

# **MAPPING HEALTH CARE NETWORKS IN TRINIDAD INTEGRATING ETHNOGRAPHIC DATA AND GIS**

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## **Introduction**

Culturally sensitive and multidimensional understandings of health and well-being are increasingly significant with worldwide movements of people in a globally connected world. Trinidad and Tobago is a two-island Caribbean population with a historically predisposed population of migrants where current exchanges of people, knowledge and goods has created a unique setting when looking at health and well-being in this multiethnic setting. Multiple migration patterns continue to be used as sociocultural links and livelihood strategies and have a significant effect on local knowledge systems, health patterns, beliefs and behavior. With this changing disease patterns, health access and disparities, changing cultural trends are taking place and interacting with each other. Relatively few studies examine health networks at a small scale while incorporating dynamic personal, cultural, social and spatial dimensions affecting health behavior and outcomes. Understanding local perspectives on health, changing health patterns and health behavior in the context of culture is necessary to address public health in a relevant manner.

Geographic Information Science (GIS) techniques transformed the map-making process in public health, shifting the focus to representation and analysis (Rushton 2003, McLafferty 2003). The initial intersection between the health fields and GIS has largely focused on epidemiology, environmental sciences where disease rates and distribution of toxic materials were visually displayed on maps to name a few examples (Cromely 2003; McLafferty and Cromley 2002). Social sciences and GIS have also interacted though more recently and also limited to representing finished products to an audience rather than being a tool to assist in the interpretation and representation of the problem at hand (Steinberg and Steinberg 2006). The intersection of social sciences, health and GIS has been severely constricted and is recent though shows interesting avenues for methodological, theoretical and applicable development (Goodchild and Janelle 2004). A few academic articles focus on methods and application (Foley 2002). Others focus on representing and interpreting interactions between public health infrastructure and communities in underdeveloped countries (Perry and Gesler 2000).

This paper underscores the potential of a developing methodology where the social sciences, qualitative GIS and culturally informed health research meet. The larger

objective of this paper examines the intersection of individual health care knowledge, access to resources through representations of individual health care practices in a non-industrialized urban setting using non-traditional mapping data. Cultural and individual health interpretations and practices, through both quick and structured assessments and fuzzier, in-depth data highlight the value and utility of integrating ethnographic data to quantitative and less contextualized GIS data. Keeping this in mind the developing mapping method I propose includes creating personal health care networks using GIS theory and methods, interfacing participant informed place information and narrative data adding culturally significant understanding of health practices within a spatial framework. I explore the acceptability of using various types of fuzzy data produced by non-cartographers in multicultural setting with GIS software to valuable and interpretable representations from the emic and etic standpoints (Yao and Thill 2006). Place and space are central in certain social sciences, but are common factors in social sciences in general. These two notions can lead to greater insight while addressing common social science objectives of understanding and explaining human behavior, predict and plan behavior, and solving dilemmas that face society (Goodchild et al. 2000; Goodchild and Janelle 2004).

Although there is the financial aspect to GIS and public health, such as mapping public health care based on distance, patient type (e.g. ESRI's Industry website on GIS for health and human services), there is also opportunity to develop methods that address the multidimensional needs of increasingly multicultural communities worldwide. From an individual standpoint health-seeking behavior is much more than accessing biomedical practitioners, and pharmacies. Developing methods using available theoretical and methodological tools such as GIS in addition to integrating the emic perspective of both individual behavior and community perspectives relative to health and health care inequalities is key. Medical pluralism where people use health and treatment methods from various medical traditions is a common practice even in native settings (Bastien 1992). This is true when people migrate and adapt to new locations not only because of limited access to public health infrastructure, financial and other logistical barriers, but for personal and cultural reasons which play an important role in health perspectives and behavior as we will see (Balick et al. 2000; Pieroni et al. 2005; Pieroni and Quave 2005).

## **Research methods**

### *Study sites and participants*

This study draws on ethnographic research conducted during seven weeks of fieldwork in Trinidad and Tobago in 2006. I chose a multi-sited approach with a concentration on urban areas including the cities of Chaguanas, Arima, Curepe, and San Fernando, which present a range of urban areas with distinct historical and cultural characteristics (figure



Figure 1. Map of Trinidad and Tobago within the Caribbean

1). Tobago, the fifth site, is a more rural setting, yet the people interviewed lived in more developed areas or were easily accessible to urbanized areas. During the course of my fieldwork, I was based in one of the communities I conducted research in and lived there most of the time. I went on short multiday stays to other communities where I also stayed with wonderful families, providing me tremendous insight on local culture and practices throughout my short time on the islands. For all components of the research participants were recruited opportunistically and through snowball sampling in urban areas.

In this paper, I draw from various sources of ethnographic data to contextualize the publications I have drawn on as background data. These data are disproportionately funded or collected by government agencies or rely on various government ministries' reports. I began my research by facilitating five focus group interviews to gather general perspectives of health and well-being. I also redefined interview questionnaires developed prior to reaching the field based on focus group findings.

I conducted twenty-seven structured interviews with various community members (figure 2). These interviews included personal background information, health related questions including health recalls and classic ethnoecological exercises to determine cultural knowledge base. The structured surveys focused on individual assessment of family and national health problems and they participated in pile sorting exercises to determine health resource availability and knowledge. Some of these data are presented as background health data. These data provided a comparative albeit very select perspective on national health data.

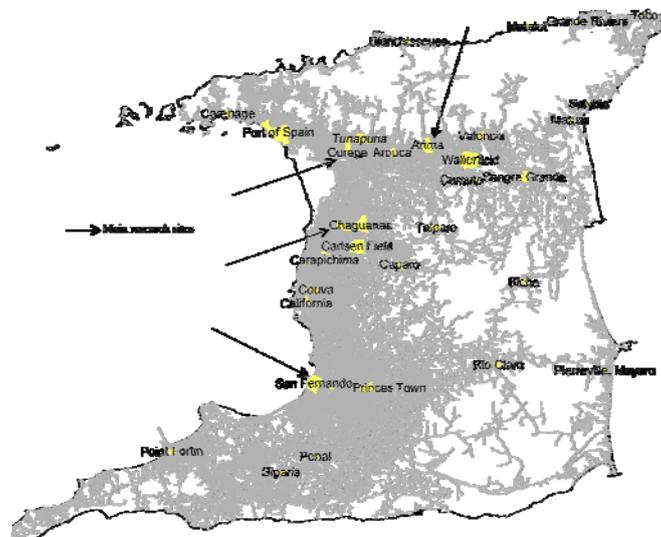


Figure 2. Map of Trinidad and main research sites

I also completed twenty-one semi-structured interviews while conducting the structured interview. These interviews focused on in-depth and open-ended questions exploring individual health and migration histories. Recent health recalls revealing levels of illness, and treatment practices were collected in addition to self-rated health measures. . These interviews contextualize current health state to reveal inequalities whether perceived or real in accessing the multitude of health care options available. During these interviews participants were asked to produce a list of health care services or goods currently used when sick and to maintain their health. They were asked to give the address and directions for each location. This health resource list was the base for creating a health network map for each individual. In this paper, I focus on Curepe where I interviewed nine participants. A local academic and collaborator graciously shared data on road networks and other geographic features usable in ArcGIS. This was essential to test a method where mapping software and spatial components are used to create visual representations contextualized by and ethnographic health narratives to examine individual and community health behavior. The interviews allowed me to explore health perspectives inequalities, preferences, and reasons behind choices made.

I used ArcGIS 9.3 and Excel to organize and analyze the location data to create the map representations. I created the necessary databases and layers in ArcGIS. Using network analyst's closest facility tool, a representative measure of how far free public hospitals were from each participants home was created. I then created a layer for each individual's house and their current health care network using the directions and locations they provided. The locations were categorized into six categories based on the pile sort results for health care options. These included: *public biomedical care*, *private biomedical care*, *local ethnomedicine*, *other non-biomedical care options*, *supplements* (e.g. vitamins, minerals, powders), and *food*. Narrative descriptions for each location

listed assisted in placing the points for each layer and understanding perspectives of space among this island population. This was important given the amount of detailed GIS data available in Trinidad and Tobago. Themes emerged from other narrative data and were used to contextualize the visual and descriptive statistical analyses of the health network maps. Network map analysis included visual qualitative interpretations of the constructed health care networks contextualized by narrative information and descriptive statistics.

### *Cultural profile*

Trinidad and Tobago is a small twin-island, middle-income nation covering roughly 5000 square kilometers. The islands are located at the southern tip of the Lesser Antilles near the coast of Venezuela in the Caribbean. Its colonial history is varied, but the British were there the longest and most recently. Today petrol, natural gas and asphalt industrial activities drive the country's economy (Blouet and Blouet 2002). Currently, most of the country's 1.3 M people are concentrated in urban areas in Trinidad and a good transportation network and services allow people to move around the island with ease.

Trinidad and Tobago's rich human migration history includes a large number of African slaves and then indentured Indian laborers being brought to the island resulting in a multiethnic and multicultural society. Roughly 40% of the population is said to be of Indian descent and 40% of African descent. The rest of the population is made up of multiethnic individuals, people of Amerindian, European, Chinese, South American, Libyan and Syrian descent (Blouet and Blouet 2002). This multiethnic history is revealed in differential health resources, knowledge and behavior.

As the nation gained independence in the early 1960s, certain British influences remained with many claiming the public health model a remnant of the colonial era that does not consider the ethnic or cultural diversity of the population (Marshall and Mahabir 2000). The economic and nutritional transitions have resulted in changing diets, disease rates. Lack of upkeep with a nation undergoing a health transition is one common critique (Marshall and Mahabir 2000). Variable access and satisfaction with different types of health care options has led to a wide range of medical options available and factors influencing individual level decision-making strategies. At the individual level, health perceptions and practices are on the move to adapt to the changing environment and circumstances although the medical system again is slow to integrate the reality of medical pluralism (Clement et al. 2005; Mahabir and Gulliford 1997).

### **Results**

Several interesting results emerged from the survey data to determine a community perspective family and national health issues. Among top health problems at both the

family and national level include diabetes, high blood pressure and cancer. Other top national health issues were general heart problems and AIDS. Other family health problems include cold, asthma and eye issues. Compared this information to public health literature and efforts cancer, diabetes and high blood pressure are significant health factors in the population. However only recently have large scale, public health efforts been disseminated to address these widespread health concerns that are in part attributed and related to changes in lifestyle and global exchanges.

Next we look at general perspectives on personal health and health care before delving into individual health care networks again from the survey data. I highlight the health behavior of individuals when ill. When asked what a participant theoretically does when he or she is sick private biomedical care (20%), the pharmacy (12.7%) and local ethnomedical practitioners (10.9%) were the three top choices of health care options followed by a tie for public hospital (8.2%) and private clinic (8.2%) (figure 3). The range from naturopathic and local medicine to biomedical is evidence of a multilevel health care behavior. Interestingly, private biomedical care is sought after. Many participants indicated that private health care is the only option to access more time and higher quality of service from biomedical practitioners.

All participants were asked to do a recent health recall and many ailments ranged from minor issues, several chronic conditions to a rare trauma event. During these health recalls, discrepancies between theoretical and actual health care choices emerged. For all recent health events 70% of the first choice of treatment when sick includes home remedies as the top category representing almost one quarter of participant behavior (figure 3). Home remedies includes a mix of traditional knowledge that may be local,

<b>Preferred treatment choice</b>	<b>%</b>	<b>1<sup>st</sup> treatment choice</b>	<b>%</b>	<b>2<sup>nd</sup> treatment choice</b>	<b>%</b>
private doctor	20.0	food and liquids	23.53	home remedies	23.26
pharmacy	12.7	private doctor	17.65	tablets	20.93
ethnomedical doctor	10.9	rest	14.71	food and liquids	13.96
private clinic	8.2	tablets	11.76	rest	13.96
public hospital	8.2	home remedies	11.76	nothing	9.3
herbal remedies	5.5	supplement	8.82	private doctor	6.98
exercise	5.5	thoughts	2.94	supplement	6.98
health center	4.5	prescription	2.94	prescription	2.33
faith healing	4.5	medicinal plants	2.94	exercise	2.33
diet	3.6	exercise	2.94	thoughts	0
other	16.4	nothing	0	medicinal plants	0
Total	100	Total	100	Total	99.99

Figure 3. Theoretically preferred treatment and actual choice of treatment when ill.often plant-based, but also includes actions such as massages, ideas of hot/cold seen in many ethnomedical systems worldwide. The other three categories include tablets (over the

counter medication or something acquired at the pharmacy), rest, and food/liquid. The last two culturally constructed behaviors are seen as key to keeping healthy and well. Resting is constantly reiterated throughout everyday interactions. Food and cultural concepts of nutrition are significant in everyday life. After the first choice of treatment was not effective or sufficient, the top second choice of treatment included food/liquid, visiting a private doctor and rest in all together representing about half of the actual choice of second treatment (figure 4). The first choice of treatment includes a prevalence of options falling more towards the middle or the naturopathic end of the health care spectrum. The second choice of treatment reveals the same though biomedical practitioners were often visited. However the reason behind general health practices is blurred since proximity to the home, cost and self-treatment are evident in most of the top treatment choices. Time and financial considerations were repeatedly expressed throughout all interviews as major obstacles towards reaching optimal health.

Results clearly show that despite a seemingly abundant and relatively even distribution of public health care options, Trinidadians take an active role in developing personal healthcare networks reflecting degrees of personal choice and inequality in the health care system (appendix A). The nine participant's actual health care networks show significant diversity and emphasize health care options close to home, similar to treatment choice results seen above. A second common trend is the preponderance of local ethnomedical choices used despite living in an urban setting. In one sense, the pluralistic approach to health care that includes ethnomedical practices reflects the significance of culturally significant behaviors despite other factors such as urban setting and socioeconomic position and global interactions.

Appendix A includes a sample of the maps that reflect where individuals go to obtain goods and services to keep healthy and when they are sick. On average an individual network consisted of four locations, with a range from 2-5. However each location may represent a place where various types of health care needs are accessed. The pharmacy may be considered a place to consult a biomedical practitioner while also being a place where certain ingredients for home remedies learned through oral tradition are purchased (soft candle, bay rum). The average distance to a location in an individual's network is 4.3 km with an average total distance of 19.5 km for each network. Interestingly women will travel longer distances overall than men to access their health care needs (figure 4). As a group, multilevel health seeking strategy was the norm where 2.6 was the average number of categories of health care options individuals accessed. Men and women together accessed biomedical and ethnomedical options at about the same rate, 36% and 33% respectively (figure 5). Men accessed biomedical and non-biomedical care about the same rate, while women chose ethnomedical above biomedical options. Women also see

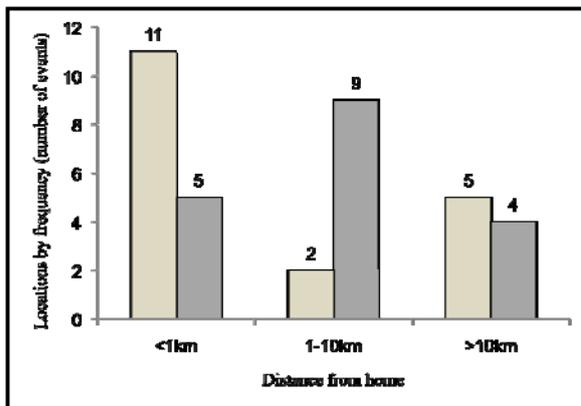


Figure 4: Health options distance from home by sex

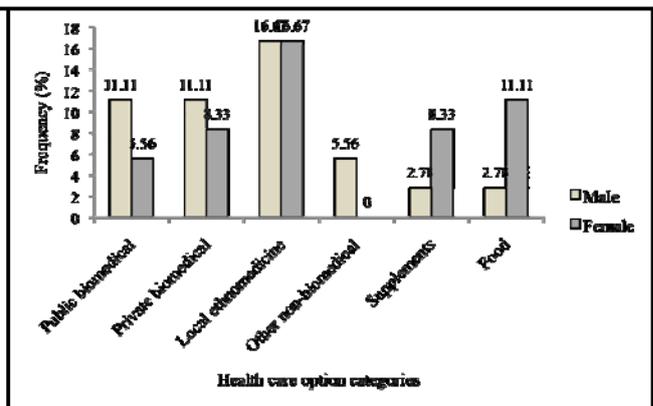


Figure 5: Distribution of health options by category and sex

and use food much more than men as a tool for health and well-being.

Narrative analysis for this group reveal themes that contextualize and complement what the health networks reveal visually and numerically. *Biomedicine* is important, but there is general wariness of it whether public or private care: addiction to medication, lack of rapport with practitioners, greediness, dissatisfaction with service, inefficiency were common themes. Many made similar remarks that ‘I use doctor offices as the last resort. [...] when there is nothing more that I can do for myself. There is a hierarchy of resort beginning with *lifestyle* including routines for exercising, eating well culturally and resting are the first time of action to be well, though most do not adhere to a consistent routine that includes these three factors. In addition this adherence to lifestyle can reduce dependence on biomedical treatments for chronic conditions such as a disciplined diet and exercise for certain diabetics. As one participant said ‘it all matters what we do. The things that you eat, your lifestyle.’ *Ethnomedicine* is seen as a first line of treatment for illnesses and to maintain health where daily ‘bush teas’ are brewed, and natural home remedies, visiting a local ethnomedical practitioner or seeking an elders advice is preferred not simply for financial reasons, but for cultural reasons even in urban centers. As one woman put it, ‘to be really really honest, [...] I practice the home remedies, because I know for a fact it’s natural thing that [I am using on my] body. Distance is one factor for using ethnomedicine, since these options may be available locally and are familiar, rather than spending significant amount of time and money going to a biomedical public or private practitioner. Finally many play and *active role* in developing

health networks that meet their needs given their circumstance and perspectives. Many seek out information in libraries, bookstores, from social networks, people who have traveled, the internet. Others take it in their hands to self-diagnose, self-treat even when they are seeking help from health professionals.

## **Discussion and conclusion**

This study uses a broad approach including access, inequalities, personal and cultural dimensions to examine and illustrate health realities and well-being. This model includes merging ethnography and GIS focusing on representation, perceptions, knowledge, experiences and current practices at a small-scale. This paper reveals important findings such as the apparent paradox between health option preferences and actual behavior. Using GIS as this paper does is an important step in expanding the scope of its potential, but it fell short of providing significant results and continued to be mainly a representational tool. Other factors such as the relationship between distance and health-seeking behavior need to be explored further. Determining ways to adequately analyze multiuse locations (e.g. pharmacy for ethnomedical and prescription medicine) or non-tangible health dimensions (e.g. general outlook, laughter) is needed. Finally minimizing participant bias is needed. The participant may provide information he/she thinks the researcher wants to hear, exclude important but sensitive health details or offer an idealized picture of personal health behavior. Further refinement and integration of the different data results will surely reveal more powerful conclusions regarding health realities at the community or household level that include culturally sensitive concepts of health and well-being.

Consistently, participants talked about the suboptimal public health care on the island, including long hours and general dissatisfaction when service was received. Some did speak positively, but they were in the minority. These individuals had limited economic resources and few options to access private biomedical services (Rudzik 2003; Singh et al. 1999). The dichotomy between the public and private biomedical services was evident and the majority displayed a negative perception of public health care. There was more than one participant indicating personal agendas of the doctors in the public health setting as 'recruiting customers' for their personal practice and '[stealing] equipment to stock [their office].' My research highlighted to what extent individual move and travel to acquire their health goods and services despite nearby public health facilities. We see in numbers and words that people do not want or choose the biomedical route most of the time.

Culturally significant health factors need to be considered at many levels. Even though public health infrastructure is technically accessible at various levels many actively avoid it if they do not have a reliable contact within the system. In Tobago, public health infrastructure is much weaker, the island is much smaller, traveling around is more limited and it is considered a more traditional society. Here local ethnomedicine is culturally important, but also necessary. In general, younger participants were not as well versed in local ethnomedical knowledge as older participants. Several youth make similar remarks to the one a young man from Curepe made, that he has 'been accused of not knowing my country in the past' when asked if he could talk about medicinal plants considered to be common and significant knowledge. Culture and upbringing can help

or hinder health and well-being whether it is place or changing sociocultural and ecological environments.

As health patterns are changing in the society, new efforts and perspectives need to meet the needs of a population that seems to be sicker than former generations that rarely accessed doctors, and lived long, simple and healthy lives. The rates of cancer, diabetes, AIDS and other previously unknown or undiagnosed illnesses are skyrocketing and individuals still choose medical pluralism. Clement et al. (2005) indicate that individuals often used ethnomedical solutions, here medicinal plants and there was some acceptance and call for increased integration of ethnomedical training within the public health care setting. This allows for recognition of an established healing system, with possibilities to help ethnomedical treatments evolve using biomedical theories and techniques. Researched integration can also decrease issues of drug or treatment overlap or interaction. Although general loss of local ethnomedical knowledge among the population is occurring, it might be slowing due to a growing worldwide interest in 'natural' and 'alternative' health care options. Several participants noted an increase in practitioners that advertise, more stores and goods throughout the island. Though its use includes making a fashion statement, dissatisfaction with biomedical options and lack of local bush doctors, the loss is being slowed and reconfigured to fit into Trinidad and Tobago's long-standing multiethnic and transnational society that is always adapting and indicating resilience of practices of value in the face of change.

As urbanization and globalization bring new opportunities to the island, it is this that is forcing locals to address the faltering of knowledge transmission affecting cultural and biological diversity, while introducing a competitor, in this case pan-naturopathy. As people deal with differential access and satisfaction with public and biomedical services, multilevel pursuits including various health care options are common and reflected in what participants create for themselves to keep healthy in the face of changing illness and diseases. The actual health network reflect this inherent diversity that includes picking and choosing what individuals deem the best in their urban environments to 'keep healthy.'

Methodological refinement in developing the personal health care network database and representation is needed to obtain a more useful and usable tool. Software limitations suggest a niche for social scientists participation. Further integration of different data types is needed to explore more robust analysis options. Initial analysis indicates the significance of culture and home, the reliance on a combination of health resources that crosses many cultural, nation-state and health care borders in a transnational setting. In conclusion, this paper fits into timely and needed research on integrating ethnographic data and the social sciences into GIS, which has traditionally had a limited relationship with field of health. This research enhances our understanding and valuing of diversity in alternative health care models, indicative of how different communities participate in determining levels of medical pluralism within an urban health setting. This study

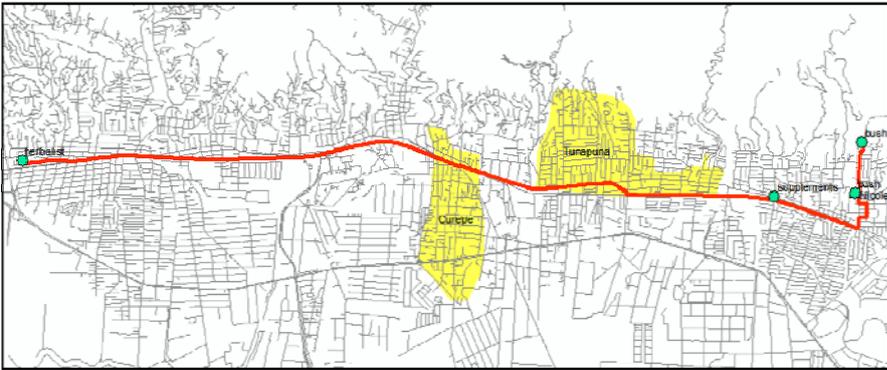
advances our understanding of small-scale cultural perspectives that can contribute to improvements while increasing equity in global health, one community and one place at a time.

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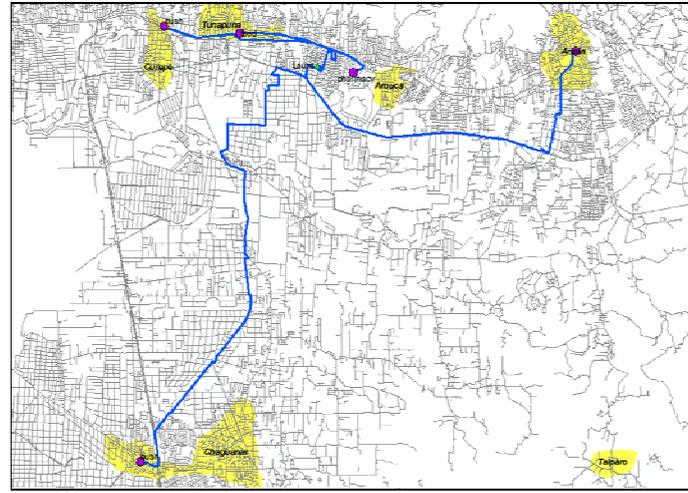
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Appendix A: Samples of individual health care network maps



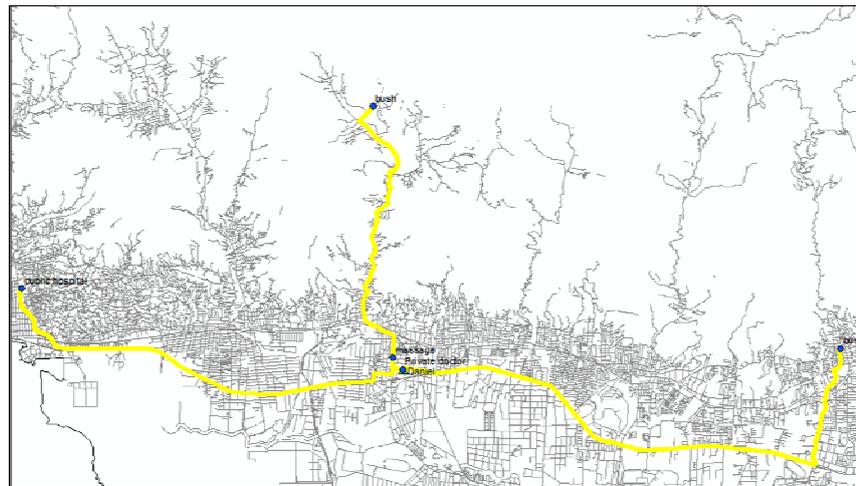
Nicole's health network



Laura's health network



Carl's health network



Daniel's health network