

Service Availability Mapping (SAM)

The Republic of Ghana



MINISTRY OF HEALTH

Collaborators:



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Acronyms

ART	Anti-Retroviral Therapy,
BMC	Budget Management Centers
CHAG	Christian Health Association of Ghana
CHIM	Centre for Health Information Management
CHO	Community Health Officer
CHPS	Community-Based Health Planning and Services
DFID	Department For International Development, UK
GHS	Ghana Health Service
GPS	Geographic Positioning System
GSS	Ghana Statistical Services
MOH	Ministry of Health
NHIS	National Health Information System
PDA	Personal Digital Assistant
PMTCT	Prevention of Mother-To-Child Transmission of HIV
PPME	Policy Planning Monitoring and Evaluation
RHA	Regional Health Administration
SAM	Service Availability Mapping
UN	United Nations
UNICEF	United Nations Children Fund
USAID	United States Agency for International Development
WHO	World Health Organisation

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Finally, we thank the World Health Organisation Team who provided technical support as well as co-funded the SAM activity. The financial support from Department for International Development (DFID) is much appreciated.

1.0 Introduction

1.1 Geography and Population

Ghana is currently divided into ten administrative regions namely; Ashanti, Brong Ahafo, Central, Eastern, Greater Accra, Northern, Upper East, Upper West, Volta and Western with a total land area of about 238,540 sq km. The ten regions composed of one hundred and thirty-eight districts. The 2005 projected population based on the 2000 census is estimated at 22,123,000 people, at a growth rate of 2.1%, giving a population density of 93 people per sq km. The urban population is estimated at about 46%.

Map 1: The Regional Map of Ghana



1.2 The Health System

In the last two decades, Ghana, like most developing countries, have implemented health sector decentralization policies usually as part of a broader process of political, economic and technical reform. This process has been fuelled by new efforts of decentralization and processes for the ‘modernisation’ of the state. These movements combined to promote accountability to local preferences, as well as to introduce competition and cost-consciousness into the public sector and develop a new role for the state in ‘enabling’ and regulating rather than replacing private sector activities.

In the health sector, this initiative has been reinforced by many donor support projects of USAID, DFID and other bilateral agencies, as well as multilaterals like the World Bank, WHO, UNICEF among others. The movement for health reform, including an emphasis on decentralization, was promoted actively in the *World Development Report 1993: Investing in Health* (World Bank 1993).

Decentralisation, involving a variety of mechanisms to transfer fiscal, administrative, ownership and/or political authority for health service delivery from the central Ministry of Health (MoH) to alternate institutions, has been promoted as a key means of improving health sector performance (World Bank 1993).

It has usually been argued that the benefits of such policies include:

- Improved ‘allocative’ efficiency by allowing a mix of services and expenditures to be shaped by local user preferences;
- Improved ‘technical’ efficiency through greater cost consciousness at the local level;
- Service delivery innovation through experimentation and adaptation to local conditions;
- Improved quality, transparency, accountability, and legitimacy owing to user oversight and participation in decision-making; and
- Greater equity through distribution of resources toward traditionally marginal regions and groups.

The primary functions of the Ministry of Health include: policy formulation; establishment of standards; resource mobilization; capacity development; technical support; coordination of health research; and monitoring and evaluation of overall sector performance.

As part of the major decentralization programme in the health sector, the Ghana Health Service and Teaching Hospital Act 525 was passed in 1996. The Ghana Health Service (GHS) is overseen by a National Governing Council and retains relatively centralized control over its regions and districts. The Ghana Health Service is responsible for planning and managing district services, health promotion, curative and rehabilitative services, vector control and control of

communicable diseases, health education, ensuring provision of safe water and sanitation, and data issues.

It is worth noting that Ghana is in the process of ‘delegating’ health sector management to semi-public institutions and ‘deconcentrating’ authority to regions and districts. The current status of decentralization has been the delegation to autonomous Ghana Health Service and to semi-autonomous Budget Management Centers (BMC).

The reform strategy parceled the healthcare delivery system in Ghana into districts, which are subdivided into sub-districts and then into communities. The communities are community-based planning and services (CHPS) zones headed by a community health officer (CHO), but they are not considered distinct administrative units. Nevertheless, the communities are primarily responsible for health service delivery. Communities are further divided into villages.

Ghana health facilities are graded at different levels depending upon the complexity of services they deliver and the administrative zones they serve. The Teaching Hospitals are the tertiary institutions, followed by the regional hospitals, district hospitals, health centers, and then CHPS.

2.0 Service Availability Mapping

2.1 Background

Service Availability Mapping (SAM) is a tool to collect and present basic information on health services namely: health infrastructure, human resources and services provided. The main focus is to enable district health administration to map health services provided in their catchment areas and monitor their performances. In Ghana, some of the information collected by SAM already exists in different forms. The benefits of SAM, however, are its systematic data collection procedure and ‘user-friendly’ presentation of data. Maps and summary measures generated through SAM provide a complete picture of the level and distribution of district resources, as well as highlight gaps in the provision of health services and interventions.

A key goal of health programmes is to make essential health services equally accessible to all individuals and communities. Access has a range of dimensions, but the initial hurdle is basic availability. Issues related to access, coverage and utilization can be addressed only if services are first available. Monitoring becomes essential in order to determine the availability of services. Several health measurement tools provide information on access, use and quality of services. These include household surveys, hospital-based statistics and facility surveys; however, none are low-cost rapid methods such as SAM.

SAM was implemented with the support of Ghana Ministry of Health in collaboration with the World Health Organisation (WHO) country office. Funding was provided by WHO AFRO and DFID.

2.2 SAM Objectives

The 2005 SAM has its primary objectives:

- To provide national planners and decision-makers with information on the distribution of services within the country, with a focus on the district level;
- To provide the baseline monitoring information for increasing the provision of key services such as antiretroviral therapy (ART), prevention of mother-to-child transmission (PMTCT) of HIV, testing and counseling of HIV/AIDS; and
- To assess whether SAM, during which all health facilities are visited, can become a useful and feasible planning and monitoring tool at the district level.

2.3 SAM Methodology

2.3.1 Questionnaire

Two questionnaires were used in the SAM activity. The first questionnaire (District questionnaire) was administered to all 138 districts to collect district level information. The second questionnaire (Facility questionnaire) was administered to all public and private health institutions. The questionnaires included the following modules:

- District Questionnaire
 - Availability of services and service providers
 - Estimated coverage of specific interventions
 - Checklist of facilities

- Facility Questionnaire
 - General Characteristics
 - General Purpose Equipment
 - Injection and Sterilisation Equipment
 - Human Resources
 - Trained Staff
 - Drugs and Commodities
 - Laboratory Tests
 - Blood Transfusion Services
 - Key Intervention Services
 - Social Issues
 - Management Issues

The questionnaires were based on the SAM model questionnaires and modified to fit Ghanaian survey standards and conditions.

2.3.2 Training, Fieldwork and Data Processing

The Ministry of Health/Ghana Health Service in collaboration with the World Health Organization organized a training workshop on Service Availability Mapping (SAM) in July

2005 for regional health information officers and other selected personnel on the use of the HealthMapper software in generating maps.

Subsequent to the July training workshop, data collectors were trained in the regions to collect basic infrastructure and service data from all health facilities both private and public. This involved the use of a standard survey questionnaire and a Personal Digital Assistant (PDA) into which the data will be entered and a final synchronization of the data and downloading it onto a computer for the development of maps. Also during the data collection process, the coordinates of the physical location of each facility was recorded using a Geographic Positioning System (GPS).

The data collection exercise was completed by the end of October 2005 and a subsequent workshop facilitated by experts from the World Health Organization was held from 29th November to 1st December 2005. The purpose of the workshop was to train participants to enter the data into the PDAs and synchronize the data onto a computer and also to acquire further skills in using the *HealthMapper* software to develop maps using the data collected.

All regions completed the data collection exercise using the printed survey questionnaire. The responses to the questionnaire were recorded on the questionnaire booklets and later entered into the PDA off-site. That is, the data were not recorded directly into the PDAs on the field during

the data collection exercise. Currently, all the regions are keeping the completed survey questionnaires and the PDAs.

Figure 2.1 Data Processing Procedures



2.4 Problems encountered in the exercise

The facility questionnaire was so large that it was divided into two parts on the PDA. After the field work, all the regions were able to synchronize and download part one of the facility data between the PDA and the computer; however none of the regions were able to synchronize part two of the facility data; thus making the data incomplete. In addition, most of the regions have their PDAs active while a few of the regions have lost the data that was keyed into the PDAs due to inability to charge the batteries.

3. Results and Discussions

3.1 Health Infrastructure

Health infrastructures are formal and enduring structures that support the entire health system. They may be directly protective of health - as in public sanitation systems - or they may support other activities that protect and enhance health. The elements of health infrastructure that tend to be easier to recognise and to describe are the physical structures such as health facilities, inpatient beds, and source of water.

Table 3.1 shows the distribution of health facilities by ownership. The Service Availability Mapping (SAM) recorded 1832 health facilities in Ghana. Of these, 897 were owned by Government representing approximately 50%. Out of the 897 Government-owned facilities, 416 were health centers and 61 were district level hospitals.

Table 3.2 shows some indicators of geographic access by region. The facility density indicates the number of facilities available to 100,000 inhabitants in a particular region. Upper East region has the highest facility density (17.9). The lowest is Brong Ahafo region (Facility density=2.0).

The regional distribution of percentage of facilities with basic amenities (electricity and piped water) is shown in Table 3.3.

Table 3.1 Distribution of Health Facilities by Ownership, Ghana, 2005

Ownership	Level of Facility										
	Teaching Hospital	Regional Hospital	Hospitals	Poly Clinics	Specialised Hospitals	Health Center	Clinics	CHPS	Maternity Homes	Others	Total
Government	2	8	61	8	3	416	162	172	35	30	897
Mission	0	0	34	0	1	42	92	0	1	12	182
Private	0	0	72	2	12	10	375	0	199	3	673
Quasi-Government	0	0	7	0	0	2	24	0	1	0	34
Others	0	0	2	0	0	2	37	0	5	0	46
Total	2	8	176	10	16	472	690	172	241	45	1832

Table 3.2 Regional Distribution of Health Facilities and Inpatient Beds per 100,000 Inhabitants, Ghana, 2005

Region	Total Population Projected from 2000 Census	^a Number of Public Hospitals	Hospitals per 100,000 inhabitants	Number of Health Facilities	Facilities per 100,000 inhabitants	Number of Inpatient Beds	Beds per 100,000 inhabitants
Ashanti	4,270,362	20	0.47	530	12.41	4543	106.38
Brong-Ahafo	2,053,988	-	-	41	2.00	301	14.65
Central	1,816,098	9	0.50	157	8.64	1662	91.51
Eastern	2,385,305	4	0.17	131	5.49	1572	65.90
Greater Accra	3,603,770	5	0.14	236	6.55	2826	78.42
Northern	2,090,399	10	0.48	168	8.04	1148	54.92
Upper East	971,820	5	0.51	174	17.90	896	92.20
Upper West	653,863	3	0.46	77	11.78	313	47.87
Volta	1,796,805	1	0.06	59	3.28	509	28.33
Western	2,258,378	11	0.49	259	11.47	2054	90.95
Ghana	21,900,788	68	0.31	1832	8.36	15824	72.25

^a The Public Hospitals represent the District Hospitals owned by Government

Table 3.3 Percentage of Health Facilities with Piped Water Supply and Electricity, Ghana, 2005

Region	Number with Piped Water	% With Piped Water	Number with Electricity	% With Electricity	Number of Health Facilities
Ashanti	261	49	416	78	530
Brong-Ahafo	21	51	31	76	41
Central	94	60	129	82	157
Eastern	62	47	100	76	131
Greater Accra	212	90	225	95	236
Northern	44	26	73	43	168
Upper East	28	16	57	33	174
Upper West	24	31	25	32	77
Volta	27	46	46	78	59
Western	112	43	181	70	259
Ghana	885	48	1283	70	1832

3.2 General Purpose Equipment in Hospitals

Like health infrastructure, medical equipment is essential inputs that support the health delivery system. A well motivated health workforce without the basic equipment to work with cannot be productive. The service availability mapping assessed the availability of functioning specific medical equipment in hospitals.

Table 3.6 presents the percentage of hospitals that have functioning specific equipment. Of 149 hospitals with data, 134 (90%) had a functioning Oxygen. 76 (61%) out of 125 hospitals with data available had a functioning X-ray machine. Only 11 (13%) out of 83 hospitals with data had functioning Cytometer.

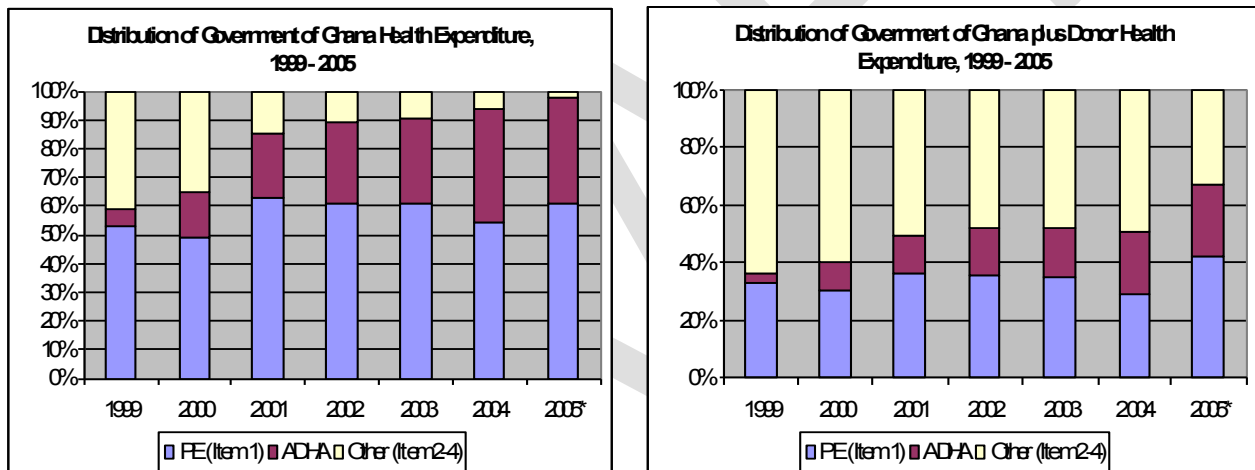
Table 3.6 Percentage of Hospitals with specific equipment, Ghana, 2005

Specific Equipment	Number of Hospitals with Equipment	% with Equipment	Number of Hospitals with Data
X-ray machine	76	61	125
Oxygen	134	90	149
Autoclave	146	95	153
Infusion Kit	115	86	133
Operating Theatre	145	94	155
Anaesthetic Machine	117	82	142
Hemocytometer	73	63	115
Cytometer	11	13	83

3.3 Human Resource for Health

Human resource for health are employed in order to provide health care services such as physician visits, supervised deliveries, immunizations, bypass surgery etc. to the population.

While pharmaceuticals, infrastructure, diagnostic equipment and other inputs are also necessary in order to produce health care services, human resources are often viewed as the most significant input since health care remains a very labour intensive industry with wages accounting for the largest component of health sector spending in both low and high-income countries. In Ghana over 80% of recurrent expenditure is devoted to salaries of health workers.

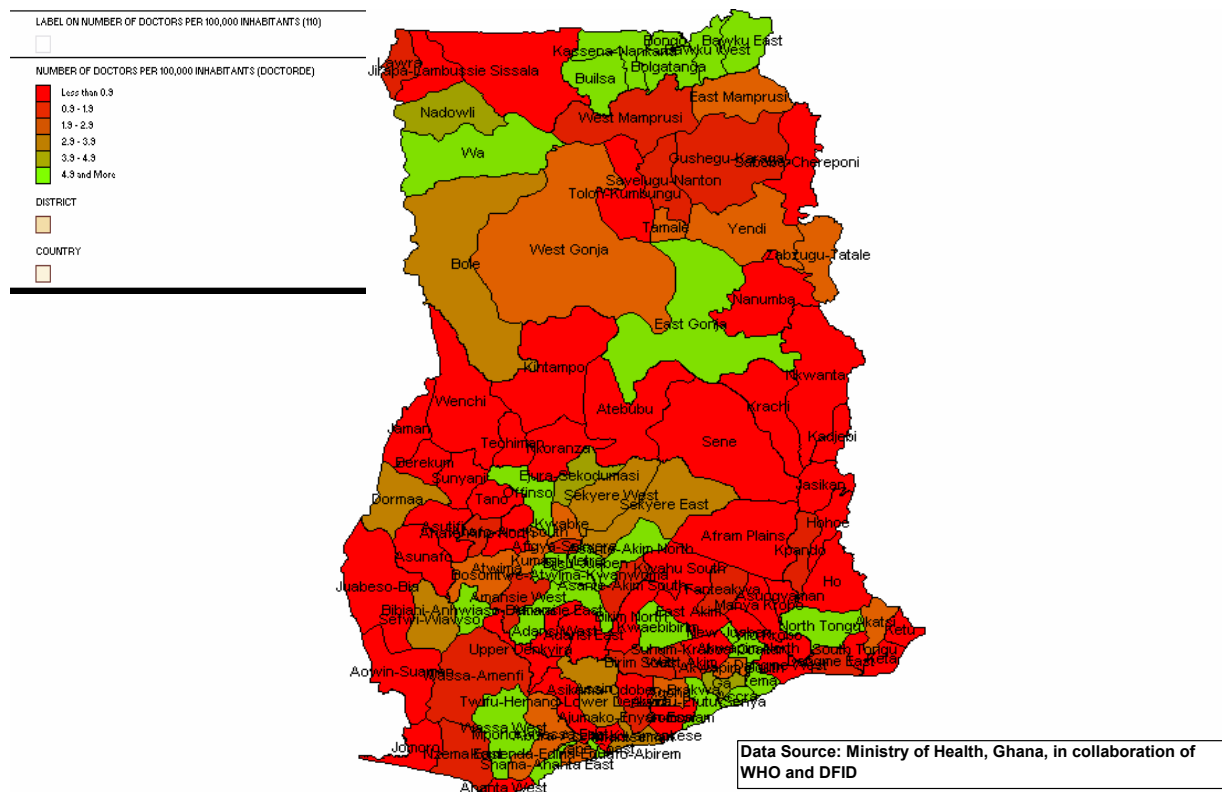


Map 3.1 depicts the number of Doctors per 100,000 inhabitants by districts. On the average (Median), 3 Doctors were available to 100,000 inhabitants in Ghana. Map 3.2 shows the number of Nurses per 100,000 inhabitants by districts. About 35 Nurses were available to 100,000 inhabitants in Ghana.

Table 3.5 presents the regional distribution of health professionals per 100,000 inhabitants. Ghana has approximately 1241 Doctors and 6599 Nurses. The distribution of Doctors and Nurses across Ghana is not even. Brong Ahafo had the lowest Doctor density (0.8 per 100,000 inhabitants) and the lowest Nurse density (4.1 per 100,000 inhabitants). Greater Accra had the highest Doctor density (8.2 per 100,000 inhabitants) whereas Upper East had the highest Nurse density (52.8 per 100,000 inhabitants).

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**Map 3.1 Number of Doctors per 100,000 inhabitants
Service Availability Mapping, Ghana, 2005**



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**Map 3.2 Number of Nurses per 100,000 inhabitants
Service Availability Mapping, Ghana, 2005**

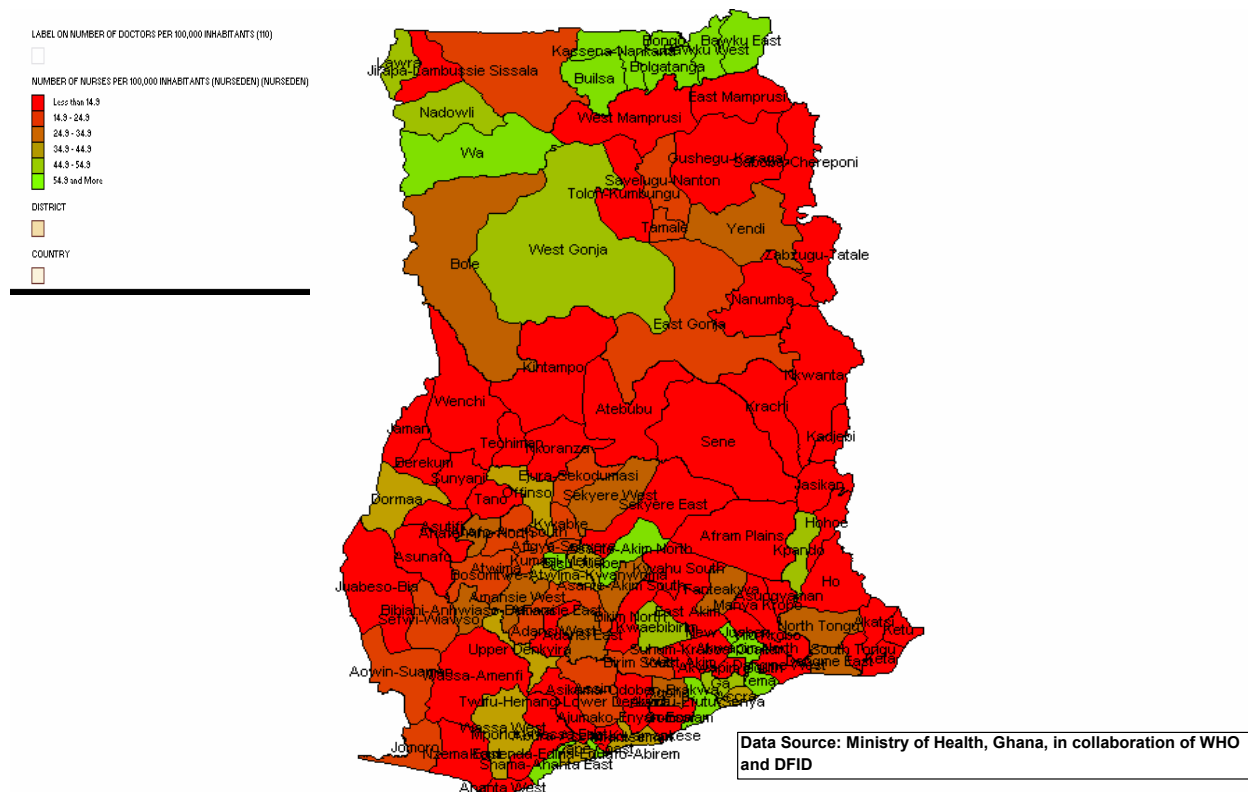
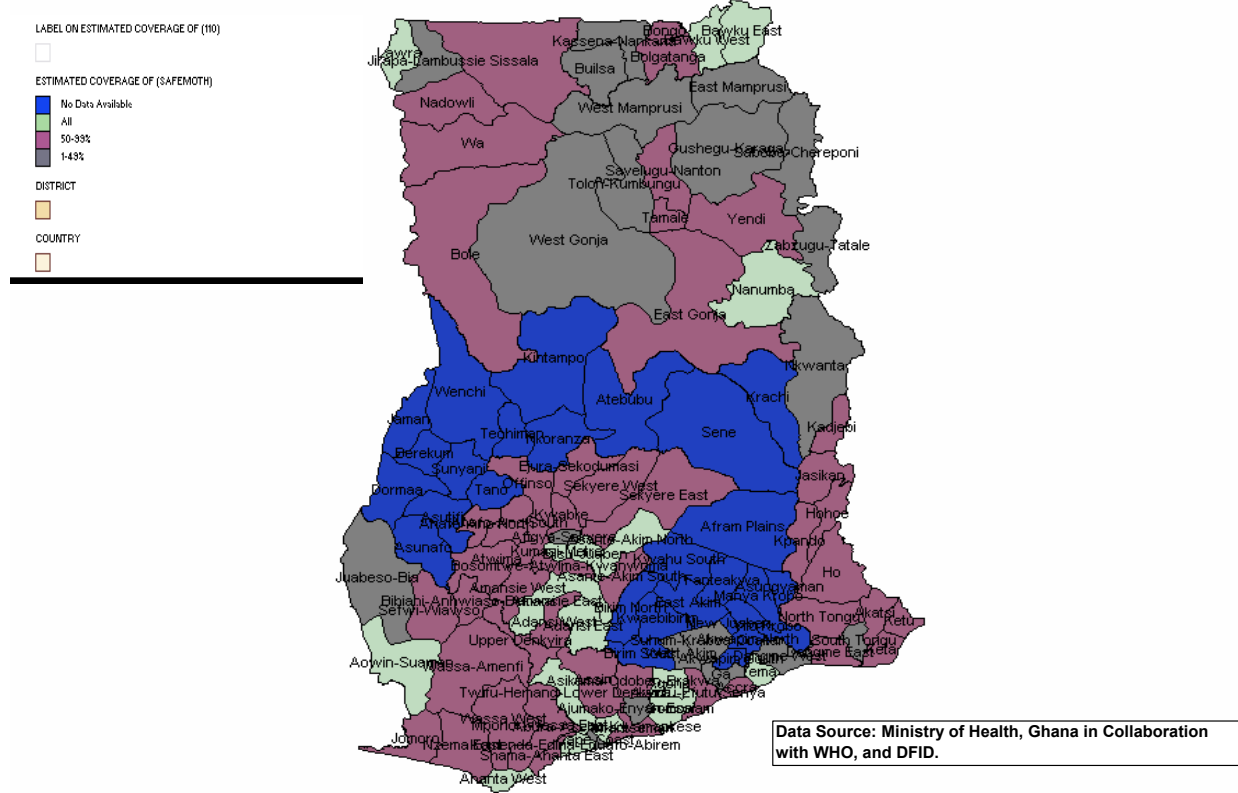


Table 3.5 Regional Distribution of Health Professionals per 100,000 inhabitants, Ghana, 2005

Region	Total Population Projected from 2000 Census	Number of Doctors	Doctors per 100,000 inhabitants	Number of General Nurse	Gen. Nurses per 100,000 inhabitants	Number of Specialised Nurses	Spec. Nurses per 100,000 inhabitants	Number of Midwives	Midwives per 100,000 inhabitants	Number of Public Health Nurses	P.H. Nurses per 100,000 inhabitants	Number of Nurses (All)	Nurses per 100,000 inhabitants
Ashanti	4,270,362	282	6.6	670	15.7	10	0.2	631	14.8	35	0.8	1346	31.5
Brong-Ahafo	2,053,988	6	0.3	34	1.7	0	0.0	49	2.4	1	0.0	84	4.1
Central	1,816,098	71	3.9	328	18.1	19	1.0	370	20.4	15	0.8	732	40.3
Eastern	2,385,305	75	3.1	230	9.6	2	0.1	192	8.0	13	0.5	437	18.3
Greater Accra	3,603,770	294	8.2	1020	28.3	61	1.7	546	15.2	76	2.1	1703	47.3
Northern	2,090,399	59	2.8	143	6.8	0	0.0	200	9.6	4	0.2	347	16.6
Upper East	971,820	21	2.2	328	33.8	7	0.7	161	16.6	17	1.7	513	52.8
Upper West	653,863	15	2.3	102	15.6	0	0.0	110	16.8	6	0.9	218	33.3
Volta	1,796,805	15	0.8	26	1.4	0	0.0	75	4.2	0	0.0	101	5.6
Western	2,258,378	99	4.4	313	13.9	2	0.1	309	13.7	14	0.6	638	28.3
Ghana	21,900,788	937	4.3	3194	14.6	101	0.5	2643	12.1	181	0.8	6119	27.9

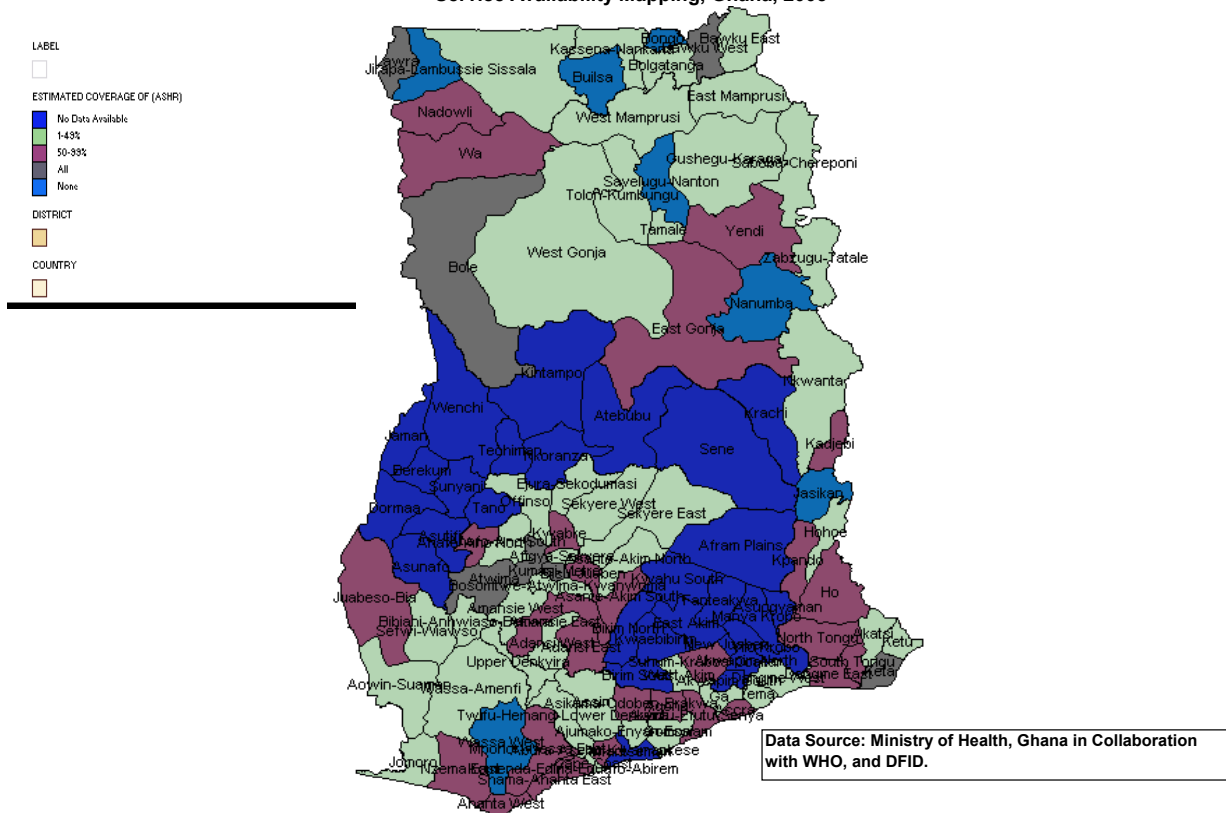
^a The Figures excludes the Teaching Hospitals

3.4 Percentage of facilities in the district that provide Safe Motherhood Services Service Availability Mapping, Ghana, 2005



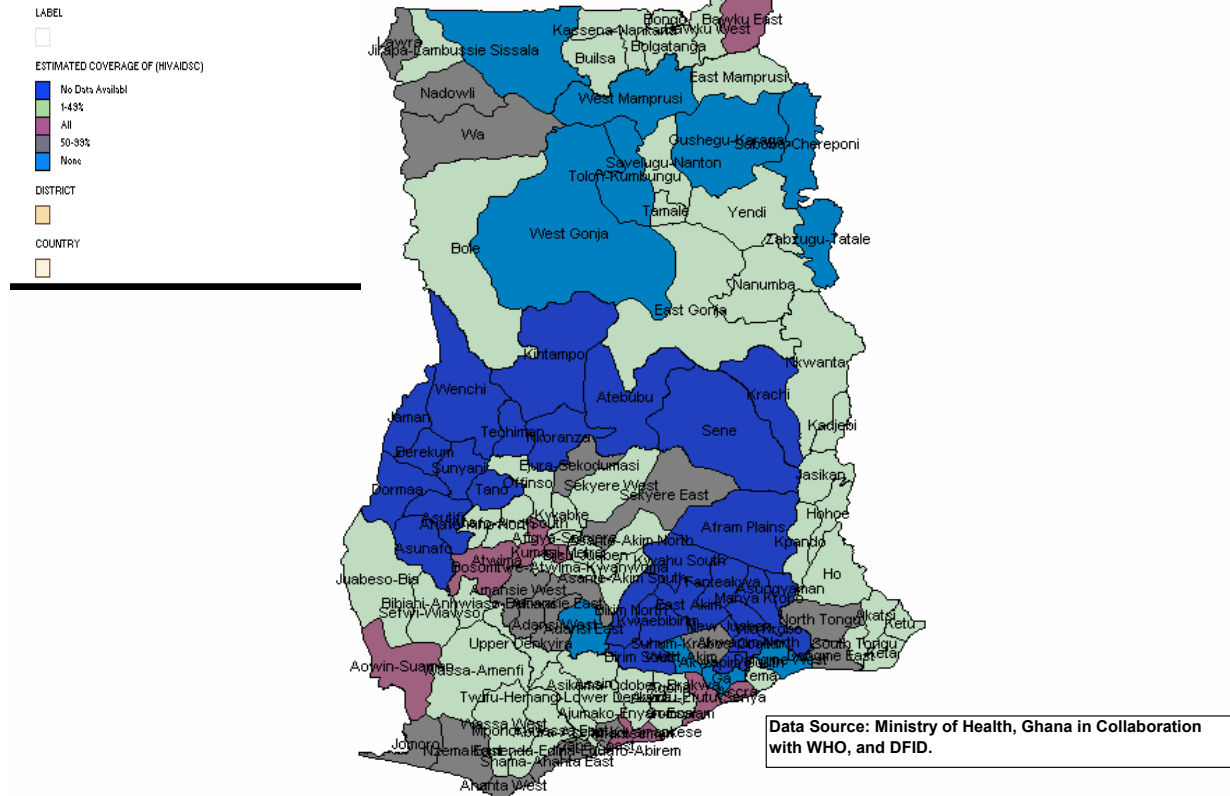
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**Map 3.5 Percentage of facilities in the district that provide Adolescent Sexual and Reproductive Health Services
Service Availability Mapping, Ghana, 2005**

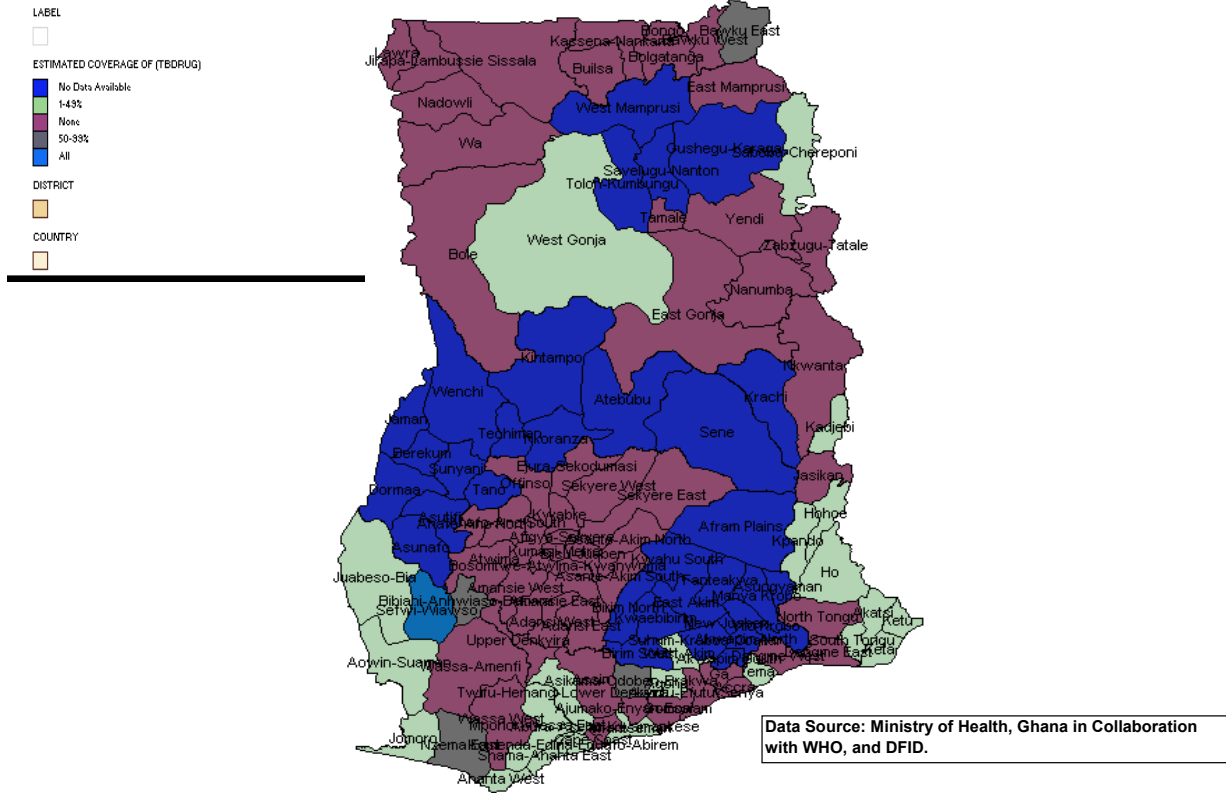


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**Map 3.6 Percentage of facilities in the district that provide HIV/AIDS Counselling Services
Service Availability Mapping, Ghana, 2005**

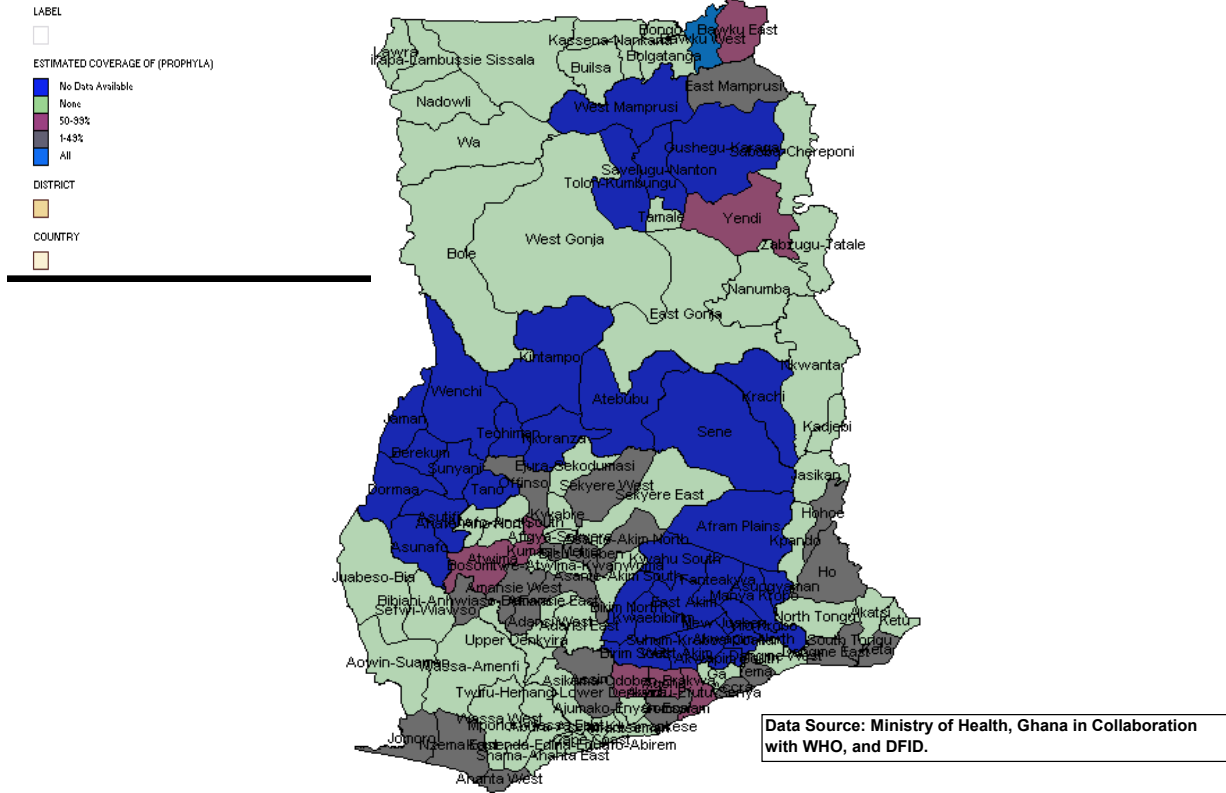


Map 3.7 Percentage of TB Treatment Sites in the district that had a "Stock Out" of any required drug during the last month
Service Availability Mapping, Ghana, 2005



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**Map 3.8 Percentage of facilities in the district that provide Isoniazide Prophylaxis to reduce the risk of TB among HIV infected persons
Service Availability Mapping, Ghana, 2005**



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4.0 Conclusions and Recommendations

The Service Availability Mapping (SAM) seeks to provide information for planning and monitoring. The exercise was also to assess whether SAM can become a monitoring tool at the district.

The study suggests that SAM can provide a snapshot of availability and location of key health interventions. Supervisory visits to health facilities could benefit greatly from using a simple monitoring tool that allows the supervisor to summarise the results at the end of the visit. SAM is such a tool. Use of HealthMapper, for example, involves uploading the data resulting from the supervisory visit into a national monitoring system. With SAM, this is relatively easy to do and will not increase the workload of health professionals.

The results also suggest that while efforts are underway to increase geographical access to health services, the distribution of health facilities is not even. Further, the three northern regions (Upper East, Upper West, and Northern) appear to have lower access to piped water supply in its health facilities.

The distribution of the human resource for health is not better than the facilities. Most of the Doctors are 'packed' in the cities (Accra and Kumasi).

The following recommendations may be useful:

- The MoH/GHS should plan to integrate SAM into the National Health Information System (NHIS).
- Funding for subsequent SAM activities should be incorporated in the existing district planning and budget system, while additional resources will have to be sought to pay for training, provision of GPS, PDAs, Software, and Technical support.
- Close collaboration with Ghana Statistical Services (GSS) is also essential. Accurate population data by district, as obtained from the latest census, will allow a better estimate of physical access to key health services
- Most of the facilities are not 'geocoded'. Thus this report should be used as a baseline of data with which to collect and integrate all existing health facilities geographical coordinates and update the HealthMapper. Further, it should become routine for the district teams to identify the location of any new health facilities for use in the collection of more data.