

MCI SOCIAL SECTOR WORKING PAPER SERIES

N° 17/2010

HEATH NEEDS ASSESSMENT FOR THE CITY OF BAMAKO, MALI

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October 2010

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NB: This needs assessment, initially prepared by Rachel Hoy, was revised and updated by MCI Social Sector Research Manager Moumié Maoulidi, MCI Co-Director Susan Blaustein and experts at the West Africa MDG Center in Mali (Dr. Amadou Niang, Abdoulaye Sidibé, Amadou Konate, Dr. Ben Aboubacar, Dr. Belco Poudiougou, Joop Clappers and Dr. Tinzana Coulibaly). UNDP consultant Brian Lutz, who helped develop the UN Millennium Project needs assessment models and subsequently led the work on the health needs assessments at the UN Development Programme, reviewed the costing model, and MCI interns Anna Chang and Sarah Jaffe assisted with reviewing and editing the report.

Figure 1: Map of Mali Showing Bamako



Source: UN, <http://un.org/Depts/Cartographic/map/profile/mali.pdf>

ACKNOWLEDGEMENTS

We would like to thank the following people and institutions whose assistance made this project possible:

MDG Center in Bamako, Mali

Dr. Amadou Niang
Mr. Abdoulaye Sidibé
Dr. Belco Poudiougou
Dr. Ben Aboubacar
Mr. Joop Clappers
Dr. Tinzana Coulibaly

Ministry of Finance and Economy

M. Sekouba Diarra, Coordinator of the Strategic Framework for Poverty Reduction, and his team

Ministry of Health

Dr. Mahamadou Coulibaly, Planning and Statistics Department (CPS)
M. Ousmane Sylla, Planning and Statistics Department (CPS)

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Regional Health Directorate

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Abdoul Karim Coulibaly, Public Health Medical Assistant
Head doctors of communes in the District of Bamako

The Mayor of the District of Bamako, and all the mayors of the six communes in Bamako

SNV-Mali

Sonja Van Dergraaf, Director, and her team

UNDP

Mr. Brian Lutz

MCI, New York

Dr. Susan M. Blaustein (Co –Director, Millennium Cities Initiative, Earth Institute)
Dr. Mounié Maoulidi (Social Sector Research Manager, Millennium Cities Initiative)

and

Dr. Gabriel Deussom Noubissie, for his constant moral and intellectual support.

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ABBREVIATIONS

AIDS	Acquired Immuno-Deficiency Syndrome - <i>Syndrome Immuno-Déficitaire Acquis</i> (SIDA)
ANC	Antenatal Consultation – <i>Consultations Prénatales</i> (CPN)
ARI	Acute Respiratory Infection- <i>Infection Respiratoire Aiguë</i> (IRA)
ASACO	<i>Association de Santé Communautaire</i> – Community Health Association
CDMT	<i>Cadre de Dépenses à Moyen Terme</i> – Framework for Mid-term Expenses
CDV	<i>Counseling et Dépistage Volontaire</i> – Voluntary Counseling and Testing (VCT)
CEPRIS	<i>Cellule d'Exécution pour les Programmes de Renforcement des Infrastructures Sanitaires</i> – Department for Implementing Programs to Strengthen Health Infrastructure
CPS	<i>Cellule de Planification et de Statistique</i> – Planning and Statistics Department
CROCEP	<i>Conseil Régional d'Orientation de Coordination et d'évaluation des programmes sociosanitaires</i> – Regional Steering and Coordination Council for Health Program Evaluation
CFA	<i>Francs de l'Union Economique Monétaire Ouest Africain (UEMOA)</i> – West African Franc
CSLP	<i>Cadre Stratégique de Lutte Contre la Pauvreté</i> – Strategic Framework for Poverty Reduction
CSCOM	<i>Centre de Santé Communautaire</i> – Community Health Center
CSREF	<i>Centre de Santé de Référence</i> – Referral Health Center
CTA	<i>Combinaison Thérapeutique d'Arthémésinine</i> - Arthemesisinine Combination Therapy
DAF	<i>Direction Administrative et Financière</i> – Administrative and Financial Directorate
DCI	<i>Denomination Commune Internationale</i> – International Common Denomination
DOTS	Direct-observed therapy, short-course (for tuberculosis)
DNS	<i>Direction Nationale de la Santé</i> – National Health Directorate
DPM	<i>Direction de la Pharmacie et du Médicament</i> – Pharmaceutical and Medical Directorate
DPCT	<i>Diphthérie Tétanos Coqueluche Poliomyélite</i> - Diphtheria, tetanus, pertussis, and polio vaccine (PPT)
DRS	<i>Direction Régionale de la Santé</i> - Regional Health Directorate
DSR	<i>Division de la Santé Reproductive</i> – Reproductive Health Division
EDSM	<i>Enquête Démographique et de Santé au Mali</i> – Mali Demographic and Health Survey (DHS)
GDF	Global Drug Facility
HIS	Health Information Systems
HIV	Human Immunodeficiency Virus – <i>Virus d'Immunodéficience Humain</i> (VIH)
IDE	<i>Infirmier diplômé d'état</i> – Certified Nurse
IEC	Information, Education, and Communication
IPT	Intermittent preventive treatment (for malaria)
IVM	<i>Initiative des Villes du Millénaire</i> – Millennium Cities Initiative (MCI)
ITM	Insecticide Treated Mosquito Nets
INRSP	<i>Institut National de Recherche de Santé Publique</i> - National Institute for Public Health Research

IMF	International Monetary Fund – <i>Fonds monétaire international</i> (FMI)
MDG	Millennium Development Goals – <i>Objectifs du Millénaire pour le Développement</i> (OMD)
MOH	Ministry of Health – <i>Ministère de la Santé</i>
MII	<i>Moustiquiaries Impregnées d'Insecticide</i> - Insecticide-Treated Mosquito Nets
MDRTB	Multi-Drug Resistant Tuberculosis
NGO	Non Governmental Organization - <i>Organization Non-Gouvernementale</i> (ONG)
OI	Opportunistic Infections – <i>Infections Opportunistes</i> (IO)
OMS	<i>Organisation Mondiale de la Santé</i> – World Health Organization (WHO)
PMA	<i>Paquet Minimum d'Activité</i> – Minimum Package of Services
PPTE	<i>Pays Pauvres et Très Endettés</i> – Heavily Indebted Poor Countries (HIPC)
PLWHA	People Living with HIV/AIDS – <i>Personne Vivant avec le VIH/SIDA</i> (PVVS)
PDSEC	<i>Plan de Développement Social, Economique et Culturel</i> – Social, Economic and Cultural Development Plan
PDDSS	<i>Plan Décennal de Développement Sanitaire et Social</i> – 10-Year Health and Social Development Plan
PPM	<i>Pharmacie Populaire du Mali</i> – The People's Pharmacy of Mali
PTME	<i>Prévention de la Transmission Mère Enfant du VIH</i> - Prevention of Mother to Child Transmission (PMTCT)
PRODESS	<i>Programme de développement sanitaire et social</i> – Health and Social Development Plan
PEV	<i>Programme élargi de Vaccination</i> – Expanded Vaccination Program
PNLT	National Program against Tuberculosis
PNLP	National Program against Malaria
PMI	<i>Protection Maternelle et Infantile</i> – Maternal and Infant Protection
PRSP	Poverty Reduction Strategy Papers
RDT	Rapid Diagnostic Testing
SIDA	<i>Syndrome d'Immuno-Déficiences Acquis</i> – Acquired Immuno-Deficiency Syndrome
SLIS	<i>Système Local d'Information Sanitaire</i> – Local Health Information System
SNV	<i>Stichting Nederlandse Vrijwilligers</i> - Netherlands Development Organization
STD	Sexually Transmitted Disease – <i>Infection Sexuellement Transmise</i> – (IST)
TB	Tuberculosis- <i>Tuberculose</i>
UN	United Nations – <i>l'Organisation des Nations Unies</i> (ONU)
US\$	United States Dollar
VAR	<i>Vaccination Anti Rougeole</i> – Anti-Measles Vaccination
VIH	<i>Virus de l'Immunodéficience Humaine</i> – Human Immunodeficiency Virus (HIV)
VCT	Voluntary Counseling and Testing - <i>Counsel et Dépistage Volontaire</i> (CDV)

EXECUTIVE SUMMARY

Bamako, the capital city of the Republic of Mali, was designated as a Millennium City by the Earth Institute at Columbia University in 2006. The city faces numerous health challenges, but it is well-positioned to meet health-related Millennium Development Goals (MDGs) by 2015. Priority health needs include: reducing maternal mortality and increasing contraceptive usage rates; reducing child malnutrition and infant morbidity; and scaling-up access to health services.

Key reproductive health challenges include the persistent, elevated number of maternal deaths, high fertility rates and low modern contraceptive usage rates. Addressing these challenges will necessitate enhancing prenatal and postnatal care and increasing the use of intrauterine devices (IUDs) and Norplant.

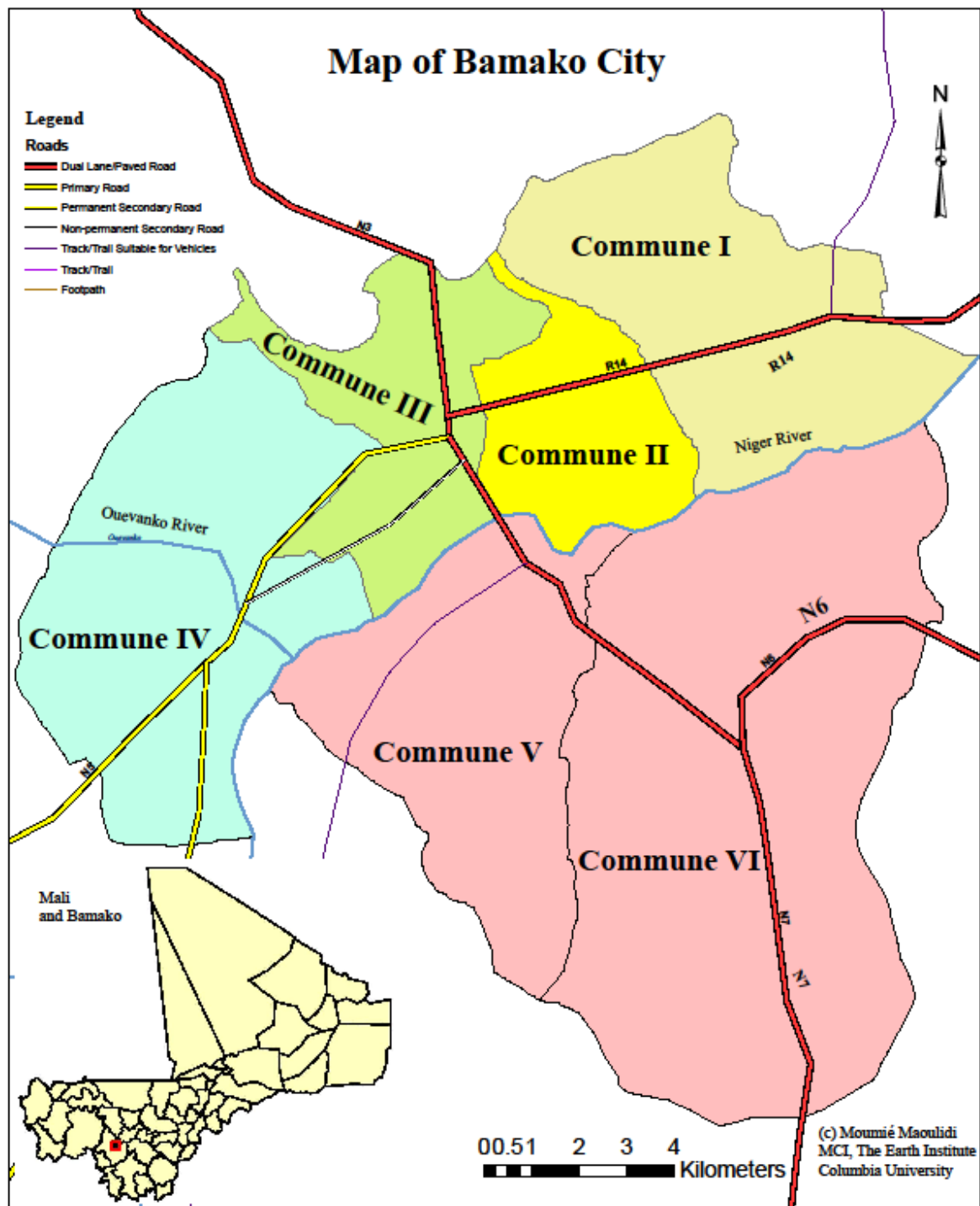
Fistula also affects a number of women in Bamako, indicating a need for urological and obstetrical/gynecological specialists. Given that many women with fistula are unaware that treatment is possible, it is also important to intensify the government's awareness campaign.

Child morbidity is another pressing issue in Bamako, with the primary disease burden coming from malaria, diarrhea, acute respiratory infection (ARI) and malnutrition. Yet not all Bamakois families access health care for their sick children, with indicators showing few children receiving care for ARI or fever. Another major challenge is the reduction of vitamin A deficiency and anaemia, from which a large number of Bamako's children suffer.

This needs assessment provides a snapshot of the health care system in Bamako, evaluates what problems exist and identifies how much it will cost to attain the three health-related MDGs: to reduce child mortality, improve maternal health and combat HIV/AIDS, malaria and other diseases. The results indicate a need to identify factors inhibiting city residents from accessing health care and to develop strategies aimed at ensuring the provision of health services to a greater percentage of the city's population. There is also a need to expand the training of physicians, specialists and nurses. MCI estimates that Bamako can achieve the health-related MDGs by 2015 with an average annual per capita investment of roughly \$27.

The report is organized as follows: an introduction reviews the methodology used and limitations in conducting the research; this is followed by a description of the structure of the health care system in Bamako city, an analysis of major health challenges and an outline of costs necessary to attain the three health-related MDGs in Bamako. The conclusion synthesizes the findings and presents some recommendations.

Figure 2. Map of Bamako



I. INTRODUCTION

Mali

The Republic of Mali is a landlocked country in West Africa. Mali is one of the poorest countries in the world, ranking 133rd out of 135 countries on the 2007 human poverty index¹ (UNDP, 2009). The adult literacy rate is under 23 percent, among the world's lowest, and the primary school gross enrolment ratio for girls stood at 54 percent in 2007 (UNDP, 2008; UNICEF, 2007). Poor economic conditions depress demand for health services and foster conditions that make the population susceptible to disease and ill health. In particular, low levels of education among girls exacerbate health and nutrition indicators for children and contribute to low contraceptive use and high fertility rates.

Bamako

Bamako, Mali's capital city, is one of Africa's fastest growing cities, with a population in 2009 of 1,809,106 (RGPH, 2009). Situated along the banks of the Niger River, Bamako is both Mali's administrative and economic center. Historically, Bamako has been classified as a giant village with expansive neighborhoods, but over the last decade, Bamako has revived its urban planning strategies. It serves as an important distribution hub to the nearby port cities of Dakar, Abidjan and Accra and will soon have a new airport, permitting it improved access to national, regional and international markets.

Geographically, Bamako is comprised of six communes (see Figure 2). Communes I, II, III and IV sit on the northern left bank of the Niger River, while communes V and VI lie to the southern right bank. A plateau directly to the northwest of the city prevents the Bamakois from expanding toward the central city. However, there has been an increase in development on the Niger's right bank, and these municipalities have been trying to respond to the needs of the growing population, most notably by expanding access to health care services.

1.1.Objectives

This needs assessment focuses on the health sector in Bamako and the health needs of the city's residents. It describes the main health challenges, identifies interventions that have the potential to ensure that health-related MDGs are achieved by 2015 and outlines associated costs.

1.2. Methodology

The needs assessment relies on quantitative and qualitative data collected in Bamako between June and August 2008, and between April and July 2010. The exercise involved gathering and analyzing demographic and epidemiological data; reviewing locally and nationally compiled health reports and assessing the disease burden; and identifying costs for infrastructure, human resources and health supplies.

¹ The human poverty index is based on four indicators: life expectancy; adult illiteracy; percentage of the population not using an improved water source; and percentage of undernourished children.

The main data sources used in this needs assessment include municipal-level reports such as the socio-cultural development plans, or PDSCs² (*Plans du Développement Socio-Culturels*), strategic plans, budgets, national health reports and policy documents.³ In addition, data were collected from monographs and emergency evacuation documents. Household surveys, such as demographic and health surveys (DHS or *Enquêtes Démographiques et de Santé*, EDSM in French), were consulted to fill in missing data. A desk review of secondary sources and semi-structured interviews with stakeholders were also conducted. Furthermore, site visits to primary, secondary and tertiary health facilities were also undertaken, to reinforce understanding of the health situation in Bamako. Facilities visited for observational purposes include the community health centers, *Centres de santé communautaires* (CSCOM). The NGO known as ARCAD-SIDA, or *Association de Recherche de Communication et D'Accompagnement à Domicile des PVVS*, provided data on HIV.

Interviews with national and regional health directorates (DNS and DRS) officials, head doctors (*médecins chefs*) and personnel at referral health centers (CSREF) and community health centers (CSCOM) were also conducted to verify and validate additional data. In some cases, the interviews provided estimations of disease prevalence when data were not available.

1.3. Limitations

As a result of the decentralization process which began in 1993, each commune, city and region in Mali is responsible for developing its own development plan and adapting national health policies to local needs.⁴ Each of the six communes within Bamako is unique and heterogeneous in terms of its developmental needs and local operational capacities. There are marked differences in the availability of medical supplies, equipment and the number of qualified health care professionals available to residents in the different communes. However, due to time and financial constraints, MCI could not conduct a separate health needs assessment in each commune. Instead, this report examines the health situation across the city as a whole.

Another limitation encountered is that some documents were incomplete in their reporting, and many did not follow a uniform format. Moreover, there were often discrepancies between data in the district and municipal reports, or between data used in planning documents versus budgeting documents. Investing more resources in health information systems (HIS) at the local level will improve the quality of data available for evaluating the effectiveness of current interventions and measuring the impact of future targeted interventions.

1.4. Demographics

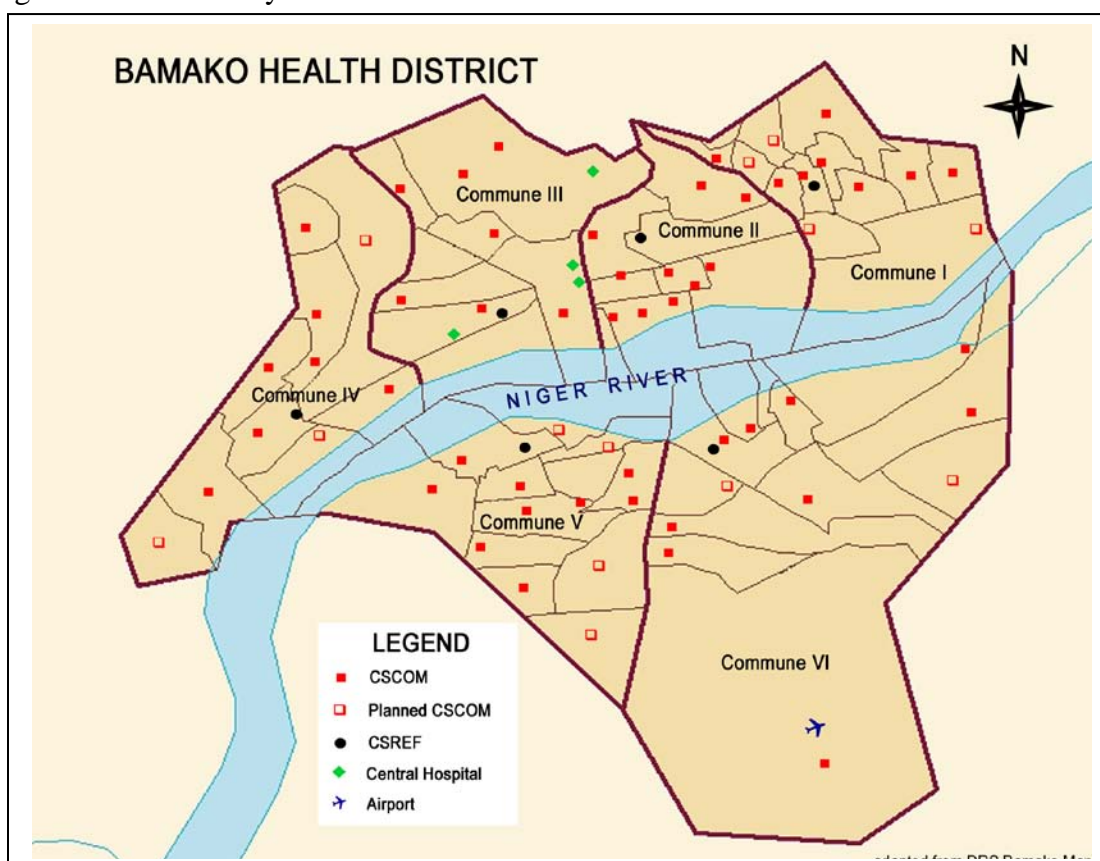
Figure 3 below shows the administrative units that make up Bamako City (Communes I-VI) and the distribution of public health facilities.

² The plural form of this French acronym is pronounced as 'pay-day-seks'.

³ The data used in this needs assessment was validated by local health experts and professionals at the Earth Institute's *Centre des OMDs* (MDG Center) for West Africa, headquartered in Bamako.

⁴ Under the decentralization policy, the Regional Health Directorates (DRS), rather than the central government, play the major role in the development of regional health programs.

Figure 3. Bamako City Administrative Units and Health Facilities



Source: DRS (2008).

Bamako's population is increasing rapidly, due to a high fertility rate (6.1 percent in 2006) and high internal migration rates (DHS, 2006). There are striking differences in population growth rates within communes, as depicted in Table 1. Commune V has the highest growth rate, at 7.5 percent, while Commune II has the lowest, at 2.2 percent. Communes I and VI also have high growth rates, primarily because they are not constrained geographically by the large plateau to Bamako's north and are thus able to expand southward and eastward. In response to this influx of people to Bamako, the Government of Mali has built thousands of homes at the outskirts of Commune VI (Mediacom, 2008).

Table 1. Bamako Population Projections by Commune

	Growth Rate	2009	2010	2011	2012	2013	2014	2015
C I	5.1%	335407	352956	371424	390858	411309	432830	455477
C II	2.2%	159805	163360	166993	170708	174505	178387	182355
C III	2.4%	128872	132002	135209	138493	141857	145303	148832
C IV	4.4%	300085	313584	327689	342429	357833	373929	390749
C V	7.5%	414668	446964	481775	519298	559743	603338	650329
C VI	7.1%	470269	504872	542021	581904	624721	670689	720039
Bamako	4.8%	1 809 106	1 913 738	2 025 112	2 143 690	2 269 968	2 404 475	2 547 780

Source: RGPH (2009)

Like the rest of Mali, Bamako has a young population, with 61 percent of all males and more than two-thirds of all females under the age of 25 (RPGH, 2009). Over two-fifths of the city's population consists of women of reproductive age (15-49), of which 85 percent are married. Over 75,000 births are expected annually in Bamako, and the crude birth rate is about 42 births for every 1,000 Bamakois, which is lower than the national average of 45 births per 1,000 people (DHS, 2006).

II. DATA ANALYSIS

2. Health Facilities and Services in Bamako

2.1. Health Facilities

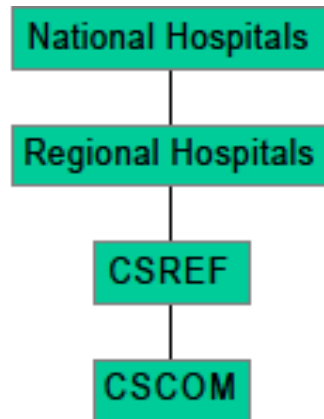
The city of Bamako has 52 primary level community health centers (CSCOM), six referral centers (CSREF) and five tertiary hospitals.⁵ There are no secondary hospitals in Bamako. The tertiary hospitals are: *l'Hôpital Gabriel Touré (HGT)*; *l'Hôpital Point-G* and *l'Hôpital Kati*; and two other specialty hospitals, the National Center for Odontostomatology, or *Le Centre National de l'Odonto-stomalogie (CNOS)*, and the Institute of African Tropical Ophthalmology (IOTA), or *l'Institut d'Ophthalmologie Tropicale d'Afrique (IOTA)*. In addition, there is a private hospital that specializes in maternal and child health called the Luxemburg Hospital for the Mother and Child, or *l'Hôpital Luxembourg de la Mère et de l'Enfant*.

Like regional hospitals, national hospitals are Public Hospital Establishments (EPH) that are managed by a board of directors and supervised by the Ministry of Health's Special Services Directorate. The regional health directorate (DRS, or *Direction Régionale de la Santé*) coordinates the activities of all referral health centers (CSREFs, or *Centres de Santé de Référence*) in the District of Bamako. The CSREFs, in turn, have a supervisory role over the activities of community health centers (CSCOMs, or *Centres de Santé Communautaire*). On the administrative-political front, health service management is one of the responsibilities that the central government has transferred to local governments. Law 95-034 of 1995, on local governance in the Republic of Mali, which was modified by Law 98-010 of 1998, assigns different health responsibilities to different local units. Thus, the six communes of Bamako are responsible for both the community and the referral health centers (CSCOMs and CSREFs, respectively).

Figure 4 is a hierarchical diagram of the health care system in Mali; Table 2 below indicates the number of health care facilities in Bamako.

⁵ All of Bamako's six CSREFs were visited to complete data and document collection.

Figure 4. The different levels of the Malian Health System



Source: IIF (2004).

Table 2. Bamako District Health Facilities

	CSCOMS						Total CSCOM	Total CSREF	National Hospitals
	I	II	III	IV	V	VI			
Number of functioning facilities	10	5	8	9	9 ⁶	11	52	6	5
Number of facilities needing updating or rehabilitation	2	3	0	1	4	3	13	2	0
Number of new facilities to construct	3	1	2	3	4	5	18	1	0
Number of private facilities	17	27	18	28	47	34	171 ⁷	0	1

Source: DRS (2008) (p. 16); interviews, and visits.

Given Bamako's many health care facilities, one would expect Bamako residents to have access to quality care. The reality, however, is that the city's health care facilities all suffer from the lack of equipment and properly trained staff. Moreover, access to drugs in pharmacies is often limited by inconsistent supplies.

In addition, although residents in all six communes live within five kilometers of a primary health care facility, all three central hospitals are located in Commune III, which happens to have the smallest population. There are plans to build a hospital in Yirimadio, in Commune VI (on the right bank of the Niger River).

2.2. Health Services

In 1987 African health ministers gathered in Bamako to establish the Bamako Initiative, which urged African health ministries to provide greater access to health care services and essential

⁶ Five additional community health associations (ASACO) have been formed, but none manages a CSCOM.

⁷ In addition to the 171, there are 19 para-public health facilities.

medicines in their respective countries. It also called for the decentralization of the health sectors in each country and for improved access to essential drugs, largely through community participation in revolving drug funds.⁸

This formal agreement was adopted officially into Mali's national health care policy, and the Ministry of Health subsequently outlined strategies in health care planning, budgeting and systems management (Ministry of Health, 1989). In 1994, an inter-ministerial decree decentralized management of the health sector. Each regional health district was given autonomy in the planning and implementation of individual activities at the district (*cercle*), commune and primary health care center (CSCOM) levels (Ministries of Health, Territorial Administration and Finance, 1994).

According to care-seeking standards established by Bamako's public health sector, the following referral structure would be adhered to, starting at the local level:



However, those seeking care do not always follow this structure. Although there is a paucity of literature on health care-seeking behaviors in Mali, it is known that many care-seekers go directly to secondary care facilities or even to the hospital. Many Bamako residents bypass primary care facilities because they have greater trust in the care that they receive at secondary or tertiary facilities, even though they end up paying higher consultation and transport costs. Health care personnel at *Gabriel Touré* hospital, for instance, stated that they are overwhelmed with cases that could be treated at the primary or secondary level. Additionally, some care-seekers first visit traditional healers, and when their condition worsens, they then consult medical care in the public or private sector, a sequence that delays treatment.

Primary Level

Community health centers (CSCOMs), intended to be the first point of contact for any care-seeker, offer the minimum provision of basic care and services, known as *paquet minimum d'activités* or PMA. Specifically, a PMA provides basic preventative and curative services in maternal and child health. As stated above, the primary challenges CSCOMs face are insufficient equipment and lack of qualified staff. Staffing levels are determined by the size of the catchment area; across Mali, CSCOM catchment areas generally cover between 5,000 - 20,000 people; in urban areas, however, CSCOM catchment areas may include up to 60,000 people.

Secondary Level

As needed, CSCOMs refer patients primarily to the CSREFs, where available services include: pre-natal consultations; maternity wards; post-natal consultations; pediatrics; family planning; vaccinations (including an expanded immunization program); surgical care; post-operative care; hygiene brigade (an ecological sanitation section of the health department); laboratory; ophthalmology; stomatology; and pharmacy.

⁸ A revolving drug fund is a drug sales program in which revenues from drug fees are used to replenish drug supplies.

The quality of care at each CSREF varies, depending on a specific facility's capacity. For example, Commune III does not have a maternity ward or surgical theater and thus refers patients requiring these services to other CSREFs or to the HGT. Laboratory standards for health facilities include the capacity to perform serology, biochemistry, CD4 counts, and to handle urine and stool samples. The ophthalmology unit treats cataracts and glaucoma, and, in Commune V, conducts up to 20 surgeries per month. Voluntary counseling and testing for HIV (VCT) is also available at both the CSREF and CSCOM levels.

CSREFs also have supervisory authority over the activities of the CSCOMs. Every five years, CSREFs draft new socio-cultural development plans (PDSCs), which outline the municipalities' development needs and generate a strategy and budget for achieving them. In turn, the Regional Health Directorate of Bamako, the district boards (*conseil du cercle*) and the regional assembly are ultimately responsible for CSCOMs, CREFs and the regional hospitals. All hospitals in Bamako are national hospitals, which constitute the third, or top level of referral.

Tertiary level

These hospitals are equipped to accommodate the most severe illnesses and conditions. They are managed autonomously as Public Hospital Establishments (EPH), or *Etablissements Public Hospitalier*, in French.

2.3. Human Resources

Qualified and appropriately staffed medical personnel are essential to providing quality health services. For nearly a decade, the Ministry of Health (MOH) has been trying to develop a national policy for human resources in the health sector. An ambitious document, entitled *Politique du Développement des Ressources Humaines pour la Santé 2008-2011*, has been compiled by the MOH to improve human resource training throughout Mali. However, given the scarcity of financial resources, the MOH has not yet been able to convert the policy to practice. Regardless, the MOH hopes this document will soon be validated for execution, as it has been waiting for more than 15 years to address such issues affecting medical personnel as improved worker training and incentives.

According to WHO (2004a), norms for medical staffing in Africa include the following: one doctor for every 10,000 inhabitants, and one midwife and one certified nurse for every 5,000 inhabitants. These norms have been surpassed in Bamako's public health care sector, particularly if the private sector's doctors and nurses are also considered.

The National Health Directorate indicates that 54 percent of primary level health staff in Bamako are civil servants supported by the MOH, one-third are paid by the local Community Health Association (ASACO), nine percent are funded at the national level by debt relief funds (PPTE), and six percent are supported by taxes collected at the municipal level and attributed to the CSREF (MOH DNS-SLIS HR, 2008). The allocation of the national health budget is shown in Figure 10.

It should be noted that Table 3 does not include health care personnel at the tertiary level. Moreover, the distribution of qualified medical staff in referral health centers (CSREFs) and

community health centers (CSCOMs) is unequal; for example, only three of Commune III's 11 doctors work in the municipality's eight CSCOMs.

Table 3. Public Health Sector Human Resources

	I*	II	III	IV	V	VI	TOTAL	DRS	Hospitals	Needs
Doctors	28	12	11	22	31	19	123	13	201	41**
Health Engineers	1	1	1	0	1	1	5	5		
Medical Assistants	7	12	12	19	24	18	92	3	128	4
Midwives	43	34	13	54	56	54	254	10	NA	
Nurses	55	29	51	58	75	49	317	2	333	223
Senior hygiene/sanitation technician	2	2	2	0	0	3	9	2		
Senior laboratory technician	2	3	3	1	3	0	12	0		
Laboratory technician	4	4	3	10	7	9	37	0		
Hygiene/sanitation technician	0	0	0	8	0	0	8	1		
Secretary	4	2	3	4	7	6	26	5		
Accountant	6	10	6	6	5	11	44	4		
Drivers	5	4	2	6	8	7	32	7		
Other support staff ⁹	90	88	54	100	156	107	595	19	123	30
Total	247	201	161	288	373	284	1554	71	785	298

Note:

*Communes include CSCOM & CSREF levels.

** To include: 14 general practitioners, 6 public health specialists, 5 obstetricians/gynecologists, 5 pediatricians, 5 anesthesiologists, 3 traumatologists, 3 radiologists, 2 surgeons, 2 gastrologists, 1 ENT (ear, nose, throat) specialist and 1 dentist, as well as 5 information-technology specialists, 1 health administrator and 3 surgical assistants.

Source: DNS-SLIS Human Resources, S. Diarra (2008), DRS (2008) p. 6-8.

Medical Professional Training

Each year, approximately 400 medical students in Mali are trained to become doctors at the *Faculté de Médecine*, located in Bamako. Annual training fees are subsidized, and students contribute 5,000 CFAF (about \$12 per year). Students also receive a monthly stipend of 26,500 CFAF (\$63.60). Pharmacists, laboratory technicians, medical assistants and other health care professionals are also trained at the *Faculté de Médecine*. Lower level training takes place at various institutions throughout the city, and there are more than 10 schools where one can learn to be a nurse's aide (*aide-soignant*).

Transportation Challenges

While all health sector vehicles are financed by the government, transportation to health care facilities is another difficult challenge Bamakois face. Each commune has drafted a document that outlines a standard transport procedure when a laboring woman at a CSCOM is in distress and requires referral care. Unfortunately, few communes have functional ambulances.¹⁰ Therefore many sick rely on public transportation to access medical care. Public vans follow standard routes for 125 CFAF (\$0.30), but make many stops and often require passengers to

⁹ Includes cashiers, laundry cleaners, gardeners, maintenance personnel, guards and the hygiene brigade, a team of ecological sanitation workers.

¹⁰ For example, at the time this needs assessment was conducted, Commune V had four ambulances, but only one was in working condition.

make multiple transfers before arriving at a final destination. They also are uncomfortably crowded and unsafe. Chartering yellow taxis is more expensive, ranging between 750 and 2000 CFAF per ride (\$1.80-4.75), depending on the distance and time of day. This cost is beyond the means of many families in Bamako, particularly when they also anticipate high hospital bills and the cost of prescription drugs.

Poor infrastructure also negatively affects access to health care in Bamako. Many roads are unpaved and difficult to navigate, particularly between May and October, during the rainy season. Sudden torrential rains result in flash floods, and few roads have proper drainage, rendering even main roads temporarily impossible to navigate. The Niger River provides an additional obstacle for those residing in Communes V and VI who need to reach a tertiary care center, since they are on the opposite side of the river from the hospital. Only two bridges connect the left and right banks of the city; a third, now under construction further downstream, will improve circulation, but currently, rush-hour traffic jams prevent the timely passage of any vehicle. In response to the large numbers of Bamakois residing in Commune VI and needing to traverse the bridge to Communes I, II and III on their daily commute, one bridge has mandated one-way traffic from 7 - 9am, and in the opposite direction from 4 - 6pm. Therefore, those wishing to travel against these commuters in pursuit of emergency care are required to cross the other bridge, adding several gridlocked kilometers to their travel time.

National /Municipal Level Responsibilities

National Hospitals in Mali (Point G, Gabriel Touré and Kati), are managed by boards of directors and are supervised by the Ministry of Health's Special Services Directorate. Each district in Mali has a Regional/District Health Directorate (DRS/DDS), CREFs and CSCOMs. The CREFs act as links between the community health centers (CSCOMs) and the regional hospitals. Bamako District has a special status, in that individual communes are responsible for the management of CSCOMs as well as of CSREFs.

ASACOs are charged with the general management of CSCOMs (under the supervision of the municipalities). In Bamako, as compared to elsewhere in Mali, ASACOs tend to be well organized and committed to upgrading the capacity of their CSCOM. They pay for some of the staff salaries and for most of the equipment. Funding for CSCOMs and CSREFs comes from the cost recovery system from grants and subsidies provided by the central government and decentralized bodies and from diverse local, regional and national partners.

The MOH, conforming to the Convention on Mutual Administrative Assistance, is responsible for providing and maintaining health care facility infrastructure, providing an initial stock of drugs to each facility and assigning health care personnel as needed. The supply of essential drugs to the CSCOMs and CSREFs follows the government's master plan for supplying essential drugs, which go from People's Pharmacy of Mali (PPM, or *Pharmacie Populaire du Mali*) central warehouse to the circle distribution depot (DRC) and from there to the CSCOMs. The District of Bamako, given its lack of DRC and the proximity of the PPM warehouses, does not follow the same channels; there, the CSCOMs and the CSREFs are supplied directly by the PPM (*Pharmacie Populaire du Mali*). When a health facility is inaugurated, a one-time drug supply is provided by the government to stock the facility's pharmacy. The government presupposes that this supply will allow the pharmacy to become self-sustaining, as care-seekers generate revenue

for the pharmacy by paying for non-essential drugs. However, many health care administrators and pharmacy staff do not believe that this stock, usually valued at 20 million CFAF (\$48,077), is sufficient to properly fund a pharmacy.¹¹ Therefore, health facilities are often forced to spend revenues on stocking their own pharmacies.

In the next three sections, this report presents an analysis of the current situation in Bamako pertaining to each health-specific MDG.

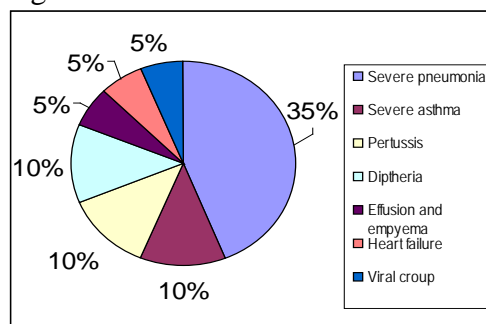
3. Child Health

3.1. Child Morbidity and Mortality

Child morbidity and mortality are pressing issues. According to 2006 DHS data, the infant mortality rate was 66 deaths per 1,000 births, and the under-five mortality rate was 108 deaths per 1,000 births. This means more than one in 10 children in Bamako did not reach his or her fifth birthday in 2006 (DHS, 2006).

Malaria, diarrhea, acute respiratory infection (ARI) and malnutrition are the primary diseases afflicting children. In 2006, eight percent of children under five in Bamako suffered from diarrhea, 8.2 percent had symptom of ARI and 14.8 percent had fever during the two weeks prior to the survey (DHS, 2006). Figure 5 illustrates the diagnoses of ARI referrals in 2007.

Figure 5. Distribution of Child ARI Referral Cases in Bamako City in 2007



Source: MDG Center (2008).

Yet not all Bamakois families are able to access health care for their sick children. The 2006 DHS cites that only 52.6 percent of all children with ARIs received care in either the public or private sector, and only 45.8 percent received care for a fever. In the future, the health sector will need to identify obstacles to care-seeking, and local health facilities need to develop strategies to reach a greater percentage of the city's population.

National policy attempts to reduce malaria morbidity and mortality by providing arthemisinin combination therapy (*combinaison thérapeutique d'arthémésinine* in French, or CTA) and quinine perfusion kits to all pregnant women and children under five during visits to health facilities.

¹¹ Pharmacist, Ségou Regional Hospital (2008).

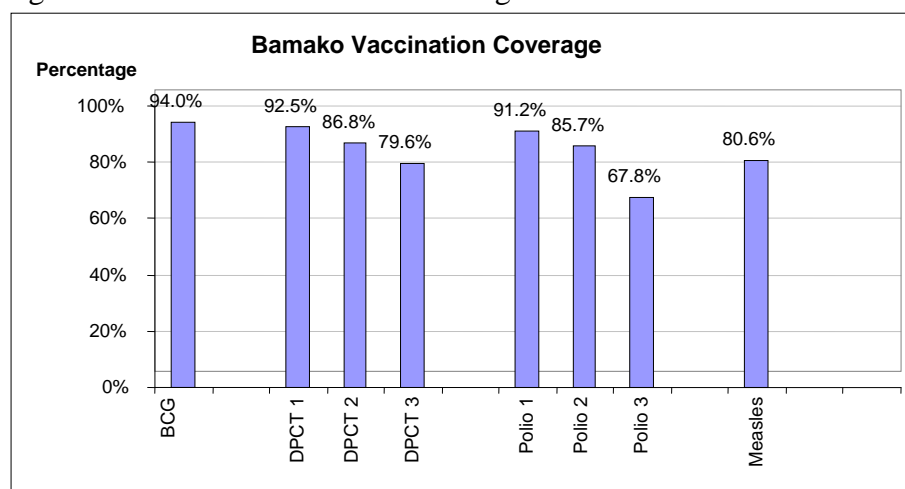
Data on municipal-level rates of malnutrition were not available, but informal surveys at child CSREF growth monitoring departments indicate that about six in 10 children are underweight, with one in 10 being severely malnourished.¹² UNICEF, via regional health directorates, provides CSREFs with supplementary foods for these children, such as fortified milk and a peanut paste called Plumpy'nut®.

Malnutrition is typically measured according to three anthropometric indices of nutritional status: height-for-age, weight-for-height and weight-for-age. Using the height-for-age measure, the 2006 DHS shows that 23.2 percent of children in Bamako were stunted, with 10 percent severely stunted. The survey also reveals that 14.3 percent were considered too thin, or wasted, and 19.4 percent were underweight.

In terms of micronutrient intake, a high number of children in Bamako suffer from vitamin A deficiency (VAD), a leading cause of childhood blindness that also increases the severity of diseases such as measles and diarrhea. According to the 2006 DHS, 81.1 percent of Bamakois children under five received vitamin A supplements in the six months preceding the survey. Anaemia, characterized by a low level of hemoglobin in the blood, is also a major health problem, with 65.7 percent of Bamakois children under five classified as having anemia in 2006 (DHS, 2006).

As Figure 6 indicates, more than 80 percent of children have had essential vaccinations, which are furnished at no charge by the DRS and are distributed via cold chain (a refrigerated transport and storage system that must be in place to keep the vaccines effective) to CSREFs and CSCOMs. According to WHO guidelines, a child should receive the following vaccinations: one dose of Bacille Calmette-Guérin BCG; three doses each of DPT-HB (Diphtheria with Hepatitis B) and polio vaccine; and one dose of measles vaccine. Many young children in Bamako do not complete all these essential vaccinations, indicating that more needs to be done to ensure that the schedule of vaccinations be monitored and completed in every case.

Figure 6. Bamako Vaccination Coverage



Source: DHS (2006).

¹² Information obtained from staff at CSREF Commune II (2008).

4. Maternal Health

Data on maternal mortality are only available at the national level. DHS data indicate that in 2006 there were 464 maternal deaths per 100,000 live births in Mali (DHS, 2006), a figure that compares favorably to the 710 maternal deaths per 100,000 live births in sub-Saharan Africa recorded in 2005. Causes of maternal mortality include inadequate postnatal care and poor access to emergency obstetric care.

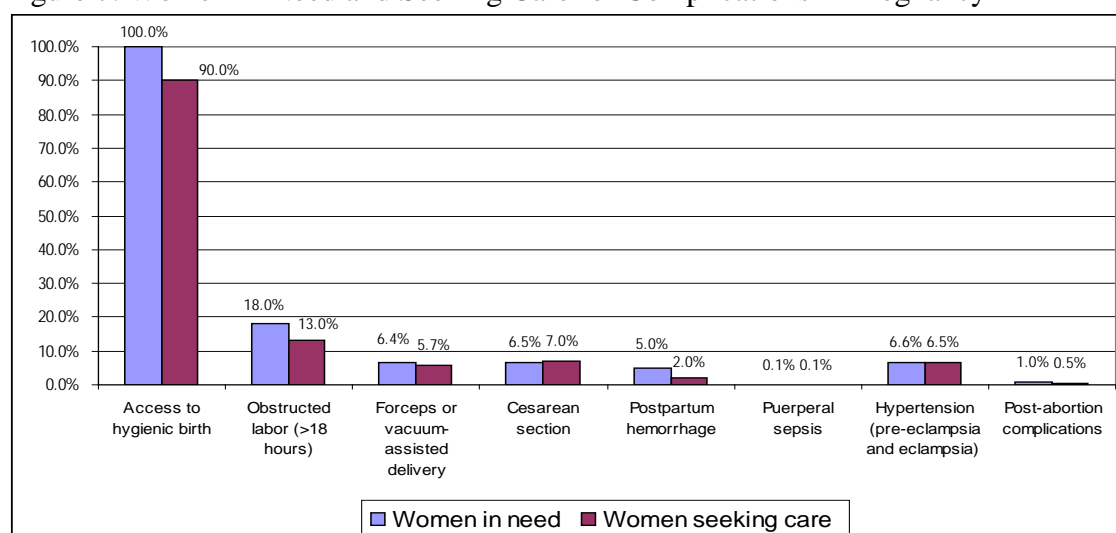
4.1. Antenatal and Postpartum Care

Mali's national reproductive health policy commits to providing free antenatal care to all pregnant women. Between 2001 and 2006, 94.2 percent of pregnant women received prenatal care from a trained health professional, but only 46 percent of all women made the suggested three visits over the course of their pregnancies (DHS, 2006; Rapport Bamako, 2008). Postnatal care is critical because most maternal and neonatal deaths occur during the first 48 hours after delivery. During the 2001-2006 period, 50.6 percent of women in Bamako who gave birth outside a health facility did not receive postnatal check-ups.

4.2. Emergency Obstetric Care

To reduce maternal mortality rates, access to obstetric care needs to improve, particularly for complicated or high-risk pregnancies. Cesarean sections are provided free of charge by the government, and the cesarean rate in Bamako is higher than for the rest of Mali, perhaps because it is the site of the only safe blood-banking center in the whole country. According to the Mali 2006 DHS, 6.5 percent of births in Bamako were delivered by cesarean section, while only 2.2 percent of births in other cities were delivered by cesarean section (DHS, 2006). However, there are many possible reasons for needing improved access to secondary care in the event of a complicated pregnancy. Figure 7 shows the percentage of women in need and seeking care for various pregnancy complications. Data on forceps- and vacuum-assisted labor, cesarean, postpartum hemorrhage and hypertension rates for those seeking care were collected from the *Gabriel Touré* hospital maternity register, while the service need was derived from DHS, WHO and DNS estimates.

Figure 7. Women in Need and Seeking Care for Complications in Pregnancy



Sources: DHS (2006), National Model, HGT Maternity Register (2006-07), DNS (2006).

To reduce maternal mortality due to malaria, at every antenatal visit, the government gives mothers insecticide-impregnated mosquito nets (MII); treatment kits for malaria, including CTA and quinine perfusions; and sulfadoxine pyrimethamine, an intermittent preventive treatment for malaria. However, only four in five pregnant women in Bamako reported receiving the sulfadoxine pyrimethamine prophylaxis (DHS, 2006). This same proportion of women reported that they had received voluntary counseling and testing for HIV during their visits, which indicates that the scale-up of Prevention of Mother to Child Transmission (PMTCT, or *Prévention de la Transmission Mère Enfant du VIH*) services within Bamako was not yet complete. HIV among pregnant women is relatively low, estimated at between 2-3 percent in the 2006 Mali DRS report (DRS, 2006; CROCEP, 2007).

4.3. Fistula

Fistula most often occurs in women during childbirth, when the vaginal walls deteriorate and create openings to the urethra or intestines. Women with fistula experience difficulties in performing daily activities, due to incontinence and discomfort. Fistula treatment is performed only at tertiary facilities, which do not fall into municipal-level health care planning. In 2006, 0.1 percent of women of reproductive age (15-49) in Bamako reported having fistula. Since then, fewer than 50 cases have been treated at HGT (CROCEP 2007). Still, it is difficult to determine how many fistula cases actually exist in Bamako, given that those treated include some from outside Bamako district who were referred to health care facilities within the city.

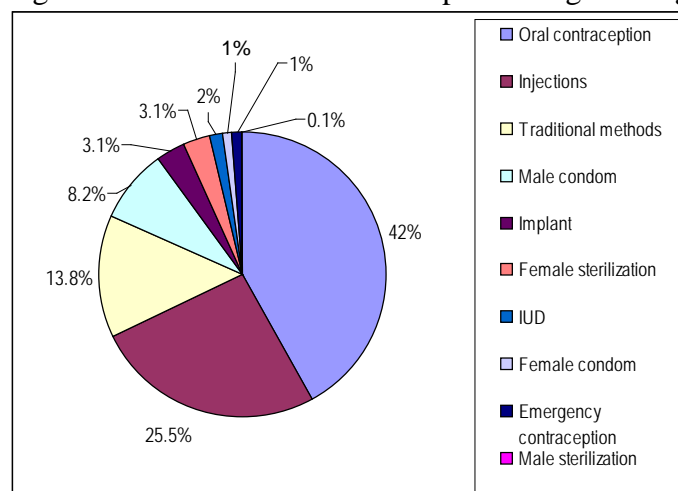
4.4. Family Planning

The crude birth rate in Bamako in 2006 was 42.2 births per 1,000 people. Contraception utilization rates have not shown significant increases over time; indeed, the usage would seem to have decreased. In 2001 23.5 percent of women practiced family planning, with 19.2 percent using modern methods and 4.3 percent using traditional methods (DHS, 2001). However, in 2006 only 16.9 percent were using modern methods, and 2.7 percent were using traditional

methods (DHS, 2006). The decrease in contraceptive use rates could be explained by either shortages of contraceptive products at public sector facilities, or by poor data collection at the level of the public, para-public and private structures. In any event, there is a need to investigate the lack of family planning in Bamako. Ensuring women's private and consistent access to safe contraception will help.

A number of women prefer accessing contraception in the private sector, where it can be obtained more discreetly. This obviously results in unrecorded utilization of contraceptive methods. CSREF personnel revealed that some public-sector family planning providers administer contraception—mainly implants or injections—to women off-the-record and after hours, so that the intervention may not be traceable by or known to the women's husbands.¹³ Condoms are used less frequently. Qualified personnel are required to administer the more permanent and less visible family planning methods, such as implants and intra-uterine devices (IUDs). Several CSREFs noted that their facilities lacked individuals properly trained in these family planning methods and that therefore the services could not be offered.¹⁴

Figure 8. Distribution of Contraception Usage among Bamako Women



Source: DHS (2006).

To reduce high-risk pregnancies, unwanted births and infant mortality rates, Bamako health authorities must promote family planning and increase the accessibility of family planning methods by training more health personnel to administer implants and IUDs. City health authorities must also ensure consistent contraceptive stocks.

5. HIV/AIDS, Malaria and Other Diseases

As stated above, malaria is a principal cause of deaths in Bamako, and tuberculosis (TB) is another important public health problem. Children and pregnant mothers are particularly susceptible to contracting malaria, and many pregnant women and children die from the vector-

¹³ Information obtained from staff at CSREF Commune VI (June 2008).

¹⁴ Information obtained from staff at CSREF Commune III (June 2008).

borne disease each year. Bamako's TB burden is also higher than the national average and needs to be reduced. Finally, while Bamako is not experiencing a generalized HIV/AIDS epidemic, continued attention to this public health threat will be needed to keep prevalence levels low.

5.1. Malaria

Bamako's location along the Niger River places the city's inhabitants at risk for malaria year round. This risk is heightened during the rainy season from May through October. Malaria is not only the primary cause of morbidity and mortality in children under five, but also the primary cause for workplace absenteeism (PNLP, 2006). In 2006 the annual incidence of malaria was estimated at 111 cases per 1,000 people (DNS, 2006).

The PNLN has drafted a five-year strategic plan (2007-2011) to combat malaria. The plan's objectives are: taking charge of those sick with malaria; preventing malaria during pregnancy; vector control; fighting against malaria epidemics; communication and social mobilization; operational research; monitoring and evaluation; and institutional support. This plan falls under the national health and social development program (PRODESS or *Programme du développement sanitaire et social*).

Prevention

According to the 2006 DHS, 54 percent of all households in Bamako had at least one mosquito net. It is unclear who was using the nets in the households, how the household residents were using the nets and whether or not the nets had been treated with insecticide. The PNLN strategic plan has promised that all mosquito nets may be re-impregnated with insecticide free of charge at primary health centers (the latest treatments last up to five years). However, this effort has not yet been coordinated effectively. Communes V and VI report household usage rates at 47 and 88 percent, respectively (Rapport Bamako, 2008), indicating sporadic distribution. Further, while about three-fourths of all infants under one year receive insecticide-treated mosquito nets (ITNs), only three percent of all children ages 1-5 making regular pediatric visits received ITNs in 2007. The report cited difficulty in determining an efficient method of distribution to this age group, given that many young children do not visit the pediatrician on any kind of regular basis (DRS, 2008).

Treatment

Only five percent of the 111 cases recorded in 2006 were confirmed by laboratory test; about 95 percent were malaria *Plasmodium falciparum*.¹⁵ Approximately one percent were so severe that they needed referrals, and one in 10 referred cases required a blood transfusion (DNS/DRS, 2006). However, despite the fact that malaria has been endemic for centuries, no conclusive data on prevalence or confirmed cases have been made available.

5.2. Tuberculosis (TB)

Bamako's detection rate for tuberculosis (the number of confirmed TB cases divided by the number of estimated cases) is 70 percent, while the national detection rate average is 29 percent.

¹⁵ According to the Sanger Institute, "the most deadly of the four *Plasmodium* species that cause human malaria is the protozoan parasite *Plasmodium falciparum* (2008)."

Currently, tuberculosis can only be tested for at the CSREF level; however, treatment is available at CSCOMs, with care-seekers paying only for transport to the facility (PNLT, 2007; INRSP, 2008).¹⁶ For cases where TB patients express difficulty in reaching health centers for their treatment regimen, health workers will travel to the patients' homes to deliver the drugs. Local trainings for health care workers have been conducted to improve treatment outcomes for TB patients. This training includes educating family members or neighbors to encourage regular hospital visits and regime adherence.

While most TB patients are on first-line treatment (funded by the Global Drug Facility [GDF]), patients with recurrent TB or failed treatment are considered candidates for second-line treatment, supported by the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFATM). In addition, multi-drug resistant tuberculosis (MDRTB) is a threat to Malians' health; at the time this research was carried out, there were 33 known patients nationwide with confirmed MDRTB. In addition, about one in five TB patients has other special health problems, such as being HIV- or Hepatitis B-positive, pregnant or diabetic (INRSP, 2008). However, the direct-observed therapy short-course advanced strategy (DOTS+) has proven effective in encouraging people diagnosed with TB to start treatment (roughly 99 percent pursue treatment when DOTS+ is available), and 85 percent of these complete a successful treatment regimen (DRS, 2008; INRSP, 2008).

5.3. HIV/AIDS

In recent years the Government of the Republic of Mali has explicitly tried to create a political environment favorable to the fight against HIV/AIDS. While the country's prevalence in 2005 was only 1.7 percent, which is relatively low compared to other sub-Saharan countries, the government has taken this relatively low prevalence as an opportunity to prevent the disease from spreading further. On April 7, 2004, the Malian government announced its commitment to providing anti-retrovirals (ARVs) to all persons living with HIV/AIDS (PLWHA) without discrimination and at no cost.

Prevention

All Malians are entitled to voluntary counseling and testing, and once scale-up is complete, this will be possible at the primary level. Currently in Bamako, only Communes III, V and VI offer voluntary counseling and testing at the CSCOM and CSREF levels.¹⁷ However, any Bamakois can access voluntary counseling and testing at a central hospital. After completing a test for HIV, all persons must be retested three months later to confirm their status. Bamako's HIV prevalence is comparable to that at the national level, at 1.9 percent and 1.7 percent, respectively. But the higher mobility of the Bamakois population, coupled with low condom use and the frequency of levirate and sonorate marriages,¹⁸ makes HIV prevention a major health priority (DHS, 2006).

¹⁶ Including interviews with Dr. Berthe Mohamed, of PNL, and Dr. Isak Mamby Touré, at INRSP.

¹⁷ However, HIV tests that are part of PMTCT do exist at most CSCOMs throughout Bamako, with laboratory specimens sent to higher levels for analysis.

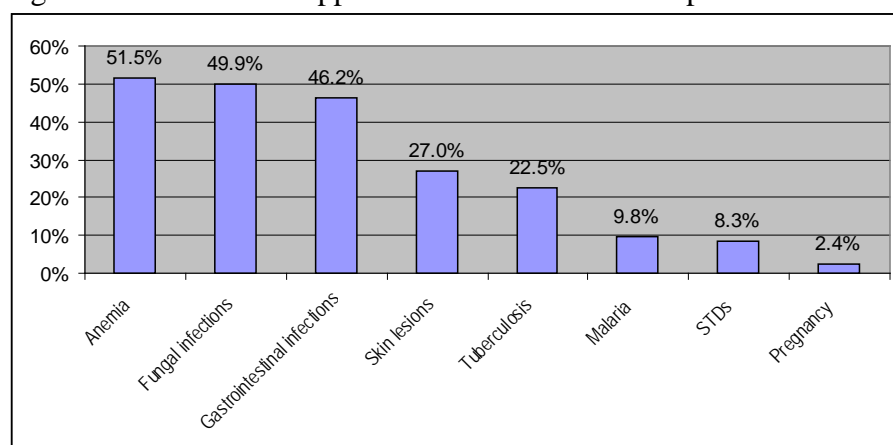
¹⁸ Marriages of widowed partners to family members of the expired spouse.

Treatment

In 2007 there were about 16,500 PLWHA in Bamako (CCSLs, 2007). About 72 percent of these persons were in need of ARV treatment; 11,300 PLWHA have been initiated on ARVs in Bamako, with 7,760 followed regularly (CCSLs, 2007). Currently, 99.4 percent of all persons on ARVs are on first-line treatment, with the rest on second-line treatment. The current number of HIV-positive children under 15 in Bamako is unknown. However, it is known that there were 730 children on ARVs in 2006 and 928 in 2007, with approximately 95 percent of them on first-line treatment (Ministry of Health, 2006; CCSLS, 2007). The Sectorial Coordinating Unit for the Fight against HIV/AIDS (CCSLs) within the Ministry of Health estimates that up to 20 percent of children will need second-line treatment going forward.

To establish an effective ARV regimen, national policy recommends that all PLWHA submit to the following tests two to three times annually: CD4 count, viral load, blood count, creatine, ALAT, cholesterol, tuberculosis and glycemia (CCSLs interview, 2008). However, insufficient laboratory equipment and technical capacity to perform some of these tests at many health facilities require that these places send their results to better-equipped facilities.

Figure 9. Incidence of Opportunistic Infections and Special Needs for PLWHA



Source: ARCAD-SIDA (2007).

Concerning psychosocial support, 80 percent of all people living with HIV/AIDS would like to receive care in the comfort of their own homes. This practice would reduce the stigma of visiting HIV care units (USAC or *Unité de Soins, d'Accompagnement et de Conseil*) and may improve adherence to drug regimens. However, only 28 percent of PLWHA receive home care. Currently, the community capacity to provide both HIV and opportunistic infection (OI) care locally is limited, and health care workers providing this care are not able to meet the needs and desires of the PLWHA population (ARCAD-SIDA 2007).

5.4. Waterborne and Communicable Diseases

The MOH has initiated several programs to control and prevent waterborne and other communicable diseases. For instance, the national program to combat schistosomiasis¹⁹ aims to

¹⁹ Schistosomiasis is a parasitic disease with a low mortality rate but with the capacity to damage internal organs and to impair growth and cognitive development in children.

reduce the spread of this disease which was successfully controlled in the 1980s and 1990s . The main control strategy used in Mali has been mass treatment with the drug praziquantel, and the focus has been on treating school-age children. The government would like to treat at least 75 percent of all primary schoolchildren by 2015. A national program for elimination of lymphatic filariasis trachoma and onchocerciasis has also been established. Strategies include community mobilization through Information, Education and Communication (IEC) sessions, vector control through insecticide-treated mosquito nets and improving the availability of filarial drugs *albendazole* and *ivermectine*. There is also a national program to combat leprosy.

5.5. Mental health

Addressing mental illnesses and disorders is an important field in public health, and global health experts have struggled to develop sound metrics for assessing mental health (Chisholm et al. 1996). As is the case worldwide, a Malian woman's post-partum depression impacts her infant's health outcomes. More generally, depressed persons are less likely to adhere to their prescribed drug regimes, and those afflicted by mental health disorders inhibit socioeconomic productivity.

To successfully combat these diseases at the municipal level, more data on incidence and prevalence must be gathered, and finding new reliable diagnostic methods will be paramount. Additionally, health sector efforts must attempt to educate personnel about the implications of mental health for individuals and society, if any mental health program is to be successful.

6. Cost and Financing of Public Health Care

In order to meet the Millennium Development Goals (MDGs), the Bamako public health sector requires effective and efficient resource allocation. Table 4 outlines the 2007 budget for Bamako and the five national hospitals located in the city. It should be noted, however, that these national hospitals serve all Malians, not just the population of Bamako City itself.

Table 4. Bamako Health District and Hospital Budgets 2007 (CFAF in thousands)

	Expected Budget	Amount received	Expenses made	Expenses justified	Balance	Operations	Investment
Bamako District	3,721,916	2,619,875	2,556,237	2,511,119	63,638	2,479,075	77,162
HGT	3,917,227	5,140,382	5,140,382	5,140,382	0	4,863,382	277,000
H Kati	1,301,003	1,269,753	1,269,753	1,269,753	0	1,004,803	264,950
H Point G	3,682,989	3,746,102	3,746,102	3,746,102	0	2,909,852	836,250
CNOS	1,449,327	1,462,125	1,461,779	1,461,779	346	1,167,625	294,154
IOTA	1,357,498	1,707,447	1,508,550	1,353,494	198,897	1,106,022	402,528
TOTAL	15,429,960	15,945,684	15,682,803	15,482,629	262,881	13,530,759	2,152,044

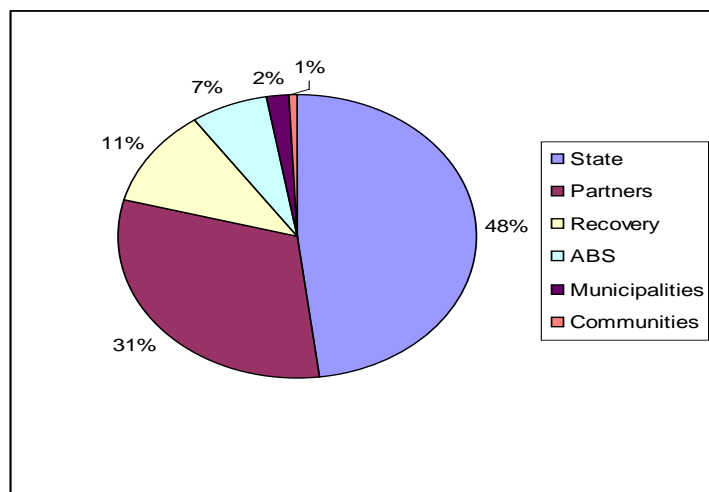
Source: Ministry of Health, DAF (2008).

The MOH's 2008 Administrative and Financial Directorate DAF report states that in coming years, the national government will continue to fund almost half of the total national health

budget, although nearly one-third of all funds will come from international partners.²⁰ The contributions of municipalities and communities remain negligible.

Some Bamakois families participate in local insurance groups (*mutualités*), but many residents cannot afford health insurance. Suggested solutions to increase the number of insured persons include: improving local micro-finance capacity in the short term; increasing formal sector employment opportunities; and developing a broader array of basic insurance schemes.

Figure 10. Anticipated Sources of National Health Budget, 2009



Source: Ministry of Health, DAF (2008).

Individual municipal budget breakdowns are available in documents called the *Conseil Régional d'Orientation de Coordination et d'évaluation des programmes sociosanitaires* (CROCEPs).²¹ Within these annual CROCEPs and five-year PDSCs, municipal governments and CSREFs must ask for funds to support their civil staff and infrastructure. Strategies for health program implementation and budgeting are derived from each commune's PDSC, which is drafted every five years to correspond with the national Poverty Reduction Strategy Program (PRSP). Some CSREFs have not yet submitted their PDSC plan for 2009-2013, although these were due in 2007.

If a municipality determines that another CSCOM is needed, an ASACO must be formed and mobilized. The ASACO will then work with the CSREF to request the necessary financing from the MOH.

Health Infrastructure Unit Costs

A specialized department within the MOH, *Cellule d'exécution pour les programmes de renforcement des infrastructures sanitaires* (CEPRIS²²), is charged with overseeing the construction of all public health facilities. Table 5 cites some construction unit costs, as

²⁰ The official donors are listed in Annex D.

²¹ CROCEPS is a planning exercise at the local level aimed at achieving a responsive national health program.

²² CEPRIS is the Department for Implementing Programs to Strengthen Health Infrastructure.

provided by the Ministry of Health in 2008 (including the costs of building new CSCOMs and CSREFs, and equipping and operating all facilities).²³

Table 5. Bamako Health Infrastructure Costs (CFAF in thousands)

	CSCOM	CSREF	Central Hospital
Unit cost of construction	56,100 (range 44,307- 75,000)	504,650 (range 480,000-800,000)	6,585,000 ²⁴
Unit cost for renovation	45,000	480,000	98,000
Operational and maintenance costs per unit	3,000	100,000	1,695,000
Rehabilitation costs (CSCOM to CSREF)	650,000	NA	NA
Costs to update equipment	12,000	250,000	NA
Operational and maintenance costs for referral equipment	2,500	30,000 ²⁵	NA

Source: Ministry of Health, CEPRIS (2008).

Personnel Costs

Civil servants receive salaries from the MOH according to the nationally designated rates. These rates are based on the level of training and the number of years in service. The annual salaries are shown in Table 6 using the 2008 exchange rate. About 54 percent of Bamako's public sector health personnel are civil servants; the remaining 46 percent of employees are generally paid within the same range, as municipalities and ASACOs can generally budget a similar amount. However, the PPTE-paid doctors may earn up to one-third more in wages. Private sector doctors do not have an established or set income, as they manage their own for-profit endeavors.

Table 6. Civil Servant Salary Rates in Mali

Class & category	A1 (Doctoral)	A3 (Master)	B1-1 (DEF +4)	B2-1 (Bac +2)	C1	D1
Type of personnel	All doctors	Pharmacists, medical assistants, Nurses (Certified)	Mid-wives	Matrons	Support staff	Other support staff
Starting Salary (CFAF)	2,268,000	1,326,780	812,700	922,320	570,780	NA
Starting Salary (US\$)	\$5374	\$3,144	\$1,926	\$2,186	\$1,353	NA
Salary after 10 years service (CFAF)	3,402,000	1,799,280	1,228,500	1,357,020	967,680	NA
Salary after 10 years service (US\$)	\$8,062	\$4,264	\$2,911	\$3,216	\$2,293	NA

Source: DNS-SLIS Human Resources, 2008; Ministry of Health, DAF (2008).

²³ In this needs assessment, CSCOM and CSREF unit costs were estimated using average reported construction costs in Mali.

²⁴ Estimate for Sikasso Hospital, 2008, because no central hospitals were built in Bamako in recent years.

²⁵ The 2008 cost per ambulance is 40,120,000 CFAF.

National budgets for human resources also include a 20-percent annual training cost per person. This projection includes pre-service training costs and assumes that additional personnel will enter the health care workforce in order to meet staffing norms appropriate to a growing Bamako population. However, the projection is low, as it also assumes that all personnel are in their first year.

Drug Costs

The People's Pharmacy of Mali (PPM or *Pharmacie Populaire du Mali*) procures drugs from international drug manufacturers and stocks them in Bamako warehouses. These drugs are then delivered to the regional headquarters, known as the *Distributeur Régional du Cercle* (DRC), where they are purchased at 1.15 times the cost of the original procurement. They are then transported to sales warehouses, or *depots de vente* (DV), where the price paid is 1.20 times the initial cost. Health facilities sell these drugs at self-determined prices, as long as these fall within the range of prices outlined in Decree 03-218 (Ministry of Health, 2003), which sets the limit of essential drug mark-ups on the DCI list at 1.3 times cost. Local health facilities are also free to purchase drugs from private companies throughout Mali, enabling them to avoid drug shortages if the central supply has run out. One Bamako pharmacist revealed that sometimes these drugs are less expensive than those purchased through the national drug supply chain. In 2007, the MOH also set a national policy restricting the drug mark-ups for private pharmacies (Decree 07-087).

The next section presents the results of the UNDP costing model.

III. RESULTS FROM THE UNDP COSTING MODEL

The UNDP costing model assumes that universal health care can be achieved by (1) providing communities with affordable, accessible, available and appropriate care; (2) expanding facility effectiveness; and (3) reducing morbidity and mortality, particularly amongst women and young children.

The main underlying assumptions of the model are:

- There will be political and financial stability in Bamako until 2015, and municipal, district and national governments will remain committed to attaining MDGs 4, 5 and 6;
- Donors and multilateral organizations will continue providing financial assistance to the public sector health facilities in Mali;
- Cost projections from 2010-15 assume the 2008 exchange rate. Inflation is not considered in these projections.

The model relies on country-specific unit costs, as well as regional unit costs derived from sources such as UNFPA.

In addition, to accommodate international and domestic shipping charges, a cost mark-up of 47.5 percent was included. Human resource needs were based on desired levels of service coverage. No estimates for capital and recurrent costs of a functioning commodity supply chain system

were included, due to lack of reliable data. Moreover, the model does not include cost estimates for HIV prevention and the creation and maintenance of a HIV-enabling environment.

The health sector costs per capita are outlined in Table 7.

Table 7. Health Sector Costs Per Capita (2010-2015, in US\$)

Per capita Costs (2010-2015), in US dollars							
	2010	2011	2012	2013	2014	2015	Average
MDG 4 - Child Health	4	4	5	5	5	6	5
MDG 5 - Maternal & Reproductive Health	1	1	1	1	1	2	1
MDG 6 - HIV/AIDS, Malaria and Other Diseases	5	6	6	6	6	6	6
Malaria Prevention	1	2	1	1	1	2	1
Malaria Treatment	0	0	0	0	0	1	0
Tuberculosis	1	1	1	1	1	1	1
HIV/AIDS	3	3	3	3	3	3	3
Facilities, HR, Health Systems	16	16	15	15	14	13	15
Cost per capita	27	28	27	27	27	27	27

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. Malaria, TB and HIV/AIDS costs will make up 21 percent of total costs, child health expenditures constitute 18 percent and maternal health costs contribute only five percent of total costs.

These estimates are on the low end for a city as large as Bamako but are still within the range of the Millennium Project estimates on a per capita basis, for scaling up health systems to meet the MDGs.

IV. CONCLUSION AND RECOMMENDATIONS

The World Bank has argued that it is unlikely Mali will achieve the health-related MDGs by 2015.²⁶ However, MCI estimates that with an average annual investment of \$27 per capita, serious political commitment and appropriate strategies, the city of Bamako can achieve the health-related MDG targets.

In recent years, immunization campaigns have improved the health of Bamako's children, but preventable diseases such as malaria, diarrheal diseases and ARIs persist. This is compounded by the fact that parents are not accessing care for their children. To address these issues, health authorities might consider strategies such as expanding public health and awareness campaigns conducted by community health workers. In addition to disseminating information, community health workers might also be trained to diagnose and treat such childhood diseases as diarrhea and ARI. Nutrition and feeding programs must also be expanded to address child malnutrition.

Bamako health authorities also need to sustain efforts to improve maternal health. Strategies that can be pursued to reduce maternal mortality rates include strengthening emergency obstetric care as well as antenatal and postnatal care. This will ensure the timely identification of high-risk pregnancies and appropriate follow-up. Safe blood needs to be available at frontline facilities, so that emergency cesarean deliveries can be carried out successfully. In addition, increasing the accessibility and acceptability of their family planning services has the potential to reduce the number of unwanted pregnancies. Efforts should therefore be made to further educate city residents about the benefits of family planning.

Malaria continues to adversely affect all members of Bamakois society, in particular vulnerable populations such as pregnant women and young children. It therefore requires the sort of full-scale frontal response that has yielded positive results in countries like Ethiopia and Tanzania. This includes improving access to and use of long-lasting insecticide-treated bed nets as well as enhancing timely and reliable testing, diagnosis and treatment. Efforts should also aim to reduce mosquito breeding grounds and flood-prone zones. Tuberculosis treatment strategies have proven effective, and successful efforts to treat TB patients using DOTS should continue. However, co-morbidity between TB and HIV/AIDS must be carefully monitored. In addition, continued HIV/AIDS awareness campaigns as well as efforts to increase prevention and promote screening will all be needed in order to keep Bamako's HIV prevalence low.

Concerning the financing of health care, Mali's central government continues to support heavily municipal facilities through the financing of both physical and human capital. This support prevents autonomy among these facilities. Among other concerns, national control has made it difficult to effectively implement a local health plan, for instance, when the head doctor (*médecin chef*) is suddenly transferred to another district without local input. Likewise, motivated ASACOs may be hindered from initiating care in a new health catchment if they must wait several years before the MOH will build a CSCOM. However, assuming financial responsibility for physical and human capital management adds a significant burden to already

²⁶ World Bank, "Country Brief, Mali."

<http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/AFRICAEXT/MALIEXTN/0,,menuPK:362193~pagePK:141132~piPK:141107~theSitePK:362183,00.html>. Accessed 30 March 2010.

strained local health administrations, including concerted efforts to manage the shift in accountability, as well as the increased staffing needs.

The attainment of the health-related MDGs is also contingent on a reliable drug supply chain and the affordability of medicines. Drug supplies are often inconsistent in Bamako; hence, there is a need to ensure efficient distribution across the city's pharmacies. The city does collect data tracking the costs of medicines to consumers, but more needs to be done to reduce drug costs.

Finally, the proposed strategies must be aligned with the national decentralization process occurring within the Malian government, which has sought to divest management and control of public health programs to the commune level. To promote progress towards the attainment of the health-related MDGs and *all* MDGs, it will be critical to harmonize the PDSC plans with plans to attain the complementary MDGs, so many of which relate intimately to the public health. MCI and the MDG Center of West Africa have already begun this process, which must be continued. With coordinated efforts, targeted investment and sustained donor support, Bamako can be on track to achieve the health-related MDGs by 2015.

REFERENCES

ARCAD-SIDA (2007). *Rapport Annuel 2007*.

Assemblée Nationale. Loi n° 06-028 / 29 June 2006. *Fixant les règles relatives à la prévention, à la prise en charge et au contrôle du VIH/SIDA* <http://www.sante.gov.ml/msante/> (Accessed 11 June 2008).

Ballo, M.B., Traoré, S.M., Niambélé, I, Ba, S., Ayad, M., Ndiaye, S. (2002). *Mali 2001 Demographic and Health Survey (DHS-III)*. (Bamako: Cellule de Planification et de Statistique, Ministère de la Santé, DNSI, Ministère de l'Économie, de l'Industrie et du Commerce and ORC Macro)

Chisholm, D., Healey, A., Knapp, M. (1997). "QALYs and mental health care," *Social Psychiatry and Psychiatric Epidemiology*, 32(2), pp. 68-75.

Diawara A, et al. (2007). *Pratiques de prescription dans les centres de santé communautaires (CSCOM) et utilisation des médicaments par les populations* (Bamako: Mali Médical, T XXII, No 2).

Direction Regional de la Sante de Bamako [DRS] (2006). *Annuaire Statistique 2006 de District de Bamako* (Bamako: Ministry of Health).

Direction Regional de la Sante de Bamako [DRS] (2008). *Rapport d'Activités 2007 et Plan d'Opérations 2009*. (Bamako: Ministry of Health).

Hetland, Ø. (2008). "Decentralisation and territorial reorganization in Mali: Power and the institutionalization of local politics," *Norsk Geografisk Tidsskrift – Norwegian Journal of Geography*, 62(1), pp. 23-35.

Hôpital de Nianankoro Fomba (2007). *Rapport Annuel d'Activité des Hôpitaux, 2006* (Bamako: Ministry of Health).

International Monetary Fund (2007). *Growth and Poverty Reduction Strategy Paper: 2nd Generation 2007-2011, IMF Country Report No. 08/121* (Washington, D.C.: IMF).

Mediacom, Conseil, Communication et Marketing (2008). "Chose promise chose dûe," Retrieved from: <http://www.mediacom mali.com/pages/log1008.html> (Accessed 10 October 2008).

Ministry of Health (2008). Retrieved from: <http://www.sante.gov.ml/msante/> (Accessed 17 August 2008).

Ministry of Health, CPS (2006). *Annuaire Statistique des Hôpitaux 2006* (Bamako: Système d'Information Hospitalier, Cellule de Planification et de Statistique).

- Ministry of Health, DAF (2008). *Comité Technique du PRODESS II Juin 2008: Synthèse du Bilan 2007 et de la Programmation 2009* (Bamako: Ministry of Health).
- Ministry of Health, Secretary General, National Health Directorate (2007). *Plan stratégique national d'expansion de la stratégie DOTS+ 2007-2011 : Intégration de la nouvelle stratégie halte à la tuberculose* (Bamako : DNS-PNLT).
- Ministry of Health, Secretary General, National Health Directorate (2007). *Annuaire SLIS (Système Local d'Information Sanitaire) 2006* (Bamako: DNS-SLIS).
- Ministry of Health, CCSLS (2008). *Politiques et Protocoles de Prise en Charge Antirétrovirale au Mali* (Bamako).
- Ministry of Health, CCSLS (2007). *Rapport Mensuel Decembre 2007* (Bamako: Ministry of Health).
- Ministry of Health, CCSLS (2006). *Plan Sectoriel 2005-2009* (Bamako: Ministry of Health).
- Ministry of Health, Secretary General, National Health Directorate (2008). *Ressources humaines en santé de Bamako en 2008*. Compiled by S. Diarra. (Bamako: DNS-SLIS Ressources Humaines).
- Ministry of Health, Secretary General, National Health Directorate (2006). *Module de formation des ONG/Associations dans le cadre de la lutte contre la tuberculose* (Bamako: DNS-PNLT).
- Ministry of Health, Secretary General, National Health Directorate (2005). *Politiques et Normes des Services de Santé de la Reproduction* (Bamako: Ministry of Health).
- Ministry of Health, Ministry of Territorial Administration, and Ministry of Finance and Commerce (1994). *Arrêté 94-5092, Gestion des Services socio-sanitaires de Cercle, de Commune* (Bamako: Ministry of Health).
- Ministry of Public Health and Social Affairs (1989). *Relance des soins de santé primaires : L'Initiative de Bamako Cadre Conceptuel* (Bamako: Ministry of Health).
- PPM (2008). *Barème de prix du PPM* (Bamako: Ministry of Health).
- Republic of Mali, Prime Minister (2007). *Décret n° 07-087/P-RM du 16 mars 2007. Fixant les prix des médicaments en dénomination commune internationale de la liste nationale des médicaments essentiels dans le secteur pharmaceutique privé*, (Bamako: Ministry of Health).
- Republic of Mali, Prime Minister (2006). *Décret n° 06 - 571/ P-RM du 29 décembre 2006 fixant la carte sanitaire hospitalière*. (Bamako: Ministry of Health).

Republic of Mali, Prime Minister (2003). *Décret n° 03-218 /P-RM du 30 mai 2008 portant réglementation des prix des médicaments en dénomination commune internationale de la liste nationale des médicaments essentiels*. (Bamako: Ministry of Health).

Samaké S, Traoré SM, Ba S, Dembélé E, Diop M, Mariko S, Libité PR. (2007) *Mali 2006 Demographic and Health Survey [DHS-IV 2006]* (Bamako: Cellule de Planification et de Statistique, Ministère de la Santé, DNSI, Ministère de l'Économie, de l'Industrie et du Commerce with Macro International Inc.)

Sanger Institute (2008) *Plasmodium falciparum Genome Projects*. Retrieved from: http://www.sanger.ac.uk/Projects/P_falciparum (accessed 2 March 2010).

Traoré N, Sidibé T, et Tounkara B, Eds. (2003) *Cadre de dépenses à moyen terme 2003-2007 dans la perspective des objectifs 2015: Améliorer la santé, faire reculer la pauvreté* (Bamako: Ministry of Health).

UNDP (2008). 2007 *Human Development Report* (New York: United Nations Development Program). Retrieved from: http://hdrstats.undp.org/countries/country_fact_sheets/cty_fs_MLI.html (Accessed 12 September 2008).

UNDP (2009). 2009 *Human Development Report* (New York: United Nations Development Program). Retrieved from: http://hdrstats.undp.org/en/countries/country_fact_sheets/cty_fs_MLI.html (Accessed 2 March 2010).

WHO (2004a). *Implementing the Integrated Management of Childhood Illness Strategy in the African Region: IMCI Country Profiles, 2004*. WHO: Regional Office for Africa: Division of Disease Prevention and Control of Communicable Diseases.

WHO/Regional Office for Africa (2004b). "Guidelines for Human Resources for Health Policy and Plan Development at Country Level." Draft. (Brazzaville: World Health Organization)

World Bank (2008) *Data and Statistics, Mali*. (Washington, D.C.: World Bank). Retrieved from: <http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/AFRICAEXT/MALIEXTN/0,,menuPK:362209~pagePK:141132~piPK:141109~theSitePK:362183,00.html> (Accessed 12 Oct 2008).

Annex A: Demographic Overview of the Bamako Population

Demographic Overview

	Mali	Bamako
Population (2009)	12,300,000	1,809,106
GDP per capita	\$1033	NA
Percentage of population living below the poverty line²⁷	56% (IMF 2007)	NA
Life Expectancy	47	NA
Life Expectancy at Birth	53	NA
Adult Literacy Rate (>15)	24%	NA
Fertility Rate	6.7	6.1 (EDSM-IV 2006)

Source: HDI (2008).

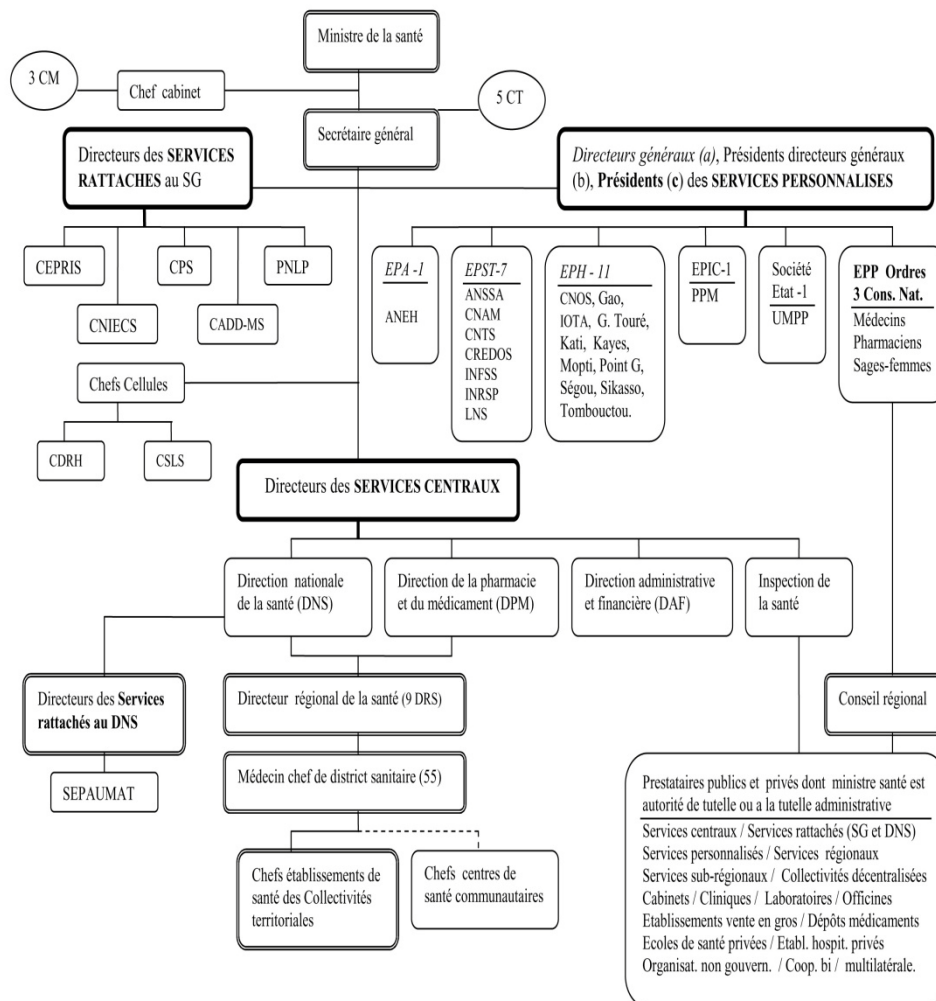
²⁷ Poverty line defined as 72,011 CFAF, at 1987 prices per person per year. IMF Poverty Reduction Strategy Paper (2007), p. 40.

Annex B: Organizational Chart of Mali's Ministry of Health

Inspection de la santé, Bamako

Organigramme du Ministère de la santé (Réf. : Lois 94-009, 02-048, 02-049)

Dernière mise à jour le 07.11.2007



L'organigramme donne une image exacte de la division du travail, indique quels postes existent dans l'Organisation, comment ils sont regroupés en unités et comment l'autorité formelle circule entre eux (Henry Mintzberg).

Les abréviations par catégorie et par ordre alphabétique

- CM : Chargés de missions
 - CT : Conseillers techniques
1. EPA : Etablissements publics à caractère administratif
 - ANEH : Agence nationale d'évaluation des hôpitaux
 2. EPSTC : Etablissements publics à caractère scientifique, technologique ou culturel
 - ANSSA : Agence nationale de la sécurité sanitaire des aliments
 - CNAM : Centre national d'appui à la lutte contre la maladie
 - CNTS : Centre national de transfusion sanguine
 - CREDOS : Centre de recherche et documentation pour la survie de l'enfant.
 - INFSS : Institut national de formation en sciences de la santé
 - INRSP : Institut national de recherche en santé publique
 - LNS : Laboratoire national de la santé
 3. EPH : Etablissements publics hospitaliers
 - CNOS : Centre national d'odontostomatologie
 - IOTA : Institut d'ophtalmologie tropicale d'Afrique
 4. EPIC : Etablissements publics à caractère industriel et commercial
 - PPM : Pharmacie populaire du Mali
 5. Société d'Etat
 - UMPP : Usine malienne de production de produits pharmaceutiques
 6. EPP : Etablissements publics à caractère professionnel
 - Ordres : Les Ordres professionnels de la santé (médecins, pharmaciens, sages-femmes ; leurs présidents sont élus)
 7. Services rattachés
 - CADD-MS : Cellule d'appui à la décentralisation / déconcentration du ministère de la santé
 - CEPRI : Cellule d'exécution du programme de renforcement des infrastructures sanitaires.
 - CNIECS : Centre national d'information et de communication pour la santé.
 - CPS : Cellule de planification statistique.
 - PNLP : Programme national de lutte contre le paludisme
 - SEPAUMAT : Service entretien parc auto et matériel.
 8. Cellules d'appui
 - Cdrh : Cellule de développement des ressources humaines.
 - Csls : Cellule du comité sectoriel de lutte contre le sida.

L'organigramme donne une image exacte de la division du travail, indique quels postes existent dans l'Organisation, comment ils sont regroupés en unités et comment l'autorité formelle circule entre eux (Henry Mintzberg).

Annex C: Services Provided at Each Level

	Primary Services (CSCOM)	Secondary Services (CSREF)	Tertiary Services (Hospital)
Child Health (Pediatrics)	Local bacterial infections, uncomplicated dehydration, uncomplicated malnutrition / underweight, uncomplicated anemia, coughs/colds, pneumonia, uncomplicated (non-measles) fever, uncomplicated measles, all immunizations ²⁸	Severe bacterial infections, severe dehydration, dysentery, severe malnutrition, severe anemia, severe pneumonia, sepsis, meningitis, severe febrile disease, urinary tract infections, eye infections, mouth ulcers, mastoiditis, chronic or acute ear infections, ophthalmia neonatorum	Very severe pneumonia, effusion and pleura effusion and empyema, severe asthma, viral croup, diphtheria, pertussis, heart failure, typhoid fever, septic arthritis, dengue hemorrhagic fever
Maternal and Reproductive Health	Short-term family planning, prenatal care, including IPT for malaria, skilled labor assistance, postnatal care, PMTCT	Long-term family planning, obstructed labor, forceps or vacuum-assisted delivery, Cesarean sections, postpartum hemorrhage, maternal puerperal sepsis, hypertension (pre-eclampsia and eclampsia), post-abortion complications ²⁹ , urinary tract infection, mastitis, STDs ³⁰	Fistula, complicated referral cases
Malaria	ITMs, preventive prophylaxis, IPT for pregnant women, uncomplicated malaria	Rapid diagnostic testing (RDT) ³¹ , Severe or complicated malaria	Severe or complicated malaria requiring a blood transfusion
Tuberculosis	DOTS+ therapy		
HIV/AIDS	Voluntary counseling and testing (VCT), PMTCT, antiretroviral (ARV) prescription and monitoring, STD and OI care, psychosocial support, adherence education, minimal laboratory activities (hemoglobin and hematocrit levels, HIV and TB screening)	Exams (CD4, viral charge, creatine, bacteriology, parasitology, hematology)	Special consultations and exams, support for labwork, determining pharmacological dosage, tests for 1 st -line drug resistance.

²⁸ Standard immunizations are DPCT 1,2,3, polio 1,2,3, hepatitis 1,2,3, measles, BCG, yellow fever, and Hib.

²⁹ Abortion is illegal in Mali, however, some women terminate pregnancies by overdosing on contraception. Further, the death of a woman from post-abortion complications is often classified as a hemorrhage-related to protect the family. The official data on abortions are limited.

³⁰ STDs treated include: chlamydia, gonorrhea, syphilis, pelvic inflammatory disease (PID), and trichomonas. However, in most cases the laboratory at the CSREF does not have the capacity to confirm which of these STDs a patient has, but will sooner send samples to the INRSP lab and treat the patient with several drug regimens.

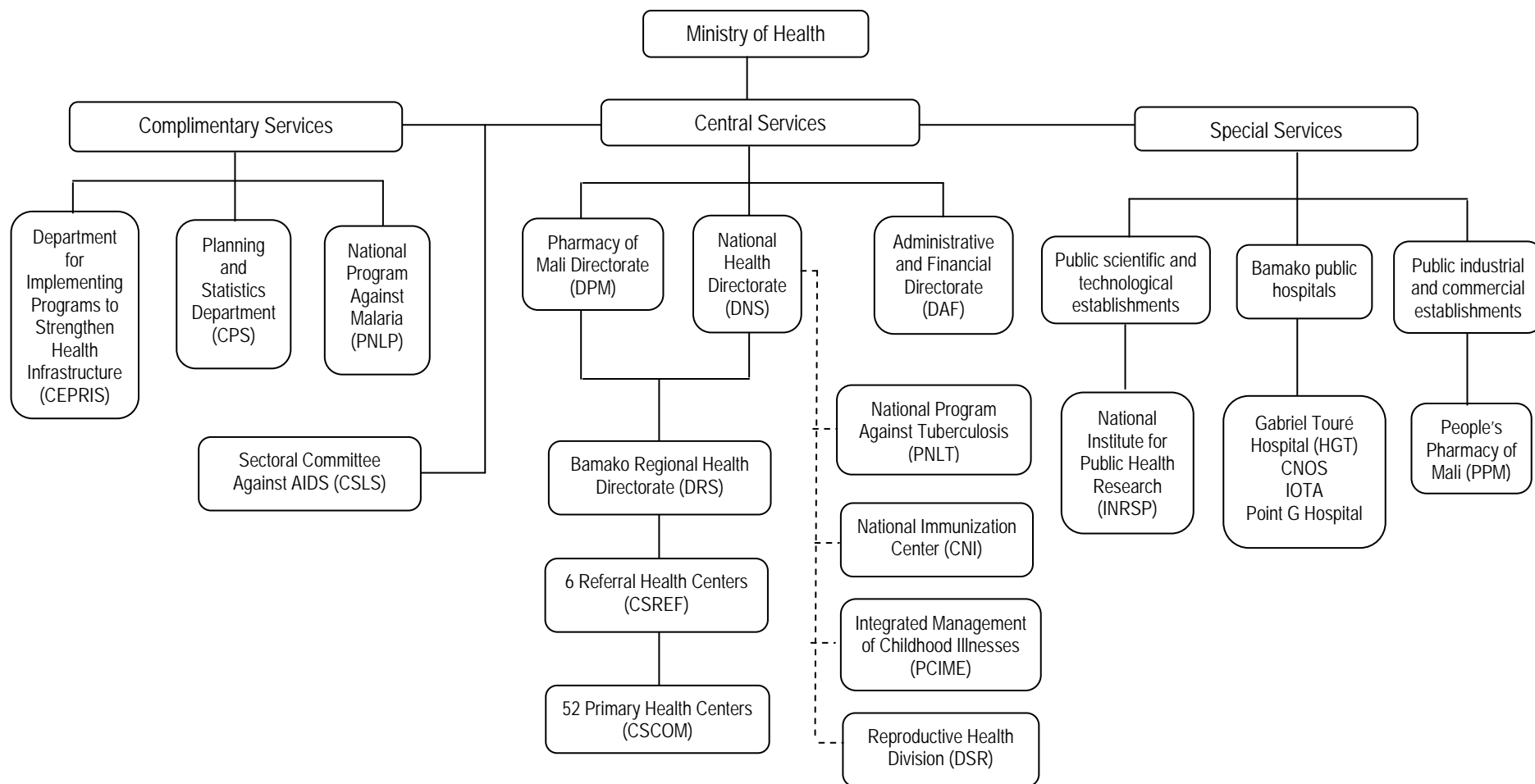
³¹ While RDT for malaria does take place at CSREFs, almost all lab technicians rely on dried-blood spot tests. This is because fewer than one in 20 RDTs gives any result. Serious problems with test specificity (true negative diagnoses) and sensitivity (true positive diagnoses) are likely due to improperly stored tests; it had been communicated that RDTs could be stored regularly, however they can not withstand prolonged exposure to tropical temperatures, and should be stored using the cold chain in Mali. http://www.wpro.who.int/sites/rdt/what_is_rdt.htm

Annex D: Mali National Health Sector Budget in 2007

EXECUTION DU PO 2007: SITUATION RECAPITULATIVE PAR ACTEUR (Compil National) en milleirs de Francs CFA							
Acteurs	Montant Prévu	Montant reçu	Montant exécuté	Montant Justifié	Solde	Taux de mobil	Taux de justif
	1	2	3	4	5=(2-3)	6=(2/1)X100	7=(4/2)X100
Etat	43 432 537	49 429 505	49 014 944	48 780 354	414 561	114	99
Recouvrements	13 523 729	12 246 114	11 965 246	11 953 428	280 868	91	98
Communautés	592 863	210 836	210 218	209 903	618	36	100
Collectivités	1 326 621	311 509	311 270	311 270	239	23	100
TOTAL PARTENAIRES	38 167 666	35 526 329	33 722 824	33 317 023	1 803 505	115	95,81
AFRF	203 466	27 133	27 133	24 504	0	13	90
ATN/USAID	187 082	146 382	145 862	145 862	520	78	100
BAD	4 372 625	3 052 372	3 038 555	3 034 625	13 817	70	99
AFD/CTB	1 514 448	889 946	889 946	879 141	0	59	99
BID	826 310	322 879	322 879	322 879	0	39	100
Canada	439 000	1 259 429	1 062 613	1 022 256	196 816	287	81
CDC/Atlanta		200 000	200 000	0	0	#DIV/0!	0
Centre Carter	177 246	41 667	41 667	41 667	0	24	100
CS 20	15 275	1 627	1 627	1 627	0	11	100
FM	1 909 721	1 417 807	1 360 280	1 269 198	57 527	74	90
Fonds MAP	973 228	545 742	545 742	545 742	0	56	100
PLAN	90 998	43 860	43 860	43 860	0	48	100
GAVI	872 500	3 864 943	3 864 943	3 864 943	0	443	100
GLOBAL 2000	35 007	23 289	23 289	23 289	0	67	100
HKI	116 992	63 850	63 850	63 850	0	55	100
ITI	58 513	102 002	102 002	86 307	0	174	85
Lux	61 677	27 000	27 000	27 000	0	44	100
MDM	7 000	1 041	1 041	1 041	0	15	100
ABS	9 887 717	9 587 695	8 654 454	8 654 454	933 241	97	90
OMS	876 690	787 780	777 222	761 717	10 558	90	97
PAM	382 313	4 493	4 493	4 493	0	1	100
PDZLII	13 512	16 519	16 519	16 519	0	122	100
PKC	371 101	105 341	101 359	101 359	3 982	28	96
Projet PASEI2	204 000	64 000	64 000	64 000	0	31	100
PSM	12 558	9 237	9 237	9 237	0	74	100
SADEVE	9 606	7 013	7 013	7 013	0	73	100
SAVE	69 994	76 374	76 374	76 374	0	109	100
SCI	250 100	213 498	213 498	213 498	0	85	100
SOLTHIS	13 200	0	0	0	0	0	#DIV/0!
SSI	43 880	64 192	64 192	63 192	0	146	98
Suisse	368 852	28 033	28 033	28 033	0	8	100
UNFPA	591 830	155 810	155 810	147 622	0	26	95
UNICEF	2 019 674	2 787 549	2 754 451	2 742 291	33 098	138	98
USAID	515 000	662 841	648 268	643 818	14 573	129	97
World Vision	39 377	330	330	330	0	1	100
Autres	10 637 174	8 924 655	8 385 282	8 385 282	539 373	84	94
TOTAL GENERAL	97 043 416	97 724 293	95 224 502	94 571 978	2 499 791	101	97

Source: Ministry of Health: DAF (2008)

Annex E: The Health System in Mali & Facilities Visited by MCI Researchers in Bamako



Annex F: MDG-related Health Indicators

MDG	Target	Indicators	2001	2006
Goal #4 : Reduce Child Mortality	Reduce by two-thirds, between 1990 and 2015, the under-five mortality rate	Under-five mortality rate (per 1000 live births)	133.8 (10)	108 (1)
		Infant mortality rate (per 1000 live births)	93.8 (10)	66 (1)
		Proportion of 1-year-olds immunized against measles	36.2% (11)	80.6% (2)
Goal #5: Improve Maternal Health	Reduce by three-quarters, between 1990 and 2015, the maternal mortality ratio	Maternal mortality ratio (number of maternal deaths per 100,000 live births)	582 (12)	464 (3)
		Proportion of births attended by skilled health personnel	93.7 (13)	92.6 (4)
Goal #6: Combat HIV/AIDS, Malaria and other diseases Indicators	Have halted by 2015 and begun to reverse the spread of HIV/AIDS	HIV prevalence among pregnant women aged 15-24 years	1.3% F 15-24 2.4% (14)	1% F 15-24 2.3% Bamako (5)
		Condom use rate of the contraceptive prevalence rate	1.3% (15)	1.6% (6)
		<i>Condom use at last high-risk sex</i>	NA	NA
		Percentage of population aged 15-24 years with comprehensive correct knowledge of HIV/AIDS	NA	22% M ; 18% F (7)
	Have halted by 2015 and begun to reverse the incidence of malaria and other major diseases	Contraceptive prevalence rate	19.2% mod. 4.3% trad.(15)	16.9% mod. 2.7% trad. (6)
		<i>Ratio of school attendance of orphans to school attendance of non-orphans aged 10-14 years</i>	NA	NA
		<i>Prevalence and death rates associated with malaria</i>	NA	NA
		Proportion of population in malaria-risk areas using effective malaria prevention and treatment measures	NA	66.6% (8)
		Prevalence and death rates associated with tuberculosis (per 100,000 people)	591 prevalence 71 death (16)	583 prevalence 70 death (7)
		Proportion of tuberculosis cases detected and cured under DOTS (internationally recommended TB control strategy)	20% detected 50% treated (17)	24% detected 75% treated (9)

Sources:

- (1) DHS (2006)/EDSM-IV p.188 – Bamako.
 (2) DHS (2006)/EDSM-IV p. 129 – Bamako.
 (3) DHS (2006)/EDSM-IV p. 199 – Mali. Also: MMR 970 Mali (2005 – MDG estimate using sisterhood method).
 (4) DHS (2006)/EDSM-IV p. 117 – Bamako.
 (5) DHS (2006)/EDSM-IV p. 252.
 (6) DHS (2006)/EDSM-IV p.72 – Bamako.
 (7) MDG 2006 – Mali.
<http://mdgs.un.org/unsd/mdg/Data.aspx?cr=466>
 (8) DHS (2006)/EDSM-IV p. 146 – Bamako.

- (9) DHS (2006)/EDSM-IV - Mali
<http://mdgs.un.org/unsd/mdg/Data.aspx?cr=466> However, 100% should be treated.
 (10) DHS (2001)/EDSM-III p.169 – Bamako.
 (11) DHS (2001)/EDSM-III p. 122 – Bamako.
 (12) DHS (2001)/EDSM-III p. 183 – Bamako.
 (13) DHS (2001)/EDSM-III p. 115-6 – Bamako.
 (14) DHS (2001)/EDSM-III p. 284-5.
 (15) DHS (2001)/EDSM-III p.66.
 (16) MDG model 2001. <http://mdgs.un.org/unsd/mdg/Data.aspx?cr=466>
 (17) MDG model 2001. DOTS Strategy adopted in 2002 (WHO).
 Note EDSM-IV is the French acronym for DHS (2006) and EDSM-III is DHS (2001).