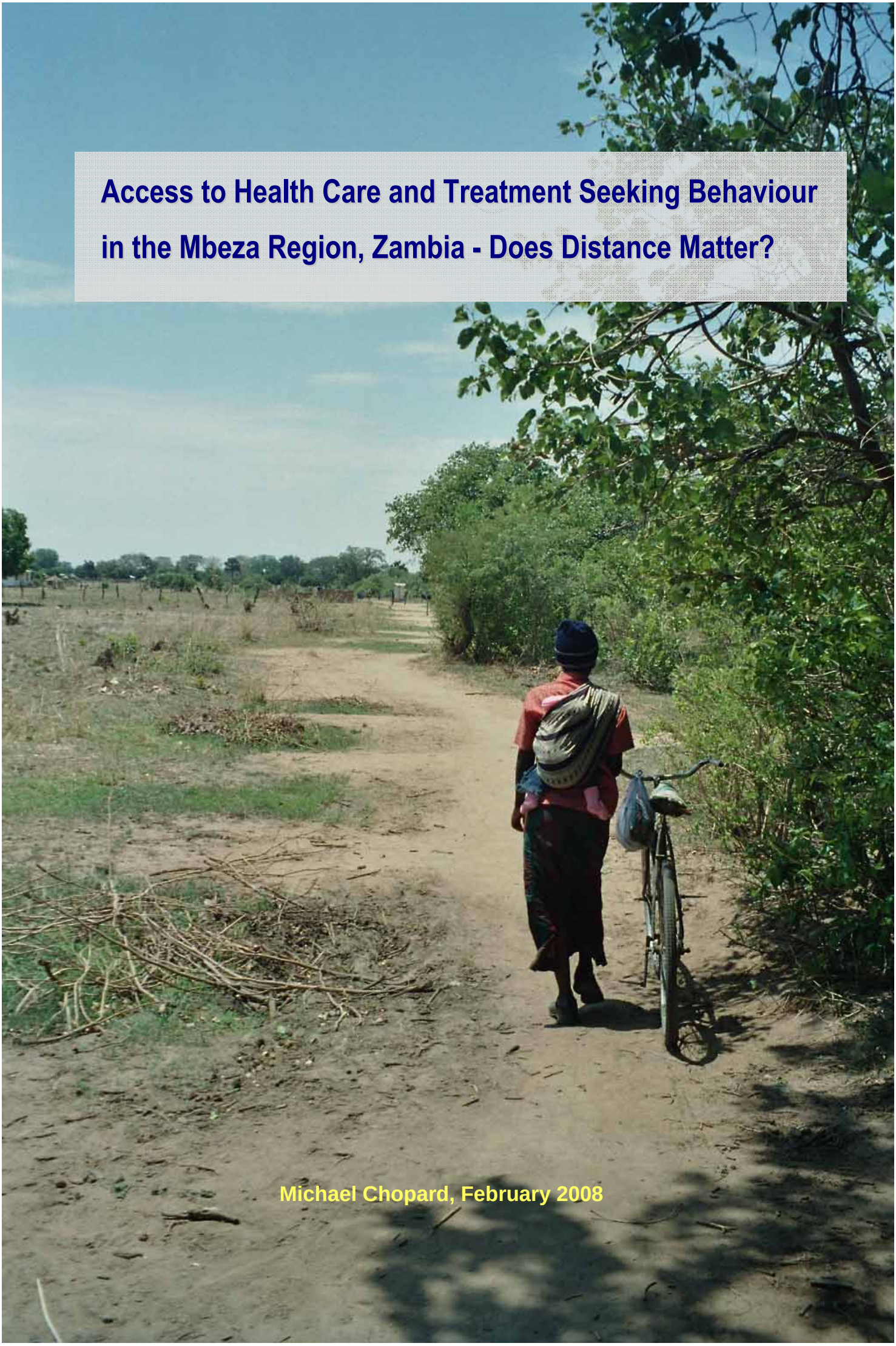
Access to Health Care and Treatment Seeking Behaviour in the Mbeza Region, Zambia - Does Distance Matter?



Michael Chopard, February 2008

University of Zurich

Master Thesis from the University of Zurich

Department of Geography

Division of:

Geographic Information Visualization & Analysis (GIVA)

Michael Chopard

Chautenatte 16

2720 Tramelan

micchop@ecomail.org

Supervisor:

Prof. Dr. Sara I. Fabrikant, Department of Geography, University of Zurich

Advisors:

Dr. Sonja Merten, MD MPH Ph. D. des., Institute of Social and Preventive Medicine, University of Basel

In loving memory of

My Father André Chopard

(1943-2003)

Table of Contents

Acknowledgements

I would like to thank my supervisor, Prof. Dr. Sara I. Fabrikant from the University of Zurich, and my advisor, Dr. Sonja Merten MD MPH Ph. D. des. They gave me the opportunity to make a master thesis in relation to a complex and interdisciplinary project in a developing country and trusted me for carrying out this project. I am very thankful to Prof. Dr. Sara I. Fabrikant for her professional supervising and support and for her patience during this long-term master thesis. I am very grateful to Dr. Sonja Merten for her precious help, advices and support throughout the various phases of the work, especially for the organisation and support before and during the fieldwork in Zambia, and for her support in relation to data analysis. She gave me a first insight into the topics of epidemiology, public health and medical anthropology.

A special thanks to Dr. Charis Keller-Lengen as well, who was my second advisor. She helped me to implement the concept of the master thesis and introduced me into the discipline of medical geography. Thanks to Dr. Charis Keller-Lengen I had the privilege to be invited in Trier, Germany, for the *Deutscher Geographentag 2005* to present the topic of my master thesis in front of the medical geography study group. I am also grateful to Dipl. Geogr. Ronald Schmidt, from the University of Zurich, Geographic Information Systems Division, for his help in relation to the geographical data and to the implementation of a GIS for the remote study area, the Mbeza Region.

I want to warmly thank all the people who welcomed me and helped me during fieldwork in Zambia. First, I am very grateful to Chief Nalubamba who welcomed me in his chiefdom and gave me his support during the fieldwork. Many thanks to the Mbeza community and all the people I encountered, for their kindness, their help and their friendliness. I want to particularly thank the staff of the clinics (medical officers, nurses, community health workers, etc.), the herbalists and traditional healers for their precious help and for the explanations, discussions and exchanges we had together. Many thanks also to all the people of Mbeza who take the time to answer my questions, to make interviews and to share their experiences and ideas with a young *muzungu* (white man) from Switzerland.

I am particularly indebted to the Zambian assistants who I want to warmly thank for their precious help and support and for their friendliness. They introduced me in the Mbeza community and advised me during the fieldwork, they shared their experiences and explained me the traditions and customs of the Ila and Tonga of Mbeza. I want to personally thank: Chrispin Chikani, Makondo Chivyindi, Cosmas Holo, Winnie Kazoka, Veronika Kaumba, Defent Shikapande and his family who welcomed me in their household during fieldwork.

I am also grateful to Dr. Tobias Haller from the University of Zurich, Institute of Social Anthropology, who supported me during my fieldwork in Zambia and for his various contributions and information on the Ila and Tonga ethnic groups. He was also the first who put me in contact with his wife, Dr. Merten, and with the people of Mbeza.

I am grateful to Dr. Jürg Utzinger from the Swiss Tropical Institute (STI), for his attempt to integrate me into a project of the STI. At first I was planning to make my master thesis in a project of the STI in Ivory Coast, but due to civil war that started at the end of 2004, this project was deferred.

I want to thank all the people who are close to me and supported me during this long project. A special thanks to my family, especially my mother who supported me during my studies and to Marie for her advices and contributions. I am very thankful to David who reviewed my first draft and all the other friends and people who helped me and who I do not mention by name.

Finally, I would like to thank the results coach of SPSS for its precious help. Although it has not provided perfect answers, it has given very useful indications in relation to my frequent statistical uncertainties.

Summary

In most developing countries of the world, a traditional health system exists side-by-side with the biomedical (modern) health system (www.who.int, December 2007). In Zambia, traditional and complementary/alternative medicine is used my more than 70% of the population and is accepted by a great majority of the people, regardless of ethnic, religious, or social background (WHO, 2001: 38-39).

The objective of this master thesis is to investigate the access to health care in a small rural area in Zambia, and to understand how patients behave during an illness episode, i.e. their *treatment seeking behaviour*. The second aim is to determine the factors influencing people to rely either on biomedical (modern) or traditional medicine in order to restore their health. A special emphasis is given to the spatial factors influencing treatment seeking behaviour (mainly distance), the main research question being: - *Does distance matter?* However, access to health in this study is understood as a broad concept, including geographical accessibility as well as social accessibility (age, gender, etc.). Hence, non-spatial factors are also considered. Thus, this study investigates if patients in case of illness prefer to attend a clinic, a hospital or a THP. In addition, it also gives an overview of the reasons why patients visit or consult specific Biomedical or Traditional Health Provider(s) (BHPs or THPs) for the first, second and third treatment.

The study area, the Mbeza Region, is a small rural area situated in the floodplain of the Kafue Flats in the Southern Province of Zambia. Various ethnic groups are living in the region, the Ila agro-pastoralists and Tonga farmers representing the majority of the population. In the northern part of the region, on the river bank of the Kafue River, several fishing villages and camps are also established. When the agro-pastoralist villages are situated in the country-side and are only accessible by one dirt road in relative good conditions, the fishing villages and camps are located in very remote areas and are difficultly accessible. During an own fieldwork conducted in 2005, various quantitative and qualitative data have been collected in four agro-pastoralist and two fishing villages, especially spatial data (GPS coordinates). With the help of questionnaire data and semi-structured interviews of patients, the treatment seeking behaviour of the population has been investigated and the influence of various spatial and non-spatial factors have been evaluated and analysed. Furthermore, with a help of a GIS, the data has been used to generate a spatial analysis and a visualisation of the treatment seeking behaviour of the people of Mbeza in their spatial environment. This further permitted to calculate the Euclidean distances separating patient's households from the various health care facilities and providers – be it in the biomedical or in the traditional sector. Finally, based on the survey data, a statistical analysis using logistic regressions was generated.

This multi-methods approach has permitted to investigate and analyse the various factors influencing the treatment seeking behaviour of the local actors and patients. It also permitted to underline the differences in the results produced by different ways of collecting data.

Although the nearest THP is about 20 times more accessible (in terms of distance) than the nearest clinic in Mbeza, the results show that the majority of the people first rely on a clinic in order to restore their health, irrespective of its accessibility (distance), of the illness type, patient's gender, age, etc.

If the distance factor has not been proved to be the decisive factor for selecting the first treatment alternative, this factor has, however, an important influence on the treatment seeking behaviour of the patients as a whole. The logistic regressions indicate that the distance to the nearest clinic, hospital or THP differently affect the treatment seeking behaviour of the patients. Globally, the distance factor has a stronger influence on the treatment seeking behaviour of the patients living in the fishing villages than for those living in the agro-pastoralist villages. Furthermore, distance is a major factor for the male patients and for children who only use self/no treatment or ever consult a Biomedical Health Provider. According to this study, the illness type more than distance, is the factor that mostly determines the treatment seeking behaviour of the patients. For example the patients who are suffering from an illness related to witchcraft/traditional illness are about 14 times more likely to ever consult a THP than the patients who are suffering from a common illness. Thus, the illness concepts and the treatment seeking behaviour of the patients are strongly influenced and embedded into the culture and believes of the people of Mbeza. When the biomedical health system and especially the clinic is the most frequently consulted facility (although less accessible in terms of distance than the nearest THP), the biomedical medicine is, however, not able to response to all illness concepts and expectations of the population. Therefore, the herbalists and traditional healers (who are geographically as well as socially more accessible) are an essential part of the pluralistic health system in Mbeza.

Zusammenfassung

In den meisten Entwicklungsländern existieren gleichzeitig ein biomedizinisches (modernes) und ein traditionelles Gesundheitssystem nebeneinander. Traditionelle Medizin ist in diesen Ländern sehr verbreitet und wird auch in den Industrieländern immer mehr gebraucht (www.who.int, Dezember 2007). Die WHO hat geschätzt, dass ca 70% der Bevölkerung in Sambia traditionelle Medizin anwendet (WHO, 2001: 38-39). Es wird durch die Mehrheit der Sambianer gut akzeptiert, ohne Rücksicht auf Religion, ethnischer Hintergrund oder den sozioökonomischen Status.

Das Ziel dieser Master Arbeit ist es, den Zugang zum Gesundheitssystem und das Verhalten der Patienten, wenn sie krank sind zu analysieren, d.h. der *Prozess der Suche nach einer Behandlung der Erkrankung* zu untersuchen (engl. *treatment seeking behaviour*). Ein weiterer Ziel ist es, die räumlichen und nicht räumlichen Einflussfaktoren zu untersuchen, welche den Zugang zum Gesundheitssystem und die Inanspruchnahme der Gesundheitseinrichtungen beeinflussen und determinieren – sei es im biomedizinischen oder im traditionellen Gesundheitssektor. Der Schwerpunkt ist auf den räumlichen Einflussfaktoren gelegt (vor allem Distanz) und eine wichtige Forschungsfrage ist: - *Spielt der Distanzfaktor eine entscheidende Rolle auf die Inanspruchnahme einer bestimmten Behandlungsalternative?* Der Zugang zum Gesundheitssystem in dieser Studie ist jedoch in seiner Multidimensionalität betrachtet, d.h. die nicht räumlichen, sozioökonomischen Einflussfaktoren sind in der Analyse auch integriert (Alter, Geschlecht, Erkrankungstypen, etc.). Diese Studie analisiert nicht nur die Ursachen weshalb Patienten in einer Klinik, ins Spital oder zum traditionellen Heiler gehen wenn sie krank sind, sondern auch wieso die Patienten ein bestimmtes Gesundheitszentrum oder einen bestimmten Heiler besuchen für eine erste, zweite oder dritte Behandlung.

Die Mbeza Region ist eine kleine ländliche Region, welcher in der südlichen Provinz von Sambia positioniert ist. In dieser Region leben vor allem die Ila (Agro-Pastoralisten) und die Tonga (Bauer). Beides sind die wichtigsten ethnische Gruppen in der Region. Im norden der Region, am Ufer des Kafue Flusses, existieren noch ein paar Fischerdörfer und Fischerlager. Während die Dörfer der Bauern dank einer relativ guten Erdstrasse einfach zu erreichen sind, sind die entfernten Fischerdörfer sehr schwer erreichbar. Eine Feldarbeit wurde in 2005 durchgeführt. Diese wurde vor allem geplant, um quantitative und qualitative Daten in vier verschiedenen Bauerdörfer und zwei Fischerdörfer zu sammeln. Vor allem räumliche Daten (GPS Koordinaten) wurden gesammelt. Der Prozess der Suche nach einer Behandlung der Erkrankung und deren entsprechenden räumlichen und nicht räumlichen Einflussfaktoren gesucht wird, wurde anhand von Fragebögen und semi-strukturierten Interviews untersucht. Ein GIS hat dazu erlaubt, eine räumliche

Visualisierung der Bewegungen der Patienten zu generieren, und die euklidische Distanzen zwischen den Haushalten der Patienten und den gewählten Gesundheitszentren bzw. der Lokalisierungen der Heiler zu berechnen. Schlussendlich, wurden logistische Regressionen generiert, um die Daten statistisch zu analysieren. Der in dieser Studie benutzte Mehr-Methoden-Ansatz hat ermöglicht, die verschiedenen Einflussfaktoren, welche den Prozess der Suche nach einer Behandlung der Erkrankung zu determinieren, herauszufiltern und zu analysieren. Es hat dazu beigetragen, die mit unterschiedlichen Methoden generierten Resultate zu vergleichen und die Unterschiede zu betonen.

Auch wenn der nächstliegende traditionelle Heiler ca. 20 Mal näher ist als die nächstliegende Klinik liegt, besuchen die meisten Patienten trotzdem die Klinik. Dies ist unabhängig vom Erkrankungstyp, vom Alter, vom Geschlecht, etc. der Patienten.

Deswegen, der Distanzfaktor scheint nicht der entscheidende Rolle für die Inanspruchnahme der ersten Behandlungsalternative zu sein. Dennoch dieser Faktor hat trotzdem einen wichtigen Einfluss auf den gesamten Prozess der Suche nach der Behandlung der Erkrankung. Die logistischen Regressionen haben ergeben, dass die Distanz zur nächstliegenden Klinik, Spital oder traditionellen Heiler, unterschiedliche Wirkungen auf dem Prozess der Suche nach einer Behandlung der Erkrankung haben. Im Allgemeinen, hat der Distanzfaktor einen grösseren Einfluss für Patienten, die in den Fischerdörfern wohnen, als für diejenigen welche in den Bauerdörfern wohnen. Ausserdem, kann die Distanz für bestimmte Untergruppen oder in spezifischen Situationen ein entscheidender Faktor sein. Zum Beispiel für Männer und Kinder, welche sich nur selbst behandeln, keine Behandlung durchgehen, oder welche je ein Gesundheitszentrum in Anspruch nehmen. Diese Studie bestätigt auch, dass meistens der Erkrankungstyp, einen entscheidenden Einfluss auf dem gesamten Prozess der Suche nach der Behandlung der Erkrankung. Zum Beispiel konsultieren die Patienten, die an einer traditionellen Erkrankung leiden, 14 mal mehr einen traditionellen Heiler, als die Patienten, die an einer anderen Erkrankung leiden. Die Konzepte von Krankheit und Gesundheit sind in der Kultur, in den Traditionen und in den Glauben der indigenen Gemeinschaften der Mbeza Region eingeprägt, was ihren Prozess der Suche nach einer Behandlung der Krankheit auch beeinflusst. Auch wenn die Klinik die am meisten in Anspruch genommene Behandlungsstrategie darstellt, ist die biomedizinische Medizin nicht fähig die gesamten Krankheitskonzepten und all die Erwartungen der lokalen Bevölkerung zu befriedigen. Deswegen sind die Kräuterkenner und die traditionellen Heiler eine unerlässliche Behandlungsquelle. Sie sind im geographischen Sinn als auch im sozialen und kulturellen Sinn ein sehr wichtiger Bestandteil des pluralistischen Gesundheitssystems in der Mbeza Region.

Résumé

Dans la majorité des pays en voie de développement, un système de santé dit *traditionnel* existe parallèlement au système de santé dit *biomédicale* ou *77e* (OMS, 2002: 1). En Zambie, pays dans lequel la présente étude a été effectuée, on estime à plus de 70% le nombre de patients ayant recours à la médecine traditionnelle. Ce type de médecine est accepté par la majorité de la population, indépendamment de l'affiliation religieuse, du groupe ethnique, ou du statut sociale de la population (WHO, 2001: 38-39).

Le but de ce travail de master est de comprendre et d'analyser d'un part l'accès aux soins et d'autre part la manière de réagir des patients en cas de maladie, c'est-à-dire leur *comportement de recours aux soins* (en anglais: *treatment seeking behaviour*). Le comportement de recours aux soins est régi par certains facteurs d'influence qu'il a ainsi fallut déterminer. Un accent particulier à été donné aux facteurs géographiques, la question principale de cette recherche étant: - *Le facteur distance a-t-il une influence déterminante sur les types de recours aux soins choisis par les patients?* Même si l'accent est porté sur les facteurs spatiaux (géographiques et environnementaux), l'accès aux soins est cependant considéré dans son caractère multidimensionnel en prenant également en compte les facteurs sociaux, tels que le type de maladie, l'âge, ou le genre (sexe) des patients, etc. dans l'analyse.

La zone d'étude se limite à la petite région rurale de Mbeza, situé dans la Province du Sud, en Zambie. Parmi les groupes ethniques présents dans la région, les Ila (principalement éleveurs-agriculteurs) et les Tonga (surtout agriculteurs) représentent la majorité de la population. Dans la partie nord de la région, au bord de la rivière Kafue, on trouve plusieurs villages de pêcheurs appartenant aux ethnies Batwa ou Lozi. Les villages des Ila et des Tonga sont situés dans le centre de la région de Mbeza et sont accessibles grâce à une route de terre (piste) en relativement bon état. De leur côté, les villages de pêcheurs sont beaucoup plus difficile d'accès et les pistes qui y conduisent sont difficilement praticables. Une recherche sur le terrain a été effectuée à Mbeza en 2005 dans quatre villages d'éleveurs-agricultures et deux villages de pêcheurs, afin de récolter des données quantitatives et qualitatives en rapport à l'accès aux soins et au comportement de recours aux soins des patients. Le but principal était de collecter des données spatiales (coordonnées GPS) afin de créer des cartes représentant les déplacements des patients entre leur domicile et les divers établissements sanitaires ou les lieux d'habitation des professionnels de la santé, que cela soit dans le secteur biomédicale ou traditionnel. A l'aide d'un Système d'Information Géographique (SIG), il a également été possible de calculer les distances de ces déplacements (distances euclidiennes).

A la base des données collectées, une analyse statistique à également été effectuée, plus précisément une analyse de régressions logistiques. Finalement, le comportement de recours aux soins a également été analysé à l'aide de méthodes qualitatives, c'est-à-dire d'entretiens semi-directifs avec des patients.

Cette étude a permis d'identifier les habitudes d'utilisation des ressources de santé par les Ila et Tonga de la région de Mbeza, lors de maladies (épisodes de maladie auto-diagnostiqués). Les multiples méthodes utilisées dans cette recherche permettent de comprendre et d'analyser les divers facteurs influençant le comportement de recours aux soins des patients et de découvrir les différences entre les résultats produits à l'aide de différentes méthodes. Cette étude montre que les guérisseurs traditionnels sont de l'ordre de vingt fois plus proche (en termes de distance) que les cliniques. Cependant, dans la majorité des cas, la population préfère se faire soigner en premier lieu à la clinique la plus proche, ceci indépendamment du type de maladie, du genre et de l'âge des patients, etc. Ce résultat suggère que la distance n'est pas le facteur déterminant lors du choix de la première source de traitement pour les patients. Toutefois, ce facteur influence fortement le choix des différents traitements au cours d'un épisode de maladie. L'analyse de régressions logistiques montre que la distance à la clinique, à l'hôpital ou au guérisseur(-se) traditionnel(le) le plus proche affecte différemment le comportement de recours aux soins des patients. Globalement, le facteur distance a une influence plus grande pour les patients qui habitent les villages de pêcheurs, par rapport à ceux des villages d'éleveurs-agriculteurs. De plus, pour certains groupes de patients, ainsi que dans certaines conditions particulières, le facteur distance peut avoir une importance beaucoup plus grande, voir décisive. Par exemple, les hommes et les enfants (à l'encontre des femmes et des adultes), sont fortement influencé par le facteur distance lorsqu'il s'agit d'avoir recours à l'auto-traitement, ou au non traitement de la maladie, ainsi que pour la consultation d'un centre de santé biomédicale.

Les résultats de cette recherche montrent que le type de maladie influence plus le choix des fournisseurs de soins que le facteur distance. Par exemple, les patients souffrants d'une maladie traditionnelle/maladie liée à la sorcellerie, sont 14 fois plus enclin à consulter un guérisseur traditionnel que dans le cas des autres maladies. On peut en déduire que les concepts de maladies et les comportements de recours aux soins sont profondément influencés et ancrés dans la culture et les traditions de la population. Même si la clinique est le plus souvent utilisée, la médicine biomédicale n'est pas capable de répondre seule à tous les concepts de maladies et à toutes les attentes de la population locale. C'est pourquoi, les herboristes et les guérisseurs traditionnels, plus proches géographiquement et socialement de la population locale représente une partie essentielle du système de santé pluraliste qui existe dans la région de Mbeza.

List of Abbreviations

AIDS	Acquired Immuno Deficiency Syndrome
AOR	Adjusted Odds Ratio
ARI	Acute Respiratory Infection
ARV	Anti Retro Viral (drugs)
BHP	Biomedical health practitioner/provider
BLR	Bivariate Logistic Regression
CAM	Complementary/Alternative Medicine
CBoH	Central Board of Health
CHW	Community Health Worker
CI	Confidence Interval
COR	Crude Odds Ratio
CSO	Central Statistical Office
DHB	District Health Board
DHC	District Health Care
DHMT	District Health Management Team
DHS	Demographic and Health Survey
EHT	Environmental Health Technician
FHH	Female Headed Household
SFSO	Swiss Federal Statistical Office
GDP	Gross Domestic Product
GIS	Geographic Information System
GNP	Gross National Product
GNS	Geonet Names Server
GPS	Global Positioning System
GRZ	Government of the Republic of Zambia
HFA	Health For All
HIV	Human Immunodeficiency Virus
HMB	Health Management Board
HMIS	Health Management Information System
HSR	Health System Research or Health Sector Reform
ILO	International Labour Organization
IMF	International Monetary Fund
IMR	Infant Mortality Rate
LCMS	Living Conditions Monitoring Survey
LRA	Logistic Regression Analysis
MHH	Male Headed Household
MLR	Multivariate Logistic Regression

MMD	Movement for Multiparty Democracy
MO	Medical Officer
MOH	Ministry of Health
NASA	National Aeronautics and Space Administration
NGA	National Geospatial-Intelligence Agency
NGO	Non Governmental Organization
NHSP	National Health Strategy Plan
OR	Odds Ratio
PHC	Primary Health Care
RHC	Rural Health Centre
SAHIMS	Southern Africa Humanitarian Information Management Network
STD	Sexually Transmitted Disease
STI	Swiss Tropical Institute
TAZARA	Tanzania Zambia Railways
TB	Tuberculosis
TBA	Traditional Birth Attendant
tTBA	trained Traditional Birth Attendant
THP	Traditional health practitioner/provider
THPAZ	Traditional Health Practitioners Association of Zambia
TM	Traditional Medicine
UTH	University Teaching Hospital
UNEP	United Nations Environment Programme
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
UNIP	United National Independence Party
UTM	Universal Transverse Mercator
UNZA	University of Zambia
WB	World Bank
WGS	World Geodetic System
WHO	World Health Organization

List of figures

List of tables

List of Maps

List of Boxes

Chapter 1

Introduction, Objectives & Research Questions

Fig. 1: A woman cycling to the clinic, carrying her baby on her back

1.1 Introduction

An important challenge, in Zambia, as in every country of the world, is to organize a good and effective health system. In this context, a lot of factors must be considered, for example: the institutional setting, political, demographic, socio-economic and cultural changes (e.g. influences of the traditions, cultural identities and ethnicity, livelihood strategies, etc.). Moreover, the spatial organization, distribution and access to the health care providers and facilities, as well as the environmental changes, topography, climatic and seasonal conditions have to be considered. These factors can be classified into spatial and non-spatial factors. On the one hand these factor influence the organization and access to the health system and its effectiveness; on the other hand these factors also influence the strategies of the local population for searching treatment, i.e. their *treatment seeking behaviour*.

As a consequence, the challenge is not only to organize a dense network of hospitals and clinics, including access to doctors and nurses, but to organize a health system that takes in account the preferences, traditions and customs of the population. Acceptability is a key component, because it is not worth building health centres that are not accepted by the communities and that will consequently not be used, even when they are located in the vicinity. Therefore health planners and communities need to communicate and cooperate, so that an effective health system may be achieved and good quality of health care can be provided. To reach this goal, there is a need to investigate and understand health and treatment-seeking behaviour, and the decision making processes of the local actors and patients within their spatial environment.

As explained by the WHO (1995: 3), despite its many successes and general acceptance throughout the world, the Western system of healing has not replaced the indigenous health system. 'Thus in most developing countries of the world, the traditional medical system continues to exist side-by-side with the modern system, and the majority of the population regularly consults both types of healers' (ibid). This (co)existence and use of multiple sources of medical care is called *medical pluralism*. As stated by Phillips:

> It is estimated that traditional healers are the basic providers of health care in various guises for up to 90% of the rural population in South Asia and Africa. (Phillips, 1990. Cited in Mead, 2000: 320)

The topics of access to health care and treatment seeking behaviour might be studied at different levels: at the macro or international level (referring to traditional and biomedical medicine in the countries of the South, to international organizations, etc.) or at the meso or national level (referring to health care organization in a country). In this thesis, the micro or local level is investigated, which consists of the households and individuals, i.e. the interaction between local actors and patients, and the biomedical and traditional medical system.

1.2 Personal motivation

At the end of my studies at the university I had the opportunity to gain first-hand experience doing fieldwork and working with researchers having knowledge and know-how in international cooperation projects. Indeed, I had the ambitious objective to combine my master thesis with a project in a developing country. During a conference and workshop on common property resources institutions in African floodplain wetlands (2005), I encountered Dr. Tobias Haller and Dr. Sonja Merten. They were finishing their respective research projects after one year fieldwork in a small rural region in Zambia. Dr. Merten from the Institute of Social and Preventive Medicine in Basel was doing research on the topics of health seeking behaviour, traditional medicine and food security. She was interested in integrating a visualisation for her study area and was interested in guiding a student for his master thesis.

Trying to combine GIS with epidemiological data collected from a small area in an African country and engage myself in such an interdisciplinary project was a real challenge. It promised to be fascinating and a very formative experience. I was particularly interested in implementing a GIS for a remote area in a developing country and link this to health aspects. In Europe, aerial photography, remote sensing and satellite images provide a wide variety of geodata sources, but I wondered what the challenges would be getting geodata (affordable or free), to implement a GIS for a remote area in Africa. Furthermore, I was very interested in doing fieldwork in Zambia. Being warmly welcomed by the community of Mbeza and having the chance to work with six competent and friendly assistants from the region was not only a very formative experience, it was an incredible human experience as well.

Originally, the focus of this work was in the area of the *Human Geography*. The first idea was to emphasize qualitative aspects and use a GIS as visualisation tool in order to interpret, discuss and analyse access to health services and treatment seeking behaviour of the local actors and patients in the Mbeza Region. A GIS was further given the possibility to calculate the distances separating local actors' and patients' households from their treatment places. After recognizing that GIS was taking an important part in this master thesis, quantitative methods became more relevant and a statistical analysis of the data collected during was applied. This multi-methods approach allows to not only discuss and analyse the possible influence of spatial and non-spatial factors on treatment seeking behaviour through qualitative and descriptive methods, but also to assess, measure and compare the influence of the spatial and non-spatial factors on treatment seeking.

1.3 Objectives of the master thesis

The overall objective of the master thesis is:

To provide a spatial, cultural and socio-economic understanding of access to health care and treatment seeking behaviour of the local actors and patients in the Mbeza Region.

To achieve this aim, it is essential to investigate, understand and analyse the factors determining access to health and treatment seeking behaviour in Mbeza. *Access* in this context is described as a multidimensional concept including geographical accessibility (distance), availability, acceptability, affordability, etc.

It is however impossible to analyse and understand the entire scope of influence factors that are playing a role. The deep embedded customs and traditions prevailing in the ethnic groups of the region, that are directly or indirectly related to well-being, health and ill-health (e.g. traditional illnesses), are especially difficult to address and understand for *outsiders*. Indeed, health care provision, access to health and treatment seeking behaviour intersect with a large part of human culture and the environment. As a consequence, the research field for this master thesis needed to be delimited by formulating more specific objectives:

1) Provide a geographical visualisation and analysis of:
   a) The distribution and accessibility - in terms of distance - of the biomedical (modern) and traditional health care facilities and providers
   b) The treatment seeking behaviour of local actors and patients of Mbeza

2) Describe, analyse and compare the influence of the distance factor on the decision to use self treatment, to attend a biomedical (clinic, hospital) or a traditional health provider (i.e. *treatment-seeking behaviour*)

3) Describe, analyse and compare treatment seeking behaviour of local actors and patients in relation to specific illnesses such as malaria, Kahungo, HIV/AIDS, etc.

4) Analyse the treatment alternative(s) selected patients more deeply by investigating the influence of further influence factors such as age, gender/gender, illness type, etc.

5) Compare treatment-seeking behaviour described from case studies (last case of illness, *realized* treatment seeking) with the *intended* and *usual* treatment seeking behaviour (cf. below).

It is well established in the literature that distance has an effect on access to health and on health, treatment seeking behaviour. However, the use of GIS in this context is only at its initial phase and few studies have incorporated the *traditional health care system.* In Zambia, quite a few studies have already surveyed the effect of distance on hospital or clinical attendances, on mortality and on health-seeking behaviour as a whole (see Diop et al., 1998; Hjortsberg, 2002; Stekelenburg, 2004). In this master thesis, the first objective (1) is to provide spatial analysis at the local or micro level. Thus, treatment seeking behaviour, illnesses and households characteristics collected through questionnaires has been combined with GIS in order to provide a visualisation of the local actors' and patients' behaviour.

GIS has further been used in the aim of calculating distance separating local actors' and patient's households from the treatment alternatives selected to restore their health – be at a clinic, hospital, or traditional health practitioner. In a next step, these results are discussed with the help of qualitative data collected during semi-structured interviews. Finally, data collected in questionnaires are statistically analysed with the help of logistic regressions in order to recognize, quantify and compare the different influence factors – especially distance - on treatment seeking behaviour and the possible interactions between spatial and non-spatial factors (Objectives 2 to 4).

It is important at this point to make a distinction between patients and local actors: the term patient is used for persons currently ill, or for people referring to former illness episodes (case studies). On the other hand, local actors are representing the *potential* patients, persons who are not ill at present and give their opinion on a illness or some other health-related issues. This distinction is particularly useful, because the last objective of this master thesis (5) is to compare the data and findings from *realized*, *intended* and *usual* treatment seeking behaviour (own classification):

- *Usual* treatment seeking behaviour refer to the treatment alternative mostly selected/used by the local actors, i.e. the most frequently consulted health provider in case of illness – be it in the biomedical or traditional health sector
- *Intended* treatment seeking behaviour goes into the details of the *usual* treatment seeking behaviour. It corresponds to what local actors *would* do or who they *would* consult to restore their health according to a list of various illnesses. At the time the person is questioned, she or he is considered as being healthy
- *Realized* treatment seeking refers to a case study (the last episode of illness in the household, or a former illness episode), i.e. what a patient *effectively* did as she or he was experiencing an illness, what kind of health provider(s) and treatment(s) have been consulted and provided

Most surveys in epidemiology and public health are based on either clinical data or case studies, or intended treatment seeking behaviour. Therefore with the help of a questionnaire where usual, intended and realized treatment seeking behaviour are investigated, a last objective of this work is to understand and address the differences produced by these different ways of collecting epidemiological data.

Since questionnaires were collected at the household level, it is important to mention that the data basis corresponds to the conceptions and reports of the local actors and patients, not to clinical data or biomedical information. This point of view is called patient oriented. According to the terminology in medical anthropology, this master thesis mainly refers to the *illness* perceived by the patients and not to *disease* diagnosed by doctors (this will be more deeply explained in the theory chapter of this thesis, cf. Chapter 3).

1.4 Research questions

This master thesis answers questions that are related to access to health and treatment seeking behaviour of the local actors and patients in the Mbeza region. The following global question is addressed:

What are the factors determining access to health care and treatment seeking behaviour for the local actors and patients in the Mbeza region?

As for the objectives, more specific questions need to be formulated, in order to delimit the research field and to focus on particular aspects. The global question will be addressed in the discussion chapter as synthesis after having considered the particular aspects under study. In these more specific questions, the spatial and non-spatial aspects in relation to access to health and treatment-seeking behaviour are more deeply investigated:

Q.1) Do local actors and patients prefer to use home remedies, visit a biomedical health centre (clinic or hospital), or consult a Traditional Health Provider (THP) for treatment in case of illness (*treatment seeking behaviour*)?

Q.2) Is distance a predominant factor for local actors and patients in relation to their access to health care and treatment seeking behaviour?

Q.3) Have the local actors and patients different treatment-seeking strategies for different illnesses, for example malaria, Kahungo, HIV/AIDS, etc.?

Q.4) What are the other factors determining or influencing treatment seeking behaviour of the local actors and patients? Which ones are the decisive factors: spatial or non-spatial?

Q.5) How do *usual*, *intended* and *realized* treatment seeking behaviours differ? What are the main differences produced by these different ways of collecting epidemiological data?

In order to answer these questions, qualitative and quantitative methods will be used. For the statistical analyse, the questions Q.2) and Q.4) are further subdivided, so that each type of treatment alternative – biomedical and traditional, i.e. no treatment, home remedy, clinic visitation, hospital visitation or traditional health practitioner visitation - can be addressed directly and each influence factor is analysed separately (cf. Questions for Logistic Regressions: QLr.1, QLr.2 and QLr.3, on Chapter 4.4).

Chapter 2

Background & Literature Review

Fig. 2: This picture shows the area where the village Shikapande was previously established. The palm trees were planted next to the households that were assembled in a village core. Today the villages are constituted of scattered households with political boundaries that cross each others.

2.1 Zambia & Zambian people – country profile

The following sections give a brief overview of Zambia's geography and demography. These features already reflect many influences on the health sector. Respective references to the development of the health system and to various indigenous conceptions related to health aspects and issues are procured. The Zambian health sector is shortly described in Chapter 2.1.3. A description of Zambian history, educational system and religions is presented in Annex 1.

2.1.1 Geography

Zambia is a landlocked country covering an area of 752'612 km^2, situated on the great plateau in central-southern Africa (CSO, 2003a: 9). It shares common boundaries with eight neighbouring countries, namely the Democratic Republic of Congo and Tanzania in the north, Malawi on the east, Mozambique, Zimbabwe, Botswana and Namibia to the south, and Angola to the west. Administratively, the country is divided into nine provinces (cf. Map 1): Lusaka and Copperbelt provinces are principally urban and the remaining seven provinces – Central, Eastern, Northern, Luapula, North-Western, Western and Southern – are predominantly rural provinces. These provinces are further divided into 72 districts, 150 constituencies and 1'289 wards (CSO et al., 2003: 1, 251).

Most of the country is located on a high plateau with an elevation average of 1'000 to 1'400 meters and some mountains in the northeast exceed 2'000 Meters. The vegetation of the country is mainly savannah woodland and grassland. The sub-tropical climate is submitted to three distinct seasons: a cool dry winter season from May to August with a mean temperature varying between 15-17 °C, a hot dry season during September and October with an average temperature of 27-32 °C. The third season is warm and wet; it is the rainy season that lasts from November to April where 95% of the annual precipitation falls during that season. The annual rainfall varies from over 1'100 mm to 1'400 mm in the northern part of the country. The central, southern and eastern parts of the country have less rainfall, ranging from 600 mm to 1'100 mm annually, which often results in droughts. The main river water sources in Zambia are the Zambezi, Kafue, Luangwa and Luapula Rivers. The country has a couple of major lakes such as, Tanganyika, Mweru, Bangweulu and the human-made Kariba Lake, which is a main source of hydroelectric power (Else, 2002: 26-27 ; Jain, 2006: 6-7 ; CSO, CBoH and ORC Macro, 2003: 1). Other notable geographic features of Zambia include the magnificent Victoria Falls that were declared a World heritage site by the UNESCO in 1989, 'the high, rolling grasslands of the Nyika Plateau, the seasonally flooded wetlands of the Kafue Flats, the teak forests of the Upper Zambezi, and the Kariba and Mpapa Gorges on the Lower Zambezi' (Else, 2002: 27).

Map 1: Republic of Zambia with its seven provinces, and bordering countries
Source: Magellan Geographix[SM] Santa Barbara, CA

The described geographical aspects have an obvious influence on the physical accessibility of health care facilities and providers. Accessibility in terms of travel time, transportation modes, physical barriers, etc. might have important impacts on the utilisation of the health services. These aspects might have a decisive influence on health system planning as well. Climatic conditions are further playing an important role. Zambia has experienced an increase in drought frequency and intensity in the last 20 years. The droughts of 1991/92, 1994/95 and the El Niño-related weather anomalies of 1997/98 - resulting in high and incessant rainfall in the northern part of the country and drought in the southern part - caused sharp reductions of crop production and worsened the quality of life for vulnerable groups such as subsistence farmers (FAO, 1998; CEEPA, 2006: 1). The two last droughts that affected the country occurred in 2001/02 and 2004/05 (FAO, 2005: 14). Droughts and the resulting bad harvests have major impacts on malnutrition, poverty and on the health and well-being of the Zambians on the whole.

According to a working paper presented to the World Bank conference on dynamic social risk management held in Paris in 2003 (2003: 3), Zambia and its social and economic situation are exposed to three main risks that are seriously hampering development:

- First the macroeconomic shocks due mainly to dependency on copper mining that have produced serious socioeconomic setbacks, and created an urban-rural gap.
- Second, the natural disaster that afflict the country, especially droughts.
- The third threat is the spread out of HIV/AIDS. This relatively new threat has a major impact on the Zambian society – especially on the economically active population - resulting in high death rate.

2.1.2 Population

The current Zambian population based on the 2000 Census of Population and Housing is 9'885'591 (CSO, 2003b: 1), which represents on average 13 persons per km^2. But last estimations from the WHO give a population of 11'668'457 for 2005 (WHO Statistical Information System on http://www.who.int, January 2007). The population density in 2000 ranged between 4.6 persons per km^2 in North-Western province and 63.5 persons per km^2 in Lusaka province.

The majority of Zambian population belongs to the Bantu-language family. The country is constituted with 99.5% of persons of African origin, the remaining 0.5% includes Asian, American, European and other ethnic groups (CSO, 2003a: 37). The population pyramid or age-gender pyramid for Zambia in 2000 (cf. Fig. 3) shows a triangular distribution, typical for developing countries. This typical pattern is often due to negative environmental factors, little access to birth control and poor access to health services.

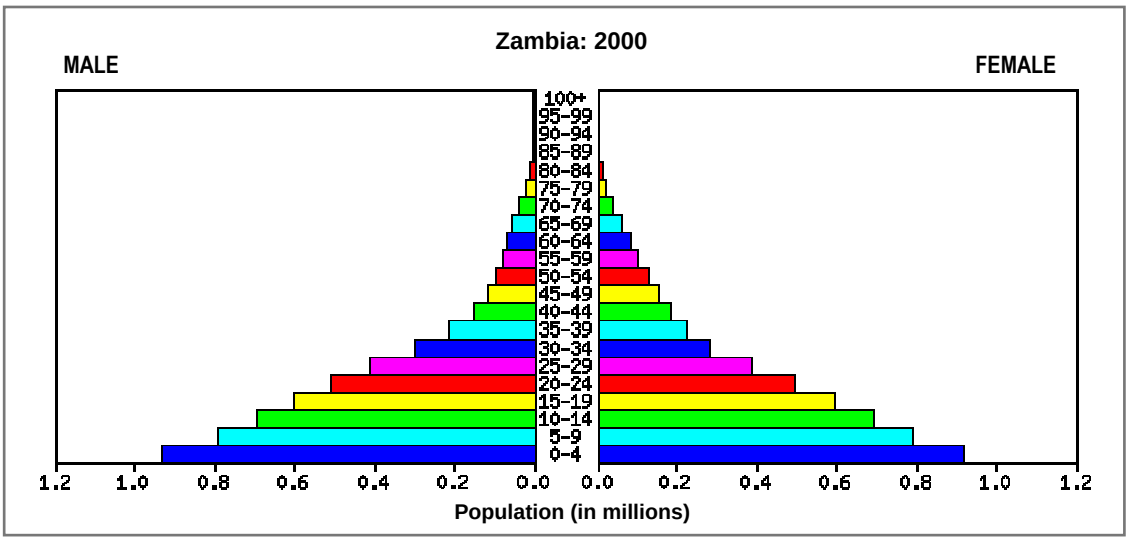


Fig. 3: Population pyramid for Zambia in 2000
Source: U.S. Census Bureau, International Data Base

The wide base indicates a large number of children, i.e., a high birth rate. The rapid narrowing of the pyramid suggests a high death rate or a short life expectancy. The total fertility rate in rural areas (6.7 births per woman) is considerably higher than in urban areas (4.9). The average household size in 2000 for Zambia was 5 members. According to the 2000 census report the life expectancy at birth in 2000 was 50 years, with a difference between rural (48 y.) and urban (54 y.) areas. The comparison between 1990 and 2000 has showed population gaps from age 8 to 23, which can be attributed to the ravaging effects of the HIV/AIDS pandemic coupled with odds of the declining economic situation in the country (CSO, 2003a: 32). If deaths from HIV/AIDS were to be excluded, life expectancy at birth in some countries in Southern Africa including Zambia would be 15 to 20 years higher (WHO, 2002:13. Cited in: CSO, 2003a: 113).

Because of the economic decline that began in the mid 1970s due to the collapse of the world copper prices, an urban-rural migration trend is still in force. The population in rural areas has steadily increased during the last three decades, from 60% in 1980 to 62% in 1990 and the proportion achieved 65% according to the 2000 census report (2003a: 30).

Ethnic groups and languages. The government of Zambia officially recognises 72 ethnic groups in Zambia (CSO, 2003a: 41). According to 2000 Census report, '[t]he 10 largest ethnic groups are Bemba (18.1%), Tonga (12.7%), Chewa (7.2%), Lozi (5.6%), Nsenga (5.5%), Tumbuka (4.2%), Ngoni (4.0%), Lala (3.3%), Kaonde (3.0%) and Lunda at 2.5% of the total population. The main ethnic groups and languages in Zambia are distributed as follow: Bemba in the North and Centre of the country, corresponding to Northern, Luapula, Copperbelt and Central provinces. The Tonga corresponds to all tribes in the Southern province. Nyanja is mainly to be found in the East and Lozi in the West (CSO, 2003c: 11-12 ; Else, 2002: 42-43).

2.1.3 Zambian health system

As the other African countries, Zambia faces major health issues, such as high infection rates of HIV/AIDS and malaria. Furthermore, the frequent droughts that hurt the country (especially the Southern Province) reinforce poverty and malnutrition. A broader access to safe water, proper toilet facilities, and better access/provision of essential drugs is needed as well. The rural areas are particularly affected. With better sanitation, especially in rural areas, the burden of waterborne diseases, diseases associated with unsafe water supply, sanitation and hygiene, such as cholera, diarrhoeal diseases or dysentery, could be further alleviate.

According to the definition of Cumper (1986, cited in MOH/CBOH, Zambia national health accounts 1995-98), the health sector represents 'all health care activities, including government, non government and traditional practitioners and household and self care services'. As described by Kasonde and Martin (1994: 4), health care is provided in Zambia 'by government institutions, religious missions, industries (particularly the mines), a number of parastatal companies, private practitioners, traditional healers and the armed services'. These different kinds of health care providers can be classified into formal and informal, or public and private sectors. The *pluralistic* health care system in Zambia is summarised in Table 1.

		Institutions	Facilities	Human resources
Formal health sector	**Biomedical**	Government	• Hospitals • Urban health centre, (UHC) • Rural health centre, (RHC) • Health posts	*Registered health care providers:* – Medical doctors – Clinical officers – Nurses – Community health worker (CHW) – Trained traditional birth attendants (tTBA) – Environmental health technicians (EHT)
		Mission/Churches	• Hospitals • Rural health centres	– Medical doctors, nurses and sisters
		Private	• Private hospital • Private clinic	– Medical doctors & nurses
		Self treatment	• Pharmacies	– Pharmacists
	Traditional	**Inter-sectoral collaboration:** Traditional health practitioners of Zambia (THPAZ)		*Registered traditional health practitioners:* – (Herbalists) – (Faith/spiritual healers) – (Diviners) – (Traditional birth attendants, TBAs)
Informal health sector	**Biomedical**	Self treatment	• Shops selling modern drugs	*Unregistered seller:* – Unqualified drug seller – Market vendors
	Traditional	Traditional Health Practitioners/ Providers (THPs)	• THP's household	*Unregistered THPs:* – Herbalists – Faith/spiritual healers – Diviners – TBAs
		Churches (charismatic)	• Churches • Islamic organisations	– Priests / THPs
		Self treatment	• Home (herbal medicines)	– Family / Relatives / Neighbours

Table 1: The pluralistic health system in Zambia, formal and informal health sectors
Source: Own Table, after Merten 2005, CBoH, 2005, Berman et al., 1995

Biomedical medicine. The formal health system makes reference to the public and private health care facilities and providers, which are recognised, regulated and registered by the government (i.e. formalised). The major part of the formal health sector corresponds to the public health system, or national health care delivery, which is either financed by the government or nominally supervised by the Ministry of Health.

The use of the term *modern* might create certain confusion (see Sindiga, 1995b: 18-19). In this master thesis, modern medicine makes reference to western, biomedical, or cosmopolitan medicine, in opposition to traditional (rural) medicine that prevail in the informal sector. Although biomedicine is mostly advocated as being more reliable, effective, etc. it has, however, many constraints such as, inaccessibility - both in physical distance and cost, especially in rural areas - possible shortage of drugs and equipment, inability to treat and cure certain diseases or illnesses, impersonal care (i.e. distance between medical staff and patient), and patients' expectation of instant cure (Sindiga, 1995b: 22). These constraints have to be considered according to the local realities.

Zambia's governmental health system includes MOH facilities, missions and industry (mostly mines) facilities. The MOH facilities alone provide over two-thirds of all medical care in the country. While MOH provides overall leadership, the ownership of the health care facilities is mixed (Berman et al., 1995: 15, 73). The 2004 Service Availability Mapping (SAM) in Zambia, its related survey, report and GIS-maps have provided a comprehensive baseline picture of the formal service availability in all district and selected facilities of the country (see MOH and WHO, 2006). The formal, governmental health system is organized nationally on the basis of a pyramidal referral structure that consists in central, provincial and district hospitals, including health centres. There is one general hospital in each province and one district hospital in almost each district. Below the district hospital are the health centres – Urban Health Centres (UHC) and Rural Health Centres (RHC) which are designed to be the primary referral points for patients and to provide basic preventive and primary care.

More precisely, the following formal health institutions are present in Zambia (after Stekelenburg, 2004: 30 ; MOH, 2000: 13):

- ***Ministry of Health/Central Board of Health*:** The MOH has the main responsibility for policy guidance and strategic planning; the Central Board of Health (CBoH) is responsible for the translation and implementation of government health policies.
- ***Third level referral services:*** (central hospital) with a catchment population of 800'000 and above, providing sub-specialisation in internal medicine, surgery, paediatrics, obstetrics, gynaecology, intensive care, psychiatry, training and research.
- ***Second level referral services*:** (general or provincial hospital) are intended to have a catchment population of 200–800'000, with services for internal medicine, general surgery, paediatrics, obstetrics and gynaecology, dentistry, psychiatry and intensive care. These hospitals are also intended to act as a referral hospital for the first level, including technical back-up, capacity building and services.

- ***First level referral services*:** (districts hospitals) These are found in most, but not all, of the 72 districts. They are intended to provide a population of 80–200'000 people with medical, surgical, obstetric and diagnostic services, and with all the necessary clinical services to support health centre referrals.
- ***Health centres*:** The two types of health centre in the restructured health care system include the urban health centre (UHC), serving a catchment population of 30–50'000 people, and the rural health centre (RHC), serving a catchment population area with a radius of 29km, or a population of 10'000.
- ***Health posts*:** These are responsible for a population of 500 households (3'500 people) in rural areas, and 1'000 households (7'000 people) in the urban setting, or set up within a 5 km radius for sparsely populated areas.

Traditional medicine. The informal health system in developing countries principally refers to the traditional health sector, i.e. the use and provision of traditional medicine and the resort to Traditional Heath Providers (THPs). Nevertheless, many charismatic churches, Islamic organisations, drugs stores and shops, market vendors, non-registered, or non-recognised Biomedical Health Providers (BHPs) are mostly part of the informal health sector as well.

Traditional Medicine/Complementary Alternative Medicine (TM/CAM) has many advantages and disadvantages that biomedical (modern) medicine does not have, and inversely. 'TM/CAM has many positive features including: diversity and flexibility; accessibility and affordability in many parts of the world; broad acceptance among many populations in developing countries; increasing popularity in developed countries; comparatively low cost; low level of technological input; and growing economic importance' (WHO, 2002c: 19). Although, the quality, reliability or effectiveness of TM is frequently questioned by health professionals, it is important to keep in mind that some traditional herbal remedies in Asia and Africa have already been prove to be effective in treating disease and various symptoms of malaria and AIDS (www.who.int, February 2007). TM is an integral part of every culture that has developed over many years. Thus, TM has become effective in curing certain cultural health problems, certain diseases and illnesses (Sindiga, 1995a: 4). In the literature, traditional medicine is often referred as being globally more available, accessible, affordable, adaptable, and acceptable than biomedical medicine (see WHO, 2002c: 2 ; Anyinam, 1987: 1, 805 ; Good, 1987: 12). However these aspects must be considered according to the local realities.

The traditional health system in Zambia includes various types of Traditional Health Practitioners/Providers (THPs). Some (charismatic) churches and Islamic organisations include priests (faith healers) that rely on traditional medicine as well. Traditional Health

Provider or Practitioner (THP), as well as traditional healer, traditional or African doctor called Ng'anga (plural: Mang'anga) in many South African countries, or the more pejorative term witchdoctor, are often used as general terms that include a wide variety of healers. More precisely, the WHO define a traditional healer, or a traditional medicine practitioner, as a person who is recognised by the community where she or he lives, as someone competent to provide health care using vegetable, animal and mineral substances and other methods based on social, cultural and religious practices, as well as on the knowledge, attitudes and beliefs that are prevalent in the community regarding physical, mental and social well–being and the causation of disease and disability (WHO, 1978: 9 ; WHO, 2000: 11-12). In many communities the traditional healers have very important social and cultural positions (Stekelenburg, 2004: 138).

An essential distinction for the categorisation of various THPs is the difference between diagnosticians and non-diagnosticians. Most of the literature is based on a categorization of THPs that distinguish herbalists, spiritualists, diviners, faith healers and traditional birth attendants (TBAs) (see Merson et al., 2006: 49 ; Stekelenburg, 2004: 139 ; Kasonde and Martin, 1994: 84). More information on the biomedical and traditional health sector in Zambia is provided in Annex 2.

2.2 Access to health care and utilization of the health services in Zambia

The access, respectively utilisation of biomedical and traditional health care facilities and providers by patients is influenced by spatial and non-spatial factors. *Access* in this study is described as a multidimensional concept including geographical or spatial accessibility (i.e. distances, regional and local geographic and climatic conditions), as well as social accessibility (i.e. access to health in terms of socio-demographic economic and health system organisation factors and variables, cf. Chapter 3.2.3).

The proportions of population visiting the different types of health care providers according to the Social Dimension of Adjustment Priority Surveys II (SDA PS II, 1993, sample size of 10'000 households) are presented in Table 2. These proportions reveals globally the treatment seeking behaviour of the Zambian urban and rural population, with higher percent using mission and traditional providers in rural areas, and higher percent using industrial and private providers in urban areas. These proportions also reflect the distribution of the different health care facilities and providers throughout the country (cf. Annex 2: Zambian health sector).

Health Institutions	Rural (%)	Urban (%)
Government	71	67
Mission	14	1
Industrial	1	17
Traditional	12	6
Other private	3	9

Table 2: Proportion of population visiting health providers by rural/urban location, Zambia 1993
Source: SDA PS II, 1993 in Berman et al., 1995: 34

However, the utilisation of the different health services does not give information on the reasons for attending one or the other type of health care facility or provider. Thus, some spatial and non-spatial factors influencing access to health care are shortly addressed in the next sections.

2.2.1 Spatial factors influencing access to health care

Access to health care facilities and providers is often hampered by topographic and climatic characteristics. There are five big rivers meandering through the country (Luangwa, Zambezi, Kafue, Luapula and Chambeshi) and four in-land lakes (Tanganyika, Mweru, Bangweulu and Kariba). Some parts of the Northern, Central, Eastern and Southern provinces are mountainous, and often require 4x4-vehicles to reach remote rural villages (MOH and WHO, 2006: 7). The majority of Zambia's roads are dirt, and in 1995, over 50% of paved roads were reported to be in poor conditions (Snow et al., 2003: 31). Transport is essential for health care provision; it affects access by the public to health facilities, as well as ensures the supply of essential goods and resources such as drugs and personnel to where they are needed (Downing et al., 2001: 5). However, transport remains difficult and expensive for the majority of the Zambians. Few people in Zambia can afford vehicles, the result of the 2000 Census of Population and Housing (2003f: 36-37), showed that only 2.8% of all households in Zambia owned a motor vehicle, with 6.5% in urban areas and only 0.9% in rural areas. On the other side, more households own a bicycle in rural areas (33.3%) than in the urban setting (18.5%).

Accessibility of health care facilities and providers is a major issue, especially during the rainy season. Many areas of Luapula, Southern, Western and the Eastern provinces are swampy and have many islands. The regions near the rivers and these islands experience seasonal flooding during the rainy season. In the most remote areas, boats and canoes are usually required to reach the communities (MOH and WHO, 2006: 7). The effects of the rainy season are usually the flooding of roads and rails, cutting access to pontoon bridges, etc. Therefore, transport becomes difficult, time-consuming, even hazardous and

dangerous. People have to make detours in order to find bridge to cross rivers, dirt roads become mud after a few weeks of rain and often become impassable (Steward, 2003).

Access to health - distance factor. After the economic crisis that started in the mid-1970s, estimations indicated that only 75% of the total population in 1984– with only 50% of the rural population - had access to the public health system, accessibility measured in terms of the numbers of people living within 12 km of a health facility (Kasonde and Martin, 1994: 3). 'However, access to effective health care [was] in fact considerably lower as a result of erratic and limited supplies of essential drugs and vaccines as well as of basic supplies and equipment' (Kasonde and Martin, 1994: 3). At the same time, the national coverage of trained health professionals has dropped to one doctor per 14'000 people in 1995, meaning a decline of about 50% compared to 1977 (Hjortsberg 2002: 30). The situation globally improved and in 1998, 99% of the households in urban areas and 50% in rural areas, were reported to have access to health services, accessibility measured in terms of the households living a 5-km distance from a health facility. 'The average distance to a health facility in rural areas is almost 8 km (UNZA, nd) and it is not uncommon in the remote areas of the country for people to cover distances of up to 30 km to the nearest health facility' (MOH, 2000: 23). With a low coverage, distances to the next health care provider increase.

Many studies have already proven an effect of the distance factor on health and treatment seeking behaviour in Zambia. In 1998, the study of Diop et al. entitled *Household Health seeking behaviour in Zambia*, concluded that 'distance [i.e. proximity] of the households to nearest institutional health facility is a major factor in determining the extent of the use of the health facilities, especially in the rural areas' (Diop et al., 1998: 5). An interesting conclusion emerging from the regression analysis in this study is that 'distance to the nearest health facility rather than price is the significant variable determining access to health services. Whatever the user fee charged at any given institution, the probability of its services being demanded diminish with the distance at which the potential clientele are located' (ibid: xvi, 36-38). The results of this study further show, that 'the probability of use of services of a sick individual located less than a kilometre from a health centre is 28%. That drops to 13% when the individual is located at a distance of 10 kilometres or more. The distance factor would impinge much more in the rural areas where there are more severe shortfalls in transport facilities and fewer all-weather road' (ibid). The dissertation of Hjortsberg (2002) entitled *Health care utilisation in a developing country - the case of Zambia,* confirmed the result of Diop et al. (1998) and conclude that distance to health facility is associated with a lower attendance rate as well with higher transport costs.

Considering the lower income of rural people and the higher transport costs especially to secondary and tertiary health care facilities, Hjortsberg concluded that people living in rural areas are clearly disadvantaged and less likely to seek health care than persons in urban zones (Hjortsberg, 2002: 56, 67, cited in Merten, 2006).

2.2.2 Socio-demographic factors influencing access to health care

Apart from the spatial factors, various non-spatial factors such as, demographic, cultural and socio-economic aspects (admission fees, waiting time, delay, quality of care, drug availability, qualified staff, costs, etc.) that influence the access and utilisation of health services, and treatment seeking behaviour of the local actors and patients.

For example, for better access and utilisation of the health services, a well-functioning referral system is a prerequisite (cf. central place theory on chapter 3). However, according to health workers, the referral system is not working well (Stekelenburg, 2004: 39). In remote areas, poverty and transport problems make it difficult for people who are referred to reach the hospital. There are mainly no ambulances and transport costs may be particularly expensive. Patients sometimes have no confidence in the higher level services. Indeed, the absence of a doctor in the district hospitals and/or the absence of a functioning theatre in the provincial hospitals hinder referrals to higher levels. On the other side, many health centres may unnecessarily refer many cases unnecessarily to hospitals because of drug shortages, understaffed health facilities, or because of patient demands. Some patients from very remote areas may also decide to go directly to the hospital, instead of going first to a rural health centre, to be certain to find appropriate drugs and qualified staff. These *unnecessary* referrals to the higher health services level put a heavy burden on the hospitals. This in turn, undermines the confidence that patients have in the ability of doctors in hospitals to treat serious cases. 'A 1997/1998 survey (CBoH/Danida 2000) revealed that approximately 90% of government health centres and 55% of church health centres faced problems in referring patients, as far as transport is concerned' (Stekelenburg, 2004: 39).

Determinants for utilisation of the different health care providers. For the non-spatial factors, the opinions either confirm the influence of specific factors or differ in their interpretations and conclusions. Below, the potential influence of socioeconomic status, age, gender/gender and education are shortly addressed:

- ***Socioeconomic status:*** Many surveys attest an influence of the socio-economic status of the household on utilisation of health care providers and health, treatment seeking behaviour of the local actor in Zambia. For example, according to Berman et al. (1995: 33), the socioeconomic status indicates a clear decline in

the utilization of traditional healers with higher socioeconomic status in both urban and rural areas. 'Also to be noted is an increase in use of public provision with higher [socioeconomic status] in rural areas, but the reverse in urban areas. This might be explained by better access to public facilities by higher income households in rural areas owing to their ability to afford travel costs more' (ibid). Besides, '[t]he probability of choosing a government hospital increases steadily with household income' (Diop et al., 1998: 17)

- ***Age:*** Given the use of demographic-based exemptions in the biomedical health sector, i.e. no user fees for children under 5 years of age and for elderly above 65, 'age operates as a variable affecting the likelihood of entering the modern health sector for curative care' (Diop et al., 1998: 16). Indeed the highest level of entry in the biomedical health sector is observed among the sick aged under five years. 'Unexpectedly, the elderly above 65 years of age who also are supposed to benefit from demographic-based exemptions have among the lowest probability of entering the modern health sector, suggesting that factors other than price may be constraining the elderly's access to modern health services' (ibid: 15). Besides, the results of Berman et al. (1995: 33) indicate a general increase in utilization of traditional healers by age, with the highest levels of utilization in those aged 50 years and above. '[T]his may reflect a cultural change over time, with younger Zambians, who have been exposed to widely available modern services for a longer proportion of their lives, having a lower preference for traditional healers' (ibid). From her side, Stekelenburg (2004: 20) found that increasing age is associated with both more frequent visits to the traditional healers and to the hospital.

- ***Sex/Gender:*** For many authors using nations-wide data on health, like Berman et al. (1998:32), there appear to be no major differences in the overall utilisation of different health providers by sex/gender. However, in her study at the district level (Kalomo) Stekelenburg (2004: 20) found that more women than men visit traditional healers. But, the frequency of the visits made by men is higher.

- ***Education:*** The opinions differ again for the potential effect of education on utilisation of the different health care providers. According to Diop et al. (1998: 17), segments of the population where the level of education is high have relatively higher levels of utilization of government hospital. But Stekelenburg (2004: 20) argues that the level of education is not an important determinant.

There are many other factors that may have an influence on the utilisation of the different health care providers. As mentioned in the first chapter, it is the aim of this research to identify the key determinants in the study area.

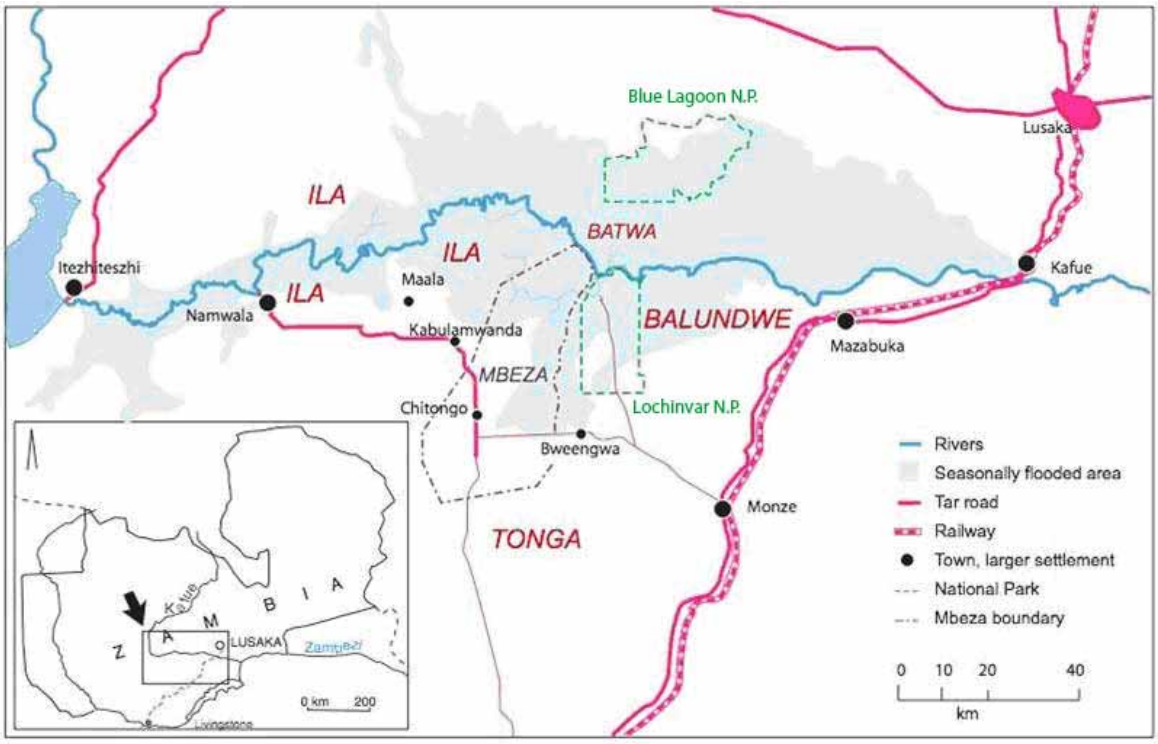
2.2 Study area and local communities

In order to understand the local context in which fieldwork for this research took place, there is a need to gain an insight into the research area – the Mbeza region – and into the local communities, i.e. the different ethnic groups established in this area.

2.2.1 Geography of the Kafue Flats and Mbeza Region

The Mbeza Region is partly integrated in the floodplain of the Kafue River, in the Southern Province of Zambia. Mbeza is located about 150 km southwest from the capital Lusaka, corresponding to 250 km by road (own estimations using GIS).

The Kafue Flats. The Kafue Flats are situated in the vast shallow basin of the Kafue River, which is one of the two major tributaries of the Zambezi River (cf. Map 2). The Flats are an open savannah wetland rich in natural resources (with abundant wildlife, rich pastures and fishing grounds) that were formed on deep floodplain sediments. The region of the Kafue Flats includes a large game management area and two national parks: the Lochinvar and the Blue Lagoon National Park that are internationally recognised as extremely important wetlands (www.panda.org, March 2007). The rainy season lasts in summer from October to March and causes a natural flooding of the flats, which starts in the western part in February/March and slowly moves towards the eastern end of the flats, arriving there in April/May (Gossert and Haugstetter, 2005: 3).



Map 2: The Kafue Flats, ethnical groups and the Mbeza region.
Source: Merten, 2006. After Drijver & Marchand, 1985 © CML

The extensive floodplain is about 255 km long and 60 km wide. It covers an area of about 6'500 km^2 that stretches between the Itezhi-Tezhi dam and its storage reservoir on the West, and the Kafue Gorge hydroelectric power plant, situated at the eastern end of the flats (WWF, 2003: 1 ; Mumba, 2004: 3 ; Gossert and Haugstetter, 2005: 1-2).

The Mbeza Region. Mbeza is a small rural region of about 2000 km^2 located in the south bank of the Kafue River (cf. Map 2 and Fig. 4). The region lies beside the Lochinvar national park in the district of Namwala. More precisely, Mbeza is situated in the Chiefdom of Nalubamba, one of the six Ila chiefdoms in the Kafue Flats (cf. Annex 3: Map of the Chiefdoms in the Southern Province).

The region counts 76 scattered hamlets which represents approximately 27'000 inhabitants. It is governed by a traditional parliament and its cabinet headed by the acting Chief Nalubamba, which assemble in the *Chambers*, a building situated in the middle of Mbeza (Haller, 2004: 5 ; Merten and Haller, 2006: 60). The name Mbeza currently refer to a village situated in the region, to a ward (lowest administrative division in the country) and to the region as a whole. The Mbeza region is a territory (*chichi*), which has clear boundaries and is subdivided into village territories that also have boundaries (Haller, 2004: 5).

Fig. 4: Mbeza Region, village Shikapande: ploughing during the rainy season

The calculated population density in the area is 15 people/km^2, which corresponds to 2-3 households per km^2 (own estimation) - a polygamy household consisting in many huts, one for each wife – but some areas near the Flats are almost deserted when population density explodes in the fishing camps and villages in the northern part of the region. On average, a village, or hamlet counts about 30 households, this represents between 120 and 300 inhabitants (Merten, 2004: 16).

Before colonial times the Ila and the neighbouring Plateau-Tonga were living in large circular or horseshoe-shaped villages in order to protect themselves from slave and cattle raids of the Lozi and from attacks of wild animals. After the *Pax Britannica,* these big villages were dismantled and today people are living in villages made up of scattered hamlets and households (Haller, 2004: 4-6). This new pattern of settlement was also due to expansion of commercial agriculture (maize production) during colonial time (see Dixon-Fyle, 1983 ; Wright, 1983 or Vickery, 1985).

Despite the fact that village territories have boundaries that are recognized by the regional chief the *real current* boundaries are subject to frequent changes. Indeed these are primarily politically established, a so-called headman/woman being responsible for each village. The village members have the liberty to choose, elect the headman/woman of their village. When a political conflict appears or when the elected headman/women does not correspond to their choice, the household members still have the possibility to affiliate themselves to another headman/woman of the region, which makes villages boundaries very dynamic (from discussion with Haller and Merten, with villagers).

The population in Mbeza is involved in cattle-rearing, subsistence farming and fishing. Maize (corn) is the main crop in the region as in whole Zambia. Ox-cultivation is widely practised in Mbeza. However, since the mid-1990s, there was a massive and widespread loss of cattle, including work-oxen, caused by a tick-born disease (theileriosis): the so-called *Corridor disease* or *East Coast Fever*. According to the FAO (2002), in the Southern Province the *Corridor Disease* killed about 60% of cattle over a 5-year period. Namwala district was particularly hit by the disease and by series of droughts (1992/93, 1995/96, 2001/02 and 2004/05). These hazardous events particularly affected the people of Mbeza and at the end of 2002, the region experienced the third hazardous famine since 1993 (cf. Map in Annex 4: Unfavourable weather pattern and food crisis in 2002, Zambia). Yet, when the rains fill the dry riverbeds of the tributaries of the Kafue River and floods occur in Mbeza, almost all people – Ila and Tonga agro-pastoralists too - are engaged in fishing activities. Although the economy and livelihood of the Ila and Tonga is based on cattle rearing and agriculture, fishing is important in the diet as well. The people of Mbeza fish during the rainy season and especially after the flood recede; at that time ponds stay filled and collective fishing occurs. Because of *corridor disease* and the resulting loss of cattle, coupled with a decline in Maize production due to changes in agriculture policies and to manifold droughts, fishing has become more attractive. Furthermore, the increasing demand for fish in the urban centres and city markets caused a price increase. According to Merten and Haller (2006: 61), the price for fish has increased nearly twice as much as the price for maize between 1980 and 2004. As result, small-scale fisheries became more important in the Mbeza as a significant source of income (Merten and Haller, 2006: 59-61).

Fishing villages and fishing camps. There were many population movements in the last years and the traditional indigenous Twa fishermen have seen the arrival of a large population of migrant fishermen into the area. These have moved from the Western, Luapula, and Northern provinces and have established semi-permanent villages in the flood plain in the Luwato, Nyimba, Wanki, and Namalyo areas (Chabwela and Mumba, 1998). The fishing villages and camps are located in the floodplain of the Kafue Flats, more particularly near the oxbows lakes and lagoons of the Kafue River, some of them are situated in the northern part of the Mbeza region (cf. Fig. 5).

Fig. 5: Fishing camps in the Kafue Flats

According to Haller and Merten (2006: 103-112) big fishing camps - which count sometimes more than 900 fishermen - can be observed along the Kafue River during the dry season. The migrant fishermen are mostly young men attracted by the fast money that can be earned in the fishing sector. The migration flows into the region and the always growing pressure on the fishing grounds combined with the use of *bad* fishing methods (fishing with plastic nets, with very large small meshed nets, or with mosquito nets) provoked a dramatic diminution of the catches in several river sections.

In contrast to the peaceful fishing villages established since many years, the climate in the big fishing camps is often rough and aggressive. The fishermen are subject to violence because of alcoholism. They are living in huts made of straw and sanitation is very poor: there is poor access to safe water and there are no adequate toilet facilities. As a result, the health status is very poor and the fishing camps are particularly vulnerable to waterborne diseases (e.g. cholera, dysentery) and epidemic episodes. The grouping in big fishing camps of mobile fishermen, women and men fish traders - coming from and travelling between rural and urban areas - attracted prostitutes and favoured sexual transaction (*fish for gender*), which caused a spread of HIV/AIDS in the area (see Merten and Haller, 2006).

2.2.2 Biomedical and traditional health sector in Mbeza

The population of the Mbeza region has access and use a broad variety of health care options both of the biomedical and the traditional sector.

Biomedical health care facilities and providers. The biomedical, public health system in Mbeza comprises 2 clinics (rural health centres, RHC) and 2 health posts (cf. Table 3). These clinics have so-called catchment areas, i.e. every village is assigned to go to a specific RHC. Additionally, there is one private clinic situated in Chitongo village. It seems that this facility is similar to the RHCs owned by the government. Indeed, the staff is not composed of a *private doctor* as told by local actors and patients during fieldwork, but of a nurse.

Health Centres	Catchment area	Accessible during rainy season	Staff and logistics
RHC Chitongo	10'500	Yes (tarred road)	- 1 clinic officer - 3 nurses - 1 social worker / EHT
RHC Nakamboma	12'500	No (bad dirt road)	- 1 nurse / clinic officer - 1 dresser - 1 EHT
RHC Moomba (still in construction in 2006)	-	Mostly accessible (good dirt road)	-
Private clinic in Chitongo	-	Yes (tarred road)	-

Table 3: Health centres in Chiefdom Nalubamba (Mbeza Region)
Source: Own representation. After Wiegand 2002, GTZ, cited in Merten, 2006

There is no doctor in Mbeza, but clinical officers, nurses and midwives, who are responsible for the about 27'000 inhabitants. According to Merten (2006), the Central Board of Health (CBoH) foresees at least 3 qualified staff members to run a health centre, consisting in clinical officer, nurse or midwife and environmental health technician (EHT) - the EHT are responsible for improving hygiene, sanitation and access to safe water in the villages. However, the facilities are often understaffed. 'Not only financial constraints of the government led to the understaffing of many health facilities, but instead recruitment problems: it is rare that qualified professionals are willing to work in remote rural areas. Harsh working conditions and work overloaded contribute to a high turnover of the staff' (ibid). In addition to the staff of the health centres, some members of the communities are selected to become trained traditional birth attendants (tTBA) and community health workers (CHW). These are playing an important role in primary health care and link the communities with the health system by providing basic health information. Both tTBAs and CHWs attend a six weeks training and later receive a small equipment to perform their duties.

These volunteers however are not paid by the state, they are supposed to charge every patient for their services. Regrettably, many CHWs limited their activities to the dispensing of panadols, ORS and condoms. Because of overwork, difficulty to earn enough money through their services, no regular supply of medical kits and a rapid deterioration of the equipment, the CHW program in some district almost completely collapsed (see for example Stekelenburg et al., 2003). Aside from the two current RHCs and the private clinic, the communities of Mbeza started building a new clinic in Moomba village in 2005. This clinic will be situated in the middle of the Mbeza Region, near a dirt road which is in relatively good conditions and mostly practicable during the rainy season, this in contrast to the dirt road leading to RHC Nakamboma.

Traditional health sector. The traditional sector in Mbeza counts a multitude of traditional health practitioners (THPs), i.e. herbalists, TBAs and traditional healers. During their fieldwork, Merten and Haller recognised that the density of traditional practitioners in Mbeza was considerably higher than the density of government health workers. 'At least one to two persons per village were known to be either an herbalist, a traditional healer or, rarely a diviner, who could at the same time be a witchdoctor' (Merten, 2006). The dense distribution of traditional practitioners makes them more accessibility than biomedical health care facilities or providers.

Additionally, Merten and Haller recognised during their fieldwork (between 2002 and 2004) that traditional medicine was facing a revival in the region. Indeed, their interviewees agreed that the number of traditional healers and herbalists has increased compared to several years ago, although their quality was partly questioned (Merten, 2006). As explained by Merten (2006), some THPs are known to be specialised on specific illnesses when others treat a wide range of problems exceeding health issues, such as problems and services related to witchcraft or magic. Examples are disturbances caused by ancestral spirits, obtaining herbs for protection against witchcraft, herbs promising luck, remedies for sexual stimulation and for increasing potency, or to make the cows having more calves, just to mention a few. Traditional healers also focus on so-called traditional illnesses, such as *'tulonda* (genital ulcera), *chabana* (cerebral malaria/feats), *kuzwa menzhi* (urinary incontinence), or *masoto* (infant's disease usually with diarrhoea, malnutrition). […] For their therapies the traditional practitioners, who were interviewed, provided knowledge of more than two hundred known medicinal plants' (ibid). Some THPs are also specialists in the treatment of STIs and HIV/AIDS and they sometimes claim to be able to cure HIV/AIDS. On the contrary to her first expectations, Merten observed that many THPs were advising their patients to go to the clinic, for example for antibiotic treatment. Some of them were also willing to participate to HIV/AIDS prevention activities and were distributing condoms to their patients (ibid).

2.2.4 Accessibility and transport to the health care services

The Mbeza Region is situated in Namwala district. According to Merten (2006), this district maintained one hospital (Namwala District Hospital) and 12 health centres for the approximately 85'000 to 95'000 inhabitants in 2002. That hospital was not equipped with an operation theatre in 2002, and patient who needed surgery, had to go in the neighbouring districts: to Macha Mission hospital in Choma District - about 90 km south of Namwala - or to Monze Mission hospital in Monze District - about 120 km east of Namwala (own estimations with ArcGIS). Only one ambulance vehicle was available for the whole district in 2002. This vehicle could be used for emergency referrals, however its availability 'depended on the condition of the car as well as of the roads […]. In addition in case of emergency time might well be too limited to wait for the ambulance to arrive from Namwala' (ibid). Indeed, the tarred road only goes from Namwala to Chitongo for about 80 km, but people have to drive on a dirt road during about 15 km to reach the centre of the Mbeza Region (cf. Map 2). This dirt road connects Mbeza on the west to the tarred road that leads to Namwala hospital in the north and to another dirt road leading to Macha hospital to the south. In the eastern direction, the same dirt road leads to Monze hospital, which is situated about 65 km from Mbeza. Patients and their relatives often have to organise transport on their own. They might take public transport, use oxcarts or if possible hire a car of a more affluent farmer (ibid). Furthermore, the dirt road is often impassable during rainy season. Thus, access to health care facilities is a major issue, in terms of accessibility as well as affordability.

2.2.5 Illnesses prevalence and utilisation of the health care services

In this sub-chapter, on the basis of the data of Merten, the illnesses prevalence and utilisation of biomedical or traditional health care facilities/providers in Zambia and in the Mbeza Region are compared and discussed.

Illnesses prevalence. First of all, the illnesses reported by patients are presented in Table 3. The results of Merten include all illnesses at the household level, i.e. the cases where no health care provider was consulted (i.e. no treatment or self treatment was used by patients) and the cases where either a clinic, hospital or a traditional healer was consulted. The most important reported illness was malaria contributing to 36% of all cases, followed by acute respiratory infections (18%), diarrhoea (9%) and musculoskeletal pain (9%). These percentages are compared to the incidence rates of the ten major cause of visitation to health facilities (cf. Table 4) for the same illnesses/diseases.

The results reported in Merten (2006) on the Mbeza Region correspond to the percentages for the whole country. However, the 5 most prevalent illnesses in Mbeza do not match exactly with the 10 major causes of visitation to health centres. The differences might be attributed to the ways of collecting the data, the grouping of illnesses and diseases, to the small local sample compared with the large national survey. However, one could argue that some of these differences might attest for illnesses/diseases where patients might prefer to use self treatment or rely on traditional medicine instead of going to a biomedical health centre.

Illness Name (illnesses episodes)	Community level Freq. (%)	Health centres level Incidence rates in all Zambia (%)
Malaria	66 (36)	37
Acute Respiratory Infection	33 (18)	16
Diarrhoea	16 (9)	8
Musculoskeletal pain	16 (9)	2
STIs, AIDS	11 (6)	-
Other	41 (22)	-

Table 4: Bio-medically categorised illness episodes (N=183) for all households in 5 Mbeza villages between November 2002 and February 2003, compared with incidence rate for all Zambia in 2005 Source: After Merten, 2005 and MOH, HMIS, 2005

For example, STIs and AIDS have important incidence rates in Mbeza, but they do not appear in the ten major cause of visitation to health centres in the country overall. According to Merten (2006), traditional healers are often the first ones to be contracted in case of genital lesions (because in contrast to the clinics patients are not requesting partner for the treatment of STIs). Could this explain the difference of incidence rates? Musculoskeletal pains are at the tenth rank for all of Zambia and at the fourth rank in Mbeza. Could this be explained by the fact that most patients prefer to use traditional medicine to treat this illness? Or does it reflect that older people mostly attend a traditional healer and do not trust biomedical medicine? Some of these interrogations are part of the research questions that are addressed in this thesis.

Realized and intended health, treatment seeking. The results of Merten's research (2006) on health seeking behaviour based on the case studies, compared with intended health seeking behaviour, are reported in Table 5. Based on the case studies, 82% of the patients who relied on a health provider visited the clinic or the hospital and 18% consulted a traditional practitioner. These percentages exactly correspond to the ones for the intended health seeking behaviour of the local actors. The other percentages show significant differences between realized and intended treatment seeking.

An essential difference might come from a under-reporting of intended use of *self medication* and of *no treatment*, and an over-reporting of the consulted health providers. Thus, *in reality* more households/patients rely on self medication. There is a great deal of

shops in Mbeza that provide modern drugs and most households know a wide range of medicinal plants. People are able to prepare herbal medicines, which they administer either as prevention or for therapeutic purposes (ibid). Merten argues that patients during interview situations might refer primarily to biomedical illness concepts as many are overlapping with traditional illnesses (*information bias)*. This seams to be confirmed by the over-reporting of clinical attendances in the intended health seeking. Merten (2006) has reported 14 cases (~ 8%) of traditional illnesses, but she was able to assign these illnesses to a corresponding biomedical disease category. Surprisingly, in none of these 14 cases a THP was involved. Biomedical and traditional illness concepts principally differ in the aggregation of symptoms and the perceived ultimate causes. 'Nevertheless, the cases where traditional practitioners were consulted didn't differ from the other cases' (ibid).

Health institutions	Case Study		Intended health seeking	
	N (%)	% All	N (%)	% All
Self medication	**64 (100)**	**36%**	**95**	**16%**
traditional herbs	31(48)	17%	-	-
Medicaments	33 (52)	19%	-	-
Biomedical or Traditional health provider	**99 (100)**	**55%**	**495 (100)**	**84%**
Clinic / hospital	81 (82)	45%	414 (82)	70%
Traditional practitioner	18 (18)	10%	81 (18)	14%
No treatment	**16**	**9%**	**6**	**1%**

Table 5: Health seeking (case study) of sick individuals (N=179) in 5 Mbeza villages compared with the intended health seeking of local actors (N=596) in 10 randomly selected Mbeza villages, Zambia 2005
Source: After Merten, 2006

In addition to the results of the health-seeking behaviour presented above, Merten (2006) investigated the intention of patients if the illness gets more severe. The results indicate that 85% consult a hospital or a clinic. Only 12% would consult a traditional practitioner. Another important finding is that frequently patients rely on both biomedical and traditional medicine for the same illness episode (ibid).

Fishing camps and villages. The situation in the fishing villages and fishing camps of the Kafue Flats are not the same as in the central part of Mbeza. The floodplain is a very remote area and the nearest health care facility is far and difficult to reach because of the bad dirt road conditions, the absence of means of transport, except bicycles. There are neither biomedical medical services nor traditional practitioners. As a result, people treat most of the illnesses on their own (Merten, 2006). When patients are seriously sick and have to attend a health centre, they must find a way to reach the nearest clinics about 20-25 km away, or the nearest hospital about 60 km in the south (own estimations with GIS).

Chapter 3

Theory: Medical Geography & Anthropology

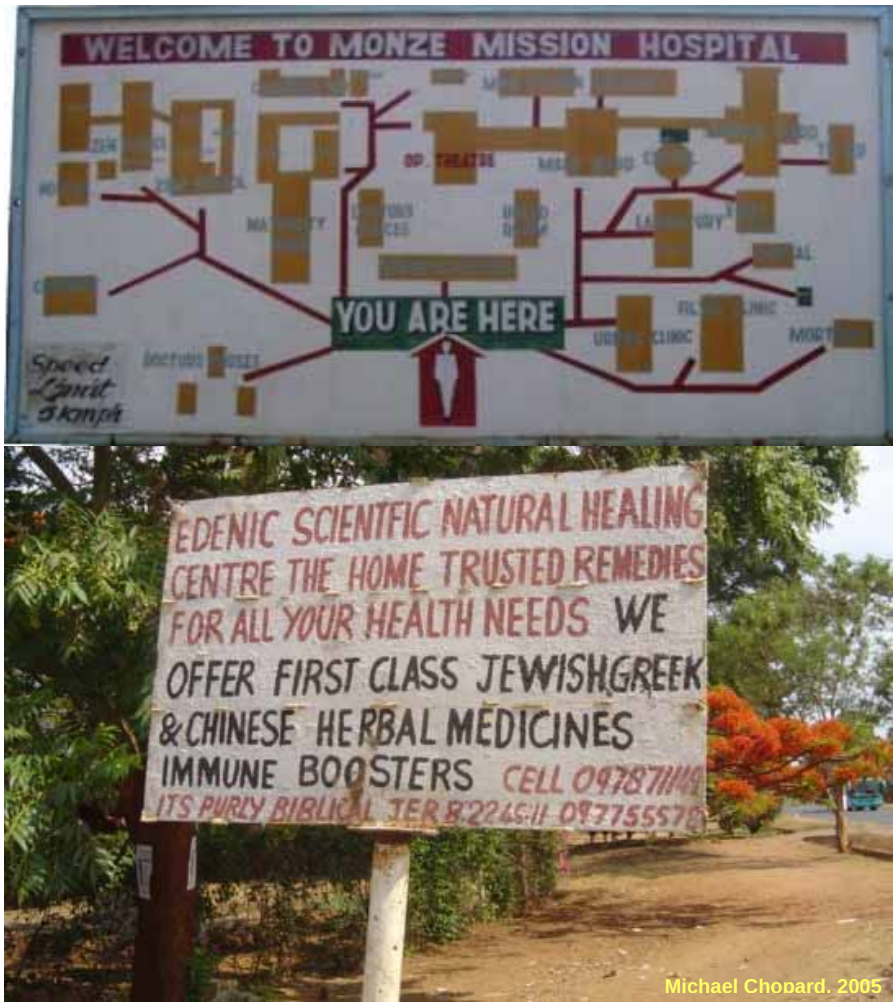


Fig. 6: Advertising sign on the street for traditional and complementary alternative medicine (TM/CAM) in Mazabuka village, and guide sign in Monze Mission hospital

3.1 Relevant disciplines and key concepts

3.1.1 Medical pluralism

In Chapter 2, the biomedical (modern) health system, and the traditional health system in Zambia and in the Mbeza Region have been described; this (co)existence and use of multiple sources of medical care is called *medical pluralism*. Already in 1978, during the World Health Organization conference on Primary Health Care (PHC) in Alma Ata (WHO, 1978a), it was recognised that two health care systems are present in many countries: a traditional health system and a health care system based on Western or so-called modern or biomedical medicine. During this conference cooperation between the two systems was already recommended. The WHO has played a leading role in proposing the use of traditional practitioners as part of the primary health care system (Stekelenburg, 2004: 137). The WHO defines *health systems* as including 'all the activities whose primary purpose is to promote, restore or maintain health' (WHO, 2000a: 5).

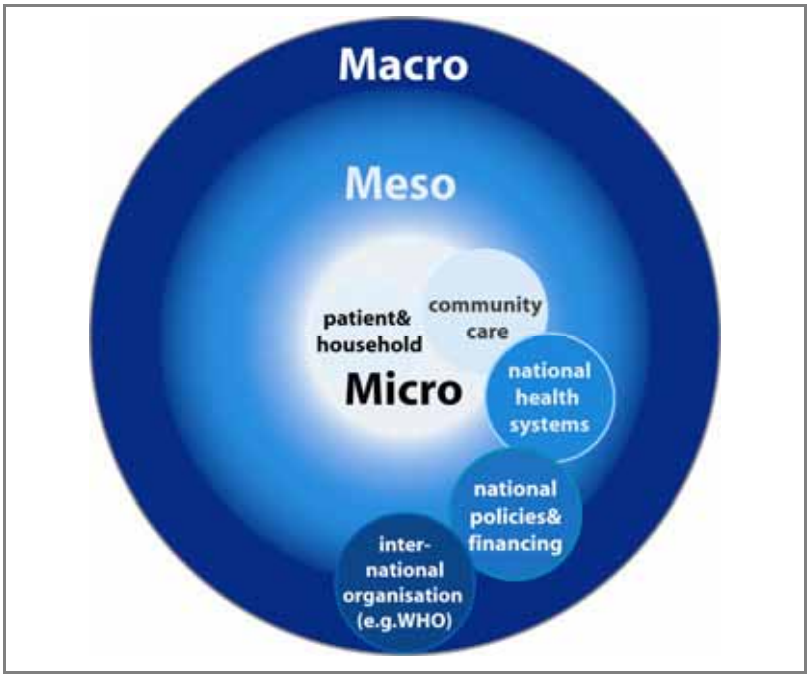


Fig. 7: Macro, meso and micro levels for health care systems analysis
Source: own representation, 2007 (Based on WHO, 2002b: 30)

Because health care systems and health care delivery intersects with a large part of human culture and the environment, their study must involve contributions from many areas of inquiry, including many academic disciplines such as public health, anthropology, sociology, geography, economics, political science, etc. (see for example Mead and Earickson, 2000: 312). Such a multidisciplinary approach is essential to understand and analyse access, organisation and utilisation of health care systems, including the various cultural, socioeconomic, political and environmental factors having an influence in this context - be it at the macro, meso and micro level (cf. Fig. 7).

As expressed by Kleinman (1980: 24), who is a prolific and very frequently cited author in the domain of medical anthropology, '[t]he single most important concept for cross-cultural studies of medicine is a radical appreciation that in all societies health care activities are more or less interrelated. Therefore, they need to be studied in a holistic manner as socially organized responses to disease that constitute a special cultural system: the *health care system.'* The result of the increasing interest in health issues and health related topics in the social sciences is the growing importance of specific disciplines or subdisciplines with a strong interdisciplinary character such as medical anthropology, medical sociology, ethnomedicine, human ecology, medical geography or geography of health, geographical epidemiology, etc. All these subdisciplines cover a broad range of topics, aspects and issues related to health, which are strongly intertwined. Therefore, the distinction between these disciplines is somehow blurred and researchers may have different opinions about what their field of study entails.

3.1.2 Medical geography

Medical geography has been conventionally mapped as a subdiscipline with two distinctive stands (cf. Mayer, 1982 and Rosenberg, 1998):

1. ***Geographical epidemiology:*** the study of the spatial distribution of disease and death, i.e. mapping and modelling disease and health
2. ***Spatial health services:*** the study the geographical complexities surrounding the location, provision, utilisation, access to and (in)equalities of health care

In relation to health-related topics and issues, medical geography has shifted over the past decade from a 'minority concern and a *confusing sub-variety* of human geography (Haggett, 1965: 1), to a confident, recognized and distinct *geography of health*' (Rosenberg, 1998). This shift from medical to the so-called (new) geography of health or to the new health geographies has been and continues to be contested. But, collectively, it is recognised that the subdiscipline has changed, distancing itself from concerns with disease and the interests of the medical world, in favour of an increased interest in well-being and broader social models of health and health care (Kearns and Moon, 2002: 606). Medical geography can be defined as follows (cf. Box 1):

> Medical geography uses the concepts and techniques of the discipline of geography to investigate health-related topics. Subjects are viewed in holistic terms within a variety of cultural systems and a divers biosphere. (Meade and Earickson, 2000: 1)

Box 1: Definition of medical geography

Medical geography is close to the field of human ecology, which is a broad term used in anthropology, epidemiology and geography. The human ecology of disease refers to 'the ways human behaviour, in its cultural and socioeconomic context, interacts with environmental conditions to produce of prevent disease among susceptible people. This constitutes the etiology, or causal evolution, of health and disease' (Meade and Earickson, 2000: 21). In this context, *health* is defined 'in terms of adaptability and is related to complex systems of interaction among habitat (environment), population, and cultural behaviour' (ibid: 22). Demography, habitat and behaviour form the triangular model of human ecology, which is part of the core dimensions in medical geography, as described by Mead (1977: 382-384, cf. Fig. 8).

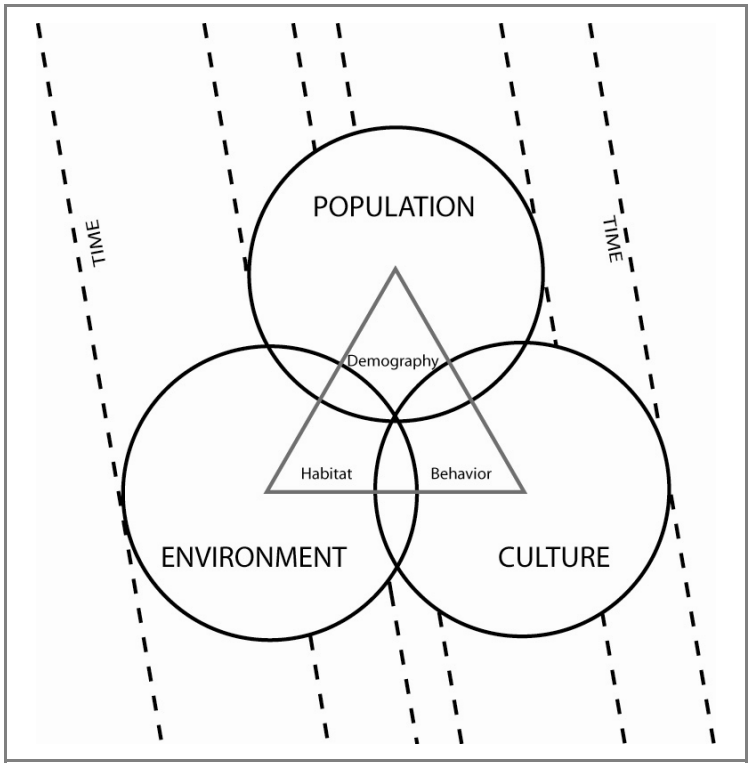


Fig. 8: Dimensions of medical geography
Source: Mead, 1977: 383

The three core dimension, namely population, environment and culture are described as follows:

- ***Population:*** This dimension refers to humans considered as biological organisms, as the potential hosts of disease, but also to their resistances and abilities, such as nutritional and immunological status. The demographic composition - effects of age, gender, genetics, etc. – are critical factors as well, that have a strong influence on population status, and on peoples' interactions with the environmental and cultural dimensions.
- ***Culture:*** Culture as a dimension includes not only such things as taboos and dietary practices, types of housing, clothing, etc. More interesting and important

is 'the conceptual world through which reality is perceived and understanding structured' (Mead, 1977: 382), and the resulting human behaviours that occur in this reality. Behaviour is the observable aspects of cultures, which usually has spatial expression. Behaviour 'springs from cultural precepts, economic constraints, social norms, and individual psychology. It includes mobility, roles, cultural practices, and technological interventions' (Mead and Earickson, 2000: 26). Behaviour determines which physical or cultural resources of the environment will be used. Behaviour patterns are conditioned by gender, age and ethnic role, etc. Human behaviour creates many environmental conditions of health and disease. These conditions have a potential influence on the medical systems for health care delivery.

- ***Environment:*** This dimension includes physical, chemical and psychosocial insults to health as well as the health services and facilities available. More precisely, the environment dimension includes a multitude of important variables, such as settlement pattern, health care services (i.e. availability and accessibility of health facilities and health personnel), type of medical treatment, laboratory facilities, transportations system, schools and health education, and government. The part of the environment where humans live and work, and which directly affects them, is called habitat. (Mead, 1977: 382-384 ; Mead and Earickson, 2000: 25-37).

The medical geography sub-discipline partly considers the same aspects as in medical anthropology. Nevertheless, when medical anthropologists predominantly focus on cultural health aspects, medical geographers are more interested in the environmental or spatial aspects related to health and health care. In other words, medical geography focuses on the cultural transformation of the human environment and the resulting implications for the human population over time (Mead, 1977: 384).

3.1.3 Medical anthropology

Medical anthropology can be defined as 'the study of ethnomedicine; explanation of illness and disease; what causes illness; the evaluation of health, illness and cure from both an *emic* and *etic* point of view; *naturalistic* and *personalistic* explanation, evil eye, magic and sorcery; biocultural and political study of health ecology; types of medical systems; development of systems of medical knowledge and health care and patient-practitioner relationships; political economic studies of health ideologies and integrating alternative medical systems in culturally diverse environments' (Bhasin, 2007: 1). More precisely Baer et al. (1997) define medical anthropology as follows (cf. Box 2).

Medical anthropology can be shortly defined as the branch of anthropological research that deals with the factors that cause, maintain or contribute to disease or illness, and the strategies and practices that different human communities have developed in order to respond to disease and illness. (Baer et al., 1997. Cited in: Bhasin, 2007: 1)

Box 2: Definitions of medical anthropology

In other words, medical anthropology aims at understanding how illness and disease are perceived by various cultures and how treatment alternatives are selected and therapies provided and accepted. In this context, it is essential to work with several key concepts from medical anthropology, such as the illness and disease dichotomy, *emic* and *etic* point of view, ethnomedicine, etc. Some of these concepts are presented below.

Ethnomedicine. Medical anthropology is firstly defined by Bhasin as the study of ethnomedicine. Unlike biomedicine, ethnomedicine defines disease and illness within given social contexts, it is the study of health and healing behaviour, i.e. the different ways in which people of various cultures perceive and cope with illness, which includes making a diagnosis and obtaining therapy (Fabrega, 1975: 969. Cited in: Sindiga, 1995b: 16 ; Bhasin, 2007: 1). Ethnomedicine also refers to the study of traditional medical practices, i.e. traditional medicine. In western cultures the biomedical paradigm prevails, i.e. disease and illness are viewed as physical or mechanical disorders, and little consideration is given to the person's social and religious experiences (Sindiga, 1995b: 22). Since both ethnomedicine and biomedicine coexist today in most countries, I would personally argue that medical anthropology is the study and analysis of medical pluralism, of the interaction between the biomedical and the traditional health care systems in a specific culture.

User and provider perspectives. The populations play multiple roles in health systems. The WHO (2000b: 50-51) recognises four roles of people in health systems: (1) patients are users/consumers of the health services - they behave in ways that influence their health, which include their choice about seeking and utilizing health care; (2) People may also contribute to financing the health systems, by paying user fees, taxes or health insurance contributions; (3) On the other side, people may be providers of health care. (4) Finally, people play the role of citizen, 'and particularly as officials whose job it is to represent citizens and protect their interests […]' (ibid). The relationship between users and providers - i.e. patients and doctors, patients and healer, or patients and health/medical providers - corresponds to two important point of views/perspectives used to study health care systems, namely:

- ***User perspective:*** this perspective refers to the study of health-related issues and topics from the point of view of the users, consumers or clients. The user

perspective is also called patient, non-professional or lay perspective (or patient-centred, patient-oriented approach), which is closely related to the insider perspective. As a result, scientists and researchers collect data at the village, household level, (medical) anthropologists make participant observation, etc. They focus on the cultural concepts related to well being and sickness, and make conclusions from the health and treatment seeking behaviour of the patients.

- ***Provider perspective:*** this perspective focuses on the study and analysis of health-related topics and problems from the point of view of the providers. This perspective mainly refers to the (bio)medical, professional, clinical or doctor's perspective. In this sense the provider perspective correspond to an outsider perspective that is not interested in the cultural context of health. However, traditional healers (e.g. African doctors) are important health care providers as well. Therefore, according to the provider perspective, data collection is made in clinics, hospitals, and at healers' places. This means that clinical officers, doctors, nurses, etc. as well as traditional healers are interviewed and questioned, in order to analyse and understand health care provision and respectively the use of the different health care services by patients.

Disease-illness scheme. The insider/outsider and user/provider approaches lead us to a key axiom in medical anthropology: the dichotomy between disease and illness. These terms have been developed by medical anthropologists in order to distinguish *illness* perceived and experienced by local actors and patients (which is considered as a subjective concept) from *disease* diagnosed by the biomedical doctor (considered as being objective, since it refer to specific symptoms and clinical facts that can be observed and often quantified) (Helman, 2000: 79-85). This distinction can be summarised by the sentence: 'Patients suffer *illnesses*; physicians diagnose and treat *diseases*' (Eisenberg, 1977: 11, cited in van Eeuwijk, 1999: 63).

In other words, the concept of disease does not include the social, cultural or psychological dimensions, i.e. the context in which disease appears, or its culturally defined meaning. Furthermore, the disease concept focuses on a single individuals affected by the disease. On the other side, the idea of illness includes communications and interpersonal interaction, particularly within the context of the family and social network, i.e. illness most often affects others as well (Kleinman, 1980: 72-73). However, as stated by Ahmed (2005: 15), '[i]t is the experience of illnesses, not the biological reality of disease, which causes an individual to consult others about his or her health'. Beside, since disease and illness do not correspond one-to-one to each other, which means that only some illnesses are recognised by the biomedicine as being *real* diseases, illness might be present where disease is absent and vice-versa (ibid).

According to Kleinman (1980: 72), '[c]onstructing illness from disease is a central function of health care systems (a coping function) and the first stage of healing.' One could argue, however, that *traditional diseases* can be (only) diagnosed by certain traditional health providers (THP). Indeed, the various typologies of THPs proposed in the literature, mostly differentiate diagnosticians from non-diagnosticians (cf. Annex 2).

The term sickness is particularly controversial. Some authors, for example Kleinman (1988: 6), have described sickness as a blanket term to label events involving disease and/or illness. Other authors (Frankenberg and Young, cited in Bhasin, 2007: 3), have redefined sickness in a narrower sense, as 'the process through which worrisome behavioural and biological signs, particularly ones originating in disease, are given socially recognisable meanings, i.e. they are made into symptoms and socially significant outcomes. […] Sickness is a process of socialising disease and illness' (Bhasin, 2007: 3).

The concepts of curing and healing follow from the distinction between disease and illness. These terms refer to health restoring practices from biomedical point of view and the patient's perspective respectively. According to Kleinman (1980: 82), the curing of disease and the healing of illnesses constitute the chief goal of health care systems. Indeed, the success of therapy depends not only on curing the disease but on alleviation of the illness as well (Ahmed, 2005: 15).

Indigenous illness concepts and aetiology of illness. Cultures vary in their perception and definitions of health and illness, in other words they have proper believe systems that influence their relation to and concepts of well being, health and ill health. Therefore, every culture has its own explanations for illness/disease causation. In contrast to the (western) industrialised countries where biomedical concepts prevail, the causation of ill health in many cultures is generally situated in the following sites: within the individual, in the natural world, in the social world, or in the supernatural world. 'In many cases, illness is ascribed to combinations of two or more causes or to interactions between these various worlds' (Helman, 2000: 91). The study of aetiologies of illnesses (i.e. the study of the causes and origins of disease) from the insider perspective is also called *lay theories of illness causation* (ibid).

In Zambia, as in many cultures around the world further concepts such as: (im-)purity, dirtiness, (un-)cleanness, taboo and pollution, etc. are particularly important in relation to the perception, transmission, origins and causes of illnesses, diseases and misfortune (for more information, see Douglas, [1966] 2002). These concepts are influenced by the religious, socio-cultural background and traditional healing practices. Different types of healers might further be responsible for illnesses related to impurity, taboo, pollution, possession by spirits, or any other illness caused by supernatural forces. These concepts also influence health and treatment seeking behaviour of patients.

3.2 Access and utilisation of health care services

Medical geographers are particularly suited to conduct research on the access and utilisation patterns of biomedical and traditional medical systems. Indeed, '[i]vestigating patient utilisation patterns requires basic locational data for which geographers are trained (Good, 1977: 70. Cited in Sindiga, 1995b: 26). As explained by Stekelenburg (2004: 75) '[a]ssessment of the utilisation and coverage of health services and its determining factors can assist health managers to identify bottlenecks in the provision of services. It can help to analyse the constraining factors and to select effective measures to improve the services (Tanahashi, 1978). The challenge is to learn and to understand how services can be organised in such a way that the needs of the clients can be met effectively'.

Access to the health care services is generally measured in terms of delivery systems, by calculating the number of doctors, health care providers, or beds per 1000 population. Another indicator of health care accessibility is the percentage of people, households or villages, living within a fixed distance (e.g. 5 km or 10 km) from the nearest health facility, respectively the nearest hospital. These are the most frequently used indicators to describe access to health services, however such indicators *only* describe the density, availability of health facilities and providers, and their spatial accessibility. But these indicators do not indicate automatically their utilisation. A socioeconomic dimension for example is necessary to determine access, because people lacking the means (money) can not afford to resort to any health care provider. Therefore, if accessibility and availability are prerequisite for patients to be able to use health care facilities, other access determinants such as cultural and social distance, gender issues, ethnicity, etc. are playing a decisive role as well. In this section, the utilisation of the health care services is linked to the access concept and its various dimensions.

3.2.1 Access to health: «the seven As»

The concept of access has been extensively debated in the literature (e.g. Penchansky and Thomas, 1981 ; Obrist, 2006). Access dimensions are differently perceived according to the user or the provider perspective, i.e. when people gain/demand access and use health care facilities, or when provider organise/offer access to and supply of health care services. From the user perspective, access is described as 'people's ability to use health services when and where they are needed' (Aday & Anderson, 1981, cited in Cromley and McLafferty, 2002: 234). The provider perspective focus on equality of health care provision and aim at providing health care resources to people who need to restore their health.

It has become popular among researchers to use different categories in order to group key factors influencing the use and access of health care services, the best known is the grouping into *four As*, namely: *availability, accessibility, affordability and acceptability*. The *four As model* 'has been widely used by medical geographers, anthropologists and epidemiologists who mainly emphasised distance (both social and geographical) and economic aspects as key factors for access to treatment' (Hausmann-Muela et al., 2003: 14). The advantage of the four As model is its capacity to identify key potential barriers for adequate treatment (ibid).

From the domain of public health, Penchansky and Thomas (1981) introduced a fifth dimension called *accommodation*. I added a sixth dimension, which has been given a special focus by Anyinam (1987) in reference to African ethnomedicine: *adaptability*. For the case study in the Mbeza region a last access dimension is further added: *accountability*. This dimension was proposed by Merten and Haller (2006). It refers to the responsibility of health care providers to restore the health of their patients, in other words to treatment reliability, quality and effectiveness.

These seven dimensions of access to the biomedical and traditional health care services are described below (cf. Penchansky and Thomas, 1981: 128 ; Cromley and McLafferty, 2002: 234 ; Hausmann-Muela et al., 2003: 14):

- ***Availability:*** This first category refers to the geographic distribution and density of health care providers and facilities - be in the biomedical and in the traditional sector (clinics, hospitals, pharmacies, drug stores, traditional healers, charismatic churches, etc.). Availability defines supply of services in relation to local actors and patients needs.

- ***Accessibility:*** This category includes spatial and temporal (or seasonal) accessibility. It defines geographical barriers, topographic and climatic constraints such as distance, transportation, travel time and cost, or more globally rivers, inundations and mountainous lands. Transportation also includes an economic dimension of accessibility, thus transport cost is integrated in both accessibility and affordability dimension. Accessibility 'highlights the geographical location of services in relation to population in need' (Cromley and McLafferty, 2002: 234).

- ***Affordability:*** Affordability defines the total cost of service in regard to people's ability to pay. This includes user fees, treatment costs for the individual, household or family, income level, existing health insurance, possible credit arrangements (paying treatment in kind, delay for treatment), etc. A distinction is made between direct, indirect and opportunity costs.

- ***Acceptability:*** This crucial dimension is related to the cultural and social distance. It describes user's views of health services and how health care providers interact with local actors and patients. Acceptability encompasses barriers linked to gender aspects, culture, ethnicity, age, type of facility, neighbourhood of facility, religious affiliation of patient and provider, excessive bureaucracy and sexual orientation (non acceptance of treating or being treated by the opposite gender, by persons belonging to another religion or ethnic group). All these factors 'affect an individual's willingness to use particular health services and his or her sense of comfort and satisfaction in receiving services' (Cromley and McLafferty, 2002: 234).

- ***Accommodation:*** This dimension added by Penchansky and Thomas (1981) identifies the degree to which services are organised to accept patients and to meet their needs. This includes: appointment system, hours of operation, walk-in facilities, waiting times, etc.

- ***Accountability:*** This dimension proposed by Merten and Haller (Merten, 2006), corresponds to the effectiveness, quality of care, or responsibility of health care providers to restore the health of their patients. It is the appropriateness, quality and reliability of diagnosis, treatments and therapies. In many developing countries, more particularly in rural, remote and resource-poor areas, the biomedical health system may be difficult to organise. Thus, the public health care system can be not reliable and treatments ineffective because of poor diagnostics (due to absence of doctors, microscopes, etc.), drugs shortage, etc. Thus, patients risk spending money in vain (ibid). Besides, the efficacy of THPs and traditional medicine has been frequently questioned (especially by professional of the biomedical sector) because traditional medicine predominantly relies on mysticism and intangible forces (e.g. witchcraft). As a consequence, reliable diagnosis, quality of care and effectiveness of treatment (i.e. accountability) is a major dimension affecting access to health. Indeed, local actors and patients, according to previous experiences, will always search for effective, reliable biomedical or traditional medicine.

- ***Adaptability:*** According to Anyinam (1987: 808-809), adaptability in the traditional sector refers to the capacity of ethnomedicine to incorporate new elements. For example, the influx of new-styled practitioners who are either Christian or Muslim spiritual healers and who operate from churches represent a form of adaptability. There is also a willingness of many traditional health

practitioners to receive training from biomedical personnel to increase their healing skills and techniques.

The biomedical sector is subject to adaptation as well. Indeed, according to Kleinman (1980: 53-59) and to its *three sectors model* (professional, folk and popular sector), the professional sector (biomedical sector) and biomedical concepts are subject to *indigenisation, popularisation* and progressive *medicalisation*. Indigenisation refers to the changes occurring into non-Western societies after the introduction and expansion of modern professional medicine. The related process called popularisation refers to the alteration and diffusion of certain aspects of professional care, such as biomedical health concept, into the popular health sector. In many societies, the growing importance and promotion of the professional (biomedical) sector provoked a progressive *medicalisation* (ibid). These processes correspond to the adaptability of the biomedical sector that results in indigenous illness concepts adaptation in many cultures and societies, and in an access expansion of biomedical medicine.

3.2.2 Central place theory and distance decay

In relation to health care provision, centrality is an important concept. The objective is to organise equitable access to the health care system for all people. Therefore health centres are supposed to be situated at the points within the areas that lies in the centre of the population, so that average distance from the health centre to the furthest households would be the same in all directions. In this case, the measure of centrality is distance, but travel time or travel costs might be utilised as accessibility measures of centrality as well. Thus, distribution and organisation of services are often based on *central place theory.*

Central Place Theory (CPT). This theory basically states that the quantity and variety of goods and services available to a given population vary with the number of people who have access to these goods and services. In other words, large populations are offered a wide range of services, and small populations fewer services at their disposal. The theory, first formulated by Christaller (1933), includes many simplifying assumptions such as an isotropic plane and an evenly distributed population with equal purchasing power. The services are organised in a hierarchical order, with the places of each order distributed across space in a regular pattern, a set of nested hexagons (Mead and Earickson, 2000: 356). 'Central place theory can be linked to the functional and spatial organisation of an idealised health care delivery system' (ibid), which corresponds to a referral system.

The levels of the hierarchy range from individual health care practitioners in health posts or homes, clinics, Rural Health Centres (RHC), up to large health centres providing the whole range of health care services. Figure 9 shows a hierarchical health care system for households and villages in a developing country. According to the central place theory, each level is intended to serve a specified number of people within a specified geographic area, a so-called catchment area (cf. Chapter 2.1.3 for the Zambian referral system). The theoretical central place market area (or catchment area) of the different health centres resembles a cone, termed as *distance-decay cone* (cf. Figure 10). Applying central place theory to the functional and spatial organisation of the health care delivery system must take account of the many factors that distort the ideal conditions enumerated by Christaller above. These factors include for example physical barriers, transport network, income distribution, etc. As a result, an ideal spatial organisation is harder to realize in practice than is a functional hierarchy.

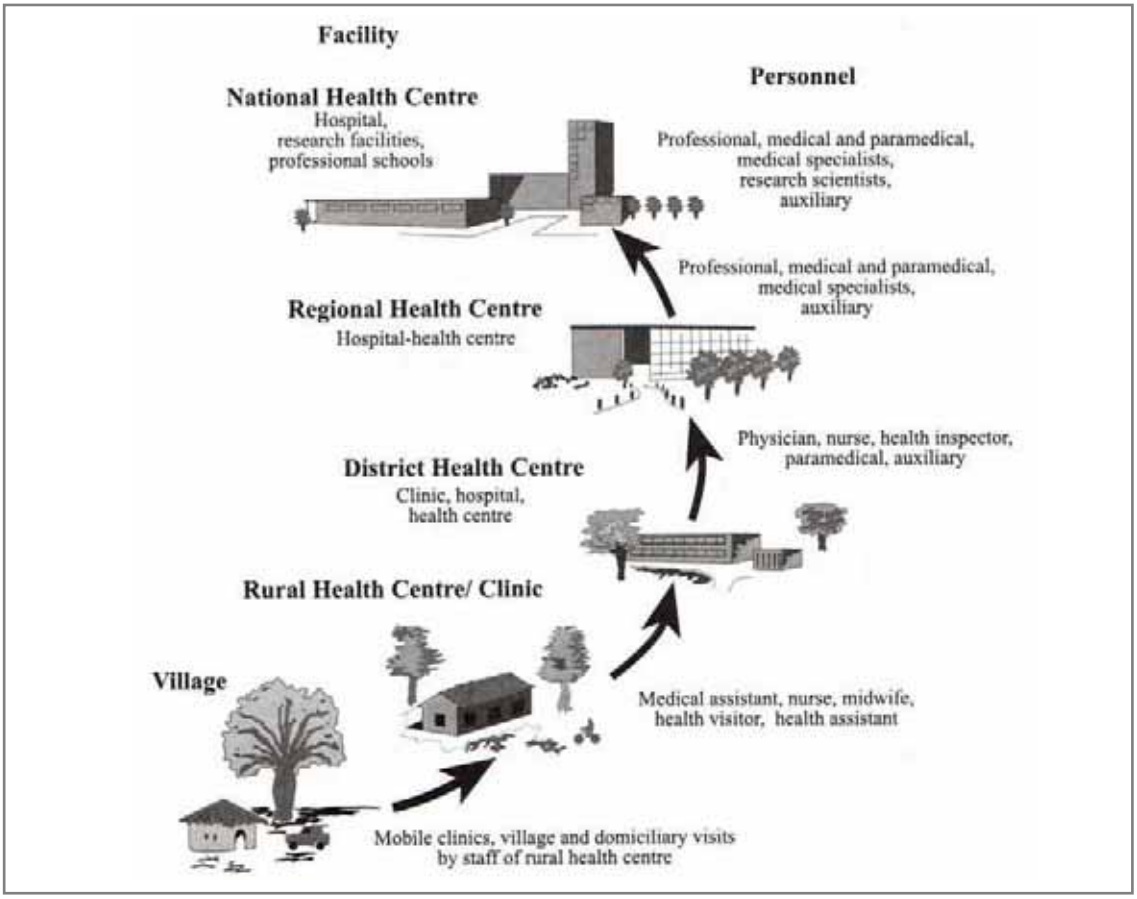


Fig. 9: Public health care hierarchy (referral system) in a developing country
Source: Mead and Earickson, 2000: 357. After Joseph and Philips, 1984: 57

Indeed in many countries of the world the population is so dispersed that a fixed system based on central place theory is not practical. Many geographers criticised the central place theory, claiming that social welfare issues should override issues of economic efficiency. Therefore, central place theory ought to be used as one of many explanatory model rather than as a prescriptive model. 'Thus, for the good of a populations' health, a

government might have to establish facilities with smaller minimum populations than central place theory justified' (Mead and Earickson, 2000: 358).

Distance decay. Distance decay is not only a basic concept in geography but also a fundamental aspect of health care utilisation patterns. It is usually a concave curve that indicates a decline of attraction to a facility as distance to the facility increase. The distance decay curve (cf. Figure 10) permits to study and visualise the decrease in utilisation of a health care facility – be in the biomedical or traditional sector -, for a specific disease or illness, for a specific gender group, ethnic group, age category, etc. and to compare the different curves between each others. For instance, in the studies of Stock (1983) in Northern Nigeria and Müller et al. (1998) in Papua New Guinea, it has been found that big differences exists in distance effect among age and gender group, and according to diagnosis and the nature of illness. Figure 10 shows a sketch that illustrates the distance decay curve and distance decay cones. For *distance decay*, the x-axis corresponds to the distance from patient's households to treatment place, or health centre (a). The y-axis corresponds to the utilisation of this health care facility. In (b) the height of the *distance decay cones* indicates the number of patients living at a given distance from the health care centre. The slope of the cone represents the drawing power of the health care centre over distance (Mead and Earickson, 2000: 357-358).

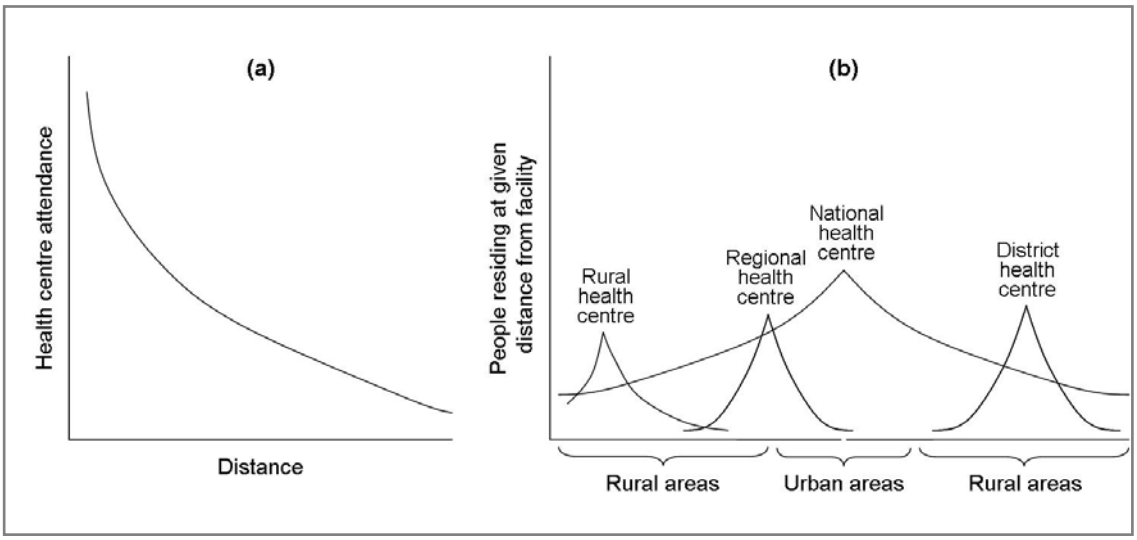


Fig. 10: (a) Distance decay curve and (b) distance decay cones for a public health care hierarchy
Source: own representation. After Mead and Earickson, 2000: 359, adapted from Pyle, 1979: 220

The actual form that distance decay functions should take has been widely debated in the literature (ibid: 384). Several possibilities have been put forward, one of the simplest equations is the concave function: $f=k \cdot d^{-b}$

In this equation, f is the frequency of consumer-resource contact, d the distance, and k and b are parameters that must be determined for any particular situation. 'There is no single formula that fits all interactions, which means that the best fitting equation can only be determined empirically' (ibid)

3.2.3 Accessibility concepts: spatial and social accessibility

Apart from the distance decay function there are many other methods that derive from the field of geography, to measure and calculate accessibility to health care services. Some authors (e.g. Khan and Bhardwaj, 1994 ; Aday and Anderson, 1974. Cited in Bowerman, 1997: 10) differentiate between *potential* and *realized spatial accessibility*, and *potential* and *realized social accessibility*. Measuring and calculating accessibility in terms of distance to health care services correspond to potential spatial or geographic accessibility. These measures concentrate on the spatial configuration of services providers relative to the spatial distribution of relevant population groups (Bowerman, 1997: 11).

The potential social accessibility examines the differential availability of health care resources emphasizing the importance of socio-demographic economic and health system organisation factors and variables. On the other side, the *effective* or *realized accessibility* makes reference to the actual use of the system. Since both spatial and nonspatial influences on the utilisation of the health services are mainly considered, there is no sharp distinction between *realized geographic* and *realized social accessibility.* 'Indicators on realized accessibility are generally obtained from population census data or surveys and are of two main types: utilisation rates and statistical models. Utilization rates are computed by grouping the population by various sociodemographic and spatial factors and then calculating the utilization rate for each group. On the other hand, statistical models, such as the logit model, attempt to quantify the effects that various factors have on health-seeking behaviour' (Bowerman, 1997: 17).

Measures of spatial, or geographic accessibility to health care can be either distance-based (for example the distance from patient's household to the nearest health care provider or facility), or area-based (measures that describe accessibility for areas like counties, towns, districts, for example the ratio of population need to services available) (McLafferty, 2003: 28). For area-based accessibility, a central or middle point (centroid*)* can be calculated, in order to determine an average distance from the middle of the area to health care facilities and providers available. Access to health, and the distance separating patients location from health care facilities and providers can be described, measured, or calculated through different means (e.g. spherical distances, Euclidean distances, network distance, travel time, etc.). Some of these accessibility measures might further be combined, in order to provide a more realistic view of the travel burden and accessibility of health care services.

Minimum distance accessibility. This measure is the simplest measure of potential spatial accessibility, it is defined as the distance from potential consumers to the nearest facility. For a population group, i, this measure is expressed as follows: $A_i = \min_j D_{ij}$
The accessibility of the population group i, is represented by A_i, and D is the distance between population group i and service provider j (Bowerman, 1997:11-12). This model mostly uses the minimum straight-line distance (Euclidean distance) between patients and the nearest health care facility, however it might be adapted to calculate for example the minimum travel time, or the minimum network distance to the nearest facility. This model is based on the assumption that local actors and patients attend the nearest facility. The main criticism for this model is that people often do not attend the nearest facility and instead may choose a farer place to be treated (see, for example, Martin and Williams, 1992, or Bailey and Phillips, 1990. Cited in Bowerman, 1997:12).

Although metric distance is a fundamental indicator of geographical access, travel time, cost, transportation access, and perceived distance might be much more relevant to analyse health care utilization. Accessibility measures offer only partial view of access to services. 'In reality, people trade off geographical and nongeographical factors in making decisions about health service use' (Cromley and McLafferty: 243). Other (access) variables, such as demographic and socioeconomic characteristics (income, occupation, age, gender, livelihood, religion, etc.) need to be considered as well. These non-spatial factors might interact with spatial variables. Distance is for example distorted by political, cultural and economic considerations. Researches indicates that people whose mobility is limited by low incomes, age or poor access to transportation are more sensitive to distance, and thus more likely to use the nearest health care provider (Bashshur, Shanon, & Metzner, 1971; Haynes & Bentham, 1982. Cited in Cromley and McLafferty, 2002: 236). As a consequence, the distance factor needs to be considered in relation to other variables and in a holistic perspective. Apart from the *seven As model* and the spatial and social accessibility concepts, additional concepts and models from geography exist, for example activity spaces and the spatial interaction models.

3.3 Health and treatment seeking behaviour

Understanding the behaviour of people in relation to their well-being and to health care has been increasingly recognised by health services providers and planners as a crucial issue, a prerequisite in order to provide appropriate and effective health care provision. Indeed, as explained in the previous chapters, perceptions differ between providers and users (patients) of health services. Therefore, there is a need to analyse and study (from a user perspective) the perceptions of health and ill-health by patients and local actors.

This also includes their own definition of effective or appropriate treatments and therapies, i.e. their health seeking behaviours with its determinants. There is already a broad literature on the determinants of health (care) behaviour. Many authors research a country, or an ethnic group; they mostly consider and measure specific determinants, such as expenses induced by treatment, influence of religious/cultural believe system, or they focused on spatial aspects such as distance to treatment place or travel time (see for example Nyamongo, 1998: 56).

The terms health and treatment seeking behaviour are widely used in the literature, however, few authors provide a definition for them. The following definitions of health and treatment seeking behaviour stem from a national survey on household health seeking behaviour in Zambia, and from a thesis of Hausmann Muela, on treatment seeking behaviour in south eastern Tanzania (cf. Box. 3). Health seeking behaviour focuses on what local actors and patients do and where they go to restore their health, why they choose a treatment alternative from another, and what are the factors determining their behaviour and decisions. Health seeking behaviour is a broad concept that takes account of emotional, socioeconomic, cultural, environmental, supernatural, etc. and other factors that might have an influence on health, ill-health, and on healing and curing of illnesses and diseases.

Health-seeking behaviour

Health care seeking behaviour patterns describe who is getting which type of health services and is closely related to issues of equity of access to health services. Self-medication, entry in the modern health sector, and provider choice are key aspects of health seeking [behaviour] whose patterns depend not only on the quantity and the composition of the supply of health services, but also on the financial and geographical access of these services and the information and perceptions that households and individuals have about their relative efficacy. (Diop et al. 1998: 13)

Treatment seeking behaviour

Treatment seeking behaviour is a process followed by individuals and/or social groups for restoring health by using medical resources of all kind. (Hausmann Muela, 2000: xiii)

Box 3: Definitions of health and treatment seeking behaviour

Treatment seeking behaviour is interested in the kinds of medicines and therapies used by local actors and patients and where they go in order to restore their health. Among other things, an objective is to know if people - according to the illness/disease - go to a clinic, to a hospital or to a traditional health practitioner (THP) for treatment, or if they do not resort to any practitioners or medicine at all. For the same illness/disease, people may choose several treatment alternatives, for instance, if they not recover after the first treatment. Therefore treatment seeking behaviour follows the ill-individual in its different treatment strategies, until she or he recovers.

3.3.1 Health seeking behaviour models

A multiplicity of theories and models has been developed in order to explain health beliefs, behaviour, and behaviour change. The theoretical foundations for these theories and models are taken from cultural epidemiology, anthropology, social psychology, medical geography, and social economy. A broad variety of health and treatment seeking behaviour have been developed (see Hausmann-Muela et al., 2003). 'In public health, probably the most utilised models from social psychology are the Health Belief Model, the Theory of Reasoned Action and its later development to the Theory of Planned Behaviour. Most known from medical sociology and medical anthropology are, respectively, the Health Care Utilization or Socio-Behavioural Model by Andersen and its diverse posterior variations, and the Decision Making Model. All models contain associations of variables which are considered relevant for explaining or predicting health-seeking behaviours' (ibid: 3). It is important to keep in mind that using a strictly utilitarian, or rational vision in health-seeking behaviour models, and departing from the assumption that individuals generally aim to maximise utility and thus prefer behaviours which are associated with the highest expected benefits, would not necessarily correspond to the reality (ibid).

Depending on the various models and on the field of study, some factors are added, replaced, reformulated, each model having its own advantages and inconveniences. However, these models globally consider the same aspects, indeed, '[c]omparison for the variables in fourteen different models used in research on the utilisation of health care services revealed that there is a large overlap in the variables included in the models (Cummings et al. 1980)' (Stekelenburg, 2004: 79). The different models globally consider the following aspects that I classified into five different categories:

1. Characteristics of the environment: the climatic conditions, the spatial or geographical aspects, i.e. distance and barrier to health services, access, etc.
2. Characteristics of the health services and of the different health care providers (biomedical and traditional): therapies, treatment alternatives available, qualified staff, friendliness of staff, waiting time, etc.
3. Characteristics of the community: this includes socio-cultural and socio-structural factors, social networks
4. Individual and/or household characteristics: demographic factors, such as age, gender, ethnicity, as well as income, livelihood, etc.
5. Illness characteristics: illness causation (due to natural or supernatural causes), symptoms, duration, acute or chronic, etc.

Two models are particularly important for this master thesis, namely: the *socio-behavioural models* (health care utilisation model) and the *pathway models*. These are described below.

Influence factors on health, treatment seeking behaviour. In the original behavioural model developed by Andersen in the 1960s, the factors that influence health-seeking behaviour were grouped into a logical sequence of three categories, which influence the choice and use of the health service: 1) Predisposing factors; 2) Enabling factors; 3) Need factors; 4) Use of health services. There have been further modifications and extensions of this model by Andersen himself (1995) and by other authors who adapted the model to their own needs. Kroeger (1983: 149), for example, developed a model for socio-medical researches in developing countries, with independent and dependent variables, which is presented in Figure 11. In this model, the characteristics of the subject (patient) represent the predisposing factors and the characteristics of the health service correspond to the enabling factors. According to Andersen, the need factors refer to perception and evaluation of severity for a reported illness, i.e. total number of days in beds, days missed from work or school, help from outside for caring, etc. (Hausmann-Muela et al., 2003: 12). The need factor described by Andersen would therefore correspond partly to the characteristics of the perceived illness in Kroeger's model.

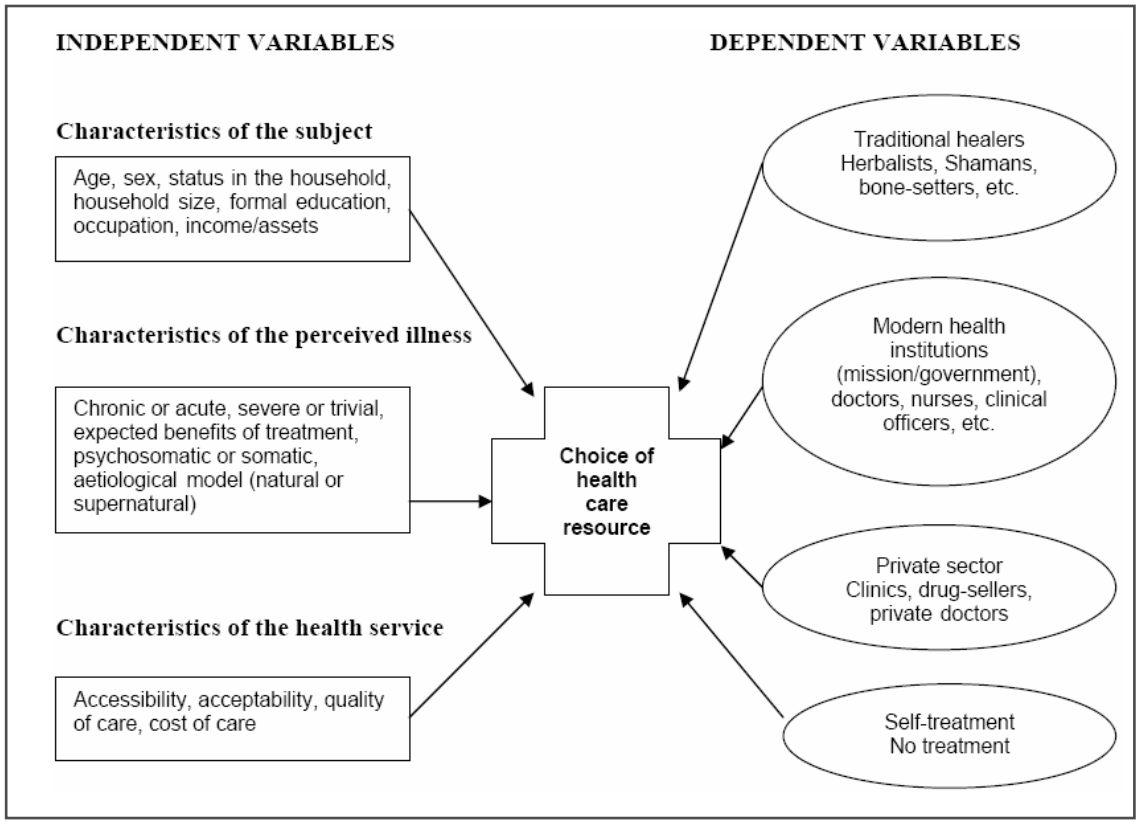


Fig. 11: Health seeking behaviour
Source: Stekelenburg 2004: 140. After Kroeger, 1983: 149

This model focuses specifically on treatment selection, perceived morbidity affecting all interrelated explanatory variables. The interaction of individual's traits, illness and health service characteristics guide the election of health care resource, which are the dependent variables (ibid: 13). The model of Kroeger combined with an own synthesis of several pathway models (cf. below), are taken as a theoretical basis for fieldwork related to this thesis, and for working with quantitative data collected and analysed with the help of statistics.

Pathway models. If the socio-behavioural or health care utilisation models provide a good overview of the different variables influencing health seeking behaviour, it does not represent, in my opinion, a sufficient visualisation for describing an *entire* illness episode. In this context, the pathway models are suitable. These models describe different steps in decision making and in the process of illness behaviour. They start with the recognition of symptoms and centre on the path that people follow until they use different health services - being in the biomedical or in the traditional health sector.

The different steps of the pathway models might be represented in a diagram. Hausmann-Muela (2003) produced a diagram for a pathway model that includes the influence of access factors (i.e. *four As model*: accessibility, acceptability, availability and affordability), including social relations and previous experiences on decision making.

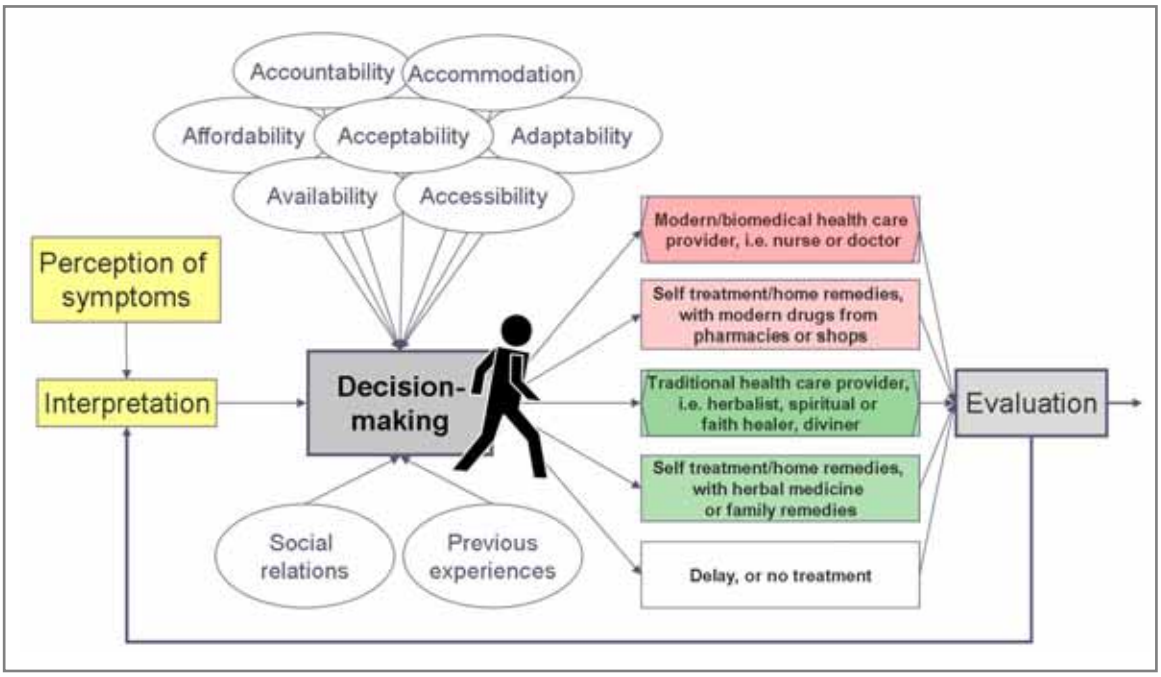


Fig. 12: Pathway model for health seeking behaviour
Source: Own representation, after Hausmann-Muela, 2003

After the decision making process, the patient resorts either to the professional/biomedical, the popular, or the folk sector for treatment, according to the *three sector model* developed by Kleinman. In his model, Kleinman (1980: 50), describe

the health care system as 'a local cultural system composed of three overlapping parts', namely: (i) the professional sector that corresponds predominantly to the biomedical sector (ii) the folk sector, and (iii) the popular sector of health care. This model uses the patient/user perspective and is based on the grade of professionalism and institutionalisation of the different kinds of health practitioners, and on illness concepts that are culturally constructed.

Figure 12 shows an extension of the model of Hausmann-Muela (2003), where treatment alternatives in the three sectors described by Kleinman (1980) have been replaced by five treatment alternatives. These alternatives represent the treatments alternatives available for local actors and patients (cf. next section). In the context of this research, it is more important to formulate five precise treatment alternatives in the pathway model, as it is proposed in the model of Kroeger above. The four access dimensions (*four As model*) integrated in the model of Hausmann-Muela (2003) are complemented by three new dimensions that I personally added (cf. the *seven As* in Chapter 3.2.1.)

3.3.2 Treatment seeking behaviour models

As expressed earlier, treatment seeking behaviour is one component of health (care) seeking behaviour. Treatment seeking behaviour makes reference to the treatment alternatives available, and to the treatment strategies chosen by the local actors and patients according to a specific illness/disease. These include five different alternatives or strategies which are summarised in Figure 13. The various cases differentiate the use of health care providers, being in the biomedical or in the traditional sector, and the *no use* of health care provider of any kind.

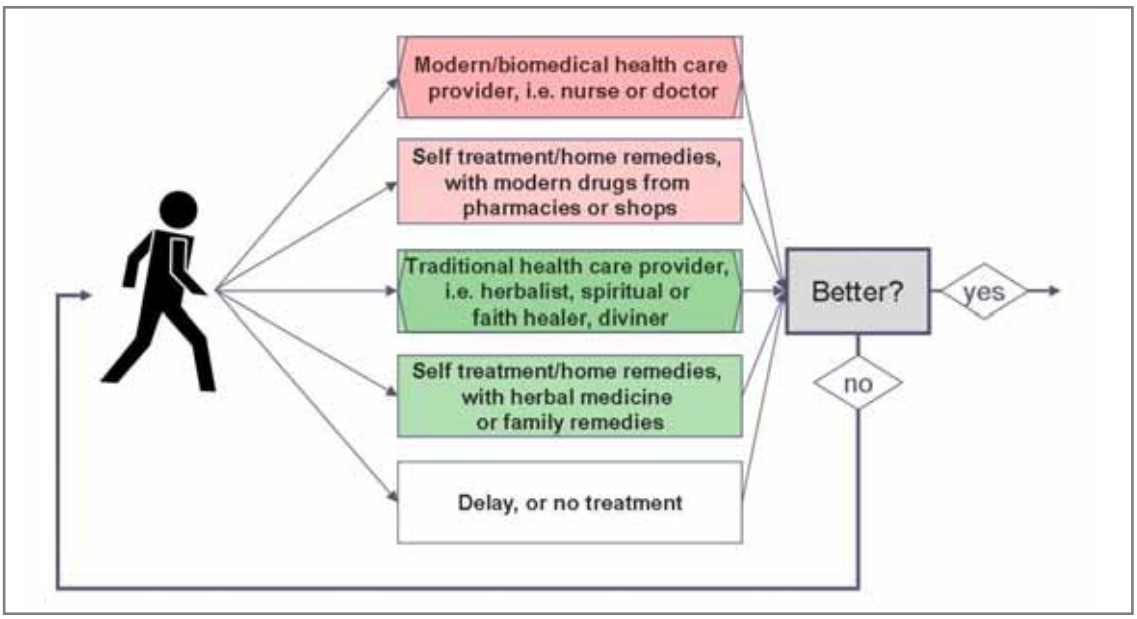


Fig. 13: The five treatment alternatives sequence-model for treatment seeking behaviour
Source: own representation

As mentioned earlier, people (patients) may choose several treatment alternatives for the same illness, especially when they are not satisfied by the treatment provided, or when they do not recover after the first treatment. As expressed by Alexander (1985, cited in Sindiga, 1995b: 23), 'Africans frequently utilize both traditional and modern medicine simultaneously for the same episode of illness or at different times for different illnesses'. Therefore treatment seeking behaviour goes below the first treatment choice, and follows the ill-individual in its different treatment(s) strategies. The sequence patterns of treatments have been described by Nyamwaya (1995b: 33), after a close examination of health-seeking behaviour in Kenyan societies from a lay perspective. The author observed that indigenous (traditional) and cosmopolitan (biomedical) medicine can interact in four main forms, namely sequential zigzag, supplementary, competition, and complementary:

- ***Competition:*** This first form of interaction takes place when one treatment is available for the illness/disease in both forms of medicine, even when the condition persists. The patient will first decide between one form of medicine, for instance between modern drugs from shops and an indigenous herbal preparation. Then, if the condition persists, the patient will have to resort to a second treatment or therapy. Once again, a suitable treatment will be available in both forms of medicine and the patient will have to decide between the two forms of medicine again.
- ***Complementary:*** Even if the patient searches treatment by one form of medicine and then by the other form, the decision is to use both treatments *at the same time*, because 'people consider both types of medicine as necessary for complete healing to occur' (ibid: 34). The complementary interaction is very common when the illness involves psychosocial and spiritual factors. For example, a patient may have a diagnosis and a treatment at the clinic, but for the same illness, the patient and her, his family may consider essential to provide a therapeutic ceremony by a THP to complete the healing process.
- ***Supplementary:*** In this case, one of the two forms of medicine is used for the management or prevention of a condition. Thus, the intervention of the other medicine is considered as extra or supplementary (ibid).
- ***Sequential zigzag:*** This succession corresponds to the use of one of the two forms of medicine as first treatment, followed by a move on to the other and then by a return to the medicine initially used by the patient. 'Thus, there is oscillation between the two types of medicine as the illness develops' (ibid).

Chapter 4

Methods: Data, Fieldwork, Spatial Analysis & GIS

Fig. 14: This picture shows the situation for doing a qualitative interview or completing a questionnaire. The man writing on the right is the assistant translating questions from English into the Tonga or Ila language.

4.1 Existing and used data

Sonja Merten and Tobias Haller simultaneously carried out several months of fieldwork in the Mbeza Region between 2002 and 2004. Dr. Haller, an anthropologist from the University of Zurich, worked on common property institutions and relations of power in the context of resource management. From her side, Dr. med. MPH Merten, a medical doctor, conducted a research on epidemiology at the Institute of Social and Preventive Medicine in Basel (ISPM) entitled: *Perception and interpretation of traditional and biomedical health concepts in a rural African community: Nutrition among Ila-speaking peoples in Zambia* (2006).

Merten and Haller used a mixed-method study that combined 'qualitative data collected over 3 years (participant observation, thematic interviews and focus group discussions) with quantitative survey data from 390 households of 13 villages. […] The following information was collected: household composition and demographic information, main livelihood strategy and income diversification, details on agriculture production and use of natural resources […], household assets and annual expenditure and information about access to natural resources compared to 5 years ago' (Merten, 2006). In addition, they collected spatial data, including the GPS coordinates of the households in five agro-pastoralist and two fishing villages (cf. Map 4). The two researchers also collected the GPS coordinates of several formal health care facilities and providers of the region. In the informal health sector, they collected the coordinates of some traditional health providers (THPs) and some shops selling modern drugs. Moreover, the geographical coordinates of relevant geographical features and important landmarks, such as roads, crossroads, bridges, schools, and the centroid of many villages, etc. were collected as well.

The survey data of Merten consisted among other things in a questionnaire on health seeking behaviour. It investigated firstly case studies (the last case of illness in the household), and second the *intended* health seeking behaviour based on a list of illnesses proposed by Merten (2006). This thesis was first supposed to be based on these data. However, the precise destinations of the various treatment places were mostly missing (Which clinic? Which hospital? Which traditional practitioner?), so that a precise spatial analyse could not be produced and distance between patients' households and treatment places could not be calculated. A fair assumption was that patients - in most cases - went either to the nearest clinic for treatment, or to one of the nearest traditional practitioner (from discussion with Sonja Merten). But, there was a need to verify these assumptions by collecting appropriate data. The data of Merten have been integrated to own data in a second step for a better statistical power.

4.2 Data collection and methods

The aim of my own fieldwork in 2005 was to collect (spatial) data on accessibility and spatial distribution of the biomedical and traditional health care facilities and providers in the Mbeza region, and on their utilisation by local actors and patients (*health* and *treatment seeking behaviour*). In contrast to the survey of Merten, it was essential to collect precise addresses of the treatment alternatives selected by local actors and patients in the form of their GPS coordinates, so that distance calculation could be performed. Data collection was carried out with assistants by cycling in groups of one or two persons from one household to the other. However, the villages in Mbeza consist of very scattered hamlets which make data collection particularly time consuming. In addition, September and October are the hottest months in Zambia, and November is the beginning of the rainy season (until April). This is a very important period of time for farmers, where they plough and sow their fields. Therefore travel path was difficult (and became even more difficult with the rain) and the 80-100 questionnaires planned were hard to complete because people were busy farming.

Level	Quantitative data	Qualitative data
Inhabitants/ households	• GPS coordinates of 3 villages (Matala, Mwanamundambwa, Halupumbu) • 84 questionnaires on health seeking behaviour in 4 villages (Matala, Mwanamundambwa, Namachila and Shikapande)	• 4 Semi-structured interview based on the 8 illness narratives of 7 patients (2 women, 2 men and 3 children)
Biomedical (modern) health care facilities and providers	• GPS coordinates of 2 public, 1 private clinics, 2 health posts and 1 hospital, 1 CHW, 1 tTBA	• 2 short semi-structured interview with clinical officers (2 women) • 1 semi-structured interview with a CHW (man) • 1 Semi-structured interview with a tTBA(women)
Traditional health care facilities and providers	• GPS coordinates of about 30 herbalists and traditional healers, and 1 Zion church	• 2 semi-structured interviews with traditional healers (1 man and 1 woman). • 3 short informal discussions with herbalists (2 men and 1 woman) • Observations at the Zion church
Regional data	• Several path distances measured with the help of a cycle computer • Many GPS coordinates of important locations (shops, rivers, etc.)	• Observations on transport and dirt road conditions (public transport, short cuts, dirt road during rainy season, etc.)

Table 6: Quantitative and qualitative data collected during fieldwork in 2005
Source: own representation

The data collected during fieldwork are summarised in Table 6. This fieldwork represents a cross-sectional study, i.e. a *snapshot* of a part of the population of Mbeza at a single point in time that focuses on their treatment seeking behaviour.

Apart from the data described above, I had the opportunity to participate in two group/focus interviews leaded related among other this to various health issues. I was allowed to ask my own questions and to record the discussions on tape. The first meeting took place in Namalyo fishing village (near Nakasale). The second meeting was organised in Moomba School, near the foundations of a new clinic (RHC Moomba). The ethical issues that must be considered in such intercultural research are shortly addressed in Annex 5.

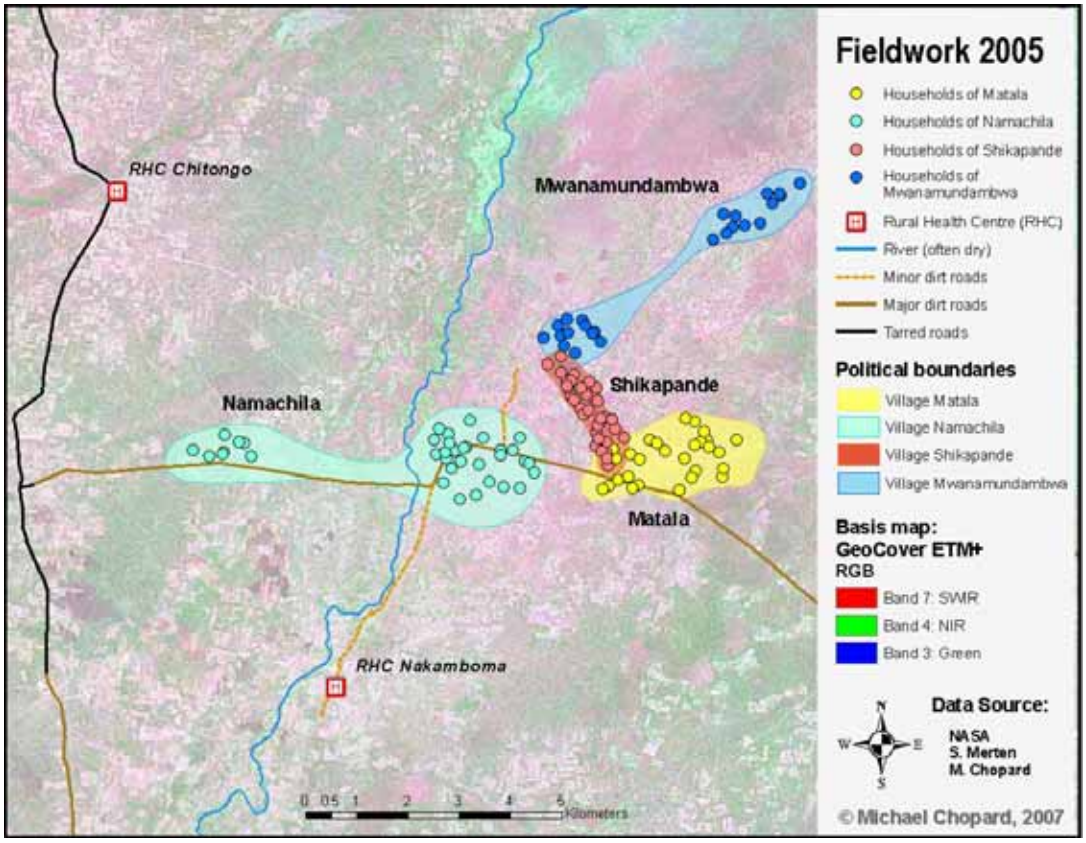
4.2.1 Study area and sample

The Mbeza region is integrated in the Ila chiefdom Nalubamba that counts 67 villages or hamlets, which represent approximately 27'000 inhabitants (Merten, 2004: 6). A sketch of all 76 villages of Mbeza (political boundaries) is presented in Annex 6.

Sample. Four villages were chosen for my fieldwork, namely: Matala, Namachila, Mwanamundambwa and Shikapande. All these villages are Ila headed. For logistic reasons they were principally selected because of their proximity to Shikapande village where I was staying. The Shikapande and Namachila villages that had already been surveyed by Merten were primarily selected to be able to compare 2002-04 and 2005 (i.e. after the supposed building of the new Moomba clinic). These four villages were also selected because of their feature: different village patterns, different catchment areas, different proximities to the main dirt road (i.e. accessibility and transport) and to the clinics. A short description of the four villages is given below (cf. Map 3):

- ***Shikapande:*** village of residence. The scattered households of this village stretch about 2.8 km in the south-east direction up to the dirt road leading to Monze hospital on the east, and to Maala on the west. This village includes a small shop, where some modern drugs are to be found. Shikapande belongs to the catchment area of Nakamboma clinic.
- ***Matala:*** This is the village selected by the Mbeza community for the new clinic Moomba, which is (will be) situated besides the existing Moomba School. Matala lies at the dirt road and belong to two catchment areas, namely Nakamboma clinic and Bweengwa clinic (located in Chiefdom Siamusonde on the east).
- ***Mwanamundambwa:*** this very scattered village is located far from the dirt road on the north. It stretches about 6.5 km in southwest-northeast direction, which is the direction to the floodplain, i.e. to the fishing villages and camps of the Kafue Flats. Mwanamundambwa belong to the catchment area of Nakamboma clinic.

- ***Namachila:*** this village has recently grown around the dirt road leading to Monze on the east and Maala on the west. It is divided into two parts that stretch about 7.3 km in the east-west direction. The major part is situated on the east side of the river, that cross the central part of the Mbeza region (the dry riverbed only fills during rainy season). This village includes some modern buildings and shops. It has a relative central location in the area. Namachila belongs to the catchment area of both Nakamboma and Chitongo clinic.



Map 3: The four villages selected for fieldwork in 2005

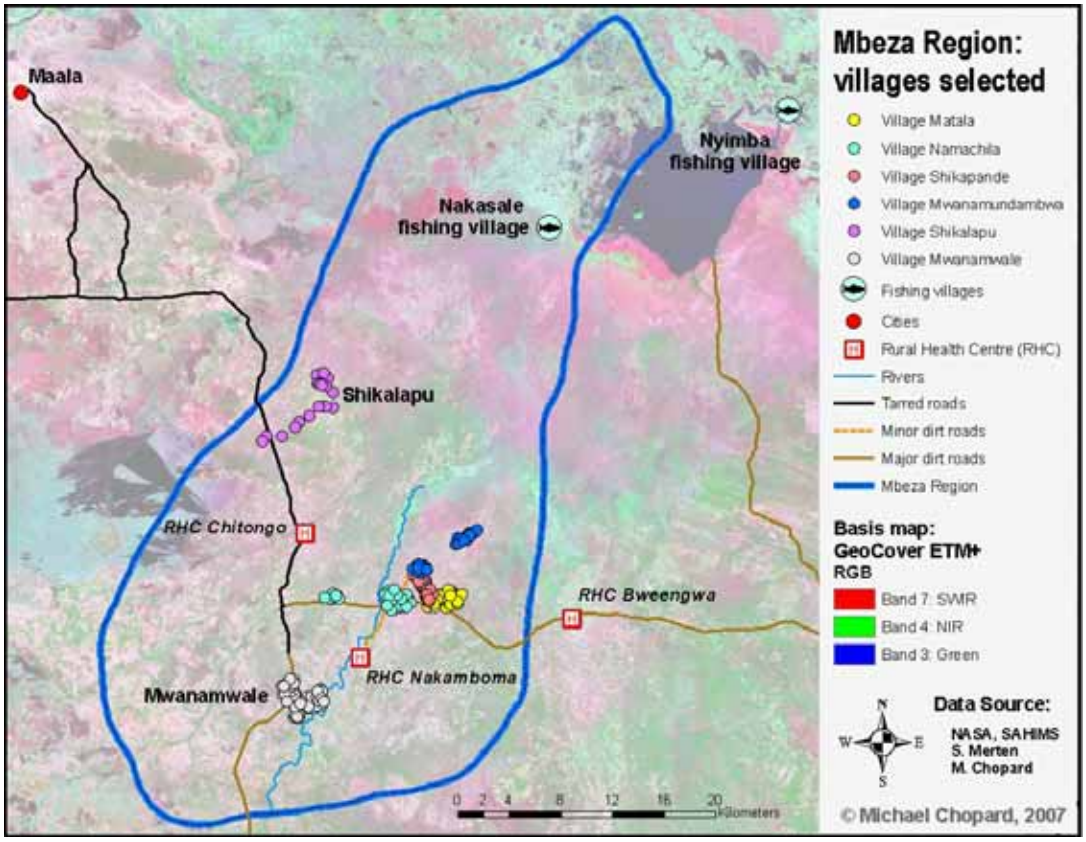
Population and sample. On average, a village consists of 30 households. The aim was to collect about 100 questionnaires from the four villages mentioned above, i.e. 25 questionnaires per village, balanced by gender. Furthermore, 10 qualitative interviews with patients, traditional and biomedical health care providers were planned in order to gain a deeper understanding of health related issues and aspects. The calculations concerning sample size depend on the primary research question and the way in which it is to be answered (Matthews and Farewell, 1988: 198). The data collected during fieldwork in 2005 (cf. Table 5) were deemed sufficient to describe and analyse access to health care and the most important factors (especially the distance factor) influencing treatment seeking behaviour. However, these data were not sufficient for a quantitative analysis of the influence factors through statistics (i.e. *logistic regression*). In order to generate meaningful statistics and results, data previously collected by Merten in the

villages of Shikapande, Namachila, Shikalapu and Mwanamwale, and the two fishing villages of Nakasale and Nyimba were integrated in the analysis (cf. Chapter 4.1). The villages and households sampled, and the numbers of questionnaires collected are presented in Table 7.

VILLAGES	# questionnaires in each village			# households in each village	
	Michael Chopard 2005	Sonja Merten 2002-04	Total	Sample	Total 02-04 / 05
Matala	22	-	22	22	- / 29
Mwanamundambwa	15	19	34	22	- / 26
Namachila	22	38	60	32	37 / -
Shikapande	25	26	51	34	36 / -
Shikalapu	-	36	36	11	19 / -
Mwanamwale (Tonga village)	-	36	36	27	54 / -
Nakasale (Lozi fishing village)	-	49	49	-	-
Nyimba (Twa fishing village)	-	112	112	-	-
Total	84	316	400	-	-

Table 7: Population and sample: questionnaires and households in each village
Source: own representation

The households sample has to be considered as a *snapshot* of the village households and their members at a particular point in time (cf. Map 4). Indeed, the situation in the villages and in the households is subject to frequent changes.



Map 4: Mbeza Region and the 8 villages under study

Data from Merten 2002-04. Shikalapu village is situated in the northern part of the region at the tarred road that leads to Maala city. It is an Ila headed village that belongs to the catchment area of Chitongo clinic. The second village, named Mwanamwale, is a Tonga headed village situated in the southern part of Mbeza that belongs to the catchment area of the Nakamboma clinic. Some households refused to participate in this study (4 in Namachila, 10 in Shikalapu). One fishing village, Nyimba, is Twa (or BaTwa) headed and the other, called Nakasale is Lozi headed. These two fishing villages are located in the Kafue Flats. Nakasale lies in the northern part of Mbeza, and Nyimba is situated outside the region on the edge of the Kafue River. Of Nyimba only one settlement was included in the study (Nzwanga). The other settlements in Nyimba consisted mainly of highly mobile immigrant fishermen coming from other parts of the country. The nearest clinic for each fishing village is situated about 25-30 km in the south. Out of these 7 villages, 69 households were Ila families, 61 Tonga. In total, 206 households have been surveyed, which represents 1'659 persons (Merten, 2004: 16).

4.2.2 Quantitative data from structured interviews (questionnaires)

The questionnaire of Merten (2006) on health-seeking has been adapted in order to obtain the precise destinations/addresses of each treatment alternative selected by local actors and patients - be in the biomedical (modern) sector, or in the traditional sector. The aim was to collect in a second step their GPS coordinates, so that distance calculation from household to treatment place(s) could be possible.

Structure of the new questionnaire. The first part of the questionnaire corresponding to an epidemiological profile based on self-reported illness (case study, i.e. last episode of illness in the household) has been adapted by Merten and I, in order to analyse the entire illness episode, i.e. the sequence of all treatment alternatives selected by patients (do/consult first, second and third) with their precise destinations (name of clinic, hospital, traditional healer, etc. with always the precise village of residence). The treatment alternatives reported from the case studies correspond to the *realized* treatment seeking behaviour of patients. In the second part of the questionnaire investigating *intended* health-seeking, the list of the specific illnesses has been updated by Merten (two new traditional illnesses were added), and the precise destinations of intended treatment places have been asked.

An own third part to this questionnaire investigates the *usual* treatment seeking behaviour and the importance of spatial and non-spatial factors having an influence in this context. Local actors were asked about the most frequently used health care provider (biomedical or traditional) with its precise address as well and the main

reason(s) to go there. They were also asked to give a degree of importance and rank a list of spatial and non-spatial factors. Next, the clinic, hospital and traditional healer attendances for the last year were investigated. Additional questions included which clinic(s), hospital(s) and traditional healer(s) had been consulted. Means of transport, travel time and cost, waiting time in relation to these clinic(s), hospital(s) and traditional healer(s) attendances were asked as well. Finally, an open question on the hopes of the people concerning the new clinic Moomba was addressed which often gave rise to a global discussion on health related issues. A copy of this new questionnaire can be found in Annex 7.

Data collection. The questionnaire has been written in English and the assistants were translating the questions in Ila or Tonga languages during an interview situation with the local actors and patients. People's answers were translated and reported in English on the questionnaires by the assistants. A pre-test phase has been first implemented: each assistant made about two questionnaires in two different households in the vicinity and we gathered later to discuss the results and make some adaptations and corrections. We also did one questionnaire all together (an assistant being questioned), so that I could explain the way I wanted them to questioned people without influencing too much their answers. The assistants shared the households of each village, so that no households could be two times surveyed. On the whole, each assistant collected data in 4-5 households per village. We organized ourselves, in order to question approximately the same amount of women as men. Then after, I was successively cycling with each assistant from one household to the other.

Data processing. The questionnaire data have been entered and coded in SPSS version 14.0. The own data collected in 2005 have been merged with those collected between 2002-04 by Merten and Haller for a better statistical power. First of all, my data were merged with the socio-economic characteristics of the households. It was a challenging work to merge the IDs of households surveyed in 2002-04, with IDs and household collected in 2005. The main complications came from the multiple changes that had occurred in the composition of the households members and in their affiliation to one or the other village. This made the identification and matching of the households particularly difficult. A match was found for only 55 of 84 households (65.5%).

On the whole, 316 questionnaires from various villages of Mbeza have been merged to the data collected in 2005, totalizing 400 questionnaires. From these added questionnaires, some households only answered the first part (case study: last case of illness) or the second part (intended health-seeking). The statistical analysis was performed on 353 questionnaires including case studies, and 279 the intended health-seeking behaviour.

Due to the aggregation of data from various fieldworks, the sample for this research is very heterogeneous: agro-pastoralist villages are mixed with two distant fishing villages; five Ila villages are mixed with one Tonga village (Mwanamwale), one Lozi (Nakasale) and one Batwa (Nyimba) fishing village. Furthermore, data was collected both during the dry and the rainy season and some households have been surveyed twice. This might have an influence on the results, and needs to be taken into account in the statistical analysis (cf. Chapter 4.4).

In addition, many variables have lots of missing values. For important categorical variables, missing values have been replaced by a new category called *no data*. Many categorical variables have been subdivided into dummy variables (binary variables), as some others have been grouped. For example, children under five and the adults above 65 were grouped (which corresponds to the demographic-based exceptions for user-fees in the public health sector established by the Ministry of Health, cf. Annex 2), in order to compare patients paying user-fees from those exempt from paying fees. Various continuous variables have been categorized to describe for instance the households situated less than one kilometre from the nearest clinic.

4.2.3 Quantitative data: GPS coordinates and path distance

In a first step, all treatment alternatives selected and reported by local actors and patients in the questionnaires (i.e. the precise destinations of the biomedical or traditional health care facility or providers) have been listed. Then after, for those locating in the Mbeza Region, the GPS coordinates have been collected. It was however not possible to visit and collect the GPS coordinates of the biomedical respectively traditional health care facilities and providers lying outside the region, because of distance. Therefore these distant providers' and facilities' locations have been attributed the GPS coordinates of the villages, or cities of residence from spatial data found in the internet (cf. Chapter 4.3.1). Besides, during our daily trips in Mbeza it has been possible to measure some path distances as we were cycling from one place to the other.

GPS coordinates. The GPS coordinates have been almost exclusively taken by one field assistant to insure data uniformity and accuracy. These coordinates were collected with the help of the hand held GPS navigator eTrex from Garmin. This is a 12 parallel channel GPS receiver that continuously tracks and uses up to 12 satellites to compute and update position. The eTrex has an accuracy of position of 15 meters Root Mean Square (RMS). According to the geometry of the satellites in view and the signal strength, the eTrex gives an estimated location accuracy. The mean accuracy based on 40 GPS coordinates yielded a result of 7.8 meters (ranging from 6 to 12 meters). The latitude and longitude

of the GPS coordinates were recorded in decimal degrees, based on the WGS84 Datum (http://www.garmin.com, January 2007).

Path distance. Several path distances have been measured during fieldwork with a GPS in order to compare the *ground truth* distances travelled by patients from their households to treatment place(s), with the distances calculated in a GIS (Euclidean distances cf. chapter 3.6). These distances were measured with the help of a cycle computer, more precisely an odometer installed on a bicycle (a device that calculates the distance by multiplying the number of rotations made by a wheel with its circumference). Sample distances were taken from specific households or landmarks to the clinic, or to a specific traditional healer, etc.

4.2.4 Qualitative data from semi-structured interviews, observations

The qualitative data collected during fieldwork consist of 10 semi-structured interviews that were done with the help of a translator and of 2 group interviews (cf. Table 6). All interviews were recorded on tape and later transcribed with a text editor. Interesting discussions and direct observations have been reported in a notebook. These observations include characteristics and reports on the daily life of the people of Mbeza, on transport, accessibility of the health care facilities and providers, and on health aspects on the whole, etc. (public transport, dirt road conditions, staffing of clinics, traditional healers, Zion churches, etc.).

Semi-structured interviews. Semi-structured interview, or in-depth interview, is a main data-collection method in ethnography and also one of the main methods for collecting household survey data. The semi-structured interviews are mainly based on the use of an *interview guide*, or *aide-mémoire* to remind the interviewer the key topics she or he is interested in, and the main questions to ask. The major questions might be altered in their sequence and probe for more information. Thus, the interviewer adapts her-, or himself to the individuality of the respondent. Semi-structured interviews permit sufficient freedom to digress, questions are mostly open-ended in order to gain richer information and an in-depth understanding about the attitudes and behaviour (Robert et al., 2003: 167 ; Bernard, 2000: 191). The aim of the semi-structured interviews was to gain information on people's experiences and own reflexion, behaviours and attitude in relation to their access to health care, and on the main factors influencing their treatment seeking behaviour. The semi-structured focused on both, the user and the provider perspective, by interviewing patients as well as various biomedical and traditional health care providers.

The semi-structured interviews of the four patients were related to a current or former episode(s) of illness, a interview technique called *illness narrative* which is a form of case study: patient were asked to remember an episode of illness, and to report each steps, sequence events and decisions taken from the apparition of the first symptoms, to the biomedical and/or traditional treatment(s) provided, until patient recovered.

The semi-structured interviews of various biomedical and traditional health care providers (1 woman and 1 man traditional healer, 1 community health worker, 1 trained traditional birth attendant and 2 short semi-structured interviews with clinic officers) were focusing on the main health issues in Mbeza (e.g. accessibility), their own ways of healing and curing patients and on their opinion on both biomedical and traditional medicine.

Direct observations. Making direct observation corresponds to watching people and recording their behaviour on the spot (Bernard, 2000: 376). With only seven weeks fieldwork, I had not the possibility to *really* immerse myself in the culture of the Ila and Tonga ethnic groups of Mbeza and to understand all events I observed. However, with the precious help of the assistants and the kindness of the people of Mbeza, I had the possibility among other things to visited several health care facilities and providers, such as the public clinics of Nakamboma and Chitongo, a private clinic in Chitongo, the Mission hospital in Monze, and a Zion Church in Mbeza (where patients go to be healed as well). I was cycling on the roads and paths of Mbeza, or taking public transports and using the dirt roads leading to Monze. Based on these daily experiences, visits and trips, I made manifold direct observations that have been reported in my notebook.

4.3 GIS and health: distance and spatial analysis

A GIS is a computer-based system and an integrated set of tools and methodologies for collecting, storing, editing, integrating, retrieving, visualising and analysing spatially referenced, as well as nonspatial information (attribute). Thus, data in GIS comprises two forms: the locational element and associated attributes (Gatrell, 2002: 72 ; Mead and Earickson, 2000: 461).

In the last decade, many national ministries of health, national and international agencies, such as the WHO and the Demographic and Health Surveys (DHS), have been increasingly using GIS and remote sensing combined with GPS data collection, in order to address health related issues and topics. GIS provides an ideal platform to visualise, present and communicate information and findings. The main advantage of GIS lies in its ability to link diverse layers of population, epidemiological and environmental information

to characterize the many dimensions of health care needs and issues at the international or national level, as well as for small areas. Furthermore, GIS includes several data analysis methods and functionalities (e.g. data base query, modelling, simulation, analysis of space-related distribution, etc. See Kistemann et al., 2002: 170). In the domain of public health, GIS has become an essential tool for analysing on the one hand health care needs, access and utilisation, and on the other hand the geography of disease, specifically the relationships between pathological factors and their geographical environments (Cromley, 2003: 7 ; McLafferty, 2003: 25).

The GIS analysis for this master thesis was done in ArcGIS 9, a product from ESRI. Additionally, some tasks were made with the help of various ArcScripts and tools that have been downloaded from the internet (cf. References: Softwares and GIS tools).

Globally, ArcGIS has been used to realise the following tasks (cf. Box 4):

1. Descriptive spatial analysis of the distribution and accessibility of the biomedical and traditional health care facilities and providers
2. Distance calculation from local actors' and patients' households to biomedical and traditional health care facilities and providers:
   a) distances to the nearest clinic (RHC), hospital and traditional health care provider (*Minimum distance accessibility,* $A_i = \min_j D_{ij}$)
   b) distances to treatment alternative(s) selected by local actors and patients (reported in the questionnaires) - be in the biomedical or traditional sector
3. Elaboration of maps showing treatment seeking behaviour of the local actors and patients (travel path patterns from households to the selected health care facilities and providers), and interpretation of the results:
   a) visualisation of local actors' travel path to treatment place(s), reported from *intended* and *usual* treatment seeking
   b) visualisation of patients' travel path to treatment place(s), reported from case studies (*realized* treatment seeking)

Box 4: Plan for analysis with GIS

4.3.1 Spatial data sources for ArcGIS

Scanning official maps of Zambia (paper map, that were bought in Zambia by Merten and Haller) would have produced a basis map with more distortions, than digital maps or rectified satellite images (according to discussions with Ronald Schmidt, research assistant of the GIS division at the University of Zurich).

As a consequence, all spatial data used for this master thesis are coming from the manifold source of geographical data available on the internet. Thus, spatial data used were downloaded from the various internet sites of international agencies and organisations, etc. that provide free GIS and geospatial data. The difficulty was to find appropriate data for the study area (resolution, degree of generalization, distortions, projection and datum, etc.) or to transform these data so that they could be combined with the GPS coordinates collected during fieldwork. Therefore, all GPS coordinates have been converted to Decimal Degree (DD). Second, all spatial data have been transformed and used in a Universal Transverse Mercator (UTM), World Geodetic System 1984 (WGS84) projection and datum.

Basis map / satellite data. The basis map is a satellite image that has been downloaded from the internet site of the Applied Research and Technology Project Office (ARTPO), affiliated to the NASA (cf. References). The satellite image has been produced by Landsat 7 (Coverage Date: 2000 +/- 3 years), with 3 Landsat ETM+ spectral bands (mid-infrared light, near-infrared light and visible green light) resulting in a false colours satellite image with a pixel size of 14.25 meters. This relatively accurate resolution has given the possibility to digitize many geographical features of the Mbeza Region (tarred and dirt roads, rivers, etc.).

Additional shapefiles. The shapefiles used in GIS (country, provinces, districts, wards, rivers, roads, cities and villages shapefiles, health facilities in Zambia, etc.) have been downloaded from the internet site of *The Southern African Human-development Information Management Network for Coordinated Humanitarian & Development Action* (SAHIMS), and from the GEOnet Names Server (GNS) of the US national geospatial intelligence agency (NGA). These data were projected when needed in order to correspond to UTM/WGS84 projection and datum. The villages and cities shapefiles have been particularly useful to find the location of distant health care facilities or providers that had been selected by local actors and patients. A precise description of the GIS and geospatial data downloaded from the internet can be found in the References (Cf. References: *GIS and geospatial data*).

4.3.2 GIS and confidentiality: geographic masking & random points

For privacy reason, it is very important to keep in mind that none of the maps in this thesis depict the true location of the households and health care providers. The coordinates have all been proceeded to preserve and assure anonymity, confidentiality and privacy. The first strategy was to remove all names from questionnaires and GPS

locations in the digital data files. However, this does not guarantee *spatial*, *locational confidentiality* (Leitner and Curtis, 2006) or *geoprivacy* (Kwan et al., 2004). The ethical aspects and issues in the domain of medical geography include a new dimension: the spatial dimension. This represents a critical ethical concern because 'location-specific data at the household or even neighborhood level may provide sufficient information so that the identity of study subjects can either directly or indirectly be determined' (Golden et al., 2005: v). While, the higher resolution data, the enhanced computer capabilities and the combination of geospatial data with health data in GIS has given the possibility to make more precise spatial analyse, confidentiality and privacy have become more and more difficult to maintain.

As one of the objectives of this research is to provide a visualisation of treatment seeking behaviour of the local actors and patients (cf. Box. 6), it was indispensable to find some strategies and methods in order to protect and preserve geoprivacy and spatial confidentiality. However, the aim was also to preserve the geographic properties of the data, i.e. the essential visual characteristics of the original point pattern (GPS coordinates of the households and health care facilities and providers), so that the results represented on maps could be analysed and interpreted.

The conventional approach to preserve and protect geoprivacy and spatial confidentiality is to aggregate all health records within a geographical area that has a population large enough to ensure prevention of disclosure (Armstrong et al., 1999: 497). This method, however, reduces the spatial resolution of the analyses that can be undertaken and thus reduces the overall interpretation of the results (Kwan et al., 2004: 4). After exploring in the literature the available strategies and methods (see Ferrell, 1999 ; Armstrong, 1999 ; Leitner and Curtis, 2004, 2006), the following possibilities have been considered: a low resolution map, data aggregation to village level, geographic masking, generation of random points-in-polygon and creation of *Thiessen polygons* (see Anselin. 2003).

Data aggregation in the two fishing villages was adapted because the households are grouped together into a core village. The fishing villages have been represented by centroids. In contrast, *false* coordinates have been attributed to the scattered households in the agro-pastoralist villages and to the households of the biomedical, traditional health providers. Random points were generated in the village-polygons for the patients' households and a geographical masking (random perturbation) was implemented for the households of the health providers (cf. Table 8 and below). Random points generation and the geographical masking were the most suitable methods according to the basis map, resolution, household distribution and village boundaries, etc. They have been used for the following data, in order to obtain the best trade-off between information loss and disclosure risk.

Point shapefiles	Methods used	Description (*false* GPS coordinates)
Households from agro-pastoralist villages	a) Separate each village in two different parts b) Random Points-in-Polygon Generation	Generate a random number of households in the villages boundaries, corresponding to the real number for each part of the village
Households from fishing villages	Aggregation	Aggregation of households data to village level (midpoint)
Traditional health care facilities and providers	Geographic masking: Random perturbation	Up to 3 km of random error in any direction
Biomedical health care providers (CHWs and tTBAs)	Geographic masking: Random perturbation	Up to 3 km of random error in any direction
Biomedical health care facilities	-	-

Table 8: Methods used to protect spatial confidentiality and geoprivacy
Source: own representation

Generation of random points in village-polygons. The best strategy to represent the households of patients and local actors, and preserve geoprivacy and spatial confidentiality was to generate random points in village-polygons - these new points representing *false* or *fake* households. First, a polygon has been digitized around the households of each village and its centroid point calculated. Second, since village households are particularly scattered within a wide area, each village has been divided into two parts (the inner village boundary going through the centroid point), in order to preserve a part of the geographic properties of the data.

Finally, random points have been generated in each village-polygon. The number of points generated was equal to the number of households located in each part of the villages. These random points have been generated in ArcMap with the help of the *Random Point-in-Polygon Generation Program* (cf. References, Softwares and GIS tools).

Geographic masking (random perturbation). Armstrong et al. (1999) have introduced the term *geographic masking* (Leitner and Curtis, 2006: 814). 'A geographical mask is a method for hiding or modifying the original location of a data point' (Kwan et al., 2004: 9). By geographically masking all points in a data set, one may be able to effectively protect geoprivacy and spatial confidentiality of the individuals represented by those points while still allowing access to the data set at the most disaggregate level (ibid: 4). The ideal is 'to mask the location of data records just enough to protect the confidentiality of individuals, without changing the essential visual characteristics of the true, original spatial distribution' (Leitner and Curtis, 2006: 813). The different types of geographic masking includes: translation, rotation, flipping and random perturbation.

A random perturbation has been implemented for the GPS coordinates of the biomedical and traditional health care providers of Mbeza, in order to generate *false* locations that preserve geoprivacy and spatial confidentiality. In a random perturbation, 'each point is displaced by a randomly determined amount and in a randomly determined direction […]' (Ferrell, 1999). In ArcMap, random perturbation has been applied by right clicking in the attribute table of the point shapefiles, selecting the ArcGIS Field Calculator and loading the expression *point Disperse.cal* from the *Easy Calculate 5.0* (cf. References: Softwares and GIS tools). Random perturbations of 500 m, 1 km, 2 km, 3 km and 5 km have been visually compared. Based on an optimized trade-off between information loss and disclosure risk, a random perturbation of 3 km was chosen.

4.3.3 Access to health care & distance calculation in a GIS

There are many ways of measuring or calculating accessibility to health care services, for example: spherical distance along the curved surface of the globe, Euclidean distances (straight-line distance between two points), network distances along transportation networks, travel time, transport cost, etc. Each accessibility measure or calculation has advantages and weaknesses that need to be considered in relation to appropriateness for the study area and their relevance with the objectives of the research. Euclidean distances were chosen to calculate, measure and analyse geographical accessibility to health services, because of the following reasons:

- For calculating distances in small areas on the Earth's surface, the globe's curvature can be neglect and straight-line distances are good enough approximations (Cromley and McLafferty, 2002: 241).
- To reach local health care services (clinics or traditional healers), the people of Mbeza travel on foot or with bicycles. They follow small paths through the fields, take shortcuts and cross the dry river beds during the dry season. They do not necessarily follow transportation networks.
- The Mbeza Region is partly located in the Kafue Flats. Except for the rivers and flooded areas that appear during the rainy season, there are no major geographic barriers.

Distance calculation. All spatial data used in this research has been transformed with a UTM projection and with a WGS1984 datum. This permits to calculate distances directly in meters or kilometres in a GIS. The question of accuracy (comparison between path distances measured with odometer, with Euclidean distances and network distances calculated in GIS) is addressed in the results (cf. Chapter 5.1.1). The Euclidean distances

separating local actors' and patients' household from the biomedical and the traditional health care providers and facilities have been calculated prior to implement the methods protecting spatial confidentiality and geoprivacy (cf. Chapter 4.3.2).

Minimum distance accessibility. The minimum distance accessibility (in Euclidean distance), is a measure of potential spatial accessibility that corresponds to the shortest distances from local actors' and patients' households to the nearest clinic and hospital, and to the nearest traditional health care provider. All *true* GPS coordinates of patients' and local actors' households, of the biomedical and traditional health care providers and facilities have been integrated into a GIS. Then, the minimum distance accessibility to health services was calculated in ArcMap with the help of the *spider diagram* function from the *ET Geo Wizards*™ (cf. References: Softwares and GIS tools).

Compiled network distances. This way of calculating and measuring distances incorporates the transport network, i.e. street, bus, or rail network. Given a starting street segment/crossroad, bus or rail station, the aim is to calculate the path along the transport network up to destination. Network distances offer a good approximation of the actual distances people must travel to obtain health services (Cromley and McLafferty, 2002: 242). For very distant biomedical or traditional health providers, some (road) network distances were calculated in GIS and compared with the Euclidean distances to address accuracy issues (cf. Chapter 5.1.1). For this aim, the main tarred and dirt roads were digitized on the basis map and the length of the road segments were calculated using the *getlength.cal* expression that was loaded in the ArcGIS Field Calculator (cf. References: Softwares and GIS tools).

Euclidean distances related to treatment seeking behaviour. In a next step, the geographical locations of the local actors' and patients' households have been linked with the health data collected during fieldwork (questionnaire data). This allows calculating in a GIS the Euclidean distance separating local actors' and patients' households from the treatment alternative(s) based on *realized*, *intended* and *usual* treatment seeking reported in the questionnaires. These distances have been calculated after connecting the GPS coordinates of the households with those of the selected health care facilities and providers by using the *Point To Polyline* function in the *ET Geo Wizards*™ and calculating the length of these polylines in the ArcGIS Field Calculator (cf. References: Softwares and GIS tools). The centroid of the village of residence was attributed for few households that could not have been linked to a corresponding GPS coordinates. These distances were coupled with the data used later for statistical analysis in SPSS.

4.3.4 GIS analysis, maps and treatment seeking behaviour

All *false* GPS coordinates of patients' and local actors' households, of the biomedical and traditional health care providers and facilities have been integrated into a GIS. In a first step, two maps were elaborated to represent the biomedical and the traditional health system in the Mbeza Region. These maps were used to generate a descriptive spatial analysis of the distribution of the biomedical and traditional health services, and of their accessibility (cf. Result Chapter, section 5.1). Second, maps representing the treatment seeking behaviour of the local actors and patients were produced with the help of the function *Point to Polyline* in the *ET Geo Wizards*™. Local actors' and patients' travel paths were represented by straight-lines connecting their households to the selected treatment place(s). Travel paths to the selected biomedical health care facilities/Biomedical Health Providers (BHPs) were represented with red lines, and travel path to selected traditional health care facilities/Traditional Health Providers (THPs) with green lines.

Based on the data for the *usual* treatment seeking behaviour reported in the questionnaires by local actors, one series of maps (at the regional and local scale) has been elaborated to present the most frequently visited health care facility/provider (cf. Chapter 5.2). Based on the data for the *intended* treatment seeking behaviour reported by local actors in the questionnaires, one series of maps (at the regional and local scale) has been elaborated for each illness proposed in the questionnaires, namely: malaria, stomach pains, diarrhoea, asthma, cough, pneumonia, chest pain/heart disease, eye disease, skin disease, injury, goitre, STDs: syphilis, gonorrhoea, Tulonda, Kahungo, AIDS and Cancer (cf. Chapter 5.3). Based on the data for the *realized* treatment seeking behaviour reported in the questionnaires by patients, one series of maps (at the regional and local scale) has been elaborated for the treatment sequence of patients (i.e. first, second and third treatment) (cf. Chapter 5.4).

4.4 Statistical analysis with SPSS

The statistical analysis was divided into different parts (cf. Box 5): first, a descriptive and exploratory analysis of own data collected through questionnaires in 2005, compared with those collected by Merten between 2002-04 was performed. Then, a descriptive analysis of the aggregated data was carried out. This includes comparisons between agro-pastoralists and fishing villages and between the various Euclidean distances calculated in GIS (distances to the nearest biomedical, traditional health care facility/ provider, distances calculated for the *usual*, *intended* and *realized* treatment seeking behaviour).

1. Descriptive statistics for all variables (table, pie and bar chart, histogram):
   a) First, the frequencies of nominal and ordinal variables
   b) Measure of centrality and characteristics of distribution for continuous variables (mean, range, median, standard deviation, skewness, etc.)
2. Checking for normal distribution of variables (Kolmogorov-Smirnov test). (Eventually variable transformation: log or x^2)
3. Measures of association between DV and IVs: crosstabs (CHI^2 or F test)
4. Two-independent samples tests (DV = 0 or DV = 1):
   a) T-test for normal distributed variables
   b) Mann-Whitney U-test for non-normal distributed variables
5. Assess the degree of relationship between variables: correlation matrix. Some variable excluded (multicollinearity)
6. Bivariate and multivariate logistic regression (stepwise)

Box 5: Plan for statistical analysis in SPSS
Source: own representation. After William, 2006 ; Fabrikant and Heye, 2006 ; and advices of Merten

Research questions and dependent variables. In order to address and analyse the *realized* treatment seeking behaviour of patients, the research questions presented in the introduction (Q.1 to Q.3, cf. Chapter 1.4) have been further divided into three sub questions (QLr.1 to QLr.3, cf. below). These focus on the different treatment alternative available in the Mbeza Region. The research field has been delimited again by making the distinction between: exclusive treatment alternative selected by patient to restore her or his health (*only* used this treatment alternative), and treatment alternative selected in a sequence pattern of treatments for the same illness episode (*ever* used this treatment alternative) (cf. Box 6).

QLr.1) What are the factors influencing patients to only use home remedies, self treatment or no treatment at all?
→ **(DV.1)** *Only self/no treatment YES/NO* (1/0)

QLr.2) What are the factors influencing patients to visit a biomedical health centre?
→**(DV.2)** *Ever Health centre visitation YES/NO* (1/0)

QLr.3) What are the factors influencing patients to consult a THP?
→ **(DV.3)** *Ever THP consultation YES/NO* (1/0)

Box 6: Research questions related to logistic regression analysis

According to the health seeking behaviour model of Kroeger for socio-medical research in developing countries (cf. Chapter 3.2.3), the Independent Variables (IVs or explanatory, predictor variables) correspond to patients characteristics, illness characteristics and health service characteristics (age, gender, education, symptoms of illness, cause(s) of illness, treatment provided, treatment cost, distance to biomedical or traditional health care provider, etc.). These characteristics guide the selection of health care resources, which are the Dependent Variables (DVs). Thus, for each type of treatment alternatives, a dummy dependent (dichotomous or binary) variable has been created (coded 0 for not using this type of treatment alternative, and 1 for using it).

4.4.1 Basic statistical methods to prepare for logistic regressions

Univariate analysis. First the frequencies of every variable were examined. In addition, the percents and cumulative percents for nominal and ordinal variables, and the measures of centrality and dispersion (mean, mode, median, standard deviation) for numerical/continuous variables have been calculated and summarized in tables (numerical description) or represented in pie charts, bar charts and histograms (graphical description) (cf. Result Chapter). In addition, variables have also been screened for outliers by using box plots. Among other things, two tables describing local actors' and patients' characteristics have been generated (cf. Table 17 and 20). All variables have been checked for normal distribution using the Kolmogorov-Smirnov one-sample test, as some techniques used for the statistical analysis (cf. below) require approximate normality or, at least, work with reliability when the data are not highly skewed, and do not include extreme outliers (Vittinghoff et al., 2005: 15). Variables that are not normally distributed were transformed using a log-, x^2- or x^3-transformation.

After describing all variables (univariate analysis), the next step has been to determine the factors having an influence on the utilisation of the biomedical, traditional health care services, i.e. on treatment seeking behaviour – the distance factor being of primary interest. *Bivariate* and *multivariate logistic regressions* were used to determine these factors. In order to build meaningful logistic regressions, the associations between each DV and the IVs have been first explored and analysed using bivariate analysis.

Measures of association between DV and IVs. Tests that describe and calculate the association between the dummy DVs and the nominal (categorical), ordinal IVs are generated by using the *crosstabs procedure* in SPSS. The most important test that is computed in this procedure is the CHI^2 test for independence and the Fisher's exact Test when the samples are small (expected frequency <5). The variables that have shown a

significant association (p<.10) have been stored to be integrated later in the logistic regressions.

Independent-samples tests were used to describe and calculate the association between the dummy DVs and the continuous IVs. On the one hand, the variables normally distributed have been analysed with a T test (parametric test). On the other hand, the Mann-Whitney U test was performed for variables non-normally distributed (non parametric). When the hypothesis that the group of patients who relied on a specific treatment alternative was independent from the group who did not relied on it was rejected (2-sided, p<.05 and p<.10), the two groups were dependent and the variable associated. These variables were stored and their correlations were verified (cf. below).

Correlations between variables. After having analysed the associations between the different DVs (DV.1 to DV. 3) and the predictors (IVs), the aim has been to check the correlation between the independent variables and to avoid multicollinearity and/or singularity. The logistic regressions will be strongest if each IV is strongly correlated with the DV but uncorrelated with other IVs. In other words, highly correlated IVs in logistic regression result in inaccurate estimates of the parameters. In order to build meaningful logistic regressions, the IVs that are *multicollinear* (too highly correlated) and/or have *singularity* (redundant because they are a combination of other variables) need to be eliminated (Williams, 2006: 70). Thus, the IVs associated to each DVs have been integrated in a correlation matrix, by using the *bivariate correlations procedure* in SPSS. On the one hand, variables that are normally distributed, the Pearson correlation coefficient has been calculated. On the other hand, the Kendall's tau-b and Spearman's rho correlation coefficients have been calculated for non-normal distributed variables. For IVs showing a high (>0.90) significant correlation (<0.05), one variables has been eliminated. In cases where relatively high correlations has been calculated (between 0.70-1.00), one or both variables have been kept for logistic regression analysis, according to the importance of each variables. Since the sample for this research is very heterogeneous, many spatial variables showed a high degree of correlation with non-spatial variables (e.g. patients' residence, distances to the nearest hospital or to the nearest clinic, ethnic affiliation, livelihood strategies, etc.). Thus, various variables had to be excluded from the statistical analysis

4.4.3 Logistic regressions

Bivariate and Multivariate Logistic Regressions (BLR and MLR) have been used to determine the factors influencing *actual* utilisation of the biomedical, traditional health care resources and the *realized* treatment seeking behaviour of patients in the Mbeza

Region. Logistic regressions are extensively used in medical and social sciences, especially in clinical, epidemiological studies and public health researches. It is mostly used to predict the presence or absence of a disease, to identify the risk factors associated with the occurrence of particular disease processes, i.e. to find out what factors (independent variables, IVs) influence an event (dependent variable, DV) to occur or not to occur (Pfeiffer et al., 1997). As explained by Bowerman (1997: 17), 'statistical models, such as the logit model, attempt to quantify the effects that various factors have on health [and treatment] seeking behaviour', which is precisely the global objective of this master thesis. An advantage of logistic regression analysis (LRA) is that the predictors may be continuous, dichotomous, or a mix. Furthermore, unlike multiple regression and discriminant function analysis, the LRA does not require a normal distribution of predictors neither equal variance within each group (i.e. homogeneity of variance) (Desjardin, 2005: 35). The logistic function is defined as follows:

$$\text{logit}(\text{Y} = 1|\text{X}) = \beta_0 + \beta_1 X_1 + ... + \beta_j X_j + ... + \beta_k X_k$$

It has an unlimited range for X, while the predicted value is restricted to a binary condition of either 0 or 1. In the logistic equation, Y is the dependent variable, the different X_j are the independent variables or predictors and the corresponding β_j are the logit coefficients. A logistic model for a dependent variable, Y, quantifies the effect of one or several predictors (X_j) in terms of log odds ratios (β_j) or odds ratios (Exp(β_j) or e^{Bj}).

The most common way of interpreting the parameters in a logistic model is to use the odds ratio (OR, Exp(β_j) in SPSS). An odds ratio is a way of comparing whether the probability of a certain event is the same for two groups. In other words it is the ratio of the odds of a condition or disease in an *exposed* population to the odds of the same condition or disease in a *nonexposed* population. Since the aim of the statistical analyse is to compare the use of different treatment alternatives and quantify the effect of various IVs/predictors, the different DVs (DV.1 to DV.3) have been coded as 0 for the group (patients) who were not selecting the treatment alternative and 1 for the group who were selecting this treatment alternative (cf. Box 6). The IVs that had previously shown an association with the respective DVs (cf. above), have been first integrated in a Bivariate (single predictor) Logistic Regression (BLR) and then with other IVs in a Multivariate Logistic Regression (MLR).

Interpretation of the parameters. The logistic regression output from SPSS is quite extensive. The most important part is a table that summarizes the roles of the predictors/independent variables (IVs), in the model by giving the logit coefficients and odds ratios for each variable. These results allow us to build the equation of the logistic regression model with the calculated logit coefficients and, if the *Wald statistic* was

significant (i.e., $p < 0.05$) to interpret the odds ratios of each variables in a 95% Confidence Interval, C.I. (When the Wald statistic is significant, the predictor is useful to the model) (Results coach from SPSS 14.0). Therefore, for each IV an odds ratio below 1 (OR<1) indicates a decrease in the odds of using the treatment alternative (a unit change in the independent variable is associated with a decrease the dependent being 1). For example an odds ratio of 0.5 for the continuous IV: *distance [km] to nearest biomedical health centre* in relation to DV.2: *Ever BHP visitation YES/NO* (1/0), would indicate a decrease in the odds of visiting a health centre for each km increase, respectively a twice increase (1/0.5=2) in the odds of *not* visiting a clinic. On the other side, an odd ratio of OR>1 represent an increase in the odds to select this treatment alternative. An odds ratio of 1.0 means that the IV has no effect on the DV (Results coach from SPSS 14.0 ; Garson, 2006).

Bivariate (single predictor) Logistic Regression (BLR). The BLR or crude models look at how a single predictor (independent variable) affects the dummy DV and ignores potential other IVs. The adjusted model corresponds to the multivariate logistic regression model which incorporates many independent variables (cf. below). A crude model calculates a so-called *crude* odds ratio. The crude odds ratio for each IV has been calculated and then compared to the adjusted odds ratios from the multivariate regression model using the same IV. According to the health seeking behaviour model of Kroeger and to previous tests and analyses, the following IVs/predictors were considered: patients' characteristics (age, gender, education, residence and distance to the nearest road), illness characteristics (symptoms and illness type) and health service characteristics (distances to the nearest clinic, hospital or Traditional Health Provider, THP). Those that have yielded significant main effect (two-sided p-values of <0.05 and <0.10) were further integrated in the multivariate logistic regressions.

Multivariate Logistic Regression (MLR). The multivariate logistic regressions were built on the basis of three different research questions, corresponding to the treatment alternatives selected by patients in order to restore their health (treatment seeking behaviour), cf. DV.1 to DV.3 in Box 6. The IVs that have shown an association with the respective DVs and no high correlation with the other IVs (multicollinearity) have been integrated in the three multivariate logistic regression models. In addition, some interactions terms have been integrated (gender*distances, age*distances, illness*distance) and their significance were integrated in the respective MLR as well. Different methods exist to specify how IVs are entered into the analysis. SPSS provides the possibility to enter IVs using block entry of variables or any of the following stepwise methods: forward conditional, forward Likelihood Ratio (LR), forward Wald, backward conditional, backward LR, or backward Wald.

The block entry (enter in SPSS) is a procedure where all selected IVs are entered in a single step. The stepwise methods determine automatically which variables to add or drop from the model, based on the probability of a Wald statistic or a likelihood-ratio statistic. SPSS gives the possibility to enter several blocks of IVs in the model, using a combination of the methods presented above (Results coach from SPSS 14.0 ; Garson, 1998). Thus, in the three multivariate logistic regression models (DV.1 to DV.3), the IVs have been entered through a combination of personal decisions and computer algorithms decisions. Indeed, an *enter* method has been first used for the variables *age* and *gender* of patient into the five models. Then, in a next block, a forward stepwise method using the likelihood ratio statistic has been performed to find the decisive factors (predictors) influencing the selection of one or the other treatment alternative. When distance or other interesting factors were not integrated in the resulting model, these were later added into another block using the enter method. Confounding effects have been verified by comparing the changes occurring in the odds ratios and logit coefficients after having added a new IV. If the parameters of the model considerably changed, then the IV just added was considered as a potential confounder (Rothman, 2002: 194). Two-sided p-values of <0.10 were considered as statistically significant for main effects and interactions, respectively.

The data collected during fieldwork 2002-05 was missing completely at random. By default, SPSS does a pairwise deletion of missing values. This means that for the BLR and MLR only cases with non-missing values for the dependent as well as all independent variables are used in the analysis.

Clustering of data for same households. It has been mentioned above that three villages (Shikapande, Namachila and Mwanamundambwa) have been surveyed in 2002-4 and in 2005, which means that many households of these villages have been questioned two times. This could have had an influence on the results in the logistic regressions. Indeed, until now the 353 case studies from questionnaires and the statistical tests assumed that the measurements were independently and identically distributed, which corresponded to an analysis ignoring the clustering of the data. However the fact that some households were asked two times need to be considered. Thus, groups/clusters had to be build for these households and a new analysis implemented. The new analysis for the same logistic regressions has been calculated using a so-called *cluster-randomised trial analysis*. This method automatically creates clusters and provides an analysis that relies on the *Huber-White sandwich estimator* or *robust standard error*. In SPSS this method is implemented by using the *complex sample procedure* (only since SPSS version 13.0). The all required processes to generate the cluster-randomised trial analysis have been described in the blog of Jeremy Miles (Miles, 2006).

Chapter 5

Results & Analysis: Merging Fieldwork Data & GIS

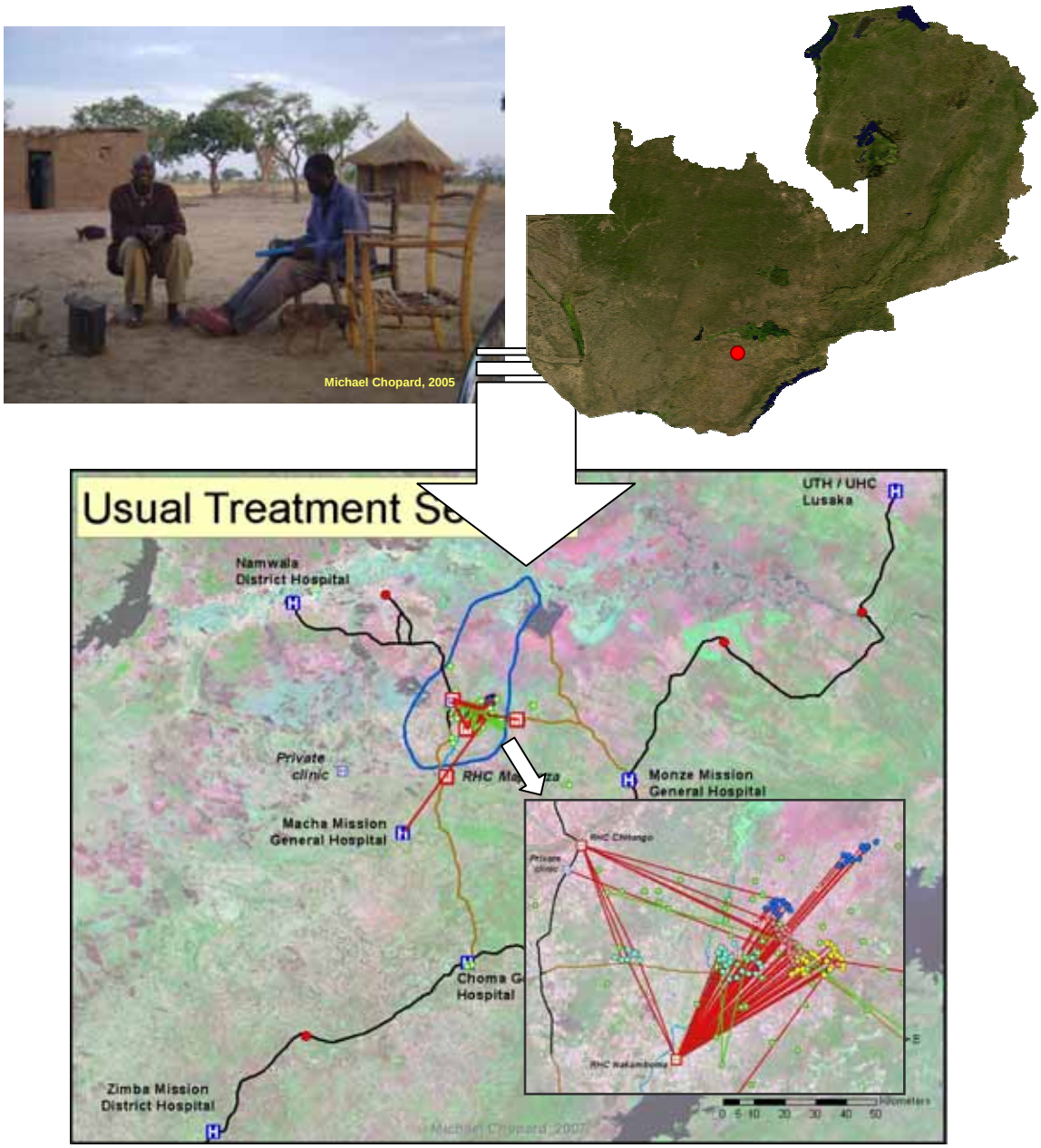


Fig. 15: These maps represent the travel paths of patients, what they did first in order to restore their health

5.1 Characteristics, spatial distribution and accessibility of the health services

In the result chapter, several maps have been generated and the distances between households and treatment places have been calculated. When all distances have been calculated with the *true* GPS coordinates, the maps presented in the results of Chapter 5.2, 5.3 and 5.4 represent *false* locations in order to preserve spatial confidentiality and geoprivacy (cf. Chapter 4.3.2).

The result chapter is divided into six different parts that are organized from the more global to the more detailed aspects: (**Chapter 5.1**) in the present section the results of the characteristics of the biomedical and traditional health care facilities and providers, of their spatial distribution and geographical accessibility are presented; (**Chapter 5.2**) the second section focuses on the *usual* treatment seeking behaviour of the local actors – where people more frequently go in case of illness. Furthermore, clinic, hospital and THP attendances to the BHP or THP consulted in 2004 are presented; (**Chapter 5.3**) a descriptive analysis of the *intended* treatment seeking behaviours of the local actors related to specific illnesses - malaria, HIV/AIDS and Kahungo - are presented; (**Chapter 5.4**) the fourth section present the results of the *realized* treatment seeking behaviour of patients (last case of illness that occurred in the household) and on the treatments sequence (first, second, and third treatment); (**Chapter 5.5**) the results of the statistical analysis for the *realized* treatment seeking behaviour of patients (logistic regressions) are presented, in order to determine and quantify the factors having an influence on treatment seeking behaviour; and (**Chapter 5.6**) finally a comparison between the *usual*, *intended* and *realized* treatment seeking behaviour is generated.

5.1.1 Distances validation with odometer and network distances

The results of the different ways of calculating and measuring same distances are presented in Table 9. This allows evaluating the accuracy of the calculated Euclidean distances in GIS, at the regional and local level.

Regional level. Distance 1 to 5 were calculated in ArcMap trough two different methods: with the network distances and with the Euclidean distances. Table 9 globally shows that the differences between the (road) network distances (Dist. A) and the Euclidean distances (Dist. B) increase with increasing distances. The variations are principally due to the trajectories followed by the road network that either differ significantly from a straight line (for example, Distance 5 to Lusaka) or almost adjusts itself with the road trajectories (for example, Distance 3 to Choma) (cf. Fig 15). Although the mean

difference between Dist. A and Dist. B are relatively high (about 34 km), distances at the regional level are so large that the accuracy is considered to be still satisfying.

Local level. Distances 6 to 17 have been measured with the help of an odometer (cyclocomputer) during fieldwork 2005 (distances between the households and different health care providers/ facilities or landmarks, e.g. schools, shops, etc.). These distances are compared in Table 9 with the Euclidean distances computed in GIS. Some distances between the same locations have been measured using different itineraries (distances 13a, b and distances 17a, b, c). From 0 to 5 km, there is less than 500 m difference between distance A and distance B. From 5 to 10 km, there is less than 1 km difference. This means that differences are proportional to distance increase. As a consequence, the calculated Euclidean distances underrate the *real* travel paths. However, the Euclidean distances are considered to be a relative good approximation of the *real* travel paths.

	Distances	Dist. A: Travel path (road network/ odometer) [km]	Dist. B: Euclidean distances (GIS) [km]	Difference (Dist. A - Dist. B) [km]
Regional level	Distance 1 (Monze)	63.3	55.2	8.1
	Distance 2 (Namwala)	89.7	69.3	20.5
	Distance 3 (Choma)	97.7	80.9	16.8
	Distance 4 (Mazabuka)	123.3	85.9	37.4
	Distance 5 (Lusaka)	245.9	156.5	89.5
	Subtotal regional level	*620.0*	*448.0*	*Mean Diff.$_{regional}$ = 34.4*
Local level (Mbeza)	Distance 6	2.6	2.2	0.4
	Distance 7	2.8	2.7	0.1
	Distance 8	2.9	2.4	0.5
	Distance 9	3.6	3.1	0.6
	Distance 10	5.5	4.8	0.7
	Distance 11	5.6	4.8	0.8
	Distance 12	8.4	7.5	1.0
	Distance 13a, 13b	9.8 / 10.3	8.7	1.1 / 1.6
	Distance 14	11.3	9.2	2.1
	Distance 15	12.0	7.7	4.3
	Distance 16	14.8	8.2	6.6
	Distance 17a, 17b, 17c	9.9 / 16.2 / 17.2	8.3	1.7 / 7.9 / 9.0
	Subtotal local level	*94.0*	*69.5*	*Mean Diff.$_{local}$ = 2.5*
	Total distance	**714.0**	**517.5**	**Mean Diff. $_{All}$ = 10.5**

Table 9: Difference between *real* travel path, network distances and Euclidean distances
Source: own representation

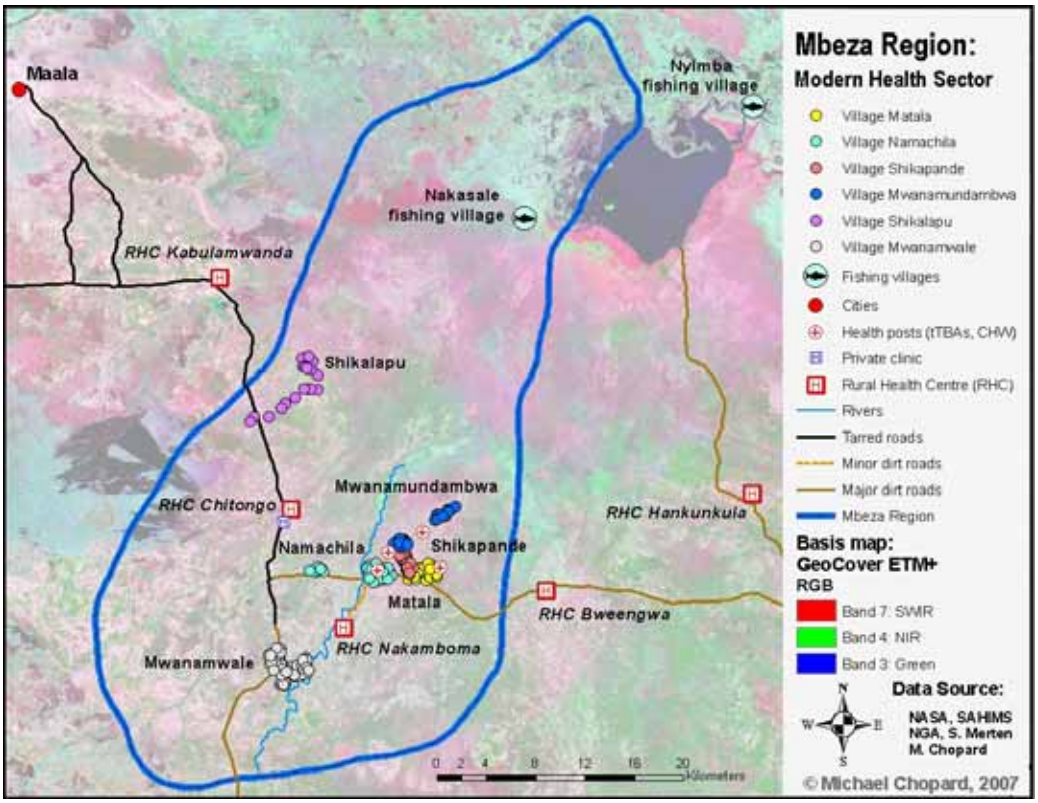
5.1.2 Biomedical health care facilities and providers

Availability. Based on all data collected, local actors and patients reported 28 destinations/addresses for the biomedical heath sector where they went or would go in order to restore their health. From these 28 biomedical health care facilities and providers there were: 11 hospitals, 2 private clinics, 9 clinics/Rural Health Centres (RHCs), 4 health posts, 1 Community Health worker (CHW) and 1 trained Traditional Birth Attendant (tTBA) (cf. Table 10).

Number of visited biomedical health centres and Biomedical Health Providers (BHPs)	Inside Mbeza	Outside Mbeza	Total
Hospitals	-	11	11
Public clinics/Rural Health Centre (RHC)	2	7	9
Private clinics	1	1	2
Health posts	3	1	4
Community Health Workers (CHW)	1	-	1
Trained Traditional Birth Attendants (tTBA)	1	-	1
Total	**8**	**20**	**28**

Table 10: Modern health care providers/facilities used or mentioned by patients and local actors during fieldwork 2002-04 and 2005
Source: own representation

The destinations in the biomedical sector stretch from capitol Lusaka (about 150 km in the northeast direction) to Zimba (about 150 km in the southwest direction). This means that some people were disposed to consult very distant Biomedical Health Providers (BHPs) for treatment. The biomedical health care facilities and providers located in and around Mbeza are presented on Map 5, together with the 8 villages under study:



Map 5: The biomedical health care facilities and providers in the Mbeza Region

According to a Community Health Worker (CHW) and a trained Traditional Birth Attendant (tTBA) who have been interviewed, there are about 5 active CHWs and 12 active tTBAs in Mbeza. However, the results of fieldwork 2005 show that only 1 CHW and 1 tTBA have been consulted by patients.

BHPs perspective on health related issues. The clinic officers of the two clinics located inside Mbeza have been interviewed. The results of these semi-structured interviews are presented below in order to gain a first insight into the major health issues according to a provider perspective.

Nakamboma clinic is a Rural Health Centre (RHC) owned by the government and equipped with electricity (solar panels) that counts 9 beds (Cf. Fig. 16). This clinic has a catchment area that includes 33 villages, the major part (29) situated in the Mbeza Region. According to the clinic officer, there are between 100-200 patients attending the clinic every day and the most common diseases are: diarrhoea, sore eyes, chest pains, malaria and STIs. The clinic officer further told that there are very high rates of STIs (e.g. syphilis, aids and gonorrhoea) in the region.

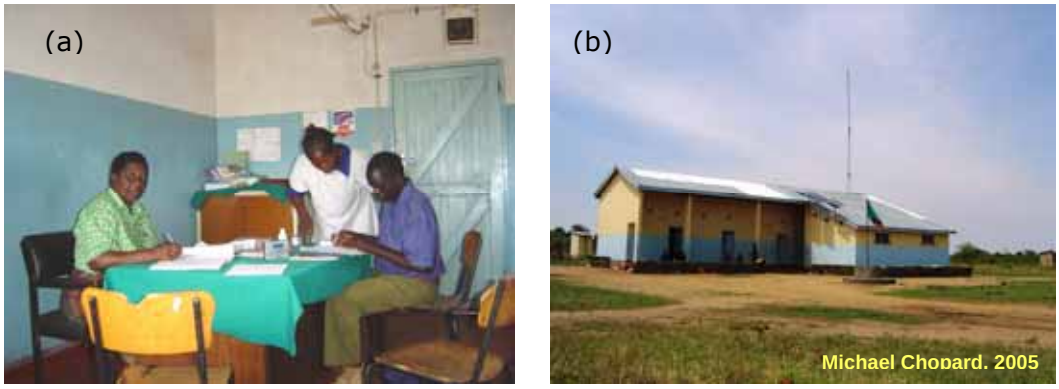


Fig. 16: (a) Short interview with clinical officer (woman on the left) in (b) RHC Nakamboma

RHC Nakamboma is located between a dirt road which is in bad conditions (a *minor* dirt road mostly impassable during rainy season) and a river (cf. Map 5). Yet, as explained by the clinical officer "*[…] when it rains this river is full, we have cases on this side, they can't come here, they have to go up to the bridge, which make the trip double to reach the centre […] So it is a problem during the rainy season*" (Clinic officer of RHC Nakamboma, October 2005). In addition, the clinic officer reported to have frequent shortage on drugs. Especially during the rainy season, the dirt roads are impassable and drugs supply is very difficult to organize. As a result, from the provider's perspective, this clinic faces two major difficulties that might hamper access to health and the use of this facility by patients, namely: difficult accessibility and frequent drugs shortages.

The second clinic situated in Mbeza is the RHC Chitongo (cf. Fig. 17). It is owned by the government, counts 10 beds and is equipped with electricity (CBoH, 2002: 58). This clinic is intended to serve 12'331 persons from 35 different villages, a great part situated in the Mbeza Region (27). RHC Chitongo is surrounded by 13 health posts. According to the clinic officer in charge, the most common diseases treated in this clinic are: malaria, respiratory infections, pneumonia, eye infections, urinary infections and sexually transmitted infections (STIs). There are about 45-80 patients attending the clinic every

day (Clinic officer of RHC Chitongo, October 2005). Chitongo lies directly at a tarred road, so that the clinic is accessible all the year long by road and public transport. The clinic officer did not report having drugs shortages.

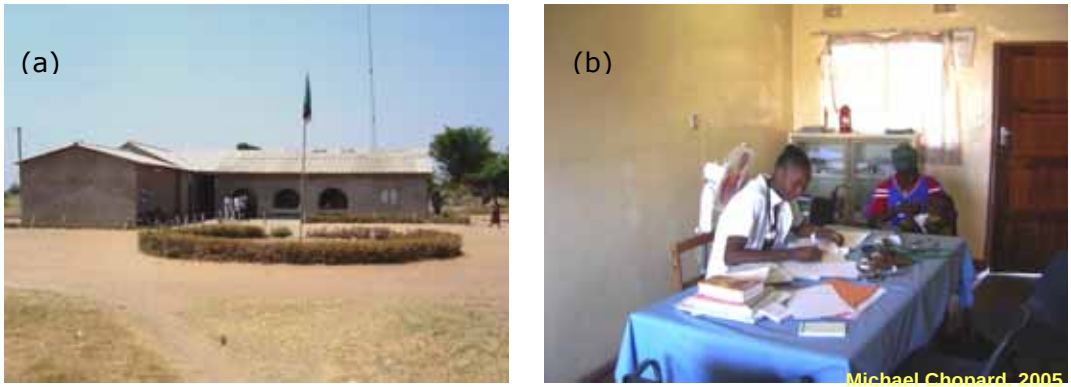


Fig. 17: (a) RHC Chitongo and (b) short interview with clinical officer (woman on the left)

As all clinics located in and around Mbeza, Chitongo clinic is often overcrowded. Waiting times are long and staff is mostly overworked. Furthermore, there are no medical doctors in the area and the nurses do not have the equipment (lab, microscopes, etc.) required to make good diagnostics (Clinic officer of RHC Chitongo and RHC Nakamboma, October 2005). Even if some clinics are located next to a tarred road, or a very good dirt road, most people face various problems related to transportation. The villagers rarely live directly at a road. The small paths crossing the fields are mostly impassable for cycling during the rainy season, so that patients have to walk and/or use different itineraries which make the trip much longer. As a consequence, travel path becomes very time-consuming and even hazardous. In case of emergency, this might often result in fatalities (ibid).

Hospital referrals. Another major issue relating to transportation and access to health care is the difficulty to reach the cities, i.e. when patients are referred to go to the hospital. To the question "What are the main difficulties for the people of the region and for the team [of the clinic]?", a clinic officer answered: "*The problem! The problem for the region… the hospitals are very far! And there is no transport, for them* [patients] *to the hospital […]. Then for us here, we have problems, because we have to see the patients which are not supposed to be seen by us…but by the doctors…*". When I further asked how they organize transport to the hospital, the same clinic officer answered: "*We just tell them to rush! And look for transport and take the patient to the hospital. If you delay the patient dies. Sometimes on the way the patient dies, because it is very far. Sometimes we find that they have no money. They first have to look for someone to buy a cattle. Meanwhile the patient dies"* (clinical officer of RHC Nakamboma, October 2005). From the (biomedical health) provider perspective, accessibility, transportation and affordability are major problems for patients who are referred to hospitals.

Minimum distance accessibility to biomedical health care facilities/providers. The Euclidean distances have been calculated between the households (or the centroid of the fishing villages) and the nearest biomedical health care facilities/providers. This included all clinics, hospitals, health posts, Community Health Workers (CHWs) and trained Traditional Birth Attendants (tTBA) reported by local actors and patients. The results of the mean distances to the nearest clinic, hospital and to the nearest biomedical health care facilities/providers are presented in Table 11.

Villages	Mean distance to the nearest hospital [km]	Mean distance to the nearest clinic/RHC [km]	Mean distance to the nearest biomedical health care facility/ provider[km]
Matala	47.4	8.0	1.1
Mwanamundambwa	50.2	10.1	1.0
Namachila	44.3	4.6	2.1
Shikapande	47.1	7.3	0.9
Mwanamwale	34.7	5.8	5.8
Shikalapu	55.9	9.6	9.6
Nyimba (fishing v.)	53.2	25.5	25.5
Nakasale (fishing v.)	63.1	25.2	25.2
Total	**50.0**	**13.4**	**10.8**

Table 11: Accessibility of biomedical health care providers/facilities for the 8 villages under study
Source: own representation

On average, the people of Mbeza have to cover about 50 km to reach the nearest hospital, 15 km for the nearest clinic (public and or private) and 12 km for the nearest biomedical health care facility/provider (including health posts, CHW and tTBAs). Except for the nearest hospital, the distances to be covered are much larger for the fishing villages situated in the floodplain of the Kafue Flats, than for the agro-pastoralist villages.

5.1.3 Traditional health care facilities and providers

Based on all data collected, local actors and patients reported 69 destinations/addresses for the traditional health sector where they went or would go in order to restore their health. These Traditional Health Practitioners (THPs) represent a snapshot of the THPs prevailing in the middle of Mbeza at a specific period of time (2005). One should keep in mind that the precise destinations of the THPs reported by local actors and patients have been *only* collected in 4 villages from the 8 villages under study – namely Namachila, Mwanamundambwa, Shikapande and Matala. The precise destinations for Shikalapu, Mwanamwale and the two fishing villages were not identified during the fieldwork of Merten (2002-04). Thus, several THPs might be missing in the 2005 listing. Despite the fact that no villagers reported to have consulted any THP from village Shikalapu and from the fishing villages of Nyimba and Nakasale, one THP is considered to be present in each of these villages.

The total number of THPs representing the traditional health sector is 72. The THPs of Mbeza have been classified into herbalists, traditional healers/African doctors, faith healers and TBAs (cf. Table 12). This typology is based on the literature (cf. Annex 2), on own observations, discussions and semi-structured interviews with THPs collected during the 2005 fieldwork. From all the THPs listed in 2005, there were 29 women (about 19 women herbalists, 9 women traditional healers) and 24 men (about 12 men herbalists, 9 men traditional healers). The gender of the remaining 19 THPs is unknown.

Number of consulted Traditional Health Providers (THPs)	Inside Mbeza	Outside Mbeza	Total
Herbalists	35	7	42
Traditional Healers / African doctors	18	9	27
Traditional Birth Attendants (TBAs)	1	0	1
Faith healers (Zion church, Islamic org.)	1	1	2
Total	**55**	**17**	**72**

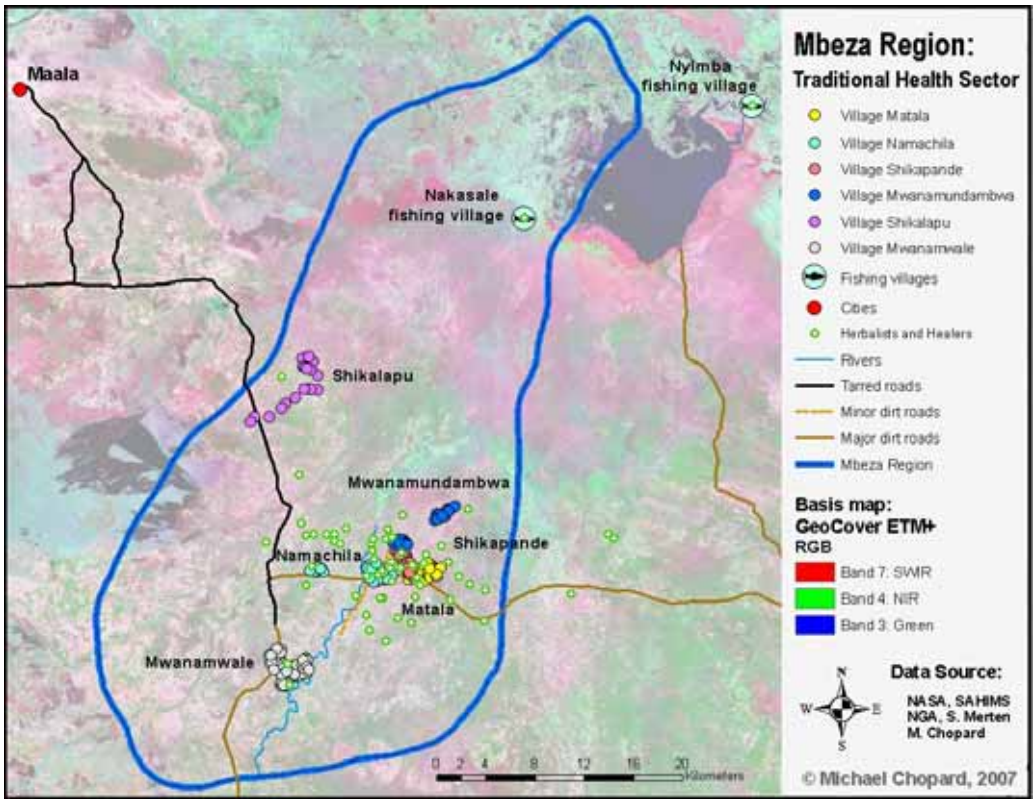
Table 12: Biomedical health care providers/facilities used or mentioned by patients and local actors during fieldwork 2002-04 and 2005
Source: own representation

Except the TBAs who are always women, the other THPs of Mbeza can be either a woman or a man (cf. Fig. 18). As explained by a THP: "*There are no differences between the male and female traditional healer, they are all healers*" (THP of Mbeza, October 2005). When I asked a THP if patients preferred to be treated by a woman or a man traditional healer, the THP answered that this choice mostly depends on the specialisations of the different THPs rather than the gender of the THP per se. Indeed, the major distinctions between the different THPs are their respective specialisations - i.e. the illnesses they are able to treat - and their ability to make a diagnostic or not - i.e. the difference between what I call herbalists and traditional healers/African doctors. In addition to the differences in the specialisations and between non-diagnosticians and diagnosticians there is further distinction in the way the diagnosticians are connected to the supernatural world for making a diagnosis: "*[O]ne* [difference] *is that some healers, they dream in night… then when they sleep, they dream about herbs to give to those people. And some people don't dream, they treat people through being possessed by the spirits that's when they can know what medicine to give*" (THP of Mbeza, October 2005).

The faith healers have a particular position among the different kinds of health care providers. In Mbeza, this includes various services provided by the Zion Churches and some Islamic organisations. The healing practices at the Zion Churches consist in prayers, blessing and purifications. However, nothing can be definitely said on Islamic medicine or Islamic organizations, as I did not encounter any person who consulted this kind of health care provider. Only 2 patients reported to have used Islamic medicine in the questionnaires collected by Merten (2002-2004). The position of the Zion Churches

and Islamic organisations in relation to biomedical and traditional medicine is not clear. Faith healing seems to reject the resort to traditional medicine because church goers are not supposed to believe in witchcraft and spirits. However, many churches in Zambia have strong charismatic elements and combine spiritual concepts with healing practices related to either traditional or biomedical medicine. Thus, even the integration of the faith healers as part of the traditional health care sector is uncertain.

Availability. If we consider that at least 1-2 THP are present in each of the 76 Mbeza villages, a village counting about 120-300 inhabitants (Merten, 2004: 16), this would make a estimated ratio of 1 THP per about 210 persons. However, in the village of Mwanamundambwa, all households have been surveyed in 2005 and nobody has been reported to be either an herbalist or a traditional healer/African doctor. In contrast, the Matala village (situated next to Mwanamundambwa) shows a high prevalence of THPs (7). In the 8 villages that have been surveyed between 2002 and 2005, 21 THPs are available (cf. Table 13). This makes an average of about 2-3 THPs per village and a calculated ratio of about 1 THP per 84 persons. Map 6 shows the distribution and density of the THPs. The great majority of the THPs are located in the centre of the region. This confirms the fact that people mostly visit the THPs living in the vicinity. However, one should keep in mind that *only* the local actors and patients of 4 villages - Namachila, Matala, Shikapande and Mwanamundambwa - have been questioned about the destinations of the THPs they consulted or would consult.



Map 6: Traditional health care facilities and providers in the Mbeza Region

Minimum distance accessibility to traditional health care facilities/providers. Table 13 shows the accessibility of the nearest THPs in each village. No data has been collected on the accessibility of the THPs in the fishing villages. Since the fishermen and –women are concentrated in the village core and not scattered as in the agro-pastoralists villages, a fair assumption is that the distance required in order to attend the nearest THP is much smaller in the fishing villages. The mean distance separating patients from the nearest THP has been estimated to be 200 meters (between 150 and 250m, own estimations). As a result, the accessibility of the nearest THP (in terms of distance) ranges from about 200 m (in the fishing villages) to about 2.1 km (in Shikalapu village). Globally, the mean distance to the nearest THP is 600 m.

Villages	Mean distance to the nearest traditional health care facility/provider [km]	THPs in each villages
Matala	0.3	7
Mwanamundambwa	0.8	0
Namachila	0.8	5
Shikapande	0.5	4
Mwanamwale	1.0	2
Shikalapu	2.1	1 (*added*)
Nyimba (fishing v.)	0.2 (*estimated*)	1 (*added*)
Nakasale (fishing v.)	0.2 (*estimated*)	1 (*added*)
Total	**0.6**	**21**

Table 13: Accessibility of traditional health care providers/facilities for the 8 villages under study Source: own representation

According to this data, the nearest traditional health care provider/facility is about 20 times more accessible in terms of distance in comparison to the nearest biomedical health care facility/provider (12.2 km, cf. above).

THPs perspective on health related issues. The THPs of Mbeza have reported to be capable of healing more than 15 different traditional illnesses – e.g. *masoto* (infant's illness usually associated with diarrhoea and malnutrition), *masabe* (fits), *kahungo* (illness similar to HIV/AIDS), *tulonda* (genital ulcera), etc. Some THPs are specialised in illnesses related to witchcraft or possession by evil spirits and ghosts. Some others claim to be able to heal *modern* illnesses as well, such as asthma, HIV/AIDS, diarrhoea, chest pains, leprosy, cerebral-malaria, etc. Additionally, the THP of Mbeza provide further services (beyond health issues) related to witchcraft or magic, such as talismans, herbs promising luck or protection, herbs for sexual stimulation or for increasing fertility in cows and women, etc.

Attendance numbers at the different THPs seem to be very variable and dependent on the specialisations of the THPs, more particularly dependent of her or his reputation and healing skills. The more skilled and well reputed THPs might receive up to 15 patients per

day, sometimes more. In addition to dairy arrivals, there are often patients who stay several days, sometimes several months with a THP. When a THP becomes well known and gains a strong reputation, patients might come from all the villages nearby, even from far cities, such as Lusaka, Monze or Namwala to consult this THP. In contrast to the herbalists and to the Islamic organisations, many traditional healers and faith healers from the Zion churches keep patients during their treatment period and the time they are administered medicine. For this aim, some straw huts are constructed around the households of the traditional healers or around the principal building of the Zion Church. Figures 18a and b shows 2 frequently consulted traditional healers.

Fig. 18: Example of (a) a woman and (b) man traditional healer of Mbeza

According to a traditional healer, "*[i]n Mbeza the first disease, the first rating disease is Tulonda, and then second Chabana to the child*" (THP, October 2005). *Tulonda* is genital ulcera and *Chabana* is cerebral malaria/fits. Other THPs also mentioned malaria and STIs in the most common illnesses prevailing in the region. Under STIs, the THPs of Mbeza understand HIV/AIDS or syphilis as well as *traditional STIs* such as *Tulonda* and *Kahungo* (*Kahungo* is an illness defined as being similar to HIV/AIDS). The distinction between modern and traditional diseases or between the diseases of *black people* and *white people* (see Gausset, 1998 or Nyamwaya, 1995: 33) is important in Mbeza. Most THPs argue that traditional illnesses can not be treated with biomedical medicine, but only with traditional medicine. This point of view is shared by the majority of the local actors and patients that have been interviewed, including several Biomedical Health Providers (BHPs, such as community health worker, traditional birth attendants and nurses). Depending on the illness, it is common that THPs refer patients to go to the clinic or the hospital. Own observations during fieldwork suggest that some BHPs might also refer patients to visit a THP for traditional illnesses. According to the THPs, there are various reasons why patients rely on traditional medicine. In case of genital lesions and sexual Transmitted Infections (STIs) for example, people mostly prefer to be treated by a THP. As explained by one of them: *"What I have observed is that, most of the patients who suffer from STIs prefer coming to the healer to heal, than going to clinics and hospitals and he has been managing to cure the diseases[…]"* (THP of Mbeza, November 2005).

Some THPs of the region are well-know for treating STIs, even HIV/AIDS, so that many patients might travel long distances to consult them. Another reason mentioned earlier has been proposed by Merten (2006): patients consult THPs because in contrast to the clinic, they are not requesting partner treatment for STIs. A next reason why patients might prefer to attend a THP is because of drug shortages in the biomedical health sector. This phenomenon is explained by a THP: "*I have helped a lot, because in hospitals or clinic, there are no medications for the patients. Most of them when they go to hospitals, they come back to me* […]" (THP of Mbeza, October 2005).

The spatial factors were not mentioned among the main problems related to health issues. From a (traditional health) provider perspective, the only *spatial* problem is that "[…] *some herbs are found very far distance... of maybe more than 20 km from here to bring that herb…*" (THP of Mbeza, October 2005).

5.2 *Usual* treatment seeking behaviour and access to health: descriptive analysis

From the 84 local actors/people who have been interviewed on their *usual* treatment seeking behaviour, are 51 women and 49 men (51% and 49% respectively). The majority of the local actors (30%) were between 30 and 45 years of age, 22% were between 15 and 30, 17% between 45 and 65, and 2% over 65 years of age. Only 16% of the local actors' households were situated at less than 5 km from the nearest clinic (Rural Health Centre, RHC), the majority (74%) were living between 5 and 10 km, and 10% between 10 and 20 km from the nearest clinic. The distances to the nearest hospital are quite farther than those for the clinic, with 90% of the local actors living between 40 and 50 km from the nearest hospital and 10% between 50 and 60km. The traditional health practitioners are considerably more accessible for the local actors, with 51% of all households located at less than 500m from the nearest THP, 34% between 500m and 1.5 km, and 5% beyond 1.5 km. A table summarizing the characteristics of the 84 local actors surveyed in 2005 is presented in Table 17, including the characteristics of the 273 local actors considered for the analysis of the *intended* treatment seeking behaviour (cf. Chapter 5.3).

5.2.1 Clinic, hospital, THP attendances in 2004 and nearest facilities

Attendances in the biomedical health sector. The attendances in the modern health sector, i.e. the clinic and hospital attendances, are represented in Figures 19 (a) and (b)

respectively. Only 2 persons (2 women, 2%) never went to a clinic in 2004 and 63 persons (75%) had never visited any hospital. On average, local actors went 3 times to the clinic and less than once to the hospital in 2004. The annual attendances for 2004 range between 0 and more than 10 times for the clinic, and between 0 and 4 times for the hospital. Gender seems to have an influence on the clinic and hospital attendances. At the first sight, men seem to more frequently visit the clinic than women. However, the mean of the attendances is slightly higher for the women than for the men (3.4 and 3.3 respectively). Even by excluding patients who attended more than 6, 7 or 10 times the clinic or after having performed a log-transformation, the attendances are still not normally distributed (Kolmogorov-Smirnov test, $p > 0.10$). The Mann Whitney U test for two independent samples for the clinic attendances does not yield a significant difference between women and men ($p > 0.10$). According to this result, gender has no effect on the clinic attendances.

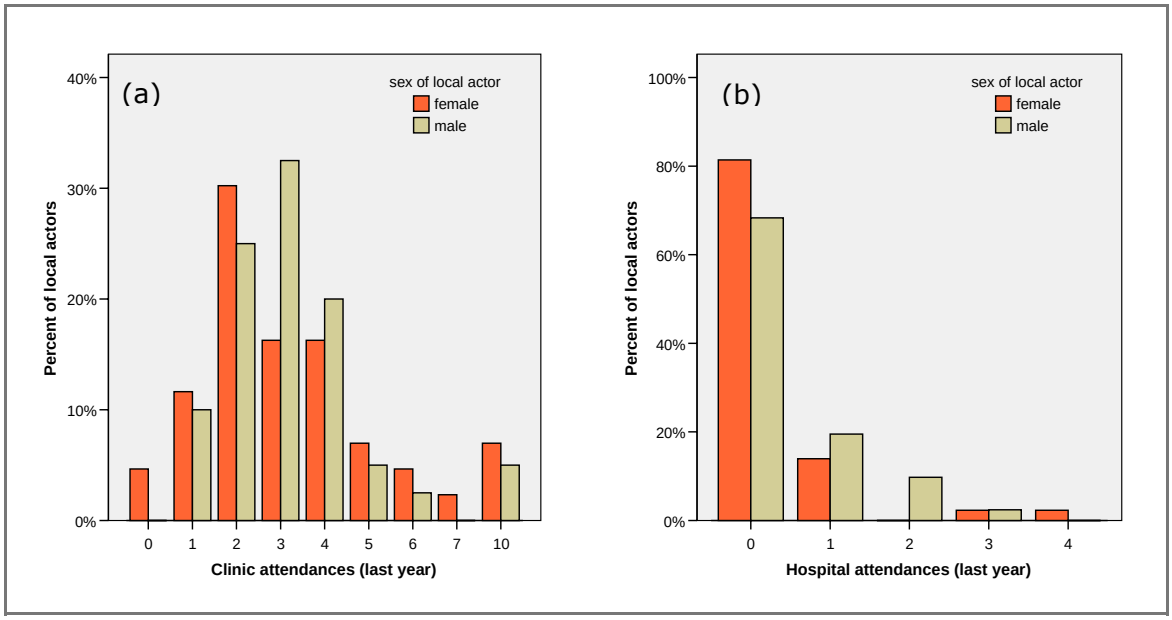


Fig. 19: (a) Clinic and (b) hospital attendances by gender, reported by local actors (N=84) for year 2004
Source: own representation

In order to visit a clinic and cover the approximately 7.5 km (Euclidean) distance (cf. Table 14), 52% of people used a bicycle and 48% went on foot. On average, the local actors estimated the travel time to the clinic to be between 1h 40min and 2h 11min on foot and 1h 17min by cycling. In other words, using bicycles cuts travel time in half. The average waiting time in the clinic has been estimated at 1h 13min. When we compare the destinations to the nearest clinic with the ones that have been visited in 2004 (cf. Table 14), we find that 13 persons did not visit the nearest facility (ca. 16%). However, this has almost no influence on the total mean distance to the selected clinic in 2004 (7.5 km), compared with the total mean distance differences to the nearest clinic (7.3 km). Except for one woman who attended the hospital 4 times, men seem to more frequently visit this health care facility.

The mean of the attendances are higher for the men (0.5) than for women (0.3). More women did not attend a hospital in 2004 (35 women, 81%) than men (28 men, 68%). The hospital attendances are not normally distributed (even after having performed a log-transformation, Kolmogorov-Smirnov test, $p > 0.10$). The Mann Whitney U test for two independent samples for the hospital attendances does not yield a significant difference between women and men attendances ($p > 0.10$). Thus, according to this result, gender has no effect on the hospital attendances. By considering the small sample size it is, however, problematic to make accurate inferences.

In order to reach the selected hospital and cover the average 57.7 km (Euclidean distance) needed (cf. Table 14), most local actors (93%) used public transport (small buses or lorries) and only 4% a car. In 2004, one local actor from Namachila village went to the hospital in Lusaka (capital), which supposes covering a distance of about 150 km (Euclidean distance) (cf. Table 9). As a result, due to the small sample size, the mean distance to the hospitals visited in 2004 for Namachila is skewed, based on this single outlier. The median distance – which is less influenced by outliers - provides a better result. Travel time to the hospital has been estimated by the local actors at 3h 17min and the average waiting time has been estimated at 1h 17min.

Villages	Mean distance to the nearest clinic [km]	Mean (median) distance to the clinics visited in 2004 [km]	Mean distance to the nearest hospital [km]	Mean (median) distance to the hospitals visited in 2004 [km]
Matala	8.0	8.3 (8.2)	47.4	50.9 (51.1)
Mwanamundambwa	9.5	9.7 (10.6)	50.0	54.1 (54.1)
Namachila	4.9	5.0 (5.0)	44.5	71.6 (54.9)
Shikapande	7.3	7.6 (7.3)	47.1	52.9 (52.9)
Total	**7.3**	**7.5 (7.4)**	**47.0**	**57.7 (52.9)**

Table 14: Accessibility (Euclidean distances) of the clinic and hospital visited in 2004, compared with the nearest one (N=84). Source: own representation

When we compare the differences of the destinations between the nearest hospital (*potential* accessibility) and the ones that have been visited in 2004 (*realized* accessibility), we find that most people did not attend the nearest one. Instead of going to the nearest hospital - Macha Mission hospital located in Choma district, at about 45-50km in the southern direction (representing only 5% of all hospital attendances in 2004) - most people decided to go to Monze Mission Hospital, in Monze district, at about 50-55km in the southern direction (visited by 91% of all local actors in 2004). Even if the Mbeza Region is situated in the Namwala district, nobody attended the District Hospital in Namwala city in 2004 (about 90 km in the northern direction). The major reason for going to Monze is because Macha city is less accessible in terms of transportation, travel time and road conditions. No public transport directly connects Mbeza to Macha city,

people have to make stations on the way, and the dirt road leading to this city is in bad conditions in comparison to the one leading to Monze.

Attendances in the traditional health sector. The attendances for the last year at the THP (including herbalists, traditional healers/African doctors and faith healers) shows that 13 persons (17%) never consulted a THP in 2004. On average local actors went twice to a THP in 2004. The annual THP attendances range between 0 and more than 12 (cf. Fig. 20). Men seem to more frequently consult a THP than women. The mean of the attendances for the men (2.1) is higher than for the women (1.9). Nine women (23%) did not consult a THP at all in 2004 compared with 4 men (11%). Even after having performed a log-transformation, the THP attendances are not normally distributed (Kolmogorov-Smirnov test, $p > 0.10$). The Mann Whitney U test for two independent samples for the THP attendances do not yield a significant difference between women and men ($p > 0.10$). Thus, gender has no effect on the THP attendances.

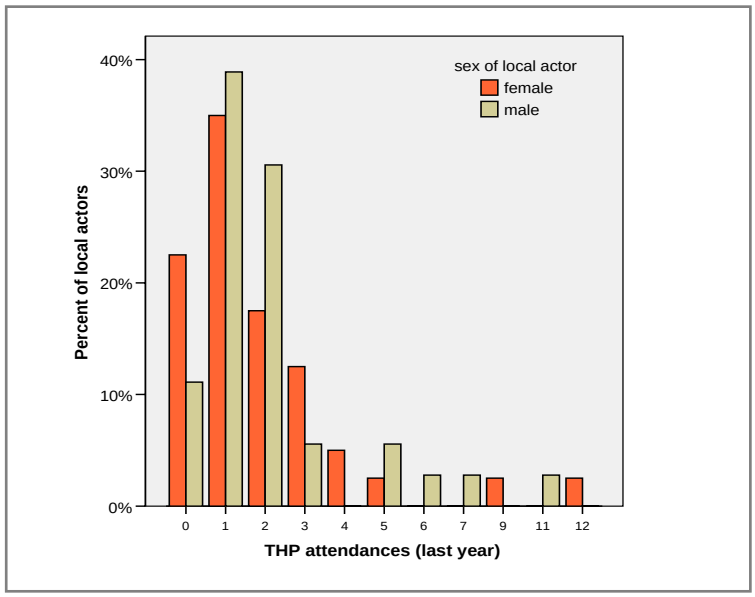


Fig. 20: THP attendances for 2004 by gender reported by local actors Source: own representation

In order to consult the selected THP and cover the average 6.3 km (Euclidean distance) needed (cf. Table 15), 72% of the local actors went on foot, 22% used a bicycle, 3% a car or public transport and 3% did not move at all since they were THPs themselves. The average travel time to visit the THP has been estimated by local actors at 1h, more precisely at 1h on foot and 46min by cycling. The 2 persons who used a car estimated 3h 30min of travel time to consult THPs living in two cities located far away from the Mbeza Region (about 80 km). Waiting time at the THP's places has been estimated at 29min, which is more than half the time that local actors wait at the clinic or at the hospital.

When we compare the mean distances to the nearest THP with the ones for the THPs consulted in 2004, we find large differences. This means that the local actors in Mbeza

did not attend the nearest THP in 2004, but consult THPs living farther away, although still in the vicinity. By considering the median distances – which is less influenced by outliers - we find again considerable differences. Smaller distances attest that the majority of the local actors consulted THPs living nearby and that some of them consulted THPs living farther away. On the whole, the difference between the median distance to the selected THP in 2004 and the mean distance to the nearest THP show that local actors consulting a THP in the vicinity travel on average 1.9 km farther than for consulting the nearest one.

Villages	Mean (median) distance to the THP consulted in 2004 [km]	Mean distance to the nearest THP [km]	Difference between selected median distance and nearest mean distance [km]
Matala	5.8 (0.7)	0.3	0.4
Mwanamundambwa	6.7 (4.9)	1.1	3.8
Namachila	3.3 (2.9)	0.4	2.5
Shikapande	8.8 (2.5)	0.4	2.1
Total	**6.3 (2.4)**	**0.5**	**1.9**

Table 15: Accessibility of the usually consulted THP compared with the nearest THP (N=84). Source: own representation

All attendance types cumulated. A last attempt has been made to find an association between gender and the total attendances for 2004 – be it at a clinic, hospital, or THP. The total number of attendances are normally distributed (Kolmogorov-Smirnov test, $p = 0.05$). However, the T-test for two independent samples for THP attendances does not yield a significant difference between women and men ($p > 0.10$). Therefore, gender has no effect on the total number of attendances in the various health care providers. It is the principal objective of the next chapters to investigate the main reasons why local actors and patients select a treatment alternative from another – either for the biomedical or traditional health sector.

5.2.2 Usual treatment seeking behaviour: spatial, non-spatial factors

This section investigates the *usual* treatment seeking behaviour and the main reasons to more frequently attend a specific health provider/facility – be it the biomedical or the traditional health sector. The results of the *usual* treatment seeking behaviour show that 77 people (92%) rely in most cases on a Biomedical Health Provider (BHP) - with about 88% attending a public clinic/Rural Health Centre (RHC) and about 1% attending either a health post, a private clinic or a hospital.

In contrast, 7 persons (8.3%) reported to mostly rely on a Traditional Health Provider (THP) (cf. Table 16).

	Institutions	*Usual* treatment seeking N (%)
BHPs	Health post	1 (1.2)
	Private clinic	1 (1.2)
	Public clinic (RHC)	74 (88.1)
	Hospital	1 (1.2)
THPs	Herbalist or traditional healer/ African doctor	7 (8.3)

Table 16: *Usual* treatment seeking behaviour (N=84) in 4 villages of Mbeza
Source: Merten and Chopard, 2007 (own representation)

Reason(s) to select the *usual* treatment alternative. The main reason(s) why local actors prefer to use one or the other treatment alternative – be it a biomedical or a tradition health provider – are presented in Fig. 21. *Proximity* (keyword: *accessibility*) is the more frequent reason mentioned by local actors who usually visit a clinic, including the single person who usually attends a health post. As explained many times by local actors and patients, they chose to attend a clinic, "[…] *because it is the only nearest clinic…"* (Patient M.1, November 2007).

Thus, although the results presented above show that the clinic is always located farther than the nearest THP (cf. above), local actors seem to prefer attending a clinic, more precisely the nearest one. The second reason, the *catchment area/overcharges* is directly related to the organization of the biomedical/public health system in Zambia.

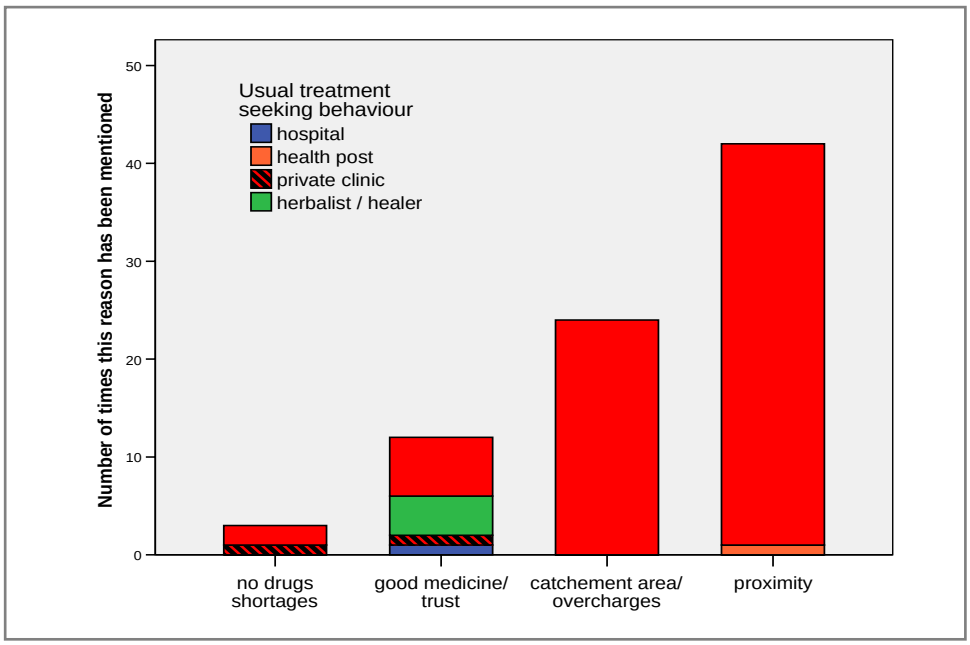


Fig. 21: Reason(s) influencing the *usual* treatment seeking behaviour according to treatment alternative selected (Fieldwork 2005, N= 84)
Source: own representation

Each village belongs to the catchment of one or two clinics (RHCs) and patients are supposed to attend the clinic responsible for their village. When they attend another clinic they might be overcharged. Therefore, the catchment area is linked to the affordability dimension of access to health care. As a result, even if proximity is the main reason to attend one clinic, the belonging to a catchment area seems to be an important reason as well. Another important reason to select one or the other clinic is to be provided good medicine and treatment, to trust the staff and to experience no drug shortages. These particular reasons seem to influence to selection of the hospital and the private clinic as *usual* source of treatment as well. *No drug shortages* is a main reason for selecting RHC Chitongo (1), RHC Bweengwa (1) and the private clinic (1). *Good medicine/trust* is a main reason for attending RHC Chitongo (4), RHC Nakamboma (2), the private clinic in Chitongo (1) and the hospital (1). These results suppose that the quality of treatment and the availability of drugs differ in the different clinics located in and around Mbeza. For the local actors who usually consult a THP, the main reason is to be provided good medicine and to trust the herbalist or the traditional healer/African doctor. Proximity does not seem to be a predominant factor for selecting a THP.

In order to better understand and determine the factors influencing local actors to usually attend one or the other health provider, they have been requested to evaluate a list of six factors on a four-point scale from *meaningless* to *very important*. Fig.22a shows that proximity is globally the most important factor for the local actors. This is followed by treatment cost, trust and friendliness that are also considered as important. In contrast, travel cost and payment suits are not seen as being important.

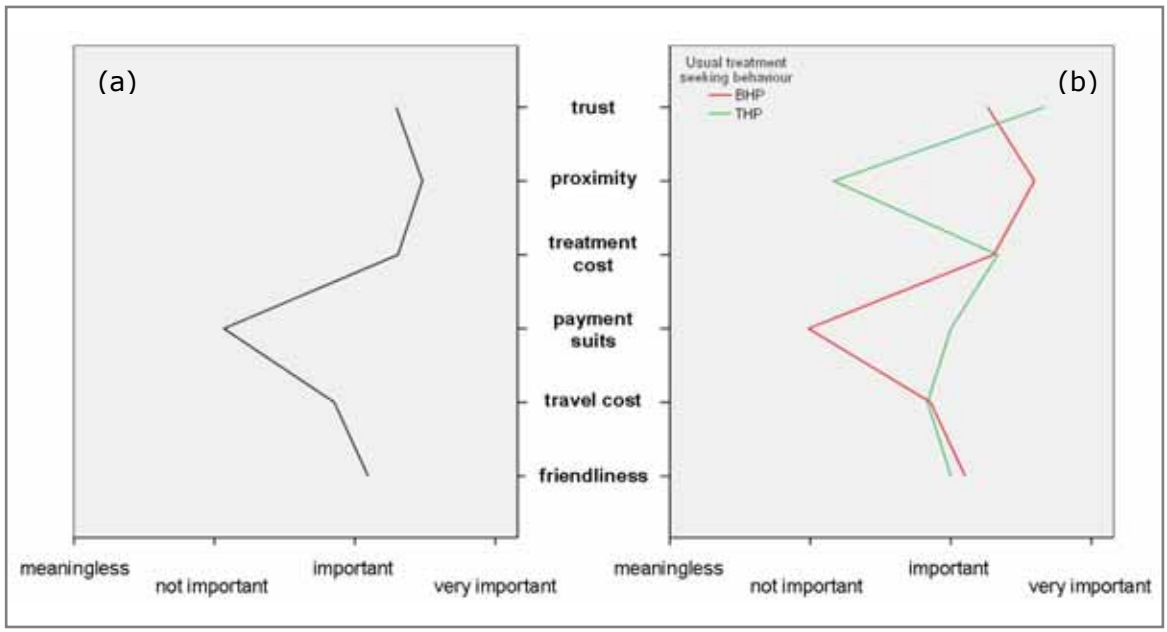


Fig. 22: (a) Importance of some spatial and non-spatial factors in *usual* treatment seeking behaviour (b) Same spatial and non-spatial factors for THPs or BHPs visitation (N= 84) Source: own representation

When we consider these results according to the reliance on either a Biomedical Heath Provider (BHP) or a Traditional Health Provider (THP), we find that the importance of some factors varies considerably. For instance, *proximity* seems to be less important for usually consulting a THP than for consulting a BHP. Friendliness, travel and treatment cost seem to have nearly the same importance for attending either a BHP or a THP. However, trust and payment suits have a bigger importance for consulting a THP than for visiting a BHP. It is evident that payment suits are more important for choosing a THP since people have the possibility to pay in kind (a chicken, a cow, etc.) or often have the possibility to delay the payment for the treatment provided by a THP. This is, however, impossible at the clinic or the hospital. Due to the small sample size (7 local actors usually rely on a THP), these results must be considered with caution.

5.2.3 Distances and GIS analysis

The mean (Euclidean) distance for the *usual* treatment seeking behaviour is 7.8 km (cf. Fig. 23). One local actor is a THP and mostly heals her-, himself so that no displacement is needed (distance = 0 km). Two people usually attend a private clinic and a hospital; their reason(s) for choosing these two distant biomedical health care facilities, instead of attending one of the biomedical or traditional health providers/facilities from the nearest vicinity have been presented above.

For the traditional health sector, the dispersion of the THPs typically consulted by the local actors, suggests that distance is not a decisive factor.

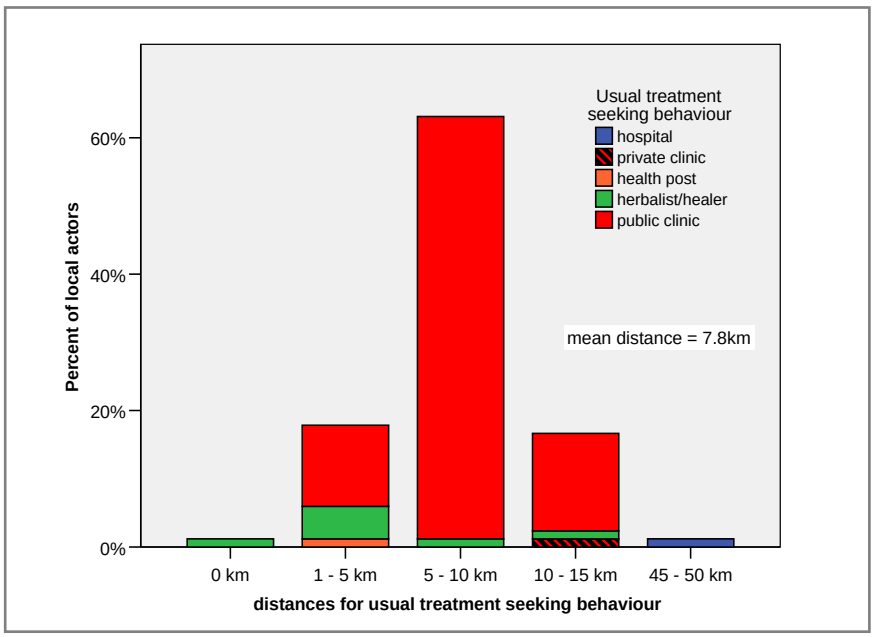


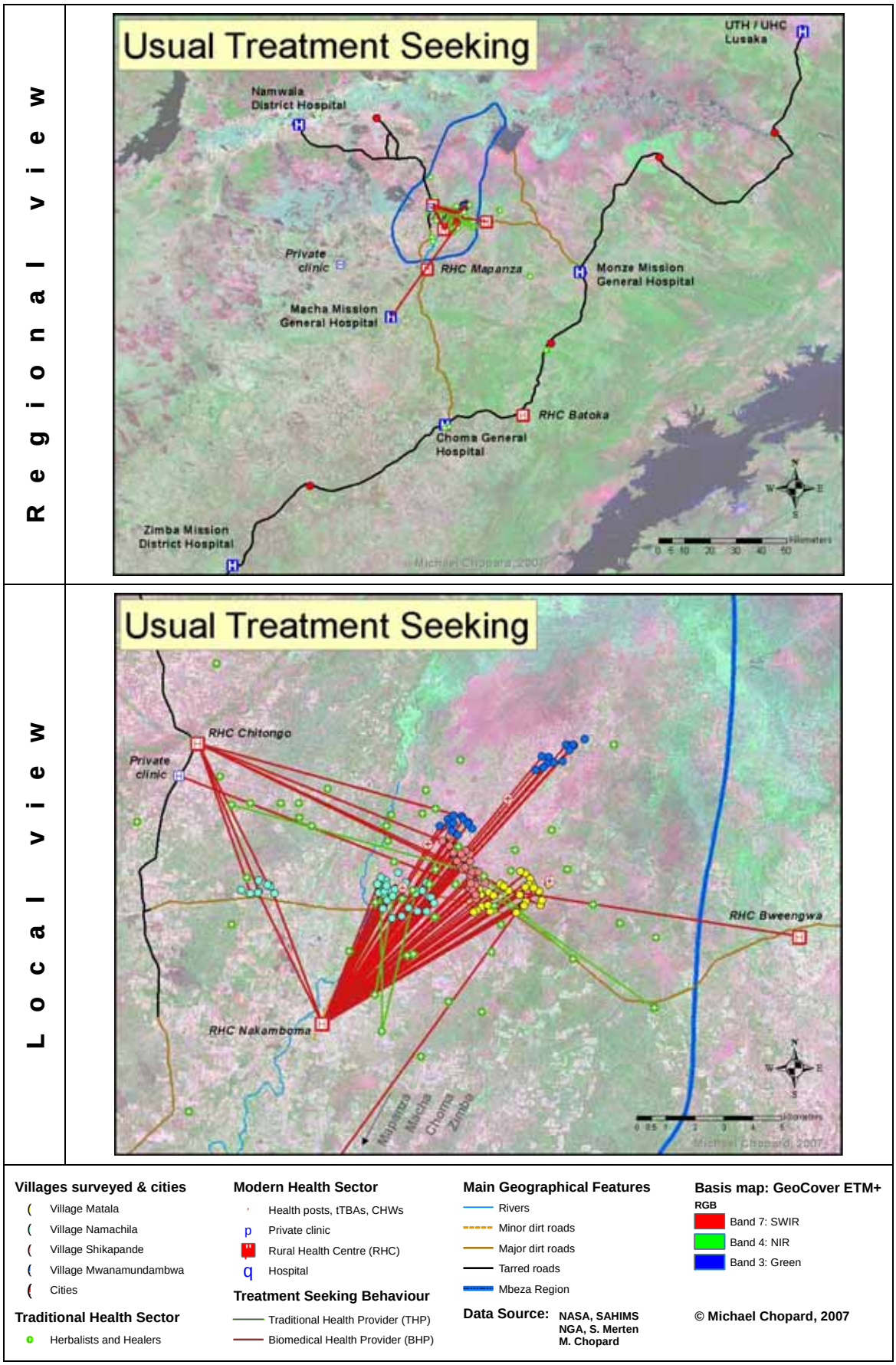
Fig. 23: Distances for usual treatment seeking behaviour according to treatment alternative selected by local actors (Fieldwork 2005, N= 84)
Source: Own representation

This is confirmed by the results presented above. However, few people seem to consult THPs living farther than 5 km from their households.

The map representing the *usual* treatment seeking behaviour of the local actors shows that most of them more frequently consult either a BHP or a THP in the vicinity (cf. Map 7, regional view and Fig. 23). Only one person - an outlier – mostly visit Macha Mission Hospital situated at a distance of about 47 km from his/her home.

In the biomedical health sector, which represents the great majority of the *usual* treatment seeking behaviour of the local actors (92%, cf. Table 16), most people visit RHC Nakamboma in the south (66 persons, 79%), 7 local actors usually visit RHC Chitongo (8%), and the others attend RHC Bweengwa and the private clinic situated in Chitongo village. The results presented in Map 7 confirm that proximity and catchment area are the most important factors to attend RHC Nakamboma. The 4 villages under study are all belonging to the catchment area of this clinic. However, Namachila and Matala villages are belonging to the catchment area of a second clinic, RHC Chitongo and RHC Bweengwa respectively. Namachila village is divided into an eastern part - where local actors usually go to RHC Nakamboma - and a western part - where people attend either RHC Chitongo or RHC Nakamboma. Some local actors from the other villages mostly attend RHC Chitongo, even if this clinic is more distant and they risk being overcharged. For these people, no drug shortages and good medicine/trust are the most important factors (cf. above).

In the traditional health sector, the 7 local actors who usually consult a THP, do not attend the nearest one. In Map 7, the fact that several THPs are directly located at the road is a coincidence. One should keep in mind that GPS coordinates have been submitted to a random perturbation of 3km (cf. Chapter 4.3.2) to ensure data privacy.



Map 7: Regional and local maps showing the *usual* treatment seeking behaviour of local actors (N=84)
Source: own representation

5.3 *Intended* treatment seeking behaviour and access to health care: descriptive analysis

On the whole, 279 local actors have been surveyed between 2002 and 2005 about their *intended* treatment seeking behaviour in relation to 12 illnesses - malaria, stomach pains, diarrhoea, respiratory infection (i.e. asthma, cough, pneumonia), chest pains/heart disease, eye disease, skin disease, injury, goitre, STDs (i.e. syphilis and gonorrhoea), HIV/AIDS and cancer.

Descriptive statistics of local actors (interviewed persons) (variables)	Own fieldwork in 2005 N = 84			Own fieldwork with data of Merten 2002-04: N = 279		
	n	(%)	Missing (%)	N	(%)	Missing (%)
Residence			0 (0)			0 (0)
Agro-pastoralist village	84	(100)		198	(71)	
Fishing village	0	(0)		81	(29)	
Gender			0 (0)			60 (21)
Female	43	(51)		113	(41)	
Male	41	(49)		106	(38)	
Age			24 (29)			47 (17)
15 - 30	19	(22)		62	(23)	
30 - 45	25	(30)		98	(35)	
45 - 65	14	(17)		51	(18)	
> 65	2	(2)		21	(7)	
mean [min - max]	38 [16-79]			40 [14-107]		
Distance to nearest clinic			0 (0)			0 (0)
< 5 km	14	(16)		52	(19)	
5 - 10 km	62	(74)		138	(49)	
10 - 20 km	8	(10)		8	(3)	
> 20 km	0	(0)		81	(29)	→ Fishing V.
Distance to nearest hospital			0 (0)			0 (0)
30 - 40 km	0	(0)		35	(13)	
40 - 50 km	76	(90)		137	(49)	
50 - 60 km	8	(10)		101	(36)	
> 60 km	0	(0)		6	(2)	
Distance to nearest THP			0 (0)			0 (0)
< 0.5 km	51	(61)		167	(60)	
0.5 -1.5 km	29	(34)		90	(32)	
> 1.5 km	4	(5)		22	(8)	

Table 17: Descriptive statistics of local actors (i.e. interviewed persons)
Source: Own representation

The data have been collected in six agro-pastoralist villages: Matala, Mwanamundambwa, Namachila, Shikapande, Shikalapu, Mwanamwale, and two fishing villages: Nyimba and Nakasale. During fieldwork 2005, the *intended* treatment seeking behaviour of two additional (traditional) has been investigated: *Tulonda* and *Kahungo* (N=84).

From the 279 local actors/people who have been interviewed, there were 113 women and 106 men (41% and 38% respectively, 21% were missing). The majority of the local actors (35%) were between 30 and 45 years of age, 23% were between 15 and 30, 18%

between 45 and 65, and 7% over 65 years of age. About 1/5 of the local actors (19%) were living at less than 5 km from the nearest clinic (Rural Health Centre, RHC), the majority (49%) were situated between 5 and 10 km, 3% between 10 and 20 km, and 29% above 20km. The local actors living further than 20 km from the nearest clinic are those living in the fishing villages of Nakasale and Nyimba. The distances to the nearest hospital are quite farther with 12% of the local actors living between 30 and 40 km from the nearest hospital, 49% between 40 and 50 km, 36% between 50 and 60 km, and 2% further than 60 km. The traditional health practitioners are considerably more accessible, with 60% of all local actors living nearer than 500 m from the nearest THP, 32% between 500m and 1.5 km, and 8% over 1.5 km. Table 17 summarizes the characteristics of the 279 local actors considered for the description of the *intended* treatment seeking behaviour.

5.3.1 Intended treatment seeking behaviour according to illness

In this section, the *intended* treatment seeking behaviour for three illnesses is considered, namely: Malaria, HIV/AIDS and Kahungo (cf. Table 18). The complete table summarizing the *intended* treatment seeking behaviour for all illnesses surveyed in 2004-04 and 2005 can be found in Annex 8.

Malaria has been selected because it is the third cause of mortality in Zambia and the leading cause of morbidity. However, the reader should keep in mind that self-reported malaria does not correspond to a malaria infection diagnosed by a medical doctor. It is a broader concept based on interpreted symptoms such as fever, headache, feeling weak or cold, etc. Even when malaria is widespread in the area, one could argue that the reported malaria illnesses in the survey data are *suspected* malaria.

HIV/AIDS has been selected for two reasons: first of all it is the leading cause of deaths in the country, accounting for 43% of the deaths for 2002 (cf. Annex 2). The second reason is to compare the *intended* treatment seeking behaviour for HIV/AIDS with the one for *Kahungo*, a traditional illness described as being similar to HIV/AIDS that is widespread in the Mbeza Region among the Ila and Tonga. According to Mogensen (1997: 433), the Tonga consider AIDS as 'a new disease which is defined as inevitably lethal and which might have been caused by contact with white people, like many other diseases, such as TB [Tuberculosis] and VD [Venereal Diseases].' AIDS is often considered as being similar to *Kahungo,* both diseases are transmitted through contact with *polluted* or *unclean* blood. However when AIDS is incurable, Kahungo is curable. Kahungo is transmitted to a man by having sexual relations with a woman who has

aborted or miscarried and has not been purified, or to any person who comes in contact with a dead foetus (Gausset, 1998).

Illnesses	Intended treatment seeking behaviour (%)									
	No Use		*Use of different type of health care providers*							
	No-thing	Home remedies	Health post (CHW, nurse)	Clinic	Private clinic	Hospital	**BHP Mod. Med.**	Herbalist	Trad. healer	**THP Trad. Med.**
Malaria	0.4	25.8	7.2	48.4	1.4	3.2	**60.2**	9.3	3.9	**13.6**
Malaria severe	1.8	1.8	0.7	44.2	2.2	37.2	**84.3**	5.5	6.2	**12.0**
Kahungo	0.0	20.2	0.0	8.3	0.0	0.0	**8.3**	47.6	20.2	**71.4**
Kahungo severe	0.0	1.2	0.0	15.5	2.4	8.3	**26.2**	46.4	22.6	**72.6**
HIV/AIDS	0.0	10.3	5.1	59.9	1.1	8.8	**75.0**	8.8	5.5	**14.7**
HIV/AIDS severe	2.6	1.1	0.7	19.9	4.5	53.9	**79.0**	5.6	11.2	**17.2**
:	:		:	:	:	:	:	:	:	:
All aggregated Illnesses	0.3	20.0	5.7	44.1	0.8	4.1	**54.7**	17.4	7.0	**25.2**
All aggregated Illnesses: severe	1.0	1.4	0.5	31.8	2.6	38.2	**73.0**	13.3	10.3	**24.6**

Table 18: Intended treatment seeking behaviour according to specific illnesses (aggregated data, N=279)
Source: own representation, after data from Merten (2002-04) and Chopard (2005)

On the whole, the results for the *intended* treatment seeking behaviour show that 20% of the local actors intend to use home remedies (family remedies/herbal medicine or modern drugs bought at the shop), 55% would attend a Biomedical Health Provider (BHP), and 25% a Traditional Health Provider (THP). The major part of the local actors intends to initially visit a clinic (44%). When the illness gets more severe, the intended treatment strategies change so that only 1% would still use home remedies, 73% would visit a BHP and 25% a THP. The majority of the local actors would attend a hospital (38%). Less people would consult an herbalist and more people a traditional healer.

An important result is presented in Table 18: the inverse pattern of the *intended* treatment seeking behaviour for the traditional illness *Kahungo* (this inversion is also present for the second traditional illness *Tulonda*, cf. Annex 9). For *Kahungo,* more than 70% of the local actors would consult a THP but only about 10% a BHP. These percentages are approximately inversed for the other illnesses. 60-80% of the local actors prefer to rely on a BHP, and about 10-20% on a THP). As a consequence, it seems that most people in Mbeza intend to consult a BHP for *common* illnesses, and a THP for *traditional* illnesses.

For the *common* illnesses, a further difference can be observed in the *intended* treatment seeking behaviour. For example, few local actors would rely on self-treatment in case of HIV/AIDS (10%) in contrast to malaria (26%). They seem to directly consult more skilled health providers or better equipped facilities – i.e. the hospitals instead of the clinics, the traditional healers instead of the herbalists (keyword: accountability) - which normally

correspond to the *intended* treatment seeking behaviour when the illness gets more severe. This resort to more specialized health providers or better equipped facilities is also valid for respiratory infections and chest pains. These results suggest that some local actors would directly seek more skilled, better equipped, (more distant?) health care providers/facilities for illnesses perceived as being more serious, dangerous or difficult to treat.

5.3.2 Distances and GIS analysis

The Distances for *intended* treatment seeking behaviour according to the three illnesses selected above are presented in Table 19. The results show that the local actors firstly consult a Biomedical or a Traditional Health Provider (BHP or THP) in the vicinity. However, when the illness gets more severe, they tend to go farther, to the hospital for those who intend to use biomedical medicine, and to a farther THP for those who intend to consult a THP. As stated above, for illnesses perceived as being more serious, some local actors seem to directly attend more skilled, better equipped, (more distant?) health care providers/facilities. This is confirmed by the total mean distances for the first treatment strategy, which are overall larger (≥9km) than for the other illnesses, when the median distances remain similar. In the case of HIV/AIDS the longer distance is skewed based on 3 local actors, one who would consult a THP living far away (in Choma city) and the two others intend to visit Monze Mission Hospital (cf. Map 9).

Illnesses	Mean (median) distances to selected THP [km]	Mean (median) distances to selected BHP [km]	Mean (median) distance according to illness [km]
Malaria	1.6 (1.6)	7.3 (7.4)	**6.1 (7.3)**
Malaria severe	3.4 (2.7)	33.7 (50.2)	**30.4 (47.0)**
Kahungo	3.2 (2.1)	6.7 (7.3)	**2.8 (1.5)**
Kahungo severe	3.6 (2.1)	19.1 (11.5)	**7.5 (3.0)**
HIV/AIDS	10.0 (2.2)	9.0 (7.7)	**9.0 (7.6)**
HIV/AIDS severe	3.5 (1.5)	45.5 (52.4)	**40.0 (52.2)**
:	:	:	:
All aggregated Illnesses	3.6 (2.4)	8.4 (7.5)	**6.6 (5.9)**
All aggregated Illnesses severe	3.6 (2.4)	35.1 (40.1)	**28.9 (27.8)**

Table 19: Euclidean distance for *intended* treatment seeking behaviour according to illness and treatment types (Fieldwork 2005, N=84)
Source: own representation

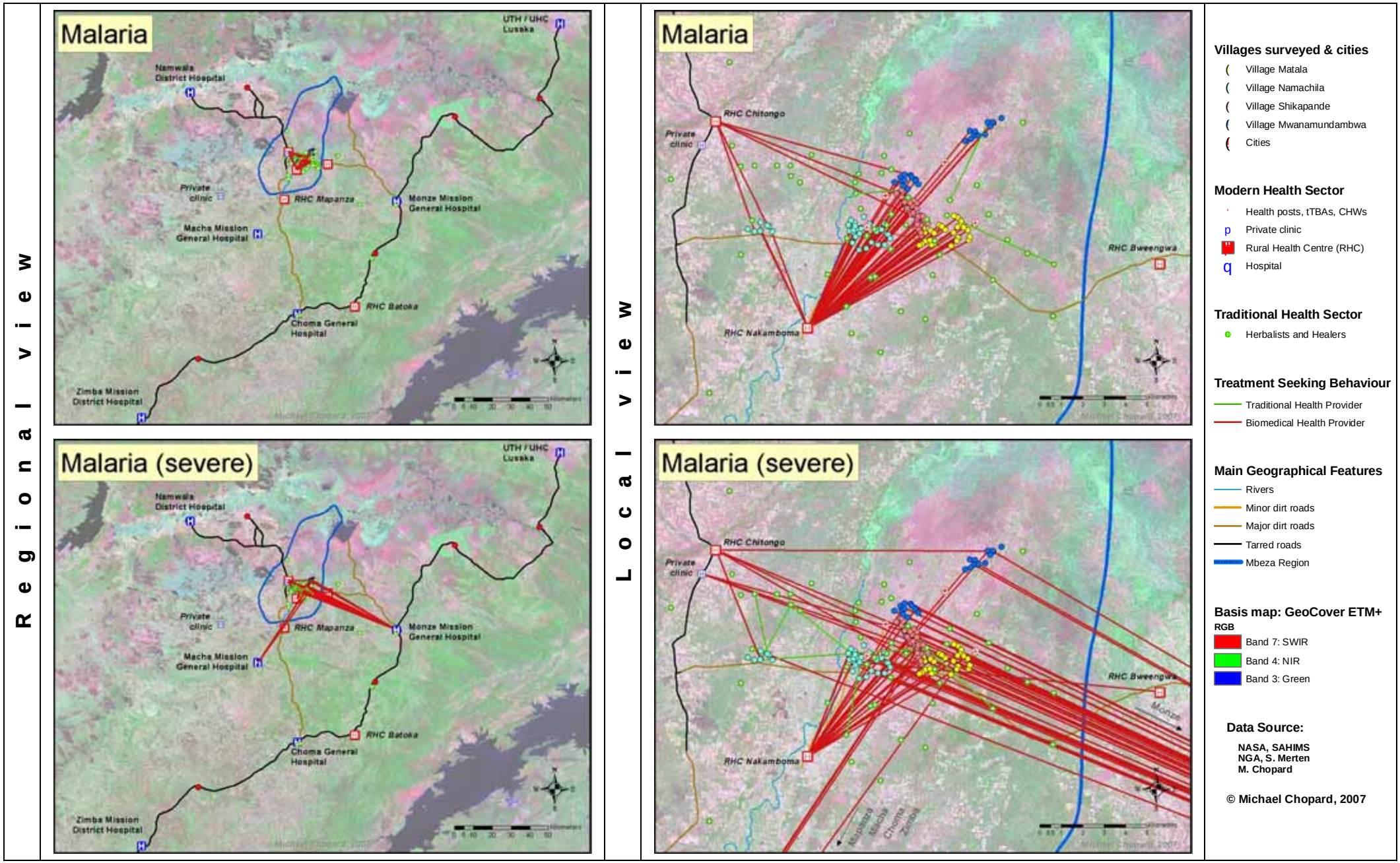
Map 8, 9 and 10 show the results of the GIS analysis for malaria, HIV/AIDS and Kahungo (the results for the other illnesses can be found in Annex 11). By comparing the different maps, it is possible to recognize several key findings already discussed above. In addition, new results related to locations of the BHPs and THPs that would be consulted by the local actors are provided: first of all, the regional view permits to recognize that

the majority of the local actors visit a BHP or a THP from the vicinity, i.e. inside the Mbeza Region. Second, the treatment alternative the most frequently chosen by local actors is a clinic (accounting for 44% of all attendances, cf. Table 18). More precisely, the most frequently visited health care provider or facility – be it in the traditional or the biomedical health sector - is RHC Nakamboma. From all destinations that have been mentioned for the *intended* treatment seeking behaviour for all illnesses, an average of 58% of the local actors would visit this clinic. This is also confirmed by the results of the *usual* treatment seeking behaviour, where 66 local actors (79%) reported to usually visit this clinic (cf. Chapter 5.2.2). Third, when the illness gets more severe, the majority of the local actors would travel farther and consult a hospital (38%), and most of them would go to Monze Mission hospital in the east and fewer to Macha Mission Hospital in the south.

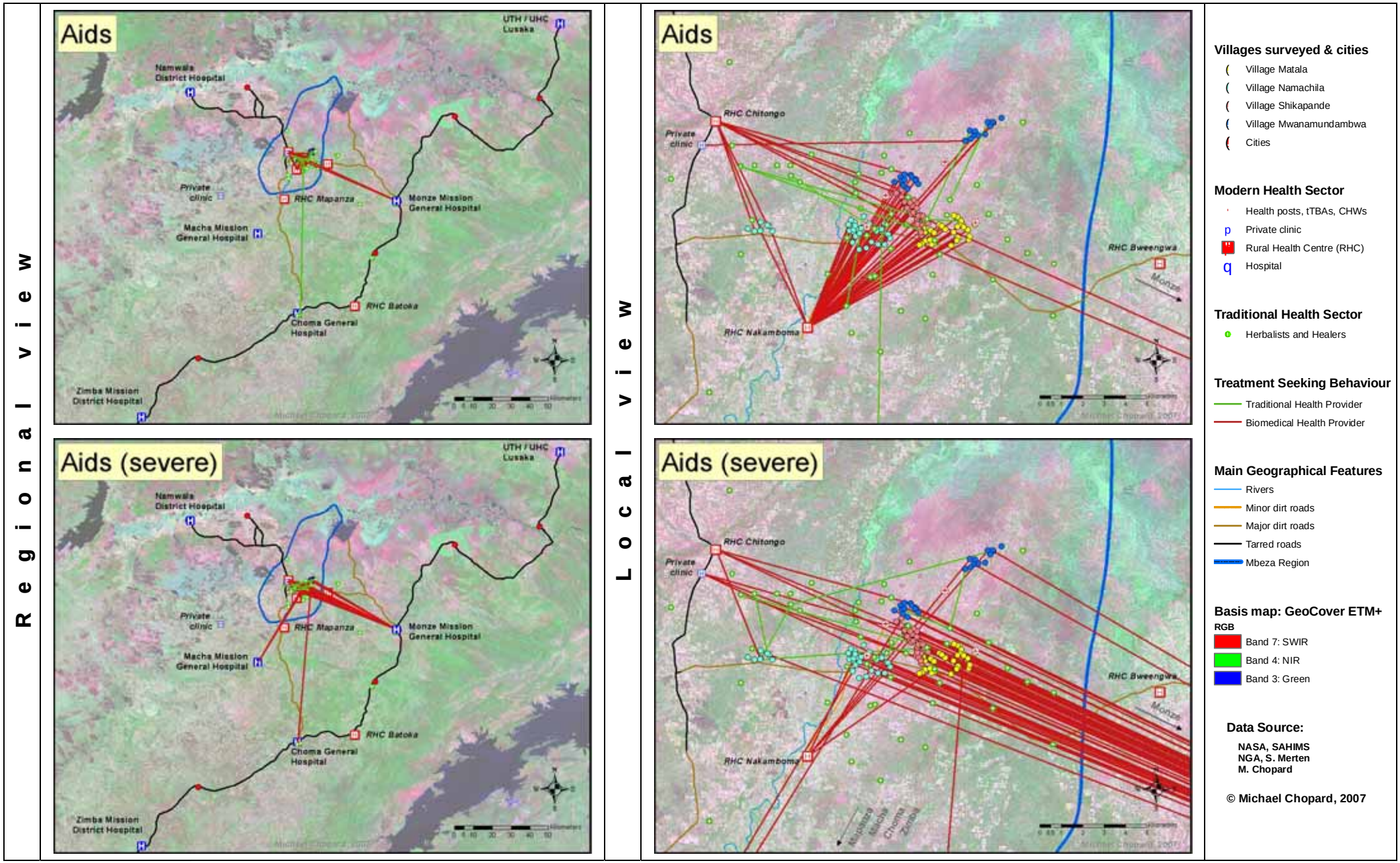
It is interesting to notice that when the illness gets more severe, some people would prefer to visit the private clinic located just below RHC Chitongo, instead of going to the hospital. Some people seem to rely on RHC Chitongo when the illness gets more severe as well. Fourth, in the traditional health sector, people who would consult a THP, mostly stay inside the Mbeza Region, and even if the local actors seem to consult a broad range of THPs, it seems that 3-4 THP are more frequently consulted than the others. Furthermore, the THPs who would be consulted seem to differ according to the illness. This confirms that most patients consult a THP according to her/his specialisations.

Malaria. The GIS analysis for malaria corresponds to the ideal or typical *intended* treatment seeking behaviour reported during fieldwork 2005, i.e. at first, local actors remain in the Mbeza Region intending to visit the clinic (RHC Nakamboma, or less frequently RHC Chitongo), and some would consult a THP in the vicinity. Then, when the illness gets more severe, the majority of the local actors would attend Monze Mission Hospital when some intend to visit the private clinic, RHC Chitongo or RHC Nakamboma.

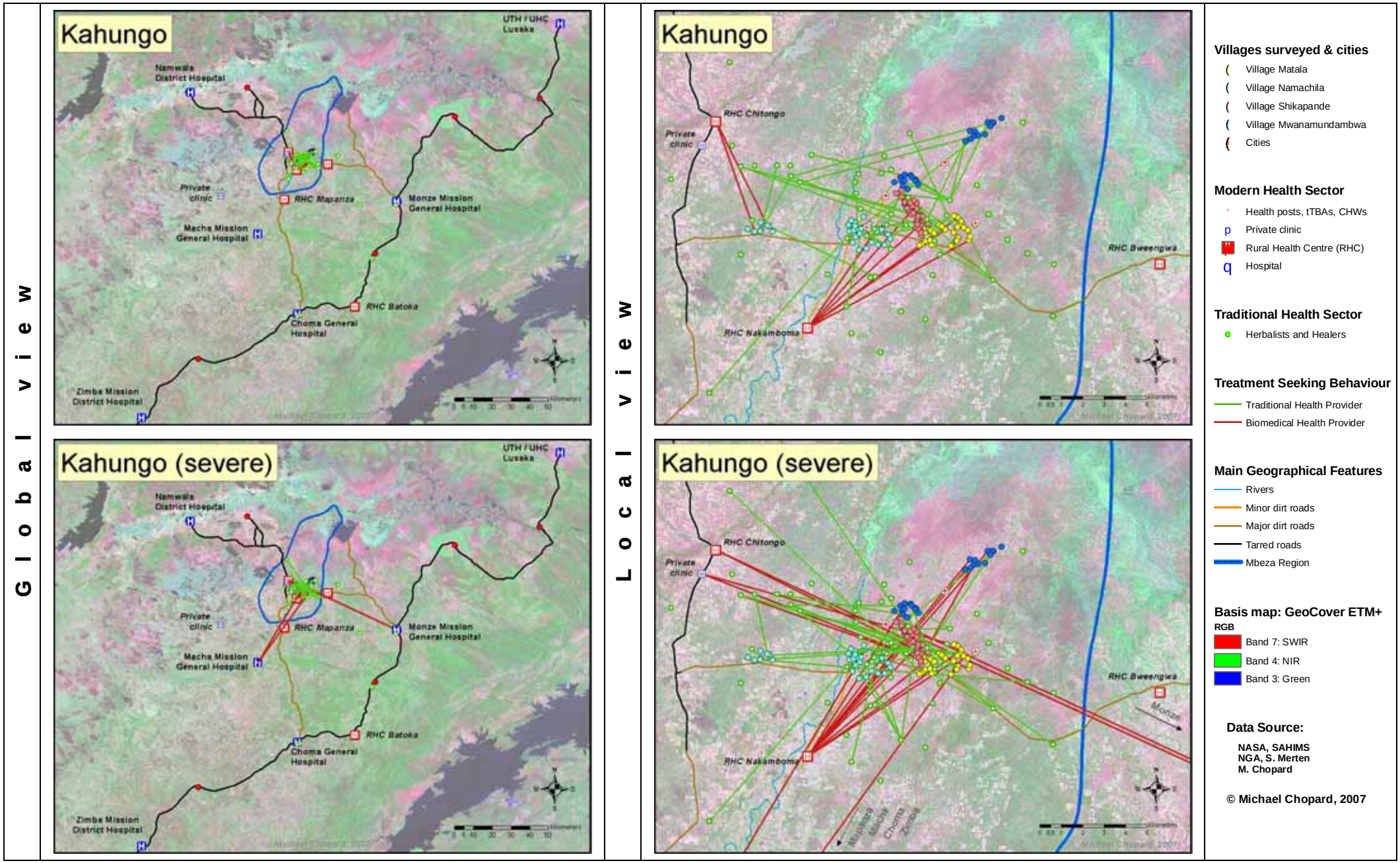
HIV/AIDS and Kahungo. The comparison between the GIS analysis for HIV/AIDS and the one for Kahungo shows at first sight that, even if both illness are described as similar by the local actors, their respective *intended* treatment seeking behaviours is very different. Indeed, as already described above, there is an inversion in the reliance on biomedical and traditional medicine between *modern*, *common* illnesses, and *traditional* illnesses.



Map 8: Regional and local maps showing the *intended* treatment seeking behaviour of the local actors for *Malaria*



Map 9: Regional and local maps the *intended* treatment seeking behaviour of the local actors for *HIV/AIDS*



Map 10: Regional and local maps showing the *intended* treatment seeking behaviour of the local actors for *Kahungo*

When local actors globally intend to rely on biomedical medicine to treat HIV/AIDS (75% would consult a BHP and 15% a THP), they intend, however, to rely on traditional medicine in order to treat Kahungo (72% would consult a THP and 8% a BHP). The GIS analysis for these two illnesses further permits to understand at one glance that local actors seem to consider HIV/AIDS as a very serious illness, because some people directly select the private clinic, the hospital, or a distant THP as first treatment alternative. This is more typical for the treatments selected when the illness gets more severe.

On the other hand, for Kahungo, local actors intend to consult first a THP in the vicinity and when the illness gets more severe a more distant THP. When local actors would consult a broad range of THPs (22 different THPs), it is however interesting to notice that some THP are more frequented than others. About 20% of the local actors would consult THP.1 and 7% THP.2 for the first treatment. When they illness gets more severe, many local actors would consult other, more distant THPs and the majority would focus on 2-3 specific THPs (36% of the local actors would consult THP.1, 5% THP.3 and THP.4).

5.4 *Realized* treatment seeking behaviour and access to health care: descriptive analysis

From the 353 patients who have been interviewed, there are 149 women and 155 men, (42% and 44% respectively; 14% are missing). The majority of the local actors (34%) are between 30 and 45 years of age, 27% are between 15 and 30, 18% between 45 and 65, and 8% over 65 years of age. In contrast to the results of the *usual* and *intended* treatment seeking for the local actors (cf. Chapter 5.3 and 5.2) the sample of the patients include children and babies as well, with 20 babies (6%) under five years of age and 17 children (5%) between 5 and 15 years old. The majority of the patients belong to the Ila (67 patients, 31%) and Tonga (69 patients, 32%) ethnic groups. The patients from the fishing villages belong to either the Batwa or the Lozi ethnic groups (15% and 3% respectively). About 110 patients (31%) attended or were attending primary school (which corresponds to grades 1-7), 29 patients (8%) junior secondary school (grades 8-9) and 19 patients (5%) senior secondary school (grades 10-12).

However, due to the difficulties encountered during data merging and harmonisation (cf. Chapter 4.2.2), about 135 patients (38%) could not be attributed an ethnic affiliation and 195 (55%) have no information on their education (cf. Table 20). Only 15% of the patients were living at less than 5 km from the nearest clinic, 49% were situated between 5 and 10 km, 8% between 10 and 20 km, and 34% above 20km. Patients who

were living further than 20 km from the nearest clinic correspond to those located in the fishing villages of Nakasale and Nyimba.

Descriptive statistics of sampled patients (variables)	Own fieldwork in 2005 N = 84			Own fieldwork with data of Merten 2002-04: N = 353		
	n	(%)	Missing (%)	N	(%)	Missing (%)
Residence			0 (0)			0 (0)
Agro-pastoralist village	84	(100)		232	(66)	
Fishing village	0	(0)		121	(34)	
Gender			0 (0)			49 (14)
Female	40	(48)		149	(42)	
Male	44	(52)		155	(44)	
Age			0 (0)			8 (2)
< 5	6	(7)		20	(6)	
5 - 15	6	(7)		17	(5)	
15 - 30	27	(32)		94	(27)	
30 - 45	28	(33)		121	(34)	
45 - 65	15	(18)		65	(18)	
> 65	2	(2)		28	(8)	
mean [min - max]	32 [1-79]			36 [1-107]		
Ethnic group (agg.)			60 (71)			135 (38)
Ila	10	(12)		67	(31)	
Tonga	13	(16)		69	(32)	
Twa [BaTwa]	0	(0)		53	(15)	
Lozi	0	(0)		10	(3)	
Other (Bemba, Ngoni, etc.)	0	(0)		19	(5)	
Education (agg.)			62 (74)			195 (55)
Primary school (grade 1 - 7)	16	(19)		110	(31)	
Junior secondary (grade 8 - 9)	5	(6)		29	(8)	
Senior secondary (grade 9 - 12)	1	(1)		19	(5)	
Distance to nearest clinic			0 (0)			0 (0)
< 5 km	14	(16)		52	(15)	
5 - 10 km	62	(74)		153	(43)	
10 - 20 km	8	(10)		27	(8)	
> 20 km	0	(0)		121	(34)	→ Fishing V.
Distance to nearest hospital			0 (0)			0 (0)
30 - 40 km	0	(0)		35	(10)	
40 - 50 km	76	(90)		138	(39)	
50 - 60 km	8	(10)		132	(37)	
> 60 km	0	(0)		48	(14)	
Distance to nearest THP			0 (0)			0 (0)
< 0.5 km	51	(61)		207	(59)	
0.5 -1.5 km	29	(34)		110	(31)	
> 1.5 km	4	(5)		36	(10)	

Table 20: Descriptive statistics for the patients sampled during fieldwork 2005 and during fieldwork 2002-2004. Source: Own representation

The distances to the nearest hospital are quite long, with 10% of the patients living between 30 and 40 km from the nearest hospital, 39% between 40 and 50 km, 37% between 50 and 60 km, and 14% further than 60 km. On the other side, the traditional health practitioners are considerably more accessible, with 59% of all local actors living nearer than 500m from the nearest THP, 31% between 500m and 1.5km, and 10% over

1.5km. Table 20 summarizes the characteristics of the 353 patients surveyed between 2002 and 2005. These characteristics and especially the distances to the nearest biomedical and traditional health care facilities/providers globally correspond to those of the 279 local actors presented in Table 17. In each household, one local actor and one patient were always interviewed and often the local actor corresponded to the last person who has been sick in the household, i.e. to the patient.

5.4.1 Illnesses prevalence according to patients' residence

Before addressing the results of the *realized* treatment seeking behaviour it is essential to be reminded again that no medical doctor is present in the Mbeza region. This means that the illnesses reported by the patients have never been diagnosed, except for the rare cases where people did attend a hospital, and for the traditional illnesses *diagnosed* by THPs. As a consequence, the illnesses reported by patients correspond to their own conception and interpretation of the symptoms, illness cause(s), advices from relatives and neighbours, or perhaps an uncertain diagnosis made by a nurse or a clinic officer of a Rural Health Centre (RHC). The results for the prevalence of the self-reported illnesses are presented in Table 19. The more frequent self-reported illness is malaria, accounting for 34% of all cases, followed by respiratory (11%) and gastrointestinal infections (11%). Rheumatic problem/musculoskeletal pain and chest pains/cardiovascular problems were also common, accounting for 10% and 7% of all cases respectively. A category called *illnesses related to witchcraft/traditional illnesses* has been created for all self-reported illnesses (19 cases) that were due to witchcraft or to the influence of bad spirits.

Illness Name (illnesses episodes)	Frequencies	Percent
Malaria	121	34%
Respiratory infections	39	11%
Gastrointestinal infections	39	11%
Rheumatic problems/Musculoskeletal pain	36	10%
Chest pains/cardiovascular problems	24	7%
Traditional illnesses/Illness related to witchcraft	19	5%
Other	75	21%

Table 21: Illnesses prevalence for self-reported illnesses (data aggregated, N=353)
Source: own representation, after data from Merten (2002-04) and Chopard (2005)

This category includes the so-called *traditional illnesses* as well, such as Kahungo, Chiposo, Tulonda, etc. Traditional illnesses and illnesses related to witchcraft almost totally correspond to each other since both illnesses types are mostly due to supernatural causes. This category accounts for 5% of all reported illnesses. The illnesses prevalence based on the self-reported illnesses (i.e. from the user/patient perspective) globally

correspond the most common diseases/illnesses mentioned by the clinic officers of RHC Nakamboma and RHC Chitongo, and by the THPs who have been interviewed (i.e. from the provider perspective, cf. Chapter 5.1.2 and 5.1.3). However, the high rate of musculoskeletal pain reported by patients was neither mentioned by the Biomedical nor by the Traditional Health Providers (BHPs and THPs). In addition to the illnesses presented in Table 23, BHPs and THPs mentioned high prevalence, infection rates of STIs and STDs. According to the 353 self-reported illnesses by patients, *only* 8 cases (2% of all illnesses) could be attributed to a traditional or biomedical STIs or STDs (including Kahungo, Tulonda, etc.). As a consequence, the results of the illnesses prevalence differ according to a biomedical, traditional provider and to a user perspective. The category *other*, includes such illnesses as eye infections, skin diseases, mental problems, fever, STDs and headache.

Agro-pastoralist and fishing villages. The results of the illnesses prevalence of the self-reported illnesses according to patients' residence are presented in Figure 24. Rheumatic problems/musculoskeletal pain seem to be more prevalent in the fishing villages (17 cases, 14%) than in the agro-pastoralist villages (19 cases, 8%).

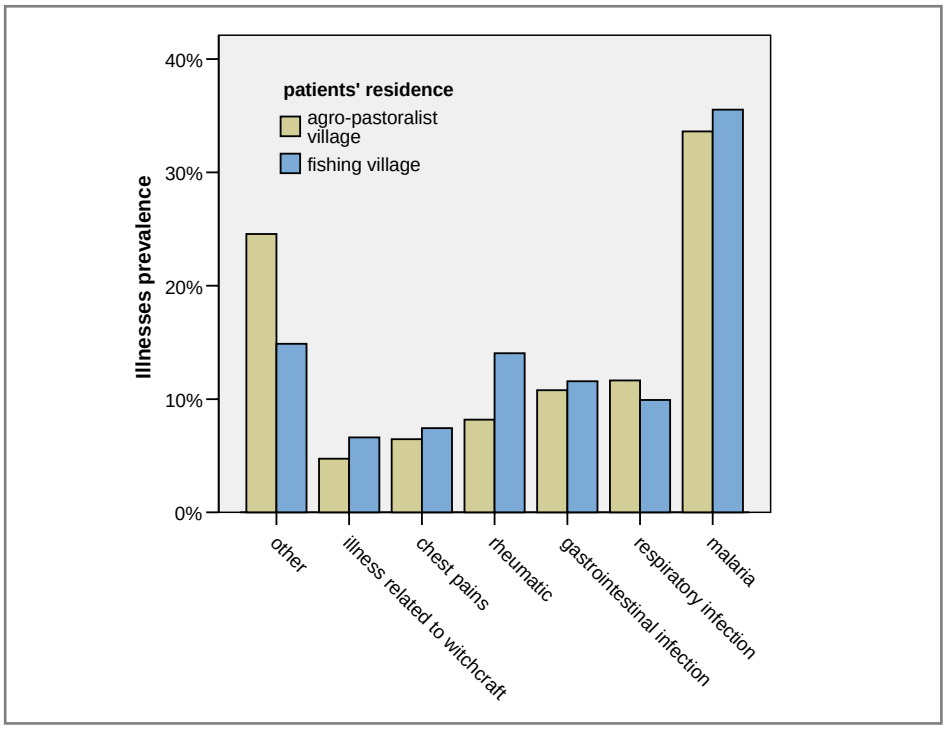


Fig. 24: Illnesses prevalence for self-reported illnesses (data aggregated, N=353) according to patients' residence (fishing village or agro-pastoralist villages)
Source: own representation, after data from Merten (2002-04) and Chopard (2005)

However, the sample is very small to make precise inferences. The own fieldwork in 2005 does not integrate interviews with fishermen/-women. The patients from the fishing villages suffering from musculoskeletal pain reported to have the following symptoms: backache, leg and hand pains. The agro-pastoralists did not reported to have hand pains,

which suggest that the higher reporting of musculoskeletal pain in the fishing villages might be due to the fishing activities. The rest of the illnesses seem to be slightly more prevalent in the fishing villages, in contrast to respiratory infections and the category *other* illnesses that are more widespread in the agro-pastoralist villages.

5.4.2 Realized treatment seeking behaviour (last case of illness)

The *realized* treatment seeking behaviour of patients related to the last case of illness that occurred in the household (case study), has been investigated for the entire illness episode. This means from the apparition of the first symptoms to the recovery of the patient, or to the current point of the healing process in the worst cases to the death of the patient. The results are summarized in Table 24. The *realized* treatment seeking behaviour of patients has been divided into *unique* and *part* treatment, i.e. if patients relied on a single treatment alternative (**only**) or on several treatment alternatives.

Table 22 shows that 35% of the patients only used home remedies, 54% ever consult a BHP and 18% a THP. Few patients (10, 3%) did not rely on any medicine or health care provider. Besides, 44% attended only a Biomedical Health Provider (BHP), and 8% only consulted a Traditional Health Provider (THP). In addition, 37 patients (11%) consulted both a BHP and a THP.

***Realized* treatment seeking behaviour**	***Unique treatment***		***Part treatment***			
	Only		Never		Ever	
	Freq. (%)	% All	Freq.	% All	Freq.	% All
Home remedies (self treatment)	**124 (100)**	**35**	**182**	**52**	**171**	**48**
Herbal medicine	*52 (42)*	*15*	*257*	*73*	*96*	*27*
Modern drugs	*63 (51)*	*18*	*265*	*75*	*88*	*25*
Biomedical health sector (Health Centre, BHPs)	**155 (100)**	**44**	**161**	**46**	**192**	**54**
Clinic (RHC)	*98 (28)*	*28*	*206*	*58*	*147*	*42*
Hospital	*34 (10)*	*10*	*292*	*83*	*61*	*17*
Traditional health sector (THPs)	**27 (100)**	**8**	**289**	**82**	**64**	**18**
Herbalist	*14 (56)*	*4*	*318*	*90*	*35*	*10*
Traditional healer	*10 (40)*	*3*	*323*	*91*	*30*	*9*
Both BHPs and THPs	**37**	**11**	**316**	**89**	**37**	**11**
No treatment	**10**	**3**	**-**		**-**	

Table 22: *Realized* treatment seeking behaviour (case study) of patients (N=353 from 8 villages)
Source: own representation, after data from Merten (2002-04) and Chopard (2005)

Agro-pastoralist and fishing villages. Since the conditions prevailing in the agro-pastoralist and in the fishing villages are different, it is essential to analyse whether patients' residences have an influence on treatment seeking. Figure 25 shows the

realized treatment seeking behaviour for the patients according to their residence. When the proportion of patients who attend a hospital or a THP seem to be approximately equal in the agro-pastoralist and fishing villages, the proportion of patients who attend a clinic are higher in the agro-pastoralist (105/232, 45%) than in the fishing villages (42/121, 35%). On the other side, the proportions of patients who did nothing or used home remedies (self treatment) are higher in the fishing than in the agro-pastoralist villages. This could reflect poor access to close biomedical health care facilities (clinic), and can explain the higher reporting of home remedies or no treatment. The proportions suggest that some fishermen and –women delay their treatment and probably attend a clinic or a hospital only when the illness gets more severe.

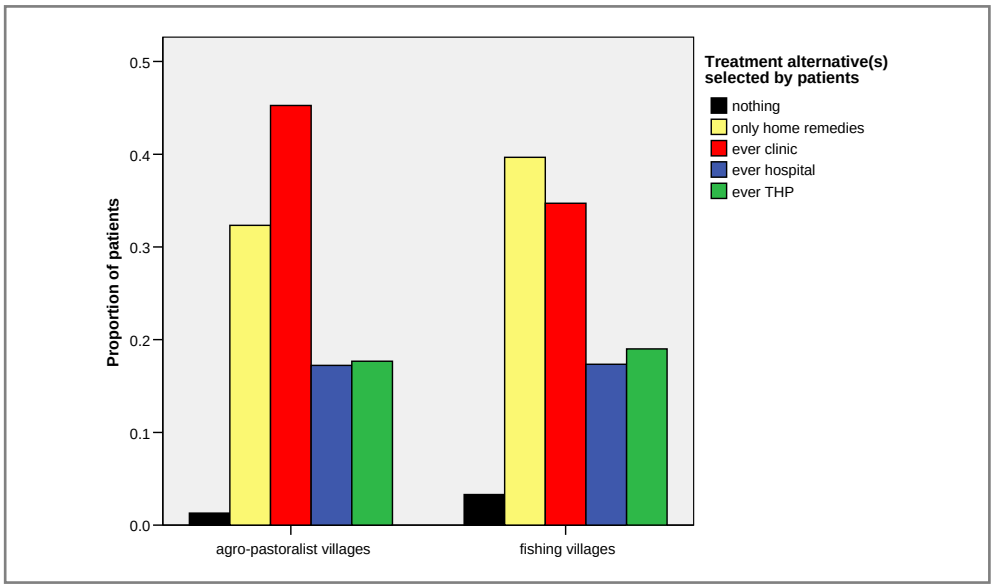


Fig. 25: *Realized* treatment seeking behaviour according to patients' residence (N=353)
Source: own representation, after data from Merten (2002-04) and Chopard (2005)

Illness duration, treatment cost and satisfaction. On average, patients needed about 131 days (4 months) to recover. These long illness durations are skewed due to some patients who were experiencing chronic illnesses for many years. The median duration of 14 days is more appropriate for *common* illness durations. On the whole, for the treatment(s) that have been provided, patients paid about 100'000 kw[1] (≅ 30CHF). However, the mean costs are skewed due to few patients who consulted very distant and expensive health providers. The median cost of the treatment(s) is equal to 6'700 kw (≅ 2 CHF). About 63% of the patients reported to feel better after treatment(s) (satisfaction). The results of Table 23 show particularly high differences between illness duration, treatment costs and satisfaction according to the various treatment alternative(s) selected by patients.

[1] The official currency in Zambia is the Zambian Kwacha (ZMK, kw). One Swiss Franc is equivalent to about 3'257 kw (5'000 kw ≅ 1,5 CHF ≅ 1 EUR, exchange rate for 1.11.2005, www.xe.com, November 2007).

Realized treatment seeking behaviour	*Illness duration*		*Total treatment cost*		*Feel better after treat.*
	Mean [days]	Median [days]	Mean [kw]	Median [kw]	Freq. (% All)
Only home remedies	**14**	**7**	**16'743**	**3'000**	**74 (67)**
Only herbal medicine	*20*	*7*	*13'600*	*4'250*	*34 (71)*
Only Modern drugs	*10*	*7*	*16'348*	*3'000*	*48 (68)*
Only BHP(s)	**165**	**14**	**129'481**	**10'000**	**107 (73)**
Only Clinic (RHC)	*64*	*10*	*75'278*	*5'000*	*70 (77)*
Only Hospital (+clinic)	*405*	*74*	*244'736*	*100'000*	*29 (60)*
Only THP(s)	**315**	**120**	**135'150**	**55'500**	**16 (64)**
Both BHP(s) and THP(s)	**247**	**52**	**113'989**	**34'000**	**20 (50)**
No treatment	**14**	**14**	**0**	**0**	**3 (75)**
Total	**131**	**14**	**99'723**	**6'700**	**221 (63)**

Table 23: Illness duration, treatment cost and satisfaction according to treatment (N=353)
Source: own representation, after data from Merten (2002-04) and Chopard (2005)

In contrast to patients who consulted only BHP(s), those who only consulted THP(s) have overall higher illness durations (120 days compared with 14 days), higher treatment(s) costs (55'000 kw compared with 10'000 kw), and fewer reported to feel better after treatment (64% and 73% respectively). However, one should not over interpret these results in that THPs are more expensive, need much more time or are less effective in treating patients. Before making any inferences, the treatment alternatives and sequences must be more precisely investigated (cf. Chapter 5.4.5).

5.4.3 First, second and third treatment seeking patterns

Figures 27a and 27b show the treatment sequences for patients located in the agro-pastoralist and in the fishing villages. This corresponds to the proportions of patients who relied on home remedies, on a clinic, a hospital or a THP, as first, second and third treatment. For the first treatment a higher proportion of fishermen/-women did nothing (13/121, 11%) for healing themselves (cf. Fig. 26a), compared with the agro-pastoralists (4/232, 2%, cf. Fig. 26b). Fewer fishermen/-women visited the clinic as first treatment strategy (30/121, 25%) and the hospital (8/121, 7%) than agro-pastoralists (81/232, 35% and 25/232, 11% respectively). In addition to the results presented in Fig. 25, it is interesting to notice that almost the double of fishermen/-women first consult a THP (18/121, 15%) than the agro-pastoralists (15/232, 7%).

As a consequence, one could argue that due to poor access to close biomedical health care facilities, patients from the fishing villages use more home remedies or no treatment at all, but also consult more THPs initially, than patients from the agro-pastoralist villages.

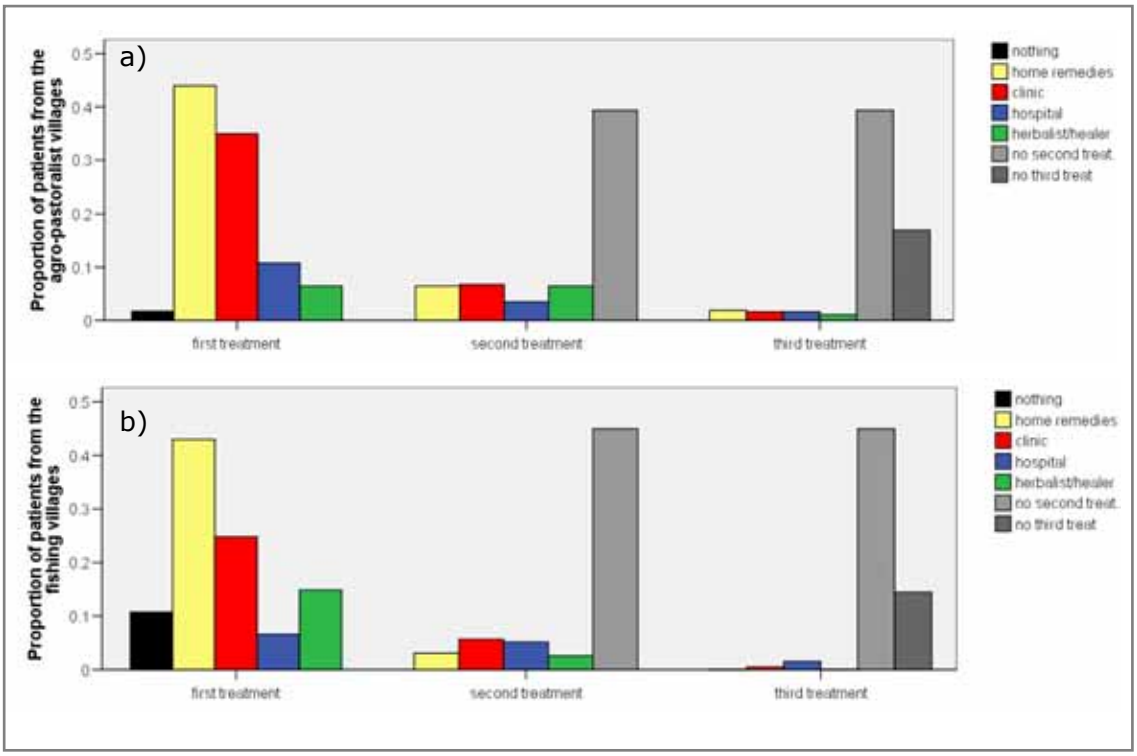


Fig. 26: Treatments sequence of the patients' r*ealized* treatment seeking behaviour for (a) the 6 agro-pastoralist villages and (b) the 2 fishing villages under study
Source: own representation, after data from Merten (2002-04) and Chopard (2005)

When patients did not recover after the first treatment, about 86 agro-pastoralists (37%) and 27 fishermen/-women (22%) relied on a second treatment. This time more agro-pastoralists than fishermen/-women consulted a THP (10% and 4% respectively). That suggests that consulting THP is rather a second strategy than a first choice for patients from the agro-pastoralist villages. On the other side, more fishermen/-women visited a hospital than agro-pastoralists (6% and 8%). One could argue that they directly attended a hospital after having delayed their treatment (cf. Fig. 27). Only 23 agro-pastoralists (10%) and 3 fishermen/-women (3%) relied on a third treatment.

***Realized* treatment seeking behaviour according to illness type.** Table 24 present the results of the *realized* treatment seeking (first and second treatment) for the six most common illnesses reported by patients. From 353 patients who have been surveyed, 113 relied on a second treatment (32%). However, the frequencies for each treatment alternative are small and the results should be interpreted with caution. Patients who decided to do nothing as a second treatment strategy cannot be differentiated from the patients who recovered after the first treatment. The results for the third treatment are not presented due to the very small sample (26 patients). Many similarities and differences can be discovered by comparing the *realized* with the *intended* treatment seeking behaviour for the same illnesses (cf. Table 18 and Annex 8).

Illnesses	Realized treatment seeking behaviour (%)									
	No Use		*Use of different type of health care providers*							
	No-thing	Home remedies	Health post (CHW, nurse)	Clinic	Private clinic	Hospital	**BHP Mod. Med.**	Herbalist	Trad. healer	**THP Trad. Med.**
Malaria	5.8	51.2	2.5	33.9	0.0	3.3	**39.7**	2.5	0.8	**3.3**
Malaria second	-	40.0	0.0	36.7	0.0	3.3	**40.0**	6.7	13.3	**20.0**
Resp. infections	7.7	20.5	5.1	35.9	0.0	20.5	**61.5**	5.1	5.1	**10.3**
Resp. inf. second	-	8.3	0.0	16.7	0.0	16.7	**33.3**	18.2	27.3	**41.7**
Gastro. Infections	2.6	53.8	0.0	35.9	0.0	5.1	**41.0**	2.6	0.0	**2.6**
Gastro. second	-	31.3	0.0	43.8	0.0	18.8	**62.5**	6.3	0.0	**6.3**
Rheuma. problems	2.8	50.0	0.0	22.2	0.0	13.9	**36.1**	11.1	0.0	**11.1**
Rheuma. second	-	14.3	0.0	28.6	0.0	35.7	**64.3**	7.1	14.3	**21.4**
Chest pains	12.5	8.3	0.0	41.7	0.0	29.2	**70.8**	4.2	0.0	**8.3**
Chest second	-	0.0	0.0	50.0	0.0	33.3	**83.3**	0.0	16.7	**16.7**
Ill. rel. to witchcraft	0.0	31.6	0.0	36.8	0.0	0.0	**36.8**	15.8	10.5	**31.6**
Witchcraft second	-	9.1	0.0	9.1	0.0	0.0	**9.1**	36.4	45.5	**81.8**
All aggregated Illnesses: first	4.9	37.8	1.1	32.7	0.0	11.6	**45.4**	6.7	3.7	**11.9**
All aggregated Illnesses: second	-	18.9	0.0	30.1	0.0	20.0	**50.1**	11.1	18.1	**31.1**

Table 24: Realized treatment seeking behaviour according to illnesses (aggregated data, N=353)
Source: own representation, after data from Merten (2002-04) and Chopard (2005)

First, both results confirm that patients have different treatment seeking behaviour according to different illnesses, but the majority of the patients always rely on the clinic as first treatment alternative for all illnesses. Second, for illnesses perceived as being more serious or difficult to treat, for example, respiratory infections and chest pains, less patients rely on home remedies first; they prefer to attend a biomedical health centre, especially a hospital. For the illnesses related to witchcraft, more patients first rely on a THP than for the other illnesses, however, the differences are not as big as for the intended treatment seeking behaviour and an inversion in the treatment alternatives selected by patients is not as obvious as for *intended* treatment seeking behaviour. In contrast to the results presented in Table 8, the inversion seems to have been transferred to the second treatment. This suggests that patients suffering from an illness related to witchcraft increasingly rely on traditional medicine as the illness gets more severe. This might attest that the recognition of this illness type is not made at the first phase of the illness episode. The main differences between the *realized* and the *intended* treatment seeking behaviour has been subject to an own section, cf. Chapter 5.6.

Pathway model. The proportions described above do not take account of the path follows by the patients, i.e. their proper treatment sequences. The first treatment has already been described according to Figure 26a and b. Figure 27 shows the results of a pathway model (cf. Chapter 3.3.2) representing the treatment sequences of the patients from the first to the second treatment, according to residence. Due to the small sample

of the third treatment, these results are not reported. The majority of the patients (110, 31%) only use home remedies, only attend a clinic (74, 21%) or only attend a hospital (24, 7%) and do not rely on a second treatment. The more common treatment sequence is the use of home remedies, followed by a clinic visitation, accounting for 6% of all cases (20). However, when 17 agro-pastoralists (7%) rely on this treatment sequence, it is only 3 patients (2%) from the fishing villages.

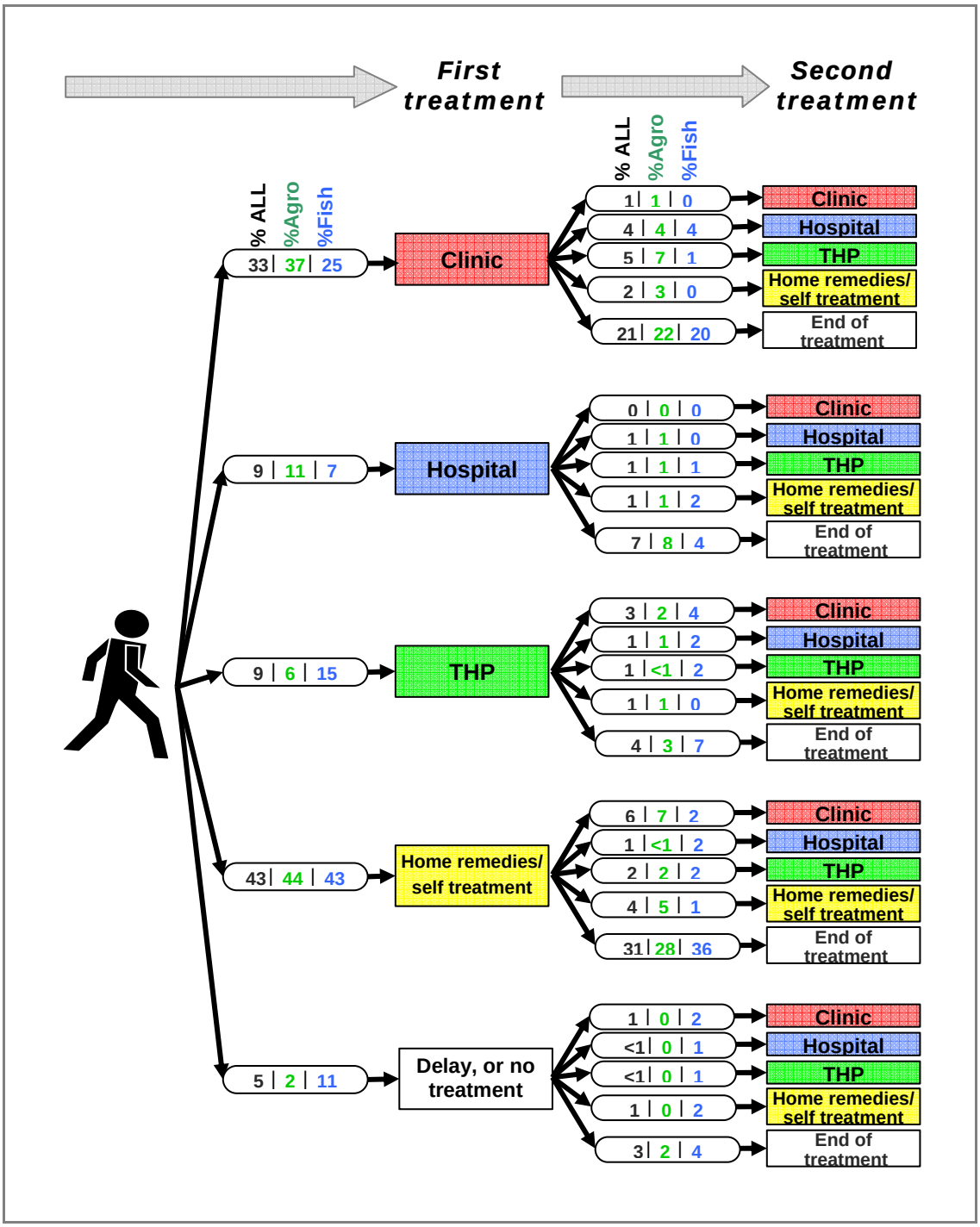


Fig. 27: Pathway model for *realized* treatment seeking behaviour, first and second treatment
Source: own representation

Further differences can be discovered between patients living in the fishing villages or in the agro-pastoralist villages. For example, more fishermen/-women consult only a THP and stop their treatment sequence (9, 7%) than agro-pastoralists (6, 3%). On the other hand, more agro-pastoralists attend a clinic and then consult a THP (16, 7%), than the patients from the fishing villages (1, 1%). Eight fishermen/-women (7%) delay the first treatment and later attend a clinic, hospital, a THP or use home remedies, in contrast to 0% of the agro-pastoralists. This again might attest for a better accessibility of the THP and a difficult accessibility of the clinics in the fishing villages.

5.4.4 Distances and GIS analysis

The mean and median distances (Euclidean distances) separating patients' households from the first, second and third treatment places have been calculated, based on the 84 patients surveyed in 2005. Table 25 shows that patients seem to always attend more distant Traditional Health Providers (THPs) or a more distant Biomedical Health Provider (BHPs) as the illness gets more severe or persists. The total mean distance for the third treatment is lower than for the first and second treatment, when patients consulted a THP. Most patients consult a nearer THP for the third treatment, than for the second treatment. Patients seem to firstly visit a THP or a BHP in the nearest surroundings.

Realized treatment seeking behaviour	Mean (median) distances to selected THPs [km]	Mean (median) distances to selected BHPs [km]	Mean (median) distance [km]
First treatment	1.5 (1.5)	13.2 (7.4)	**11.6 (7.2)**
Second treatment	8.8 (2.9)	23.1 (8.1)	**17.0 (7.6)**
Third treatment	17.5 (2.6)	27.1 (12.0)	**24.5 (8.0)**

Table 25: Euclidean distance for *realized* treatment seeking behaviour according to treatment sequence and types (Fieldwork 2005, N=84)
Source: own representation

Nevertheless, few patients attends BHPs situated outside the Mbeza Region - one patient attended a clinic in Namwala city (about 70 km from Mbeza) and one other a clinic in Lusaka capital city (about 150 km from Mbeza, cf. Fig. 28 and Map 11). Outliers are the reason for large differences between the mean and the median distances for the BHPs selected for the first treatment. For the second treatment, patients seem to visit more distant THPs and BHPs, with some patients consulting again very distant ones, especially distant hospitals. This again results in very large differences between the mean and the median distances for the THPs and BHPs consulted for the second treatment (cf. Fig. 28a). The number of BHPs and THPs consulted increase considerably: from 8 treatment places (4 BHPs and 4 THPs) for the first treatment to 21 treatment places (9 BHPs and 12 THPs) for the second treatment. This confirms that the patients consult different, more distant and probably more specialized BHPs and THPs for the second treatment.

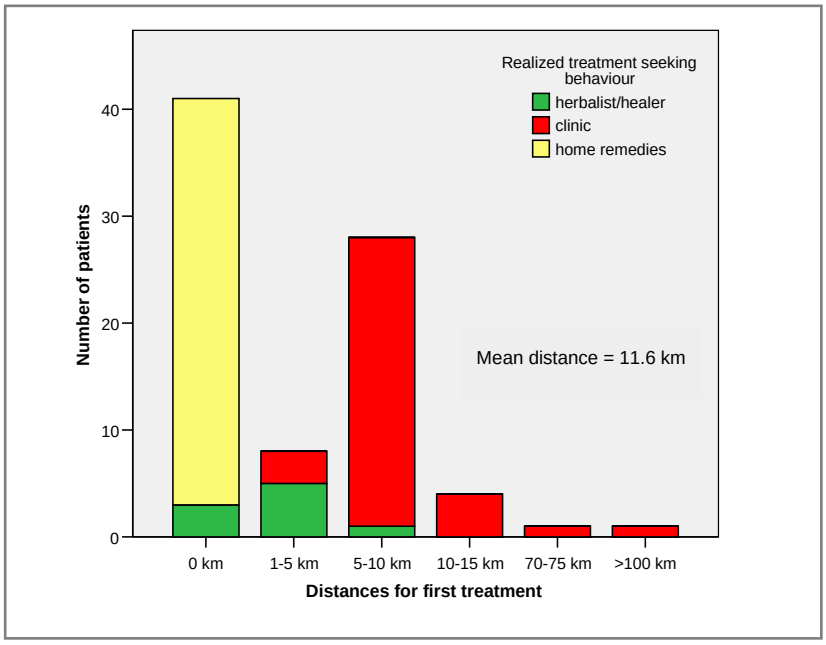


Fig. 28: Distances for *realized* treatment seeking behaviour: do first
Source: Own representation, after data from 2005 (N=84)

Figure 29a shows that the distances to the various THPs are considerably different, ranging from about 1-5 km to about 50-100 km. For the third treatment place (cf. Figure 29b), patients generally seem to visit THPs and BHPs located in greater proximity to their households, even if a few still consult relatively distant health providers and facilities. The reasons to attend distant or close BHPs and THPs for the first, second or third treatment are addressed in the next section.

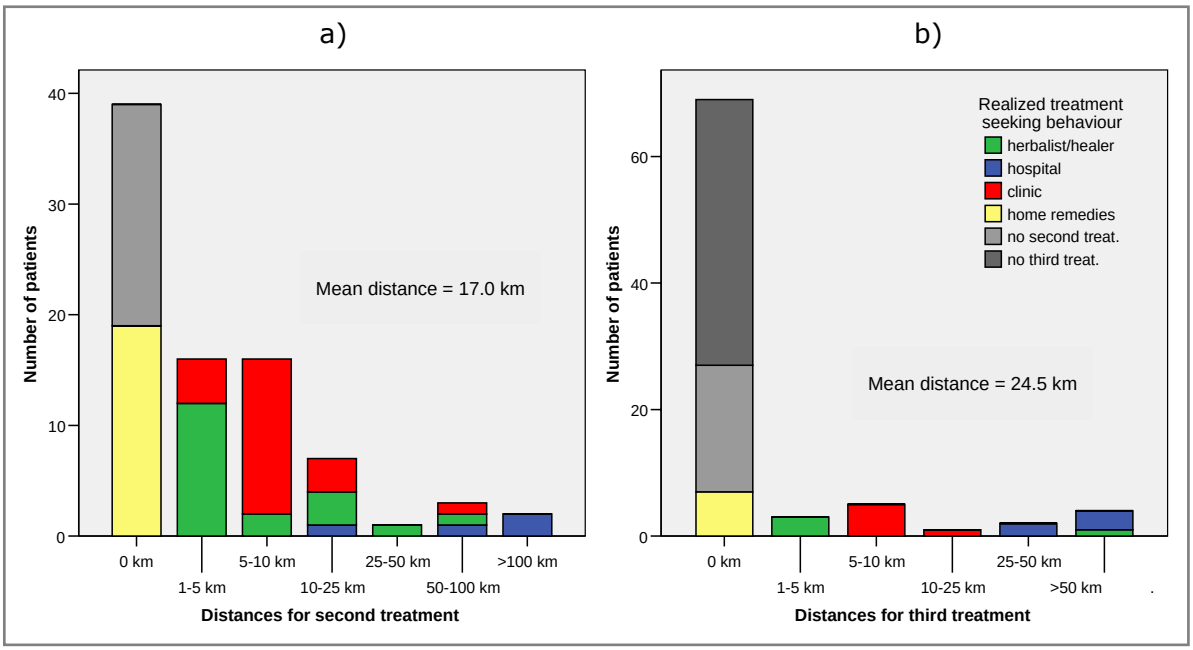
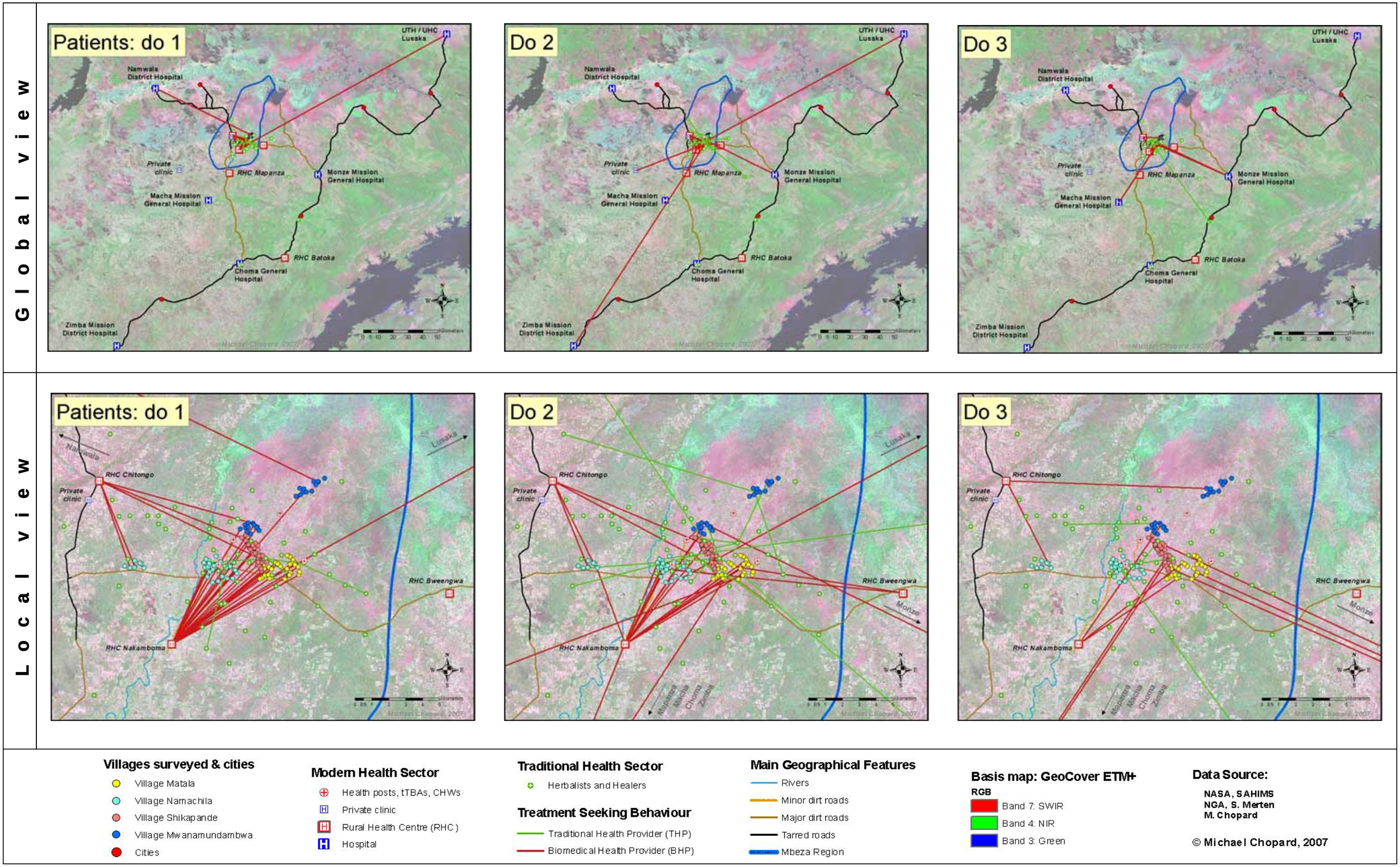


Fig. 29: Distances for *realized* treatment seeking behaviour: (a) do second and (b) third
Source: Own representation, after data from 2005 (N=84)

GIS analysis. Map 11 shows the results of the GIS analysis for the *realized* treatment seeking behaviour based on the 84 patients surveyed in 2005. The maps are divided into

first, second and third treatment. For the first treatment, as already stated above, patients seem to mostly consult BHPs and THPs in their vicinity. However, 2 patients attended 2 distant clinics located outside of the Mbeza Region - in Namwala city and in the capital Lusaka (outliers). From the 46 patients (55%) who first relied on a health care facility/provider – be it in the traditional or the biomedical health sector - Nakamboma clinic was by far the most frequently visited health care facility, accounting for 63% of all attendances (29 patients). Chitongo clinic was the second destination mostly visited (5, 11%). In the traditional health sector, 4 patients (9%) consulted the same THP (THP.1) and 3 patients treated themselves (6%, patients and THPs at the same time). The other 3 patients consulted different THPs. For the second treatment, Map 11 shows that a broad variety of health care providers, of BHPs and THPs have been consulted. However, RHC Nakamboma reminds the most frequently consulted health care facility, accounting for 31% of all patients who relied on a biomedical or traditional health care facility/provider (THP or BHP). About 4 patients attended RHC Chitongo (9%) and 2 RHC Bweengwa (4%). Besides, 4 patients attended a hospital. Surprisingly, these patients attended different hospitals, some located particularly far away from the Mbeza Region (max. 163 km to Zimba Hospital). Only one patient visited a near hospital, Monze Mission hospital and none of them visited Macha hospital, which is the nearest hospital in terms of distance. In the traditional health sector, 6 patients consulted THP.1 (13%) and 3 patients (7%) consulted another THP (THP.2). The remaining 10 patients consulted different THPs. Some of these THPs were living relatively far from patients' households (max. 31 km). Only few patients relied on a third treatment (20, including those who relied on home remedies) and only 15 consulted either a THP or a BHP. 4 patients attended RHC Nakamboma and 2 RHC Chitongo. In contrast to the second treatment, patients who attended a hospital visited the nearest ones, i.e. Macha Mission Hospital (2) and Monze Mission Hospital (3). In the traditional health sector, the 4 patients who consulted a THP selected 4 different ones.

It is essential to identify the different destinations, i.e. the BHPs and THPs who have been consulted by patients. Map 11 shows the displacement pattern of patients. At first it depicts only a few destinations, then *explodes* into a broad variety of consulted BHPs and THPs, and finally concentrates again in 3-4 destinations. The majority of the patients first consult the nearest clinic or the second nearest clinic. For the second treatment, more patients rely on traditional medicine and consult THPs in the vicinity, although not the nearest ones. Finally, patients attend the nearest hospitals and clinics. While Map 11 allows to easily describe the displacement pattern of patients, it is, however, impossible to understand why few patients consulted very distant BHPs or THPs, and what factors might have influenced these patients to make such decision. These reasons have been investigated in the form of several semi-structured interviews (cf. next section).



Map 11: *Realized* treatment seeking behaviour of patients (last case of illness)

5.4.5 Realized treatment seeking behaviour reported from semi-structured interviews of patients

Before addressing the statistical analysis of the factors influencing treatment seeking behaviour (cf. next section), it is essential to present the results of the semi-structured interviews with patients. While quantitative factors can be analysed through statistical methods, many others related to patients' decision making processes, reflexions and interactions with health care providers are better investigated through qualitative methods. The results of the semi-structured interviews with patients provide a deeper understanding of the spatial and especially the non-spatial factors that influence the health and treatment seeking behaviour of patients. The first aim of this section is to examine the typical first treatment selected by the patients and the factor influencing this decision. The second objective is to outline the factors influencing the patients to select next treatment alternative(s) (when further treatment(s) are needed). The main results from the 8 semi-structured interviews of patients can be summarized as follows:

1) **First treatment:** except in emergency situations, the patients of the Mbeza Region typically first use home remedies and/or attend the nearest clinic/rural health centre.

2a) **Next treatment(s) based on referral(s):** when patients do not recover after the first treatment, many of them select the second treatment alternative, based on the referral of the clinic officer. The decision to select a third, fourth, etc. treatment alternative is typically influenced by further referral(s) of the last consulted Biomedical Health Provider (BHP) or Traditional Health Provider (THP).

2b) **Next treatment(s) based on previous experiences, on the social network and on illness diagnosis:** Illness includes communications and interpersonal interaction (Kleinman, 1980). In most cases, patients consult their families and relatives before deciding to rely on one or the other treatment alternative. During the illness episode, the patients also encounter and interact with many different people. Thus, the decision to select the next treatment alternative is usually based on previous experiences and on advices of the family and relatives, of the neighbours, or of people encountered during expected or unexpected meetings. The selection of next treatment alternative(s) is influenced by the diagnosis of the disease as well. On the one hand, patients often consult an additional BHP or THP in order to have a second or more reliable diagnosis. On the other hand, depending on the diagnosis, some patients decide to consult specialized BHPs or THPs in such illness.

Figure 30 shows a diagram representing the *realized* treatment seeking of a male patient (patient M.1) who suffered from haemorrhoids (the reader will find the diagrams for the 7 other patients in Annex 10). The entire illness episode of patient M.1 includes five treatment alternatives, selected successively in the biomedical and traditional health sector. The sequence pattern of treatments of patient M.1 is called *sequential zigzag* (cf. Chapter 3.2.2). There is an oscillation between the two types of medicine as the illness develops. In addition, for every treatment alternatives selected, the total treatment cost (travel cost and treatment cost) is reported on the diagram.

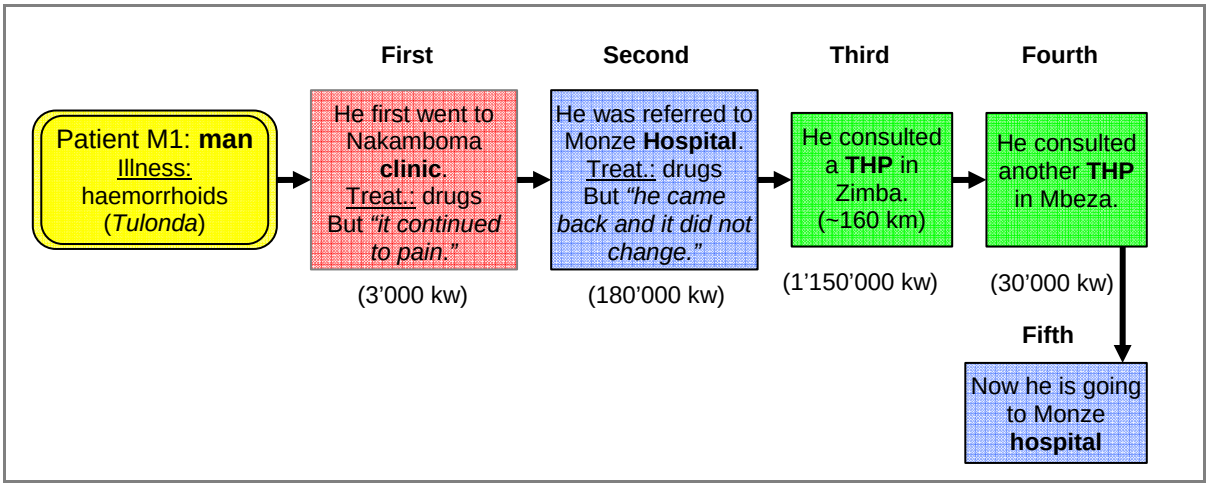


Fig. 30: Diagram summarizing the *realized* treatment seeking behaviour reported by patient M.1
Source: own representation

First treatment. In case of illness, it is a rule of thumb for the majority of the patients to first take home remedies and/or to attend a clinic/rural health centre (RHC). As stated by patient M.1: *"In his case and the family, the first thing that he starts to do is to go to the clinic… "* (November 2005). The reasons to first attend a clinic are manifold. Some patients select this treatment alternative because of the availability and effectiveness of modern drugs (keyword: availability and accountability): *"They think that modern herbs can respond quickly to the diseases, so that's why we go there* [to the clinic]" (Patient M.3, November 2005). Thus, in terms of treatment duration, biomedical medicine is considered to be more effective than traditional medicine. *"Yes, we want to be healed quickly because the traditional herbs take time to be healed, so that's why we rely on the modern medicaments to quickly recover"* (ibid). Another reason for attending the clinic is to have a first diagnosis, so that patients can decide if the illness should be later treated with biomedical or traditional medicine. Even if the economic reason was not mentioned for attending the clinic, the low prices (user fees) at the clinic (cf. Fig. 30) surely contribute to the decision to first rely on this treatment strategy (affordability). Figure 30 and Table 23 show that the treatments in the biomedical health sector – at least at the clinic - are less expensive than in the traditional health sector. This is confirmed by the

results of Merten (2006): 'Treatments by THPs were usually more expensive than treatments at the clinic especially for minor therapies'.

At this point, it is important to understand how patients decide to attend a specific clinic. As explained by patient M.1, he went to Nakamboma clinic "[…] *because it is the only nearest clinic…"* (November 2007). While the distance factor seems important for attending a specific clinic (accessibility), the catchment area seems also to be relevant. Each village belongs to the catchment area of one or two clinics. This could be described as a *restricted access* or *referral services access* in reference to the central place theory (Christaller, 1933) and to the Zambian referral system (cf. Chapter 2.1.3 and 3.3.2). As explained by patient M.1, the reason why he first visited RHC Nakamboma is "[…] *because he was assigned to… there are all assigned to go to Nakamboma clinic,* (Patient M.1, November 2005). Thus patients attend a specific clinic because they have a restricted access to the other ones. The belonging to a specific catchment area is further linked to economic issues (affordability), since patients might be overcharged when they visit a different clinic than the one from their village' catchment area.

For the majority of the patients, the first decision is to attend a clinic. However, some exceptions must be considered. For example, the treatment seeking behaviour mostly differs in case of emergency (severe injuries and accidents) and for patients from remote villages (especially fishing villages). The results of Chapter 5.4 have shown that patients from the fishing villages more frequently rely on a THP, delay their treatment, or do not do anything compared to patients from the agro-pastoralist villages. Furthermore, in case of emergency (severe injury or accident), patients directly attend a better equipped, or more specialized health care facility/provider that is mostly a hospital. In addition, few patients reported to first rely on a specific THP, because they trust her or him, and her/his herbal remedies (accountability). One female patient also explained that she mostly relies on a specific female THP *"[…] because she is quite negotiable in terms of payment"* (affordability).

As a consequence, patients have different reasons to first attend a clinic. However, they have different priorities and perceive the various access dimensions differently. Some of them consider a THP more affordable, reliable, etc. than attending a clinic and vice-versa.

Next treatment(s) based on referrals. The selection of the next treatment alternative(s) is often due to referrals and based on advice from either Biomedical Health Providers (BHPs) or Traditional Health Providers (THPs). In the biomedical health sector, when the illness gets more severe, or when it is necessary to rely on a medical doctor or on specific equipments (e.g. x-ray, operating theatre, etc.), patient are mostly referred to hospitals located outside the Mbeza Region. This is the case for the great majority of

the patients who have been interviewed, including patient M.1. (cf. Fig. 30): "[…] *from Nakamboma, he was referred to go to Monze hospital"* (November 2005).

Based on the referral system, patients must first go to the clinic to get a referral letter before attending a hospital, "[…] *because if you just go straight sometimes to Monze, it is not possible, they can not attend to you* [...]*"* (Patient M.1, November 2005). Except the referrals to *higher* health centres in the biomedical health sector, some THPs also refer patients to attend a clinic or a hospital when they are not able to heal the patient, or when the illness is *not for traditional medicine.* The last referral possibility is when patients are referred by BHPs to consult a THP. As explained by patient M.1: "[…] *sometime even in hospitals they also advice to go to traditional healers if they see that they give you some medicaments and there is no change they refer you to look for some traditional healers. So this also helps to decide to go to traditional healers"* (Patient M.1, November 2007). Additionally, THPs refer patients to each other. The herbalists and traditional healers often refer patients to consult another THP specialized in the illness/disease that the patient is suffering from.

Even if a referral is issued, it happens that the patients have not access - in terms of accessibility, acceptability or affordability - to the distant hospital or the distant specialized THP. They often do not have enough money for transport to the hospital, no means of transport might be available, or the roads impassable (not accessible). They sometimes have to sell a cow or borrow money from relatives before attending a distant health care provider. Transportation is particularly difficult during the rainy season. As explained by a female patient: *"She is saying that always during the rainy season, there is a shortage of money. Many people doesn't have enough money for medications and always when someone is assigned to go to further places to search medical help, there is a need to have enough money. Like she gave the example when she was assigned to go to Macha Hospital, there was a difficulty of finding a source of money* […]*"* (Patient W.2, November 2005).

Next treatment(s) based on previous experiences, on the social network, and on illness diagnosis. The selection of the next treatment(s) are also determined by patients own knowledge. For example, knowledge of the illness they are suffering or of a health care provider(s) specialized in treating such illness. Patients gain this information based on previous experiences (i.e. former illness episodes) and based on interactions with health care providers, and/or within their social network. For example, patient M.1 (cf. Fig. 30) explained that *"[w]hile he was Monze hospital, there he met a certain lady* […] *and this lady told him to go to this healer who stays in Zimba, because he is specialized in such diseases"* (November 2007). For this patient, after visiting a clinic and

a hospital, an unexpected meeting permitted him to expand his social network and to consult a THP specialized in his illness.

Previous or current experiences also have an influence on the treatment seeking behaviour of patients. After having consulted a specific THP who managed to treat her illness, a woman explained: *"She will always go the clinic or the hospital first. But for special diseases, she will maybe go first to the traditional healer, because she trusts now more. Now she has made a friendship and she will always come here and not to another traditional healer"* (Patient W.1, November 2005). Previous experiences permit to build trust (or mistrust) in various treatment alternatives, and in various BHPs and THPs. The social interactions and the previous experiences are part of the pathway model described in Figure 12 (cf. Chapter 3.3.1).

A further important factor influencing the selection of the next treatment(s) is related to the illness diagnosis and potential cause(s). The recognition by patients that they are suffering from a *traditional* or *modern* illness influences the reliance on either a BHP or a THP. As explained by a female patient (a nurse encountered at a THP): *"According to the type of the disease, the modern or the traditional medicine can be better"* (Patient W.1, November 2005). Hence, when the first treatment (clinic) does not heal the patient, he or she might select another treatment alternative, i.e. consult another BHP or THP, in order to obtain a *second* or *new* diagnosis. *"She came here* [THP.1] *to be told the cause of the disease, what was the cause. With modern medicine, this disease cannot be healed but with traditional medicine it is possible"* (Patient W.1, November 2005). Most patients seem to consult a THP only after having attended a clinic, sometimes a hospital. *"She first was thinking, she was just suffering from a normal disease but after the injections it became worst, that's why she wanted to take herbs and now it is working. She tried first two times with modern medicine but it became worst, that's why she tried traditional medicine…* (Patient W.1, November 2005). As a consequence, when the illness is difficult to cure, patients might try every treatment alternative available, accessible, acceptable or affordable. As explained by patient M.3: *"We tried all the possible ways to get this child to be healed; we even used the traditional herbs. At last we decided to take the child to Zion church"* (Patient C.3, November 2005).

When patients perceived the first treatment as being ineffective (clinic), they might request a second or new diagnosis, try other treatment alternative(s), or seek other BHP(s) or THP(s). In this case, they follow a *sequential zigzag treatment sequence*. On the other side, some patients consider biomedical and traditional medicine as complementary, so that they follow a *complementary treatments sequence* (cf. Chapter 3.2.2). As explained by patient M.3: *"At the moment I'm using both, African medicine or herbs with the modern medicaments, the medicine… tablets"* (November 2005).

5.5 Determinants of the *realized* treatment seeking behaviour: statistical analysis

In section 5.5.1, 5.5.2 and 5.5.3 the results of the single and multiple predictors' models (BLR and MLR) based on the dependent variable DV.1, DV.2 and DV.3 (cf. Chapter 4.4) are presented and analysed. The results of the more meaningful or relevant MLR for each DV have been selected. In epidemiology, the gender and age are always included in the models. The other IVs have been integrated in a second step by using the forward stepwise method in order to find the decisive IVs predicting the three DVs.

It was impossible to simultaneously integrate the residence factor, the livelihood strategies, the ethnic affiliation, and the nearest distances to the different health providers/facilities or to the nearest road, because these factors show high degrees of correlation (multicollinearity). The results of the multivariate logistic regressions integrate data clustering, i.e. a correction for the households that have been surveyed during both the fieldwork of Merten (2002-04) and own fieldwork (2005).

Since patients rarely consult the nearest Biomedical or Traditional Health Provider (BHP or THP, cf. results of the previous chapters), distances to the clinic, hospital and THP integrated in the logistic regressions are corrected, based on the results of Chapter 5.2.1 and 5.2.2. The differences between the mean distances to the nearest clinic, hospital and THP and the median distances to the selected/consulted clinic, hospital and THP in 2004, were adjusted to correct the minimum distance accessibility of each household to the different health care providers. Thus, 100 m were added to the distances to the nearest clinic, 5.9 km to distances to the nearest hospital and 1.9 km to distances to the nearest THP (cf. Table 14 and 15).

5.5.1 Influence factors on the use of home remedies or no treatment

According to Table 22 (cf. Chapter 5.4.2: *Realized treatment seeking behaviour*), 124 from 353 patients (35%) first relied on home remedies – either herbal medicine or modern drugs or both – in order to heal themselves during the last episode of illness. In addition, 10 patients (3%) did nothing at all. These have been grouped in order to focus on the patients who did not rely on any health care provider or delayed (at least) the first treatment. The 134 patients account for about 38% of all cases The Dependent Variable (DV) in the logistic regression for these patients is:

(DV.1) *Only self or no treatment YES/NO* (1/0)

Bivariate (single predictor) logistic regression (BLR). According to the results of the CHI^2 test (for independent categorical variables) and of the T/U tests (for continuous variables), the following predictive variables have shown a significant association with DV.1 (p<.10): *distance [km] to the nearest road, distance [km] to the nearest hospital, square distance to the nearest THP, villages of residence, fishing camps/agro-pastoralist villages, catchment area of clinics, ethnic group: Batwa, patient's age: 20-25 years old, household budget, symptoms: chest pains, illness: chest pains/cardio-vascular problems, illness: malaria, illness: respiratory infections, illness: headache*. Interactions: *gender*dist. nearest road (continuous), gender*dist. nearest clinic (continuous), age*dist. nearest road (continuous), age*dist. nearest clinic (continuous).*

Unfortunately, there are a great deal of missing values (>50%) for the following IV: *household budget* and this variable does not generate a significant BLR (p>.10). Thus it has been omitted in the analysis. The resulting crude odds ratios of the selected spatial and non-spatial IVs predicting DV.1 are presented in Table 26 and 27, respectively. First, the residence factor (BLR 1.1) shows that patients who are living in the fishing villages (remote areas) are 1.5 times more likely to only rely on self/no treatment than those from the agro-pastoralist villages. Second, the distances to the nearest hospital is a useful predictor as well (p=.03). The distances in km to the nearest hospital have been divided by 10 in order to describe the odds of relying on only home remedies/no treatment for a 10 km increase. The results of BLR 1.3 show that patients would have an increase of about 5 of the odds of relying only on self/no treatment for each 10 km increase in the distance separating patients' households from the nearest hospital. Patients also have an increase of about 1.5 of the odds of relying on self/no treatment for each 10 km increase in the distance separating the patient's households from the nearest road. The other spatial IVs do not seem to be useful for predicting DV.1 (p>.10). In order to interpret the interactions the have yielded significant results (p<.10), separated Bivariate Logistic Regression have been calculated for each sub-group.

The results of the interactions indicate that the distances to the nearest road and clinic are only useful to predict the reliance on self/no treatment for male patients and for children (less than 15 Years old). Male patients are 2 times more likely, and children under 15 years are 4.5 times more likely to rely on only self/no treatment for each 10 km increase separating patients' households from the nearest road. Additionally, male patients are about 1.5 times more likely and children under 15 years of age are about 3 times more likely to rely on only self/no treatment for each 10 km increase separating patients' households from the nearest clinic.

Many non-spatial IVs are also useful predictors for DV.1 (cf. Table 27, crude odds ratios). The patients suffering from headache are about 5.5 times more likely and those suffering

from malaria are about twice more likely to only rely on home remedies/no treatment than the patients who are suffering from other illnesses.

	Only self/no treatment				Crude Odds Ratio			
	Independent Variables	Model	Sub-group[1] (Effect modifier)	#Obs. (%)	OR	95.0% CI		Sig.
Spatial Independent variables	Agro-pastoralist (0) / Fishing village (1)	**BLR 1.1**	**Total**	353 (100)	**1.5**	0.95	0.08	0.08
	Distance nearest road *[km/10]*	**BLR 1.2**	**Total**	353 (100)	**1.41**	0.95	0.09	0.09
		BLR 1.2a	Gender=male	154 (51)	**2.11**	1.13	0.02	0.02
		BLR 1.2b	*Gender=female*	*150 (49)*	***0.79***	*0.40*	*0.48*	*0.48*
		BLR 1.2c	Age = < 15 y.	37 (11)	***4.52***	*1.12*	*18.21*	*0.03*
		BLR 1.2d	Age = 15-65 y.	*280 (81)*	***1.34***	*0.86*	*2.11*	*0.20*
		BLR 1.2e	Age = > 65 y.	*28 (8)*	***1.06***	*0.28*	*0.93*	*0.93*
	Distance nearest clinic [km/10]	**BLR 1.3**	***Total***	*353 (100)*	***1.21***	*0.95*	*0.12*	*0.12*
		BLR 1.3a	Gender=male	154 (51)	**1.45**	0.99	0.06	0.06
		BLR 1.3b	*Gender=female*	*150 (49)*	***0.91***	*0.60*	*0.64*	*0.64*
		BLR 1.3c	Age = < 15 y.	37 (11)	**2.95**	1.17	7.49	0.02
		BLR 1.3d	Age = 15-65 y.	*280 (81)*	***1.20***	*0.91*	*1.58*	*0.21*
		BLR 1.3e	Age = > 65 y.	*28 (8)*	***0.89***	*0.40*	*1.99*	*0.77*
	Distance nearest hospital [km/10]	**BLR 1.4**	**Total**	353 (100)	**4.86**	1.15	0.03	0.03
	Distance nearest BHP [km/10]	**BLR 1.5**	**Total**	*353 (100)*	***1.15***	*0.94*	*0.18*	*0.18*
	Distance nearest THP [km/5]	**BLR 1.6**	**Total**	*353 (100)*	***0.35***	*0.05*	*0.32*	*0.32*
	Distance nearest health provider [km/10]	**BLR 1.7**	**Total**	*353 (100)*	***0.58***	*0.14*	*0.46*	*0.46*

[1] : due to significant interactions for gender and age with the distance to the nearest clinic and road, the effect for the distances variables have been calculated separately for each sub-groups (stratified models)

Table 26: Influence of spatial variables on the reliance of only self/no treatment (DV.1), single predictor models Source: own representation

On the other hand, patients who are suffering from chest pains or respiratory infections are about 3 times more likely to *not* rely on self/no treatment.

Multivariate logistic regression (MLR). The results of the more meaningful or relevant multiple predictor logistic regression is presented in Table 27, for the reliance on *only self/no treatment* (DV.1). The two spatial IVs that were integrated in the second block: the distance to the nearest clinic (cat.) and the distance to the nearest THP (cat.), do not yield a significant result for every category.

The significant results (p<.10) indicate that patients living between 5.5 and 7.5 km from the nearest clinic are about 2.5 times more likely to use only self/no treatment than patients who are living at less than 5.5 km from the nearest clinic. The patients living between 10.5 and 25.5 km from the nearest clinic are again more likely (4 times) to only use self/no treatment. Furthermore, patients who are living more than 3 km from the nearest THP are about 2.5 more likely to only rely on self/no treatment in comparison with those who are living at less than 3 km from the nearest THP. This means that an increase in the distances of both the Biomedical and the Traditional Health Provider is associated with an increase in the use of only self/no treatment.

However, the factor having the strongest effect on the prediction to DV.1 is the illness *headache*. The patients who are suffering from this illness are 7 times more likely to rely on only self/no treatment.

Only self/no treatment		***Crude Odds Ratio*** [1] *(N=353)*				***Adjusted Odds Ratio*** [3] *(N=301)*			
Spatial and non-spatial variables	#Obs. (%)	**OR**	95.0% CI		Sig.	**OR**	95.0% CI		Sig.
Dist. nearest clinic (ref= <5.5 km) [c, 2]	56 (19)	**1.00**	-	-	-	**1.00**	-	-	-
Dist. nearest clinic: 5.5-7.5 km	85 (28)	**1.18**	0.59	2.36	0.65	**2.51**	0.45	7.97	0.45
Dist. nearest clinic: 7.5-10.5 km	65 (28)	**0.49**	0.22	1.11	0.09	**0.78**	0.23	1.89	0.23
Dist. nearest clinic: 10.5-25.5 km	45 (15)	**2.06**	1.01	4.22	0.05	**3.98**	0.16	12.80	0.16
Dist. nearest clinic: >25.5 km	62 (21)	**0.83**	0.40	1.73	0.62	**1.56**	0.03	5.06	0.03
Dist. nearest THP (ref= < 3 km)[d]	235 (78)	**1.00**	-	-	-	**1.00**	-	-	-
Dist. nearest THP: > 3 km	66 (22)	**0.88**	0.52	1.50	0.65	**2.50**	0.08	6.91	0.08
Gender patient = male	152 (51)	**1.24**	0.78	1.98	0.36	**1.39**	0.21	2.33	0.21
Age patient [year]: 20-25 y.	33 (11)	**2.58**	1.32	5.04	0.01	**2.31**	0.06	5.48	0.06
Illness : respiratory infections [a]	34 (11)	**0.34**	0.15	0.79	0.01	**0.39**	0.08	1.12	0.08
Illness : headache [b]	8 (3)	**5.35**	1.06	26.89	0.04	**7.04**	0.03	41.54	0.03
Illness : malaria [e]	99 (33)	**2.16**	1.37	3.39	0.00	**1.70**	0.07	3.00	0.07
Not integrated into multivariate analysis after the stepwise selection									
Illness : chest pains	24 (7)	**0.32**	0.11	0.96	0.04	**-**	-	-	-

Block 1: Enter for gender and age — Nagelkerke R Square = 0.15
Block 2: Forward LR for all other independent variables, stepwise selection: Entry: p<.10
[a], [b], [c], [d], [e]: variables entered on step 1, 2, 3, 4, 5

[1]: 2% missing for age and 14% missing for gender
[2]: nearest distance separating patient's household from the clinic is 4.2 km
[3]: adjusted for all independent variables of Table 27, and clustered by household (215 households)

Table 27: Influence of spatial and non-spatial variables on the reliance of only self/no treatment, (DV.1) adjusted for clustering on household Source: own representation

The second influence factor is the illness *respiratory infections*. Patients who are suffering from this illness are about 3 times *less* likely (1/0.39) to rely on only self/no treatment. Then, patients suffering from malaria are 1.7 times more likely to rely on only self/no treatment. The age category *20-25 years old* is an important predictor as well. People of this age are more than twice more likely to use only self/no treatment in comparison with the other categories of age. With this model, about 66.1% of the observations related to DV.1 can be correctly predicted.

5.5.2 Influence factors on biomedical health care visitation

Table 20 (cf. Chapter 5.4.2: *Realized treatment seeking behaviour*) shows that 192 patients from 353, ever visited a biomedical health centre/ever consulted a Biomedical Health Provider (BHP) – be it at a clinic and/or at a hospital - during the last case of illness. These patients account for about 54% of all cases and represent the patients who relied on one or several Biomedical Health Providers (BHPs), combined or not with the

consultation of one or several Traditional Health Providers (THPs). The Dependent Variable at the basis of the logistic regressions is:

(DV.2) *Ever Biomedical Health Provider visitation YES/NO* (1/0)

Bivariate (single predictor) logistic regression (BLR). Based on to the results of the CHI^2 test (for independent categorical variables) and of the T/U tests (for continuous variables), the following predictive variables have shown a significant association with DV.2 (p<.10): *distance [km] to the nearest road, distance [km] to the nearest hospital, distance [km] to the nearest THP, villages of residence, fishing camps/agro-pastoralist villages, catchment area of clinics, ethnic group: Batwa, patient's age: 20-25 years old, household budget, household livelihood, illness: chest pains/cardio-vascular problems, illness: tooth problem, illness: respiratory infections, illness: headache, illness: diarrhoea, illness: injury* (10 cases, Fisher test)*, illness: STDs* (8 cases, Fisher test). Interactions: *gender*dist. nearest road (continuous), gender*dist. nearest clinic (continuous), gender*dist. nearest THP (continuous), age*dist. nearest clinic (continuous).*

For the same reasons as for DV.1, the IV *household budget* was not included in the analysis. Some variables were showing very small frequencies (*illness: injury* and *illness: STDs*). Even if the Fisher exact test confirms a significant association (p<.10) between these variables and DV.2, the results must be interpreted with caution. The resulting crude odds ratios of the selected spatial and non-spatial IVs predicting DV.2 are presented in Table 28 and 29, respectively. All spatial IVs are relevant for the model (p<.10). Patients from the fishing villages are about 1.7 *less* likely to ever consult a BHP than patients from the agro-pastoralist villages (1/0.58=1.7).

The biggest effect of a spatial IV is based on the distance to the nearest hospital [km/10]. The inverse OR for this IV is equal to about 6.7, meaning that with an increase of 10 km in the distance separating patients' households from the nearest hospital, patients are about 6.7 times *less* likely to ever consult a BHP. The second OR is related to the distances to the nearest THP: with 5 km increase in the distance separating patients' households from the nearest THP, patients are about 6.4 more likely to ever consult a BHP. This means that not only the distance to reach a clinic has an influence on the *ever consultation of a BHP*, but the difficulty to reach a THP is also a relevant factor as well. The results of the interactions indicate that the distances to the nearest road, clinic and THP have a strong effect on male patients and on children (less than 15 Years old) to ever consult a BHP. Male patients are about 1.7 times (1/0.60) *less* likely, and children under 15 years of age are about 2.7 times (1/0.37) *less* likely to ever consult a BHP for each 10 km increase separating patients' households from the nearest clinic.

More notable, is the OR of the male patients, who are about 20.7 times more likely to ever consult a BHP for each 10 km increase in the distance separating their households from the nearest THP.

	Ever consultation of a Biomedical Health Provider				Crude Odds Ratio			
	Independent Variables	Model	Sub-group[1] (Effect modifier)	#Obs. (%)	OR	95.0% CI		Sig.
Spatial Independent variables	Agro-pastoralist (0) / Fishing village (1)	**BLR 2.1**	**Total**	353 (100)	**0.58**	0.37	0.90	0.02
	Distance nearest road *[km/5]*	**BLR 2.2**	**Total**	353 (100)	**0.78**	0.65	0.95	0.01
		BLR 2.2a	Gender=male	154 (51)	**0.60**	0.43	0.83	0.00
		BLR 2.2b	*Gender=female*	150 (49)	***1.07***	*0.78*	*1.47*	*0.66*
	Distance nearest clinic [km/10]	**BLR 2.3**	***Total***	353 (100)	**0.76**	0.60	0.97	0.02
		BLR 2.3a	Gender=male	154 (51)	**0.60**	0.40	0.88	0.01
		BLR 2.3b	*Gender=female*	150 (49)	***1.05***	*0.72*	*1.55*	*0.80*
		BLR 2.3c	Age = < 15 y.	37 (11)	**0.37**	0.16	0.85	0.02
		BLR 2.3d	Age = 15-65 y.	280 (81)	***0.80***	*0.61*	*1.05*	*0.11*
		BLR 2.3e	Age = > 65 y.	28 (8)	***0.93***	*0.42*	*2.05*	*0.85*
	Distance nearest hospital [km/10]	**BLR 2.4**	**Total**	353 (100)	**0.15**	0.04	0.62	0.01
	Distance nearest BHP [km/10]	**BLR 2.5**	**Total**	353 (100)	**0.83**	0.68	1.01	0.06
	Distance nearest THP [km/5]	**BLR 2.6**	**Total**	353 (100)	**6.42**	0.90	46.01	0.06
		BLR 2.6a	Gender=male	154 (51)	**20.65**	0.75	572.05	0.07
		BLR 2.6b	*Gender=female*	150 (49)	***0.21***	*0.01*	*4.61*	*0.33*
	Distance nearest health provider [km/10]	**BLR 2.7**	**Total**	353 (100)	**3.25**	0.81	13.00	0.10

[1] **:** due to significant interactions for gender and age with the distance to the nearest clinic and road, the effect for the distances variables have been calculated separately for each sub-groups (stratified models)

Table 28: Influence of spatial variables on the ever consultation of a Biomedical Health Provider (DV.2), single predictor models Source: own representation

The different illnesses seem to be particularly important for predicting the reliance on a BHP (cf. Table 29, crude odds ratios). Patients who are suffering from STDs are about 6 times more likely to ever consult a BHP, for chest pains and injury it is 3.5 times, diarrhoea 2.5 times, and for respiratory infections it is 2 times more likely to ever consult a BHP. On the other hand, patients suffering from headache are 8.3 times *less* likely, and from teeth problems 4.5 times *less* likely to consult a BHP.

Multivariate logistic regression (MLR). The results of the more meaningful or relevant multiple predictor logistic regression is presented in Table 29, for the *ever consultation of a Biomedical Health Provider* (DV.2). The only spatial IV that was integrated in the second block is the distance to nearest hospital (cat.). A decrease in the odds ratios can be noticed from 0.71 to 0.09, as the distance to the nearest hospital increases. Since the reference category is the nearest category (less than 44 km), this means that the patients who are living farther from the nearest hospital are less likely to ever consult a BHP. In comparison with the patients living at less than 44 km from the nearest hospital, the patients who are living between 44-47 km, 47-50 km, 50-53 km,

53-56 km and more than 56 km are 1.4 times, 2.1 times, 2.4 times, 1.8 times, and 11.1 times *less* likely to ever consult a BHP, respectively.

Ever consultation of a Biomedical Health Provider		*Crude Odds Ratio [1] (N=353)*				*Adjusted Odds Ratio [2] (N=301)*			
Spatial and non-spatial variables	#Obs. (%)	**OR**	95.0% CI		Sig.	**OR**	95.0% CI		Sig.
Dist. nearest hospital (ref=<44 km)[a]	39 (13)	**1.00**	-	-	-	**1.00**	-	-	-
Dist. nearest hospital: 44-47 km	67 (22)	**0.66**	0.29	1.52	0.33	**0.71**	0.27	1.86	0.01
Dist. nearest hospital: 47-50 km	66 (22)	**0.43**	0.19	0.99	0.05	**0.48**	0.19	1.22	0.01
Dist. nearest hospital: 50-53 km	27 (9)	**0.48**	0.17	1.32	0.16	**0.42**	0.15	1.14	0.04
Dist. nearest hospital: 53-56 km	82 (27)	**0.69**	0.32	1.52	0.36	**0.56**	0.23	1.35	0.07
Dist. nearest hospital: >56 km	20 (7)	**0.18**	0.07	0.46	0.00	**0.09**	0.02	0.48	0.03
Gender patient = man	152 (50)	**0.83**	0.53	1.30	0.41	**0.70**	0.44	1.13	0.15
Age (cat.)= 20-25 y.	33 (11)	**0.36**	0.18	0.72	0.00	**0.46**	0.20	1.10	0.08
Illness: tooth problems[b]	14 (5)	**0.22**	0.06	0.79	0.02	**0.23**	0.06	0.91	0.04
Illness: respiratory infection[c]	34 (11)	**2.03**	0.99	4.15	0.05	**2.79**	1.17	6.61	0.02
Illness: chest pains[d]	21 (7)	**3.45**	1.25	9.40	0.02	**2.90**	0.91	9.23	0.07
Illness: STDs[e]	8 (3)	**6.05**	0.74	49.73	0.09	**6.12**	0.72	52.30	0.10
Illness : diarrhoea[f]	15 (5)	**2.45**	0.86	6.97	0.09	**2.98**	0.88	10.12	0.08
Not integrated into multivariate analysis after the stepwise selection									
Illness : injury	7 (2)	**3.46**	0.72	16.51	0.12	**-**	-	-	-
Dist. nearest THP (ref= < 2.5 km)	235 (78)	**1.00**	-	-	-	**-**	-	-	-
Dist. nearest THP: > 2.5 km	66 (22)	**1.43**	0.93	2.20	0.10	**-**	-	-	-

Block 1: Enter for gender and age — Nagelkerke R Square = 0.20

Block 2: Forward LR for all other independent variables, stepwise selection: Entry: p<.10

[a], [b], [c], [d], [e]: variables entered on step 1, 2, 3, 4, 5

[1]: 2% missing for age and 14% missing for gender

[2]: adjusted for all independent variables of Table 29, and clustered by household (215 households)

Table 29: Influence of spatial and non-spatial variables on the ever consultation of a Biomedical Health Provider (DV.2), adjusted for clustering on household Source: own representation

The factor having the strongest effect on the prediction to ever (or never) consult a BHP is the illness *STDs*. Patients suffering from STDs are 6.1 times more likely to ever consult a BHP. Then, the patients suffering from toothache are about 4.3 times *less* likely to ever consult a BHP (1/0.23=4.3). Next follows the illnesses *diarrhoea, chest pains,* and *respiratory infections*. Patients suffering from these illnesses are 3 times, 2.9 times, and 2.8 times more likely to ever consult a BHP, respectively. Then the age category 20-25 years old is an important predictive factor. People of this age group are 2.2 times *less* likely to use self/no. With this model, about 65.4% of the observations related to DV.2 are correctly predicted.

5.5.3 Influence factors on traditional practitioner visitation

Based on the results of Table 22 (cf. chapter 5.4.2: *Realized treatment seeking behaviour*), 64 patients from 353 ever consulted a Traditional Health Provider (THP) – be

it an herbalist, a traditional healer/African doctor, faith healer, etc. - in order to recover from the last case of illness. These patients consulted one or several Traditional Health Providers (THPs), combined or not with the visitation of one or several Biomedical Health Providers (BHPs), they account for about 18% of all cases. Thus the Dependent Variable for this last logistic regression is:

(DV.3) *Ever Traditional Health Provider consultation YES/NO* (1/0)

Bivariate (single predictor) logistic regression (BLR). According to the results of the CHI^2 test (for independent categorical variables) and of the T/U tests (for continuous variables), the following predictive variables have shown a significant association with DV.3 (p<.10): *distance [km] to the nearest health care provider, distance [km] to the nearest THP, villages of residence, fishing camps/agro-pastoralist villages, catchment area of clinics, patient's ethnic group, patient's age (cat.): 5-15 years old, gender patient, patients' education, household livelihood, symptom: rheumatic problems/ musculoskeletal pain, illness: malaria, illness: gastrointestinal infections, illness: illnesses related to witchcraft, illness: STDs* (8 cases, Fisher's test).

The resulting crude odds ratios of the spatial IVs that predict DV.3 are presented in Table 30 and 31. There are only two BLRs that include a useful spatial variable in order to predict the *ever consultation of a THP* (p<.10): BLR 3.6, and BLR 3.7. First, the distance to the nearest THP has a strong effect, indeed an increase of 5 km separating patients' household from the nearest THP result in a 25 times increase for *not* consulting a THP (1/0.04=25). The non-spatial factor *education* (cf. BLR 3.8 and BLR 3.9) is also useful for predicting the *ever consultation of a THP*. The patients who attended secondary school (i.e. above grade 7) are about 5 times *less* likely to ever consult a THP.

	Ever consultation of a Traditional Health Provider (DV.3)				Crude Odds Ratio			
	Independent Variables	Model	Sub-group[1] (Effect modifier)	#Obs. (%)	OR	95.0% CI		Sig.
Spatial Independent variables	*Agro-pastoralist (0) / Fishing village (1)*	**BLR 3.1**	**Total**	353 (100)	***1.09***	*0.62*	*1.93*	*0.76*
	Distance nearest road [km/5]	**BLR 3.2**	**Total**	353 (100)	***1.12***	*0.69*	*1.83*	*0.65*
	Distance nearest clinic [km/10]	**BLR 3.3**	***Total***	353 (100)	***1.06***	*0.78*	*1.43*	*0.72*
	Distance nearest hospital [km/10]	**BLR 3.4**	**Total**	353 (100)	***0.66***	*0.11*	*3.87*	*0.65*
	Distance nearest BHP [km/10]	**BLR 3.5**	**Total**	353 (100)	***0.96***	*0.75*	*1.24*	*0.77*
	Distance nearest THP [km/5]	**BLR 3.6**	**Total**	353 (100)	**0.04**	0.00	0.66	0.03
	Distance nearest health provider [km/10]	**BLR 3.7**	**Total**	353 (100)	**0.07**	0.01	0.84	0.04
Non-spatial	Education level of patient	**BLR 3.8**	**Total**	**158 (45)**	**0.85**	0.70	1.02	0.08
	Education patient (cat. ≤7, >7)	**BLR 3.9**	**Total**	**158 (45)**	**0.22**	0.05	1.00	0.05

[1]: no significant interactions were found in relation to the ever consultation of a Traditional Health Provider

Table 30: Influence of spatial variables on the ever consultation of a Traditional Health Provider (THP), single predictor models Source: own representation

However, due to the high number of missing values present in this variable (only 158 patients, 45%), this independent variable was not integrated in the multivariate logistic regression.

The strongest effect in the different bivariate logistic regressions is produced by the illnesses related to witchcraft. The patients suffering from this illness type are about 14.5 times more likely to ever consult a THP. The patients suffering from STDs are about 4.8 times more likely to ever consult a THP. In addition, the patients experiencing the symptom rheumatic problems/musculoskeletal pain are 3 times more likely to ever consult a THP. On the other hand, the patients who are suffering from gastrointestinal infections and malaria are about 3.3 times and 4.5 times *less* likely to ever consult a THP, respectively. The *ever consultation of a THP* is the only treatment alternative (the only dependent variable) where gender is a relevant predictor (p=.10). The female patients are about 1.6 times more likely to ever consult a THP than the male patients (1/0.62).

Multivariate logistic regression (MLR). The results of the more meaningful or relevant multiple predictor logistic regression is presented in Table 31, for the *ever consultation of a Traditional Health Provider* (DV.3). A decrease in the odds ratios can be observed as the categories for distance categories to the nearest THP increases. Since the reference category is the nearest category (less than 2 km from the nearest THP), this means that the patients who are living farther from the nearest THP are less likely to ever consult a THP. The patients who are living between 2 and 2-5 km from the nearest THP are about 2.5 less likely to ever consult a THP than for patients living at less than 2 km from the nearest THP. The patients who are living between 2-5 and 3 km are even less likely to ever consult a THP (3.8 times). The patients living farther than 3 km from the nearest THP are about 5 times less likely to ever consult a THP than for the patients who are living at less than 2 km from the nearest THP. This category did not yield a significant result (p>.10). After being integrated in the multivariate logistic regression, the gender and the age variables did not yield significant results (p>.10).

The illnesses related to witchcraft represent the variable having the strongest effect on the *ever consultation of a THP.* The patients who are suffering from this illness type are about 10.5 more likely to ever consult a THP, which confirm that the indigenous illness are mostly treated with traditional medicine. The relative high effect produced by the patients suffering from STDs must be interpreted with caution since the frequencies are very small (only 8 cases). These patients are about 4.7 more likely to ever consult a THP.

The patients having the symptom of rheumatic problems are also more likely to ever consult a THP (2.3 times). With this model, about 83.2% of the observations are correctly predicted.

Ever consultation of a Traditional Health Provider		*Crude Odds Ratio [1] (N=353)*				*Adjusted Odds Ratio [2] (N=297)*			
Spatial and non-spatial variables	#Obs. (%)	**OR**	95.0% CI		Sig.	**OR**	95.0% CI		Sig.
Dist. nearest THP (ref=<2 km) [d]	20 (7)	**1.00**	-	-	-	**1.00**	-	-	-
Dist. nearest THP*: 2-2.5 km*	114 (38)	**0.32**	0.12	0.83	0.02	**0.40**	0.14	1.14	0.01
Dist. nearest THP*: 2.5-3 km*	62 (21)	**0.25**	0.08	0.74	0.01	**0.26**	0.08	0.86	0.09
Dist. nearest THP*: >3 km*	101 (34)	**0.15**	0.05	0.42	0.00	**0.20**	0.06	0.62	0.55
Gender patient=male	152 (51)	**0.62**	0.35	1.11	0.10	**0.64**	0.34	1.21	0.17
Age patient= 5-15 y.	13 (4)	**2.71**	0.96	7.63	0.06	**1.99**	0.48	8.27	0.34
Symptom: rheumatic problems [c]	51 (17)	**2.96**	1.58	5.54	0.00	**2.32**	1.07	4.99	0.03
Illness: ill. related to witchcraft [a]	17 (6)	**14.48**	4.95	42.36	0.00	**10.47**	3.30	33.16	0.00
Illness : STDs [b]	8 (3)	**4.75**	1.16	19.53	0.03	**4.70**	1.00	22.38	0.05
Not integrated into multivariate analysis after the stepwise selection									
Dist. nearest hospital (ref= < 45 km)	87 (25)	**1.00**	-	-	-				
Dist. nearest hospital: 45-50 km	84 (24)	**2.67**	1.22	5.88	0.01	-	-	-	-
Dist. nearest hospital: 50-55 km	86 (24)	**2.06**	0.94	4.53	0.07	-	-	-	-
Dist. nearest hospital: > 55 km	40 (11)	**0.56**	0.20	1.59	0.28	-	-	-	-
Illness : malaria	98 (28)	**0.30**	0.15	0.61	0.00	-	-	-	-
Illness : gastrointestinal infections	33 (9)	**0.22**	0.05	0.94	0.04	-	-	-	-

Block 1: Enter for gender and age — Nagelkerke R Square = 0.23

Block 2: Forward LR for all other independent variables, stepwise selection: Entry: p<.10

[a], [b], [c], [d] : variables entered on step 1, 2, 3, 4

[1]: 2% missing for age and 14% missing for gender

[2]: adjusted for all independent variables of Table 29, and clustered by household (213 households)

Table 31: Influence of spatial and non-spatial variables on the ever consultation of a Traditional Health Provider (THP), adjusted for clustering on household Source: own representation

5.6 Comparison between *usual*, *intended* and *realized* treatment seeking behaviour

Figure 31 shows pie charts summarizing the results of the *usual*, *intended* and *realized* treatment seeking behaviours. One can directly recognise that the different methods used for investigating the treatment seeking behaviours of the people of Mbeza yielded different results. The *usual* treatment seeking behaviour is the most abstract way to ask people how they behave in case of illness. By asking where the patients most frequently go for treatment, the home remedies are not considered and the locations of the health care providers most frequently consulted do not take into account the illness type, and the treatment sequence followed by patients when the illness gets more severe. However, the *usual* treatment seeking behaviour concept allows identifying that the majority of the local actors most frequently attend a clinic in case of illness.

In contrast to the *usual* treatment seeking behaviour, the *intended* treatment seeking behaviour takes into account the illness type and the intended treatment sequence

followed when the illness gets more severe. This dual perspective when analysing the treatment seeking behaviour in a population generates more precise results. Different treatment strategies can be discovered, distinguishing for *modern* and *traditional* illnesses (cf. Chapter 5.3). However, depending on the number and type of illnesses surveyed, the cumulated result, i.e. the *total* intended treatment seeking behaviour of all aggregated illnesses might differ considerably, as shown in Figure 31 in the pie charts 2a) and 2b). During fieldwork 2002-04, the intended treatment seeking behaviour of 12 common or modern illnesses was investigated. The two traditional illnesses added during fieldwork 2005 have resulted in a considerable change in the *total* intended treatment seeking behaviour.

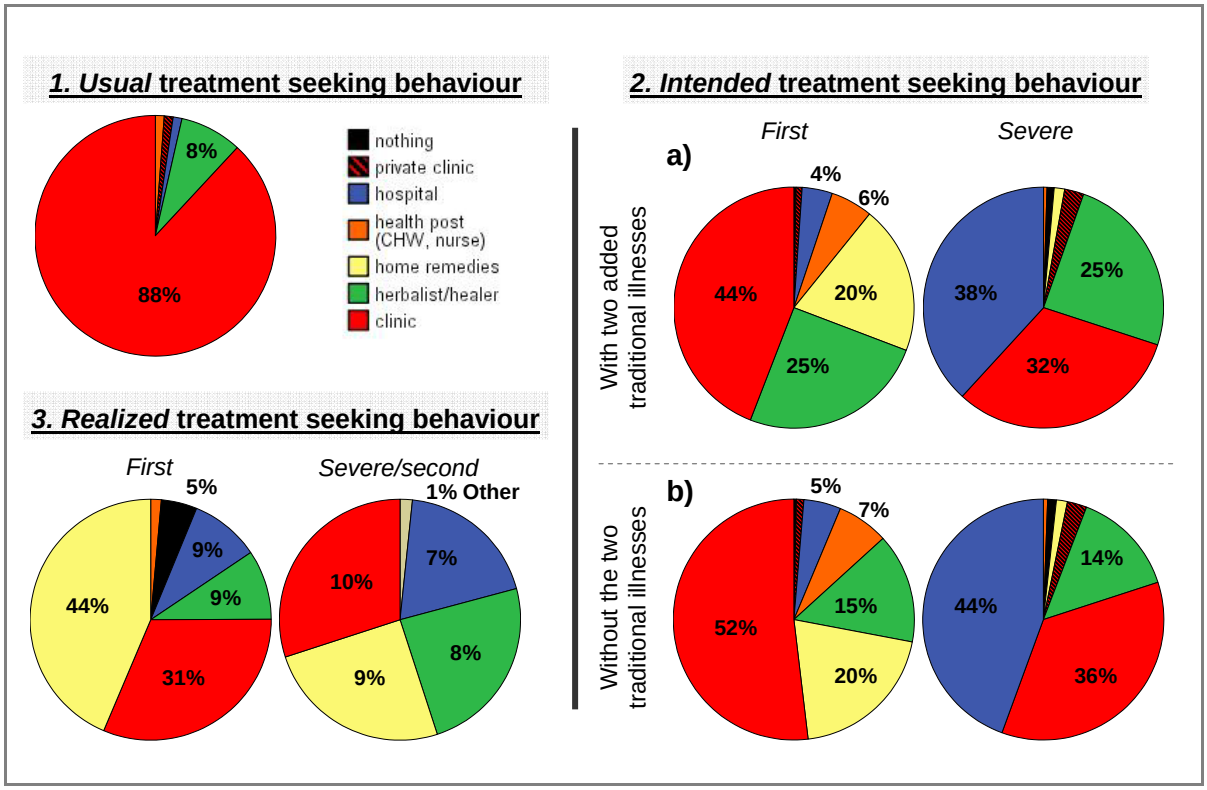


Fig. 31: Comparison between *usual* (N=84), *intended* (N=279) and *realized* (N=353) treatment seeking behaviour Source: own representation

Many differences can be identified between what local actors **would do** (*intended* treatment seeking behaviour) and what patients **actually did** (*realized* treatment seeking behaviour) in case of illness. This is visualised into the pie charts. In contrast to the *realized* treatment seeking behaviour, local actors seem to over report the clinic visitations (52% compared with 31%) and the THPs consultations (15% compared with 9%) in the *intended* treatment seeking behaviour. The over-reporting of the use of the clinic and THP seems also apparent when the illness gets more severe.

However, for the second treatment, the hospital attendances are also over-reported in the *intended* treatment seeking behaviour. On the other hand, there seem to exist an

under-reporting of the hospital attendances and of the use of home remedies for the first treatment. Various reasons for this over, respective under-reporting of certain treatment alternatives can be put forward. First, the presence of severe illnesses or injuries, and accidents, in our sample for the *realized* treatment seeking behaviour might explain the high reliance on the hospital for the first treatment alternative selected. Second, the diagnosis in the *intended* treatment seeking behaviour is *given* to the local actors. On the other hand, in the *realized* treatment seeking behaviour the patients mostly have to obtain a diagnosis for their illness by consulting a BHP and/or a THP. In other words, the *intended* treatment seeking behaviour does not take into account the first phase of an illness episode: the perception and interpretation of symptoms and the identification of the illness (diagnosis).

The results of the semi-structured patient interviews of (cf. Chapter 5.4.5) have additionally indicated that the identification of the illness might be a reason for consulting specific Biomedical or Traditional Health Providers (BHPs or THPs). Third, local actors are not ill at the time there are interviewed which can influence their responses as well.

Influence of the distance factor. Would local actors consult farther or nearer BHPs and THPs than patients actually did? The results of Table 31 shows that the majority of the local actors usually consult more distant THPs (median distance: 2.9km and 2.4km, respectively) and more distant BHPs (7.6km, 7.5km) than for their *intended* treatment seeking behaviour. In contrast, for the *realized* treatment seeking behaviour, most patients consult nearer THPs (1.5km) and BHPs (7.4km) for the first treatment. However, a few patients consult very distant ones, resulting in a large mean distance for the selected BHPs in the *realized* treatment seeking behaviour. In addition, a comparison of the maps showing the distances and travel paths of the *usual* (cf. Map 7)*, intended* (cf. Maps 8, 9, 10) and *realized* (cf. Map 11) treatment seeking behaviours, reveals an important difference: local actors under-report the number of BHPs and THPs that they would consult, in contrast to the broad variety of BHPs and THPs who are effectively consulted by patients.

Treatment seeking behaviour	Mean (median) distances to selected THP [km]	Mean (median) distances to selected BHP [km]	Mean (median) distance [km]
Usual treatment seeking behaviour	4.2 (2.9)	8.2 (7.6)	**7.8 (7.5)**
Intended treatment seeking behaviour: first	3.6 (2.4)	8.4 (7.5)	**6.6 (5.9)**
Intended treatment seeking behaviour: severe	3.6 (2.4)	35.1 (40.1)	**28.9 (27.8)**
Realized treatment seeking behaviour: first	1.5 (1.5)	13.2 (7.4)	**11.6 (7.2)**
Realized treatment seeking behaviour: second	8.8 (2.9)	23.1 (8.1)	**17.0 (7.6)**
Nearest distances	0.6 (0.6)	10.8 (5.5)	**1.1 (0.6)**

Table 32: Distances comparison for *usual*, *intended* and *realized* treatment seeking behaviour
Source: own representation

Chapter 6
Discussion, Conclusion & Outlook

Fig. 32: The new clinic Moomba in construction (November 2005)

6.1 Discussion

The overall research question in this thesis is (cf. Chapter 1.4): What are the factors determining access to health care and treatment seeking behaviour for the local actors and patients in the Mbeza region? This question and the five more precise research questions (Q.1 to Q.5, cf. Chapter 1.4) are answered in the present section, based on the results of Chapter 5.

The data for this research consist of a very heterogeneous sample, including six agro-pastoralist villages and two distant fishing villages, i.e. households having different livelihood strategies, and villages of various ethnic groups (Ila, Tonga, Batwa and Lozi headed villages). A representative sample including the main sub-groups existing in the Mbeza region have been integrated into the analysis. However, it can not be excluded that the selection of the various villages and of the households that have been questioned produced a bias. The situation in each village is often dramatically different, since some villages are much more accessible than others or are situated in closer proximity of a clinic or include more THPs than others.

On the methodological level, the multi-methods approach and the various perspectives (provider and user) adapted in this research permit to identify, investigate and analyse a broad range of spatial and non-spatial factors influencing the treatment seeking behaviour of the Mbeza people. This research also provides a visualisation of the treatment seeking behaviour of the local actors and patients in their spatial environment. This provides for the first time a direct spatial understanding of the availability, accessibility and the use of the health care services by the population of Mbeza. Furthermore, it provides a precise analysis of entire illness episodes, including the first, second and third treatment and allows recognising some differences in the results according to the way data was collected. This study not only considers the factor influencing patients to either consult a Biomedical Health Provider or a Traditional Health Provider. It also shows the effective displacements of the patients during their treatment seeking behaviour and the precise locations of the Biomedical or Traditional Health Provider (BHP or THP) who are actually consulted. This survey further addresses some of the reasons why the patients consult these specific BHPs or THPs and not others.

The GIS analysis and the maps representing the *usual*, *intended* and *realized* treatment seeking behaviour in the four villages surveyed in 2005 (cf. Maps 7-11), provide a good visualisation of the patients travel paths to reach the selected Biomedical or Traditional Health Provider (BHP or THP). Due to confidentiality and privacy issues, detailed spatial information can not be showed. However, this thesis provides strategies to protect geoprivacy and spatial confidentiality (cf. Chapter 4.3.2). The listings of the BHPs and

THPs established in and around the Mbeza Region that have been compiled in 2005 (cf. Table 10 and 12) permitted to estimate the availability of the different types of health care providers and facilities in the region. It also allows calculating the accessibility (Euclidean distances) of the BHPs and THPs for the patients. The results indicate that the THPs are about 20 times more accessible than the BHPs. But the listings of 2005 correspond to the BHPs and THPs reported by the people of four agro-pastoralist villages located in the middle of Mbeza, and thus does not correspond to whole health services available in the region. For example, in the biomedical health sector, several health posts are missing. In the traditional health sector, many THPs are also established in the other villages. This means that the calculated distances to the nearest BHP (12.2 km, cf. Table 11) or to the nearest THP (0.6 km, cf. Table 13) might be larger than in the reality. If all health posts were integrated in this study, the THPs would be probably less than about 20 times more available for the patients than the BHPs. Nevertheless, the traditional health sector is clearly much more accessible in terms of distance and travel time than the biomedical health sector.

In this study, the distance related to the treatment alternative *home remedies/self treatment* was considered to be non existent. However, for relying on modern drugs (panadol, cafemol, etc.), patients have to visit a shop. In Mbeza, except for the bigger villages like Chitongo, there are few shops and drugs stores. People living further inland have to cover quite a few kilometres in order to buy modern drugs from the shops, however, these are always located in closer proximity than the nearest clinic and there is no waiting time to get the remedies. On the other hand, people relying on family remedies/herbal medicine also have to find the required herbs, roots, bushes or trees in order to prepare the herbal remedy. For common herbal remedies (e.g. *Mululwe*) that are known in all household and are often taken in a case of illness, people find the required herbs and trees in the vicinity, near their households. However, for the fishermen/-women living in the Flats, there is almost no vegetation nearby and people are supposed to cycle or walk quite a few kilometres to find herbs and trees. These distances were not considered in this study and this treatment strategy is not represented on the maps.

Q.1) Do local actors and patients prefer to use home remedies, visit a biomedical health centre (clinic or hospital), or consult a Traditional Health Provider (THP) for treatment in case of illness (*treatment seeking behaviour*)?

Irrespective of the symptoms, illness type, gender, age or socioeconomic condition of the individuals, etc. the first treatment alternative selected by the people of Mbeza is home remedies. Moreover, the results of the *usual, intended* and *realized* treatment seeking behaviour indicate that the first health care provider/facility selected by the majority of

the local actors and patients in case of illness is a clinic. Only few people consult first a THP. All maps further confirm that Nakamboma clinic is by far the most frequently visited health facility and that some THPs are more frequently consulted than others. The results of the *intended* and *realized* treatment seeking behaviour confirm that when the illness gets more severe, most people consult more specialized health care providers or visit better equipped facilities – which mostly mean more distant BHPs and THPs as well. An increasing number of local actors and patients either attend a hospital in the biomedical health sector or consult a traditional healer/African doctor in the traditional health sector, when the number of people consulting a clinic or an herbalist decreases.

Comparisons between the health and treatment seeking behaviour based on self reported illness reported from former studies (at the country level) indicate that the results of the treatment seeking behaviour reported in Mbeza are similar to some of the other studies and radically differ from others. According to the study of Berman et al. (1995, based on the data of the Priority Survey II, cf. Table 2), 12% of the sick individuals from the rural areas of all Zambia reported to have consulted a THP and 88% a BHP. These results correspond to the own results (18% consulted a THP and 82% a BHP). However, the own results do not correspond to the results of the study of Diop et al. (1998). According to this study, only 1% of the sick individual who reported an illness (based on the data of the Living Conditions Monitoring Survey, LCMS 1996) have consulted a THP in the rural areas of all Zambia. However, they argue that this very low percentage might be due to respondents' lack of willingness to provide such information or data limitations of the LCMS (ibid: 15).

Q.2) Is distance a predominant factor for local actors and patients in relation to their access to health care and treatment seeking behaviour?

All results indicate that the first health care provider/facility selected by the majority of the local actors and patients in case of illness is a clinic. Since the nearest THP has been proven to be located about 20 times closer than the nearest clinic, this suggests that distance is not a decisive factor for selecting the first health care provider. The results of the annual attendances at the clinic, hospital and THP (cf. Chapter 5.2.1) for 2004 allows comparing the locations and distances to the clinic, hospital and THP selected by the local actors and patients with the nearest ones. The results show that about 16% of the local actors did not attend the nearest clinic, 95% did not attend the nearest hospital and approximately 87% did not consult the nearest THP. This suggests that Euclidean distance is not a decisive factor for visiting a hospital or consulting a THP. However, the main reason for selecting a more distant hospital is related to other accessibility variables or functional distance, namely transportation cost and travel time. The nearest hospital is

not connected to a good dirt road with the Mbeza Region and transportation is disorganized, so that travel time would be too long, in contrast to the second nearest hospital. On the other hand, the high rate of people selecting the nearest clinic (84%) suggests that Euclidean distance might influence clinic selection. This is confirmed by the people themselves who reported in the questionnaires that proximity is the major reason for attending the most frequently visited clinic (cf. Fig. 21).

On the whole, the majority of the local actors and patients always consult or would consult BHPs and THPs located in the vicinity. Only few patients attend very distant clinics, hospitals or consult distant THPs (at least as first treatment alternative, cf. Map 11: first treatment alternative selected by patients). However, when the illness persists, or gets more severe the priorities of the patients and, as a consequence, the treatment strategies change. More local actors and patients would consult or consult more distant BHPs or THPs – i.e. more specialized health care providers or better equipped facilities. In this case, the distance factor is relegated to a secondary factor; the accountability and effectiveness of the treatment being of primary interest (cf. Chapter 5.4.5, results of the semi-structured interviews of patients).

As a consequence, small distance differences between patients' households and the clinics, the hospitals or the THPs do not seem to have a decisive influence on the treatment seeking behaviour of the population at the first stage of an illness episode. However, the distance factor might have a strong effect, even a decisive one, in specific situations or in relation to specific populations or sub-groups. For example, when the distance differences are bigger, as it is the case for the households located in the fishing villages, the distance factor seems to gain a stronger importance. The results of the *realized* treatment seeking behaviour confirmed that fewer fishermen/-women attend first a clinic or a hospital and more consult a THP or rely on home remedies or not treatment at all, compared to the patients from the agro-pastoralist villages (cf. Fig. 26a and b, and Fig. 27). One might argue that these differences are caused by a reduced accessibility of the clinics and hospitals for the fishermen/-women.

The results of the bivariate and multivariate logistic regressions (cf. Chapter 5.5) confirm that the distance to the nearest clinic, to the nearest hospital or to the nearest THP differently affect the dependent variables, i.e. the different treatment alternatives selected by the patients: *only self/no treatment* (DV.1), *ever consultation of a biomedical health provider* (DV.2) or *ever consultation of a traditional health provider* (DV.3). The bivariate logistic regressions confirm that the distance factor might have a strong influence on specific sub-groups, such as the patients living in the fishing villages, the male patients or children under 15 years of age. For example, patients living in the fishing villages are about 1.5 more likely to rely on self/no treatment (cf. Table 26) and

about 1.7 *less* likely to ever visit a BHP (cf. Table 28 and 29), than patients from the agro-pastoralist villages. For the male patients and for the children under 15 years of age, an increase in the distance separating their households from the nearest road, the nearest clinic or the nearest THP has been proved to have strong effects (i.e. high odds ratios) on the use of self/no treatment, and on the ever consultation of a BHP. However, no significant effect of the distance factor (p>.10) have been confirmed for these sub-groups for the *ever consultation of a THP* (DV.3).

The reliance on *only self/no treatment* (DV.1) has been proven to be influenced by the distance to the nearest road, to the nearest clinic and to the nearest hospital. Based on the adjusted model of the multivariate logistic regression for DV.1 (cf. Table 27), the results indicate that an increase in the distances of both the Biomedical and/or the Traditional Health Provider is associated with an increase in the use of only self/no treatment. All spatial variables are been further proven to be useful for predicting the *ever visitation of a BHP* (DV.2). The strongest effect is given by the distance to the nearest hospital. As the distance to the hospital increases, less people are likely to *ever consult a BHP*. The *ever consultation of a THP* (DV.3) can be predicted with only one spatial variable, namely: the distance to the nearest THP. With increasing distances, patients are less likely to *ever consult a THP* (cf. Table 30 and 31).

In accordance with other studies (e.g. Diop et al., 1998), this research confirms that distance is a major factor influencing the treatment seeking behaviour of a population. However, on contrast to nation-wide surveys, the effects discovered in this study are more specifically related to a local scale. Distance has showed to be relevant at different levels, be it either population sub-groups or different treatment categories or different locations. The major effects of the distance factor are based on specific sub-groups (fishermen/women, males patients and children), and on specific interactions between the distance to the nearest road, clinic, hospital and the nearest THP, and the use of self/no treatment or the ever consultation of a BHP or THP.

Q.3) Have the local actors and patients different treatment-seeking strategies for different illnesses, for example malaria, Kahungo, HIV/AIDS, etc.?

This research confirms that the illness type and more globally illness characteristics (symptoms, causes and types) are major factors influencing the treatment seeking behaviour of the local actors and patients in Mbeza. The comparison between the map representing the *intended* treatment seeking behaviour of the traditional *Kahungo* illness (cf. Map 10) and the maps for *Malaria* or *HIV/AIDS* (cf. Map 8 and 9), show that local actors would select very different treatment alternative(s) depending on the illness. In reality, treatment seeking behaviour for traditional illnesses/illnesses related to witchcraft

is not that different from common/modern illnesses. The results of the *realized* treatment seeking behaviour show that patients who are suffering from a traditional illness/illness related to witchcraft are mostly relying on a clinic for the first treatment. It is only for the second treatment that the majority of the patients consult a THP in order to recover from a traditional illness/illness related to witchcraft. These results attest that the people of Mbeza make a clear distinction between common/modern illnesses and the traditional ones. As explained by Nyamwaya (1995: 33), 'most societies dichotomize illness. It is usually argued that people make a clear distinction between illnesses which can be treated by cosmopolitan medicine (by the *muzungu*, the white man) and those which can be treated by indigenous medicine'.

The results of the semi-structured interviews with patients suggest that patients often do not know the illness type they are suffering from at the beginning of an illness episode. Some patients attend a clinic to first try the modern drugs in order to cure the unknown illness. Others attend a clinic in order to gain a first, presumed diagnosis. When the illness persists and gets more severe, or the modern drugs *failed* or when the presumed diagnosis seemed to confirm the presence of a traditional illness, the patients consider other explanations/causation for the illness (magic or witchcraft) and consult a THP. In that case, only a traditional healer/African doctor will be able to diagnose and cure the traditional illness/illness related to witchcraft.

The major non-spatial variables predicting the use of *self/no treatment* (DV.1) are to suffering from headache or malaria. These illnesses increase about 5 and 2 times, respectively, the odds of relying on this treatment alternative (cf. Chapter 5.5.1). Thus, patients mostly take for example panadol when they suffer from a headache and they do not consult any heath care provider, which is not surprising. Since the patients are used to experience frequent malaria outbreaks they seem to be more likely, except for severe malaria, to treat the suspected malaria with *only self/no treatment* as well.

The major non-spatial variables predicting to *ever consult a Biomedical Health Provider* (DV.2) are gastrointestinal infections, chest pains and respiratory infections. The patients suffering from these illnesses are about 3 times more likely to ever consult a BHP (cf. Chapter 5.5.2). Diop et al. (1998: 15) found that perceived symptoms have a moderate influence on the decision to use biomedical health care services. Those with headaches, for example, used biomedical care least and those with diarrhoea used them most. This study, confirm these results.

The major factors predicting to *ever consult a Traditional Health Provider* (DV.3) are when patients are suffering from a traditional illness/illness related to witchcraft and the symptom of having rheumatic problems. These patients are about 8 and 2 times more likely to ever consult a THP.

Q.4) What are the other factors determining or influencing treatment seeking behaviour of the local actors and patients? Which ones are the decisive factors: spatial or non-spatial?

Several studies have already assessed and analysed locally or on country level, the effect of various non-spatial variables on the health and treatment seeking behaviour of a population. In this research, the illness type, illness symptoms, gender and age are the main non-spatial variables that have been analysed. Other socioeconomic variables were only superficially examined in qualitative assessments (cf. Chapter 5.4.5, semi-structured interviews of patients).

Based on the results of the semi-structured interviews with patients, the major reasons to first consult a clinic are due to the availability and effectiveness of modern drugs, and because patients requesting to have a first (presumed) diagnosis of the illness they are suffering from. By comparing the clinic fees and more globally the entire treatment costs for patients consulting either a BHP or a THP or both of them (cf. Table 23), the clinic provides the cheapest treatment. As a consequence, one can assume that the economic considerations also have an influence on the clinic selection for first treatment, although this effect was not statistically confirmed is this study. It is further essential to understand the reasons for attending one or the other clinic. When most local actors in the agro-pastoralist villages reported that proximity is the major reason for attending a specific clinic, other factors have a strong influence as well. A second reason, the catchment area of the different clinics, can be described as *restricted access* to the available health centres. Each village is assigned to the catchment area of a specific clinic or two clinics and patients who attend another clinic might be overcharged and pay an additional fee. Other non-spatial factors influencing clinic selection are trust in staff/to be provided good medicine and treatment, and drug shortages.

When the illness persists or gets more severe, patients will have to select further, additional treatment alternative(s). These decisions are influenced by previous experiences (including the first treatment alternative selected), by the advice of the family members and relatives (social network) and by the first (presumed) diagnosis given by the first health care provider consulted. The selection of the next treatment alternative(s) might be further influenced by patients' willingness to obtain a better, second diagnosis. Next treatment alternatives might be either prescribed by the last consulted health provider, when patients are referred by a BHP or THP to another BHP or THP. When clinic officers refer very sick patients to the hospital, some patients might also be referred by a BHP to consult a THP and inversely.

According to the statistical analysis (especially the bivariate logistic regressions), each treatment alternatives selected by the patients is influenced by non-spatial variables. For example, the patients in the age category between 20 and 25 years old seem to be about twice more likely to only use self/no treatment. The results of Berman et al. (1995: 32) indicate that the utilization of traditional healers by age have the highest levels of utilization in those aged 50 years and above, what could reflect a cultural change over time with younger Zambians who have been exposed to widely available biomedical services for a longer proportion of their lives, having a lower preference for traditional healers. This statement was not verified in this study.

The education level seems a useful characteristic to predict the ever THP consultation. Patients who attended primary school (up to level 7) are about 5 times more likely to ever consult a THP than patients having attended secondary school (beyond level 7). Thus the statement made by Berman et al. (1995: 3) that '[m]uch of the continued reliance on traditional providers appears to be a direct consequence of poor access to modern sources of care, as well as low levels of education' is partly confirmed by own results. However, as explained by Merten (2006), 'The assumption, that illness concepts merely depend on the level of education, and thus are firmly linked to socio-economic status, is probably flawed to some extent even in a setting with large variation of the formal education. Biomedical information is not always transparent, and neither univocal, for a non-professional. […] Irrespective of the level of education, ultimate causes perceived as responsible for individuals cases of sickness are often linked to the religious background of the affected person, and might not correspond with biomedical explanations.' Due to the very heterogeneous sample, many of the non-spatial variables are showing a high correlation with spatial factors. For example, the patients belonging to a Batwa household were showing a high correlation with the livelihood strategy related to fishing activity and with the distance to the nearest clinic or hospital. By integrating all independent variables, many confounding ones can appear. The focus was on the spatial variables and thus, the non-spatial ones were omitted in the analysis. However, the statistical analysis has permitted to analyse and quantify the effect of various important non-spatial factors.

Q.5) How do *usual*, *intended* and *realized* treatment seeking behaviours differ? What are the main differences produced by these different ways of collecting epidemiological data?

The different ways of investigating treatment seeking behaviour yielded differences in the results (cf. Fig. 31 on Chapter 5.6). The main difference between *intended* and *realized* treatment seeking behaviour is an over-reporting of the health providers who are

intended to be consulted (compared with those who are effectively consulted), respectively an under-reporting of the decision to use self/no treatment as first treatment strategy. According to the results of the *intended* treatment seeking behaviour, 68% of the local actors who intend to first rely on a health provider would consult a Biomedical Health Provider (BHP) and 31% rely on a Traditional Health Provider (THP). Based on the results of the *realized* treatment seeking behaviour, 79% of the patients consult first a BHP and 21% a THP. Hence, more local actors intend to consult a THP and fewer a BHP, than in the case of the *realized* treatment seeking behaviour. These tendancies have been also reported in the study of Merten (2006, cf. Table 5). However, in her study, there is no difference in the health providers' selection between the *intended* and the *realized* treatment seeking behaviour, with 82% of the people consulting a BHP and 18% consulting a THP. The differences between both studies are due to the 2 traditional illnesses (*Kahungo* and *Tulonda*) that have been added in the questionnaire of fieldwork 2005. If these illnesses were excluded, the results (81% for the BHP and 19% for the THP) of both studies would almost perfectly correspond. This means that the results of the *intended* treatment seeking behaviour vary significantly based on the list of illnesses selected by the researcher.

The differences between *intended* and *realized* treatment seeking behaviour are still present for the second treatment, i.e. when the illness develops or gets more severe. About 38% of the local actors would attend a hospital and 20% of the patients effectively attend one. A further important difference is that more patients effectively consult a THP (38%), than local actors intended to (25%). This means that, in reality, the relying on a THP is more a second than a first treatment strategy for patients. These differences attest for a change in the treatment strategies reported by a local actor who is not sick at the time she or he is interviewed, and a patient who remembers and describes a former or current illness episode. The GIS analyses and the maps representing the *intended* and the *realized* treatment seeking behaviour attest for other differences between what local actors would do and what patients actually do in case of illness. By comparing Maps 7 to 11, one can directly notice that patients consult a broader range of BHPs and THPs than local actors reported to intend to consult.

6.2 Conclusions

The access to health care and the treatment seeking behaviour of a population are very complex topics that are influenced by a multitude of spatial and non-spatial factors. Their studies require the contributions from many areas of inquiry, including varying professional and academic expertises. This master thesis attempted to combine medical

geography and medical anthropology in order to investigate the multi-dimensional access and the utilisation of the health services within a pluralistic health system. The multi-methods approach and the various perspectives (provider and user) employed in this research permit to investigate and analyse a broad range of spatial and non-spatial factors having an influence on the treatment seeking behaviour of the people of Mbeza.

With the help of a spatial perspective and spatial tools (especially GIS), it has been possible to visualise the treatment seeking behaviour of individuals and to depict the travel paths (straight lines) follow by patients in order to consult selected Biomedical or Traditional Health Provider(s) (BHPs and THPs). This provides for the first time a direct spatial understanding of the availability, accessibility and the use of the health care services by the population of Mbeza. However, maps do not reveal the reasons why local actors and patients select specific treatment alternatives. These reasons have been investigated with the help of quantitative and qualitative methods, which permit to discover various spatial and non-spatial factors influencing the treatment seeking behaviour of the people of Mbeza, and to understand and quantify the effect of these different factors.

The qualitative approach including semi-structured interviews with patients, with Biomedical and Traditional Health Providers (BHPs and THPs), reveals that culture affects people's definitions of health and illness/disease as well as patients' patterns of treatment. Most people in Mbeza make a clear distinction between modern/common illnesses which can be treated by biomedical medicine, and those which can be treated by indigenous medicine. However, they mostly rely on a clinic at the first stage of any illness episode, despite the fact that the THPs are much more accessible, in terms of (Euclidean) distance. On the whole, the qualitative and quantitative methods used in this study confirm that the distance factor has an influence on the treatment seeking behaviour of the population of Mbeza. More precisely, it confirms that the minimum distance accessibility of the road, clinic, hospital and of the THP have different influences on the various treatment alternative(s) selected by the patients. Furthermore, the distance factor has a different effect on specific sub-groups (i.e. stronger for male patients, children, and fishermen/women) and for particular situations (i.e. severe accident, acute illness, impassable roads during the rainy season, etc.).

6.3 Outlook

In this research, the focus has been on the spatial factors (i.e. Euclidean distance) influencing the treatment seeking behaviour of the population in the Mbeza Region. There

are three main topics to which this study could be further extended. First, by improving the spatial understanding, and by calculating the network distances instead of the Euclidean distances, or by integrating further spatial factors, such as travel time, travel cost or means of transport. The results of Chapter 5.1.1 show that Euclidean distances, although representing good approximations of the *real* travel paths followed by patients, underestimate the distances separating patients' households from the various biomedical and traditional health care providers and facilities. The major weakness of Euclidean distances is that they are not taking into account the transportation routes, barriers to movement, etc. because people rarely move from place to place along straight lines (Cromley and McLafferty, 2002: 241-242). By integrating network distance and the travel time, access to health care might be assessed more accurately. An analysis considering the seasonal patterns would also better correspond to the changing accessibility of the biomedical and traditional health care facilities for the people of the Mbeza Region (cf. Fig 33).

Fig. 33: The Mbeza Region during the rainy season

Another approach could be to employ a multilevel analysis at the household level, the village level and the clinic catchment area level. This would give the possibility to examine more deeply the influence of the spatial and non-spatial factors influencing the treatment seeking behaviour of the population. With the help of linear or multinomial logistic regression the effect of other non-spatial variables such as waiting time, income, etc. on the clinic, hospital and THP attendances could be further calculated. In addition, linear regressions could be further used to analyse the effect of the distance on the clinic, hospital or THP attendances and distance decay curves could be calculated.

Lastly, it would be very interesting to make a longitudinal analysis including the survey data of this thesis and newly collected data, i.e. data collected after the building and functioning of the new clinic Moomba. This new clinic radically changes the availability and the accessibility of the biomedical medicine in the region.

References

Ahmed, S. M. (2005): Exploring health-seeking behaviour in disadvantaged populations in Bangladesh. Karolinska Institute. Stockholm, Sweden

Altpeter, E., Burnand, B., Capkun, G., et al. (2005): Essentials of good epidemiological practice. *Sozial und Präventivmedizin*, Vol. 50, No. 1: pp. 12-15.

Andersen, R. M. (1995): Revisiting the Behavioural Model and Access to Medical Care: Does it Matter? *Journal of Health and Social Behavior*, Vol. 36, No. 1: pp. 1-10.

Anselin, L. (2003): GeoDa™ 0.9 User's Guide. Center for Spatially Integrated Social Science (CSISS).

Anyinam, C. (1987): Availability, accessibility, acceptability, and adaptability: four attributes of African ethno-medicine. *Social science and medicine*, Vol. 25, No. 7: pp. 803-811.

ARHAP (2006): Appreciating Assets: The Contribution of Religion to Universal Access in Africa. Report for the World Health Organization. The African Religious Health Assets Program (ARHAP). Cape Town.

Armstrong, M. P., Rushton, G. and Zimmerman, D. L. (1999): Geographically masing health data to preserve confidentiality. *Statistics in Medicine,* Vol. 18: pp. 497-525.

Berman, P., Nwuke, K., Rannan-Eliya, R., Mwanza, A. (1995): Zambia: Non-Governmental Health Care Provision. Data for Decision Making (DDM). Harvard School of Public Health. Boston.

Bernard, H. R. (2000): Social research methods: qualitative and quantitative approaches. Thousand Oaks, California. Sage publications.

Bhasin, V. (2007): Medical Anthropology: A Review. *Studies on Ethno-Medicine,* Vol. 1, Number 1: pp. 1-20.

Bowerman, R. L. (1997): Evaluating and Improving the Accessibility of Primary Health Care Services. University of Waterloo. Waterloo, Ontario, Canada

Burnett, A., Baggaley R., Ndovi-Macmillan, M., Sulwe, J., Hang'Omba, B., Bennett, J. (1999): Caring for people with HIV in Zambia: are traditional healers and formal health workers willing to work together?" *AIDS Care,* Vol. 11, No. 4: pp. 481-491.

CBoH (2000): National malaria situation analysis Zambia. Central Board of Health (CBoH), National Malaria Control Centre.

CBoH (2002): Health Institutions in Zambia: A Listing of Health Facilities According to Levels and Location for 2002. Central Board of Health (CBoH). Lusaka.

CBoH (2003): The HMIS In Zambia: A Trace on the Implementation Steps. Central Board of Health (CBoH).

CBoH (2004): Annual Health Statistical Bulletin 2003: a presentation of selected indicators on disease burden and service delivery. Central Board of Health (CBoH). Lusaka.

CBoH (2005): 2005 Annual Health Statistical Bulletin. Central Board of Health (CBoH). Lusaka.

CEEPA (2006): Climate change and African agriculture. Policy Note No.27. Center for Environmental Economics and Policy in Africa (CEEPA).

Chabwela, H. N. V. and Mumba, W. (1998): Case study: Zambia: Integrating Water Conservation and Population Strategies on the Kafue Flats. Water and Population Dynamics: Case Studies and Policy Implications. American Association for the Advancement of Science (AAAS).

Colson, E. (2000): The Father as Witch. *Journal of the International African Institute,* Vol. 70, No. 3: pp. 333-358.

Colson, E. ([1951] 1961): The Plateau Tonga of Northern Rhodesia. In: Seven Tribes of British Central Africa. Edited by: Gluckman, E. b. E. C. a. M., The Rhodes-Livingstone Institute. Manchester University Press.

Colson, E. ([1962] 1970): The Plateau Tonga of Northern Rhodesia (Zambia): Social and Religious Studies. University Press Manchester.

Colson, E. and Gluckman, M., Eds. (1961): Seven Tribes of British Central Africa. The Rhodes-Livingstone Institute. Manchester University Press.

Corporation, E. S. (2004): GeoCover™ Product Description Sheet: Orthorectified Landsat Enhanced Thematic Mapper (ETM+) Compressed Mosaics.

Cromley, E. K. (2003): GIS and disease. *Annual Review Public Health,* Vol. 24: pp. 7-24.

Cromley, E. K. and McLafferty, S. L. (2002): GIS and public health. Guilford Press. New York.

CSO (2003a): 2000 Census of Population and Housing Zambia Analytical Report, Vol. 10. Central Statistical Office (CSO). Lusaka, Zambia.

CSO (2003b): 2000 Census of Population and Housing Summary Report. Central Statistical Office (CSO). Lusaka, Zambia.

CSO (2003c): 2000 Census of Population and Housing: Census Atlas. Central Statistical Office (CSO). Lusaka, Zambia.

CSO (2003d): 2000 Census of Population and Housing: Agricultural Analytical Report. Central Statistical Office (CSO). Lusaka, Zambia.

CSO (2003e): 2000 Census of Population and Housing: Migration and Urbanization. Central Statistical Office (CSO). Lusaka, Zambia.

CSO (2003f): 2000 Census of Population and Housing: Housing and Households Characteristics, Analytical Report. Central Statistical Office (CSO). Lusaka, Zambia.

CSO (2005): The Monthly, September 2005. Vol. 31. Central Statistical Office (CSO).

CSO, CBoH and Macro, O. (2003): Zambia Demographic and Health Survey 2001-2002. Central Statistical Office (CSO), Central Board of Health (CBoH), and ORC Macro. Calverton, Maryland, USA.

CSO and Macro, O. (2003): Zambia DHS EdData Survey 2002: Education Data for Decision-making. Central Statistical Office (CSO) and ORC Macro. Calverton, Maryland, USA.

Curtis, A. J., Mills, J. W. and Leitner, M. (2006): Spatial confidentiality and GIS: re-engineering mortality locations from published maps about Hurricane Katrina. *International Journal of Health Geographics,* Vol. 5, No. 44.

Dixon-Fyle, M. (1983): Reflections on Economic and Social Change among the Plateau Tonga of Northern Rhodesia, c. 1890-1935. *The International Journal of African Historical Studies*, Vol. 16, No. 3: pp. 423-439. Boston University African Studies Center.

Diop, F., Seshamani, V. and Mulenga, C. (1998): Household Health Seeking Behavior in Zambia. Technical Report No. 20. Partnerships for Health Reform Project (PHR), Abt Associates Inc. Bethesda, MD.

Douglas, M. ([1966] 2002): Purity and Danger: an analysis of the concepts of pollution and taboo. Routledge Classics Edition. London.

Downing, A., TRL, Sethi, D., et al. (2001): Health Issues in Transport and the Implications for Policy. Department for International Development (DFID), UK.

Eeuwijk, P. v. (1999): Diese Erkrankung passt nicht zum Doktor: Medizinethnologische Untersuchungen bei den Minahasa (Nord-Sulawesi, Indonesien). Band 41. Basler Beiträge zur Ethnologie. Ethnologisches Seminar der Universität und Museum der Kulturen Basel.

Else, D. (2002): Zambia. Lonely Planet Publications Pty Ltd. Maribyrnong St, Footscray.

Fabrikant, S. I. and Heye, C. (2006): Statistik in der Geographie WS 2006. Powerpoint presentation. University of Zurich. Department of Geography.

FAO (1998): Special Report: FAO/WFP Crop and Food Supply Assessment Mission to Zambia, FAO corporate document repository.

FAO (2005): Special Report: FAO/WFP Crop and Food Supply Assessment Mission to Zambia, FAO corporate document repository.

Ferrell, J. (2005): Geographic Masking and Interpretation: Health Providers Proximity to Patients. ESRI Health GIS Conference Proceedings 2005.

Fowler, E. (19xx): Speaking Ila.

Garson, G. D. (1998): Logistic Regression, from *Statnotes: Topics in Multivariate Analysis.* http://www2.chass.ncsu.edu/garson/pa765/statnote.htm, July 2007

Gatrell, A. C. (2002): Geographies of Health: An Introduction. Blackwell Publishers Ltd. Oxford.

Gausset, Q. (1998): The changing meaning of disease among the Tonga of Zambia. Paideusis. *Journal for Interdisciplinary and Cross-Cultural Studies*, Vol. 1. http://www.geocities.com/paideusis/n1qg.doc, July 2007

Gausset, Q. and Mogensen, H. O. (1996): Sida et pollutions sexuelles chez les Tonga de Zambie. *Cahier d'Études africaines,* No. 143: pp. 455-476.

Golden, M. L., Downs, R. R. and Davis-Packard, K. (2005): Confidentiality Issues and Policies Related to the Utilization and Dissemination of Geospatial Data for Public Health Applications.

Good, C. M. (1987): Ethnomedical systems in Africa. Guilford Press. USA, New York.

Gossert, A. and Haugstetter, J. (2005): Case Study: Hydroelectric Power Production at the Kafue River. ETH Zurich, Switzerland.

Gumede, M.V. (1990): Traditional healers: a medical practitioner's perspective. Cape Town, Blackshaws.

Haller, T. (2003): Contested floodplain and Changed Rules: Institutional Change of Common Pool Resource Management and Conflicts among the Ila, Tonga and Batwa in Southern Province, Zambia. Draft do not cite.

Haller, T. (2004): Open Access and the State: Change of Institutions Governing Floodplain Common Pool Resources (CPRs) and conflicts in the Kafue Flats, Zambia. Panel 112: The politics of land tenure reforms and the indigenous peoples. Tenth Biennial Conference of the International Association for the Study of Common Property [IASCP], August 9-13 2004, Oaxaca, Mexico. Draft do not cite.

Haller, T. (2005): Common Pool Resource Management, Institutional Change and Conflicts among the Ila, Balundwe-Tonga and Batwa, Kafue Flats, Zambia. Paper presented at the Conference and Wokshop on CPR-Institutions in African Floodplain Wetlands, University of Zurich, Switzerland. February 15, 2005.

Haller, T. and Merten, S. (2005): Opening Up the CPRs: Institutional Change and the State in Kafue Flats, Zambia. *CPR Digest*. 2005 September 2005.

Haller, T. and Merten, S. (2006): "No capital needed!" - De facto open access to common pool resources, poverty and conservation in the Kafue Flats, Zambia. *Policy Matters*, Vol. 14.

Hausmann-Muela, S. (2000): Community understanding of malaria, and treatment-seeking behaviour, in a holodendemic area of southeastern Tanzania. Basel.

Hausmann-Muela, S., Muela-Ribera, J. and Nyamongo, I. (2003): Health-seeking behaviour and health system response. DCPP background paper. Powerpoint presentation. Joahnesburg.

Helman, C. G. ([1984] 2000): Culture, Health and Illness. Reed Educational and Professional Publishing Ltd.

Hjortsberg, C. (?): Determinants of household health care expenditure - the case of Zambia. Department of Economics, Lund University. The Swedish Institute for Health Economics (IHE). Lund University Center for Health Economics (LUCHE).

Hjortsberg, C. (2003): Why do the sick not utilise health care? The case of Zambia. *Health Economics*, Vol.3: pp. 775-770.

Hjortsberg, C. and Mwikisa, C. N. (2002): Cost of access to health services in Zambia. Health Policy and Planning 17, 1: pp. 71-77.

HRW (2002): Suffering in silence: The Links between Human Rights Abuses and HIV Transmission to Girls in Zambia. Human Rights Watch (HRW).

Jain, S. (2006): An empirical economic assessment of impacts of climate change on agriculture in Zambia. Discussion paper, CDP 27. Center for Environmental Economics and Policy in Africa (CEEPA).

Jaspan, M. A. (1953): The Ila-Tonga peoples of North-Western Rhodesia. International African Institute. Hazell, Watson & Viney Ltd. London.

Karim, ASS, Ziqubu-Page, et al. (1994): Bridging the gap: potential for the health care partnership between African traditional healers and biomedical personnel in South Africa. *South African Medical Journal*. Report of the South African Medical Research Council.

Kasonde, J. M. and Martin, J. D., Eds. (1994): Experience with primary health care in Zambia. *Public Health in Action*, No. 2. World Health Organization (WHO), Geneva, Switzerland.

Kasonde, J. M. and Martin, J. D. (1994): Moving towards primary health care. In: Experiences with primary health care in Zambia. Edited by: Kasonde, J. M. and Martin, J. D. Geneva, Switzerland, World Health Organization (WHO). No. 2: pp. 7-14.

Kearns, R. and Moon, G. (2002): From medical to health geography: novelty, place and theory after a decade of change. *Progress in Human Geography,* Vol. 26, No. 5: pp. 605-625.

Kirkwood, B. R. ([1988] 2001): Essential of medical statistics. Blackwell Scientific Publications. Oxford.

Kleinman, A. (1980): Patients and Healers in the Context of Culture. Number 3. University of California Press.

Kleinman, A. (1988): Illnesses narratives. Suffering, healing, and the human condition. Basic Books. New York.

Kroeger, A. (1983): Anthropological and socio-medical health care research in developing countries. Social science and medicine Vol. 17, No. 3: pp. 147-161.

Kwan, M.-P., Casas, I. and Schmitz, B. C. (2004): Protection of Geoprivacy and Accuracy of Spatial Information: How Effective are Geographical Masks? *Cartographica*, Vol. 39, Number 2: pp. 15-28.

Lancaster, C. S. (1974): Ethnic Identity, History, and "Tribe" in the Middle Zambezi Valley. *American Ethnologist,* Vol. 1, No. 4: pp. 707-730.

Last, J. M., Ed. ([1983] 2001): A dictionary of epidemiology. Fourth edition. Oxford University Press, New York.

Leitner, M. and Curtis, A. (2004): Cartographic Guidelines for Geographically Masking The Locations of Confidential Point Data. *Cartographic Perspectives,* Number 49: pp. 8-25.

Leitner, M. and Curtis, A. (2006): A first step towards a framework for presenting the location of confidential point data on maps—results of an empirical perceptual study. *International Journal of Geographical Information Science*, Vol. 20, No. 7: pp. 813-822.

Marshall, P. A. (2007): Ethical challenges in study design and informed consent for health research in resource-poor settings. Special Topics in Social, Economic and Behavioural (SEB) Research report series; No. 5. World Health Organization on behalf of the Special Programme for Research and Training in Tropical Diseases 2007.

Marten, L. and Kula, N. C. (2006): Zambia: 'One Zambia, One Nation, Many Languages'. Language and Identity in Africa.

Martin, J. D. (1994): Zambia - a country profile. In: Experiences with primary health care in Zambia. Edited by: Kasonde, J. M. and Martin, J. D. Geneva, Switzerland, World Health Organization (WHO). No.2: pp. 1-6.

Martin, M. and Collins, K. (2004): Traditional Leaders in Zambia: A Weapon Against AIDS. International Perspectives. Abt Associates Inc.

Matthews, D. E. and Farewell, V. T. (1988): Using and understanding medical statistics. 2nd, revised edition. Karger. Basel.

Mayer, J. D. (1982): Relation between two traditions of medical geography: health systems planning and geographical epidemiology. *Progress in Human Geography,* Vol. 6: pp. 216-30.

McLafferty, S. L. (2003): GIS and health care. Annu. Rev. *Public Health,* Vol. 24: pp. 25-42.

Meade, M. S. (1977): Medical geography as human ecology: the dimension of population movement. *Geographical Review*, Vol. 67, Number 4: pp. 379-393.

Meade, M. S. and Earickson, R. J. (2000): Medical Geography. Second edition. Guilford Press. New York.

Meissner, O. (2003): Traditional medicine and its accommodation in the South African national health care system with special attention to possible statutory regulation. University of South Africa.

Merson, M. H., Black, R. E. and Mills, A. J. (2006): International Public Health: Diseases, Programs, Systems, and Policies. Second Edition. Jones and Bartlett Publishers.

Merten, S. (2004): From Subsistence to Sale: Institutional Change in Indigenous Women's Access to Common Pool Resources. Panel 112: The politics of land tenure reforms and the indigenous peoples. Tenth Biennial Conference of the International Association for the Study of Common Property [IASCP], August 9-13 2004, Oaxaca, Mexico, - Draft do not cite.

Merten, S. (2006): Perception and Interpretation of Traditional and Biomedical Health Concepts in a Rural African Community: Nutrition among the Ila-speaking Peoples in Zambia. Institute of Social and Preventive Medicine, University of Basel and the Swiss Tropical Institute

Merten, S. and Haller, T. (2006): 'Fish for Gender' Exchange in the Kafue Flats: Risky Opportunities of Rural Women. Paper 7. In: Responding to HIV and AIDS in the Fishery Sector in Africa: Proceedings of the International Workshop, February 20-21 2006, Lusaka, Zambia. Cairo, Egypt, WorldFish Center.

Miles, J. (2006): Huber-White estimates in SPSS. Online article from the *Applying Regression Blog* of Jeremy Miles.
http://www.jeremymiles.co.uk/regressionbook/2006_04_01_archive.html, July 2007

Mogensen, H.O. (1997): The narrative of AIDS among the Tonga of Zambia. *Social science and medicine*, Vol. 44, No. 4: pp. 431-439.

MOH (1992): National Health Policies and Strategies: Health Reform. Ministry of Health (MOH). Lusaka, Zambia.

MOH (2000): National Health Strategic Plan, 2001-2005. Ministry of Health (MOH).

MOH and CBOH (?): Zambia National Health Accounts 1995 - 1998.

MOH and WHO (2006): Service Availability Mapping (SAM). Ministry of Health (MOH) and World Health Organisation (WHO).

Müller, I. (2000): Application and validation of new approaches in spatial analysis as tool in communicable disease control, health systems and environmental epidemiology in tropical countries. University of Basel. Basel, Switzerland

Müller, I., Smith, T., Mellor, S., et al. (1998): The effect of distance from home on attendance at a small rural health centre in Papua New Guinea. *International Journal of Epidemiology*, Vol. 27: pp. 878-884.

Mumba, M. (2004): Biodiversity challenges for invaded wetland ecosystems in Africa: The case of the Kafue Flats floodplain system in southern Zambia. Third (3rd) IUCN World Conservation Congress Bangkok, Thailand 17 - 25 November, 2004.

Ndubani, P. and Höjer, B. (1999): Traditional healers and the treatment of sexually transmitted illnesses in rural Zambia. *Journal of Ethnopharmacology,* Vol.67: pp. 15-25.

Nyamongo, I. K. (1998): Lay people's responses to illness: an ethnographic study of anti-malaria behavior among the Abagusii of Southwestern Kenya. University of Florida.

Nyamwaya, D. O. (1995): A case for traditional medicine in official health services: flogging a dead horse? In: Traditional medicine in Africa. Edited by: Sindiga, I., Chacha Nyaigotti-Chacha and Kanunah, M. P. Nairobi, East African Educational Publishers Ltd. pp. 30-39.

O'Brien, D. (1983): Chiefs of Rain. Chiefs of Ruling: A Reinterpretation of Pre-Colonial Tonga (Zambia) Social and Political Structure. *Journal of the International African Institute,* Vol. 53, No. 4: pp. 23-42.

O'Brien, D. and O'Brien, C. (1996): The Monze rain festival: the history of change in a religious cult in Zambia. *The International Journal of African Historical Studies*, Vol. 29, No. 3: pp. 519-541.

Obrist, B. (2006): Understanding „access" to health care: A anthropological view from international health. Frühjahrestagung der Schweizerischen Akademie der Geistes- und Sozialwissenschaften und der Schweizerischen Akademie der Medizinischen Wissenschaften.

OMS (2002): Stratégie de l'OMS pour la Médecine Traditionnelle pour 2002-2005. WHO/EDM/TRM/2002.1. Organisation Mondiale de la Santé (OMS). Genève, Suisse.

Penchansky, R. and Thomas, J. W. (1981): The concept of access: definition and relationship to consumer satisfaction. *Medical Care*, Vol. XIX, No. 2: pp. 127-140.

Pfeiffer, D. U., Duchateau, L., Kruska, R. L., et al. (1997): A spatially predictive logistic regression model for occurrence of Theileriosis outbreaks in Zimbabwe. From Proceedings of 8th Symposium of the International Society for Veterinary Epidemiology and Economics, Paris, France, July 8-11, 1997. Special Issue of Epidémiologie et santé animale 31-32, 12.12.1-3.

Robert, M., Miller, L. and Brewer, J. D. (2003): The A-Z of Social Research, A Dictionary of Key Social Science Research Concepts. Sage Publications Ltd. London.

Roberts, A. (1976): A History of Zambia. Cox & Wyman Ltd. London.

Rosenberg, M. W. (1988): Linking the geographical, the medical and the political in analysing health care delivery systems. *Social science and medicine*, Vol 26: pp. 179-186.

Rosenberg, M. W. (1998): Medical or health geography? Populations, peoples and places. Research review 5. *International Journal of Population Geography*, Vol. 4, Issue 3: pp. 221-226.

Rothman, K. J. (2002): Epidemiology: an introduction. Oxford University Press, Inc.

Sawada, M. (2002): README: Instructions to Use the Random Point-in-Polygon Generation Program (VBA Macro).

Shacinda, S. (2003): Rise in Child Rapes in Zambia Traced to AIDS Cure Myth, Some Say. Reuters/Philadelphia Inquirer 12/19.

Simuchimba, M. (2005): Religion and education in Zambia, 1890-2000 and beyond. University of South Africa. Pretoria.

Sindiga, I. (1995a): Traditional Medicine in Africa: An Introduction. In: Traditional medicine in Africa. Edited by: Sindiga, I., Chacha Nyaigotti-Chacha and Kanunah, M. P. Nairobi, East African Eductional Publishers Ltd. pp. 1-15.

Sindiga, I. (1995b): African Ethnomedicine and Other Medical Systems. In: Traditional medicine in Africa. Edited by: Sindiga, I., Chacha Nyaigotti-Chacha and Kanunah, M. P. Nairobi, East African Educational Publishers Ltd. pp. 16-29.

Sindiga, I., Chacha Nyaigotti-Chacha and Kanunah, M. P., Eds. (1995): Traditional medicine in Africa. East African Educational Publishers Ltd, Nairobi.

Smith, E. (1907): Handbook of the Ila Language. Oxford University Press. Oxford.

Smith, E. W. (1921): The Ila-Speaking People of North Rhodesia. *Journal of the Royal African Society*, Vol. 20, No. 78: pp. 89-94.

Smith, E. W. and Dale, A. M. ([1920] 1968): The Ila-speaking peoples of Northern Rhodesia. Vol. 1 and 2. University Books. New Hyde Park, New York.

Snow, T., Faye, M., McArthur, J., et al. (2003): Country case studies on the challenges facing landlocked developing countries. United Nations Development Programme.

Stekelenburg, J. (2004): Health care seeking behaviour and utilisation of health services in Kalabo District, Zambia. University of Vrije, Amsterdam.

Stekelenburg, J., Jager, B. E., Kolk, P. R., et al. (2005): Health care seeking behaviour and utilisation of traditional healers in Kalabo, Zambia. *Health Policy*, Vol. 71, No. 1: pp.67-81.

Stekelenburg, J., Kyanamina, S. S. and Wolffers, I. (2003): Poor performance of community health workers in Kalabo District, Zambia. *Health Policy*, Vol. 65, Issue 2: pp. 109-118.

Stock, R. (1983): Distance and the utilization of health facilities in rural Nigeria. *Social science and medicine*, Vol. 17, No. 9: pp. 563-570.

Tembo, M. S. (1993): The Witchdoctors are not Wrong: The Future Role and Impact of African Psychology on Individual Well-Being. Paper Presented at the Annual Meeting of the African Studies Association held in Boston, Bridgewater College, department of sociology and anthropology.

Twumasi, P. A. (1994): The role of traditional healers in primary health care in Zambia. In: Experiences with primary health care in Zambia. Edited by: Kasonde, J. M. and Martin, J. D. Geneva, Switzerland, World Health Organization (WHO). No.2: pp. 79-87.

UNDP (2003): Zambia Human Development Report 2003: Eradication of Extreme Poverty and Hunger in Zambia: An Agenda for Enhancing the Achievement of the Millennium Development Goals. United Nations Development Programme (UNDP). Lusaka, Zambia.

UNDP and SOAS (2006): Economic policies for growth, employment and poverty reduction: case study of Zambia. United Nations Development Programme (UNDP) School of Oriental And African Studies (SOAS). Lusaka.

Vickery, K. P. (1985): Saving Settlers: Maize Control in Northern Rhodesia. *Journal of Southern African Studies*, Vol. 11, No. 2: pp. 212-234. Taylor & Francis, Ltd.

Vickery, K. P. (1986): Black and white in Southern Zambia: The Tonga Plateau Economy and British Imperialism, 1890-1939. Contribution in Comparative Colonial Studies, Number 21. Greenwood Press. Westport, Connecticut USA.

Vittinghoff, E., Glidden, D. V., Shiboski, S. C., et al. (2005): Regression Methods in Biostatistics: Linear, Logistic, Survival and Repeated Measures Models. Springer. New York.

WHO (1978): The promotion and development of traditional medicine. Technical Report Series. World Health Organisation (WHO). Geneva, Switzerland.

WHO (1995): Traditional Practitioners as Primary Health Care Workers. World Health Organisation (WHO), Division of Strengthening of Health Services and the Traditional Medicine Programme. WHO/SHS/DHS/TRM/95.5. Geneva, Switzerland.

WHO (2000a): Traditional and modern medicine: harmonizing the two approaches. World Health Organisation (WHO), Western Pacific Region. Geneva, Switzerland.

WHO (2000b): The world health report 2000: Health systems: Improving performance. World Health Organisation (WHO). Geneva, Switzerland.

WHO (2001): Legal Status of Traditional Medicine and Complementary/Alternative Medicine: A Worldwide Review. World Health Organisation (WHO). Geneva, Switzerland.

WHO (2002a): Country report: Zambia. Meeting on health sector responses to the current humanitarian crisis in Southern Africa, 26-28 August 2002. Harare, Zimbabwe, Powerpoint presentation.

WHO (2002b): Innovative care for chronic conditions: building blocks for action: global report. WHO/MNC/CCH/02.01. World Health Organisation (WHO). Geneva, Switzerland.

WHO (2002c): WHO Traditional Medicine Strategy 2002-2005. WHO/EDM/TRM/2002.1. World Health Organisation (WHO). Geneva, Switzerland.

WHO (2003): The African Health Monitor: traditional medicine: Our culture, our future. January - June 2003. World Health Organisation Regional Office for Africa. Brazzaville, Congo.

WHO (2005): Health action in crisis: Zambia. World Health Organisation (WHO). Geneva, Switzerland.

WHO (2006): The African Regional Health Report: The Health of the People. World Health Organisation (WHO). Geneva, Switzerland.

WHO (2006): Mortality Country Fact Sheet 2006: Zambia. World Health Organisation (WHO). Geneva, Switzerland.

Williams, R. (2006): Statistics. HLSC 5990. University of Lethbridge. Lethbridge, Alberta, Canada.
http://classes.uleth.ca/200601/hlsc5990a/private/HLSC5990-Statistics.doc, June 2007

WorldBank (2001): Indigenous Knowledge and HIV/AIDS: Ghana and Zambia. IK Notes, No 30.

WorldBank (2003): Social risk management in Zambia. A working paper presented to the conference on dynamic social risk management held in Paris from 30th June-4th July. Wold Bank.

Wright M. (1983): Technology, Marriage and Women's Work in the History of Maize-rowers in Mazabuka, Zambia: A Reconnaissance. *Journal of Southern African Studies*, Vol. 10, No. 1, Special Issue on Women in Southern Africa, pp. 71-85. Taylor & Francis, Ltd.

WWF (2003): Kafue Flats. Managing Rivers Wisely. World Wildlife Fund (WWF).

ZANA (2002): YWCA urges Traditional healers body to discourage the child gender prescription by its members. Zambia News Agency (ZANA).

List of the used softwares and ArcScripts

- **ArcGIS 9:** The GIS analysis for this master thesis was done in ArcGIS 9, a product from ESRI. Additionally, some tasks were made with the help of the ESRI Support Centre (http://support.esri.com, January 2007) and the free ArcGIS plug-in component *ET Geo Wizards*™ and the *Easy Calculate 5.0* that have been downloaded from the internet (http://www.ian-ko.com/, January 2007).

  ArcScripts and programs used to calculate the distances or protect geoprivacy:

  - *Random Point-in-Polygon Generation Program (VBA Macro)*: created by Dr. M. Sawada, University of Ottawa, downloaded on http://arcscripts.esri.com/details.asp?dbid=12098, March 2007
  - ArcGIS Field Calculator: some expressions were useful in this study. The *Easy Calculate 5.0* is a file containing a multitude of expressions that can be downloaded from the internet (cf. above). In this study, the expression *point_Disperse.cal* permitted to generate a random perturbation (geographical masking) for the households of the modern and traditional health providers, in order to preserve spatial confidentiality and geoprivacy. In addition the expression : *getlength.cal* as well as some functions of ET Geo Wizards™ (e.g. *spider diagram*), permitted to calculated the length of the straight lines (distance) connecting patients' households with the health care providers. http://webhelp.esri.com/arcgisdesktop/9.1/index.cfm?ID=340&TopicName=Making%20field%20calculations&rand=584&pid=326, June 2007

Geospatial (GIS) data

- **SAHIMS:** The Southern African Human-development Information Management Network for Coordinated Humanitarian & Development Action (SAHIMS) provide GIS data on its homepage. The GIS Library includes various data on Zambia and other countries of Southern Africa. The following shapefiles were downloaded: *Health facilities in Zambia, Zambia major roads, Wards of Zambia,* etc.

  http://www.sahims.net/gis/Gis%20Input/GIS_library_Zambia.asp?cmd=reset, June 2007

- **NASA:** The basis map is a satellite image that has been downloaded from the internet site of the *Applied Research and Technology Project Office* (ARTPO), affiliated to the NASA (https://zulu.ssc.nasa.gov/mrsid, January 2007). The so-called GeoCover Landsat mosaics - or orthorectified Landsat Enhanced Thematic Mapper (ETM+) Compressed Mosaics - are delivered in a UTM/WGS84 projection and datum. The UTM zone including the Southern Province of Zambia - with the Kafue Flats and Mbeza Region - corresponds to UTM zone 35 (S_35_15_2000), extending between 15 and 20 degrees south latitude. A product description is available on:

  https://zulu.ssc.nasa.gov/mrsid/docs/GeoCover_circa_2000_Product_Description.pdf, June 2007.

- **NGA:** US National Geospatial intelligence Agency (NGA). Various point shapefiles for cities, villages and hamlets have been downloaded from the GEOnet Names Server (GNS) of the US national geospatial intelligence agency (NGA): http://www.nga.mil/, June 2007.

  The Geonet Names Server (GNS): http://earth-info.nga.mil/gns/html/index.html, June 2007.

List of the annexes