially by the poor and those who lack access to modern medicines (World Health Organization,2002) - it is vital that such disparities in utilisation should be quantified and disaggregated to better inform policymakers on the extent and depth of inequality.

Equality and equity in utilisation are widely accepted and therefore researched areas of interest in developed countries. As developing countries become increasingly advanced in the provision of public health systems, governments have, in line, emphasised the importance of fairness in distribution. To date, however, most studies on equity in SSA have failed to look at equity in utilisation. For example in a systematic review, Schellenberg et al (2003) find that as of 2003 only 102 articles were about (in)equity in SSA, with most focusing on financial or ethnic differences and very little has been added to the literature since. Studies which do look at inequity either exclude traditional providers or stop short of evaluating the contribution of income to inequity. Yet, income matters in shaping the way individuals utilise different forms of care and the stage at which certain providers are chosen: the rich have a higher probability of seeking care from modern providers, and sooner rather than later, while the poor are more prone to using TC at earlier stages of care (paper 2; Ahmed, et al.,2001; Develay, et al.,1996; Mock, et al.,2001; Phillips, et al.,1992). Inequities in utilisation of different forms of care and patterns of resort owing to differences in income therefore clearly exist. As such, there is much to be gained from exploring the degree of inequality and HI (taking into account difference in need) for both MC and TC utilisation - along with sub-categories of providers. This paper uses Ghana as a case study to analyse these topics. This is achieved by exploring the following questions:

a. What is the degree of inequality and horizontal inequity for both modern and TC? How about for different care types *within* these two categories?
b. What is the contribution of income to inequity, and factors aside from income?

5.2 Background

5.2.1 Definition

Inequalities in health care utilisation exist when there are differences in utilisation rates between different population groups. Inequalities may be attributed to both avoidable and unavoidable causes, but the presence of such inequalities, twinned with a value judgement, gives rise to inequity. Accordingly, there are multiple dimensions of equity[81] in health: equal access for equal need; equal utilisation for equal need, and equal/equitable health outcomes (Oliver & Mossialos,2004). From a policymaker's perspective, this term is highly subjective and political, but it is generally accepted that equity implies that financial disparities should not be an impediment to accessing treatment. WHO's definition highlights; "equity in health implies that ideally everyone should have a fair opportunity to attain their full health potential and, more pragmatically, that no one should be disadvantaged from achieving this potential, if it can be avoided" (WHO 1986 from Braveman,2006). Braveman and Gruskin (2003, p. 254) define equity in health as "the absence of [significant, frequent or persistent] systematic disparities in health or in the major social determinants of health between groups with different levels of underlying social advantage/disadvantage". Inequities exist where individuals demonstrate differing levels of health within a population, and its determinants are considered avoidable, unnecessary, unjust, or unfair (Whitehead,1992).[82] Measurement also requires one to distinguish between actual use and opportunity to use, i.e. whether the fulfilment of need is a potential or realised event. For example, an individual may live near a drug outlet, therefore having geographic accessibility and opportunity to use, but may not actually use if income does not allow for the purchase of medicines. Similarly, individual choice (e.g. religious reasons) may dictate an avoidance of use even if access is guaranteed. This

[81] The concept of equity is normative while equality is not necessarily so. An inequity in the distribution of resources drives inequalities in health (Braveman & Gruskin,2003).
[82] Braveman and Gruskin (2003, p. 255) do not recommend the use of avoidability in the definition as 'unjust' and 'uncertain' already imply avoidability. They also challenge the notion that some health inequities need fundamental changes in social structures and one would not want the ease of avoidability to be a measure of the degree of inequity. Finally, they question for whom avoidability is an issue.

debate has previously been outlined (Mooney, Hall, Donaldson, & Gerard,1991) and Culyer et al (1992), with the former arguing that access is not utilisation – according to Mooney et al, equal access means 'equal costs of utilisation', and many policy statements state 'equal access for equal need', not 'equal utilisation for equal need'. Culyer et al (1992) respond saying policymakers are confused, or use these terms interchangeably but imply utilisation when they say access. Debate notwithstanding, this study aims to analyse equal treatment for equal need ("ETEN"), or, equity in utilisation, with the recognition that this is an important policy goal for the government of Ghana (Ministry of Health,2007, 2008).

5.2.2 Ghanaian health system

Ghana's health system is pluralistic and individuals have a wide array of possible sources from which to obtain medicines. Sources can broadly be classified as modern (public or private facilities, or self-medication using modern drugs) or traditional (self-medication using herbal products or healers). Modern systems are split into primary, secondary, and tertiary institutions and include pharmacies, health clinics, community health posts, and hospitals (World Health Organization,2002)[83]. TM are typically (although not restricted to) herbal, mineral, or animal products obtained locally or from healers. Healers include herbalists (spiritual or non-spiritual), fetish priests, bonesetters, and circumcisers. Traditional systems are extremely popular in Ghana, where utilisation rates hover around 70%, in line with the SSA average of 80% (World Health Organization,2002, p. 1). TM are argued to be more accessible, affordable, available, and culturally acceptable (Tabi, et al.,2006; Twumasi,1979a; World Health Organization,2002). However, healers are not necessarily utilised for being cheap. Rather, it is their flexibility in accepting different payment forms and basing contracts on ability to pay and outcomes which attracts the poor (Anyinam,1987; Asenso-Okyere,1995; Hausmann Muela, et al.,2000; Leonard,2003). More recently, Ghana has increasingly seen syncretic forms of health care, whereby TH draw elements from modern medicines into their practices, for example through the dispensation of modern drugs (Dixon,2008). As with many developing countries, self-medication remains a very popular mode of care (van den Boom, et al.,2008) as a first

[83] In 2000 some mission hospitals were awarded district hospital status, such that these institutions gain government assistance through enablement of reimbursement under NHIS (see policy goal below and insurance section in Chapter 1), provision of personnel and payment of salaries and other significant costs. For the individual user, this resulted in the possibility of using the NHIS card (i.e. free treatment at the point of care) thus these institutions are classified as public because payment via NHIS is possible and from a user's perspective this is perhaps one of the most important reasons for choosing a facility.

source and polypharmacy (the act of consuming multiple drug regimen by one individual) is common especially if an individual suffers from chronic illness (Adeponle, Obembe, Adeyemi, & Suleiman,2007; World Health Organization,2010a).

5.2.3 Policy goal

In 2003, the National Health Insurance Scheme (NHIS), based on the UK National Health Service, was introduced in Ghana to phase out 'cash and carry' (out-of-pocket payments for medicines) and thus achieve a fairer distribution of health; "ultimately, the vision of government in instituting a health insurance scheme…is to assure equitable and universal access for all residents of Ghana to an acceptable quality package of essential care" (Ministry of Health,2004b). Equity has been a longstanding policy goal for many governments, with origins rooted in the 'Resource Allocation Working Party's' (RAWP) model, formed for the National Health Service (NHS) in England in 1976 to allocate funds across regions along the mantra of 'equal opportunity of access for equal needs' (Creese, Darby, Palmer, & Patrick,1978). In line, the 1978 Alma Ata Declaration advocated access to primary health care for all citizens of the world, regardless of wealth. Policymakers wished for needs, not ability to pay, to determine health care access, with resources specifically directed toward the poor to achieve this outcome. Similar policies have been implemented in Mozambique (Lindelow,2005), Zambia and Uganda [(from Asante, Zwi, & Ho,2006), see Gilson et al (2001) for financing in developing countries] and the MOH in Zambia allocates resources according to a deprivation-based formula (Chitah & Masiye,2007). It is also an important policy goal in Ghana, where the MOH tries to ensure adequate allocation of resources by identifying those most in need (Jehu-Appiah, et al.,2011; Jehu-Appiah, Baltussen, Lauer, & Koolman,2007; Ministry of Health,2007).

However, the evidence on whether such pro-poor schemes have been effective is mixed. For example, with NHIS, despite redemptions from premia for the vulnerable (elderly, pregnant women, children), poor and indigent, uptake of the scheme is dominated by the richest income quintiles (Jehu-Appiah, et al.,2011) suggesting a pro-rich bias in enrolment. Ballou-Aare et al (2008) find only 40% in the lowest income quintile are registered, and only 2.3% of those covered are indigents while 70% of the richest quintile are enrolled. Thus, even the NHIS, which was created so every individual - no matter income status - could access health care, has inadvertently favoured the rich especially due to hefty registration/renewal fees. An Oxfam report (Oxfam,2011) argues given that NHIS is

funded through sales tax, it is disproportionately at the expense of the poor, and pushes the very individuals they intended to help further into poverty. Indeed, Baltussen et al (2008) show that at the national level, the government does well to allocate resources to the vulnerable but the diseases of the poor are less well considered, leaving plenty of room for improvement to reduce health inequities. Such findings are confirmed within region also; by constructing a relative deprivation index to proxy needs at the sub-regional (district) level, Asante et al (2006) show that the resulting equity-adjusted share index was significantly correlated to development funds in the Northern region, but a worsening of trend was discovered in Ashanti between 1999 and 2002. Whereas in 1999, 56% of the variation in funding was due to needs, by 2002 this had reduced dramatically to 1%. These data show considerable intra-regional discrepancies, with funding often biased toward areas located near district capitals.

Gilson et al (2001) argue that such pro-poor policies are hard to realise as the poor not only have difficulty financing and accessing care, but also lack the 'voice', or decision making weight. In line, Agyepong and Adjei (2008) and Asante and Zwi (2009) assess that political power play, designated actors, and processes and imbalances in commitment are all important contributors to equity. Even once 'pro-poor' policies are implemented, some initial inequity might be inevitable: proposing the 'inverse equity hypothesis' as an offshoot from the inverse care law, Victora et al (2000) postulate a trickle-down effect where intervention programmes first benefit the rich, improving their health status and hence increasing inequities, and it is only once the rich can no longer gain and reach a threshold, that the poor catch up, eventually leading to a decrease in inequity. This is shown to hold even where absolute improvements in health are seen for all of the population. Waters (2000) partly confirms this hypothesis using data from Ecuador, where insurance schemes are shown to increase general access to health care, but overall, have negative impacts on equity.

5.2.4 Health outcomes and inequalities in utilisation and benefits

It is widely acknowledged that poorer segments of society suffer a greater burden of disease than the rich. Examples are abundant: in Uganda, infant and child mortality rates are double the rate for the poor than the rich (from Kiwanuka, et al.,2008); in Ghana, the prevalence of underweight children in the lowest income quintile is estimated at 19%, while figures for the wealthiest quintile stand at 9% (ICF Macro,2010, p. 4). Even where

data show favourable changes, the wealthiest often make faster progress. For example, between 1983-1987, the overall Ghanaian under five mortality rate was 155/1000 and by 2008 this had fallen to 80 (ICF Macro,2010, pp. 12-13) – but the wealthiest displayed the biggest improvement compared to the poorest quintile, with a rate of 60/1000 versus 102/1000. This pro-rich bias is echoed in almost every indicator within the Ghanaian Demographic and Health Survey (DHS) – immunisation rates, presence of a skilled provider at childbirth, use of contraception all demonstrate unequal health provision utilisation and resulting health outcomes (Ghana Statistical Service, Ghana Health Service, & ICF Macro,2009). Such disparities are not merely driven by income, but also by cofactors such as urban-rural inequalities (Lavy, Strauss, Thomas, & deVreyer,1996) and gender inequalities (Buor,2004) .

Despite the heavier burden of disease and illness among the poor, it is commonly cited that this group accesses fewer health resources and utilises less formal care, in a phenomenon dubbed the 'inverse care law' (Gwatkin, Johnson, Wagstaff, Rutstein, & Pande,2000; Preker & Carrin,2004). Back in 1993, the WB warned of unequal distribution in public subsidies for health, taking an example from Indonesia, where 12% of government spending for health was consumed by the bottom quintile while the top quintile consumed 29% (Makinen et al.,2000). More recently, it was found that the richest 20% were receiving 30% of the financial benefits while the poorest 20% gained under 12% (Gwatkin,2001, p. 720) and infant and child death rates were twice as high for those in the lowest 20% (Gwatkin, Bhuiya, & Victora,2004, p. 1273). In further examples, a cross country study carried out by Makinen et al (2000) found that when ill, richer groups were more likely to seek care, be examined by doctors and obtain medicines when ill than poorer groups. Using eight developing and transition economies[84], they show that in seven countries, the richest quintile had higher frequencies of seeking care than the poorest quintile. Although the poor were more likely to use hospitals when ill, this was explained by the fact that hospitals tended to be provided by the public sector and therefore perceived to be of lower quality, thus avoided by those able to afford private care. Indeed, this is further supported by the disproportionate use of private care[85]by richer quintiles in most countries, pointing to regressive distribution patterns (Gwatkin, et al.,2004; Makinen, et al.,2000).

[84] Kyrgyzstan, Thailand, Zambia, Kazakhstan, Guatemala, Burkina Faso, Paraguay and South Africa.
[85] The definition of private care varies between countries – in Zambia and South Africa, it includes traditional healers thus making cross country comparisons difficult.

Zere et al's (2007) study of households in Malawi also investigates inequalities in health outcomes and utilisation. For most indicators of health[86], there was an increase in inequality between the poorest and richest quintiles between 1992 and 2004. Yet, there were pro-rich inequities in utilisation of treatment. Similarly in Namibia, the rich are also 30% more likely to use formal maternal services than the poor (Zere, et al.,2010). Gwatkin (2001) and Gwatkin et al (2000, p. 721) provide further evidence from over forty countries in Africa, Asia and Latin America, to find that uptake for oral rehydration therapy was 10-20% higher for the upper classes, and immunisation rates for the poor were only around half that of the rich. Kiwanuka et al (2008) provide a review of utilisation of health care services by the poor in Uganda, and confirm the poor have greater burden of disease but worse access to health services, with barriers arising from both demand and supply sides. Schellenberg et al (2003) find that richer individuals were more likely to take children to a health facility and receive drugs than the poor, because they know better how to spot symptoms of dangerous illnesses. Further, the rate of hospital admissions in the lowest quintile was almost half that of the highest, even where likelihood of falling ill was similar.

While it is commonly found that the poor use less modern services than the rich, little is known about the utilisation of alternative sources of care. This is particularly important in medically pluralistic societies where traditional and modern services sit side-by-side, and traditional services may be particularly utilised by the poor. In Nigeria, pro-rich patterns are found for primary health care centres and hospitals, but the poor tended to use herbalists, patent medicine dealers and community health workers (Onwujekwe,2005). Findings are also confirmed using top/bottom quintile ratios. In another study from Uganda, Nsungwa-Sabiti et al (2007) show even home remedies are more frequently used by the least poor as compared to the most poor. These 'lower level' providers are blamed for high rates of disease, as they tend to offer lower quality treatment (Hanson et al.,2004). While these studies are commendable, they do not decompose the inequities, and evaluate only communicable endemic diseases.

5.2.5 Decomposition

Once inequities in utilisation have been quantified, an analysis of contributing factors ("decomposition") follows naturally. To date, most decomposition studies have focused on

[86] Infant mortality, under five mortality, acute respiratory infections and diarrhoea in children under five.

developed countries for a range of levels and types of providers, commonly including specialised services. For example, inpatient, outpatient and use of doctors within the OECD (van Doorslaer & Masseria,2004; van Ourti,2004); inclusion of dental visits in Canada (Allin,2008) and ambulatory care in USA (Kim & Shin,2010). Decompositions in developing countries have tended to look at inequalities in health outcomes (Pradhan & Arokiasamy,2010; Wagstaff, van Doorslaer, & Watanabe,2003; Yiengprugsawan, Lim, Carmichael, & Sleigh,2007) or health financing; most of these studies find pro-rich inequalities to be largely driven by income disparities. Excepting Leung et al (2007), no studies for inequities in utilisation followed by its decomposition were found for developing countries. They look at five types of service utilisation, including TMP, in Hong Kong (HK), Taiwan and South Korea (SK). Their study finds pro-rich inequity in western doctor visits but not for specialist care in HK, while the ETEN principle holds quite well in SK. In Taiwan, emergency visits and inpatient admission are pro-poor but the rich are more likely to use outpatient services. The study finds a pro-rich bias in the number of TMP visits. The decomposition suggests need factors (age, sex, self-reported health, activity limitations) contribute significantly to most inequalities in utilisation, but observed pro-rich inequalities arise mainly due to non-need factors, such as differences in income, employment, and private health insurance. This study is interesting in light of Ghana and other African countries, in which individuals may opt to use TM/H because insurance coverage is not universal and many cannot afford insurance premia (thus, TMP utilisation would most likely be pro-poor). Traditional systems are also formally institutionalised in Asia, whereas systems in Ghana are considered more informal and most practitioners remain unlicensed.

5.3 Empirical strategy

5.3.1 Measuring equity

There are many ways to measure equity, as outlined in Mackenbach et al (1997) and Waters (2000). The method used here is advocated by van Doorslaer and colleagues (O'Donnell, et al.,2008; van Doorslaer et al.,2000) to allow for calculation of concentration and horizontal inequity indices and decomposition of factors contributing to the inequity. Concentration indices (CI) have the advantage of measuring relative income or other socioeconomically related health inequality across the whole income distribution, thereby offering a holistic assessment of inequality rather than top/bottom quintile ratios as is

common in existing literature (Wagstaff, et al.,2003). A CI of zero indicates complete absence of socioeconomic inequalities (Kakwani, Wagstaff, & van Doorslaer,1997), thus people with equal needs receive equal amounts of care irrespective of other factors. This can be represented in the form of concentration curves which are perfectly aligned to the 45 degree line, where cumulative income and cumulative health care utilisation are on *x* and *y* axes respectively. A positive score indicates pro-rich inequity, whereas negative scores measure pro-poor inequity. Accordingly, the horizontal inequity index can be derived by deducting the contribution of need factors (typically, sex, age, and health variables) from the total CI (Wagstaff, et al.,2001)[87]. This is an important step because health inequalities due to differences in need characteristics cannot be considered inequitable. Through 'decomposition', it is possible to see and quantify the inequalities that do not reflect need inequalities (O'Donnell, et al.,2008, p. 5) and inequalities can be attributed to need factors, non-need factors (including income) and any residuals (Huber,2008; van Doorslaer, Koolman, & Jones,2004; van Ourti,2004; van Ourti, van Doorslaer, & Koolman,2009; Wagstaff, et al.,2001). The 'snapshot approach' measures inequalities between the rich and poor at one point in time, after controlling ('standardising') for differences in need in relation to income[88].

The following steps outline the methods to calculate CI and its subsequent decomposition:

1) calculate CI (denoted C) = income related inequality in use of care, unstandardised distribution of actual use

$$\frac{2\sigma_R^2 y_i}{\bar{y}} = \alpha + \beta R_i + u_i \qquad \text{(A)}$$

The above is termed a 'convenient regression', from which robust standard errors and estimates of concentration indices are estimated. y is utilisation; $\bar{y}$ is mean of y; R_i is the fractional rank of the ith individual in the income distribution; σ_R^2 is the variance of R_i. C is *not* inequity, as it includes need differences.

2) Decomposition of inequities into need ('acceptable') + non-need (including income, 'unacceptable') + residual (unexplained) factors.

As per Leung et al (2007):

[87] See Bago d'Uva et al (2009) for panel data methods.
[88] Assumes vertical equity (unequal treatment for unequal needs) is satisfied.

Utilisation comprises: income, need and non-need variables

$$y_i = \alpha + \gamma lninc_i + \sum_k \gamma_k \, x_i^k \; + \sum_p \gamma_p \, z_i^p \; + u_i \qquad \text{(B)}$$

Where, lninc is log income, x_i^k are need standardising variables, z_i^p are non-need variables, α is a constant, γ are coefficients to be found, u_i is an error term, including approximation errors. Estimates for coefficients are measured using the average effect for each individual with characteristic k and taking sample mean over the subset of individuals (log income can then be divided into quintiles for further decomposition).

3) CI for utilisation:

$$C = \theta C_{lninc} + \sum_k \theta_k \, C_{xk} + \; \sum_p \theta_p \, C_{zp} + \; GC_u / \, \bar{y} \qquad \text{(C)}$$

$$\theta_k = \; \gamma_k \bar{x}_k \, / \bar{y}$$

$$\theta_p = \; \gamma_p \bar{z}_p \, / \bar{y}$$

$\bar{x}_k, \bar{x}_p \; are \; means \; of \; x \; and \; p$; θC_{lninc} is the partial contribution of income inequality; GC_u is the generalised concentration index for the approximation (GCI of the regression error). Equation C is the original linear model for calculation of CI, suitable for continuous dependent variables such as number of visits to a health centre. However, even when the dependent variable is non-linear and binary in nature (i.e. utilisation or no utilisation) van Doorslaer et al (2004) and van Doorslaer and Masseria (2004) show this methodology is also appropriate, so long as one accepts that regressions are merely approximations. Consequently, authors argue that linear and non-linear indices give rise to similar results and often researchers use linear approximations (OLS or linear probability models, LPM), as the simpler of the two versions[89].

4) The decomposition method (Huber,2008; van Doorslaer, et al.,2004; van Ourti, et al.,2009; Wagstaff, et al.,2003) then allows for HI in utilisation to be measured conveniently and easily by subtracting the contributions of need variables from the unstandardised CI (van Doorslaer, et al.,2004). HI is total concentration index-contribution of need variables, HI = C- $\sum_k (\theta_k / \bar{y}) C_{xk}$ = income related inequity in use after needs

[89] See van Doorslaer et al (2004) for an exposition on difference between linear and non-linear models.

standardisation[90]. A positive HI signifies that the inequity favours the rich ('pro-rich inequity'), while a negative HI indicates that inequities favour the poor ('pro-poor inequity'). When HI is zero, utilisation and need are equally distributed. The key assumption made is that after standardising for need, all residual variation in utilisation is due to non-need factors[91].

5.3.2 Data and variables

The methodology was designed to analyse individual level health-seeking behaviour especially in remote areas. Household surveys are appropriate for this as alternatives such as facility level data will only capture formal (modern) service use. A standardised WHO methodology was used to collect data from two regions of Ghana in late 2010 (please see appendix 5; Arhinful,2011). Under this methodology, public health facilities in both urban and rural areas are chosen as reference points, from where clusters of households in specified radii are identified. Researchers survey households within these clusters, using respondents according to selection criteria. [For a discussion of sample sizes and further details on methodology please see Appendix 8 and (Sato,2012c)]. In sum 772 households were interviewed and information regarding 'need' for health care was collected for every member, totalling to 716 individuals with need[92] and 832 episodes of care. The upshot of using the method outlined is that the definition of 'need' becomes crucial in ascertaining the size of inequities. Being a subjective concept, a wide array of definitions have been proposed (Allin,2009; Liss,1993) and it is important to clarify exactly what is measured. In this study, need is characterised by age-sex interaction effects (as people of different ages and genders have varying health care needs), self-reported severity of indicated illness and affirmation (by medical personnel or otherwise) of chronic illness(es). Non-need variables are control variables, as outlined in the summary table in Appendix 25), and includes income, insurance, demographic variables, location of household and attitudes toward TM/H.

[90] Using indirect standardisation, where data are not grouped and this measures need for care for every individual and predicted use if they had been treated the same as others with the same need characteristics.
[91] If need is correlated with income, this will lead to bias in HI (Schokkaert, Dhaene, & van de Voorde,1998).
[92] For whom income data were available.

Dependent variables

The dependent variable for each CI is utilisation (binary variable), defined as 'realised access' (Donabedian,1988) given need for acute illnesses experienced within the past two weeks and one month for chronic illnesses. This is derived from the survey, which asks respondents to recall whether they sought medications from any of the following sources: all modern care (comprising public, private, and self-medication by modern drugs) [and sub-grouped into public care (comprising public health centres, public hospitals, NGO facilities); private care (private health centres, private hospitals); self-medication by modern drugs], and all TC (comprising self-medication by TM and TH), [sub-grouped into self-medication by TM, and finally, TH].

Independent variables

Independent variables are split into need and non-need variables. Need variables are factors directly related to an individual's health needs. These may alternatively fall under 'predisposing and need factors' to utilisation, as per Andersen's (1995) utilisation model. Three variables are chosen to control for health needs: 1) sex-age dummies; 2) self-reported severity of disease/illness (very serious, serious, not serious, not serious at all); 3) dummy for whether illness is chronic (this variable is further divided in the sensitivity analysis). Non-need variables, on the other hand, are 'enabling factors' such as financial capability, characterised by their mutability (that policymakers are able to alter). Thus the main independent non-need variable is logged equivalised expenditure, serving as a proxy for income. This method is popularly used where income data are hard to come by (Deaton & Grosh,2000; Filmer & Pritchett,2001). Monthly household expenditures are calculated and equivalised according to the number of adults and children using an OECD formula[93]. Income is split into quintiles (income group one denoting poorest 20% and group five the richest 20%). Further, nine 'non-need' control variables are added: whether the individual is insured (insured individuals are more likely to utilise public sources); to what level the head of household is educated (educated individuals may be more inclined to use formal sources); whether the individual is Christian or not[94] (religious beliefs may deter use of some providers); whether the head of household is a farmer (occupation is

[93] $(\alpha+ \beta K)^{0.75}$ where α is the number of adults; K the number of children; $\beta$is set to 0.3.

[94] In Ghana the predominant religion is Christianity (67% the population), the other major religious groups being Islam (16.5%) and traditional religions (9.2%). 7.4% ascribe to no religion (Ministry of Health,2008, p. 9).

another indicator of income); whether an individual is married (individuals in relationships may be better financially protected); a cultural index indicating attitudes toward TM/H (increasing value indicates decreasing approval); whether the household is located in an urban area (defined as the regional capital, in which people have better access to modern services); whether the household has a modern facility from which to obtain medicines within 30 minutes' walk from home (better accessibility may mean greater utilisation). Finally a dummy (Greater Accra) is included to control for regional effects.

5.4 Results

5.4.1 Descriptive data

Table 17 depicts utilisation of providers for all sources ever used across the quintiles. Data show that utilisation of different types of providers fluctuates considerably across expenditure quintiles. Public sector care is patronised by all, with a slight bias toward poorer quintiles. Unsurprisingly, private care is rarely used by the bottom three quintiles, with the top 40% dominating its use. Self-medication by modern medicines appears to be undertaken more by the rich than the poor. Overall, modern care tends to be used by the top quintiles more so than the bottom. Turning to TC, it appears self-medication by herbs is fairly evenly distributed by income, except for people in the second quintile who use a little less in comparison. The trend for TH is clear, however, with a third of all those in the bottom quintile ever using healers, while this figure is under 11% for individuals in the top quintile. Care-seeking from other unclassified sources, or no care-seeking whatsoever, tends to be higher in the lower quintiles but there were not many individuals (22) belonging to this last category, indicating that given some health need, individuals, on the whole, do take some action to obtain medicine.

Table 17 - Utilisation of modern and TC, by income quintile, all sources

	Modern Care						TC				None/other	
	Public		Private		Self orth		TM		TH			
Quintile	**n**	**% of quintile**	**n**	**% of quintile**	**n**	**% of quintile**	**n**	**% of quintile**	**n**	**% of quintile**	**n**	**% of quintile**
1	76	60.3	2	1.6	29	23.0	18	14.3	40	31.8	7	5.6
2	78	61.9	2	1.6	38	30.2	10	7.9	30	23.8	9	7.1
3	82	63.6	6	4.7	44	34.1	24	18.6	14	10.9	0	0.0
4	57	45.6	27	21.6	46	36.8	18	14.4	12	9.6	4	3.2
5	65	52.9	15	12.2	42	34.2	22	17.9	13	10.6	2	1.6
N (% of total episodes)	358 (43)		52 (6)		199 (23)		92 (11)		109 (13)		22 (3)	

**Source: author's own*

5.4.2 Income related inequality and inequity

When only MC is accounted for, the overall CI is 0.049, thus there is pro-rich inequality in its use. However, taking TM/H use into account, the magnitude of the CI falls to 0.030. This suggests that the magnitude of inequity in utilisation is reduced and can be primarily explained by the fact that the poor's utilisation patterns are included. Table 18 shows concentration and horizontal indices for the linear probability and (nonlinear) probit models. Figures for overall MC and TC are computed, and in addition, sub-categories are presented to ascertain the impact of each separate provider. In looking at sub-categories, public care is slightly pro-poor, suggesting that the public health system, with its health insurance scheme, is proving effective for the poor. Further, it is no surprise that private systems are extremely pro-rich and is indicative of being the most inequitable system, with the highest CI of all categories. Clearly, only the rich who can afford to pay out-of-pocket for private health care are able to utilise. On self-medication using modern medicine, use is slightly pro-rich. It may be the case that richer individuals are better able to afford out-of-pocket payments for even smaller purchases made at pharmacies and drug sellers, or other confounding factors such as education, are linked to self-sufficiency in diagnosis and treatment.

Table 18 - Concentration and horizontal inequity indices, MC and TC

		HI (need standardised CI)	
	CI	Linear probability model	Probit
Modern care all	0.049	0.050	0.051
Public	-0.057	-0.055	-0.064
Private	0.403	0.303	0.511
Self	0.085	0.055	0.062
Trad care all	-0.115	-0.079	-0.083
TM self	0.090	0.105	0.122
TH	-0.234	-0.247	-0.280

**Source: author's own*

Conversely, there is pro-poor inequality in utilisation of all TC (-0.115). This is largely driven by the utilisation of TH rather than self-medication by TM, as the separate CIs indicate. Pro-poor utilisation of TH (-0.234) is expected, especially where utilisation in poorer areas is very high. Self-medication by TM is shown to be pro-rich, which is perhaps surprising if one considers TC to be mainly used by the poor. However, it may be that the rich are using TM by themselves in addition to MC, rather than as substitutes (see Paper 2).

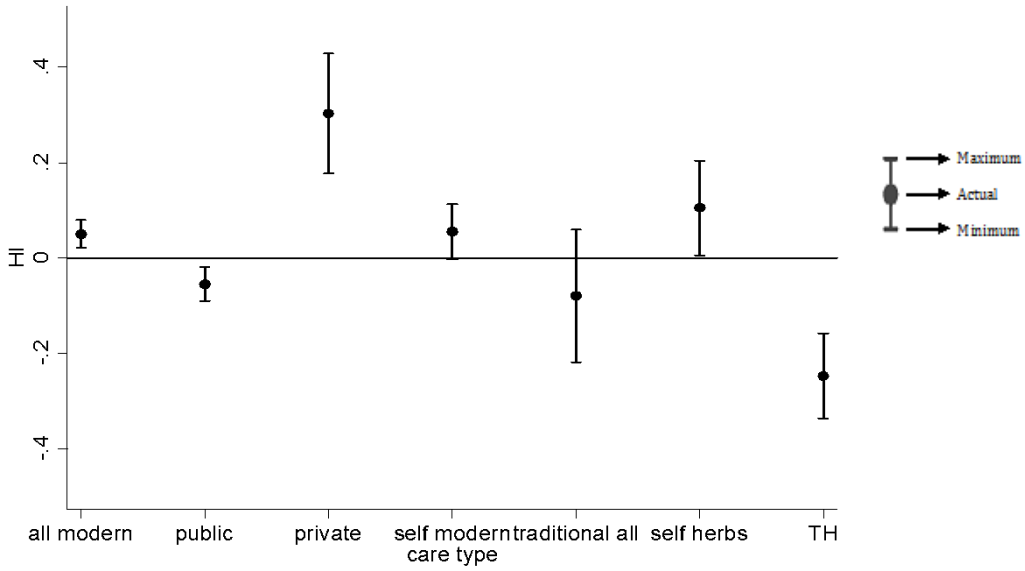
Once concentration indices are standardised for need, results for MC remain largely unchanged but TC inequities lessen. Using the linear probability and probit models results in HI indices of 0.050 and 0.051, respectively, versus 0.049 unstandardised. This means that overall, utilisation of MC is not sensitive to need factors such as age, sex, or disease and illness characteristics, and this holds for both the LPM and probit functions. Looking at sub-categories, public care HI does not differ much from unstandardised CI, but by standardising for need using the probit function, inequity increases from -0.057 to -0.064. The largest changes are seen for private care, which is very sensitive to needs factors; once these are taken into account, horizontal inequity falls in the LPM but rises when modelled by probit. This instability is explained by the large errors encountered when modelling private care (as the decomposition also shows). The last sub-category of modern care, self-medication by modern medicines, is also sensitive to need. Once need is taken into

account, inequities fall from 0.085 to 0.055 and 0.062 for LPM and probit, respectively. However, non-need variables still account for most of the inequities.

Turning to TC, there is a dramatic drop in CI from -0.115 (unstandardised) to -0.079 and -0.083 using LPM and probit, respectively, when need variables are controlled for. This suggests that while income and other non-need factors explain a large proportion of inequality, need factors are also a big contributor to TC use. Thus, individuals take into account their disease characteristics before utilising TC. Most of the changes in CI are due to self-medication by traditional methods rather than utilisation of TH, as HI estimates show.

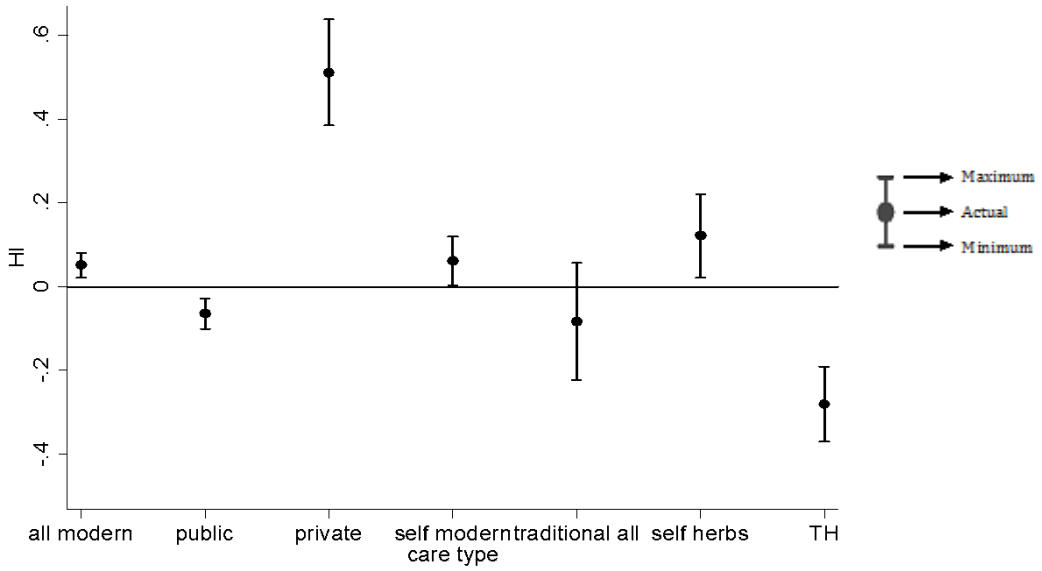
Overall, the calculation of horizontal inequities does not differ much according to whether it is modelled by LPM or probit, except where errors may fluctuate, as is the case for private care. This is also illustrated in Figure 13 and Figure 14. The largest inequities are seen in utilisation of private care (pro-rich) and TH (pro-poor), with self-medication by either type of medicines pro-rich and public systems pro-poor. In the next section, a decomposition of all inequities is presented to show detailed contributors to these inequities.

Figure 13 - Horizontal inequity indices using LPM, by type of provider



**source: author's own*

Figure 14 - Horizontal inequity indices using probit, by type of provider

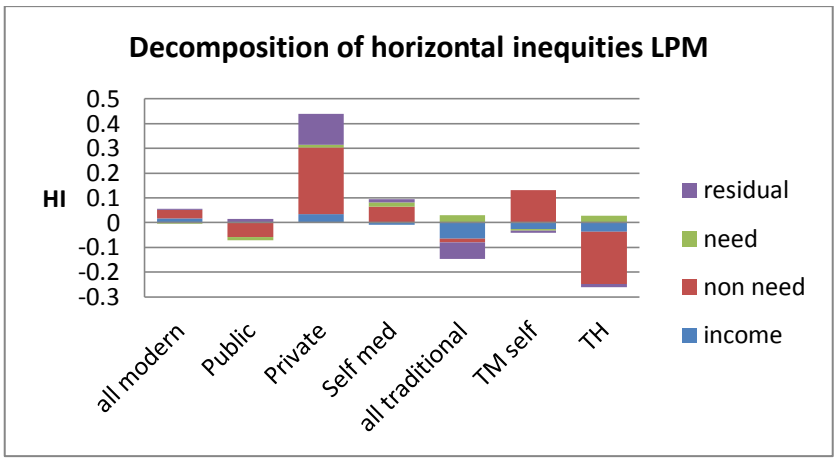


**source: author's own*

5.4.3 Decomposition

Estimates from the previous section are decomposed into income, need, other non-need and error factors ('residuals'). This follows equation C and visual analysis is provided in Figure 15 (probit version in Appendix 26). HI is the sum of all non-need indicators. As linear and probit models were shown to result in similar horizontal inequities, the linear decomposition is given here and the probit model is presented in Appendix 27. Contributions to each income, need and other non-need inequities can be either positive or negative, so the overall effect can technically be cancelled out depending on the different components. Thus, numerical breakdowns are also given in Table 19.

Figure 15 – Bar chart depicting decomposition of HI using LPM



**Source: author's own*

If no HI existed, only need factors would be prevalent in the bar charts. However, it is clear that non-need contributions (excluding income factors) are larger than need variables in all but the 'all traditional' category, and once income is taken into account within non-need contributions, all discrepancies in inequity are dominated by non-need, rather than need, factors. The decomposition (Table 19) shows that for all MC, income accounts for about a third of HI, with the richest quintile exerting the largest impact, while the sum of non-need variables amounts to exactly double the income contribution. In particular, the positive effect of living in GA contributes greatly to inequities. Need variables are near negligible for all MC, but point toward a pro-poor HI.

Significant contributions of non-need factors are carried through to public health care utilisation, with large regional effects once again. The overall income contribution is pro-poor and fairly small, but the richest quintile again demonstrates disproportionate use. Need variables cumulatively display pro-poor tendencies, with an index of -0.014. Individuals with poorer self-reported severity of health and who are older are more concentrated for poorer groups and have a greater likelihood of utilising public services (as demonstrated by negative indices of -0.017 and -0.006 respectively). Inequity is calculated as -0.055 for public care, and the influence of each non-need variable can be broken down. The main contributing factor is region, explaining 78.2% of HI. This is followed by presence of insurance (23.6%); being in the second income quintile (the first was omitted) (10.9%); being in the third income quintile and culture (both 7.3%) and

Table 19 - Decomposition using LPM

Variables	Modern Care				Traditional Care		
	All	Public	Private	Self modern	All	TM self	TH
CI	0.049	-0.057	0.403	0.085	-0.115	0.090	-0.234
95% interval	(0.019,0.080)	(-0.094, -0.020)	(0.278, 0.529)	(0.025, 0.145)	(-0.250,0.020)	(-0.008, 0.188)	(-0.326,-0.142)
HI	0.050	-0.055	0.303	0.055	-0.079	0.105	-0.247
95% interval	(0.021,0.080)	(-0.090, -0.019)	(0.177, 0.429)	(-0.003, 0.113)	(-0.219,0.060)	(0.005,0.204)	(-0.336,-0.158)
Income variables	0.017	0.003	0.034	-0.009	-0.064	-0.027	-0.036
Inc2	-0.007	-0.006	0.047	-0.003	-0.015	0.029	0.002
Inc3	-0.004	-0.004	0.026	-0.009	-0.003	0.001	0.007
Inc4	0.003	-0.001	-0.008	0.008	-0.00007	-0.006	-0.006
Inc5	0.025	0.015	-0.031	-0.005	-0.046	-0.051	-0.039
Need variables	-0.005	-0.014	0.012	0.016	0.031	-0.005	0.028
Self-reported severity	0.004	-0.017	-0.053	0.030	0.014	-0.009	-0.013
Chronic	-0.005	0.009	0.008	-0.015	0.007	0.005	0.022
Age-sex	-0.005	-0.006	0.021	0.0009	0.011	-0.0007	0.019
Non-need variables	0.034	-0.058	0.269	0.065	-0.016	0.132	-0.211
Insurance	-0.006	-0.013	-0.005	0.016	0.019	0.008	0.007
Education	0.004	0.005	-0.004	-0.005	-0.011	-0.007	-0.003
Christian	-0.004	-0.006	-0.005	0.005	0.029	-0.016	0.040
Farmer	0.0009	0.001	-0.002	-0.001	-0.005	-0.003	-0.002
Married	0.0009	-0.0003	0.011	0.0008	-0.005	-0.004	0.002
Culture	0.004	-0.004	-0.017	0.010	0.011	-0.003	-0.017
Modern facility	0.005	0.003	0.020	-0.0006	-0.008	-0.007	-0.006
Greater Accra	0.029	-0.043	0.273	0.040	-0.046	0.164	-0.232
Residual	0.005	0.012	0.125	0.014	-0.067	-0.010	-0.014

being in the fourth income quintile (1.8%). The remaining variables (being in income group 5, education, farmer, married, modern facility) all serve to reduce pro-poor inequity in public care utilisation (or, increase pro-rich inequity) owing to their positive contributions.

For private care, income, regional effects, and error term contributions are all very big and positive but the latter two are larger, suggesting that while non-need variables are important, they may be downplaying or overriding income effects. This is reflected by the negative contributions of the two highest quintiles, an unexpected result. As such, there may be some interaction effects between income and living in Greater Accra and the tendency of the highest income individuals not to reveal household income – thus their exclusion - may have contributed to this large error, in addition to other non-need factors which remain unaccounted for. Overall, non-need variables appear to be greater than need variables, and display positive HI. Region explains around 90.1% of HI, while the combined contribution of income is 11.2%. There is also a non-negligible contribution of culture (-0.017).

Self-medication by modern medicines indicate slightly pro-poor income indices (-0.009) but the overall non-need contribution is pro-rich (0.065) and the overall HI is positive (0.055). Need concentration indices sum to 0.016, with the greatest contribution coming from the self-reported severity variables, totalling 0.03, whereas once again, regional effects account for 72.7% of the impact of non-need inequity. Other important contributors to HI include insurance (29.1%); culture (18.1%) – which shows a positive index indicating more negative attitudes toward TC is concentrated among the rich; and income group four (14.5%).

Decomposition of TC shows income variables to be very important in explaining utilisation. The combined income index is -0.064, of which -0.046 is attributable to the richest quintile. The contribution of the richest quintile is 58.2% of HI. Additionally, 19.0% of HI is explained by income group two and 3.8% by income group three. This income effect is more than double the size of contributions arising from need variables (all positive), among which self-reported severity and age-sex dummies are significant. Again, region explains a large proportion of pro-poor utilisation of TC, in addition to education (13.9% of HI) but this is counter-balanced by pro-rich advantages among Christians and those who hold insurance. This picture, however, is incomplete as it is known that there are

discrepancies within sub-categories of TC. Indeed, the last two columns display results for TM by self and utilisation of TH. The contribution of being in income group two to HI is 27.6%, but this is counter-balanced by the even greater effect from the richest quintile. TM utilisation is also dominant in GA, with its contribution outweighing all other variables' contributions. While need variables are pro-poor for self-medication using TM, this is not the case for TH, whose sum of need variables are pro-rich, driven by those who suffer chronic illnesses and older individuals. Similarly, while being Christian contributes negatively to self-medication with TM, there are positive effects (i.e. pro-rich effects) for healer use. Further, although age-sex factors influence healer utilisation inequalities, pro-poor and pro-rich inequality is demonstrated for self-reported severity and chronic variables, respectively. Culture is also explains pro-poor utilisation of healers (6.8% of HI). Regional effects are once again important in explaining healer utilisation.

In sum, results confirm the important role of income and other non-need variables such as regional, insurance and cultural effects in contributing to horizontal inequity. Regional influence was particularly sizeable in most decompositions. In the majority of cases these non-need variables are shown to explain larger proportions of inequality than need variables, which demonstrate the importance of taking these factors into account when exploring utilisation patterns of different types of care providers.

5.4.4 Sensitivity analysis

The calculation of concentration indices, horizontal inequity, and subsequent decomposition are dependent on the variables included in analysis. As such, sensitivity analysis using three most prevalent named chronic diseases – hypertension, arthritis and ulcers - in place of the all-encompassing variable 'chronic', is undertaken, with all remaining variables as controls. The sensitivity analysis suggests that results are robust to this variation, as the column 'HI extension' in Table 20 shows. There are slight reductions in inequities for self-medication by modern drugs, suggesting that the utilisation of this type of care is sensitive to the type of chronic illness in question. However, overall, none of the results - by either LPM or probit - change significantly, so it is safely concluded that the original inequity estimates, along with their decompositions, are robust and appropriate.

Table 20 - Sensitivity analysis – HI extension

	CI	Original HI		HI extension	
		Linear probability model	Probit	Linear probability model	Probit
Modern care all	0.049	0.050	0.051	0.046	0.047
Public	-0.057	-0.055	-0.064	-0.049	-0.058
Private	0.403	0.303	0.511	0.312	0.534
Self	0.085	0.055	0.062	0.042	0.046
Trad care all	-0.115	-0.079	-0.083	-0.072	-0.073
TM self	0.090	0.105	0.122	0.107	0.125
TH	-0.234	-0.247	-0.280	-0.227	-0.268

**Source: author's own*

5.5 Discussion

This paper is the first to study horizontal inequity and decompose into explanatory factors in Ghana, and moreover, with the inclusion of the traditional sector. The level of inequity is shown to decrease if TC utilisation is considered, primarily because utilisation patterns of the poor are taken into account. The paper finds pro-rich inequities in MC use, in particular the private sector and self-medication by modern drugs, whereas TC is pro-poor, due to utilisation of TH.

Optimistically, the public health care system is pro-poor, suggesting that the insurance scheme in place is somewhat effective in protecting the poorest populations from excessive financial expenditures. On the other hand, there appears to be an aversion to utilisation – and hence a 'crowding out' of public systems by the rich, who instead utilise private facilities, as indicated by positive concentration and horizontal indices. Apart from the obvious conjecture that only those without financial barriers or means to hold private health insurance can afford to utilise private care and thus off-setting some public care use, pro-poor public care inequities may manifest because the rich have a higher rate of time preference, so the opportunity costs for seeking care from public systems are quite large, even though direct costs may not be insurmountable. For example, richer quintiles are more likely to be employed in the formal sector, and are thus less inclined to take time off

work to visit public health care providers where queues and waiting times might be long. As such, the rich do not have to wait, in terms of provider choice ordering, to use private systems (see Paper 2). This is confirmed by the raw data which affirms that those who use private care do so almost immediately, as a first choice of provider. There is also perhaps a stigma to using public health systems, especially if these facilities are viewed to be of poor quality. This has previously been found in literature (Leung, et al.,2007; Makinen, et al.,2000). Additionally, the rich may be demonstrating and signalling their higher socioeconomic status by avoiding public systems. These results must be treated with caution, however, especially due to small numbers of users, resulting in large errors and unstable estimates when comparing linear and nonlinear versions. Looking at private care, therefore, requires a more comprehensive range of variables incorporating factors such as risk aversion, time preference, and signalling and an exploration of econometric techniques to gain more accurate measures of inequity.

Self-medication using modern drugs is pro-rich, a result which may surprise some who believe it to be an action mostly taken by poorer individuals who cannot afford formal health care. However, unlike the 'free' NHIS system, self-medication requires out-of-pocket payments to be made, hence might be seen as an expensive way to treat symptoms, especially if illnesses are chronic. One study (Health Action International & World Health Organization,2005) finds that medicines are unaffordable to a large proportion of the population in Ghana, with an estimated 11 days' worth of work by the lowest paid unskilled government worker to purchase enough drugs to last one month for an adult with peptic ulcer (a top three chronic illness found in this particular dataset, also included in the robustness check) and the same treatment with innovator drugs costs eight times as much. Medicine prices are undoubtedly higher at private pharmacies (as opposed to LCS) where personnel are required by law to have appropriate qualifications. Clearly, these costs are prohibitive to the poorest segments of society, who are typically farmers and have larger household units, multiplying the chances of a family member falling ill. Further, the prevalence of self-medication is extremely high in Ghana (van den Boom, et al.,2008), so the pro-rich inequity may be a sign that richer individuals are able to use multiple sources of care, thus self-medicate in conjunction with other treatments more so than the poor.

Analysis of inequities shows how the poor use traditional systems instead, partly owing to income constraints and cultural preferences. Although overall, TC is pro-poor, these results are largely driven by the effects of TH use rather than utilisation of TM by self. In evaluating the latter, patterns of inequity can be explained by differences in utilisation rates at the regional level: looking back at descriptive data, 65.0% of users of TM by self were from the GA region, with the remainder coming from UW. This is in contrast to utilisation of TH, who were only used by 19 of 344 (5.5%) with needs in GA. In line, the regional dummy effect is strongly negative. The extreme results in HI are indicative of the need to distinguish between TM use per se and TM use through healers. While many Ghanaians believe in the power and efficacy of herbs and plants to cure illnesses, faith in healers errs on the side of caution, especially among the biomedical profession (Gort,1989; Green,1985). The strong effect of the religion variable suggests that two-thirds of users of TH are Christian, and over half classified themselves to be of Catholic denomination, whereas Catholics comprised a fifth of all those who used TM through self-medication. It therefore appears that Catholics are more inclined to be sceptical of healers and therefore utilise them less, but not necessarily TM. The role of religion in TH utilisation has previously been documented (Kim & Kwok,1998) and suggest a need for in-depth analysis by denomination. Culture was also shown to be a strong contributor of pro-poor inequities. Those with favourable attitudes toward healers are more likely to use them. One possible explanation for this is the financing mechanism, which is both flexible and Pareto optimal: Leonard (2003) theorises that healers and patients operate within an efficient and fair system of outcome-contingency; effectively, he argues that patients and healers come to a mutual understanding about payment, and patients only pay if treatment proves successful. These types of informal bargaining mechanisms illustrate the importance of negotiation skills and are arguably only accepted within close-knit social circles (i.e. the local community) which undoubtedly serve to further crowd out the rich who are less likely to live in communes.

When robustness checks are run using three chronic conditions in place of a binary indicator, the overall findings are not altered, but inequities reduce slightly for self-medication by modern drugs. This suggests that self-medication by modern drugs is sensitive to the type of illness an individual experiences, rather than non-need variables such as income. This could be explained by the fact that individuals with one of the three chronic conditions (hypertension, arthritis, and ulcers) seek care from multiple providers

(including themselves) more so than individuals with unidentified chronic illnesses, thus serving to reduce HI estimates once chronic conditions are named.

Governments for whom universal access to health care is important are faced with resource constraints and pressures to contain costs. However, because income and other affordability factors are mutable by policy, viable options exist and through longer term investments, governments will ultimately be rewarded with healthier and more productive populations. Given that inequity is a normative concept, policymakers must first consider what levels of inequity are acceptable. While conventional studies have failed to take into account TM/H utilisation, this paper has shown that taking TC into account is critical to gain a fuller picture of inequality and inequity. Thus, policymakers must incorporate this very popular mode of care into analysis. Further, the study encourages deeper analysis by taking sub-categories of care by provider type, as the poor and rich are shown to have differing utilisation rates within the broader MC and TC categories.

Large contributions of the regional indicator suggest that MOH's blanket – national - egalitarian principles are somewhat lacking. This echoes the findings of Asante et al (2006) who find resource allocation between regions to be highly inequitable. It is likely that these inequities also exist at the district level, with a tendency for funding to be targeted nearer district capitals rather than in rural locations. This suggests an urgent need for a diversion of resources, both financial and human, to the poorest and often most neglected areas of the country. In so far as the national insurance scheme appears to have been effective in providing coverage for the poor, this indicates that targeted policy interventions can pay off: in Taiwan, Leung et al (2007) found that utilisation of western doctor visits and hospital admissions were pro-poor, and attributes this to specific policy changes including the provision of service-on-wheels in rural areas and waiving co-payment for rural residents. Therefore, even if such schemes can take time to affect inequity (Victora, et al.,2000) there is considerable merit in pursuing targeted policy.

The finding that public systems are pro-poor is perhaps a testament to Ghana's health insurance scheme and the government would do well to push this scheme as far as financial capabilities allow. Problems notwithstanding, it is essential to keep expanding its coverage and scope to further encourage public facility use. Outstanding barriers to

obtaining insurance, such as premia and registration fees, also need closer examination. Where individuals are unable to afford these, policies to lower or scrap fees are necessary to ensure the poorest are not deterred from registering and renewing. Larger cross subsidisation from richer groups, who are automatically registered and pay 2.5% of their pay toward the health insurance scheme (National Health Insurance Authority,2011a), could be used to fund these changes. While such policies may be politically challenging, there is some evidence to suggest that the rich are willing to make 'altruistic payments' toward the poor especially if schemes are local in nature (Onwujekwe et al 2002) and such redistributive policies would make for a more equal society in general.

In the absence of expanded insurance, other mechanisms to facilitate payment and increase affordability of MC systems are necessary. One key reason for TH use by the poor is the healers' skill in ascertaining clients' ability to pay, such that payment modes include payment-in-kind, instalments or are outcome-contingent. It would seem that allowing for these types of payment mechanisms might make modern services more attractive for the poor. For example, a recent survey undertaken by MeTA in Ghana shows that only 18% can get credit from private pharmacy if needs arise and 23% agreed that 'in public facilities, health providers take into account our ability to pay when they decide which medicines to prescribe'. Similarly, taking other popular elements of healer use (their accessibility, acceptability, and availability) and replicating them as far as possible within the modern sector may increase utilisation. For example, the same survey shows that 81% agreed that they would use public health care facilities if opening hours were more convenient.

The large inequities seen in the private sector create a highly unequal, two tiered system and reinforce the view that private facilities are purely the domain of the rich. This does not have to be the case. Private facilities, unlike public facilities, are not automatically accredited into NHIS, but the government does allow for this and a significant number of facilities are indeed participants in the scheme. Yet, even if individuals held an insurance card which was valid for private facilities, the popular perception is that private facilities are expensive. In the MeTA survey, 67% agree that medicines are more expensive at private pharmacies than at public health care facilities. By encouraging private providers to be accredited to the NHIS and then making this known to the public, utilisation of

private providers would be more equal and further, would undoubtedly ease the load off public systems.

Given the popularity of self-medication in Ghana and other developing countries (Goodman, et al.,2007; Okumura, et al.,2002; van den Boom, et al.,2008), strategies to make self-medication more affordable are needed. While generic substitution is actively encouraged within Ghana's prescribing system, the MeTA survey recently found that only 8% of those surveyed had heard of the word 'generic'. Of these, 34% stated that generics were lower in quality than branded medicines and only half believed that they were cheaper than brands. Clearly, better quality advice and awareness of generic and branded medicines is needed to equip individuals with as much information as possible when purchasing medicines.

The study was not able to analyse more types and levels of care, which may have exposed different inequity patterns, owing to small sample sizes. An analysis by level of public provider, to include hospital (inpatient, outpatient), primary health care, and 'lower' level community health practices may have revealed the poorest individuals visiting hospitals immediately, by-passing lower levels in order to benefit from what is perceived to be better quality care, even where primary care may suffice (Habtom & Ruys,2007). This has cost implications for both users and providers, and is an urgent research priority.

In line with the common criticism of equity analysis, this study looks at the quantification of utilisation but not the quality of services utilised (van Doorslaer, et al.,2004). As such each utilisation episode is treated equally no matter what length of visit or quality of care is provided. Further, CI do not necessarily provide an intuitive meaning (Koolman & van Doorslaer,2004) because they are not expressed in natural units: it is unclear, for example, whether a CI of 0.5 is twice as unequal as an index of 0.25. However, by applying the idea of income redistribution to the indices it is possible to reinterpret indices more intuitively such that an index of 0.5 would require a lump sum distribution of 50% of the total utilisation from the richest to poorest half of the population to equalise utilisation levels (Koolman & van Doorslaer,2004). Another shortfall of using the CI method is that indices can equate to zero if utilisation and need values coincide (for example, the pro-poor component in the distribution can cancel out the pro-rich component, or vice versa). Methodologically, endogeneity of income is ignored and decomposition results can be sensitive to the included variables. In turn, the measurement of variables themselves

relies heavily on proxies: for need, self-reported indicators of health are purely subjective and from the individual's perspective. This is made even more refutable if the questionnaire was answered by a proxy, as was the case for mothers and their children, or wives for their husbands. Indeed, Sutton et al (1999) offer further insights and problems of using self-reported morbidity. During data collection respondents were encouraged to respond as accurately and openly as possible, but inevitably answers are subject to recall and revelation bias. For example, if individuals felt stigmatised for using certain providers of care they may fail to mention it, resulting in an underestimate of utilisation and biased inequity measures. Future research should be directed toward analysis by region with the use of information by district, and deeper investigation of private care to reduce errors. Further, a time series analysis - per Wagstaff et al (2003) and Bago d'Uva et al (2009) - would enable the analysis of changes over time especially given Ghana's rapid economic growth rates, which could serve to increase inequality.

5.6 Conclusion

Overall, this study encourages the incorporation of TM in analysing the egalitarian goals of many health systems around the world. For policymakers, the study offers an alternative notion of inequality and inequity by taking into account the oft neglected traditional sector: if decisions reflect both constraints (including income) and preferences, and individuals are free to choose service providers, the pro-rich inequities frequently found in MC utilisation may not necessarily be detrimental and merely be reflecting cultural preferences for alternatives (Habtom & Ruys,2007). In the case of Ghana, equity issues seem somewhat halfway achieved, with the public sector seemingly serving the poor population well. Ghana has seen a fall in poverty and increases in income levels in the past few years and with the introduction of NHIS, modern health care use is becoming more popular. Nonetheless TC utilisation remains high and prevalent and larger disparities in income are apparent. Accordingly, as the rich get richer, these disparities seem likely to grow and the continuation of increasing health insurance coverage is vital in maintaining pro-poor utilisation in the public sector. Such policies would ensure reductions in inequities and ultimately, health inequalities.

Conclusion

The overarching objective of this thesis was to investigate rationales for TM utilisation and its equity implications using Ghana as a case study. Variations in utilisation rates of TM had previously been explained disparately, by economics and anthropology. These different disciplines largely remain confined to using their own approaches and methods to explain health-seeking behaviour in countries with pluralistic health systems. Emphasis has also been on modern medicines, such that there are limited data on TM use at the household level, resulting in an incomplete analysis of health-seeking behaviour. This thesis has sought to contribute to closing a gap in the literature by employing a unique survey which considered the traditional health system as one of many forms of care, utilised at any point during the course of illness. Ideas were amalgamated from multiple disciplines and analysed using the frameworks of Andersen's (1995; 1973) utilisation model and institutional economics. Specifically, four distinctive aspects of utilisation were explored: dimensions of cultural attitudes; the role of income in shaping utilisation patterns; the reasons for satisfaction with use and the inequity in utilisation of different providers. This Chapter begins with an overall summary and discussions by paper, and outlines broader policy implications. Limitations and future research agenda are presented in the concluding section.

6.1 Summary and discussion of results

The conceptual framework presented in Chapter 1 suggested that utilisation could be modelled using ideas from institutional economics, and explored statistically using variables based on Andersen's (1995; 1973) model. Andersen originally formulated the model to cover only formal services rather than medicine use per se, and as such, misses the informal, society-based decisions and institutions – like TM/H - in countries with pluralistic health systems. In this respect, the biggest conceptual contribution of the thesis is the inclusion of TM/H (including self-medication) within the modelling of health care utilisation.

6.1.1 Overall answer to the research problem

Although there are many possible rationales for TM utilisation, three main explanations - cultural, economic and procedural – are provided in this thesis.

- Chapters 2 and 4 (Paper 1 and Paper 3, respectively) argued that health beliefs and attitudes are formed within a societal context: cultural beliefs about illness causation, interpretation, diagnosis and potential cure evolve according to social norms;
- Chapter 3 (Paper 2) showed how income is a significant factor in explaining the type and order of providers chosen;
- Chapter 4 (Paper 3) demonstrated that individuals gain satisfaction from rituals and healing processes involved in utilising TM/H over and above any perceived health benefits.

Utilisation of different providers, in turn, is manifested in inequity:

- Chapter 5 (Paper 4) argued that estimations of inequity fluctuate once TM/H are accounted for.

TM/H are important sources of care (used over and above their potential curative effects) especially for the poor and where formal institutions have failed to fulfil health needs, and modern systems do not necessarily constitute a perfect substitute for TM/H. Essentially, traditional systems offer a self-regulated, social insurance mechanism, and such informal institutions shape health-seeking behaviour. The currently dominant model utilisation as based purely on the scientific paradigm (that medicines are valued for their biomedical properties and little else), but this thesis argues that health-seeking behaviour is shaped by much more than purely the goal of acquiring medicines. Summaries by paper are presented below.

6.1.2 Paper 1 - Cultural reasons for continued utilisation of traditional medicines

Culture is commonly put forward as a reason for TM/H utilisation within anthropological literature, which posits that individuals hold certain beliefs about the causes of illnesses and disease, and act in accordance with those beliefs. As a result, studies investigating the role of culture on health-seeking behaviour have remained largely qualitative in nature, using culture as a descriptive notion. Such approaches are typically limited to observational analyses and cannot quantify which dimensions of culture matter most.

Economists, on the other hand, have begun to explore ways to measure culture and its effect on economic outcomes (e.g., growth) but have not applied this to health care utilisation. By combining insights from both disciplines, Paper 1 analysed various dimensions of culture that affect TM/H utilisation.

Accordingly, the first paper queried, 'How do cultural attitudes toward TM affect its utilisation?' Methodologically, this study proposed that the quantification of culture is both appropriate and possible if clearly defined and a unique dataset was designed to elicit attitudes and beliefs (on a 5 point Likert scale) about various dimensions of TM/H. Analysis of cultural attitudes towards TM indicated that trust, perceived ability to cure and healer knowledge were the most important factors in explaining utilisation. Cultural explanations were also shown to be important after including an income proxy, a dummy variable for insurance coverage and other control variables. Culture was also compiled into a single index and an instrumental variables approach combined with discrete choice modelling allowed for the evaluation of ethnicity as an indirect driver ('instrument') of utilisation (on the assumption that ethnicity shapes attitudes and beliefs, which are in turn associated with utilisation). Significant effects for the cultural variable were retained. Checks using an alternative income indicator and regrouping opinions into a 3 point scale showed this result to be robust.

These findings lend support to exploring the idea of culture as a key reason for the continued utilisation of TM. The paper strongly suggests individuals form opinions according to their social environment, such that culture is a learned, 'collective cast of mind', (Kuper,1999, p. 93). Medicines utilisation and health-seeking behaviour should therefore be analysed bearing in mind the individual's social context and the beliefs and attitudes of others around them (Tawil, Verster, & Oreilly,1995). Empirical evidence, both in developing and developed countries, also supports this view. For example, social, combined with individual interventions, are believed to be key in reducing cardiovascular risk in Sweden (Weinehall & Lewis,2001). Similarly, Jana et al (2004) show efforts to reduce HIV rates among sex workers in India are more successful where community interventions target community, group and individual factors together, under what is termed a 'multi-level approach'. Such multi-level approaches are also thought to be more sustainable and self-synergistic than single-level interventions (Campbell,2001; Gillies,1998; Schensul,2009).

The consideration of cultural dimensions in health seeking behaviour is especially important in countries like Ghana where communities are close-knit and decisions – whether health, economic or otherwise – are routinely group-based. This holds particularly in rural or remote areas where people may be more reliant on informal systems of care, including that of the household (van den Boom, et al.,2008). Indeed, individual attitudes toward TM/H are likely to be constrained by social influences and accordingly, fluctuate as societies are exposed to, and accept (or reject), alternative ideas.

6.1.3 Paper 2 - Income in shaping utilisation and health care-seeking behaviour

Income is recognised to be a major enabling factor for utilisation of health care services and determining patterns of health-seeking behaviour. The majority of studies to date, however, analyse only formal health care services (for example, utilisation of public or private providers) and further, model utilisation as a one-time event, disregarding the possibility of multiple sources of care for a given health need. Chapter 3 (Paper 2) sought to fill this gap in literature by looking at the role of income in affecting utilisation patterns when modern and TM are modelled together. The paper methodologically expands on existing analyses to include informal (traditional) medicines utilisation and by allowing individuals to state up to four different sources of care, in order of use, for one illness episode. Care-seeking from traditional and modern providers was modelled using joint estimation techniques of biprobit modelling (which classes individuals into one of four categories depending on the combination of type of care taken: none at all, only modern medicines, only traditional medicines, both) and ordered logit (for an individual's revealed choice of provider in sequence: first, second, third or never). These modelling techniques are appropriate for pluralistic health systems where a large number of providers exist. Income, the key independent variable, was proxied by log equivalised per capita household expenditure.

Findings show that income significantly affects choice of provider, with rising income associated with greater probability of using MC and decreasing probability of using TC. One possible interpretation, also found in literature, was that richer individuals have greater means to access modern health care (UN Millennium Project,2005), owing to

geographic accessibility (richer people are more likely to live in urban areas where the majority of facilities are located, or have greater mobility to reach them); affordability (richer individuals can afford modern medicines because they can pay out-of-pocket or are more likely to be covered by insurance); availability (supply of modern care is better in richer areas); and acceptability (richer individuals may be more exposed to information about modern medicines leading to their greater acceptability).

The paper also considered health-seeking behaviour as a chain of actions and reactions rather than a one shot decision. This idea follows from studies that suggest individuals view illness and treatment-seeking as iterative processes as illness is a continuous transformation from one condition to the next (Hausmann Muela, Muela Ribera, & Nyamongo,2003; MacKian,2004; van der Geest, et al.,1996). Findings showed that in many cases people felt it necessary to utilise two sources of care, although very few look for third or fourth sources of treatment. This is in line with Mwabu (1986) who shows that individuals often seek care from multiple sources. Further, it was at the second source of care that utilisation of TM/H becomes predominant: the same data show that by revealing second sources, it more than doubles and triples the incidence of TM/H in acute and chronic cases respectively (Sato 2012). Findings revealed that poorer individuals are also more likely to use multiple sources whereas the rich use fewer providers. While both the poor and rich most frequently seek care from modern sources first, at the second source the poor are more likely to turn to TC. Together, this suggests that the poor tend to use less effective methods for a cure and therefore must turn to multiple providers after the first method has failed. This can be problematic if individuals delay seeking treatment from professionals. This is thought to be common for those who have firstly tried self-treatment (Nyamongo,2002; Ryan,1998), but is also the result of lack of basic knowledge and education in handling symptoms (Meyer-Weitz, Reddy, Van den Borne, Kok, & Pietersen,2000) and can result in longer-running health problems where illnesses have progressed and individuals are later forced to visit higher level (secondary and tertiary as opposed to primary) providers. In turn, individuals who visit these providers without insurance are subject to considerable financial outlays[95].

[95] One report claims that secondary and tertiary health care delivery in Ghana is 'mostly an income generating area of health' operating on a out-of-pocket payment system where insurance is lacking (Salisu & Prinz,2009, p. 26).

The frequent movement from one mode of care to another and the utilisation of systems in conjunction with one another is analysed through the syncretic approach (Hausmann Muela, et al.,2002). The authors show that people amalgamate the two - sometimes conflicting - systems. In Tanzania, modern and traditional services exist side-by-side, because traditional beliefs have been adapted to the available biomedical information. For example, although individuals believe malaria cannot spread from person to person directly, twins are exempt from this rule because they are believed to share everything, including blood. Individuals are strongly motivated by these understandings even if they accept modern explanations. Individuals also syncretise different viewpoints to switch between care providers based on past experience. For example, even if individuals recognise mosquitoes to be the vector for malaria, if biomedical solutions have not cured it in the past, individuals will hold the belief that the cause must be something other than mosquitoes: 73% of individuals stated that malaria was caused by witchcraft, the upshot being that biomedical solutions are not sufficient (Hausmann Muela, et al.,2002, p. 410).

Given traditional understandings of illness, disease and treatment, individuals will deem TM/H a viable option and continue to use this form of care even if they gain access to modern medicines. However, the finding that patterns and ordering of utilisation differ according to income suggests that economic constraints pose a severe limitation when deciding which provider to utilise. Modelling health-seeking behaviour should therefore reflect such constraints and analyse modern and traditional systems together, rather than separately.

6.1.4 Paper 3 - Procedural utility from traditional medicines utilisation

Chapter 4 (Paper 3) examined how individuals rated TM/H and offered a final reason for continued utilisation. Previous research had explored satisfaction with the outcomes of TM/H utilisation but no research had analysed satisfaction gained from the *processes* involved in consumption. The paper sought to fill this void by evaluating variations in satisfaction according to whether rituals (such as incantations, prayers and animal sacrifice) and other healing processes were carried out. Users of TM/H generally reported high satisfaction rates, but those who had carried out rituals and other healing processes were more likely to report higher utility than those who did not. Thus, the paper explored the hypothesis that individuals were gaining PU from processes such as rituals and healing

processes, over and above the (traditionally measured) OU arising from perceived health benefits.

The main method used was ordered probit modelling to ordinally rank satisfaction scores. PU was measured by a dummy variable indicating whether an individual had used rituals or healing processes when taking TM. Firstly, in line with descriptive data, ordered probit models showed that individuals using rituals were more likely to report high levels of satisfaction. This result held even when controlling for a range of illness characteristics, financial capability, societal environment, socio-demographic and locational characteristics. Sub-samples according to region were also tested and showed similar results. Perceived health benefits were then measured using the EQ5D tool, which evaluated five dimensions of health: mobility, self-care, daily activities, pain and anxiety. To directly test OU against PU, these measures were used as extra controls. Again, rituals had significantly positive effects on satisfaction. Robustness checks were carried out using sample selection models and alternative measures of satisfaction and OU, all of which showed the importance of PU and were suggestive of a hedonic placebo effect from the consumption of TM/H. The main advances of this paper include the application of PU to TM/H, and the direct measurement of OU.

PU was argued to accrue from good quality interaction between patient and healer and adhering to social norms of TM/H utilisation. Healers typically provide holistic, patient-oriented care, almost acting as a counsellor, and relationships between the healer and individual were likely to be very amicable. Visiting a healer was also suggested as being in line with explanatory frameworks for illness in traditional societies, where the concept of efficacy involves more than purely biomedical effects. Individuals were also possibly gaining utility from acting out pro-social behaviours and conforming to societal norms.

Given that satisfaction can reflect both procedural and outcome utilities, it is important to separate these effects when measuring satisfaction and analyse which element is more valuable to users. The recognition that explanatory frameworks (and hence the importance of rituals) differ from those provided within the biomedical arena is also important to the identification of possible sources of satisfaction. If users are gaining utility from processes rather than outcomes, lessons on service provision can be learnt and transferred to the modern sector, for example, through improved physician training and

interpersonal communication. By doing this, it would be possible to maximise total utility from both procedural and outcome aspects.

The three papers above provide rationales for TM/H utilisation. In the subsequent paper, the distributional consequences of utilisation are considered.

6.1.5 Paper 4 - Inequality and inequity in health care utilisation

In Paper 2 it was ascertained that income played a considerable role in shaping utilisation patterns and care-seeking behaviour. In particular, individuals with lower income were shown to have a larger likelihood of utilising TC while richer individuals mostly sought care from modern health providers. As countries develop economically and health systems evolve, governments face increasing pressures to shift their focus from the provision of basic universal care toward increased coverage and equitable access. In Ghana, a key policy goal is for all individuals with health needs to access health care no matter their financial status. However, there has been no study looking at utilisation biases toward different providers especially with respect to TC. Further, analyses have not differentiated between TM use by self-medication and TH use, nor do they investigate factors contributing to inequity. Paper 4 therefore sought to compute inequality and inequity firstly by modern and TC use, then by sub-categories of care within these groupings (TM by self-medication; TH; private sector; public sector; modern medicines by self-medication). Inequities were then decomposed into their constituent parts.

The main methodology adopted was regression analyses (in which utilisation is the dependent variable) that allowed for the calculation of CI for inequality (which did not standardise for need factors such as age, gender and health needs) as well as the HI index for calculation of inequity (which took these factors into account). Decomposition analysis then showed the relative importance of non-need factors in contributing to the inequity. Both linear probability and probit models were run to cross-check results. The main value added in this paper was empirical, with the application of this methodology to individual utilisation data on both modern and TC, and the exploration of sub-categories to find divergent patterns within.

Findings revealed pro-rich inequality and inequity in modern care use while TC was pro-poor. Further, by including TC into calculations, overall inequity of utilisation decreased. However, it was only by breaking down into sub-categories of care specific patterns

became apparent. Private care inequity (the first sub-category analysed) was considerable, suggesting that overall MC inequity was largely driven by this sector. Only individuals with the means to afford private health insurance or pay directly out-of-pocket are able to use private health care. This is a tiny fraction of the Ghanaian population, approximately 1% (Sulzbach, Garshong, Benahene, & Bethesda,2005). Without insurance, private health care (asides from self-medication by visiting a private vendor) remains out of reach for the majority of the population. Van den Boom (2008, p. 8) finds that on average, a private visit costs about $10 per session: in a country where the daily minimum wage is $2 (3Ghc) and a significant proportion are subsistence farmers, private care is simply an unaffordable luxury. Further, private providers tend to concentrate themselves in urban areas and more affluent regions (see table of providers by region in Appendix 5), thus lack of supply may be confounding inequity, and vice versa. Where the private sector falls out of government control and are subject to market forces, even larger inequities may be seen. In carrying out the decomposition, region and income were very strong contributory factors toward inequity in the case of private health care, as compared to any other category of care. In contrast, being in GA had negative effects on public health care utilisation, suggesting some substitution effect toward private care in this region. Having negative attitudes toward TM/H (as measured by the culture variable) also contributed largely to private care inequity, suggesting an inverse relationship between private care and TM/H utilisation.

The second sub-category of MC, public care, showed a pro-poor bias. On the whole this is an extremely optimistic finding as it suggests that the poor are able to access these public systems. The government's egalitarian goal seems at least halfway achieved. However, in practice the insurance designed to be used in these systems remains far from free as not all groups are exempt from payment of registration and renewal fees (see Appendix 6 for full listing by groups). This strongly discourages individuals from replacing expired cards or to even obtain a card in the first place and is particularly problematic for individuals with chronic illnesses who require a continuous supply of medicine. Further, these findings tell only one aspect of the story. Pro-poor utilisation of public systems suggests that the rich have rejected these services and substituted away toward alternative providers. Deficiencies in the public system such as long waiting times, perceptions (and/or realities) of bad quality service and staffing problems may be discouraging use by the rich. Indeed, the literature provides some evidence of poorer quality in public systems: in 2006, the GHS

found clients to be dissatisfied with long waiting times, poor staff attitudes, illegal charges, high costs and dirty environments (Ghana Health Service,2007c). Further, people perceive there is better availability of medicines at private facilities (Arhinful,2011). Thus, even if the poor have been patronising public services there are no revealed indicators to ascertain quality standards.

The recognition that sub-categories are not homogenous is particularly important when analysing TC. Interestingly, inequity indices showed that the rich shunned TH but not TM (by self-medication). This confirms the scepticism toward healers as opposed to the herbal preparations alone; an effect magnified by the finding within the decomposition that individuals living in GA (the richer region) had a strong tendency to use TM but are extremely averse to healers. Further, the contribution of non-need variables (excluding income) appear much greater than that of income, suggesting that healers were predominantly located in UW and hence their utilisation is greater, but TM were used in both regions and by both rich and poor individuals. Such findings have previously only been qualitatively documented, with a blanket assumption that TM and TH can be considered equal. This analysis shows that such assumptions do not necessarily hold. Chi (1994) also confirms this necessary distinction when analysing Chinese medicines in Taiwan. Chinese medicines, based on family-owned prescriptions (secretive and handed down through generations) are cherished and frequently used whereas Chinese Medicine Practitioners (CMP) are less popular: 'when studying the population's preference for Chinese medicine, therefore, it is important to differentiate between their use of CMP versus Chinese medicine users as the latter tend to be far greater than the former' (Chi,1994, p. 316).

Self-medication was slightly pro-rich for both traditional and modern medicines, reflecting the popularity of self-diagnosis especially in developing countries (van den Boom, et al.,2008; van der Geest, et al.,1996, p. 165). In terms of financial outlay, self-medication may be seen as either the cheapest form of care (behind not taking any care at all) or one of the more expensive sources (if medicines are obtained from unregulated markets or without insurance coverage). In the case of self-medication by modern drugs, individuals are able to obtain this from numerous sources and in varying quantities, which may serve to lessen the financial burden. For example, individuals may use drugs already available at home, visit the LCS (of which there are thousands across Ghana, often around the corner

even in remote locations) and receive a single dose rather than a whole pack of medicines, obtain supplies from a travelling drug seller, or ask friends and relatives for medicines. In such instances, outlay is minimal and could hardly be considered a burden. However, if an individual visits a private pharmacy where prices are not regulated, and larger-than-necessary packs of medicines must be obtained, this is likely to cause more financial hardship and the probability of self-medication by individuals with lower income declines. With TM the story is similar. If an individual is able to identify which herbs are needed, they are often able to pick it by themselves at no cost. On the other hand, if they buy herbal preparations from herbal shops or other vendors, both of which are on the open market, costs can be substantial.

Overall, the study showed that depths of inequality and inequity varied when TM/H use was taken into account and sub-categories are analysed. Decompositions also allowed for deeper investigation of the contributions of different factors. Thus, where TM/H use is common, the incorporation of this element of care is necessary for a fuller quantification and understanding of inequality.

6.2 Policy recommendations

Although the analysis has only considered two regions within Ghana (and is therefore not necessarily representative of the whole country or other countries), tentative implications for the policy environment are suggested. Some of these recommendations (the overarching recommendations, points 1, 2 and 3) are general and apply to any country with a pluralistic health system, while recommendation 4 is Ghana-specific.

Overarching recommendation

The thesis supports the view that modern health care systems are not perfect substitutes for TM/H (Hausmann Muela, et al.,2002; Press,1978), and as such, policymakers must consider carefully whether individuals are using TM/H due to choice, or inaccessibility of modern medicines. Some evidence exists to support the 'choice' reason: TM/H appear to be socially acceptable (Paper 1) and bring procedural utility (Paper 3) to users. In this case, policies that disregard TM/H or attempt to replace TM/H with modern medicines may prove politically unpopular. However, it is also clear that those with fewer economic constraints (proxied by income and location) are more likely to utilise modern care (Paper 2 and Paper 4). For policymakers concerned about equity, the thesis suggests that the

inclusion of TM/H utilisation into analysis can be equity-enhancing. All this suggests that in the future, much more attention to users' perspectives of TM/H within the study, design and implementation of health systems in countries with pluralistic forms of care is needed.

Policymakers face a tough challenge: should TM/H be promoted, thus encouraging use, or should their focus purely lie in managing better access to modern facilities? Policy documents or directions do not necessarily reach remote areas of Ghana where TM/H use is likely to be triggered by hearsay, word of mouth, and learning-by-doing. The provision of adequate modern facilities – especially in rural areas – is crucial, but individuals may not change health seeking behaviours merely because more sources of care are on offer.

Within health care policy, a further debate can be framed around welfarist versus extra-welfarist points of view (Brouwer, Culyer, van Exel, & Rutten,2008). Welfarists aim to maximise utility across all individuals, and although the welfarist view is not necessarily incompatible with the equity objective it has often been criticised for focusing on efficiency (Hauck, Smith, & Goddard,2004). On the other hand, extra-welfarists advocate that the most relevant characteristic in evaluating alternative policies is health outcomes , and need for health care - rather than individual demand - is the guiding principle upon which to allocate resources (Gyrd-Hansen,2005; Hauck, et al.,2004). Thus, from the point of view of welfarists, social institutions such as TM/H are not good or valuable in themselves but only for their consequences (specifically, their effect upon health outcomes) (Mooney,2001). Paper 3, however, suggested that if policymakers took into account the value of procedural utility, above and beyond outcome utility, the level of overall satisfaction would increase. Accordingly, Ng (2004, pp. 258-259) suggests:

> *'we want to consume products that satisfy our preferences, so going from the analysis of products to the analysis of preferences is going a layer deeper, but what we want ultimately is happiness or true welfare…not just preference satisfaction…Ultimately it is the degree of happiness that counts, more so than preference'.*

This thesis has shown that users of TM/H appreciate its social and cultural aspects in addition to the biomedical properties of herbal products. However, it is this very 'holistic' approach which makes its evaluation difficult since a broad range of disciplines must be drawn upon to understand its utilisation. Policymaking is further hampered by the lack of scientific evidence on the biomedical properties of herbal products, and while some

research centres (such as The Centre for Scientific Research into Plant Medicine in Mampong, Ghana) test and classify herbs, it is highly unlikely that all products ever used by Ghanaians will come under such scrutiny – by the policymakers' own admission, many traditional practices remain shrouded in secrecy (Ministry of Health,2004a). If this is the case, the concept of PU is an even more important avenue to explore in order to understand more fully the role of patient-healer interactions.

An extra-welfarist approach when evaluating modern and traditional systems in Ghana would therefore better accommodate the complex attributes of TM/H. If policymakers recognised that TM/H has intrinsic, as well as instrumental, value, policy priorities would lie more in understanding the social aspects of health and well-being, rather than directly comparing TM/H with modern medicines. Based on this, four specific recommendations are outlined below:

Specific recommendations

1. Recognise multiple care-seeking and encourage revelation of medicines used.

Paper 2 analysed utilisation patterns to find that individuals were typically using multiple sources and were also likely to evaluate illnesses as a chain of reactions rather than a single event (as is commonly assumed in household surveys). While it is difficult to keep track of every action taken, physicians should make it standard practice to enquire about TM use to increase the chances of the individual's full drug history being revealed. As it stands, TM/H appears shrouded in secrecy, such that patients do not systematically reveal that they have been taking TM and knowledge about potential risks (for example, drug interaction effects) is poor (Howell et al.,2006; Mills, et al.,2005). In turn, regulatory bodies need to document clearly the potential side effects from herbal medicines and drug interactions among more frequently used combinations in order that physicians have such information to hand, and can prescribe accordingly.

2. *Draw upon cross-cutting themes to maximise utility.*

Traditional systems of care are used because they are aligned with cultural attitudes (Paper 1) and provide procedural utility (Paper 3). To a certain extent, it is possible to draw upon preferred characteristics of TM/H and transfer them to the modern sector. For example, physicians can be encouraged to build trust with their patients through better

communication (as per recommendation one). Similarly, while in the traditional sector, rituals and other healing processes increase utility, modern sectors should focus on equivalent process indicators, such as good quality service and patient-physician interactions. By so doing, it would be possible to maximise utility across the systems.

3. *Find common grounds on which to compare the systems to provide a level platform for evaluation.*

TM/H and modern systems are currently both evaluated according to standards on scientific rigour and regulation. Even though scientific testing and regulation of TM/H are important in ensuring patient safety, given expectations and perceptions between the two systems differ, this approach is inadequate as it fails to capture how a system treats individuals to meet their legitimate non-health expectations. For example, individuals use TM/H for procedural utility over and beyond health benefits (Paper 3), thereby suggesting that health-seeking behaviours reflect considerations about providers, as well as the medicines consumed. Instead, it is necessary to find other common grounds for evaluation, such as objective measures of service provision (as advocated in Paper 3). By using comparable measures, a more level platform for evaluation would be available and deficiencies within both systems could be pinpointed.

4. Divert resources to poor and rural areas to reduce inequities in utilisation.

Studies on income (Paper 2) and equity (Paper 4) revealed differences in utilisation patterns can partly be attributed to an individual's income status and the region in which they live. Given that income is a mutable characteristic, there is some scope for policy to make an impact and achieve tangible outcomes. In particular, poorer regions (e.g. UW) must look toward poverty alleviation and economic development strategies. A regional focus channelling funds toward rural areas with greatest need, not greatest political influence, is clearly required. This is particularly the case as local governments have previously been criticised for 'ring fencing' expenditures to protect annual budgets rather than spending according to need (Asante, et al.,2006). Policymakers must also take steps to ensure the continued utilisation of public systems by the poor by investing in better quality of care and expanding NHIS coverage. Asides from funding, personnel shortages and distribution of workers pose potential problems for service delivery. Compulsory national service for aspiring medics to take up residencies in rural areas, including education on traditional practices, would also serve to bridge the divide. Research and

training of TM and modern practitioners could also be carried out alongside each other to encourage cross learning and acceptance. Without such measures, further segmentation between modern and TC users are inevitable[96].

6.3 Limitations and future research agenda

This section provides an outline of limitations common to all papers (topic specific descriptions are found within-papers), after which future research agenda are discussed.

6.3.1 Limitations

Limitations fall under three broader categories: data collection, measurement and methods/conceptual framework.

Data collection

The first limitation concerns data collection. Owing to time and cost constraints only two regions were purposively selected for cultural, geographic and socioeconomic variation. Subsequently, data are cross sectional rather than longitudinal and all findings should be taken as associations rather than causal as it was not possible to control for unobserved heterogeneity. This also meant it was not possible to allow for prospective measurement of health outcomes (particularly that of EuroQol 5 dimensions (EQ5D) used for Paper 3, for which before and after treatment would have been preferable). Studies of this sort for TM/H are the first of its kind and as such should be seen as a step toward evaluation of TM/H and inform future data collection. Using only two regions will also have either included or excluded some segments of the Ghanaian population and should be borne in mind when considering results and policy implications for the whole populace. Individuals were not surveyed for logistical purposes, primarily the labour intensity of fieldwork[97]

[96] This is similar to Chi's (1994) recommendations based on Taiwan. Historically in Taiwan, medical schools were mainly in the hands of the private sector. Without government support and increasing popularity of modern medicine (for its higher prestige and income), the curriculum gradually began to be geared toward modern medicines, without much spillover of scientific knowledge into the traditional sector. Generally, Chinese medicine physicians are accorded a lower social status and treated differently from modern practitioners (e.g. the existence of a dual licensure system), the upshot being an inequitable distribution of power among different providers. Chi (1994) suggests that by training traditional practitioners alongside physicians, the margin of difference will be decreased.

[97] It was decided to survey the two regions one after the other rather than simultaneously in order that the author could be present at all times. This also ensured full training, selection and monitoring of research assistants. In this respect, a few seasonal inconsistencies were forsaken (although not overlooked) for better quality data.

(GA was surveyed in September 2010, UW in October 2010) and in so doing, there is a possibility of minor seasonal effects reflected in the data. For example, at the beginning of September households were preparing for the end of Ramadan, resulting in inflated expenditures (which may subsequently place households in higher income groups than normal). Similarly, the fact that data collection took place at this time of year means findings should not necessarily be extrapolated to other months or seasons. This study clearly defined 'household' (what it consists of, how to identify it and so on) before data collection, but alternative definitions would have resulted in different collection methods and results.

Further, using the WHO methodology has its own limitations. For example, although the survey methodology aims for minimum bias, households nearer to the reference facility may have a slightly higher probability of being selected than those further away, simply because clusters are chosen according to the order in which housing settlements appear (as we drive away from the reference facility). However, the radius method tries to mitigate this as far as possible and is deemed a suitable method for medium scale household surveys where households are not listed. Additionally, selecting households 'by the most common type of housing' will necessarily seek the 'average' household in any given area. Individuals living in public buildings and those without homes would have been automatically excluded. While it is accepted that all household surveys (bar the Census) do exclude some people, often marginalised individuals or those living in public buildings (e.g. hospitals, hostels, army barracks) exhibit the greatest health care needs and most sporadic patterns of access.

Measurement

The second category of shortcomings concerns measurement. The questionnaire relies on many subjective answers which may lead to bias. The most important of these is self-reported health, whereby respondents are asked for symptoms (not necessarily confirmed by a physician)[98] and perceived severity. Sutton et al (1999, p. 877) argue that individual perceptions of health measure 'something different' to actual health, such that using self-reported health increases the chance of measurement error: 'in addition to any true effect

[98] For chronic illnesses individuals were asked whether they had been – at any time - diagnosed by trained or untrained personnel. Acute illnesses were either self-reported or diagnosed by trained or untrained personnel.

of morbidity on utilisation, the estimated parameter picks up the effect of four factors: a) utilisation on true health; b) individual specific unobservables influencing both health and utilisation; c) utilisation on individual reporting behaviour and d) individual specific unobservables influencing both reporting behaviour and utilisation'. All these effects could potentially lead to inaccurate analyses. Blaxter (1985) provides an empirical example, whereby 20% of self-reports on chronic illnesses failed to match that of physician records.

In many ways, given that the study aims to understand health-seeking behaviour and actions taken when symptoms strike, some of the biases arising from self-reported health and subjective questioning are not a major problem. For example, within regression analyses multiple indicators of health need - such as severity, type of illness and age-sex interaction effects can additionally be controlled for, just as one might take into account other demographic traits. Andersen (1995, p. 3) also discusses how his own work on modelling utilisation has been criticised for relying on subjective measures of need as the prime determinant of use but he responds:

> *''any comprehensive effort to model health services' use must consider how people view their own general health and functional state, as well as how they experience symptoms of illness, pain, and worries about their health and whether or not they judge their problems to be of sufficient importance and magnitude to seek professional help. Indeed, even evaluated need is not immune to social components and varies with the changing state of the art and science of medicine as well as according to the training and competency of the professional expert doing the assessment''.*

Consequently, there are many aspects of need and unmet need (Allin,2009) and as such, the use of physician diagnoses should not automatically be taken as a gold standard. Professionals – trained or not – also hold certain biases and their views are just as subjective. Instead, one should enquire as to *who* made the evaluation rather than whether need was 'evaluated' per se. Crucially, the study's premise was to go beyond the formal sector, and as such asking for illness episodes only when it had been diagnosed by a 'professional' or trained practitioner would have been insufficient and missed the point entirely. Assessing one's own health is a necessary part of seeking health care especially where informal care is common and professional views are not always considered. Empirics from developed countries also suggest that self-reported health status is closely aligned with physician diagnoses, and further, is a strong predictor of future mortality

(Idler & Benyamini,1997; Mossey & Shapiro,1982) suggesting that individuals are good evaluators of their own health status.

Strategic reporting of TC use, however, is cause for concern, especially given the often secretive nature of traditional practices. In order to encourage full and truthful responses, individuals were reminded of ethical guidelines which assured anonymity and the non-judgmental nature of the research. Moreover, individuals were told that revelation of their health care-seeking behaviour would build a clearer picture for policymakers and future research agenda as information on this is currently scant. Upon hearing this, individuals seemed happier to share personal information. Asking sensitive questions about expenditures and income is also universally recognised to be a difficult task (Falkingham & Namazie,2002; Filmer & Pritchett,2001). Skewed results can arise from: social desirability bias (e.g. higher income and expenditures are more 'desirable' traits; reporting high satisfaction scores is deemed obligatory because the health care provider is a friend, and so on); gaming or Hawthorne effect (investigator presence affects behaviour of participants) (Leonard,2008; Martin, Sheldon, & Smith,1995); un-enforceability and un-accountability (it is hard to verify answers); or simply that people genuinely do not know the true answer, so guestimate to please the interviewer or speed up the interview pace. For example, where the individual presenting the illness was unable or unavailable to answer, the main respondent served as a proxy. However, to counter the effects of social desirability bias and Hawthorne effects, research assistants explained and reiterated the importance of truthful answers without consequence. This was a standard ethical procedure, and participants were reminded of this throughout questioning. Several techniques including re-questioning using different wordings and styles, asking for descriptive analysis if the answer seems unlikely, and indirect questioning were also employed (Fisher,1993). Respondents were also only asked for information from recent weeks in order to elicit accurate data.

Revelation of information problems aside, the issue of purchasing power across regions needs to be considered. In more rural and remote areas households are still heavily reliant on subsistence farming and live within a barter economy. As such, expenditures may be low, but powers to exchange, high. Similarly, values sometimes could not be placed on goods produced and consumed. Thus, it was not possible to gain extremely accurate measures of expenditures and in the future some standardisation both across and within

regions would be required. However, Chapter 2 compares models with income (expenditure) and wealth data to find that either measure gives rise to similar results, in line with previous research which suggests there is little difference in using wealth or income as proxies for poverty (Sahn & Stifel,2003; Wagstaff & Watanabe,2003).

This study focused on curative, rather than preventive, care and medicines utilisation. It is recognised that individuals use healers for an array of reasons, including social and personal motivations, for example, luck in exams or life guidance (Stekelenburg, et al.,2005). Healers also deal with 'precautionary attacks' and thus have a preventive role (Hausmann Muela, et al.,2000). The survey did not allow for these, as the focus was purely on actions taken following health ailments. The questionnaire also elicited information on utilisation of TBA, but this was not analysed within this PhD because of key differences associated with this mode of care. Firstly, all users of TBA were female. Secondly, medicines were not always utilised and the primary purpose of this thesis was to explore medicines utilisation. Thirdly, many TBA reside within households themselves (typically grandmothers or elders rather than 'suppliers' who usually charged for services). Thus, payment was typically zero or in-kind. Fourthly, TBA are predominantly used almost as an emergency measure; i.e. immediately at the time of giving birth and not even during pregnancy. As such, most visits were a one-time event. For all these reasons, TBA analysis would have required different modelling techniques. However, data are available for future studies that focus exclusively on maternal care.

While the thesis recognises that TC is highly heterogeneous (including self medication using herbs; different types of TMP; its uses), the papers contained within this thesis have, on the whole, tended to pool all types of TM/H together. Paper 4 shows that many different factors affect demand for different types of TC. For example, self-medication using TM is popular among the rich, whereas TH tend to be patronised by the poor. Under such circumstances, it is unlikely that a single model pooling TM and TH (as done so in papers 1, 2 and 3), is sufficient to capture these nuances. Unfortunately, with only a limited number of observations for every source of care, it was not possible take this limitation into account fully.

Finally, it is acknowledged that overlaps between modern and traditional services exist. For example, some 'modern' aspects are creeping into traditional treatment, such as healers wearing white coats (Dixon 2008). Healers have also been known to refer patients

to the modern system, blurring the boundaries between medicine providers. The thesis took this into account by asking about the type of medication healers offered, but in all cases herbs were used and only a few healers gave both pharmaceuticals drugs and herbs. Vice versa, the incidence of physicians prescribing herbal treatments is likely to be very low because patients must specifically request (and are not guaranteed) TM.

Methods/conceptual framework

This thesis used the utilisation model proposed by Andersen to frame the research questions. One key criticism of health utilisation models is the lack of attribution to supply factors. In this thesis four measures were used to proxy for supply; the number of healers within 15 minutes' walk (Paper 1, Chapter 2); presence of modern health facility (pharmacies, health centres, hospitals) within 30 minutes' walk; the distance from reference facility as measured by the radius in which the household belonged; and a regional dummy. Additionally Paper 1 (Chapter 2) and Paper 3 (Chapter 4) considered supply features of healers, such as quality of care. The supply of TM/H is very difficult to ascertain because of their informal and sometimes ad-hoc nature: being a healer is often a secondary occupation. Added to this is the secrecy under which healers sometimes shroud themselves, leading both users and suppliers to frequently understate their existence. Consequently accounting for every healer in the locality can be complicated. Further, it may be the case that there is no separation between demand and supply; those who have needs use their knowledge to treat themselves and depending on the type of herbs, supply can be infinitely abundant if sourced in local areas.

Utilisation models are also criticised for side-lining emotional and non-rational aspects. Although this thesis's methodology aimed to incorporate these aspects by considering institutional economics and discussing culture and other sociological dimensions, it does not examine further various alternative models and theories (see Hausmann Muela, et al.,2003 for a non exhuastive list). These include the health belief model (Janz & Becker,1984); theory of planned behaviour (Fishbein & Ajzen,1975) and pathway models which emphasise dynamics (Suchman,1965). During fieldwork some qualitative interviews were carried out informally for background and informative purposes, rather than detailed analysis. A mixed method approach combining qualitative and quantitative field research would have allowed for a deeper understanding of medicines utilisation (Kroeger,1983a, 1983b; Kroeger, Zurita, Perez-Samaniego, & Berg,1988; Weller, et

al.,1997). However, there is some evidence to suggest that these two methods give rise to similar conclusions (Weller, et al.,1997).

Finally, utilisation is merely the means to a bigger goal, that of better health outcomes. As such, although variations in utilisation are highly indicative of differences in outcomes, this thesis has not sought to examine in detail the relationship between these two variables (bar self-reported health outcomes in Paper 3).

6.3.2 Future research agenda

This section briefly proposes improvements to be incorporated in future research. At the outset it was recognised that 'culture' was a poorly defined term, used disparately across different disciplines. Although this thesis examined only one particular facet of culture, that of attitudes and beliefs (typically inherited and transmitted by infrequently changing traits such as ethnicity), as Paper 1 discussed, there is considerable debate about what the word actually represents. This, in turn, posed problems in modelling especially when using ethnicity as an IV. Unfortunately the data did not allow for use of other, perhaps more suitable, variables. In order to truly isolate the cultural component, it would be ideal to have panel data on immigrants (as per Fernandez & Fogli,2006). This way, it would be possible to track whether individuals who migrate retain cultural attributes. However, such shortfalls in data are also reflected in currently existing datasets as researchers have generally failed to incorporate TM within the medicines utilisation framework. Where data on TM are collected, they are modelled as marginal, rather than critical, sources of care. In addition to further exploring culture, among the more important topics for research using panel data include understanding better the long term health effects of TM/H utilisation, and changes in health-seeking behaviour as financing mechanisms (such as the health insurance scheme) evolve.

While the focus of this study has been on the demand side, it would be valuable to better control for supply characteristics to reconcile the demand and supply of medicines. This would require collecting data on observable structural measures such as numbers of TM providers and indicators on the environment in which they practise, in addition to compiling a comprehensive list of herbs and plants available and routinely used in local areas. Alternative process indicators such as the quality of service, measured using both direct practitioner observation and vignettes (Leonard & Masatu,2005) and healer

payment mechanisms should be explored. Such data would shed further light on the findings of Paper 3 (which showed satisfaction to be partly attributable to PU) and Paper 4 (which showed inequitable utilisation of healers versus self-medication by TM). Further, it would be particularly interesting in view of increasing numbers of 'neo herbalists' (healers who use modern techniques and adopt modern mannerisms) (Dixon,2008) and marketisation of TM (Bloom & Standing,2001) as it would be possible to ascertain the importance of the services of healers as opposed to the biomedical effects of TM use alone. This would be one step toward reconciling demand and supply of medicines (Ensor & Cooper,2004) in environments with multiple health care providers.

Another major research agenda would be to analyse the utilisation of traditional systems by widening the research scope to incorporate well-being and preventive care. During the course of research it became clear that TH were used for a multitude of reasons including psychological support for orphans (Kayombo, et al.,2005), 'personal and social ills' such as job loss, family arguments and bad omens, while herbal medicines were frequently utilised as dietary supplements, as a cleanser/bathing product or for the prevention of colds and fevers. Clearly, utilisation of TM/H is not limited to curative care and it would be interesting to explore other dimensions of health and reasons for use. This is especially important as many diseases in developing countries are preventable and a considerable amount of funding and effort is directed toward immunisation programmes (IFFIm,2011).

Finally, while this thesis has used Ghana as a case study, it is possible to draw upon other countries to compare and contrast experiences to inform policymaking. From Taiwan's experience, Chi (1994) suggests that even though both modern and traditional systems have the same aim – the production of health care – they present three fundamental differences: the system of medical knowledge and technology; the personnel who possess this knowledge and technology; and resources (such as drugs and equipment). By considering only modern medicines, developing countries typically face shortages in all three dimensions and often resort to importing expensive know-how, equipment and medicines and 'exporting' better educated medics to foreign countries. However, with TM, Chi argues that many countries can exploit their relative abundance of resources at low cost while reducing reliance on (often conditional) development aid. This is particularly important when Ghana's MOH has admitted its main challenge is funding the drugs policy (Ministry of Health,2004a) and it may well be worth exploring empirically how others (like

Taiwan) have achieved sustainable financing through TM. Similarly, it would be interesting to analyse why even developed countries see high levels of TM and alternative medicines use: do the three broad rationales presented in this thesis apply to individuals all over the world, no matter how comprehensive the formal institutions? This thesis offers some insights to address such queries, but further research is needed to elucidate better health-seeking behaviour and the policies required to attain equity in utilisation.

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Appendices

Chapter 1

Appendix 1 - Existing surveys

The overarching reason for writing and preparing my own survey was the lack of acknowledgement of TM as a viable form of care in existing surveys. This is true of most formal surveys, including versions of the Ghana Living Standards Survey (GLSS), Demographic Health Survey (DHS) and World Health Survey (WHS). While all surveys have a demand side focus, they tend to be biased toward pharmaceutical and formal systems of care. In a medically pluralistic setting this appears inappropriate. All surveys also suffer from outdated information in a rapidly changing economy (see Appendix 3). In the past few years, Ghana has elevated itself from a low- to a middle-income country, with parallel rises in living standards, changes in health care-seeking behaviour and expectations from the health system - even between survey rounds considerable changes have been taking place. Additionally, each survey has its own shortcomings. The GLSS 4 (2000) and GLSS 5 (2005) are general purpose household surveys of 8000 households in each region. In 2005, the NHIS had been in place for less than a year, with the consequence that users were few and only public providers were entitled to NHIS accreditation. These changes are likely to have impacted utilisation patterns. The DHS, on the other hand, investigates purely maternal, child, reproductive care and HIV/AIDS. This nationally representative survey gives information on health care demand for 6600 households. The major shortfall here is the exclusive focus on under-fives and pregnant women. Nonetheless, these surveys provide good quality data for descriptive and exploratory purposes.

Appendix 2 – Indicators of governance, Ghana

Built upon the legacies of British rule, Ghana is often hailed as having 'good governance', a stable, democratically elected government, and rule of law. This is reflected in relatively high scores in well-established indicators of governance such as the Ibrahim Index of African Governance (7th in 2010) (The Mo Ibrahim Foundation,2010), the Failed States Index (in 2011, 114th from the 'most failed', out of a possible 177) (The Fund For Peace,2011) and the Corruption Perceptions Index (4.1 out of 10 in 2010, with 10 being 'very clean') (Transparency International,2011).

Appendix 3 – Ghana overview

Country overview

Ghana is situated in West Africa and the southern border lies on the coast overlooking the Gulf of Guinea. To Ghana's west lies Cote d'Ivoire and to the east, Togo, while the bulk of the northern and north western territories neighbour Burkina Faso. Ghana's total land size is 238,537 km^2 (92,100 square miles) and the 2010 census reveals a population of 24.2m (Ghana Statistical Service,2011). The country is most heavily populated in Greater Accra and Ashanti regions, together comprising approximately 38%[99] of the whole population. Greater Accra is the smallest of Ghana's ten regions in terms of land size, but has the greatest concentration of people and jobs and contains the capital city, Accra. Ghana's ten regions can be roughly divided according to socioeconomic and geographic strata: the coastal belt (Western, Central, Greater Accra) the fertile central belt (Volta, Eastern, Ashanti, Brong Ahafo) and the drier north (Northern, Upper West, Upper East)[100]. The coastal belt is largely reliant on the services industry and tourism, owing to its intensive road and air networks and relative abundance of historical sites (for example, the infamous coastal castles used for the slave trade). Fishing is also widely practiced. In the fertile central belt, agriculture is abundant. In the Ashanti region the second largest city and traditional heartland, Kumasi, is found. Ghana's primary language, Twi, originates from this region. The northern regions are sparsely populated, located at least eight hours away from Accra via hole-pocked roads. Each region contains a regional capital, and regions are split further into districts and sub-districts.

Economic indicators

Ghana's gross domestic product (GDP) was approximately $31.3m in 2010 (current US$) (World Bank,2010). GDP per capita is estimated at $1,280 while Gross National Income (GNI) per capita is $1,230 (World Bank,2010) and Ghana is thus termed a 'lower middle income' country[101]. Economic growth (estimated at 6.6% in 2010) (World Bank,2010), is

[99] Ashanti has population 4,881,427 and Greater Accra 4,281,137 (GSS, personal communication, April 2010).
[100] Detailed socioeconomic indicators for the two sampled regions are given in Appendix 8.
[101] According to the World Bank, a ' lower middle income' country has a per capita Gross National Income (GNI) of between $976-3,855 and an 'upper middle income' country has GNI per capita between $3,856-11,905 (UNDP,2011). The difference between GDP and GNI is subtle, but the latter includes income from abroad attributable to Ghanaians while the former includes only products and output within Ghana's geographic boundaries.

attributed to services, agriculture (predominantly cocoa, cassava, yam, plantain, maize and rice crops) and industry, which comprise 49.5%, 31.7% and 18.9% of the economy, respectively (Ghana Statistical Service,2008b). Other socioeconomic indicators suggest a rise in living standards in the past decade: from half the population living in poverty in 1992, this has drastically reduced to 28.5% by 2006, and poverty is set to decrease further with the nominal increase of the daily minimum wage from 1.90Ghc in 2007 to 3.11Ghc in 2010 (Ghana Statistical Service,2008a, p. 27). However, despite these gains, there is some suggestion of income inequality, whereby the highest quintile has an average per capita income of over six times that of the bottom quintile (Ghana Statistical Service,2008b, p. 105) and other social inequalities also appear problematic (McKay & Aryeetey,2004).

Key demographic statistics, Ghana

Item	Value
1.1 Population, millions	24.2
1.2 Life expectancy	57
1.3 Population under 15, % of total population	39
1.4 Population over 60, % of total population	6
1.5 Urban population, % of total population	50
1.6 Birth rate, per 1000 population	30.8
1.7 Death rate, per 1000 population	9
1.8 Fertility rate, births per woman	3.9
1.9 Under 5 mortality rate, per 1000	61
1.10 Maternal mortality ratio, per 100,000	260
1.11 HIV prevalence for 15-49 year olds (%)	1
1.12 Age standardised mortality rate by non-communicable diseases, per 100,000	699
1.13 Age standardised mortality rate by cardiovascular diseases, per 100,000	343
1.14 Top two causes of death of Under5s, (% of deaths)	Malaria (26.3), pneumonia (10.4)
1.15 Births attended by skilled health staff, % total	57
1.16 Adult literacy rate, % of total population	65
1.17 Primary school enrolment rate, males and females, % of total population	72

**items 1.1 from GSS; 1.9, 1.10 from MeTA (2010, p. 9) and Ghana Statistical Service (2011) 1.2-1.5 from WHO (2010b), 1.6 from Ghana Demographic and Health survey 2008 (Ghana Statistical Service, et al.,2009), 1.7 from Unicef (2010), 1.8 from World Health Statistics (WHOSIS,2009), estimate for 2007, 1.11 from World Development Indicators (World Bank,2009), 1.12,1.13 from MeTA World Health Statistics 2009 for 2004 (WHOSIS,2009), 1.14 from World Health Statistics, 2010 estimates for 2008 (WHOSIS,2009). 1.15 from World Bank (2009), 1.16 and 1.17 from World Health Statistics (WHOSIS,2009), estimate for 2000-2007.*

Appendix 4 - Distribution of health facilities by region, 2007

Region	CHPS	Clinic	District Hospital	Health Centre	Hospital	Polyclinic	Regional hospital	Teaching hospital	Grand Total	Pop: facility
Ashanti		200	2	106	81			1	390	12516
Brong Ahafo	1	106	3	46	22		1		179	12666
Central	18	100	3	42	17		1		181	10617
Eastern	39	188	5	65	19		1		317	7532
Greater Accra	1	185		38	74	7	1	1	307	13945
Northern	10	47	4	115	11		1		188	12418
Upper East		48	3	28	2		1		82	12382
Upper West	4	38	5	54	3		1		105	6391
Volta		11	4	198	21	1	1		236	8209
Western	11	201	1	58	20	2	1		294	8692
Grand Total	84	1124	30	750	270	10	9	2	2279	10642

**Source: Ghana Statistical Service (personal communication, April 2010)*

**Population figures are projected numbers in 2009*

**CHPS: Community based Health Planning Services*

** in Ashanti, the regional hospital is the teaching hospital*

Appendix 5 - List of health facilities by ownership, 2007

	Government	Private	CHAG	Muslim (MAM)	Quasi-government	Total	Population	Pop:facility
Ashanti	177	153	51	3	6	390	4,881,427	12516
Brong Ahafo	128	31	11	1	8	179	2,267,195	12666
Central	97	67	13	1	3	181	1,921,640	10617
Eastern	219	64	24	0	10	317	2,387,502	7532
Greater Accra	69	217	5	0	16	307	4,281,137	13945
Northern	137	7	39	0	5	188	2,334,540	12418
Upper East	64	7	10	0	1	82	1,015,290	12382
Upper West	79	5	16	5	0	105	671,043	6391
Volta	205	15	15	0	1	236	1,937,301	8209
Western	138	88	34	1	33	294	2,555,362	8692
Grand Total	1313	654	218	11	83	2279	24,252,437	10642

**Source: GSS (personal communication, April 2010)*

Appendix 6 - Structural statistics

Item	Value (per 10,000)
1.1 Physicians	1.1
1.2 Nursing and midwifery personnel	9.8
1.3 Licensed pharmacists	0.6
1.4 Licensed pharmacies	0.77
1.5 Beds in hospitals	9

1.1, 1.2, From WHO Global health observatory 2010 (World Health Organization,2010b), figures for 2008, 1.3, 1.5 from World health statistics 2009 for 2004 (WHOSIS,2009). MeTA calculations (based on 350 hospitals reported).1.4 from Pharmacy Council (1800 pharmacies as of 2009). All from (MeTA Ghana,2010, p. 15).

Appendix 7 - National health insurance scheme premia, by category

Category	Operational definition	Yearly contribution/ premium (Ghc)	Registration /card processing	Renewal
Core poor/indigent	Unemployed adults who do not receive any identifiable and regular support from elsewhere for subsistence	No	No	No
Formal sector workers	SSNIT contributors	2.5% of monthly pay automatically deducted	Yes	Yes
Dependants	Under age 18	No	Yes	Yes
Pensioners/elderly	Over age 70, retired, previous SSNIT contributors	0	Yes	Yes
Pregnant women/under fives	Pregnant women and children under 5	0	No	No
Very poor/poor	Unemployed adults who receive regular and identifiable financial support from sources of low income/employed adults who have low income and are unable to meet basic needs	7.2	Yes	Yes
Middle class	Employed adults who are able to meet their basic needs	18	Yes	Yes
Rich/very rich	Adults who are able to meet their basic needs and some or most of their wants	48	Yes	Yes
All	General sales tax	2.5% sales tax (Health insurance levy) on selected goods and services to fund NHIS	-	-

**Source: Mensah (2010, p. 21) and National Health Insurance Authority (2011b).*

Appendix 8 - Fieldwork and data collection overview

Sampling summaries compared

	WHO	PhD
Geographic areas	6 Largest urban area+5 other administrative areas randomly chosen with probability proportional to population size (so long as each region has 10+ public health facilities and population over 100,000)	2 Largest urban area+ most rural area purposively chosen (Greater Accra+Upper West)
No. districts per region	N/A	2 Region 1: Greater Accra District 1a:Accra Metropolitan District 1b:Dangbe East Region 2: Upper West District 2a:Wa Central District 2b: Jirapa
No. reference points per region	6	8 (4 per district)
No. households per reference point	30 (10 households per radius)	33-68 = average 48 (approx. 16 households per radius)
No. households per region	180	>385
Total number of households, target	1080	772

**WHO methodology adapted from (TCM - Department of Technical Cooperation for Essential Drugs,2007).*

Core socioeconomic indicators for GA and UW

Indicator	***Greater Accra***	***Upper West***
1.1 Population (2007)	3.9m (4.2m 2009 projection)	650,000
1.2 Total fertility rate, TFR (2003)	2.9	5.5
1.3 Mean annual per capita expenditure ($, 2005)	217	34
1.4 Mean annual per capita income ($, 2005)	112	22
1.5 Mean household size (2005/6)	3.4	6.5
1.6 % urban population with no education (2005/6)	8.8	39.3
1.7 % rural population with no education (2005/6)	32.4	72.6
1.8 Main dialect/ethnicity of household heads (2005/6)	Akan/Twi and Ga/Dangbe	Dagaaba/Wala
1.9 Main religion of household heads (2005/6)	Christianity	Christianity, Islam, traditional
1.10 Population in urban areas (%)	88	18
1.11 Number of health facilities (2007)	466	144
1.12 Number of district insurance schemes(2009)	10	8
1.13 Number registered with insurance scheme (2009)	1,655,531	553,227
1.14 Population registered in region using 2009 population estimate(%, 2009)	39.3	87.7
1.15 Utilisation of NHIS scheme (Jan 2009-Sept 2009)	829,454	154,235
1.16 Dr: population(2006)	1:5624	1:45568
1.17 Nurse: population(2007)	1:979	1:1208
1.18 No hospital beds (2006)	4318 (20% of all beds in Ghana)	682 (3% of all beds in Ghana)
1.19 Hospital admission rate(no of admissions per 1000 inhabitants, 2006)	25	46.8

**figures 1.1, 1.2, 1.11, 1.16, 1.18, 1.19 are taken from Ghana Health Service (2007b); 1.3-1.9 from Ghana Statistical Service (2008b); 1.10 from Modern Ghana (2011); 1.12, 1.13, 1.14, 1.15 from NHIA (2009); 1.17 (from Ghana Health Service,2007a).*

Number of households interviewed, by listed public reference facility

Reference facility	Greater Accra		Upper West	
	Accra Metropolitan	Dangbe East	Wa Central	Jirapa
Korle Bu Teaching hospital*	59			
Osu Gvt maternity home	52			
Ussher Town polyclinic	57			
Achimota Hospital	47			
Dawhenya Community Health Practice		43		
Dangbe East hospital		33		
Pediator Kope Health centre		51		
Sege health centre		45		
Wa Regional hospital*			68	
Charia Health centre			44	
Bussa health centre			50	
Wa Health centre			44	
Jirapa health centre				44
Jirapa Reproductive and Child Health clinic				45
Jirapa Community Health Nursing School				45
Midwifery Jirapa				45
TOTAL BY DISTRICT	215	172	206	179
TOTAL BY REGION	387		385	
TOTAL	772			

*Largest hospital in region. Variations in the number of households sampled are explained by: lack of sampling units (requiring us to move on before target number was reached); surveying timing and respondent availability; and the speed at which RAs were able to survey, which was partly dependent on the number of illness episodes per household.

Selection and training of research assistants

Research assistants' characteristics:

Educational background;

- Economics, politics, anthropology, sociology, social policy, health policy, epidemiology, development and other related disciplines
- And/or: medical: pharmacy, biology, physics, chemistry
- A good undergraduate degree or other related/relevant qualification
- Ideally masters, preference for those studying for PhD
- Fluent English essential
- Local dialect(s) relevant to region

Previous experience:

- Experience in conducting surveys and interviews
- Fieldwork in urban and rural areas

Those invited to the selection spent two and a half days in the classroom for an explanation of the theoretical background, purpose, ethics of research and interview training. Several rounds of translations and back translations were made in all relevant languages (Twi being the most common throughout Ghana, and additionally Ga/Dangbe for GA, and Waale/Dagaare for UW). An extra two and a half days were spent familiarising research assistants to the questionnaire, mainly on the field carrying out mock interviews. Data collectors were picked at the end of the week with the proviso that they had completed the full week's training. During the week, they were informed that supervisor(s) were to be potentially selected, for which individuals with previous experience in managing groups of people on the field or classroom was preferred. In GA, two people were chosen for this role, which ensured teamwork in twos, as four people in total were selected. In UW, the author took on the supervisory role and five data collectors were employed. The aim was for each regional team to consist of at least one pharmacist or health professional, one social scientist, and to obtain an evenly balanced gender mix. An emphasis on team spirit and personal skills was also made. All individuals were paid for selection, training and data collection and continuously briefed on their performance.

Appendix 9 – Data overview

In all, 781 households were approached for interview. Of these, a total of 772 households, evenly split between the two regions, agreed to participate resulting in a very high response rate of 98.8%. Data on household size and composition, (by distance from facility and region) and respondents' characteristics are summarised in tables below.

Summary table of household size and composition[102]

	Distance from facility (km)							
	All		**0.5-5**		**5-10**		**10+**	
Number of households	772		248		282		242	
Average household size	6.1		6.1		5.9		6.4	
Total population	4713		1503		1667		1543	
Average age	25.4		25.0		25.9		25.2	
% females	53.3		53.7		52.4		53.9	
% children (aged <18)	42.5		42.6		41.2		43.9	
Average food expenditure in past week (cedi)[103]	49.2		53.6		45.9		48.1	
Average total expenditure in past month (cedi)[104]	277.5		316.9		260.1		255.5	
Education level (%)								
None (includes day care)	29.0		23.5		33.1		30.0	
Basic primary	31.4		31.8		30.2		32.4	
Basic junior	20.4		22..9		18.9		19.6	
Senior	15.1		16.3		14.4		14.8	
College or vocational	2.9		4.6		2.1		2.1	
University 1st degree	1.0		0.9		1.0		1.0	
Other	0.2		0.1		0.3		0.1	
Do not know or missing	0.1		0.0		0.2		0.1	
Occupation (%)	Inc.	Exc.	Inc.	Exc.	Inc.	Exc.	Inc.	Exc.
Farmer/fisherman/manual labourer	18.1	31.8	12.7	23.1	20.6	34.4	20.7	37.1
Teacher	1.5	2.6	2.4	4.4	0.8	1.3	1.3	2.3
Artisan	1.6	2.8	2.2	4.0	1.4	2.4	1.2	2.2
Office worker	0.8	1.4	1.2	2.2	0.8	1.4	0.4	0.7
Civil servant	0.9	1.6	1.5	2.8	0.7	1.1	0.7	1.2
Health worker	0.5	0.9	0.8	1.5	0.3	0.5	0.4	0.7
Self-employed - own business/shop	17.3	30.4	18.3	33.3	17.9	30.0	15.7	28.1
Driver	1.2	2.1	1.4	2.5	1.1	1.8	1.0	1.9
Student/pupil	43.0	--	45.0	--	40.1	--	44.2	--
Unemployed	4.0	6.9	4.6	8.3	4.0	6.7	3.4	6.0

[102] All figures given to 1 decimal place: rounding errors apply

[103] Mean value, week before survey (1st week September in GA, 1st week October in UW)

[104] Mean value including food, month before survey (August in GA, September in UW). Assistants asked for total monthly expenditure, but where this seemed difficult or not possible, they were trained to ask for weekly outgoings and multiply by four. The most important aspects to ask about included expenditure on housing, education, food, health care, bills and other miscellaneous items.

	Distance from facility (km)							
	All		**0.5-5**		**5-10**		**10+**	
Not in labour force	7.5	13.1	6.2	11.3	8.8	14.7	7.3	13.0
Retired	2.9	5.1	3.3	5.9	2.4	4.0	3.2	5.7
Other or missing	0.7	1.3	0.5	0.9	1.0	1.7	0.6	1.1
Marital status (%)								
Single	59.7		29.4		59.5		59.2	
Married, one spouse permanently present in household	29.9		52.4		29.3		30.9	
Married, one spouse, spouse migrant	3.6		6.5		4.1		2.9	
Married, more than one spouse, all spouses present in household	0.7		0.6		0.8		0.8	
Married with more than one spouse, one or more spouses migrant	0.1		0.2		0.1		0.1	
Widow/er	4.1		7.0		4.0		4.3	
Divorced/separated	1.9		3.8		2.2		1.4	
Inherited widow/er	0.1		0.0		0.0		0.3	
Other	0.0		0.0		0.0		0.0	
Religion (%)								
Christian	67.2		62.3		67.3		71.6	
Muslim	26.1		32.5		23.4		21.5	
Traditionalist/African or indigenous religion	2.0		0.9		2.6		2.7	
Spiritual/African independent church	1.4		1.8		2.0		0.0	
Combination	0.02		0.0		0.1		0.7	
No religion/atheist	3.4		2.5		4.7		3.6	
Other	0.0		0.0		0.0		0.0	
Ethnicity (%)								
Akan	6.0		7.4		6.7		5.3	
Ga/Dangbe	26.4		32.8		25.0		22.6	
Ewe	6.4		4.7		7.9		6.9	
Hausa	1.7		1.8		1.4		2.0	
Dagbani	0.1		0.4		0.0		0.1	
Nzema	0.0		0.0		0.1		0.0	
Wala	19.2		20.8		21.0		15.2	
Sissale	0.1		0.2		0.0		0.0	
Dagaaba	38.3		30.2		36.3		46.4	
Other	1.8		1.7		1.7		1.6	

**inc = including students, exc=excluding students*

**Source: author's own*

Summary table of household size and composition, by region

	Greater Accra				Upper West			
	Distance from facility (km)							
	All	***0.5-5***	***5-10***	***10+***	**All**	***0.5-5***	***5-10***	***10+***
Number of households	387	124	145	118	385	124	137	124
Average household size	5.1	5.5	4.8	5.0	7.1	6.6	7.1	7.7
Total population	1976	684	699	593	2737	819	968	950
Average age	26.2	25.4	27.8	25.1	24.8	24.6	24.6	25.3
% females	56.4	57.6	56.2	55.1	51.1	50.4	49.6	53.6
% children (aged <18)	37.8	39.5	33.5	41.0	45.9	45.3	46.7	45.7
Average food expenditure in past week (cedi)[105]	69.9	71.0	67.7	71.6	28.2	36.0	23.1	26.0
Average total expenditure in past month (cedi)[106]	391.8	405.9	392.7	375.0	171.8	231.9	134.1	152.2
Education level (%)								
None (includes day care)	16.6	16.4	17.3	16.1	37.9	29.4	44.4	38.6
Basic primary	27.7	29.1	25.0	29.2	34.1	34.1	33.9	34.5
Basic junior	26.6	30.1	24.8	24.8	15.9	16.9	14.7	16.4
Senior	24.6	21.2	27.0	25.8	8.3	12.2	5.4	8.0
College or vocational	2.4	2.1	3.0	2.0	3.3	6.8	1.5	2.1
University 1st degree	1.7	1.0	2.2	2.0	0.4	0.7	0.2	0.4
Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Do not know or missing	0.4	0.2	0.7	0.2	0.0	0.0	0.0	0.0

[105] Mean value, week before survey (1st week September in GA, 1st week October in UW)
[106] Mean value including food, month before survey (August in GA, September in UW)

	Greater Accra								Upper West							
	Distance from facility (km)															
	All		***0.5-5***		***5-10***		***10+***		**All**		***0.5-5***		***5-10***		***10+***	
Occupation (%)	Inc	Exc	Inc	Exc	Inc	Exc	Inc	Exc	Inc	Exc	Inc	Exc	Inc	Exc	Inc	Exc
Farmer/fisherman/manual labourer	8.8	14.7	9.7	16.7	7.0	11.4	9.8	16.5	24.8	45.0	15.3	28.9	30.4	51.7	27.5	51.3
Teacher	1.3	2.1	1.2	2.0	1.0	1.6	1.7	2.8	1.6	2.9	3.4	6.5	0.6	1.1	1.1	2.0
Artisan	1.8	3.1	2.1	3.5	1.6	2.6	1.9	3.1	1.5	2.7	2.3	4.4	1.3	2.3	0.8	1.6
Office worker	1.1	1.9	1.2	2.0	1.4	2.3	0.7	1.1	0.6	1.1	1.2	2.3	0.4	0.7	0.2	0.4
Civil servant	1.6	2.6	2.3	4.1	1.0	1.6	1.4	2.3	0.5	0.9	0.9	1.6	0.4	0.7	0.2	0.4
Health worker	0.3	0.4	0.3	0.5	0.3	0.5	0.2	0.3	0.7	1.2	1.2	2.3	0.3	0.5	0.5	1.0
Self employed - own business/shop	2.82	47.5	25.0	43.3	32.2	52.5	27.3	46.0	9.4	17.1	12.7	24.1	7.6	13.0	8.4	15.7
Driver	1.7	2.9	1.0	1.8	2.0	3.3	2.2	3.7	0.8	1.4	1.7	3.2	0.4	0.7	0.3	0.6
Student/pupil	4.5	…	42.3	…	38.6	…	40.6	…	44.8	…	47.3	…	41.2	…	46.4	…
Unemployed	6.3	10.5	7.5	12.9	6.0	9.8	5.2	8.8	2.3	4.2	2.2	4.2	2.6	4.4	2.2	4.1
Not in labour force	5.6	9.4	5.1	8.9	4.9	7.9	6.9	11.7	8.8	16.0	7.1	13.4	11.7	19.9	7.5	14.0
Retired	1.6	2.6	1.8	3.0	1.9	3.0	1.0	1.7	3.9	7.1	4.5	8.6	2.8	4.8	4.5	8.5
Other or missing	1.4	2.3	0.7	1.3	2.2	3.5	1.2	2.0	0.3	0.5	0.2	0.5	0.2	0.4	0.3	0.6
Marital status (%)																
Single	60.3		62.1		59.2		59.5		59.3		58.9		59.8		59.0	
Married, one spouse permanently present in household	24.6		21.5		24.1		28.8		33.7		36.2		33.1		32.2	
Married, one spouse, spouse migrant	7.7		7.3		8.9		6.8		0.6		0.6		0.7		0.5	
Married, >1 one spouse, all spouses present in household	0.1		0.0		0.0		0.2		1.1		0.6		1.5		1.3	
Married with >1 spouse, one or more spouses migrant	0.1		0.2		0.0		0.0		0.2		0.1		0.1		0.2	
Widow/er	4.0		5.0		4.0		2.7		4.2		2.1		3.9		5.4	
Divorced/separated	3.3		4.0		3.9		2.0		0.8		0.5		0.9		1.1	

	Greater Accra				Upper West			
	Distance from facility (km)							
	All	***0.5-5***	***5-10***	***10+***	**All**	***0.5-5***	***5-10***	***10+***
Inherited widow/er	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.4
Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Religion (%)								
Christian	86.5	83.0	84.1	87.9	53.3	45.6	51.8	61.5
Muslim	6.6	9.5	3.0	7.4	40.1	54.0	38.1	30.2
Traditionalist/African or indigenous religion	0.4	0.9	0.3	1.7	3.1	0.1	4.3	4.3
Spiritual/African independent church	3.3	3.2	4.7	3.0	0.0	0.0	0.1	0.0
Combination	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
No religion/atheist	3.2	3.4	3.3	3.4	3.5	0.4	5.7	4.0
Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ethnicity (%)								
Akan	14.3	13.2	15.9	13.7	0.0	0.0	0.0	0.0
Ga/Dangbe	62.9	70.0	59.5	58.7	0.1	0.2	0.0	0.0
Ewe	15.3	9.4	18.7	18.0	0.0	0.2	0.0	0.0
Hausa	3.9	3.4	3.3	5.2	0.1	0.0	0.0	0.0
Dagbani	0.3	0.7	0.0	0.2	0.0	0.0	0.0	0.0
Nzema	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Wala	0.0	0.0	0.0	0.0	33.0	39.0	36.2	24.6
Sissale	0.0	0.0	0.0	0.0	0.2	0.6	0.0	0.0
Dagaaba	0.0	0.0	0.0	0.0	65.9	59.0	62.6	75.4
Other	3.3	3.4	2.4	4.2	0.7	1.0	1.2	0.0

**inc = including students, exc=excluding students*

**source: author's own*

Respondents' characteristics

	All	Greater Accra		Upper West	
		Accra Met	Dangbe East	Wa Central	Jirapa
Age (years)					
Mean	40.6	38.9	36.5	42.7	44.0
Min	13	13	16	18	16
Max	115	85	115	94	93
Sex (%)					
Male	35.9	21.4	23.8	44.4	52.9
Female	64.1	78.6	76.2	55.6	47.1
Relationship to head of household (%)					
Head	45.6	40.0	34.3	47.5	58.3
Spouse	33.3	31.6	33.7	40.7	29.2
Child	13.6	20.5	20.4	6.2	7.2
Sibling	2.2	1.4	5.8	2.5	0.0
Parent	1.3	23	0.6	1.2	0.9
Grandchild	0.9	0.0	2.9	0.0	0.9
Great grandchild	0.1	0.5	0.0	0.0	0.0
Son's or daughter's spouse	0.7	0.0	0.0	1.2	1.4
Brother's or sister's spouse	0.3	0.0	0.6	0.0	0.5
Nephew/niece	1.4	2.8	1.7	0.0	0.9
Other relative	0.7	0.9	0.0	0.6	0.9
Education level (%)					
None	34.6	7.5	29.2	52.2	52.0
Basic primary	15.4	11.7	18.1	13.7	17.9
Basic junior	21.7	31.5	26.9	15.5	13.0
Senior	21.2	39.0	21.6	11.2	11.2
College or vocational	4.7	6.1	1.8	5.0	5.38
University 1st degree	2.0	3.3	1.8	2.5	0.4
Other	0.4	0.0	0.0	0.0	0.0
Do not know or missing	0.0	0.9	0.6	0.0	0.0
Occupation (%)					
Farmer/fisherman/manual labourer	32.5	2.3	22.1	43.2	61.9
Teacher	3.4	3.3	1.2	3.7	4.9
Artisan	3.9	4.7	2.9	4.3	3.6
Office worker	0.9	1.4	0.0	1.2	0.9
Civil servant	0.4	0.5	1.2	0.0	0.0
Health worker	0.9	0.5	0,0	1.2	1.8
Self employed - own business/shop	39.8	59.5	52.9	30.3	17.5
Driver	1.4	0.9	2.9	2.5	0.0

	All	Greater Accra		Upper West	
		Accra Met	Dangbe East	Wa Central	Jirapa
Student/pupil	5.7	9.3	7.6	3.7	2.2
Unemployed	5.4	9.3	7.6	2.5	2.2
Not in labour force	0.3	0.0	0.6	0.6	0.0
Retired	4.3	4.7	0.6	6.8	4.9
Other or missing	1.2	3.7	0.6	0.0	0.0
Marital status (%)					
Single	17.1	32.6	22.7	6.8	5.4
Married, one spouse permanently present in household	60.4	41.4	45.9	80.3	75.7
Married, one spouse, spouse migrant	5.3	5.6	13.4	1.2	1.8
Married, more than one spouse, all spouses present in household	2.3	0.0	0.0	4.3	5.0
Married with more than one spouse, one or more spouses migrant	0.4	0.0	0.6	0.0	0.9
Widow/er	8.0	8.4	7.6	6.2	9.5
Divorced/separated	6.4	12.1	9.9	1.2	1.8
Religion (%)					
Christian	71.0	90.2	83.1	27.2	74.9
Muslim	21.1	7.9	3.5	70.4	11.7
Traditionalist/African or indigenous religion	2.2	0.0	1.2	0.6	6.3
Spiritual/African independent church	1.8	0.9	7.0	0.0	0.0
Combination	0.1	0.0	5.2	0.0	0.5
No religion/atheist	3.8	0.9	3.5	1.9	6.7
Other	0.0	0.9	0.0	0.0	0.0
Ethnicity (%)					
Akan	7.8	26.5	1.7	0.0	0.0
Ga/Dangbe	29.8	42.8	79.7	0.6	0.0
Ewe	8.7	18.1	16.3	0.0	0.0
Hausa	2.3	5.6	2.3	0.6	0.5
Dagbani	0.3	0.9	0.0	0.0	0.0
Wala	14.4	0.0	0.0	65.4	2.2
Sissale	0.3	0.0	0.0	0.6	0.5
Dagaaba	34.3	0.0	0.0	30.3	96.9
Other	2.2	6.1	0.0	2.5	0.0

**Source: author's own*

Appendix 10 - Overview of research questions

Question	Subset	Question	What do we know already?	Main method	Answer	Key contribution
1		How do cultural attitudes toward TM affect its utilisation?	Anthropologists have provided evidence that culture impacts medicines utilisation but have been reluctant to measure it, while economists have begun to quantify the impact of culture on economic outcomes.	Probit models using attitudes and beliefs as key independent variables. PCA for creation of cultural index; ivprobit for discrete choice modelling with instrumental variables.	Cultural beliefs and attitudes can explain some variation in utilisation.	Measurement of culture and its application in traditional medicines utilisation.
1	a	What sort of attitudes and beliefs influence utilisation of TM/H?	Some literature showing trust and perceived benefits of TM/H exist but studies are largely qualitative in nature, with few modelling econometrically attitudes and beliefs.	Probit models, with six attitudes and beliefs as separate and compounded independent variables. PCA to create cultural index. The index is then used in probit model where culture is exogenous and then in Ivprobit model, where culture is endogenous (using ethnicity as an instrument).	Cultural attitudes on trust, healer knowledge and perceived ability to cure have considerable effects on use. The cultural index is also a significant indicator of utilisation. Results hold for exogenous or endogenous models.	Survey data on attitudes and beliefs toward traditional medicines. Creation of culture index; culture as endogenous factor explaining utilisation.
1	b	Do cultural explanations remain valid even when income and insurance status are taken into account?	Literature show income and insurance are important in explaining utilisation.	Addition of income and insurance data to regressions and subsamples.	Cultural attitudes are still important indicators of utilisation despite taking into account income and insurance.	Inclusion of cultural variables alongside economic variables.
2		Does income explain use of modern and traditional health care services?	Income is a key predictor of health care service utilisation, and by type.	Biprobit modelling for joint estimation and ordered logit for ordered choice. Log equivalised expenditure is the key independent	Income has a positive relationship with an individual choosing modern care while it has a negative relationship	Modelling multiple sources of care for one illness episode. Joint estimation of modern and

Question	Subset	Question	What do we know already?	Main method	Answer	Key contribution
				variable. Standard controls included.	with an individual choosing traditional care. The order of choice is also affected by income: poorer individuals use traditional care at earlier stages than the rich.	traditional health care systems and modelling health care choices as an ordered revealed preference.
2	a	When modern and traditional medicine utilisation are modelled together does income affect choice of provider?	Separately modelled, utilisation is affected by income.	Biprobit in which an individual belongs to one of four categories (modern only, modern and traditional together, traditional only, none).	Rising income is associated with modern care use while decreasing income is associated with traditional care use. Utilisation of modern systems only is the most common and likely response, followed by modern and traditional care together, then traditional care only.	Joint estimation of health care utilisation in a pluralistic environment.
2	b	How do patterns of health-seeking behaviour differ with income?	Individuals frequently use many sources of care for a given illness and income can be an important determinant of provider choice.	Ordered logit in which modern care and traditional care are modelled separately, as first, second, third or fourth choices.	Rising income has a positive effect on choice of modern care as a first provider, while choosing it second, third or never is associated with decreasing income. As income rises, utilisation of traditional care as a first choice decreases.	An analysis of the stage and order in which an individual seeks care from both modern and traditional providers according to income variation.
3		What explains variations in levels of satisfaction	Previous studies have found varying levels of satisfaction but fail to	Ordered probit, in which satisfaction is the dependent variable.	Individuals gain utility through the act of rituals and healing processes	Attribution and application of procedural utility to

Question	Subset	Question	What do we know already?	Main method	Answer	Key contribution
		following TM/H utilisation?	distinguish between utility gained through positive health outcomes and processes.		even once outcomes are controlled for. This is strongly indicative of a 'hedonic placebo effect'.	satisfaction gained from traditional medicines utilisation.
3	a	How satisfied are users of TM/H?	Varied levels of satisfaction; uncertainty about whether they are measuring PU or OU.	Descriptive.	Users report high levels of satisfaction, with variations between people who have had rituals and those who have not.	Generally users of TM/H report high levels of satisfaction but levels are higher if healing processes have been carried out.
3	b	Is there procedural utility in the utilisation of TM/H?	Medical evidence of placebo effect (consumption of medicines has a positive effect on health psychologically rather than physically or biologically). PU in economics and politics has been tested (eg individuals gain utility from being treated well at work and it is not just pay that accounts for satisfaction).	Ordered probit and use of a procedual variable, ritual, indicating whether individual has had rituals or other healing processes in the course of treatment. Outcome utilities based on EQ5D are used as main controls.	Users of TM/H who practice rituals and other healing processes exhibit higher rates of satisfaction. Results hold even once outcome utility and other standard controls are included and suggest the effect of a hedonic placebo effect.	PU has not previously been tested for utilisation of medicines/health care. Measurement of outcome utility based on EQ5D has also not been applied to TM/H medicines before.
4		How do inequalities in health care utilisation change when we take into account TM?	Utilisation of modern care is skewed toward the rich despite the poor's tendency for greater need. Little known about inequality in traditional medicine use, or which factors matter most in contributing to inequities.	Inequality and inequity are calculated as concentration indices and horizontal inequity indices respectively.	Rich tend to utilise modern care disproportionately while poor utilise traditional care. This holds even once need variables are accounted for. If traditional care is included, however, inequity falls.	Inequality and inequity are calculated for both modern and traditional care services and their sub-categories. Decompositions by contributing factors are also carried out.

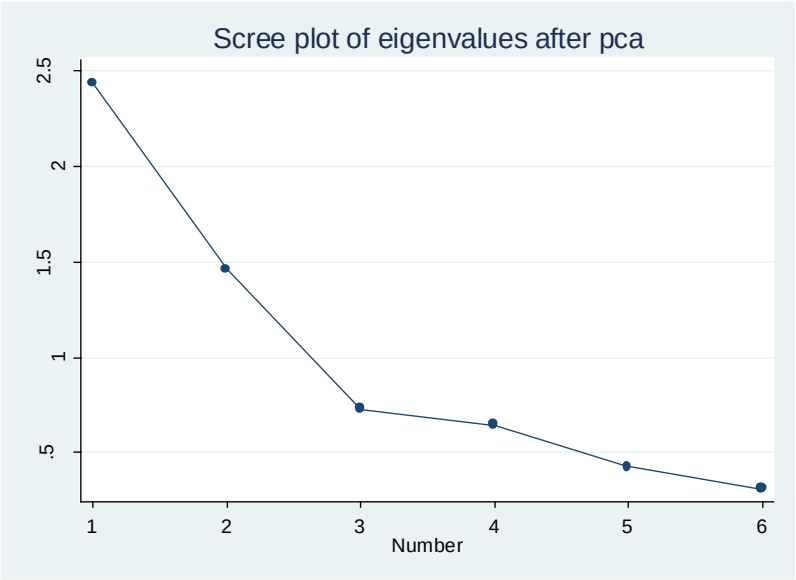
Question	Subset	Question	What do we know already?	Main method	Answer	Key contribution
4	a	What is the degree of inequality and horizontal inequity for both modern and traditional care?	Inequalities in utilisation (biased against the poor) are commonly found. Horizontal inequity calculations in pluralistic systems tend to omit traditional care.	Concentration index for inequality; HI index for inequity; grouping 'non-need' (of which income is one) and 'need' variables. Use of both linear probability and probit models.	Utilisation of modern medicine is pro-rich while utilisation of traditional medicines is pro-poor. Inequity falls once traditional medicines are taken into account.	Inclusion of traditional medicines utilisation in inequality/inequity calculations.
4	b	Do results change when we look at sub-categories of care?	Private sources are utilised by the rich. Other sources show mixed results.	As above but by sub-category of care.	Public institutions and use of traditional healers are pro-poor. Private sources and self-medication (both modern and traditional) are pro-rich.	Sub-categories of care reveal different patterns of inequality and inequity. TM and TH use should be analysed separately.
4	c	What is the contribution of income to inequity, and factors aside from income?	Non-need factors often account for a large proportion of the inequity.	Decomposition method.	Non-need factors (geographic location, income) dominate in contributing to inequity.	Decomposition by sub-category of care.

Chapter 2

Appendix 11 - Summary table of variables for Paper 1

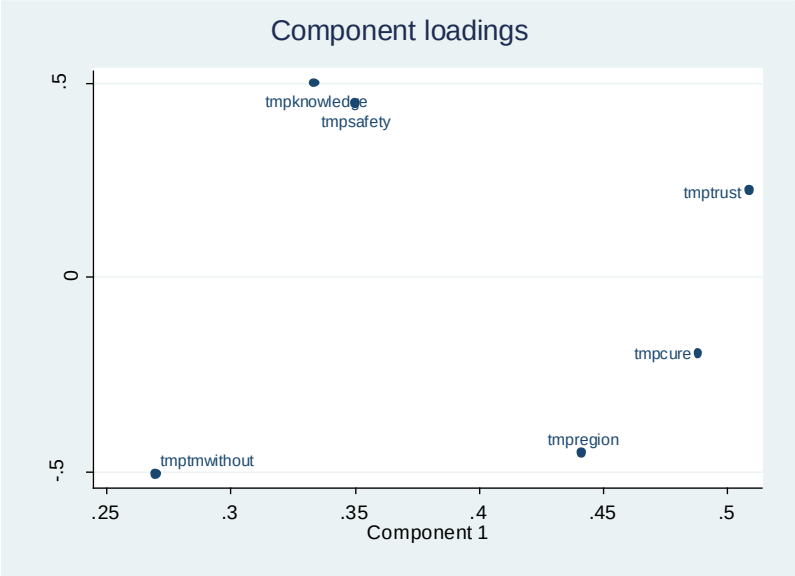
Variable	Count	Mean	Median	SD	Min	Max	Coding
Tradever	741	0.311741	0	0.463518	0	1	dummy: 0 - did not use; 1 - did use
Knowledge	726	2.786501	3	1.240638	1	5	level of agreement: 1 strongly agree-5 strongly disagree
Cure	732	1.88388	2	1.012325	1	5	level of agreement: 1 strongly agree-5 strongly disagree
Trust	741	2.468286	2	1.127365	1	5	level of agreement: 1 strongly agree-5 strongly disagree
Accept	740	1.778378	2	0.832082	1	5	level of agreement: 1 strongly agree-5 strongly disagree
Safety	728	3.167582	3	0.97954	1	5	level of agreement: 1 strongly agree-5 strongly disagree
Tmwithout	736	2.023098	2	0.894889	1	5	level of agreement: 1 strongly agree-5 strongly disagree
Quintile	651	3.116743	3	1.43748	1	5	income quintile: 1 poorest quintile-5 richest quintile
Wealth	741	1.807018	2	0.712251	1	3	wealth tertile: 1 richest tertile-3 poorest tertile
Insurance	741	0.618084	1	0.486184	0	1	dummy: 0 - not insured; 1 - insured
Chronic	741	0.406208	0	0.491456	0	1	dummy: 0 - not chronic illness; 1 - chronic illness
Serious	741	1.739541	2	0.541184	1	3	illness severity: 1 serious-3 low severity
Age	739	30.51466	27	23.3806	0.1667	110	age in years
Gender	741	0.587045	1	0.492698	0	1	dummy: 0-male; 1-female
Education	735	0.876191	1	0.81683	0	2	dummy education head of household: 0 none; 1 primary; 2 junior+
Occupation	741	2.438596	3	1.202731	1	4	dummy occupation head of household: 1 farmer/fisherman/labourer; 2 formally employed; 3 own business; 4 none
Religious	741	1.408907	1	0.704331	1	4	dummy religious group: 1 Christian; 2 Muslim; 3 other; 4 none
Ethnic	741	3.470985	4	1.364921	1	5	dummy ethnicgroup: 1 Akan; 2 Ga/Dangbe; 3 Others; 4 Waale; 5 Dagaarti
Tmpclose	741	0.788124	1	0.408913	0	1	dummy whether has healer close by: 0 - not within 15 minutes' walk; 1 - within 15 minutes' walk
Urban	741	0.504723	1	0.500315	0	1	dummy urban location: 0 not urban; 1 - urban

Appendix 12 – Screeplot



**Source: author's own*

Appendix 13 - Loading plot



**Source: author's own*

Appendix 14 - First stage estimates for ivprobit

Dependent var is culture	
Income quintile_2	0.293**
	[0.120]
Income quintile_3	0.533***
	[0.183]
Income quintile_4	0.273
	[0.200]
Income quintile_5	0.41
	[0.303]
Insurance	0.084
	[0.156]
Chronic	0.148
	[0.108]
Serious	0.116
	[0.094]
Not serious	-0.174
	[0.172]
Age	-0.004
	[0.002]
Female	0.331**
	[0.158]
Religiousgroup_2_muslim	-0.003
	[0.161]
Religiousgroup_3_other	-0.640**
	[0.306]
Religiousgroup_4_none	-0.081
	[0.104]
Education_primary	-0.114
	[0.140]
Education_other	0.028
	[0.120]
Occupation_formal sector	-0.129
	[0.192]
Occupation_own business	-0.199
	[0.136]
Occupation_none	0.106
	[0.102]
Ethnicgroup_2_ga dang	0.922***
	[0.124]
Ethnicgroup_3_other	0.645**
	[0.263]
Ethnicgroup_4_waale	-1.110***
	[0.213]
Ethnicgroup_5_dagaare	-0.623***
	[0.084]
Tmpclose	0.082
	[0.100]

Urban	-0.225**
	[0.097]
Constant	5.099***
	[0.281]
Observations	584

Robust standard errors in brackets; marginal effects presented
significant at 10%; ** significant at 5%; * significant at 1%*

Appendix 15 – Second stage estimates for ivprobit

Dependent var is tradever	
Cultural index	-0.177***
	[0.058]
Income quintile_2	0.083
	[0.324]
Income quintile_3	-0.293
	[0.217]
Income quintile_4	-0.301***
	[0.115]
Income quintile_5	-0.181***
	[0.060]
Insurance	-0.243
	[0.225]
Chronic	0.423***
	[0.145]
Serious	-0.032
	[0.171]
Not serious	-0.905***
	[0.147]
Socio-demographic characteristics	*yes*
Supply factors	*yes*
Constant	0.282
	[0.405]
Constant - athrho	0.168**
	[0.082]
Constant – lnsigma	0.127***
	[0.031]
Wald test of exogeneity	0.04
Observations	584

Robust standard errors in brackets; marginal effects presented
significant at 10%; ** significant at 5%; * significant at 1%*

Appendix 16 - Robustness checks using wealth indicator

Dept var is tradever	I Sensitivity1	II Sensitivity2
Knowledge_2	0.127***	
	[0.028]	
Knowledge_3	0.258***	
	[0.037]	
Knowledge_4	0.278***	
	[0.042]	
Knowledge_5	0.311***	
	[0.030]	
Cure_2	-0.031	
	[0.038]	
Cure_3	-0.155**	
	[0.063]	
Cure_4	-0.080***	
	[0.014]	
Trust_2	-0.024	
	[0.042]	
Trust_3	-0.096	
	[0.063]	
Trust_4	-0.199***	
	[0.038]	
Trust_5	-0.108	
	[0.199]	
Accept_2	-0.023	
	[0.019]	
Accept_3	-0.097	
	[0.063]	
Accept_4	-0.086**	
	[0.039]	
Accept_5	0.141	
	[0.264]	
Safety_2	-0.068	
	[0.067]	
Safety_3	-0.063	
	[0.097]	
Safety_4	-0.129	
	[0.113]	
Safety_5	-0.139*	
	[0.082]	
Without_2	-0.023	
	[0.044]	
Without_3	0.054	
	[0.142]	
Without_4	0.039	

Dept var is tradever	I Sensitivity1	II Sensitivity2
	[0.069]	
Without_5	-0.016	
	[0.196]	
Cultural index		-0.038***
		[0.003]
Wealth_mid	-0.151***	-0.141***
	[0.038]	[0.046]
Wealth_high	-0.123***	-0.139***
	[0.020]	[0.035]
Insurance	-0.027	-0.052
	[0.074]	[0.066]
Chronic	0.178***	0.179***
	[0.026]	[0.041]
Serious	-0.074	-0.022
	[0.047]	[0.047]
Not Serious	-0.226***	-0.216***
	[0.029]	[0.050]
Socio-demographic characteristics	*yes*	*yes*
Supply factors	*yes*	*yes*
Pseudo R2	0.155	0.120
Observations	639	650

Robust standard errors in brackets; marginal effects presented

significant at 10%; ** significant at 5%; * significant at 1%*

Appendix 17 - Robustness checks collapsing opinion categories

Dept var is tradever	I Sensitivity3	II Sensitivity4	III Pcrobust
Knowledge_2	0.103***	0.198***	
	[0.021]	[0.011]	
Knowledge_3	0.151**	0.199***	
	[0.067]	[0.056]	
Cure_2	-0.131***	-0.145*	
	[0.028]	[0.076]	
Cure_3	-0.081***	-0.015	
	[0.021]	[0.022]	
Trust_2	-0.05	-0.081	
	[0.046]	[0.061]	
Trust_3	-0.164***	-0.152**	
	[0.061]	[0.069]	
Accept_2	-0.055**	-0.069*	
	[0.022]	[0.037]	

Dept var is tradever	I Sensitivity3	II Sensitivity4	III Pcrobust
Accept_3	-0.039	-0.01	
	[0.042]	[0.061]	
Safety_2	0.03	0.024	
	[0.022]	[0.025]	
Safety_3	-0.035	-0.071	
	[0.088]	[0.046]	
Without_2	-0.001	0.061	
	[0.116]	[0.132]	
Without_3	0.007	0.06	
	[0.014]	[0.056]	
Cultural index			-0.026***
			[0.006]
Income_quintile_2		-0.029	0.012
		[0.104]	[0.127]
Income_quintile_3		-0.177***	-0.139**
		[0.045]	[0.068]
Income_quintile_4		-0.177***	-0.152***
		[0.054]	[0.059]
Income_quintile_5		-0.129***	-0.121***
		[0.023]	[0.041]
Insurance		-0.065	-0.085
		[0.089]	[0.084]
Chronic		0.129***	0.138***
		[0.044]	[0.049]
Serious		-0.07	-0.02
		[0.076]	[0.066]
Not serious		-0.269***	-0.246***
		[0.025]	[0.035]
Socio-demographic characteristics	*no*	*yes*	*yes*
Supply factors	*no*	*yes*	*yes*
Pseudo R2	0.041	0.149	0.109
Observations	712	584	584

Robust standard errors in brackets; marginal effects presented

significant at 10%; significant at 5%; *** significant at 1%*

Appendix 18 - Predisposing factors to traditional medicines use

Predisposing Factor	Impact on TM use	Location of study	Author/year
Age and sex	Older people tend to visit TH more. More men than women use TH (62% vs. 44%) and men who visit TH do so more frequently.	Kalabo District, Zambia	Stekelenburg et al (2005)
	TM use higher for females in univariate analysis. No sex or age effects in multivariate analysis.	KwaZulu-Natal, South Africa	Peltzer et al (2008)
	As age increases likelihood of CAM decreases in univariate analysis. Sex does not determine CAM use. Results hold for multivariate analysis.	Ankara, Turkey	Ceylan et al (2009)
	Neither age nor sex determines CAM use but current CAM users tended to be older than non-users. No impact for new users.	Korea	Kim et al 2008
	Age is significantly positively associated with use of herbs. Linear trend.	Ethiopia	Gedif and Hahn (2003)
Household size	Larger families are about 3 times more likely to use CAM than smaller ones. Result holds for multivariate analysis.	Ankara, Turkey	Ceylan et al (2009)
Education	TH use was between 53-60% for all levels of education but utilisation varied according to illness (infertility, demon possession and epilepsy). Education not important at the general level, but for specific diseases, the higher the level of education, the lower the probability of visiting TH.	Kalabo District, Zambia	Stekelenburg et al (2005)
	The more educated use TM more than the less educated in univariate analysis; result does not hold in multivariate analysis.	KwaZulu-Natal, South Africa	Peltzer et al (2008)

Predisposing Factor	Impact on TM use	Location of study	Author/year
	No significant results in univariate regressions but in multivariate analysis, those with 1-8 years of education have lowest CAM use. Education is related to CAM use but not linearly. Those with 9+ years of education use CAM most frequently, but this is not significant.	Ankara, Turkey	Ceylan et al (2009)
	TM (food, massage and behavioural therapy) users were less educated than non-users.	Korea	Kim et al (2009)
	Duration of education is not related to CAM use.	Chatsworth, South Africa	Singh et al (2004)
	Illiterate people are more likely to use herbal medicine than literate people. Higher education is associated with less utilisation.	Ethiopia	Gedif and Hahn (2003)
	Some thought it demeaning to accept advice from a healer with lesser education; others believed western education 'brain washed' people into thinking that anything African was 'bad'.	Ghana	Tabi et al (2006)
Religion and ethnicity	Univariate analysis: those with no religion are more likely to use herbs; those with 'charismatic' religion most likely to use TM. Results do not hold in multivariate regression; impact likely to be small.	KwaZulu-Natal, South Africa	Peltzer et al (2008)
	No effects of religious on CAM use.	Chatsworth, South Africa	Singh et al (2004)
	Some Christian and Muslim interviewees believed TM had demonic influences, preferring to use modern medicine. Religion seems to impact beliefs and understandings of medicine.	Ghana	Tabi et al (2006)

Appendix 19 - Enabling factors to traditional medicines use

Enabling Factor	Impact on TM use	Location of study	Author/year
Geographic accessibility	TH provide the majority of medical care as the rural clinic often has drug shortages.	Chiawa, Zambia	Ndubani and Höjer (1999)
	49% live under 29 mins walking distance from TH vs. 34% for hospital. Average walking distance to TH is less than hospital, but of those who had never visited TH, only 5% said it was due to distance.	Kalabo District, Zambia	Stekelenburg et al (2005)
	Ratio of doctors to population is 1:20,000. ratio of healers to population is 1:200. Healers are more accessible and tend to be the first point of contact for most people.	Ghana	Tabi et al (2006)
	Rural residents use both herbs and CAM more than urban residents. The difference is 2-3 times. In multivariate analysis results do not hold.	Kwa-ZuluNatal, South Africa	Peltzer et al (2008)
	CAM users who lived in rural areas were more likely to be taking oriental medicines than those in urban areas. Rural residents more likely to use alternative medicines.	Korea	Kim et al (2009)
Communication, trust of provider	Public providers are preferred for more serious illnesses because they are free and trusted, but private providers are preferred when illnesses are acute or moderate. Poor relationships are a barrier to access no matter income. People trust technical competence of private family doctors and quality of drugs at private pharmacies, and prioritised additional care given by private doctors. Municipal dispensaries are not trusted due to poor inter-personal interactions, even where technical quality of care is evident.	Sri Lanka	Russell (2005)
Quality of care	Long waiting times caused by poor staff availability: 48% not helped immediately at hospital, vs. 28% at TH. 11% dissatisfied with hospitals due to waiting times.	Kalabo District, Zambia	Stekelenburg et al (2005)
	Individuals appreciate good hygiene, accurate dosage and testing offered at hospitals. Modern medicine is preferred by some but TM are often used as back up.	Ghana	Tabi et al (2006)

Enabling Factor	Impact on TM use	Location of study	Author/year
Costs/income	Two types of payment exist: chiponda msango is payment made before medicines are dispensed; shano is paid after the client is healed. Only 6 of 23 healers charge chiponda msango, (median $1.50). 20 charge shano, median $7.	Chiawa, Zambia	Ndubani and Höjer (1999)
	2/3 paid an animal (usually a cow, valued at Kwachaa 200,000-400,000; $70-130). 1/3 paid under Kwachaa 10,000 ($3). Most had 'no cure, no pay' system and payments in instalments was accepted. At hospital, cost would be Kwachaa2000 for registration and 10,000 for major surgery – but some groups are exempt. 1/3 had not visited TH due to high cost, but overall affordability does not influence treatment option.	Kalabo District, Zambia	Stekelenburg et al (2005)
	Herbal therapies cost 128 rand ($15) per month on average; modern treatment costs 120 rand per visit (average 6 per year). In univariate analysis, those with enough money to meet needs are less likely to use herbs or CAM. Individuals with sources of income other than salary and government donations/grants were less likely to use herbs or CAM. Being on disability grant increased likelihood of herb and CAM use. Impact on TM use is mixed, as costs also include prayers which are free. On the whole patients may be using TM because costs of modern medicine are too high. Having health insurance is not a key determinant of TM use. In multivariate analysis, those who classed 'contributions from family' as main source of income were significantly less likely to use TM than those with formal salaries.	KwaZulu-Natal, South Africa	Peltzer et al (2008)
	Mean cost of CAM was $102 per month, while modern treatment cost $73.	Korea	Kim et al (2009)
	Income has no impact on CAM use. 61% spent under 200 rand in 12 months; 19.5% spent between 200-500 rand; 9.6% between 500-1000 rand; 9.1% spent over 1000 rand.	Chatsworth, South Africa	Singh et al (2004)
	Rural poor cannot afford modern medical expenses. Poverty prevents treatment/drug use at hospitals; reliance on herbal medicines.	Ghana	Tabi et al (2006)

Appendix 20 – Summary table of variables for Paper 2

		Predicted effect		All sample with needs		MC==1, TC==1		MC=1, TC=0		TC==1, MC=0		TC=0, MC=0	
Variable	**Definition and unit of measurement**	**MC**	**TC**	**mean**	**sd**	**mean**	**sd**	**mean**	**sd**	**mean**	**sd**	**mean**	**sd**
x	log household expenditure, using equivalence scale	+	-	4.099971	1.011457	3.960037	1.074066	4.211925	.9519998	3.859524	1.05792	3.281351	1.183102
Sex	gender; =1 if male; =2 if female	+	+	1.585056	.4931046	1.606667	.4901262	1.574209	.495065	1.622642	.4893644	1.533333	.5163978
Agegroup	age in years grouped as 1:<12; 2:12-17; 3:18-34; 4:35-54; 5: 55+	-	+	2.947536	1.48949	3.6	1.315881	2.6691	1.488982	3.226415	1.367782	3.066667	1.437591
Serious	severity of illness: very serious, serious, not serious, not serious at all (omitted very serious)	-	-	.4753577	.4997898	.4333333	.4971957	.4841849	.5003589	.5283019	.5039755	.4666667	.5163978
Notserious		-	-	.1764706	.3815234	.1466667	.3549585	.1849148	.3887016	.1886792	.3949977	.2	.4140393
Notseriousat		-	-	.0413355	.1992233	.0133333	.1150819	.053528	.2253582	.0188679	.1373606	.0666667	.2581989
Chronic	whether individual suffers chronic illness, =0 if no, =1 if yes	**+**	+	.4085851	.4919635	.5866667	.4940813	.3406326	.4744996	.4716981	.5039755	.2666667	.4577377
Insurance	whether individual has national health insurance, =0 if no, =1 if yes	+	-	.6375199	.481099	.6066667	.4901262	.6690998	.4711107	.5471698	.5025335	.4	.5070926
Educprimary	level of education attained by household head: primary, basic junior+, other types eg apprenticeships (omitted no education)	+	**-**	.1383148	.3455048	.14	.3481495	.136253	.3434752	.1698113	.37906	.0666667	.2581989
Educjuniorplus		+	-	.4117647	.4925446	.3666667	.4835088	.4525547	.4983505	.3018868	.4634696	.1333333	.3518658
Educother		+	-	.0651828	.2470446	.0666667	.2502795	.0632603	.2437273	.0566038	.2332953	.1333333	.3518658
Christian	whether individual is Christian, =0 if no, =1 if yes	?	?	.6597774	.474161	.6466667	.4796065	.6666667	.4719791	.6981132	.4634696	.4666667	.5163978
Farmer	whether household head is a farmer, =0 if no, =1 if yes	-	+	.09062	.2872965	.16	.3678342	.0583942	.2347731	.1509434	.3614196	.0666667	.2581989
Married	whether individual is married, =0 if no, =1 if yes	?	?	.3243243	.4684944	.4533333	.4994852	.2554745	.4366591	.4528302	.5025335	.4666667	.5163978
Culture	cultural index of attitudes and beliefs toward TC. Higher index value implies increasing negativity toward TC	**+**	-	1.71071	3.037623	1.274325	2.565119	1.814706	3.105002	2.210805	3.793942	1.458067	2.16666
Urban	whether household is in urban area (regional capital) =0 if no, =1 if yes	**+**	**-**	.5023847	.5003922	.46	.5000671	.5231144	.5000742	.509434	.5046949	.3333333	.48795
Modernfac	individual can obtain modern drugs within 30minutes' walk from pharmacies, health centres, hospitals; =0 if no, =1 if yes	+	-	.8521463	.3552374	.82	.3854745	.8832117	.3215593	.7735849	.4225158	.6	.5070926
GA	region (Greater Accra) dummy; =0 if no, =1 If yes	+	-	.4387917	.4966343	.38	.4870125	.4768856	.5000742	.3962264	.4937931	.1333333	.3518658
N				629		150		411		53		15	

Bold indicates actual effect did not match expectation

Appendix 21 - Income elasticities of utilisation

	Probit		Biprobit			
	MC	TC	MC=1, TC=1	MC=1, TC=0	MC=0, TC=1	MC=0, TC=0
Without controls	0.022	-0.045	-0.003	**0.028**	-0.184	-0.224
With controls	0.014	-0.005	0.017	0.007	-0.090	-0.146

**MC indicates modern care, TC indicates traditional care. Income elasticity calculations use equivalised income figures. Bold indicates significance. *Source: author's own.*

Chapter 4

Appendix 22 - Summary table of variables for Paper 3

			Full sample		
Variables	**Description**	**Coding**	**Mean**	**SD**	**N**
Satisfaction variables					
Lifeafter	life satisfaction after TM/H utilisation	0-10. 0 absolute dissatisfaction, 10 absolute satisfaction	6.701299	1.764862	231
Process variable					
Rituals	whether individual experienced rituals or other healing processes	0=no; 1= yes	0.229437	0.421384	231
Outcome variables					
Mobility	whether individual felt better in mobility dimension following utilisation	0= no, got worse or saw no change; 1=yes, got better	0.606061	0.489683	231
Selfcare	whether individual felt better in selfcare dimension following utilisation	0= no, got worse or saw no change; 1=yes, got better	0.601732	0.490604	231
Activity	whether individual felt better in activity dimension following utilisation	0= no, got worse or saw no change; 1=yes, got better	0.670996	0.470872	231
Pain	whether individual felt better in pain dimension following utilisation	0= no, got worse or saw no change; 1=yes, got better	0.796537	0.403448	231

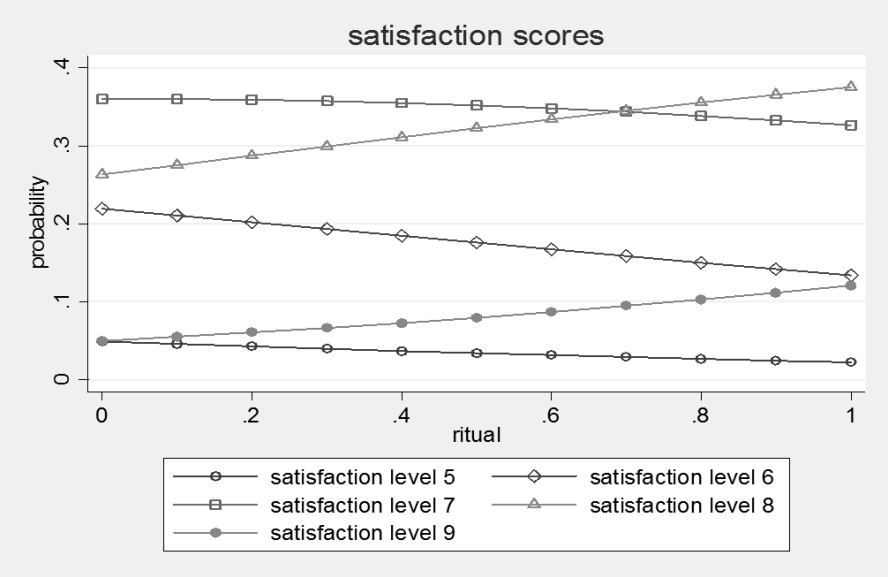
			Full sample		
Variables	**Description**	**Coding**	**Mean**	**SD**	**N**
Anxiety	whether individual felt better in anxiety dimension following utilisation	0= no, got worse or saw no change; 1=yes, got better	0.647826	0.47869	230
Mobilityabso	level of mobility	0= no problems at all; 1=some or severe problems	0.147186	0.355061	231
Selfcareabso	level of selfcare	0= no problems at all; 1=some or severe problems	0.160173	0.367563	231
Activityabso	level of activity	0= no problems at all; 1=some or severe problems	0.220779	0.415673	231
Painabso	level of pain	0= no problems at all; 1=some or severe problems	0.34632	0.47683	231
Anxietyabso	level of anxiety	0= no problems at all; 1=some or severe problems	0.291304	0.455354	230
Score	EQ5D utility score following utilisation	range -0.145 to 1, where 1 is full health and 0 is death, negative is worse than death	0.858057	0.221337	230
Control variables					
Disease characteristics					
Chronic	whether illness was chronic	0=no; 1= yes	6.521072	1.354331	215
Severity	perceived severity of illness	1: very serious; 2: serious; 3: not serious	1.848485	0.727405	231
Financial capability					
Insurance	whether individual has health insurance	0=no; 1=yes	0.597403	0.491486	231
Income (x)	log equivalised income		3.933266	1.049867	202
Societal environment					
Culture	index of cultural attitudes toward traditional medicines/healers	positive score increasing with dislike or negativity toward TM/H	6.521072	1.354331	215
Communitygroup	whether anyone in household belongs to a community group	0=no; 1=yes	0.285714	0.452735	231
Socio-demographic characteristics					

			Full sample		
Variables	**Description**	**Coding**	**Mean**	**SD**	**N**
Sex	gender	0=male; 1=female	0.606061	0.489683	231
Education_cat	highest level education completed or currently attaining	0=none; 1=basic primary; 2=junior; 3=junior+; 4=other	1.069565	1.103561	230
Occupation	occupational group	1=farmer/fisherman; 2=office worker; 3=own business; 4=unemployed	2.774892	1.241133	231
Religious_group	religious group	1=Christian; 2=Muslim; 3=other; 4=none	1.458874	0.821873	231
Ageg	age group	1= 0-11; 2=12-17; 3=18-34; 4=34-55; 5=55+	3.46875	1.355575	224
Married	whether individual is married	0=no; 1=yes	0.4329	0.496553	231
Head_cat	relationship to head of household	1=head; 2=spouse; 3=child 4=other	2.367965	1.110666	231
Locational characteristics					
Region	region dummy	0=Greater Accra; 1=Upper West	0.450217	0.498596	231
Urban	urban dummy	0=no; 1=yes	0.601732	0.490604	231

Appendix 23 - Changes in probability of obtaining satisfaction levels

Satisfaction	Ritual=0	Ritual=1	Difference	Confidence interval for difference
Pr(y=1x):	0.0006	0.0039	-0.0033	[-0.0112, 0.0046]
Pr(y=2x):	0.0075	0.029	-0.0215	[-0.0523, 0.0094]
Pr(y=3x):	0.0095	0.0284	-0.019	[-0.0409, 0.0029]
Pr(y=4x):	0.0181	0.0461	-0.028	[-0.0428, -0.0131]
Pr(y=5x):	0.0237	0.0518	-0.0281	[-0.0495, -0.0068]
Pr(y=6x):	0.1151	0.1947	-0.0796	[-0.1104, -0.0488]
Pr(y=7x):	0.2621	0.3022	-0.0402	[-0.0413, -0.0390]
Pr(y=8x):	0.3731	0.2686	0.1045	[0.0619, 0.1471]
Pr(y=9x):	0.1822	0.0736	0.1086	[0.0985, 0.1187]
Pr(y=10x):	0.008	0.0015	0.0065	[-0.0125, 0.0255]

Appendix 24 – Changes in probability, with OU



**Source: author's own*

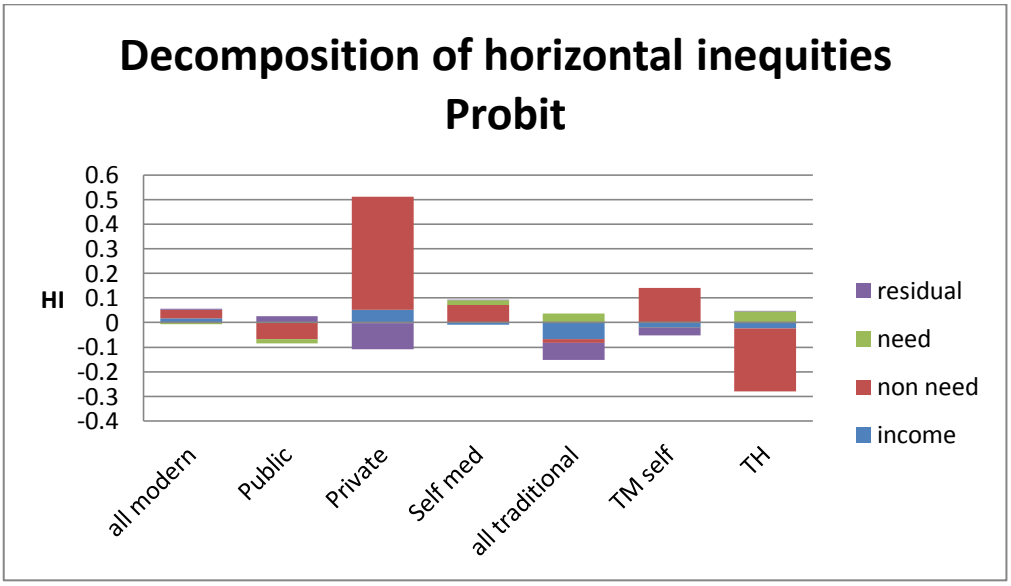
Chapter 5

Appendix 25 - Summary table of variables for Paper 4

			All sample with needs	
Variable and label (where appropriate)		**Definition and unit of measurement**	**Mean**	**SD**
"x", income	inc2	log household expenditure, using equivalence scale	0.1536313	0.360847
	inc3		0.1662011	0.3725213
	inc4		0.1759777	0.3810674
	inc5		0.2332402	0.4231895
Sex-age dummies	mage2	age in years grouped as 1:<12; 2:12-17; 3:18-34; 4:35-54; 5: 55+; sex m=male; f=female	0.0363128	0.1871982
	mage3		0.0712291	0.2573869
	mage4		0.0726257	0.2597025
	mage5		0.075419	0.2642508
	fage1		0.1340782	0.3409745
	fage2		0.0460894	0.2098253
	fage3		0.146648	0.354002
	fage4		0.1438547	0.3511877
	fage5		0.1187151	0.3236791
Serious		severity of illness: very serious, serious, not serious, not serious at all (omitted very serious)	0.4622905	0.4989245
Notserious			0.1857542	0.38918
Notseriousatall			0.051676	0.2215268
Chronic		whether individual suffers chronic illness, =0 if no, =1 if yes	0.4036313	0.4909682
Insurance		whether individual has national health insurance, =0 if no, =1 if yes	0.6201117	0.4856981
Educprimary		level of education attained by household head: primary, basic junior+, other types eg apprenticeships (omitted no education)	0.1410615	0.3483283
Educjuniorplus			0.4022346	0.4906916
Educother			0.0614525	0.2403264
Christian		whether individual is Christian, =0 if no, =1 if yes	0.6815642	0.4661952
Farmer		whether householdhead is a farmer, =0 if no, =1 if yes	0.0907821	0.2874999
Married		whether individual is married, =0 if no, =1 if yes	0.3212291	0.467275
Culture		cultural attitudes and beliefs toward TC, using index of opinions. Higher index value implies increasing negativity toward TC	2.021209	3.589283

			All sample with needs	
Variable and label (where appropriate)		**Definition and unit of measurement**	**Mean**	**SD**
Urban		whether household is in urban area (regional capital) =0 if no, =1 if yes	0.5083799	0.5002793
Modernfac		individual can obtain modern drugs within 30minutes' walk, =0 if no, =1 if yes	0.853352	0.354002
GA		region (Greater Accra) dummy; =0 if no, =1 If yes	0.4636872	0.4990282
N			716	

Appendix 26 – Bar chart of decomposition of HI using probit



**Source: author's own*

Appendix 27 - Decomposition using probit

Variables	Modern care				Traditional Care		
	All	Public	Private	Self modern	All	TM self	TH
CI	0.049	-0.057	0.403	0.085	-0.115	0.090	-0.234
95% interval	(0.019,0.080)	(-0.094, -0.020)	(0.278, 0.529)	(0.025, 0.145)	(-0.250,0.020)	(-0.008, 0.188)	(-0.326,-0.142)
HI	0.052	-0.064	0.511	0.062	-0.083	0.122	-0.280
95% interval	(0.022, 0.081)	(-0.100,-0.028)	(0.385,0.637)	(0.004,0.120)	(-0.222,0.056)	(0.022,0.221)	(-0.370,-0.191)
Income variables	0.018	0.003	0.051	-0.009	-0.068	-0.019	-0.024
Inc2	-0.006	-0.008	0.094	-0.005	-0.018	0.035	-0.0004
Inc3	-0.004	-0.005	0.031	-0.011	-0.002	0.003	0.005
Inc4	0.003	-0.001	-0.011	0.009	-0.0001	-0.006	-0.003
Inc5	0.026	0.018	-0.063	-0.002	-0.048	-0.050	-0.026
Need variables	-0.007	-0.017	-0.002	0.019	0.036	-0.0002	0.045
Self-reported severity	0.005	-0.019	-0.033	0.036	0.014	-0.005	-0.009
Chronic	-0.005	0.010	0.009	-0.016	0.008	0.005	0.024
Age-sex	-0.007	-0.007	0.022	-0.0005	0.015	0.0007	0.030
Non-need variables	0.034	-0.067	0.460	0.071	-0.015	0.141	-0.256
Insurance	-0.006	-0.015	-0.012	0.018	0.019	0.009	0.008
Education	0.004	0.005	-0.029	-0.006	-0.013	-0.010	-0.006
Christian	-0.004	-0.006	-0.018	0.004	0.029	-0.016	0.032
Farmer	0.001	0.0009	-0.0008	-0.001	-0.009	-0.004	-0.001
Married	0.0009	-0.0002	0.012	0.0009	-0.004	-0.004	0.002
Cultural index	0.004	-0.006	-0.018	0.011	0.009	-0.001	-0.067
Modern facility	0.005	0.004	0.038	-0.0006	-0.008	-0.009	-0.004
Greater Accra	0.029	-0.050	0.493	0.045	-0.039	0.176	-0.220
Residual	0.005	0.023	-0.106	0.004	-0.068	-0.032	0.002