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# The Healthcare Needs of Patients in Rural Kaduna, Nigeria

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**The Healthcare Needs of Patients in Rural Kaduna, Nigeria**

**Jaime Stevens**

**B.A. Johns Hopkins University, 2001**

**A Thesis**

**Submitted in Partial Fulfillment of the**

**Requirements for the Degree of**

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**2011**

**APPROVAL PAGE**

**Master of Public Health Thesis**

**The Healthcare Needs of Patients in Rural Kaduna, Nigeria**

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2011**

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## Introduction

Nigeria is a medically underserved country with declining life expectancy, substandard facilities, inadequate training of healthcare professionals, and inferior quality and accessibility of services (1). The academic literature contains little information about the healthcare needs of rural Nigerians and demographic data as a whole is unreliable (1). This paper seeks to raise awareness in the medical and public health communities about common medical problems in this underserved population and to add to our understanding of the medical needs of rural Nigerians by examining one particular community in detail. It examines the demographics, health status, and self- and provider-identified healthcare needs of 3,525 patients who presented for care during 4,590 encounters over a two-week medical mission in March 2008. This FaithCare mission served the people in and around Kateri Village in the Kaduna State of Nigeria. Healthcare utilization is described in relation to patient age and gender, number of times having previously seen a physician, number of family members living with the patient, distance traveled to the clinic, alcohol and tobacco use, presenting symptoms, diagnoses, and vital signs. It is hoped that a growing understanding of the unmet needs of rural sub-Saharan villagers will aid in targeting programming and policy and encourage those with the resources to provide assistance, leading ultimately to improved healthcare access and health outcomes.

## Background

### *Health and Healthcare in Nigeria*

Nigeria is a federal republic approximately twice the geographic size of California and home to one quarter of the population of Africa (1). It is situated between Benin and Cameroon on the Gulf of Benin and is home to approximately one-quarter of Africa's population (2).

As of 2003, over 70% of the population lives on less than US \$1 per day, and Nigeria is one of the 20 poorest countries in the world, with a per capita income of US \$310 (1, 3). Poverty has

increased in the past few decades. Fewer than half of Nigerians have access to improved water sources (defined by the World Health Organization [WHO] as: household connections, public standpipes, boreholes, protected dug wells or springs, or collected rainwater), less than one-third have access to safe sanitation (defined by the WHO as: public sewer or septic, flush or pit latrine), and these numbers are declining (1).

Most key indicators of health in Nigeria have stayed the same or have deteriorated over the past several years (1). For example, life expectancy has dropped and infant mortality rate has risen (1). Healthy life expectancy at birth is 48 years as of 2006 (3). The infant mortality rate is approximately 9% and one in five children die by age five (1, 3). The maternal mortality rate is 800/100,000 - one of the highest in the world. According to the WHO, HIV/AIDS is the leading cause of death in Nigeria accounting for 16% of all deaths, and as of December 2005, only 6% of the HIV+ population was receiving antiretroviral therapy, with only 3% of HIV+ women treated during pregnancy (4). The incidence and prevalence of hypertension, heart disease, diabetes, and cancer are on the rise (1). Diseases of significance include malaria, dysentery, pneumonia, measles, tuberculosis, HIV, onchocerciasis, schistosomiasis, cholera, meningitis, yellow fever, injury from accidents, and genetic disease such as sickle cell anemia (1).

Nigerians in rural areas have worse health indicators than those who reside in urban areas. As of 2003, the urban: rural ratio for births attended by skilled personnel was 2.2 and the urban: rural ratio for one-year old measles immunization coverage was 1.8, whereas the rural: urban ratio for under-5 mortality rate was 1.6 (3). In 2006, 35% and 65% of urban residents had sustainable access to improved sanitation and improved drinking water, respectively (3). The same year, 25% and 30% of rural residents had sustainable access to safe sanitation and access to improved drinking water, respectively (3).



Availability, accessibility, quality, and utilization of health services have decreased in the last decade (1). As of 2003, there were three doctors for every 10,000 people (3) and the WHO cites an urgent need for trained medical personnel (1). Neither government healthcare facilities nor provider education meet US standards (5). A large majority of people live more than 10 km from a health center and these centers generally lack supplies and trained staff (1).

Government spending on healthcare declined throughout the 1980s and 1990s and as of 2003, the government spent 3% of its total expenditure on healthcare (1, 4). Years of political instability ended with a return to civilian government in 1999 and led to a renewed interest in external healthcare funding (1). The federal government has initiated certain policies and programs in the interest of bettering the health of the population and improving access to healthcare (1). The National Health Policy, adopted in 1998, states that “health development shall be seen not solely in humanitarian terms but as an essential component of the package of social and economic development as well as being an instrument of social justice and national security.” However, state and local government cannot be compelled to implement the policies and recommendations of the federal government (1), leaving healthcare services to be provided by other sources, including private for-profit organizations, NGOs, community organizations, and religious and traditional groups.

#### *Kateri, Kaduna State, Nigeria*

Kaduna state is the third largest in Nigeria in area and in population (6). The terrain consists of savannah woodlands which are farmed for crops such as cotton, peanuts, and tobacco, and the Kaduna River and others flow through the state (6, 7). The majority of people work as farmers and live in rural areas (6). Hausa and English are the two most common languages (6). The area is rich in history and was home to the Nok people dating back to 90 BC (6). Now over 36 ethnic groups reside in Kaduna, with most people belonging to the Hausa, Gwari, Karab, and Bajjuu

groups (6). However, the state has become known internationally for violence between the Christian and Muslim communities over the past several years. There are six hospitals and clinics in the state including one teaching hospital (5, 6). The importance of improved healthcare delivery is reflected in Governor Sambo's 11-point agenda for the state (6).

Little population or health data exist for small rural villages in Kaduna, but the regional population is estimated at 500,000 (8). Kateri is a small market town between the towns of Kaduna and Abuja in rural north central Nigeria (8). Most people live in villages surrounded by the bush and make a living as subsistence farmers, carrying their produce to the market (8). The Kateri Medical Clinic is visited by a physician twice a week (9) and the nearest hospital is 50 miles away (8).

#### *FaithCare*

Peter Schnatz, D.O. is the principal investigator in this project. He and the volunteers and staff of FaithCare collected the data for this study and were actively involved in the project.

FaithCare, formerly known as the Christian Medical Fellowship, is a non-profit, non-denominational organization which provides humanitarian aid through community outreach projects and international missions (10). They seek to provide "access to affordable, holistic and quality health care services including education for prevention of disease while assisting patients with disease management, and helping them to assume responsibility for their health in the USA and throughout the world in places like Nigeria, Haiti, Siberia, and the Dominican Republic" (11). FaithCare seeks to aid the underserved by promoting individual faith, community outreach, and international missions, and is working to develop a fellowship training program in care to the needy and a hospital internationally to complement the US based FaithCare free health clinics (11).

### *FaithCare's 2008 Nigeria Mission*

This FaithCare mission provided a unique opportunity to gain insight into and disseminate information about the needs of patients in Kateri while providing them needed care. From March 17 to 28 2008, 16 FaithCare-USA volunteers and 37 FaithCare-Nigeria volunteers provided free medical care in a poorly staffed and minimally equipped local clinic. All necessary supplies, staff, and medications were brought from the United States FaithCare warehouse. General consultations, dentistry, ophthalmology, gynecology, gynecologic surgery, general surgery, laboratory services, and counseling were provided to patients. Thousands of patients presented for care during this time so patients were issued consultation cards on a first-come first-served basis. The mission provided care to 3,525 patients and some patients were seen by multiple providers for a total of 4,590 patient encounters.

### *Publications*

Two studies have examined missions by FaithCare to rural Nigeria. One study has been published by Dr. Schnatz on the data collected during a 2004 mission of the Christian Medical Fellowship to Okene, Kogi State. This study investigated the prevalence of cervical HPV and cytological abnormalities in 199 women receiving gynecological consultation. Ages of participants were compared to determine any difference in high risk and low risk types of HPV (12).

Another study, The Menopausal Women of Kaduna, Nigeria as Cared for by FaithCare (Schnatz et al.) examined the demographics, presenting symptoms, diagnoses, and cardiovascular parameters of 575 menopausal women served during this 2008 mission to Kateri, Kaduna State (13). It explored a subset of the data which will be considered in this study, considering only

women over age 50. While the parameters are similar, data from all 3,525 patients -men and children as well as women of all ages- were analyzed in the present paper.

### Data Collection

Consultation cards were used both as an intake form to help staff appropriately guide patients to the correct providers and services and as documentation of data collected from each participant.

The following factors were determined by participant verbal self-report and recorded on the patient's consultation card by FaithCare volunteer staff: participant sex was listed as male or female and age was listed in years. The number of individuals living in the household of the participant was reported by a numeral which includes the participant. The number of times a patient had previously seen a physician was recorded as a numeral, with a zero entered for those who had never seen a doctor. The name of the participant's hometown was recorded as well as their estimate of the distance they traveled to the clinic in kilometers. Tobacco and alcohol use were recorded by entering the words "smoke" for tobacco, "drink" for alcohol, and "N/A" for neither. The patients' presenting symptoms were listed according to patient description. At least one symptom was identified for each participant, and no more than 6 were recorded.

The following factors were determined and recorded on the consultation card by a provider: pulse rate was recorded in beats per minute, and the respiratory rate in breaths per minute. Systolic and diastolic blood pressure were measured by sphygmomanometer and recorded in mmHg. Patient diagnosis was listed as determined by the provider after a history and physical examination. Other information was collected from some patients such as marital status, sexual history, results of other physical examination findings, and treatment plan, but only certain variables were complete enough to be examined in this paper.

The data from the cards were then entered into a database and de-identified. Please see Appendix 1: Consultation Card.

### Questions and Hypotheses

In order to better understand the basic demographics and needs of the population of patients served during the mission, the sex ratio of participants, the average and range of ages of patients presenting for care, the average and range of number of family members living in patients' households, the percentage of patients who have never seen a physician, the average and range of distances traveled by patients to be seen during this medical project, the prevalence of tobacco and alcohol use, the most common presenting symptoms, the most common diagnoses, and the prevalence of tachycardia and systolic and diastolic hypertension were examined. Several relationships between sex and age of patients, prior doctor's visits, distance traveled, symptoms, and diagnoses were also explored.

Since care was made available on a first-come, first-served basis to all who needed it, it was hypothesized that patients of all ages would present for care, but children were expected to be over-represented as infectious diseases are the three greatest causes of mortality in Nigeria (HIV, lower respiratory infection, and malaria), and children are particularly susceptible to such infectious disease (14, 15). There was no expected relationship between age of a patient and number of prior doctor's visits. Although in developed countries, older patients may have had more experience with conventional healthcare, the presence of physicians in this area is sparse and even elderly patients may not have had much prior opportunity to meet with a physician. It was expected that older adults would have traveled, on average, the least distance to the clinic as the primary form of transportation in the area is walking and older individuals, particularly those with health concerns, may have been less able to make a longer journey on foot.

The sex distribution in Kaduna is approximately 50:50 female: male (6). Although there exists no cultural studies to suggest that one sex would be represented over the other in seeking medical attention, in the United States gender differences in healthcare utilization have been explored, and women seek ambulatory care 33% more frequently than men exclusive of reproductive related care (16). Thus, it was expected that more women than would present for care during the mission and that women would have experienced more doctor's visits and have travelled farther for care than men. The sex differences expected were not anticipated to vary by age group.

There is no demographic information available for the villagers in Kateri other than that obtained from Schnatz et al (13). The results of that study were the best estimate of what would be found when considering the data from the trip as a whole, however the subjects in that study were women over age 50, a non-random sample of individuals who presented for care, and certain factors may vary among patients of different sexes or ages. The subjects of Schnatz et al. traveled a mean distance of 27.7 km to the clinic, with a range of 1 to 650 km. In that study 39% of patients had never seen a doctor and those who had had done so an average of 5.5 times, with a range of 1 to 40. The number of family members living with those patients was 7.1 with a range of 1 to 40. It was hypothesized that the distance traveled, experience with conventional healthcare, and family structure of the women considered in Schnatz et al. would not differ from those of the clinic population as a whole.

The percentage of subjects considered in Schnatz et al. who drink alcohol and smoke was 20% and 2.8%, respectively. The prevalence of both alcohol consumption and smoking would be expected to be higher in the patient population as a whole as both are even more common amongst men and both are also popular amongst teenagers in Nigeria (17, 18).

Systolic hypertension was present in 26.4% of the Schnatz et al. subjects (defined as a systolic blood pressure greater than or equal to 140), with a maximum value of 222 and a mean of 159.1. Diastolic hypertension was present in 22.6% of subjects of that study (defined as a diastolic blood pressure greater than or equal to 90), with a maximum value of 170 and a mean of 99.3. In addition, there were 11.8% who had a pulse of greater than or equal to 100, with a mean of 104.8. The overall prevalence of hypertension in Nigeria is estimated to be approximately 20-25% (19), with similar prevalence between men and women, however, studies of hypertension in other regions of sub-Saharan Africa suggest that rural areas may have a lower prevalence (20). Therefore, a prevalence of approximately 20%, or the lower end of the range of estimates, was expected.

Peptic ulcer disease, followed by arthritis, hypertension, malaria, and ophthalmologic conditions were the most common illnesses diagnosed in the subjects of Schnatz et al. According to the WHO, the top ten causes of death in Nigeria are: HIV/AIDS, lower respiratory tract infections, malaria, diarrheal disease, measles, perinatal conditions, tuberculosis, CVD, ischemic heart disease, and whooping cough (3), the majority of which are infectious. It is also known that diarrhea, measles, malaria, and lower respiratory disease are particularly common among young Nigerian children (4). Because of this, it was hypothesized that infectious diseases would represent the most common diagnoses, but may be even more prevalent amongst children. In addition, men are more susceptible to infection, although mortality from infectious disease is comparable between the sexes. Therefore, men were expected to be diagnosed with infectious disease more than women (21, 22). It was also hypothesized that patients with curable disease, such as many infectious diseases or diarrhea, would have had fewer prior doctor's visits than patients with chronic and debilitating conditions. Patients with diseases that impact daily functioning or status in society were hypothesized to be willing to travel farther for care and were expected to have sought medical care more often. Examples include certain neurological

conditions such as seizure disorder, which are particularly stigmatized in sub-Saharan African rural regions (23), and reproductive problems such as infertility, which is common in Nigeria, but is also a cause of ostracism, psychological trauma, physical violence, and suicidality (24, 25).

Although Schnatz et al. studied women of menopausal age, few patients offered menopausal symptoms as their presenting complaint as other medical issues were more pressing for them. Pain, followed by eye complaints, swelling, cough/cold, and fatigue were the most common presenting complaints among the older women. Their concerns are issues that affect patients of both sexes and all ages, so it can be hypothesized that the clinic population as a whole would present with similar symptoms and other complaints related to infectious diseases mentioned above, such as fever, diarrhea, and rash.

As stated above, younger patients and men were expected to present more often with complaints that could be related to infectious disease. Also, given that children may have been brought to the clinic by their caregivers, they were expected to be the age group most likely to present without any symptoms. Women were expected to disproportionately present with reproductive complaints, as in Nigeria “women's lives also tend to be affected more profoundly than men's by their reproductive roles” (26) and “the necessity for a woman to have a child remains basic in this region. Motherhood continues to define the way a woman is treated in the community, her self-respect and her understanding of womanhood . . .they receive the major blame for reproductive mishaps (24).” In addition, women were expected to present with a with a greater number of symptoms based on the expectation from developed countries that that women utilize more healthcare than men (16). Patients with complaints that are uncomfortable or socially unacceptable, such as pain and seizure, were expected to have traveled farther and have seen a physician more frequently.



## Methods

### Human Subjects

The IRB at Hartford Hospital and local Nigerian medical educators and personnel reviewed the study protocol and determined all data collection and analysis used for this project to be exempt as identifiers have been removed. As the majority of information collected for the study was information collected at intake for the purpose of patient care, the collection imposed no risks to the participants other than risk of invasion of privacy. Protection against invasion of privacy has been maximized by de-identifying the data prior to analysis. Identifiable data is stored solely by Dr. Schnatz on a password-protected system. The goal of the study was to gather information that will ultimately be used by the public health and medical communities to understand and help meet the needs of rural Nigerian communities at large.

### Subject Selection

The study population is comprised of individuals of all ages residing in and around Kateri Village who presented for medical care during the mission. Most patients become aware of the mission through word of mouth. In addition, village leaders and local churches, along with radio and television stations helped inform those who may have been interested in care. All patients seeking care were given a consultation card on a first-come first-served basis. Once they received a consultation card, patients were assured to be seen by the medical team. All patients who were seen during the mission were included in this study.

### Analysis

Patient age was truncated to the nearest whole number and ages over 110 years were considered erroneous entry and coded as missing values in SPSS. The patients were divided into age groups 0-18, 19-44, 45-64, and 65+, based on cutoff points offered by PubMed's Limits tool (27).

Values greater than 150 and <0 for the number of times having seen a physician were considered

erroneous and coded as missing values. Zeros for systolic blood pressure, diastolic blood pressure, pulse, and respiratory rate were considered missing values. Tachycardia was defined as >160 beats per minute (bpm) for infants under one year, >120 bpm for children aged 1-10, and >100 bpm for adolescents and adults aged 11+. Bradycardia was defined as <100 bpm for infants under one year, <70 bpm for children aged 1-10, and <60 bpm for adolescents and adults aged 11+. The following normal ranges were used for respiratory rate: infants under one year: 30-60 breaths per minute; children aged 1-11: 16-40 breaths per minute; adolescents and adults aged 12+: 12-20 breaths per minute. Systolic hypertension was defined as a systolic blood pressure of >120 mmHg and diastolic hypertension was defined as a diastolic blood pressure of >80 mmHg. Diastolic blood pressure values under 25 or over 200 were deemed unlikely to be accurate and were considered to be errors in data entry. Normal blood pressure was defined as 55-100/35-65 mmHg for infants under one year, 90-120/55-75 mmHg for children aged 1-11, and 90-120/60-80 mmHg for adolescents and adults aged 12+. Hypertension was defined as a systolic blood pressure over 140 or a diastolic blood pressure over 90 in a patient over 12 years of age.

Data was standardized to ensure that similar symptoms and diagnoses, which may have been reported differently by different volunteers, were coded similarly. For example, a symptom of “dysmenorrhagia,” a term not frequently used in American English, was coded as “dysmenorrhea,” the term more commonly used for pain with menses. In addition, a hierarchy of symptoms was developed in order that prevalence of specific conditions as well as more general categories of conditions could be examined. This numerical system allowed, for example, the calculation of the prevalence of pain as a whole (codes 8000-8999) as well as the prevalence of individual types of pain such as abdominal (8300-8399), back (8500-8599), chest 8400-8499), head and neck (8200-8299), and joint (8700-8799). Where necessary, subcategories were used to examine frequencies of more specific symptoms, for example, the codes for head and neck pain

were subdivided into headache (8210-8219), eye pain (8220-8229), ear pain (8230-8239), dental pain (8240-8249), and neck pain (8250-8359). The entire coding scheme for patients' symptoms can be found in Appendix 2: Codes for Presenting Symptoms. Finally, since each patient had up to six symptoms recorded, and the complaints were not listed in any particular order, all were considered in determining prevalence of a particular symptom in the patient population.

Diagnoses were coded similarly to symptoms so that prevalence of certain types of conditions could be determined. Only the first diagnosis listed was coded unless the first diagnosis listed by the physician was illegible, incomplete, a sign or symptom, or a less serious or urgent condition than another diagnosis listed. Suspected diagnoses which could not be confirmed due to the brief nature of the mission were coded as if the diagnoses had been confirmed. For example, a diagnosis written by the physician as "referral to urologist" was coded under Urinary/Renal, whereas "suspected malaria" was coded with malaria under Infectious Disease, "suspected fibroid" was coded under female reproductive, and "suspected PVD" was coded under Cardiovascular. The complete coding scheme for diagnoses can be found in Appendix 3; Codes for Diagnoses.

Data analysis was performed using SPSS on the database containing the patient information from the consultation cards.

#### *Demographic Variables*

The ratio of male to female participants in each of the four age groups was calculated. The difference in average distance traveled to the clinic between men and women was examined using the independent samples t test, as was the difference in average number of prior doctor's visits (equal variances assumed). The correlation between a patient's age and distance traveled to the

clinic as well as the correlation between age and number of doctor's visits was determined by the Pearson correlation.

### *Presenting Symptoms*

The Chi-Squared distribution was used to compare the number of men and women presenting with a symptom from each of the nine major symptom categories as well as those presenting without symptoms. A Chi-Squared analysis for trend was performed to examine the prevalence of each symptom amongst the four age groups. The odds ratio was calculated for each major symptom type to compare the odds a man presented with a given symptom in comparison to the odds a woman presented with that symptom. Odds ratios were also calculated to compare the odds that a member of each age group complained of a certain symptom to the odds that an adult complained of that symptom. Analysis of variance (ANOVA) was used to ascertain any relationship between the age of a patient and the number of symptoms presented. The t-test was used to compare the average distance traveled by patients with and without each of the major symptom types as well as the average number of prior doctor's visits attended by patients with and without each of the major symptom types (equal variances assumed).

### *Diagnoses*

The Chi-Squared distribution was used to compare the number of men and women given a diagnosis from each of the major diagnostic categories (with the exception of pregnancy and puerperium), except where the expected cell counts were  $<5$ , in which case Fisher's exact test (two sided) was performed. A Chi-Squared analysis for trend was performed to examine the prevalence of each diagnosis in the different age groups. Odds ratios were calculated to compare odds a male patient received a diagnosis to the odds a female patient received that diagnosis. Odds ratios were also calculated to compare the odds that a member of each age group received a certain type of diagnosis to the odds that an adult received such a diagnosis. The t-test was used

to compare the average distance traveled by patients with and without each type of diagnosis as well as the average number of prior doctor's visits attended by patients with and without each type of diagnosis (equal variances assumed).

#### *Patients Presenting with Pain and Diagnosed with Infectious Disease*

As pain was present in over two-thirds of the patient presenting for care, the sex and age of these patients was examined in more detail. The Chi-Squared distribution was used to examine sex and age group differences in patients presenting with pain, and those diagnosed with infectious disease. The Chi-Squared distribution was also used to compare the number of men and women presenting with each specific type of pain.

### **Results**

FaithCare served 3,525 patients over the course of the mission and all 3,525 were included in the analysis.

#### Demographic Variables

Demographic and vital sign information is summarized in Table 1. Sex was recorded for 3,498 of the 3,525 patients. Of these, 2,327 (66.5%) were female. Ages were recorded for all 3,525 patients. Three values were excluded as they did not meet criteria. The mean and median age of the remaining 3,522 patients were 34.2 years and 35.0 years, respectively, with a standard deviation of 19.5 years and a range of zero to 97 years. A total of 744 patients (21.1%) were children aged zero to 18, 1,599 (45.4%) were adults aged 19 to 44, 905 (25.7%) were middle-aged between 45 to 64 years of age; and 241 (6.8%) were seniors age 65 or over.

All 3,525 patients had recorded the number of times they reported having seen a physician prior to the mission, and 3,522 values met criteria. Values ranged from zero to 56 and 1,523 (43.2%)

had never seen a physician, 85.9% had seen a physician five times or fewer, and 95.4% had seen a physician 10 times or fewer. Of those who had previously seen a physician, 49.8% had seen one 3 times or fewer.

The mean distance traveled was 25.3 km (median of 5.0 km). The range of distances traveled was from zero kilometers to 650 kilometers, and 40.3% of patients reported traveling one kilometer or less, 50.1% traveled five km or less, 25.5% traveled between six and 25 km, 20.1% traveled between 26 and 100 km, and 4.3% traveled between 101 and 650 km.

The household size was recorded for 3,522 patients. The average household size was 7.0 (median of 6.0) with a range from one to 100. Of these, 14.1% of patients' households contained two or fewer members, 25.1% had between three and five family members, 48.5% between six and 10 family members, 11.3% between 11 and 25 family members, and 1.0% between 26 and 100 family members.

Most patients abstain from both alcohol and cigarettes accounting for 3001 (85.1%) of the participants. Of the remaining patients, 455 (12.9%) reported drinking only, four (0.1%) reported smoking only; and 65 (1.8%) reported both smoking cigarettes and drinking alcohol.

### Vital Signs

A pulse was taken for 1,814 patients. Of these, 229 (12.6%) were tachycardic and 83 (4.6%) were bradycardic. The respiratory rate was measured for 544 patients. Of these, 70 (12.9%) were tachypnic and nine (1.7%) were bradypnic. Systolic blood pressure was measured for 1,808 patients and diastolic blood pressure for 1,807 patients. Six values were excluded from the analysis of diastolic blood pressure. A high systolic reading was found for 874 patients (48.3%), and 575 (31.9%) had a high diastolic reading, whereas only eight (0.4%) had a low systolic

reading and 49 (2.7%) had a low diastolic reading. Of the 1777 patients 12 years and older who had their blood pressure measured, 442 (24.9%) met the criteria for hypertension.

### Presenting Symptoms

The participants included 2,446 (69.4%) patients with pain symptoms whereas 716 (20.3%) complained of infectious disease symptoms, and 450 (12.8%) had general complaints. Head or neck symptoms were experienced by 371 patients (10.5%), and the same number presented with cardiovascular or pulmonary complaints. Gastrointestinal or genitourinary symptoms affected 273 patients (7.7%) whereas 246 (7.0%) had dermatologic complaints, 112 (3.2%) had neurological or psychiatric complaints, and 133 patients (3.8%) presented without complaints.

### Diagnoses

There were 24 patients (0.7%) who were given diagnoses that could not be determined due to spelling or abbreviation and 890 patients (25.2%) were not given a diagnosis at the time of their visit to the clinic. An additional 80 patients (2.3%) also lacked a definitive diagnosis, but signs and symptoms of their conditions were documented by the physician.

Infectious disease was the most common diagnosis, accounting for 682 patients (19.3%). This was followed by gastrointestinal disease, accounting for 548 patients (15.5%). Providers diagnosed 202 patients (5.7%) with dental disease, followed by 196 (5.5%) with eye disease. Skin, subcutaneous, musculoskeletal, or connective tissue conditions were diagnosed in 188 patients (5.3%), followed by 172 (4.9%) with cardiovascular disease and 141 (4.1%) with reproductive conditions. Reproductive diseases were present in 119 women and 23 men. Seventy-seven patients (2.2%) had injury, accident, or pain diagnoses, and 50 (1.4%) had a neurological disease. There were 48 patients (1.4%) diagnosed with respiratory disease, 46 (1.3%) with blood or lymph disorders, and 40 (1.1%) with an endocrine, nutritional, or metabolic

condition. Thirty-four patients (1.0%) were diagnosed with ear, nose, or throat problems, followed by 29 patients (0.8%) with neoplasm, and 24 (0.7%) with disorders relating to pregnancy or the puerperium. Nineteen patients (0.5%) had congenital abnormalities and 15 (0.4%) had allergic, hypersensitive, or immunologic conditions. Only 13 patients (0.4%) were diagnosed with a mental or behavioral disorder and the least common diagnosis was urinary or renal conditions assigned to only seven patients (0.2%).

### Demographic Comparisons

In all age groups female patients outnumbered male patients by more than 2:1, except in the child age group where male children just outnumbered female children (1.1:1). The highest ratio of female to male patients was found in the adult age group with a ratio of 2.9:1. Women traveled on average 27.4 km to the clinic, whereas men traveled 21.7 km. The mean difference of 5.7 was significant ( $t(3496) = 3.19, p < 0.01$ ). Prior to the visit under consideration, women had previously seen a physician an average of 3.1 times, whereas men had seen one an average of 2.5 times. The mean difference of 0.7 visits was significant ( $t(3493) = 3.73, p = <0.01$ ). No significant correlation was found between a patient's age and the distance they traveled to the clinic (Pearson correlation = 0.06), and no significant correlation was found between a patient's age and the number of prior doctor's visits they had attended (Pearson correlation = 0.08).

### Sex and Presenting Symptoms

The likelihood that a woman reported reproductive symptoms was 13.8 times the likelihood that a man reported such symptoms. Women offered on average 2.0 symptoms, whereas men offered 1.8. The mean difference of 0.2 was significant, with equal variances assumed (independent samples  $t(3481) = 5.02, p < 0.01$ ).



The most common complaint given by women was pain, followed by infectious symptoms, and then by general medical complaints. Men also most commonly complained of pain, followed by infectious, and then by cardiopulmonary symptoms.

Men were significantly more likely to report head and neck, cardiopulmonary, gastrointestinal/genitourinary, and infectious symptoms than women were to report such symptoms. Women were significantly more likely to report reproductive, neuropsychiatric, and pain symptoms than men were to report such symptoms.

The number of patients presenting with a symptom in each symptom category is broken down by sex in Table 2.

#### Age and Presenting Symptoms

Pain was the most common symptom in every age category, with 50.8% of children, 75.0% of adults, 73.0% of middle-aged, and 69.4% of seniors experiencing pain symptoms. In children, this was followed by infectious symptoms and then by gastrointestinal/genitourinary symptoms. The next most common symptoms for adults were infectious symptoms followed by reproductive concerns. Middle-aged patients complained second most commonly of head and neck symptoms, followed by infectious symptoms and after pain, seniors experienced general medical concerns and infectious symptoms most commonly.

Head and neck complaints and pain increased significantly with increasing age, whereas gastrointestinal/genitourinary and infectious complaints decreased significantly with increasing age. The odds of presenting for care without complaints decreased significantly with age (Chi-Squared for trend, all  $p < 0.01$ ).

The odds that a child presented with either gastrointestinal/genitourinary or infectious complaints were significantly higher than the odds that an adult presented with either of these complaints, OR = 2.6 (2.0-3.5) and 3.3 (2.7-4.0), respectively. The odds a child presented with pain were significantly less than the odds an adult presented with pain, OR = 0.3 (0.3-0.4). The odds of presenting with head and neck complaints were significantly higher in both middle-aged and senior patients than in adults, OR = 2.4 (1.9-3.1) and 1.7 (1.1-2.3), respectively. The odds of cardiopulmonary complaints were significantly higher in all age groups than in adults,  $OR_{child:adult} = 1.6 (1.1-2.1)$ ,  $OR_{middleaged:adult} = 1.6 (1.2-2.1)$ , and  $OR_{senior:adult} = 1.7 (1.1-2.6)$ , and expectedly, the odds of reproductive complaints were significantly lower in all age groups other than adults,  $OR_{child:adult} = 0.1 (0.1-0.2)$ ,  $OR_{middleaged:adult} = 0.3 (0.2-0.4)$ , and  $OR_{senior:Adult} = 0.0 (0.0-0.2)$ .

For all symptom categories, the percentage of patients complaining of each symptom type varied significantly by age group except for dermatologic, neuropsychiatric, and general medical complaints. No significant relationship was found between the age of the patient and the number of symptoms (ANOVA:  $F (1, 3505) = 3.77, p = 0.05$ ).

The number of patients presenting with each symptom type is broken down by age group in Table 3.

#### Distance and Presenting Symptoms

Patients with neuropsychiatric complaints traveled on average the greatest distance for care: 36.4 km. This was followed by patients with reproductive concerns who traveled on average 33.9 kilometers and those with cardiopulmonary complaints who traveled on average 29.2 kilometers.

Patients with reproductive, neuropsychiatric, and pain complaints traveled significantly farther to reach the clinic than those who lacked these complaints. Conversely, those with head and neck

and dermatologic complaints traveled a significantly shorter distance, on average, than those without these complaints. Those patients who denied complaints did not travel a significantly shorter or farther distance than those who experienced symptoms.

The average distance traveled by patients with and without each symptom type is listed in Table 4.

#### Number of Doctor's Visits and Presenting Symptoms

Patients with neurologic or psychiatric symptoms had, on average, the most prior experience with healthcare: 3.9 visits. This was followed by patients with general medical complaints, who had on average 3.4 previous visits, and those with pain, who had on average 3.2 previous visits.

Patients with neuropsychiatric symptoms, pain, and general medical complaints had, on average, significantly more previous doctor's visits than those who did not experience these symptoms.

Patients with head and neck complaints had, on average, significantly fewer previous doctor's appointments than those who had no head and neck complaints. Patients who presented for care in the absence of complaints did not differ significantly from those who cited complaints in terms of number of previous visits.

The average number of doctor's visits attended by patients with and without each symptom type is listed in Table 5.

#### Sex and Diagnosis

For both men and women, the most common outcome of the visit was no diagnosis/signs and symptoms without diagnosis, accounting for 26.5% of the male patients and 28.0% of the female patients. The most common diagnosis for both men and women was infectious disease,

accounting for 22.3% and 18.0% of patients, respectively, and the second most common diagnosis for both men and women was gastrointestinal disease accounting for 12.3% and 17.2% of patients, respectively. This was followed by eye disease, diagnosed in 8.0% of men, and dental disease, diagnosed in 6.6% of women.

Men were significantly more likely than women to be diagnosed with infectious, hematologic/oncologic, neurologic, eye, ear/nose/throat, respiratory, congenital, and allergic/hypersensitive/immunologic disease (Pearson Chi-Squared  $p < 0.01$ ,  $p = 0.01$ ,  $p = 0.02$ ,  $p < 0.01$ ,  $p = 0.03$ ,  $p = 0.01$ ,  $p < 0.01$ ,  $p = 0.03$ , respectively). Women were significantly more likely than men to receive gastrointestinal, reproductive, and dental diagnoses (Pearson Chi-Squared all  $p < 0.01$ ).

The odds of a male patient being given an ear/nose/throat diagnosis were more than twice the odds of a female patient being given such a diagnosis. The same was true for a respiratory diagnosis. The odds of congenital abnormality and allergy/hypersensitivity/immunologic disease in men were also more than twice the odds in women, however the number of patients with these diagnoses were small at 19 and 15, respectively. The odds of a woman receiving a reproductive diagnosis were nearly three times the odds of a man receiving such a diagnosis (OR = 3.0).

The number of patients who were given a diagnosis was in each diagnostic category is broken down by sex in Table 6.

#### Age and Diagnosis

For all diagnostic categories, the percentage of patients receiving the diagnosis varied significantly by age group except for endocrine/metabolic/nutritional, mental/behavioral, renal, and injury/accident/pain diagnoses (Pearson Chi-Squared or Fisher's Exact test, all  $p < 0.01$ ). The

number of patients who received no diagnosis also varied significantly by age group (Pearson Chi-Squared  $p < 0.01$ ).

Eye, cardiovascular, gastrointestinal, skin/subcutaneous/musculoskeletal/connective tissue, and injury/accident/pain disorders increased significantly with increasing age (Chi-Squared for trend  $p < 0.01$ ,  $p < 0.01$ ,  $p < 0.01$ , and  $p < 0.05$ , respectively). Conversely, infectious disease, hematologic/oncologic, neurologic, and respiratory diagnoses decreased significantly with increasing age among the patients at this clinic (Chi-Squared for trend all  $p < 0.01$ ).

In all age groups other than children, no diagnosis/signs and symptoms only was the most common outcome of the visit (478 or 29.9% of adults, 208 or 23.0% of middle-aged, 72 or 29.9% of seniors). Among children, the 250 (32.3%) diagnosed with infectious disease outnumbered the 209 (26.9%) discharged without a diagnosis. The next most common diagnosis for children was gastrointestinal disease (53 or 6.8%) followed by hematologic/oncologic disease (42 or 5.4%). The most common diagnosis for adults, middle-aged, and senior patients was gastrointestinal disease (289 or 18.1%, 166 or 18.3%, and 40 or 16.6%, respectively). For adults this was followed by infectious (287 or 17.9%), and dental disease (122 or 7.6%). For middle-aged patients gastrointestinal disease was also followed infectious disease (118 or 13.0%), but then by eye disease (99 or 10.9%). Skin/subcutaneous/ musculoskeletal/connective tissue disease was second most common diagnosis in seniors (31 or 12.9%), followed by infectious disease (27 or 11.2%).

There were several diagnostic categories in which children had much higher likelihood of diagnosis than adults. The likelihood of a child being diagnosed with an ear/nose/throat or respiratory condition were more than five times the likelihood of an adult being diagnosed with such a condition. Conversely, adults were 6.5 times as likely to have reproductive problems and

5.4 times as likely to have complications of pregnancy as children. There was an increased likelihood that a child was diagnosed with congenital disease and that children and middle-aged participants were diagnosed with allergy/hypersensitivity/ immunologic disease, but only 19 and 15 patients in total received these diagnoses, respectively.

The odds that a child received an infectious disease, hematologic/oncologic, mental/behavioral, ear/nose/throat, respiratory, or congenital diagnosis were all significantly higher than the odds an adult received such a diagnosis (OR = 2.2 (1.8-2.6), OR = 5.3 (3.0-9.4), OR = 3.4 (1.8-6.5), OR = 7.6 (3.3-17.6), OR = 5.72 (2.8-11.9), and OR = 17.9 (4.1-77.5), respectively). The odds that a child received a cardiovascular or gastrointestinal diagnosis, or was experiencing complications of pregnancy were all significantly less than the odds an adult received such a diagnosis (OR = 0.3 (0.1-0.5), OR = 0.3 (0.2-0.5), and OR = 0.2 (0.0-0.8), respectively).

Both children and middle-aged patients had significantly higher odds of receiving an allergic/hypersensitive/ immunologic diagnosis than adults (OR = 14.5 (1.8-118.3) and OR = 12.5 (1.5-101.4), respectively) and both had significantly lower odds of receiving a reproductive diagnosis than adults (OR = 0.2 (0.1-0.3) and OR = 0.6 (0.4-0.9), respectively).

Middle-aged patients had significantly higher odds than adults of receiving an eye or cardiovascular diagnosis (OR = 3.3 (2.3-4.6) and OR = 2.1 (1.5-2.9), respectively) and significantly lower odds than adults of leaving the clinic without a diagnosis (OR = 0.7 (0.6-0.8)). Both middle-aged patients and seniors had significantly lower odds than their adult counterparts of receiving an infectious disease diagnosis as their primary diagnosis (OR = 0.7 (0.5-0.9) and OR = 0.6 (0.4-0.9), respectively).

The number of patients with a condition in each major diagnostic category is broken down by age group in Table 7.

#### Distance and Diagnosis

Those with respiratory diagnoses traveled on average the greatest distance for care, 36.8 km.

This was followed by patients diagnosed with skin/subcutaneous/musculoskeletal/connective tissue disease who traveled on average 34.2 km and those with renal diagnoses who traveled 32.3 km.

Patients diagnosed with skin/subcutaneous/musculoskeletal/connective tissue disease and those who received no diagnosis traveled significantly farther to reach the clinic than those who did not receive such outcomes. Those who were diagnosed with eye disease or dental disease traveled, on average, a significantly shorter distance to the clinic than their counterparts who did not have eye or dental disease as their primary diagnosis.

The average distance traveled by patients with and without each type of diagnosis is listed in Table 8.

#### Number of Doctor's Visits and Diagnosis

Patients with endocrine/metabolic/nutritional diagnoses had, on average, the most prior experience with healthcare, 5.5 visits. This was followed by patients with mental/behavioral disorders and pregnancy related problems. Both of these groups had, on average, 5.0 prior visits.

Patients with endocrine/metabolic/nutritional, cardiovascular, gastrointestinal, and skin/subcutaneous/ musculoskeletal/connective tissue disease, and pregnancy related problems had, on average, significantly more previous doctor's visits than those who did not have these problems. Patients with infectious disease and those with eye and dental conditions had, on

average, significantly fewer previous doctor's visits than those without these concerns. Patients who were seen but not assigned a diagnosis had, on average, significantly fewer previous visits than those who were diagnosed at the clinic.

The average number of doctor's visits attended by patients with and without each diagnosis type is listed in Table 9.

### Patients Presenting with Pain

#### *Pain, Sex, and Age*

Pain was a presenting symptom of 2,446 patients (69.4%) who attended the clinic. Of these, sex and age were recorded for 2,430. In all but the child age group women were more than twice as likely to complain of pain than men. Over half of the women who had pain were in the adult age group (53.3% of women who had pain were adults), whereas the ages of men who were experiencing pain were more evenly distributed (39.7% were adults, 27.6% were children, and 24.0% were middle-aged). Girls accounted for 49.5% of the children who complained of pain, whereas boys accounted for 50.5%. Seniors of both sexes were less likely to complain of pain than any other age group within their sex, older women accounted for only 7.3% of women complaining of pain and older men accounted for only 8.7% of men complaining of pain. These differences were significant (Pearson Chi-Squared = 110.59,  $p < 0.01$ ).

#### *Types of Pain*

Abdominal pain was the most common type of pain experienced by patients, accounting for 50.3% or 1,231 of the patients presenting with pain. This was followed by head and neck pain (28.0%) and general pain (20.1%). Gastrointestinal/genitourinary pain was the least frequently offered type of pain, accounting for only 6.7% of the pain experienced by patients.



### *Type of Pain and Sex*

Men and women did not differ significantly in the type of pain they experienced except for chest pain. 12.3% of females with pain described chest pain, whereas only 7.8% of males with pain described this subtype. The difference was significant (Pearson Chi-Squared = 10.14,  $p < 0.01$ ).

### *Type of Pain and Age*

Every subtype of pain examined varied significantly by age group. General pain, back pain, gastrointestinal/genitourinary pain, and extremity pain tended to increase with age, whereas head and neck pain and abdominal pain tended to decrease with age. Chest pain peaked amongst adults, with adults accounting for 56.3% of patients with chest pain.

### Patients Diagnosed with Infectious Disease

#### *Infectious Disease, Sex, and Age*

Infectious disease was the primary diagnosis given to 682 patients (19.3%) who attended the clinic. Of these, sex and age were recorded for 680 patients. Adult women accounted for the greatest proportion of female patients diagnosed with infectious disease (48.7%), and in all age groups except children more women than men were diagnosed with infectious disease. Boys accounted for the greatest proportion of male patients diagnosed with infectious disease (49.0%). Seniors of both sexes were less likely to be diagnosed with infectious disease than any other age group within their sex; older women accounted for only 3.3% of women diagnosed and older men accounted for only 5.0% of men diagnosed. Differences in sex and age of patients diagnosed with infectious disease were significant (Pearson Chi-Squared = 32.77,  $p < 0.01$ ).

### *Infectious Disease and Presenting Symptoms*

The most common symptom amongst patients diagnosed with infectious disease was pain with 74.0% of the patients with the diagnosis experiencing this symptom. Of patients with an infectious disease diagnosis, 77.6% of women and 68.6% of men had pain as a symptom. In addition, 58.5% of children, 80.8% of adults, 88.1% of middle-aged, and 85.2% of seniors with infectious disease had pain as a symptom. This was followed by infectious symptoms - defined as cough, cold, infection, or fever - and then gastrointestinal/genitourinary symptoms, experienced by 48.4% and 17.9% of patients with the diagnosis, respectively. It was rare for a patient suffering from infection to be asymptomatic, only 1.2% of patients with infectious disease diagnoses denied complaints.

## **Discussion**

### **Limitations**

Limitations of this study include patient report, time available for data collection, sampling method, and external validity and reliability. In this part of Nigeria infants are infrequently delivered in hospitals and only 33% of births were registered in 2006, according to the WHO (3). Patients may be unlikely to know their exact age and data collected may be an estimate on behalf of the patient. Ideally, given more time and resources, more information would have been collected on more demographic and health related variables. The time and staff allotted to collection of data was limited as the primary goal of the mission was to provide direct care to those in need. Presenting symptoms were recorded primarily by organ system but detail was not available for symptom intensity, chronicity, or impact on daily functioning. In addition, in some cases, the diagnoses used in determining prevalence of different categories of conditions were presumed and not confirmed due to timing and diagnostic and technological limitations. It is important to note that this mission captures the needs of a population during a single brief period of time. Reliability of the results cannot be determined, as it is unknown how much the needs of

the population would be found to vary in subsequent trips. In addition, there may have been numerous community members who were in need of medical attention who were not captured by this study because they did not present for care. Given that the mission was primarily publicized through word of mouth, not all potential patients living in the area may have been aware of the opportunity to receive care. Some may have been unable to take the time or make the trip to the clinic or may have been unable to wait in the long lines. Also, although many communities in Nigeria, including the Hausa, are open to multiple medical modalities and use “pluralistic medicine,” the value this particular community places on conventional western medical care in comparison to traditional care for certain conditions is unknown and may affect the symptoms and diseases for which patients present to a clinic such as this (28). Cultural gender differences are also likely to have impacted the demographic makeup of the clinic population as many women in the area lack the freedoms to seek treatment without permission and to make their own healthcare decisions (26). In addition, this mission provided not only traditional medical, but also spiritual care, and it was not recorded if patients sought care primarily for one or the other of these services. While the spiritual care was optional and offered to all regardless of specific religion or faith, there may have been potential patients who did not feel comfortable seeking care from Christian providers, particularly as this region is one of high tension between those of Christian and Muslim faiths. Lastly, although many people traveled long distances for care, extending the breadth of patient exposure, the majority of participants were from a single small village. External validity cannot be evaluated as it is unknown how applicable the results might be to other villagers in sub-Saharan Africa.

## Conclusions

### *Age and Sex*

Patients of all ages were well represented at the clinic during the mission, but surprisingly without a predominance of children presenting for care. As expected from studies of Western patients,

more women presented for care than men and this was consistent amongst all age groups except children (16).

#### *Prior Physician's Visits*

Compared to the 39% of women from the menopause study, 43.3% of the entire population in the current analysis had never seen a physician. Women in Kateri who have completed their reproductive years may be more likely to have experienced medical care than the population as a whole.

#### *Household Size*

The average number of household members size was 7 with wide variation. This was expected and consistent with the subset of participants studied in Schnatz et al.

#### *Distance Traveled*

The mean distance traveled by patients as a whole was comparable to that of the women considered in Schnatz et al.

#### *Tobacco and Alcohol*

The clinic population as a whole smoked tobacco and drank alcohol much less than the subgroup of women included in the menopause study. This is surprising as men are known to smoke and drink more than women in Nigeria, but may partially be explained by the inclusion of young children in this study (17, 18).

#### *Hypertension*

Hypertension was found in 24.9% of patients cared for during the mission. This is consistent with estimates of 20-25% of the population of Nigeria as a whole, however, slightly higher than

expected as rural patients were anticipated to exhibit a lower prevalence of this chronic condition (19, 20).

### *Symptoms and Diagnoses*

As expected, pain was the most common symptom and infectious disease was the most common diagnosis given during the course of the mission.

### *Sex and Presenting Symptoms*

Men were more likely to complain of infectious disease-related symptoms and women were more likely to present with a greater number of complaints, both of which were expected based on prior research (16, 21, 22). In addition, the likelihood that a woman reported reproductive symptoms was 13.8 times the likelihood that a man reported such symptoms, which is consistent with the importance of a Nigerian woman's ability to reproduce (23, 24, 25, 26).

### *Age and Presenting Symptoms*

Children were significantly more likely to present with either gastrointestinal/genitourinary or infectious complaints than their adult counterparts. This finding is understandable as infectious disease affects children most significantly - over half of the deaths from infectious disease are children under five - and many symptoms associated with infectious disease are gastrointestinal in nature (14).

The odds of presenting for care without complaints decreased significantly with age. This may suggest that children were more likely to present or be presented by their parents for well-patient care than their adult counterparts who lacked symptoms.

### *Distance and Presenting Symptoms*

As expected, patients in pain and those with neurological and reproductive complaints traveled farther to reach the clinic. The majority of neurological complaints are accounted for by seizures, a symptom particularly stigmatized in the area. Infertility, also stigmatized, was the second most common reproductive complaint, surpassed only by vaginal discharge, a common symptom of STDs, which have a high prevalence in Nigeria, particularly among women, due to cultural limitations to protecting oneself from such infection (29).

There was no significant difference in kilometers traveled between symptomatic and asymptomatic patients. This may suggest that patients are willing to travel as far as needed for medical care regardless of symptomatology.

### *Prior Doctor's Visits and Presenting Symptoms*

Patients with neuropsychiatric symptoms and pain had more experience with doctor's visits than their counterparts without these symptoms. This might be expected, given the cultural importance of neuropsychiatric symptoms and the impact that pain has on functional status. Surprisingly, given the importance of reproductive health in Nigeria, those with reproductive complaints did not have more experience with conventional healthcare than those without reproductive complaints.

There was no significant difference in number of doctor's visits between symptomatic and asymptomatic patients. This may suggest that patients seek care when it is available regardless of symptomatology.

### *Sex and Diagnosis*

As predicted, men were more likely to be diagnosed with infectious disease than women, however, infectious disease was still the most common diagnosis given to patients of either sex.

As may have been expected from the disproportionate number of women presenting with reproductive complaints, the odds of a woman receiving a reproductive diagnosis were nearly three times the odds of a man receiving such a diagnosis.

### *Age and Diagnosis*

The odds a child received an infectious disease diagnosis were significantly higher than the odds an adult received such a diagnosis. This was anticipated given the higher susceptibility of young patients to infection (14). The likelihood of a child being diagnosed with an ear/nose/throat or respiratory condition were more than five times the likelihood of an adult being diagnosed with such a condition. This is consistent, for example, with the high prevalence of respiratory diagnoses among children in the United Kingdom. According to the Lung and Asthma Information Agency, among children in the United Kingdom “33% of all consultations are for respiratory diseases, with upper respiratory tract diseases accounting for two thirds of these. In adults, respiratory diseases account for 13-14% of all consultations” (30). Worldwide, 20% of deaths of children under 5 are attributable to acute respiratory infections alone (31).

Cardiovascular disease, gastrointestinal disease, and pregnancy complications were less common in children than in adults, as may be expected given the chronic and progressive nature of many cardiovascular and gastrointestinal diseases and that many of the patients of the “child” age group were not of childbearing age.

Middle-aged patients had significantly higher odds than adults of receiving an eye or cardiovascular diagnosis and significantly lower odds than adults of leaving the clinic without a

diagnosis. These findings are understandable as the likelihood of having at least one medical problem increases with age, as do many eye conditions such as presbyopia and cataracts. Both middle-aged patients and seniors had significantly lower odds than their adult counterparts of receiving an infectious disease diagnosis as their primary diagnosis. Gastrointestinal and skin/subcutaneous/musculoskeletal/connective tissue diseases were more common in seniors than infectious disease. In addition, whereas infectious disease was the most common diagnosis for children, it was the second most common for adults and middle-aged patients, and the third most common for seniors. These findings are intuitive as older populations suffer from more chronic than acute disease.

Children were the only patients for whom the most common outcome of the visit resulted in a diagnosis. As expected, the most common diagnosis was infectious disease, however, this finding is interesting as children were the group of patients most likely to present without symptoms. It is possible that this is related to a child's inherent challenge with verbal communication and may underscore the importance of universal well-child care.

#### *Distance and Diagnosis*

It was hypothesized that patients whose disease impacted daily functioning and status in society would have, on average, traveled farther for care. Patients with respiratory and skin/subcutaneous/ musculoskeletal/connective tissue, and renal diagnoses traveled the farthest. These categories are broad and the diseases within them may impact the lives of the patients they affect in many different ways. More questioning into motives for seeking treatment would be needed to understand this association. In addition, it would be of value for future missions to understand the availability of providers for respiratory, dermatologic, and musculoskeletal and connective tissue diseases in the greater Kaduna region.



### *Prior Doctor's Visits and Diagnosis*

Patients with endocrine/metabolic/nutritional diseases had the most prior experience with conventional healthcare, which is understandable given the chronic nature of these disorders. This was followed by patients with mental/behavioral disorders and pregnancy related problems, both of which are important to functioning and status in the community and both of which may affect a patient over a long period of time.

### *Patients Presenting with Pain*

In all but the child age group women were more than twice as likely to complain of pain as men. This sex difference is not unexpected given that women in general have greater pain sensitivity, lower thresholds, and higher pain ratings than men (32, 33, 34).

Of all age groups, seniors were least likely to complain of pain, which is consistent with recent studies showing age-related decrease in pain perception and report. (35)

It is not unexpected that of all types of pain, abdominal pain is the most commonly experienced by the patient population. Both the most common diagnosis overall, infectious disease, and the most common diagnosis for patients over 19 years old, gastrointestinal disease, can present with abdominal symptoms.

A higher percentage of women complained of chest pain than men. While the differential for chest pain is lengthy, and chest pain is commonly associated with coronary disease, this finding is not unlikely as it is more frequently associated with anxiety, a disorder much more common in women than in men throughout the world (36).

### *Patients Diagnosed with Infectious Disease*

In all age groups except children more women than men were diagnosed with infectious disease. Although it was predicted that more men would be diagnosed with infectious disease than women given their increased susceptibility (21, 22), this finding may be partially explained by the fact that “gender differences in access to and control over resources, in decision-making power in the household and in roles and activities can limit women's ability to access health care for themselves and their children” (37).

Seniors were the least likely of all age groups to have infectious disease as their primary diagnosis. This is expected because although aging leads to increased susceptibility to infection, it also is a primary risk factor for chronic disease, which may be more important in this population.

### Implications

As this project was centered around a descriptive study whose purpose is to raise awareness and gain greater understanding of a population, the contributions of the paper will not be directly measurable. However, it is hoped that this paper will add a small piece to a growing literature about the medical needs of this population leading to targeted programming and policy, and ultimately to better healthcare access and health outcomes for rural villagers in Sub-Saharan Africa.

While local and international health organizations such as the WHO have set out goals to promote the health of people in Nigeria, it is important to understand the needs of the community served from the viewpoint of the community members and from providers themselves (1, 4). Little is known about the demographics and health status of the village residents in Kaduna. Trends in age, gender, experience with Western medical care, distance traveled to see a provider, behavioral

health choices, presenting complaints, general cardiovascular parameters, and diagnoses may help the healthcare community as a whole and future providers in particular understand which resources are needed, both to be instituted permanently in the country and in order to better tailor a future mission to the patient population. For example, it is well known and expected that infectious diseases will need to be treated during any medical mission to the area. The results of this study, however, show that for men and women over age 19, gastrointestinal disease is the most likely diagnosis. This may impact recruitment of gastroenterologists on subsequent trips and preparedness for the treatment or management of such diseases. In terms of addressing the population's perceived needs, a pain specialist and pediatrician may be of benefit as well, as a majority of patients present with pain and many children are brought for care presumably for well-child visits given the lack of symptoms in this age group. By offering services to individuals that address self-identified concerns, one is likely to attract more patients and thus have an opportunity to address healthcare concerns, not only those identified by patients themselves but also those identified by the healthcare community such as vaccination or hypertension, for which patients may not themselves be likely to present. This examination of care needed in the village of Kateri may be added to growing evidence about specific healthcare needs of those in rural sub-Saharan Africa which can be used by providers in Nigeria and internationally to target care, by public health professionals and international agencies to develop appropriate programming, and by the state and national governments of Nigeria to guide health policy. While it is not always possible due to logistical reasons for a given organization to return to a particular community it has served in the past, the knowledge gained from this trip may help FaithCare in its future trips, guide other organizations who seek to provide care to the Kateri region, and inform providers, public health agencies, and health policymakers about rural regions in Kaduna in general. Missions such as these may educate patients about options for care and vice versa inform professionals about the primary care and tertiary care needs of patients in rural areas where neither of these systems of care are readily available. It is hoped that disseminating information

about healthcare needs through research such as this, combined with opportunities to provide care, such as those offered by FaithCare, will result in better access to care and health outcomes in underserved areas for which little health data exist, like the village of Kateri.

**Table 1: Demographic Variables and Vital Signs**

Variable	Number included in analysis	Results
Sex	3,948	66.5% female
Age	3,522	mean 35.3 years median 35.0 years
Number of visits	3,522	range 0 to 56
Travel distance	3,525	mean 25.3 km median 5.0 km
Household size		mean 7 median 6
Alcohol use	3,525	12.9%
Tobacco use	3,525	0.1%
Alcohol and tobacco use	3,525	1.8%
Tachycardia	1,814	12.6%
Tachypnea	544	12.9%
Hypertension	1,777	24.9%
Most common symptom	3,525	69.4% - pain
Most common diagnosis	3,501	19.3% - infectious disease

**Table 2: Presenting Symptoms by Sex**

Symptom	Female (2,327)	Male (1,171)	Total (3,498)	p value	OR
Head and neck	201 8.6%	165 14.1%	366 10.5%	<0.01	1.7 (1.4-2.2)
Cardiopulmonary	193 8.3%	174 14.9%	367 10.5%	<0.01	1.9 (1.6-2.4)
Gastrointestinal/ Genitourinary	156 6.7%	117 10.0%	267 7.8%	0.01	1.5 (1.2-2.0)
Reproductive	247 10.6%	10 0.9%	257 7.3%	<0.01	0.1 (0.0-0.1)
Dermatologic	155 6.7%	90 7.7%	245 7.0%	0.26	1.2 (0.9-1.5)
Neurologic/ Psychiatric	87 3.7%	25 2.1%	112 3.2%	0.01	0.6 (0.4-0.9)
Infectious	439 18.9%	276 23.6%	715 20.4%	<0.01	1.3 (1.1-1.6)
Pain	1,729 74.3%	704 60.1%	2,433 69.6%	<0.01	0.5 (0.5-0.6)
General Medical	300 12.9%	149 12.7%	449 12.8%	0.89	1.0 (0.8-1.2)
No Symptoms	81 3.5%	45 3.8%	126 3.6%	0.59	1.1 (0.8-1.6)

**Table 3: Presenting Symptoms by Age Group**

Symptom	Adult (1,599)	Child (777)	Middle - Aged (905)	Senior (241)	Total (3,522)	Chi- squared p value
Head and Neck	122 7.6%	70 9.0%	150 16.6%	29 12.0%	371 10.5%	<0.01
Cardiopulmonary	131 8.2%	97 12.5%	111 12.3%	32 13.3%	371 10.5%	<0.01
Gastrointestinal/ Genitourinary	100 6.3%	115 14.8%	47 5.2%	11 4.6%	273 7.8%	<0.01
Reproductive	206 12.9%	11 1.4%	40 4.4%	1 0.4%	258 7.3%	<0.01
dermatologic	104 6.5%	62 8.0%	69 7.6%	11 4.6%	246 7.0%	0.21
Neurologic/ Psychiatric	58 3.6%	21 2.7%	25 2.8%	8 3.3%	112 3.2%	0.54
Infectious	257 16.1%	299 38.5%	124 13.7%	36 14.9%	716 20.3%	<0.01
Pain	1,200 75.0%	395 50.8%	661 73.0%	187 77.6%	2,443 69.4%	<0.01
General Medical	203 12.7%	106 13.6%	103 11.4%	38 15.8%	450 12.8%	0.26
No Symptoms	59 3.7%	40 5.1%	27 3.0%	7 2.9%	133 3.8%	0.11

**Table 4: Presenting Symptoms and Distance Traveled**

Symptom	Average distance traveled if symptom absent (km)	Average distance traveled if symptom present (km)	Difference in mean distance traveled (km)	t test 95% CI (equal variances assumed)
Head and Neck	26.9	11.9	14.9	9.6 - 20.2
Cardiopulmonary	24.8	29.2	-4.4	-9.7 - 0.9
Gastrointestinal/ Genitourinary	25.1	27.5	-2.4	-8.4 - 3.8
Reproductive	24.6	33.9	-9.2	-15.5 - -3.0
Dermatologic	25.8	18.6	7.2	0.8 - 13.6
Neurologic/ Psychiatric	24.9	36.4	-11.4	-20.7 - -2.1
Infectious	25.1	26.0	-0.8	-4.9 - 3.2
Pain	19.4	27.9	-8.5	-12.1 - -5.0
General Medical	25.0	27.6	-2.6	-7.5 - 2.3
No Symptoms	25.5	21.5	4.0	-4.6 - 12.5



**Table 5: Presenting Symptoms and Number of Doctor's Visits**

Symptom	Average number of doctor's visits if symptom absent	Average number of doctor's visits if symptom present	Difference in average number of doctor's visits	t test 95% CI (equal variances assumed)
Head and Neck	3.1	0.9	2.3	1.8 - 2.8
Cardiopulmonary	2.9	3.2	-0.3	-0.8 - 0.2
Gastrointestinal/ Genitourinary	2.9	3.2	-0.3	-0.9 - 0.3
Reproductive	2.9	3.2	-0.3	-0.9 - 0.3
Dermatologic	2.9	2.7	0.2	-0.4 - 0.8
Neurologic/ Psychiatric	2.9	3.9	-1.0	-1.9 - -0.1
Infectious	2.9	3.1	-0.2	-0.6 - 0.2
Pain	2.2	3.2	-1.0	-1.4 - -0.7
General Medical	2.8	3.4	-0.6	-1.1 - -0.1
No Symptoms	2.9	2.1	0.8	0.0 - 1.6

**Table 6: Diagnosis by Sex**

Diagnosis	Female (2,327)	Male (1,171)	Total (3,498)	Chi- squared p value	OR
Infectious Disease	419 18.0%	261 22.3%	680 19.4%	<0.01	1.3 (1.1-1.6)
Hematologic/ Oncologic	39 1.7%	35 3.0%	74 2.1%	0.01	1.8 (1.1-2.9)
Endocrine/ Metabolic/ Nutritional	23 1.0%	16 1.4%	39 1.1%	0.32	1.4 (0.7-2.6)
Mental/Behavioral	7 0.3%	6 0.5%	13 0.4%	**0.38	1.7 (0.6-5.1)
Neurologic	25 1.1%	24 2.0%	49 1.4%	0.02	1.9 (1.1-3.4)
Eye Disease	98 4.2%	94 8.0%	192 5.5%	<0.01	2.0 (1.5-2.7)
Ear/Nose/Throat Disease	16 0.7%	17 1.5%	33 0.8%	0.03	2.1 (1.1-4.2)
Cardiovascular	116 5.0%	55 4.7%	171 4.9%	0.71	0.9 (0.7-1.3)
Respiratory	23 1.0%	24 2.0%	47 1.3%	0.01	2.1 (1.2-3.7)
Gastrointestinal	400 17.2%	144 12.3%	544 15.6%	<0.01	0.7 (0.6-0.8)
Skin/Subcutaneous/ Musculoskeletal/ Connective Tissue Disease	137 5.9%	50 4.3%	187 5.4%	0.05	0.7 (0.5-1.0)
Renal	5 0.2%	2 0.2%	7 0.2%	**1.00	0.8 (0.2-4.1)
Reproductive	114 4.9%	20 1.7%	134 3.8%	<0.01	0.3 (0.2-0.6)
Pregnancy Related Problems	24 1.0%	0 0.0%	24 0.0%	N/A	N/A
Congenital Abnormalities	5 0.2%	14 1.2%	19 0.5%	<0.01	5.6 (2.0-15.6)
Allergic/ Hypersensitive/ Immunologic Disease	6 0.3%	9 0.8%	15 0.4%	0.03	3.0 (1.1-8.4)
Injury/Accident/ Pain Syndromes	49 2.1%	28 2.4%	77 2.2%	0.59	1.1 (0.7-1.8)
Dental	153 6.6%	48 4.1%	201 5.7%	<0.01	0.6 (0.4-0.9)
No Diagnosis/ Signs and Symptoms Only	652 28.0%	310 26.5%	962 27.5%	0.33	0.9 (0.8-1.1)

\*\* = Cells with expected counts <5. P value given is from Fisher's Exact Test (2 sided).

**Table 7: Diagnosis by Age Group**

Diagnosis	Adult (1,599)	Child (777)	Middle- Aged (905)	Senior (241)	Total (3,522)	Chi- Squared p value
Infectious Disease	287 17.9%	250 32.2%	118 13.0%	27 11.2%	682 19.4%	<0.01
Hematologic/ Oncologic	17 1.1%	42 5.4%	12 1.3%	4 1.7%	75 2.1%	<0.01
Endocrine/ Metabolic/ Nutritional	16 1.0%	12 1.5%	8 0.9%	4 1.7%	40 1.1%	**0.47
Mental/Behavioral	7 0.4%	2 0.3%	3 0.3%	1 0.4%	13 0.4%	**0.92
Neurologic	15 0.9%	24 3.1%	7 0.8%	4 1.7%	50 1.4%	**<0.01
Eye Disease	58 3.6%	27 3.5%	99 10.9%	11 4.6%	195 5.5%	<0.01
Ear/Nose/Throat Disease	7 0.4%	25 3.2%	2 0.2%	0 0.0%	34 1.0%	**<0.01
Cardiovascular	69 4.3%	9 1.2%	78 8.6%	16 6.6%	172 4.9%	<0.01
Respiratory	10 0.6%	27 3.5%	8 0.9%	3 1.2%	48 1.4%	**<0.01
Gastrointestinal	289 18.1%	53 6.8%	166 18.3%	40 16.6%	548 15.6%	<0.01
Skin/Subcutaneous/ Musculoskeletal/ Connective Tissue Disease	56 3.5%	16 2.1%	85 9.4%	31 12.9%	188 5.3%	<0.01
Renal	4 0.3%	1 0.1%	1 0.1%	1 0.4%	7 0.2%	**0.72
Reproductive	89 5.6%	7 0.9%	31 3.4%	8 3.3%	135 3.8%	<0.01
Pregnancy Related Problems	22 1.4%	2 0.3%	0 0.0%	0 0.0%	24 0.7%	**<0.01
Congenital Abnormalities	2 0.1%	17 2.2%	0 0.0%	0 0.0%	19 0.5%	**<0.01
Allergic/ Hypersensitive/ Immunologic Disease	1 0.1%	7 0.9%	7 0.8%	0 0.0%	15 0.4%	**<0.01
Injury/Accident/ Pain Syndromes	36 2.3%	11 1.4%	21 2.3%	9 3.7%	77 2.2%	0.17
Dental	122 7.6%	27 3.5%	44 4.9%	9 3.7%	202 5.7%	<0.01
No Diagnosis/ Signs and Symptoms Only	478 29.9%	209 26.9%	208 23.0%	72 29.9%	967 27.5%	<0.01

\*\* = Cells with expected counts <5. P value given is from Fisher's Exact Test (2 sided).

**Table 8: Diagnosis and Distance Traveled**

Diagnosis	Average distance traveled if diagnosis absent (km)	Average distance traveled if diagnosis present (km)	difference in mean distance traveled (km)	t test 95% CI (equal variances assumed)
Infectious Disease	24.9	26.8	-1.9	-6.0 - 2.3
Hematologic/ Oncologic	25.4	21.6	3.8	-7.5 - 15.1
Endocrine/ Metabolic/ Nutritional	25.3	22.9	2.5	-12.9 - 17.9
Mental/ Behavioral	25.3	21.5	3.8	-23.1 - 30.7
Neurologic	25.3	24.8	0.6	-13.2 - 14.3
Eye Disease	26.5	4.7	21.8	14.7 - 28.9
Ear/Nose/Throat Disease	25.3	23.8	1.5	-15.2 - 18.2
Cardiovascular	25.1	28.5	-3.4	-10.9 - 4.2
Respiratory	25.1	36.8	-11.7	-25.8 - 16.8
Gastrointestinal	25.1	26.5	-1.5	-6.0 - 3.0
Skin/Subcutaneous/ Musculoskeletal/ Connective Tissue Disease	24.8	34.2	-9.4	-16.6 - -2.1
Renal	25.3	32.3	-7.0	-43.6 - 29.6
Reproductive	25.1	29.5	-4.4	-12.9 - 4.1
Pregnancy Related Problems	25.3	25.0	0.4	-19.5 - 20.2
Congenital Abnormalities	25.3	23.5	1.8	-20.4 - 24.1
Allergic/ Hypersensitive/ Immunologic Disease	25.3	18.7	6.7	-18.4 - 31.7
Injury/Accident/ Pain Syndromes	25.4	22.39	3.0	-8.2 - 14.1
Dental	26.3	8.8	17.5	10.2 - 24.5
No Diagnosis/ Signs and Symptoms Only	23.9	28.9	-5.0	-8.6 - -1.3

**Table 9: Diagnosis and Number of Doctor's Visits**

Diagnosis	Average number of doctor's visits if diagnosis absent	Average number of doctor's visits if diagnosis present	Difference in average number of doctor's visits	t test 95% CI (equal variances assumed)
Infectious Disease	3.0	2.6	0.4	0.1 - 0.8
Hematologic/ Oncologic	2.9	2.5	0.4	-0.7 - 1.5
Endocrine/ Metabolic/ Nutritional	2.9	5.5	-2.6	-4.1 - -1.1
Mental/Behavioral	2.9	5.0	-2.1	-4.7 - 0.5
Neurologic	2.9	3.2	-0.3	-1.7 - 1.0
Eye Disease	3.1	0.4	2.7	2.0 - 3.3
Ear/Nose/Throat Disease	2.9	2.2	0.8	-0.8 - 2.4
Cardiovascular	2.9	4.3	-1.5	-2.2 - -0.7
Respiratory	2.9	3.0	-0.1	-1.5 - 1.2
Gastrointestinal	2.8	3.6	-0.8	-1.3 - -0.4
Skin/Subcutaneous/ Musculoskeletal/ Connective Tissue Disease	2.9	3.8	-1.0	-1.7 - -0.3
Renal	2.9	3.1	-0.2	-3.8 - 3.3
Reproductive	2.9	3.5	-0.7	-1.5 - 0.2
Pregnancy Related Problems	2.9	5.0	-2.1	-4.0 - -0.2
Congenital Abnormalities	2.9	1.0	2.0	-0.2 - 4.1
Allergic/ Hypersensitive/ Immunologic Disease	2.9	1.3	1.6	-0.8 - 4.0
Injury/Accident/ Pain Syndromes	2.9	3.6	-0.7	-1.8 - 0.4
Dental	3.0	0.6	2.5	1.8 - 3.1
No Diagnosis/ Signs and Symptoms Only	3.0	2.6	0.4	0.1 - 0.8

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**CHRISTIAN MEDICAL FELLOWSHIP**  
 Patient Consultation form  
 (Free healthcare services)

Surname: \_\_\_\_\_ Other names: \_\_\_\_\_ age \_\_\_\_\_ Gender \_\_\_\_\_ date \_\_\_\_\_

Patient's Complaints: 1 \_\_\_\_\_  
 2 \_\_\_\_\_  
 3 \_\_\_\_\_

Additional relevant history \_\_\_\_\_

Physical examination:  
 General: \_\_\_\_\_

BP: \_\_\_\_\_ / \_\_\_\_\_ mmHg; Pulse \_\_\_\_\_ /min; Respiratory rate: \_\_\_\_\_ /min

Head & Neck/Eye/Dental \_\_\_\_\_

1. Chest: \_\_\_\_\_  
 2. Breast: \_\_\_\_\_

Abdomen \_\_\_\_\_

Musculoskeletal \_\_\_\_\_

3. External Genitalia \_\_\_\_\_

V/E and/or DRE: \_\_\_\_\_

Diagnosis \_\_\_\_\_

Investigation: \_\_\_\_\_

Treatment Plan \_\_\_\_\_

Doctors' Name: \_\_\_\_\_ Doctors' Signature: \_\_\_\_\_

**Appendix 1: Consultation Card**



**CHRISTIAN MEDICAL FELLOWSHIP**  
 Patient Consultation form  
 (Free healthcare services)

Surname: \_\_\_\_\_ Other names: \_\_\_\_\_ age \_\_\_\_\_ Gender \_\_\_\_\_ date \_\_\_\_\_

Patient's Complaints: 1 \_\_\_\_\_  
 2 \_\_\_\_\_  
 3 \_\_\_\_\_

Additional relevant history \_\_\_\_\_

Physical examination:  
 General: \_\_\_\_\_

BP: \_\_\_\_\_ / \_\_\_\_\_ mmHg; Pulse \_\_\_\_\_ /min; Respiratory rate: \_\_\_\_\_ /min

Head & Neck/Eye/Dental \_\_\_\_\_

1. Chest: \_\_\_\_\_  
 2. Breast: \_\_\_\_\_

Abdomen \_\_\_\_\_

Musculoskeletal \_\_\_\_\_

3. External Genitalia \_\_\_\_\_

V/E and/or DRE: \_\_\_\_\_

Diagnosis \_\_\_\_\_

Investigation: \_\_\_\_\_

Treatment Plan \_\_\_\_\_

Doctors' Name: \_\_\_\_\_ Doctors' Signature: \_\_\_\_\_

## Appendix 2: Codes for Presenting Symptoms

1 Head and Neck	1000	
1 Eye Complaint (296)	1100	
2 ENT Complaint (10)	1200	
3 Dental (54)	1300	
4 Dental Caries (13)	1400	
2 Cardio/Pulmonary	2000	
1 Hypertension (27)	2100	
2 Swelling (308)		2200
3 Asthma (6)	2300	
4 Shortness of Breath (33)	2400	
3 GI/GU	3000	
1 GI	3100	
Vomiting (84)	3110	
Jaundice (5)	3120	
Constipation (22)		3130
Diarrhea (173)	3140	
Blood in Stool (19)	3150	
2 Urinary	3200	
Hematuria (4)	3210	
4 Reproductive	4000	
1 Gynecologic	4100	
1 Amenorrhea	4110	
1 Amenorrhea(Primary) (4)	4111	
2 Amenorrhea(Secondary) (12)	4112	
2 Abnormal Uterine Bleeding	4120	
1 Menorrhagia (12)	4121	
2 Menstruation Related (1)	4122	
3 Vaginal complaints	4130	
A. Vaginal Discharge (146)	4131	
B. Vaginal Itching (1)	4132	
4 Infertility (74)	4140	
2 Obstetric	4200	
1 Family Planning (2)	4210	
2 Pregnancy (29)	4220	
5 Dermatologic	5000	
1 Itching (178)	5100	
2 Skin Complaint (81)	5200	

6 Neurologic/Psychiatric	6000	
1 Neurologic	6100	
1 Dizziness (88)		6110
2 Convulsions (5)	6120	
3 Seizure (17)	6130	
4 Epilepsy (1)	6140	
2 Psychiatric	6200	
1 Psychiatry (2)		6210
7 Infectious Disease	7000	
1 Cough/Cold (226)	7100	
2 Infection (42)	7200	
3 Fever (558)	7300	
8 Pain	8000	
1 Generalized Pain	8100	
1 Pain (328)		8110
2 Body Pain (167)		8120
2 Head and Neck Pain	8200	
1 Headache (440)		8210
2 Eye Pain (3)		8220
3 Ear Pain (42)		8230
4 Dental Pain (184)		8240
5 Neck Pain (31)		8250
3 Abdominal Pain	8300	
1 Abdominal Pain (725)		8310
2 Stomach Pain (143)	8320	
3 Epigastric Pain (336)	8330	
4 Waist Pain (67)	8340	
5 Lower Abdominal Pain (76)	8350	
4 Chest Pain (269)	8400	
5 Back Pain (243)	8500	
6 Gastrointestinal/Genitourinary Pain	8600	
1 Dysmenorrhea (39)		8610
2 Dysuria (65)		8620
3 Heartburn (65)		8630
7 Extremity / Joint pain	8700	
1 Limb Pain (117)		8710
2 Joint Pain (202)		8720
3 Knee Pain (33)		8730
4 Arthritis (4)		8740

9 General Medical	9000	
1 Constitutional	9100	
1 Insomnia (23)		9110
2 Loss of Appetite (66)	9120	
3 Mal Nutrition (4)	9130	
4 Fatigue (158)	9140	
5 Weight Loss (48)	9150	
2 Endocrine	9200	
1 Diabetes (18)	9210	
3 Miscellaneous	9300	
1 Bleeding (27)		9310
2 Desires Surgery (1)	9320	
3 Injury (3)	9330	
4 Lump / Mass (41)	9340	
5 Miscellaneous (121)	9350	
N/A (14513)	0	
Missing {empty cell in original data}	99999	

### Appendix 3: Codes for Diagnoses

#### Summary of Coding for Diagnoses

- 0 No diagnosis given
- 1 Infectious Disease
- 2 Hemeoncologic Condition
  - 2.1 Neoplasm
  - 2.2 Blood/Lymphatic Disorder
- 3 Endocrine, Nutritional, and Metabolic Disease
- 4 Mental or Behavioral Disorder
- 5 Neurologic Disease
- 6 Eye Disease
- 7 Ear, Nose, or Throat Disease
- 8 Cardiovascular Disease
- 9 Respiratory Disease
- 10 Gastrointestinal Disease
- 11 Skin/Subcutaneous/Musculoskeletal/Connective Tissue Disorder
- 12 Urinary/Renal Disease
- 13 Reproductive Condition
  - 13.1 Female reproductive
  - 13.2 Male reproductive
- 14 Pregnancy, Puerperium
- 15 Congenital Abnormalities
- 16 Allergic/Hypersensitive/Immunologic Condition
- 17 Injury/Accident/Pain Disorder
- 18 Signs and Symptoms, not otherwise specified
- 19 Dental Condition
- 99999 {illegible}

#### Detailed Coding for Diagnoses

- 0 No diagnosis given
- N/A
- 1 Infectious Disease
  - abscess
  - amebiasis
  - ascariasis
  - atypical pneumonia
  - bronchopneumonia
  - candidiasis
  - chest infection
  - dysentery
  - enteric fever
  - febrile seizures
  - fever
  - filariasis
  - fungal infection/rash
  - gastroenteritis
  - genital/reproductive tract infection
  - gonorrhea

helminthiasis  
HIV  
infected foot injury  
Pott's disease  
leprosy  
LRTI  
malaria  
measles  
nail infection  
PID/chronic PID  
pyelonephritis  
ringworm  
RTI  
scabies  
schistosomiasis  
septic arthritis  
skin infection  
STD  
TB  
thrush  
tinea capitis  
tinea cruris  
tinea infection  
trichuriasis  
typhoid  
urethritis  
URTI  
UTI  
vaginal candidiasis  
varicella  
viral infection  
worm infection/infestation  
yeast infection

## 2 Hemeoncologic Condition

### 2.1 Neoplasm

acoustic neuroma  
ameloblastoma  
breast carcinoma  
esophageal carcinoma  
intraabdominal malignancy  
lipoma  
lump/mass  
lymphoma  
malignancy  
neurofibroma  
pelvic cancer

### 2.2 Blood/Lymphatic Disorder

anemia  
lymphadenitis  
lymphedema

multiple lymph node swellings  
sickle cell anemia/disease/crisis/SCA/SCD  
splenomegaly  
tropical splenomegaly syndrome

### 3 Endocrine, Nutritional, and Metabolic Disease

dehydration  
diabetes  
goiter  
hypoglycemic attack  
malnutrition/poor nutrition  
metabolic disorder  
nutritional supplements  
rickets  
vitamin deficiency

### 4 Mental or Behavioral Disorder

alcoholism  
anxiety  
depression  
mental retardation  
paranoid schizophrenia  
pseudocyesis  
psychosis  
psychosomatism/psychosomatization  
stress

### 5 Neurologic Disease

absence seizures  
alcohol neuropathy  
cerebral Palsy  
convulsive disorder  
dyskinesia  
epilepsy  
generalized neurology  
headache  
hemiplegia  
hydrocephalus  
insomnia  
meningism  
meningitis  
migraine  
myopathy  
numbness of extremities  
paralysis of one side of body  
seizure, seizure disorder

### 6 Eye Disease

allergic conjunctivitis  
aphakia  
asthenopia



bacterial conjunctivitis  
cataract, immature/mature  
chemosis  
conjunctivitis  
corneal irritation  
corneal opacification  
corneal rupture  
corneal scar  
corneal ulcer  
entropion  
epiphoria  
glaucoma, end stage/primary open angle  
irritant conjunctivitis  
keratitis  
leucoma  
myopia  
myopic astigmatism  
presbyopia  
pseudoaphakia  
pterygium  
refractive error  
shrunken eye ball  
squint  
synechia  
trachoma  
vernal conjunctivitis

#### 7 Ear, Nose, or Throat Condition

acute otitis  
chronic otitis media  
coryza  
deafness  
ear deficit  
ear infection  
hearing Impairment  
intranasal polyp  
nose bleeding  
otitis  
sinusitis  
tonsillitis

#### 8 Cardiovascular Disease

anemic heart failure  
angina  
CAD  
cardiomyopathy  
cardiomegaly  
CHF  
CVA  
heart failure  
hemorrhoids

HTN/essential HTN  
lymphedema  
PVD

#### 9 Respiratory Disease

asthma/bronchial asthma/exercise induced asthma  
bronchitis/chronic bronchitis  
cold  
emphysema  
hemoptysis  
pneumonia

#### 10 Gastrointestinal Disorder

anal prolapse  
appendicitis/subacute appendicitis  
aphthous ulcer  
cirrhosis  
constipation  
diarrhea/chronic diarrhea  
dyspepsia  
fistula-in-ano  
gastric ulcer  
gastritis  
GERD  
GI bleed due to PUD  
heartburn  
hepatitis  
hernia, incisional/inguinal/femoral/epigastric/LIH/RIH/  
periumbilical/supraumbilical/umbilical/ventral  
jaundice  
PUD/PUDx/peptic ulcer  
rectal prolapse

#### 11 Skin/Subcutaneous/Musculoskeletal/Connective Tissue Condition

arthritis  
boil  
bone deficit  
bursitis  
cyst of jaw  
dermatitis  
dermatophytosis  
fibrosis  
fibrocystic breast  
furuncles  
ganglion cyst  
joint effusion  
juvenile RA  
keloid  
lumbar spondylosis  
muscular dystrophy  
myalgia

OA  
osteomyelitis  
pruritis  
psoriasis  
rheumatoid arthritis  
sciatica  
skin lesion  
strained muscle  
vitiligo

## 12 Urinary/Renal Disease

cystitis  
glomeruonephritis  
overactive bladder  
posterior urethra valve  
urge incontinece  
referral for significant urologic condition

## 13 Reproductive Condition

### 13.1 Female Reproductive

amenorrhea  
BV  
cervical abrasion  
dysmenorrhea/dysmenorrhagia  
fibroid  
hysterectomy  
infertility  
irregular menses  
menometrorrhagia  
menopause/perimenopausal sxS  
menorrhagia  
menstrual disorder  
menstrual cramps  
ovarian cyst  
PCOD  
primary cystocele  
uterine atrophy  
uterine prolapse  
vaginal tenderness  
vaginitis

### 13.2 Male Reproductive

BPH  
hydrocele  
low sperm count  
vaginal hydrocele

## 14 Pregnancy, Puerperium

amniotic membrane intact  
antenatal checkup  
c-section  
cyesis

HELLP Syndrome  
perineal laceration  
PPH  
pregnancy  
prematurity  
recurrent abortion  
retained products of conception  
ruptured ectopic

#### 15 Congenital Abnormalities

congenital heart disease  
congenital hernia  
congenital hydrocele  
congenital periumblical hernia  
constitutional growth restriction  
Down's syndrome  
inability to talk since birth  
Meckel's Diverticulum  
meningomyelocele  
retractile testes  
undescended testis  
unseparated labia

#### 16 Allergic/Hypersensitive/Immunologic Condition

allergic sensation  
allergy  
immune suppression  
delayed milestones  
delayed moments  
hypersensitivity

#### 17 Injury/Accident/Pain Disorder

abrasions  
accident, car accident  
back strain  
chest contusion  
leg wound  
pain - abdominal, back, body, breast, chest, leg, ovulation, MS, pelvic, stomach, waist  
shoulder dislocation

#### 18 Signs and Symptoms, not otherwise specified

aging  
cough  
fatigue  
gynecologic review  
insomnia  
itching  
loss of appetite  
malaise  
referral for surgery  
referral for significant condition

screening test - pap, urinalysis, blood sugar, HIV test  
stomach upset  
swelling  
U/S testing  
weakness  
well child

#### 19 Dental Condition

acute gingivostomatitis  
periodontitis - acute, apical, chronic, typical  
pulpitis - acute, chronic, irreversible, reversible, apical, acute on chronic  
caries/cavity/apical caries  
chronic gingivitis  
dental abscess  
edematous tooth  
extraction  
pericoronitis  
retained dentition  
retained root  
screen for significant dental condition

99999 {illegible}