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HEALTH NEEDS ASSESSMENT FOR KUMASI, GHANA

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Figure 1. Ghana, Ashanti Region and Kumasi



Source: Kumasi Metropolitan Assembly (2008)

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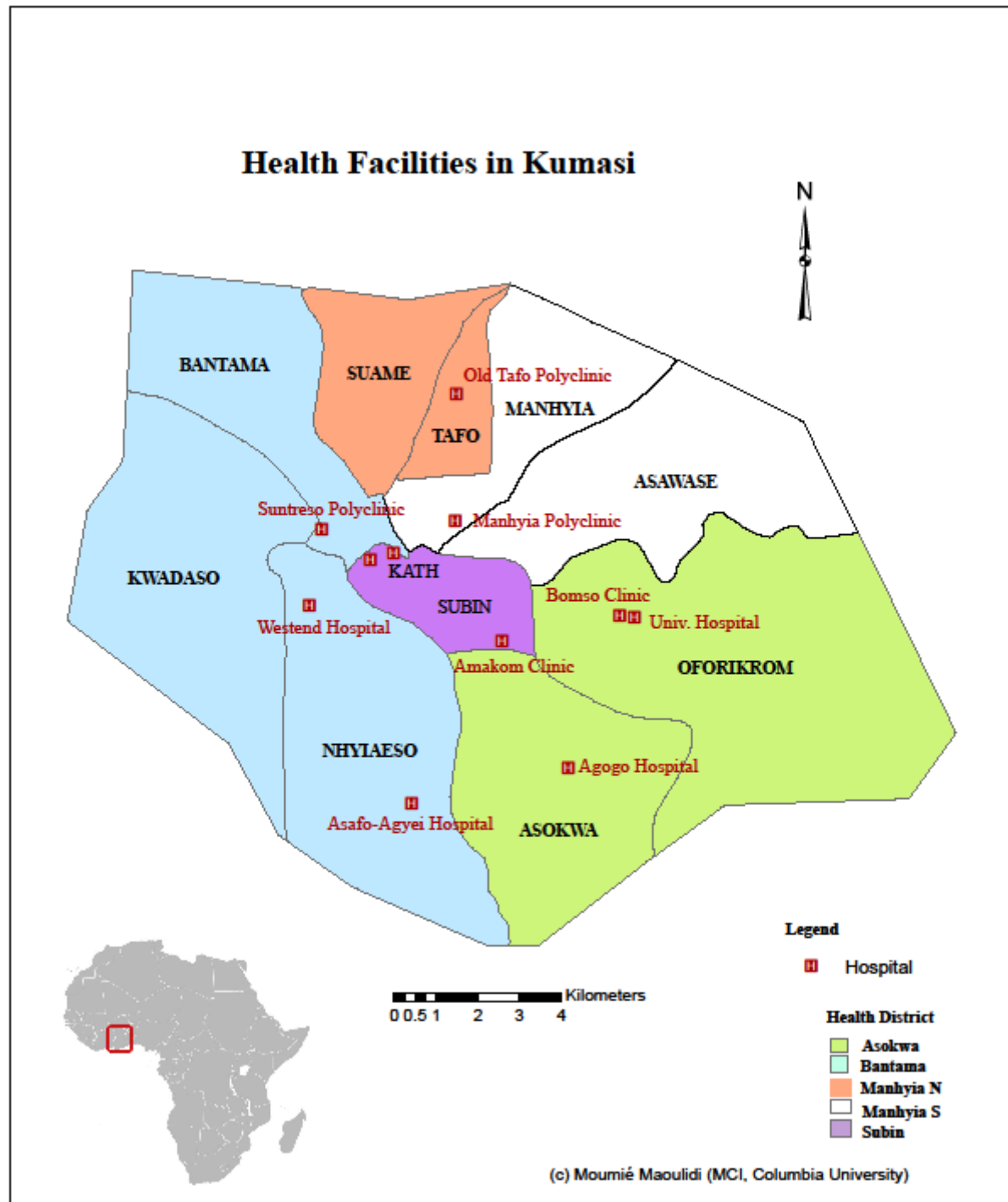
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ABBREVIATIONS

ACT	Artemisinin-based Combination Therapy
AFT	Acute Flaccid Paralysis
AIDS	Acquired Immune Deficiency Syndrome
ANC	Antenatal Care
APH	Antepartum Haemorrhage
AS/AQ	Artesunate and Amodiaquine
B/F	Breastfeeding
BMI	Body Mass Index
C/S	Caesarean Section
CD 1	Communicable Disease - weekly
CD 2	Communicable Diseases – monthly
CEDEP	Centre for Development of People
CBGP	Community Based Growth Promotion
CHAG	Christian Health Association of Ghana
CHO	Community Health Officer
CHPS	Community Health and Planning Service
COPE	Client Oriented Provider Efficient Service
CSM	Cerebro-Spinal Meningitis
CT	Counseling and Testing
DHIMS	District Health Information Management Systems
DOTS	Direct Observational Therapy Short Course
DPF	Donor Pooled Fund
EI	Earth Institute
ENT	Ears, Nose, Throat
EOC	Essential Obstetric Care
EPI	Expanded Programme on Immunization
GOG	Government of Ghana
HIRD	High Impact Rapid Delivery
H/A	Height for Age
HC	Health Center
HED	Health Education
HELLP	Haemolysis, Elevated Liver Enzymes, Low Platelet Count
HIV	Human Immuno Deficiency Virus
HP	Health Post
HSDS	Health System Database Software
IDD	Iodine Deficiency Disorders
IE & C	Information, Education and Communication
IGF	Internally Generated Funds
IMCI	Integrated Management of Childhood Illness
IPT	Intermittent Preventive Therapy
ITN	Insecticide Treated Nets
IUD	Intrauterine Device
JHS	Junior High School
KATH	Komfo Anokye Teaching Hospital

KMA	Kumasi Metropolitan Assembly
LAM	Lactational Amenorrhoea Method
MBU	Mother and Baby Unit
MCI	Millennium Cities Initiative
MCHH	Mother and Child Health Hospital
MDGs	Millennium Development Goals
NGO	Non-governmental organization
NHIS	National Health Insurance Scheme
OPD	Out Patient Department
PLWHA	People Living with HIV/AIDS
PMTCT	Prevention of Mother-to-Child Transmission of HIV
PNC	Postnatal Care
PPH	Postpartum Haemorrhage
PPM	Public-Private Mix
RCH	Reproductive & Child Health
RDT	Rapid Diagnostic Testing
SCD	Sickle Cell Disease
STI	Sexually Transmitted Infections
T&T	Travel and Transportation
TB	Tuberculosis
TBA	Traditional Birth Attendant
TT	Tetanus Toxoid
UNICEF	United Nations Children's Fund
VCT	Voluntary Counseling and Testing
VIA	Vaginal Inspection with Acetic Acid
VSC	Voluntary Surgical Contraception
W/A	Weight-for-Age
W/H	Weight-for-Height
WIFA	Women in Fertility Age

Figure 2. Health Facilities in Kumasi



EXECUTIVE SUMMARY

Kumasi, Ghana's second largest city, is the capital and cultural center of the Ashanti Region. Located in the south-central part of the country, with a population of approximately 1.6 million people, Kumasi boasts a high number of public and private health facilities that many people from nearby villages and towns travel to the city to utilize.

In early 2006 Professor Jeffrey Sachs, Director of the Earth Institute (EI) at Columbia University, launched Kumasi as a Millennium City. Since then, the EI's Millennium Cities Initiative (MCI) has conducted research aimed at identifying the services, resources and infrastructure needed for the people of Kumasi to attain the Millennium Development Goals (MDGs), a set of universally endorsed, quantifiable targets established by the United Nations to point the way out of extreme poverty for the planet's poorest billion.

As a Millennium City, Kumasi has been successful in forging partnerships with various organizations that work with the city to help it reach the MDGs. In public health, numerous medical training programs for health professionals have been conducted, including in neonatal emergency, as a result of which, two innovative and low-cost, low-tech neonatal units have been opened in association with two of the city's sub-metro hospitals, all with the expert support of Israeli doctors and the Government of Israel. Following up on this important intervention, a further neonatal survival training intervention has just begun,¹ a public-private partnership with the Government of Ghana (GOG), American Academy of Pediatrics and Johnson & Johnson. Extensive ophthalmological surgeries and screenings have been carried out by the MCI partner, Himalayan Cataract Project, leading to the construction and establishment of an eye care regional center for excellence in Kumasi, funded by US Agency for International Development.

But Kumasi's challenges in the public health arena remain formidable. Many of the city's health facilities require refurbishment, and most hospitals need to be expanded to accommodate the increasing numbers seeking care. In addition, data from 2007 - 2008 for Kumasi show that maternal and infant deaths were on the rise and diseases such as malaria and tuberculosis continued to be major causes of morbidity. Other preventable common diseases in Kumasi include diarrhea, malnutrition, hypertension and diabetes. However, on a positive note, MMR fell significantly in 2009, and projections for 2010 show that it will most likely continue to decline (KMHD, 2010).

The city also lacks both sufficient skilled medical practitioners and adequate financial resources for effective health care delivery. Moreover, although health data is collected, there are inaccuracies in data and misreporting, and very little data is collected electronically.

This needs assessment analyzes the health care system in Kumasi and identifies areas to be addressed in order for Kumasi to achieve the health-related MDGs by 2015. It summarizes the major health problems facing residents of Kumasi City and presents some of the key infrastructure and financial challenges. MCI estimates that, to achieve the MDGs in health, the city of Kumasi needs to invest approximately \$10 per capita each year, during the 2010-2015

¹ In June – August, 2010.

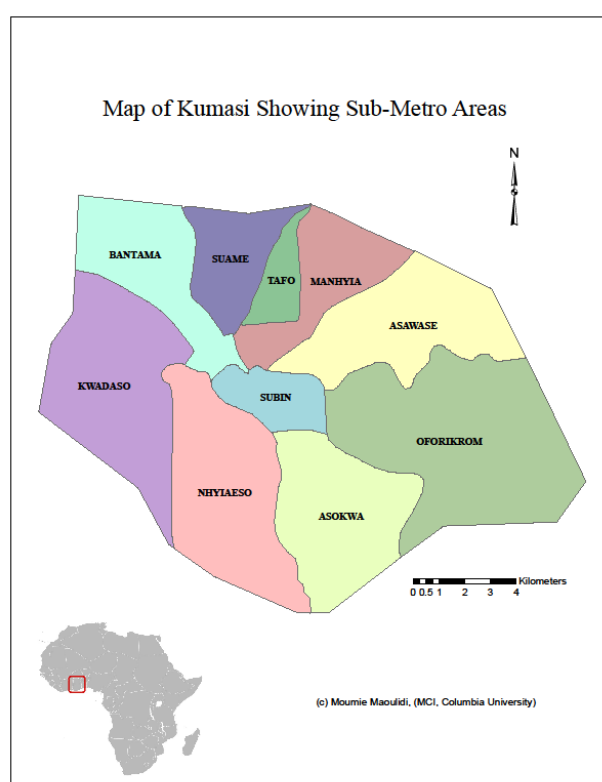
period. This estimate is on the low end, mainly because certain expenditures are not included, e.g., spending on rehabilitating malnourished children and the costs of such medical equipment as delivery beds, incubators, newborn resuscitators, vacuum extractors and operating tables.²

The report has four sections. Section I is an introduction to Kumasi, as well as the objectives, methodology and limitations of the needs assessment. Section II is a discussion of various aspects of Kumasi's health care system, including health services and facilities, child and maternal health care and care for communicable diseases. Section III reports the results from the UNDP costing model, and Section IV presents the conclusions and recommendations.

I. INTRODUCTION

Ghana is divided into 10 administrative regions.³ Kumasi, capital of the Ashanti region, is located in the south-central part of the country. The city accounts for nearly one-third of the region's population and is divided, in turn, into 10 sub-metropolitan areas, as shown in Figure 3. These 10 sub-locations are grouped into five health districts: Asokwa, Subin, Bantama, Manhyia North and Manhyia South.⁴

Figure 3. Kumasi Sub-Metropolitan Areas



² The cost of nutritional rehabilitation is quite high.

³ The regions are: Ashanti, Brong-Ahafo, Central, Eastern, Greater Accra, Northern, Upper East, Upper West, Volta and Western.

⁴ Kumasi Metro Health Directorate (KMHD), 2008.

1.1. Objectives

This public health needs assessment has two objectives: to identify the challenges to be addressed for Kumasi to meet the health-related Millennium Development Goals; and to identify and estimate the costs of scaling up health service delivery in Kumasi, enabling the KMA, regional and national government and the development partners to know approximately what it will take, per capita, per annum, for the city to attain the health-related MDGs by the universally embraced target date of 2015.⁵

The health-related MDGs on which this paper is focused include the reductions by two-thirds of child mortality (MDG 4), by three-quarters of maternal mortality (MDG 5) and of rates of infection for HIV/AIDS, malaria, tuberculosis (TB) and other diseases (MDG 6). Table 1 lists some of the key indicators associated with each MDG.

Table 1. Health-Specific MDGs and Indicators

Goal	Indicator
4. Reduce child mortality	4.1. Under-five mortality rate
	4.2. Infant mortality rate
	4.3. Percentage of 1-year-old children immunized against measles
5. Improve maternal health	5.1. Maternal mortality ratio
	5.2. Percentage of births attended by skilled health personnel
6. Combat HIV/AIDS, malaria and other diseases	6.1. Percentage of current users of contraception who are using condoms
	6.2.A. Condom use at last high-risk sex
	6.2.B. Percentage of population aged 15-24 years with comprehensive correct knowledge of HIV/AIDS
	6.2.C. Contraceptive prevalence rate
	6.3.A. Percentage of population in malaria-risk areas using effective malaria prevention and treatment measures
	6.3.B. Percentage of children under five sleeping under Insecticide Treated Nets (ITNs)
	6.3.C. Percentage of children under five who are appropriately treated

* ITN = Insecticide Treated Nets

1.2. Methodology

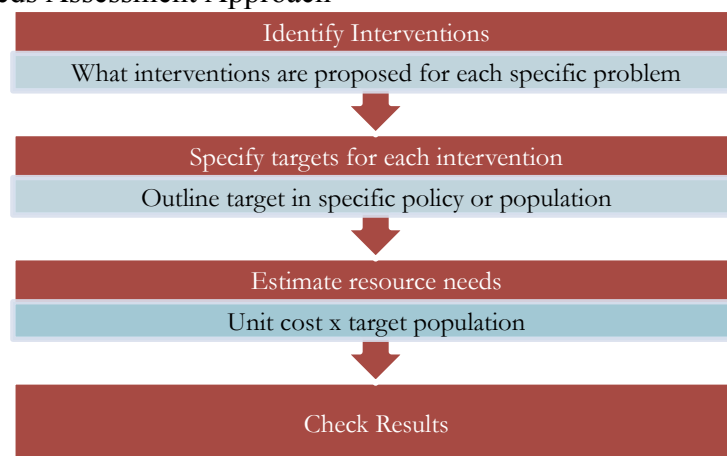
Data used in this report were collected in August 2009 from officials at the municipal and regional health offices in Kumasi, as well as doctors and researchers based in the sub-metro

⁵ The instrument utilized here was developed by the United Nations Millennium Project, under Special Advisor to then-Secretary General Kofi Annan, Jeffrey D. Sachs, also Director of the Earth Institute. This costing model, now administered by the UN Development Programme (UNDP) and member states for use at the national level, is being applied for the first time at the municipal level by MCI.

hospitals and the autonomous Komfo Anokye Teaching Hospital (KATH). Interviews with different key health stakeholders were also conducted.

The MDG-related health needs assessment approach used can be broken down into four steps, the first of which was to gather data and determine the key health challenges. The second step was to identify interventions for specific health problems, the third, to identify targets set by the city and the Ministry of Health for specific health problems or interventions. The fourth step was to determine the health system costs required to meet MDGs 4, 5 and 6, using a costing model first developed by the United Nations Millennium Project.⁶ Figure 4 briefly summarizes the MDG-based needs assessment approach.

Figure 4. MDG Needs Assessment Approach



Source: UN Millennium Project

1.3. Limitations

Every effort was made to collect relevant health data, and many people were extremely accommodating in providing the essential information. However, it was not possible to collect all data. For instance, under-five mortality is calculated from data provided by the sub-metro hospitals and KATH. However, KATH habitually submits their data late. Another challenge was the proprietary approach taken by many offices with regard to some of the requisite information, which they were reluctant to divulge or share.

Additionally, much of the health data collected in Kumasi is transcribed by hand, making it difficult to access nuanced and more specific data. While many institutions were working on streamlining the process of data collection, many of the data required were difficult to locate, and most were not centralized in one location.

One issue meriting particular attention is that data for children under two months is not listed separately but rather is incorporated into the under-one year data.⁷ Although Kumasi's children

⁶ "Health systems costs" include the costs of facilities, human resources and equipment. Typically, the United Nations Development Programme (UNDP), which now administers these models, through the MDG Support Group of its Poverty Unit, applies them at the national level, as mentioned in footnote #5.

⁷ See Footnote 1.

are confronted with many health challenges, a great deal of data are lacking on the subject, particularly in the area of neonatal care.

1.4. Demographics

The estimated 2010 population of Kumasi is 1,634,900.⁸ Table 2 shows the Kumasi Metropolitan Health Directorate's projections of different sub-populations in 2008.

Table 2. Population Breakdown of Kumasi Metro, by Sub-Metropolitan Areas

Sub-Metro District	WIFA (23.2% of total pop)	Expected Pregnancy (4% of total pop)	Children 0-11m (4% of total pop)	Children 12-23m (3.9% of total pop)	Children 24-50m (8.6% of total pop)	Under 5 yrs old	Adolescent
Asokwa	103,958	17,924	17,924	17,476	38,536	68,111	97,685
Bantama	83,030	14,315	14,315	13,957	30,778	54,399	78,019
Manhyia North	54,896	9,465	9,465	9,228	20,349	35,966	51,583
Manhyia South	63,816	11,003	11,003	10,728	23,656	41,810	59,965
Subin	37,398	6,448	6,448	6,287	13,863	24,502	35,141
Total of Kumasi Metro	343,098	59,155	59,155	57,676	127,182	224,788	322,393

Source: KMHD (2008)

II. DATA ANALYSIS

2. Health Services and Facilities in Kumasi

Ghana's Ministry of Health has established a vision to "create wealth through health," with the ultimate goal of ensuring access for all Ghanaians to a quality and affordable health care system supported by motivated staff (KMHD, 2008).

2.1. Structure of Health Care System in Kumasi

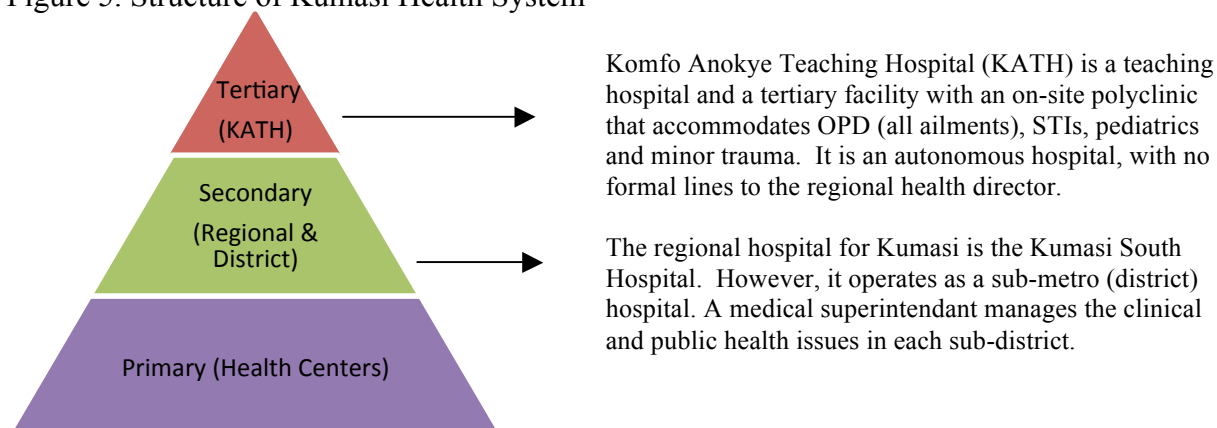
Aside from its clinics, the health system in Kumasi has three levels, as shown in Figure 5. The top level consists of one tertiary hospital (KATH), while secondary care hospitals (regional and district) make up the second level, and health centers make up the third. Figure 5 is a simplified hierarchical diagram of health facilities in Kumasi.

KATH is located at Bantama Sub-Metropolitan area and serves the whole city as well as its immediate peri-urban communities. It also serves as a reference laboratory for the rest of the

⁸ The 2010 population was calculated using an exponential growth function. According to the Kumasi Metro Health Directorate, the growth rate in 2007 was 3.4 percent. After re-calculating, MCI has put the growth rate rather at 3.34 percent.

hospitals in the metropolis. The Kumasi South Hospital (KSH) is situated at Chirapatre, within the industrial hub of the metropolis and serves the people of Asokwa, Ahensan, Atonsu, Esreso, Gyenyase and Kaase. The Manhyia Hospital, located at Ashanti Newtown near the Manhyia Palace, serves Manhyia, Krofrom, Ashanti Newtown, Aboabo and Asawasi communities. The Suntreso Government Hospital is located at North Suntreso and serves North and South Suntreso, Patasi Estate, Kwadaso, Adoato, Asuoyeboa, Breman and Suame.

Figure 5. Structure of Kumasi Health System



The Metro Health Directorate oversees health care in Kumasi and manages government facilities and hospitals. Its mission is “to work in collaboration with all partners in the health sector to ensure that every individual, household and community is adequately informed about health, and has equitable access to high quality health and related interventions” (KMHD, 2008). As stated in Figure 5, Komfo Anokye Teaching Hospital (KATH) is an autonomous facility. Private hospitals and facilities are overseen by Ghana Health Services.

2.2. Health Facilities

There is a government hospital facility in each of Kumasi’s five health districts (see Table 3). These facilities provide both clinical and public health services to the residents of the sub-metro districts in which they are located.

Table 3. Catchment Sizes of Select Health Facilities in Kumasi in 2007

Sub-Metro District	Government Hospital Facility	Catchment Size	% of Total Kumasi Population
Asokwa	Kumasi South Hospital	448,097	30.3
Bantama	Suntreso Hospital	357,886	24.2
Manhyia North	Tafo Hospital	236,619	16
Manhyia South	Manhyia Hospital	275,070	18.6
Subin	Mother Child Health Hospital	161,197	10.9
Total of Kumasi Metro		1,478,869	100

Source: KMHD (2008)⁹

Some of the sub-metro government hospitals serve as regional sites for different medical services, such as ear, nose and throat (ENT) surgery or sexually transmitted infections (STI) care. The medical superintendent based at each sub-metro hospital is supported by a staff of sector specialists. Some of the most critical personnel include: a health administrator, who oversees the hospital's administrative services; a disease control officer, who oversees epidemiological considerations; a Director of Nursing Services, who plays an important role in the delivery of clinical services care of hospital patients, and a public health nurse, who oversees maternal and child care, both for the hospital and the entire sub-metro district.¹⁰

As shown in Figure 6, the Kumasi Metro Health Directorate oversees all sub-metro district hospitals. In addition to these sub-metro district hospitals, there are also quasi-governmental, private and mission hospitals, which offer similar levels of care to the government hospitals.¹¹

There are also several clinics, maternity homes, laboratories and other health care providers, as shown in Table 4. Private facilities are under the jurisdiction of the Regional Health Directorate. There are also 122 outreach stations in Kumasi, located throughout the five sub-metro areas (KMHD, 2008). Hence, most Kumasi residents are geographically situated well within the vicinity of a health care facility (KMHD, 2008).

Table 4. Kumasi Health Facilities by Ownership

Sub-Metro District	Gov't Hospitals	Quasi-Gov't Hospitals	Mission Hospitals/Clinics	Private Hospitals	Private Clinics	Maternal Homes	Homeopathic Clinics	Private Labs
Asokwa	1	1	1	14	22	18	3	1
Bantama	1	0	1	15	16	12	0	7
Manhyia North	1	0	1	5	10	16	13	2
Manhyia South	1	0	0	7	8	6	4	2
Subin	2	3	0	3	11	3	0	3
Total	6	4	3	43	67	55	20	15

Source: KMHD (2008)

2.3. Health Services

The Kumasi Metro Health Directorate is committed to making health care financially and geographically accessible to the people of Kumasi and the surrounding districts (KMHD, 2008). In 2003, Ghana enacted the National Health Insurance Act, and a year later, the National Health Insurance Scheme (NHIS) was launched to ensure equitable universal access for all residents of Ghana to an acceptable quality of essential health services.¹² However, not all of Kumasi's

⁹ KSH is also the designated regional hospital for the Ashanti region.

¹⁰ MCI Project Manager for Ghana.

¹¹ Quasi-governmental hospitals answer to both the Metro Health Directorate and their private boards; private hospitals answer to the more hierarchical Ghana Health Services; and mission hospitals answer to the Christian Health Association of Ghana – CHAG.

¹² NHIS was launched in 2004, but the National Health Insurance Act was enacted in 2003.

residents are covered under NHIS; registration of citizens is at the prerogative of the individual. Once registered, coverage is assured for all services, as described in the NHIS schedule. Problems of liquidity, however, occasioning sometimes crippling delays in reimbursement, have been common in these early years of NHIS implementation, affecting these hospitals' financial health.¹³

Table 5. Number of NHIS Registrants, 2007¹⁴

Sub-Metro District	Population	Number of Registrants	Percent Registered (%)
Asokwa	364,500	183,038	50.2
Bantama	323,000	198,386	61.4
Manhyia	405,000	211,393	52.2
Subin	126,000	115,000	91.3
Total	1,218,500	707,817	58.1

Source: KMHD (2008)

Although the Kumasi Metro Health Directorate did not document community health promotional activities in their 2007 Annual Report, the Directorate does organize many health promotional activities and conducts outreach for child welfare, antenatal care, health education and the treatment of minor ailments. Each of the sub-metros has outreach sites that are visited periodically to promote the aforementioned activities. For instance, in 2007, the Kumasi Metro Health Directorate and MCI held a health fair, during which 535 people in the Tafo sub-metropolitan area were screened for hypertension and diabetes and had their body mass index (BMI) checked. Advice about these conditions was given, and those shown to have high blood pressure and high sugar levels were referred to hospitals for treatment. In May 2007 a Child Health Promotion Week took place at the sub-metro level. Activities included immunizations, growth monitoring, vitamin A supplementation, insecticide treated nets (ITNs) distribution, birth registration and health education. The number of participants in the Child Health Promotion Week was not recorded, but the event was well attended (KMHD, 2008).

In November 2007, a successful Maternal and Child Health Campaign promoted several activities, including: Vitamin A supplementation to children 6-59 months and to postnatal mothers; oral polio vaccinations (OPV); de-worming of children two to five years of age; birth registration of children under 12 months; and ITN distribution to children under 12 months and pregnant women.¹⁵

2.4. Human Resources

¹³ In 2007, as an example, more than a half-million Ghana cedis (GH¢), or \$538,000 in outstanding claims, were pending before the NHIS (Kumasi Metro Directorate, 2008).

¹⁴ The table shows registrants in the five health districts, which is different from the city's projected 2007 population.

¹⁵ The theme was "Healthier Mothers and Children in Ghana's Golden Jubilee Year and Beyond." Many pregnant women attended the campaign to receive ITNs. However, it is not clear how many women received them, because there were delays in delivering ITNs to campaign sites, and it is likely that some women left before the ITN distribution began.

Kumasi has a shortage of skilled health professionals. In 2007, for instance, there were 33 doctors in Kumasi, making the patient-to-doctor ratio 46,338:1. The latest data, from the half-year report (2009), indicates that the number of doctors in Kumasi increased to 35, decreasing the patient-to-doctor ratio to 41,000:1 (KMHD, 2008). In 2008, there were 383 nurses in Kumasi, yielding a patient-to-nurse ratio of 3,993:1. It was not possible to locate information regarding staffing norms required per health facility. However, the city has not been able to employ enough people to fill the positions available, because recruitment is centralized at Ghana's Ministry of Health. There are also not enough specialists to handle complex or specialized cases that would otherwise be referred.

3. Child Health

Children in Kumasi face many health challenges, including high rates of malaria, acute respiratory infection (ARI), dehydration and malnutrition.¹⁶

In 2007, mothers who sought antenatal care (ANC) visited a health care professional on average 3.9 times during their pregnancy, just slightly under the four visits recommended by the World Health Organization (WHO; KMHD 2008). Unfortunately, as shown in Table 6, the rate of antenatal service coverage decreased from 85.4 percent in 2005 to 74.1 percent in 2007 (KMHD, 2008). This is an alarming trend, given the 90-percent ANC coverage target set for 2009 (KMHD, 2008).

Table 6. Percent Coverage of Antenatal Services in Kumasi Metro Area

Year	Percent Coverage of Antenatal Services (%)
2005	85.4
2006	73.3
2007	74.1
2008	79

Source: KMHD (2007- 2009).

All five sub-metro district hospitals and KATH provide ANC services. There are also private maternity homes and Community Clinics (CC), which are government-run facilities. Both maternity homes and CCs provide 24-hour service for antenatal and delivery services, some family planning services and vaccinations for children under five. In addition to the services listed, CCs also provide a range of services for minor ailments.¹⁷

There has been improvement in the proportion of women receiving tetanus and toxoid (TT2+) during their pregnancy, from 61.2 percent in 2006 to 71.4 percent in 2007 (KMHD, 2008). Despite the geographic availability of ANC services, 21 percent of women in 2008 still did not seek these services during their pregnancies (KMHD, 2008). The Government of Ghana

¹⁶ This document only discusses morbidity and mortality, inoculations and nutrition.

¹⁷ According to the MCI Project Manager for Ghana.

anticipates that the new National Health Insurance Scheme, which covers ante- and postnatal visits, will reverse this unsettling trend (Appiah-Kubi, 2010).

3.1. Child Morbidity and Mortality

The Kumasi Metro Health Directorate collects data on deliveries in Kumasi. In 2007, there were 59,155 births, accounting for four percent of the city's total population for that year. Slightly more than half the births were supervised by skilled attendants.¹⁸

Under-five mortality rates were not available from the Kumasi Metro Health Directorate, but the Water and Sanitation for the Urban Poor (WSUP) project puts the 2008 infant mortality rate at 68 deaths per 1,000 live births in Kumasi City. This is significantly higher than both the national infant mortality rate and the Ashanti region's infant mortality rate, which stood at 51 and 54 respectively that same year.¹⁹

3.2. Inoculations

Kumasi has an Expanded Programme on Immunizations (EPI) to improve vaccination coverage in all sub-metros. The data in Table 7 reflect only those persons who have received all three doses per vaccine (for DPT, OPV, HEP, and HIB), the standard of acceptable coverage set by WHO.

Table 7. EPI Coverage by Sub-Metro District, 2007-2008

Sub-Metro District	Target Population	BCG	Measles	DPT/HIB /HEB	OPV3	Yellow Fever	TT2+
Asokwa	17,924	10,054	9,412	8,165	8,165	9,412	8,073
Bantama	14,315	8,337	8,361	7,357	7,357	8,375	5,834
Manhyia South	11,003	7,271	5,986	6,394	6,394	5,986	6,030
Manhyia North	9,465	9,036	8,811	7,934	7,934	8,811	7,278
Subin	6,448	3,538	4,474	3,957	3,957	4,476	8,546
KATH	5,621	13,024	3,555	3,218	3,218	3,321	3,594
Total for Metro	59,155	51,278	40,599	37,025	37,025	40,381	39,355
% Covered (2007)		86.70%	68.60%	62.60%	62.60%	68.30%	66.50%
% Covered (2008)		98.50%	78.50%	70.80%	70.80%	78.60%	81.30%

Source: KMHD (2008)

3.3. Nutrition

¹⁸ Skilled attendants include professional midwives, physicians, obstetrician/gynecologists and trained traditional birth attendants, or TBAs.

¹⁹ Ghana Demographic Health Survey (2008) and the UN Millennium Development Goals Indicators (2008).

The Kumasi Metro Health Directorate conducts growth monitoring of children under five at Well Baby Clinics.²⁰ Since 2005, the proportion of malnourished children has decreased. In 2007, only 4.0 percent of children at the Well Baby Clinics were considered at risk for malnutrition, with 1.7 percent deemed severely chronically malnourished or “underweight” (KMHD, 2008).²¹ The Health Directorate also conducts nutritional surveillance of children in kindergarten. In 2007, 3.1 percent of these children were underweight (KMHD, 2007). On the other hand, the proportion of stunting among children ages 24-59 months declined, from 4.7 percent in 2005 to 3.2 percent in 2007.²² Similarly, the proportion of children born thin has also fallen from 2.2 percent in 2005 to 1.3 percent in 2007.²³ Table 8 shows anthropometric data gathered between 2005-2007. The cost of nutritional rehabilitation is quite high. UNICEF is not involved, and although the NGO Catholic Relief Services used to provide the milk for early feeding, it stopped in early 2000.

Table 8. Nutrition Surveillance

Indicator	2005	2006	2007
Number W/A < 80% (underweight)	126 (3.1%)	314 (3.3%)	395 (3.1%)
Number H/A < 80% (stunting)	188 (4.7%)	332 (3.7%)	405 (3.2%)
Number W/H < 80% (thinness)	90 (2.2%)	128 (1.4%)	167 (1.3%)

Source: KMHD (2008)

4. Maternal and Reproductive Health

In Kumasi, hospitals, private maternity homes and government-run CCs provide antenatal and delivery services. CCs provide the same range of services as maternity homes; however, not many women frequent these establishments, partly because of inadequate staffing and supplies.

In 2007, 38.1 percent of women in Kumasi received postnatal care services. This proportion was lower in 2007 than in the previous two years: 48.8 percent in 2005, and 48.3 percent in 2006 (KMHD, 2008).

4.1. Supervised Deliveries

In 2007, 53.5 percent of births in Kumasi were supervised, and 51.8 percent of births were deliveries attended by skilled birth attendants (doctors and nurses only). A year later, 58.5

²⁰ Child welfare clinics.

²¹ “Underweight” refers here to “the proportion of children under five years of age falling below two standard deviations from the median weight-for-age of the reference population (Fanzo, 2009).”

²² Stunting is based on the height-to-age ratio and refers to proportion of children under five years of age falling below two standard deviations from the median height-for-age of the reference population. Acute malnourishment (“wasting”) is based on a child’s weight-to-height ratio (Fanzo, 2009).

²³ Thinness refers to the weight-to-height ratio and to the proportion of children under five falling below two standard deviations from the median weight-for-height of the reference population.

percent of births were supervised deliveries, with 57.6 percent attended by skilled health professionals (KMHD, 2009). This indicates that a large number of women are still not giving birth with the assistance of a skilled health worker. Equally troubling is the fact that, of the 60,696 deliveries in Kumasi in 2007, 15.8 percent required emergency interventions, as compared to the 13.2 percent of deliveries requiring intervention in 2006 (KMHD, 2008). Table 9 provides data on births and methods of delivery in Kumasi in 2007.²⁴

Table 9. Breakdown of births in Kumasi Metro, 2007

Sub-Metro District	Total Deliveries	Still Birth		Emergency Deliveries		
		Macerated	Fresh	C-Section	Vacuum	Forceps
Asokwa	5,462	49	23	217	33	0
Bantama	4,813	54	10	650	18	0
Manhyia South	3,399	27	9	215	10	0
Manhyia North	3,084	22	15	83	1	0
Subin	1,212	11	6	0	1	0
KATH	12,723	206	208	3,435	188	0
Total for Metro	30,693	369	271	4600	251	0

Source: KMHD (2008)

In recent years, Ghana's maternal mortality ratio (MMR) declined from 560 deaths out of 100,000 live births in 2005, to 451 deaths in 2007 (WHO, 2005; Ghana DHS, 2007). However, statistics from Kumasi show that maternal deaths then began rising. In 2007, MMR was 359 out of 100,000, while in 2008 it was 397 out of 100,000 (KMHD, 2009).²⁵ Some of the factors contributing to the high MMR include unsafe abortion and inadequate facilities. The majority of maternal deaths in 2007 occurred at KATH, most likely because this hospital is the referral hospital for complicated medical emergencies. Because of the limited emergency care and access to the operating theater even at this tertiary care center, mothers continue to die in line on the way to deliver their babies.²⁶ More recently, however, significant progress has been made, thanks to measures taken by the Kumasi Metro Health Directorate to ensure better reporting and, with that, to instill a culture of accountability, information-sharing and self-reliance among the network of sub-metro facilities regarding every mother's survival and successful delivery.²⁷ As

²⁴ A new intervention facilitated by MCI is intended to increase the number of deliveries assisted by trained birth attendants and to improve the rate of neonatal survival. This training in neonatal resuscitation, as well as in ordinary infant care, will be piloted by the Kumasi Metro Health Directorate in the MBU at Suntreso Hospital, as well as in an Accra polyclinic,²⁴ under the authority of the Ghana Health Service and Ministry of Health. The neonatal resuscitation curriculum, designed by the American Academy of Pediatrics (AAP), in association with the WHO, and entitled, "Helping Babies Breathe," is focused on drying and warming the newborn, clearing his/her nasal passages and aspirating where necessary. This particular training was designed to teach laypeople, as well as skilled midwives and medical practitioners, the importance of the precious "Golden Minute," during which so many newborns are lost to asphyxia, often for lack of knowledge on the part of those in the room at the moment of birth. The GHS Master Trainers and MCI have combined the AAP protocol with another valuable newborn care curriculum developed by Save the Children and already part of practitioners' training, that is now being shared with teams representing each sub-metro facility. Beginning in September-October, frontline community nurses and other health workers will disseminate the information they have learned to mothers when they come in for postnatal visits.

²⁵ This trend was also noted in <http://www.Ghana Districts.com/news/?read=30995>.

²⁶ According to Dr. Yeboah-Awudzi, Director of the Kumasi Metro Health Directorate, in a March 2009 interview.

²⁷ From a follow-up interview with Dr. Awudzi in July 2010.

shown in Table 10, MMR fell by nearly 20 percent in 2009, and projections for 2010 show that it will almost certainly continue to decline.²⁸ This would be an important positive reversal of the worrisome earlier trend (KDHS, 2010) that could serve as a model for improvement in other regions.

Table 10. Maternal Mortality Ratios in Ghana, Ashanti and Kumasi

	2005	2006	2007	2008	2009	2010 (Projected)
Kumasi	395	383	359	397	332	273
Ashanti Region	200	208	246	253	210	
Ghana	560		451			

Source: World Health Organization (2007), Ghana Maternal Health Survey (2007), GHS Ashanti Region Annual Report (2006), KMHD (2009), KMHD (2010a), KMHD (2010b).

4.2. Family Planning

According to the Kumasi Metro Health Directorate, about 10 percent of women of fertility age (WIFA) were enrolled in family planning services and using contraception in 2007 (KMHD, 2008). This percentage went down in 2008, when only 7.2 percent of WIFA were enrolled in such services (KMHD, 2009). In 2007, the most frequently used contraceptive was the injectable, with 36.8 percent of WIFA who used family planning services choosing this method. The next most popular forms of contraceptives are intra-uterine devices (IUDs, 17.3 percent), oral pills (15.7 percent) and male condoms (13.9 percent). Other methods, used with less frequency, include female sterilization, Norplant and vasectomies (KMHD, 2008). The majority of condoms available in Kumasi are male condoms. There are no reports of emergency contraception (EC) usage in Kumasi; indeed, most people in Kumasi are unaware of EC.

5. HIV/AIDS, Tuberculosis, Malaria and Other Diseases

5.1. HIV/AIDS

Ghana has a relatively low HIV/AIDS prevalence rate in comparison to countries in Southern and East Africa; however, concerns remain for HIV infection in different geographical regions and among various sub-populations with higher risks for contraction of the disease. The Ghana National Health Service and National AIDS/STI Control Programme oversee and administer the country's primary prevention, treatment, care, support services and surveillance data. These two bodies also generate the HIV/AIDS Sentinel Survey Report, which reports on HIV infection in Ghana, including HIV prevalence for the country, specific regions, cities and urban-versus-rural areas. The target for the sentinel surveillance in Ghana is based on pregnant women attending ANC's (Ghana Health Service, 2009).

²⁸ Ibid.

The responsibilities of primary prevention, treatment care, support services and surveillance data are disseminated to Ghana's Regional Health Directorate, which has responsibility for overseeing the specific regions.

In 2008, HIV prevalence in Ashanti Region was three percent, a decrease from the HIV prevalence of 3.8 percent in 2007 and 3.7 percent in 2006.²⁹ In 2006, the HIV prevalence in Kumasi City itself was almost five percent, decreasing to about 4.6 percent in 2007³⁰ and to 3.6 percent by 2008 (Ghana Health Service, 2009).

The Kumasi Metro Health Directorate under the supervision of the Regional Health Directorate is promoting HIV/AIDS testing in the metropolitan area. Table 11 shows that both the numbers of mothers receiving medication to prevent vertical transmission and of women seeking HIV voluntary counseling and testing (VCT) increased between 2005 and 2007.

Table 11. Number of HIV Cases Recorded, 2005-2007

Year	Indicator	PMTCT	VCT
2005	Number Tested	2,500	596
	Number Positive	72	270
2006	Number Tested	4,861	1,394
	Number Positive	146	453
2007	Number Tested	13,632	3,350
	Number Positive	356	859

Source: KMHD (2008)

Suntreso Hospital, located in the sub-metro district of Bantama, has a Sexually Transmitted Infections clinic at the hospital which collects data on STIs and HIV/AIDS. The data collection began after 2007, so information indicating the number of people in Kumasi on antiretroviral therapy (ART) is not available for the time period. According to the Suntreso STI clinic records, in June, 2009, 231 adults and five children were on first-line ART, and two adults (no children) were on second-line ART.³¹

5.2. Tuberculosis

In recent years the number of tuberculosis (TB) cases in Kumasi has decreased (see Table 12 below). In 2007 Kumasi saw 960 reported cases of TB in Kumasi. Free treatment programs for TB patients exist, and the KMA partners with many private facilities by training them both to manage and care for TB cases, and to provide logistical and material support, such as transport, drugs and/or other incentives (KMHD, 2008). The strategy being implemented for TB treatment and reduction is Direct Observation Therapy Short course (DOTS), and a mix of public and

²⁹ Ghana Health Service, Ministry of Health, National AIDS/STI Control Programme (2007). *HIV Sentinel Survey Report* (Accra: Ghana Health Service, Ministry of Health), p. 23.

³⁰ Ibid, p. 25.

³¹ At the beginning of treatment, the combination of drugs that a person is given is called 1st line therapy. If after a while HIV becomes resistant to this combination, or if side effects are particularly bad, then a change to second line therapy is usually recommended. Second line therapy will ideally include a minimum of three new drugs, with at least one from a new class, in order to increase the likelihood of treatment success.

private facilities provides treatment and care for TB patients across Kumasi.³² Additionally, while the cure rate for TB is high in Kumasi, case detection remains low, as shown in Table 12.

Table 12. Cure Rates, Success Rates, and Case Detection for TB Cases in Kumasi, 2002-2007

Indicator	4th Quarter 2002 (Before Global Fund support)	4th Quarter 2004	4th Quarter 2005	4th Quarter 2006	4th Quarter 2007
Cure rate	20.6	85.4	90	93.2	95.5
Success rate	30	89.8	93.3	95.1	97.3
Case Detection	n/a	1452	1187	1034	960

Source: KMHD (2010)

In addition to DOTS, in 2007 there were several public campaigns initiated to educate people about TB. The goal of these efforts was “to destigmatise TB and promote equitable access to prevention, care, support and treatment for all persons affected by TB” (KMHD, 2008). Talk shows and radio programs were used to educate people; home visits were conducted to help manage TB cases and treatment. To help TB patients, enablers’ packages have been provided at both public and private facilities (KMHD, 2008).³³

5.3. Malaria

Malaria is endemic in Ghana, including in Kumasi. Most cases in the country are *plasmodium falciparum*.³⁴ However, the exact prevalence and incidence of malaria in the city is difficult to measure, because prior to 2008, most reported fevers were routinely treated as malaria cases. Upon treatment for malaria, health care workers would then look for other conditions with similar symptoms. Since 2008, laboratory testing through Rapid Diagnostic Testing (RDT) has been used to confirm cases of malaria.

RDT is not available in all health care facilities, mainly because of the associated costs. Microscopy and laboratory confirmation cost 1 GH¢, approximately \$ 1.07.³⁵ Health care facilities are required to pay upfront costs for the tests, and the National Health Insurance Scheme (NHIS) is supposed to reimburse them. However, most facilities claim insufficient funds to pay the initial costs for RDT, and that NHIS does not pay reimbursements in a timely fashion. Thus, while the regional medical stores have sufficient RDT kits in stock, many facilities cannot access them because the cost is prohibitive. RDTs are thus underutilized in Kumasi, and the facilities may continue to treat fever cases as malaria.³⁶

³² DOTS is an internationally recognized health care management system that is patient-centered and provides support by observing patients even as they take their treatments.

³³ The national TB control program has two components: one for health staff, another for patients. For patients, enablers packages include payments for patients to get tested, as well as funds for food, transportation and for health staff to conduct home visits.

³⁴ This is the most deadly of the four parasites known to cause malaria (Sanger Institute, 2010).

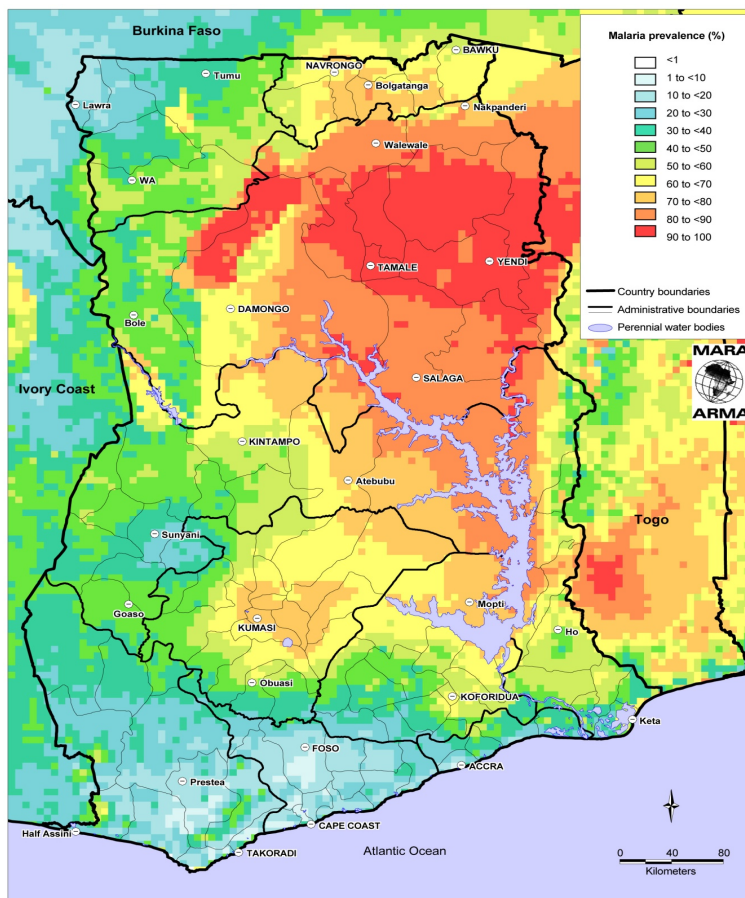
³⁵ July-December 2007 exchange rate (<http://www.oanda.com>).

³⁶ Conversation conducted with the Malaria Focal Person at GHS for the Ashanti Region.

Pregnant women and children under five receive malaria treatment, including ACTs, free of charge, as do older children and adults who have enrolled in the NHIS (USAID, 2009).

Malaria data collection is sponsored by the Global Fund to Fight AIDS, Tuberculosis and Malaria.³⁷ Data is first gathered at the facility level (e.g., at a clinic or hospital). This data is then reported to the metro health directorate, and after that, to the regional health directorate. Figure 7 shows malaria prevalence in Ghana; it can be seen that Kumasi is located in an area with high malaria prevalence rates.

Figure 6. Malaria Prevalence in Ghana



Source: MARA/ARMA (2002)

Roll Back Malaria Program

The Roll Back Malaria (RBM) Program is a global effort comprised of 500 partners whose goal is to reduce malaria-related morbidity and mortality. Established in 1998 by the United Nations Children's Program (UNICEF), the World Health Organization (WHO), the United Nations Development Programme (UNDP) and the World Bank, RBM and its many partners, including Ghana, work together to help malaria-endemic countries scale up health services and health system delivery to combat the disease and also work to prevent duplication of efforts.

³⁷ The Global Fund also sponsors TB and HIV treatment protocols in Ghana.

Malaria Cases

As previously mentioned, it is difficult to measure accurately the number of malaria cases in Kumasi. Kumasi's Metro Health Directorate recorded 347,108 cases of acute endemic malaria in 2007, up from 277,350 in 2006 and 306,187 in 2005 (KMHD, 2008).

Populations considered particularly at-risk for malaria are pregnant women, children under five, those who are non-immune and people with compromised immune systems, such as those living with HIV/AIDS (PLWHA).³⁸ Malaria symptoms are worse when infected individuals rely on self-treatment at home, have other life-threatening conditions or do not take drugs properly or at all. These additional factors characterize cases defined as "severe malaria." Table 13 introduces important malaria indicators.

Table 13. Important Malaria Indicators

Indicator	2005	2006	2007
Children <5 reporting with malaria	63,519	61,874	73,140
Children <5 admitted with malaria	3,786	3,029	3,594
Children <5 dying of malaria	58	31	20
<5 Malaria case fatality rate	0.09	0.05	0.02

Source: Kumasi Metro Health Directorate, 2008

The preferred treatment in malaria cases in Kumasi is the medication *artesanate and amodiaquine* (AS/AQ), which is administered to all clinical cases at OPD. Second-line malaria treatment, *Artemether-lumefantrine* (AL) and *dihydroartemisinin-piperaquine* (DHAP), is reserved as an alternative in the event that a patient reacts poorly to AS/AQ. Third-line malaria treatment is *dihydroartemisinin piperaquine*. Both second- and third-line treatments have been available since 2008 (USAID, 2009).

ITN use

Subsidized nets are provided to Kumasi by the WHO. These nets are distributed to children under five and pregnant women. Individuals pay GH¢ 2.00 (\$ 2.14) for ITNs distributed by the WHO. The market price for ITNs is GH¢ 8.00-10.00 (\$ 8.56-10.70).³⁹

5.4. Other Contributors to Kumasi's Disease Burden

The quality of Kumasi's water and sanitation systems has an obvious impact on the overall health of the city's population. Many institutions (including schools and government offices) also lack adequate toilet facilities for students and employees, while 36 percent use bucket latrine systems,



³⁸ Persons who are non-immune are from an area where malaria is not endemic.

³⁹ July-December 2007 exchange rate (<http://www.oanda.com>).

sewerage, pit latrines or open defecation (KMA, 2006). Poor water supply and solid waste management can make for unhealthy living conditions in any type of environment, often aggravating the spread of water-borne disease. Providing clean drinking water to people and ensuring adequate solid waste and industrial management can reduce both the incidence and prevalence of water-related illnesses.



It is also relevant to note that while many of the roads in Kumasi are paved, severe congestion, narrow roads and petty traders make transportation difficult. Many *tro-tros* (public vans), taxis and private vehicles congest the narrow roads. Such conditions complicate transfer of patients requiring immediate medical care.

6. Cost and Financing of Public Health Care in Kumasi

Funding for the Kumasi Metro Health Directorate comes from the Government of Ghana, Internally Generated Funds (IGF) and development partners. IGF has proved to be the most dependable source of funding and was responsible for hospitals receiving over 93 percent of their funding in 2007, as opposed to much lower percentages from other sources.

In 2003, the Government of Ghana passed Act 650, known as the National Health Insurance Scheme (NHIS). Act 650 made it compulsory for all Ghanaians to join one of three health insurance schemes (IRIN, 2004). The insurance schemes are: a government-supported District-Wide Mutual Health Insurance Scheme (DWMHIS); a Private Mutual Health Insurance Scheme (PMHIS); and a Private Commercial Insurance Scheme (PCHIS). To participate in the government-supported DWMHIS, individuals are required to pay an annual fee, which can be paid in monthly installments, depending on one's socio-economic status. Those adults who are unemployed, have no consistent financial support and are certified as paupers by the Department of Social Welfare are exempt from paying, as are children under 18. The Government of Ghana also offers nationwide fee exemptions for all pregnant women, enabling them to access services from the antenatal period through delivery. This same exemption is applied to the mother-baby(ies) pair until 90 days after birth. High-income individuals pay higher rates and therefore subsidize those individuals who cannot contribute to the scheme. Table 14 outlines the annual minimum contributions.⁴⁰

⁴⁰ "National Health Insurance Scheme" (n.d.) Retrieved March 22, 2010 from: http://img.modernghana.com/images/content/report_content/NHIS.pdf

Table 14. Minimum Annual Contributions to DWMHIS

Name of group	Definition	Minimum contributions payable annually (Ghanaian old cedi)	Minimum contributions payable annually [USD]
Core Poor	Adults who are unemployed and do not receive any identifiable and constant support from elsewhere for survival	free	
Very poor	Adults who are unemployed but receive identifiable and consistent financial support from sources of low income	72,000	8.08
Poor	Adults who are employed but receive low returns for their efforts and are unable to meet their basic needs		0
Middle Income	Adults who are employed and able to meet their basic needs	180,000	20.19
Rich	Adults who are able to meet their basic needs and some of their wants	480,000	53.84
Very Rich	Adults who are able to meet their needs and most of their wants		

Source: National Health Insurance Scheme http://img.modernghana.com/images/content/report_content/NHIS.pdf

Despite the stipulated coverage for NHIS, buy-in to the national health insurance is not mandatory. This might explain why there is not 100-percent coverage in Kumasi (refer to Table 5 for NHIS percent coverage by sub-metro).

Hospitals are partly funded by revenues from the National Health Insurance Scheme. Indeed, the Kumasi Metro Health Directorate notes that 41.6 percent of its 2007 revenue came from the Government of Ghana, much of which consisted of claims submitted under NHIS.⁴¹

Table 15. Inflows- Metro Health Directorate (2005-2007)⁴²

Source	2005 ACTUALS	2006 ACTUALS	2007 BUDGET	2007 ACTUALS	% RECEIVED
	A	B	C	D	E
Donor Pooled Funds (DPF)	76,700.12	44,707.80	13,743.07	3,958.48	28.80%
Government of Ghana (GOG) Adm and Service	15,449.10	18,960.77	95,000.00*	40,063.18*	42.17%*
Internally Generated Funds (IGF)	31,170.90	28,929.44	25,000.00	23,293.87	93.17%
Total	123,320.12	92,598.01	133,743.00	67,315.53*	50%*

Source: Kumasi Metro Health Directorate Annual Report (2008)

In addition to the funding generated from IGF and the Government of Ghana, the Kumasi Metro Health Directorate receives “program earmarked funds (PEF)” each year from a variety of sources. Below is a table of allocated program funds for the years 2005-2007. Though not a large source of funding, PEF supplemented other expected sources of income that did not come through.

⁴¹ The numbers published in the 2008 annual report are inaccurate. The revised calculation for the total percentage of revenue that comes from NHIS claims should stand at 51.1 percent, according to verified calculations by MCI

⁴² Note: the figures with an asterisk (*) indicate that MCI verified the data in Table 42 of the Kumasi Metro Health Directorate and found inaccuracies. Correct data were found in Appendix A of the same report. This table has been updated to reflect the correct data in Appendix A.

Table 16. Program Funds (2005-2007)⁴³

Source	2005 ACTUALS	2006 ACTUALS	2007 ACTUALS
	A	B	C
EPI/NID	180,057.51	95,354.32	123,733.00
UNFPA/US AID	0	0	51,700.00
District Assembly Common Fund	15,352.63	5,930.00	5,000.00
Global Fund	221,096.00	217,955.70	260,574.36
Exemption- Maternal Delivery	158,460.00	84,529.70	27,574.36
High Impact Rapid Delivery	0	0	137,090.00
Total	574,966.14	403,769.72	**605,124.21

Source: Kumasi Metro Health Directorate Annual Report (2008)

III. RESULTS FROM UNDP COSTING MODEL

To estimate the costs necessary to achieve the health-related MDGs and to forecast the essential financial, human resources and infrastructure requirements, this needs assessment has used UNDP's Integrated Health model.⁴⁴ The results derived from this model depend on a set of assumptions; for instance, the Kumasi health model assumes that the population will grow at same rate between 2010 and 2015. The unit costs used here are international unit costs derived from UN agencies.

Based on available data, Table 17 shows estimates of per capita costs needed to attain child health, maternal health, malaria, tuberculosis, staffing and health facilities goals for each year between 2010 and 2015, in order for the health-related MDGs to be achieved by 2015. As previously noted, due to incomplete data, the results presented in this paper are on the low end for a city as large and complex as Kumasi. Nevertheless, they still represent an estimate of what it will take to achieve the MDGs in health.

Table 17. Health Sector Costs Per Capita (2010-2015, in \$)

Per Capita Costs (2010-2015)							
	2010	2011	2012	2013	2014	2015	Average
Child Health (MDG-4)	0.53	0.51	0.50	0.48	0.47	0.45	0.49
Maternal Health (MDG-5)	0.15	0.15	0.15	0.15	0.16	0.15	0.15
HIV, Malaria, and other diseases (MDG-6)	1.51	1.62	1.80	1.82	1.92	1.70	1.73
Facilities, Human Resources, Health Systems	6.08	5.87	6.07	5.30	5.12	4.95	5.57
Commodity Supply System	2.86	2.50	2.44	1.98	1.41	1.17	2.06
Total	11	11	11	10	9	8	10

⁴³ Note: MCI verified the data in the above table and found that some of the calculations of the Kumasi Metro Health Directorate were inaccurate. The total for Column C (**) should be 605,671.72

⁴⁴ As explained above, this model is a product of the UN Millennium Project, now administered by the MDG Support Group, part of the Poverty Unit at the UNDP.

The results of the model show that facilities, human resources and health systems costs will account for 56 percent of total costs between 2010 and 2015, while supplies will account for about 21 percent. Malaria, TB and HIV/AIDS costs are expected to make up 17 percent of total costs, while child health costs will likely constitute only five percent of the total. Maternal health costs come to less than two percent of total costs.

CONCLUSION AND RECOMMENDATIONS

Kumasi holds a unique seat as both an important regional capital and the second largest city in Ghana. Some of Ghana's premiere health care services are located in the city, including the two newly-constructed mother and baby units and top-care facilities at Komfo Anokye Teaching Hospital. In many instances, the overall health of Kumasi's residents has improved as disease incidence and prevalence have decreased and the provision of health care services has expanded. A reduction in tuberculosis cases, an increase in child nutritional monitoring and recent reductions in neonatal deaths are examples of such developments.

There are, however, areas of concern. The Kumasi Metro Health Directorate states, "The bane of service delivery in Kumasi is poor health infrastructure, staff indiscipline and inappropriate health seeking behavior" (KMHD, 2008). The sub-metro hospitals need more staff, facility upgrades and more equipment. Doctors and nurses often work in cramped spaces with intermittent electricity, while in-patients are expected to provide even such basic supplies as their own sheets. Such practices spread disease and reduce hygiene in health care facilities.

Further, the system does not have the financial resources to provide in-service training for all health care employees. The KMA has also highlighted the issue of inadequate staff discipline, resulting in inconsistency in scheduling and longer wait times in clinics. Lack of clarity between regional and city authorities regarding the division of responsibilities, as well as disordered data collection processes, exacerbate these issues. Investment in more staff, upgraded facilities, staff training and more streamlined data collection will go a long way toward improving the provision of all health care services in Kumasi.

Community awareness campaigns are also necessary to build collective public knowledge regarding what constitutes healthy behavior. For instance, the sick often seek herbalists, spiritual churches and quack doctors before seeking professional medical attention. Such patients arrive at hospitals in worse condition than had they sought out proactive medical attention at the onset of their symptoms. Increasing the number of trained, reputable community nurses and other health workers will serve local populations' basic health needs, freeing up hospitals to focus on treatment for more serious and acute illnesses.

Kumasi's hospitals and health authorities have made progress towards improving child health in recent years, reducing the number of under-five malaria cases and increasing child nutritional monitoring. However, antenatal coverage, a key indicator for child health, had not really improved, up to the time when the NHIS went into effect; indeed, the number of pregnant women making at least four antenatal visits actually decreased between 2006 and 2007. The increased reliability of the NHIS should yield improvements in these numbers; nevertheless,

Regional Health Services and KMA will need to scale up coverage for antenatal services to change this pattern permanently.

With regard to maternal health, Kumasi has made significant improvements in ensuring that births are supervised. Yet, at just over 50 percent, the figures are still too low. The utilization of family planning is also quite low and should be expanded, given the impact these services can have on maternal health. The training of community health workers can also help increase the uptake of family planning in Kumasi.

These community health workers must furthermore be trained to address common infectious diseases. While HIV/AIDS prevalence is relatively low in Kumasi, the city still has some of the highest prevalence rates in Ghana. HIV/AIDS surveillance is routinely conducted on women attending antenatal care; however the extension of surveillance to other high-risk populations is essential. Tuberculosis rates have steadily decreased, and continuation of surveillance and DOTS programs will build on this progress. Malaria also remains a prevalent issue in Kumasi, and while more efficient technology is available to improve detection, such tools are underutilized. Better access to RDT and higher rates of reimbursement from the National Health Insurance Scheme can help make malaria diagnosis and treatment more accurate and cost-effective.

Strategies such as merging the home-based care of malaria with the treatment of acute respiratory and diarrhea under the Integrated Management of Childhood Illnesses (IMCI) need to be actively promoted. UNICEF, WHO and USAID are already funding IMCI activities. As recommended by the National Malaria Control Strategy, community-based agents (CBAs) should be responsible for managing uncomplicated malaria, diarrhea and respiratory infections in children under five years old. This would free up health practitioners to take care of patients with more severe cases.

Kumasi faces a number of complex challenges in meeting the health-related MDGs by 2015, from endemic malaria to the lack of reliable health care infrastructure. However, recent improvements have opened a unique window of opportunity. MCI predicts that with carefully targeted interventions and an average annual per capita investment of \$ 10 per year during the 2010-2015 period, Kumasi can meet the health-related MDGs, ensuring a healthier future for a far greater number of the city's residents.

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APPENDIX

Appendix 1: Human Resources in Kumasi Health System

Human Resource Staffing	Number Employed	Pre-Service Training Required
Medical Staff		
Medical Officer	33	Senior high school; 7 years medical school; 2 years housemanship* rotation
Dentist	3	Senior high school; 7 years medical school; 2 years housemanship rotation
Medical Assistant	17	
Pharmacist	7	Senior high school; 4-year course in pharmacy training (for degree); 1-year housemanship; must pass license exam before practice
Technical Officers		
Biostatistics	15	Senior high school; 3-year diploma in biostatistics
Nutrition	12	Senior high school; 3-year diploma in nutrition
Disease Control	7	Senior high school; 3-year diploma in disease control
Health Information	1	Senior high school; 3-year diploma in health information
Nurses		
Registered Nurse/Midwife	270	Senior high school; 4-year course training (for degree)
Profession Auxiliary Nurse**	37	Senior high school; 3-year course training (for certificate)
Public Health Nurse	12	Senior high school; 4-year course training; 1-year training in public health (for certificate)
Community Health Nurse	64	Senior high school; 2-3-year. course training in public health (for certificate)
Technicians		
Dispensing Technician	43	Senior high school; 3-year training in pharmacy
Laboratory Technician	6	Senior high school; 3-year training as laboratory technician
X-ray Technician	5	Senior high school; 3-year training as X-ray technician
Assistants		
Dispensing Assistant	10	Senior high school; training on the job
Laboratory Assistant	9	Senior high school; training on the job
Biostatistics Assistant	15	Senior high school; training on the job
Dental Assistant	4	Senior high school; training on the job
Ward Assistant	52	Senior high school; 6 months of training (in non-technical aspects of nursing)
Administration		
Health Administrator	4	Masters in Health Services

* A housemanship is a medical internship.

**While this training existed in 2007, it had ended by the time of this report.

Source: Metro Health Directorate – Kumasi, Annual Report (2007); MCI Project Manager for Ghana.

Appendix 2: Sub-Metro Hospitals in Kumasi.

Asokwa – Kumasi South Hospital (KSH)

Kumasi South Hospital has many different departments, including: laboratory; general ward; ear-nose-throat (ENT) specialist; eye specialist; surgery; maternity department (obstetrics and gynecology); mother and baby unit (MBU); family planning department; public health; pharmacy; dental; records; OPD; ART center for HIV; general admissions; and pediatrics. KSH specializes in dental care, ophthalmology, surgery, pediatrics, obstetrics, gynecology and ENT. The hospital's needs include the expansion of the entire facility, particularly for specialty services (at present, the only specialty service that has a dedicated space is obstetrics and gynecology). The hospital also needs funds to complete the construction of a ward building, as well as to purchase more equipment.

Bantama – Suntreso Hospital

The in-depth discussions carried out by MCI regarding each hospital's department listings, needs and successes were not conducted at Suntreso. The hospital has a newly constructed MBU clinic, built with support from the Millennium Cities Initiative, the Office of International Cooperation (MASHAV) of the Ministry of Foreign Affairs, Government of Israel, and the Alliance for Global Good, as well as a STI and HIV/AIDS clinic, which collects a great deal of useful STI and HIV/AIDS data.

Manhyia North – Tafo Hospital

Tafo Hospital houses 12 different departments, including maternity, psychiatric and recovery wards; an operating theatre, out-patient department, pharmacy and laboratory; and departments of public health, medical records, X-ray, family planning and DOTS. The hospital also has a clinic specializing in dermatology and skin care. Unfortunately, although Tafo is the only hospital with a psychiatric ward, completion of a new psychiatric block, begun by the KMA four years ago, has apparently been abandoned. Construction of a maternity block was also suspended, and more wards, particularly for recovery, need to be built. More sterilization and laboratory equipment is also needed, as is more readily available transportation (right now, the hospital is in possession of one old pick-up truck).

Manhyia South – Manhyia Hospital

Located down the street from Manhyia Palace, the residence of the Ashanti King, Manhyia Hospital was built during the 1960s and has 11 departments: X-ray; maternity; OPD; operating theatre; inpatient care; antenatal care (ANC); family health; a pharmacy and laundry; eye services; and administration. The hospital specializes in obstetrical and gynecological care and eye service and care. The hospital also has a surgical specialist and an ENT (Ears, Nose, Throat) nurse.

The Manhyia Hospital superintendent listed many of the facility's needs, affirming that there is much the hospital is lacking, including the need to rebuild the entire facility. Regarding equipment, the hospital is in need of an anesthesia machine, more diagnostic sets, surgical, maternity, ENT and general ward equipment and upgrading, and laundry machines. With only 42 beds, overflow cases are referred to KATH. Despite these resource challenges, the hospital manages to see approximately 500 OPD cases each day.

Subin – Maternal Child Health Hospital (MCHH)

MCHH was built in 1927, and in addition to its standard hospital responsibilities, specializes in maternal, prenatal, antenatal and child health care. MCHH has 13 different departments: nutrition rehabilitation clinic; family planning; ANC clinic; HIV counseling unit; general consulting (mostly pediatric); a child welfare clinic; laboratory services; a labor ward and maternity wing (postnatal care administered here); a pharmacy; accounting; administration; a children's ward; and a kitchen to feed inpatient children. The hospital's most pressing needs include a generator; a larger maternity wing; the completion of the abandoned project for a second maternity ward; the completion of an abandoned X-ray building project; and the expansion of the crowded child and maternity wards.

Autonomous Hospital – Komfo Anokye Teaching Hospital (KATH)

Komfo Anokye Teaching Hospital, one of two autonomous hospitals in Ghana, is a large facility that includes, but is not limited to OPD, surgery, MBU, pediatrics, a pharmacy, biostatistics office, sophisticated blood-banking unit and ambulatory care.