MINISTRY OF HEALTH

THE NATIONAL TUBERCULOSIS HEALTH SECTOR STRATEGIC PLAN FOR GHANA 2015–2020

Moving out of the box to end the TB epidemic
Post 2015 TB Control Strategy

CONTENTS

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ACRONYMS AND ABBREVIATIONS

ACSM	Advocacy, communication, and social mobilization
ART	Antiretroviral therapy
CAT I, CAT II, CAT III	Category I, Category II, Category III [treatment regimens]
CB-DOTS	Community-based DOTS
CCM	Country Coordinating Mechanism [Global Fund]
CDR	Case detection rate
CFR	Case fatality rate
CHAG	Christian Health Association of Ghana
CPT	Co-trimoxazole preventive therapy
CRS	Catholic Relief Services
CSO	Civil society organization
DANIDA	Danish International Development Agency
DFID	Department for International Development [UK]
DOT	Directly observed treatment
DOTS	Directly observed treatment, short course
DST	Drug susceptibility testing
EQA	External Quality Assurance
FBO	Faith-based organisation
FDC	Fixed-dose combination
GDF	Global Drug Facility
GFATM	Global Fund to Fight AIDS, Tuberculosis and Malaria
GHS	Ghana Health Service
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
GLC	Green Light Committee
GOG	Government of Ghana
HIV	Human immunodeficiency virus
HMIS	Health management information system
HRD	Human resources development
ICF	Intensified case finding
IEC	Information, education, and communication
IOM	International Organization for Migration
IPC	Infection prevention and control
IPT	Isoniazid preventive therapy
ISTC	International Standards for TB Care
KAP	Knowledge, Attitude, and Practice
KATH	Komfo Anokye Teaching Hospital
KBTH	Korle-Bu Teaching Hospital
KNCV	KNCV Tuberculosis Foundation, Netherlands
MDG	Millennium Development Goals
MDR-TB	Multidrug-resistant TB
M&E	Monitoring and evaluation
MGIT	Mycobacterium growth indicator tube
MOH	Ministry of Health
MSH	Management Sciences for Health
NACP	National AIDS Control Programme

NGO	Non-Governmental Organization
NHIS	National Health Insurance Scheme
NMIMR	Noguchi Memorial Institute for Medical Research
NPHRL	National Public Health Reference Laboratory
NTP	National Tuberculosis Control Programme
PAL	Practical Approach to Lung Health
PHC	Primary health care
PLHIV	People living with HIV/AIDS
PMTCT	Prevention of mother-to-child transmission [of HIV]
POW	Programme of Work
PPD	Purified protein derivative
PPM	Public-Private Mix
PPME	Policy Planning and Monitoring and Evaluation Division
QA	Quality assurance
QHP	Quality Health Partners
SOP	Standard operating procedures
SS+	Sputum smear–positive
SS-	Sputum smear–negative
SWAp	Sector-wide approach
TA	Technical assistance
TB	Tuberculosis
TB CAP	Tuberculosis Control Assistance Project
TBTCA	Tuberculosis Coalition for Technical Assistance
UNHCR	UN High Commission for Refugees
USAID	US Agency for International Development
VCT	Voluntary counselling and testing [for HIV]
WHO	World Health Organization
XDR-TB	Extremely-drug-resistant TB
ZN	Ziehl-Neelsen

FOREWORD

Tuberculosis control is important not only to individuals afflicted with the disease and those affected by it, but also to society as a whole.

Over the years, Ministry of Health has maintained TB among its top priority diseases because the effect of inaction against this silent killer could be devastating. Presently, new and emerging forms of the disease MDR/XDR-TB are threatening global security and health. The country has made progress in treatment success rate, but this has been very slow. Our case detection still remains a major challenge. The health infrastructure base needs more improvement and we ought to expand laboratory network and intensify advocacy, communication and social mobilization activities.

Scaling up our priority interventions require heavy capital injection if we are to meet the new targets set for Tuberculosis control under the post 2015 global TB strategy. Recent funding from the Global Fund to fight TB, Malaria and AIDS has been of tremendous assistance.

We, however, plan scaling up towards accelerated universal access to Tuberculosis control. I, therefore, welcome this comprehensive strategic plan developed with the support and active involvement of all stakeholders as the national response to the ravaging epidemic.

The Government of Ghana by incremental support will provide a minimum 30% of annual budgetary need of implementation cost in the medium to long term, and will require assistance from partners and stakeholders to make up for the short fall.

Let all partners contribute to stop TB, and let all of us work together to create wealth through health.

Dr Kwaku Agyeman-Mensah
Hon. Minister of Health

EXECUTIVE SUMMARY

Towards stopping the national TB epidemic, the **overall objective** of the Health sector response is to work towards achieving the World Health Assembly (WHA) and Stop TB Partnership post 2015 TB control strategy targets. The **mandate** of the National Tuberculosis Control Programme (NTP) therefore is to provide leadership and stewardship to accelerate coordinated intense efforts to reduce the recently established adult TB burden of 286 per 100,000-person population from 2013, National TB Prevalence Survey. Other key challenges are low TB case notification, unacceptably high TB death rates, low ARV coverage among TB/HIV patients and low drug resistant notification and treatment.

Goals:

1. To reduce by 20% the 2013 TB prevalence baseline level of 286 per 100,000 person population by 2020 in line with post 2015 Global TB Control Strategy.
2. To reduce by 35% the 2012 TB mortality rate baseline of 4 deaths per 100,000 person population by 2020.
3. To end the TB epidemic in Ghana by 2035 without catastrophic cost due to TB affected families.

Though very ambitious the plan recognises limitation of resources in seeking to achieve the targets set for the goals. To attain these targets the country needs to detect over 70,000 new TB cases annually. The amount of funding needed ranges between USD 56 million to 73 million per year. As the National Tuberculosis Control Programme adapts the post 2015 TB control strategy, the objectives are therefore set based on realistic projections from expected funding and health systems capacities to rapidly scale up.

Objectives:

1. To early screen, detect and enrol into treatment all forms of notified (new cases) from 15,606 in 2013 to 37,302 by 2020, while increasing the proportion of bacteriologically confirmed pulmonary TB from 51% in 2013 to 60% by 2020
2. To early detect and enrol into treatment at least 85% of confirmed MDR-TB cases among new and previously treated cases by 2020
3. To attain higher treatment success for all forms of TB from 84% in 2012 to at least 91% by 2020 through improved quality clinical care and community TB care
4. To reduce death rates of TB/HIV co-infected cases from 20% in 2012 to 10% by 2020 and uptake of ART coverage among co-infected from 37% in 2013% to 90% by 2020
5. To improve Programme management; coordination Monitoring & Evaluation and operations research to support treatment and screening strategies for TB/HIV

Three strategic plans have been successfully implemented within the period from 1994-2013. The current plan focuses on implementing and scaling up best practices, while addressing the problems of key affected populations. The principle underlying implementation is strong coalition with civil society organizations and communities (Stop TB Partnership, Ghana) and working in partnership with other state agencies such as Attorney General's Department, to ensure protection and promotion of patients' rights, ethics and equity under National Health Insurance Scheme (NHIS), Food and Drugs Authority (FDA) and Public Health Act.

There is a shift from passive TB case finding to active case finding using superior screening algorithms and diagnostic tools. An award winning evidence based WHO guideline, *Systematic Screening for active tuberculosis (principles and recommendations)* piloted in Ghana guided prioritisation of proposed interventions in the plan. Costing of the strategic plan was done using the WHO planning and budgeting tool.

The total funding need for the six year National Health Sector Strategic Plan (2015-2020) is USD 358,817,198. Through the Global Fund-financing mechanism 6% (USD 21,008,049) of the total funding needs in the next three years would be provided. The Government of Ghana will provide 30% of the annual budgetary needs of the plan.

The successful implementation of the plan will depend on a continuous stable political climate in the country and increased, predictable and sustained funding from other developmental partners.

BACKGROUND

Country Profile

The Republic of Ghana is centrally located on the West African coast and extends inlands from the Gulf of Guinea. It is bordered on the south by the Atlantic Ocean, Togo to the east, Burkina Faso to the north, and La Cote D'Ivoire to the west. The country is bisected by the Greenwich Meridian and lies entirely within the northern tropics between latitude 4^0 and 12^0N above the equator.

It covers a surface area of 238,537 sq. km and a coastline of 540 km, most of which is relatively flat and lies below an altitude of 150 km, except for a range of hills on the eastern border and Mt. Afadjato-the highest point above sea level (884 metres)-which is west of the Volta River.

Ghana can be divided into three ecological zones: the sandy coastline backed by a coastal plain, which is crossed by several rivers and streams; the middle belt and western parts of the country, which are heavily forested and have many streams and rivers; and a northern savannah, which is drained by the Black and White Volta Rivers. The Volta Lake, created as result of the construction of hydroelectric dam in the eastern part of the country, is one of the largest artificial lakes in the world.

The country has a tropical climate with temperatures and rainfall varying according to distance from the coast and elevation. There are two distinct rainy seasons, April to June and September to October. Annual rainfall ranges from about 1,015 millimetres (40 inches) in the north to about 2,030 millimetres (80 inches) in the southwest (DHS, 2008). Northern Ghana has a wet climate from April to October; the rest of the period is hot and dry with temperatures up to 38^0C. In southern Ghana, the rains last from April to June, and also from September to October. There are drier months in between these periods. Generally, temperatures are between 21^0C-31^0C in the south [Ghana Tourist Board website 2012].

The Harmattan, a dry desert wind, blows from the northeast between December and March, lowering the humidity and creating very warm days and cool nights in the north. In the south, the effects of the Harmattan are felt mainly in January. Average relative humidity ranges from nearly 100% in the south to 65% in the north; during the Harmattan season the drier areas can fall as low as 12%.

Figure 1: Map of Ghana

Accra is the capital city of Ghana (a metropolitan city with population of 3-4 million). There are 10 administrative regions (Fig. 1), and 216 districts[1] including metropolitan and municipal areas.

Each region is headed by an appointed Regional Minister who represents the President and each district also is headed by a Chief Executive (Metro, Municipal or District), who is nominated by the President and approved by the District Assembly. Districts are also sub divided into approximately 600 unit areas/sub-districts and are headed by elected executives. Due to the on-going development and population increases, new districts are progressively being created. It is estimated that there are slightly more than 45,000 communities and 240,000 households.

Demographic Characteristics

[1] See www.ghanadistricts.gov

Ghana's population is now 26,594,183 projected from 2010 Population Census by the Ghana Statistical Service (GSS). The population is made up of several ethnic groups. There are 75 Ethnic groups: Akan 47.5%, Mole-Dagbon 16.6%, Ewe 13.9%, Ga-Dangme 7.4%, Gurma 5.7%, Guan 3.7%, Grusi 2.5%, Mande-Busanga 1.1%, others 1.6% (2010 census). The population density per square kilometre has more than doubled from 36 persons per sq. km in 1970 to 79 persons per sq. km in 2013. Thirty-one percent (31%) of households in Ghana are headed by women. Children less than 15 years constitute 42% of the total population. Furthermore, 33% of households in urban areas, and 44% of households in rural areas have at least one child aged less than five years. The mean household size is 3.5 in urban areas, and 4.3 in rural areas. The most common household size is 2-3 household members (30%), while 27% have 4-5 household members.

Age-Sex Differentials

The age structure is typical of a young population characterised by high fertility. This type of population structure imposes a heavy burden on the social and economic assets of a country. Children less than 15 years constitute 42% of the total population and 5% of the population is in the older age groups (65 years and above). This has not changed much since 2003 (Fig 2).

Ghana's population comprises of 51.2% females and 48.8% males resulting in a sex ratio of 95 males to 100 females. For both sexes, the largest population age-group is 15-24 years. For women, 34 percent are in this category, while for men it is 31 percent. In addition, 6 in 10 women and about 5 in 10 of men are currently married/in union, while 30 percent of women and 40 percent of men have never been married/in union. Nearly half of the men (46%) and women (47%) live in rural areas.

For children under-five years, Ghana has roughly the same proportion of girls and boys but there are more children in rural areas than in urban areas (57% against 44%) and they are also slightly more likely to live in the poorest households: 23% of the children under age five live in the poorest households while 17% live in the richest.

Fertility

In Ghana, 70 percent of women have given birth at least once, and 24 percent gave birth in the last two years. The adolescent birth rate and total fertility rate (TFR) are respectively 60 per 1000 live births and 4.3 children per woman. The average is 3.3 children per woman in urban areas and 5.5 children per woman in rural areas. Regional variations are also observed with the highest TFR (6.2) in Northern region compared to the lowest TFR (3.2) in Greater Accra. The TFR decreases with educational level and by wealth index quintiles. The lower TFR is observed among women with secondary or higher education (3.1) and in the richest quintile (2.9) (MICS, 2011).

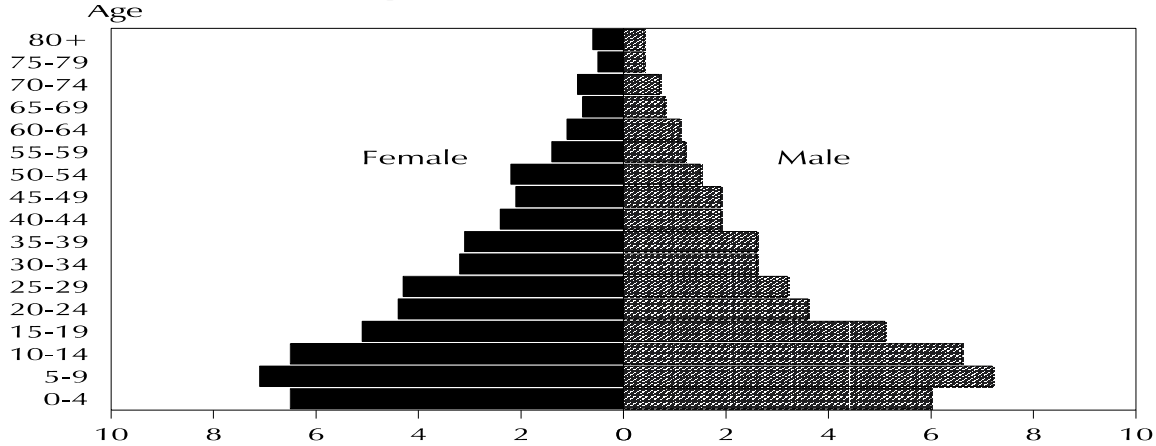

Figure 2: Population Pyramid of Ghana 2010 (GSS, 2013)

Literacy and Education

Sixty-one percent of young women (aged 15-24 years) and 71 percent of young men (aged 15-24 years) are literate. In the richest wealth quintile, 85 percent and 93 percent of young women and men respectively are literate while in the poorest wealth quintile only 31 percent and 41 percent of young women and men are respectively literate.

The primary school net attendance rate (adjusted) is 73 percent. In urban areas, the net attendance rate (adjusted) is 80 percent compared to 68 percent in rural areas. The secondary school net attendance rate (adjusted) is 42 percent, which is 51 percent in urban areas compared to 34 percent in rural areas. The gender parity ratio for net attendance rate (adjusted) is 1.02 in primary school and 1.10 in secondary school (MICS 2011).

Table 1: Demographics of Ghana

Indicators	2000	2012
Population (total)	19.9 million	25.37 million
Populations growth	2.2	2.0
Life expectancy at birth	56.7	64 (2011)
Infant mortality rate (per 1,000 live births)	68.0	53 deaths per 1,000 live births (2011)
The maternal mortality rate	—[a]	485.2 per 100,000 live births (2010)
Prevalence of HIV	2.3	1.37(2012)
School enrolment in primary education	80.5	88.4
School enrolment in secondary education	37.4	43.6
Ratio of boys to girls in primary and secondary education	89.4	92.6
Literacy rate, youth female (percentage of females ages 15–24)		65.5
Doctors-to-population ratio	1: 8,288	1: 14,732 (2009)

[a] Data not available.

Sources:

- World Bank. 2013. World Databank. Washington, DC: World Bank.
- Facts and Figures. Policy Planning, Monitoring and Evaluation Policy, Planning, Monitoring and Evaluation (PPME): 2005, Ghana Health Service
- Ghana 2010 Population and Housing Census Report. Ghana Statistical Services

Socio-Political, Economics and Development

Ghana is a democratic nation, with a centralised presidency-who is both chief of the executive and head of state, cabinet, a multiparty parliamentary system and an independent judiciary. The country is divided into ten regions: Ashanti, Brong-Ahafo, Central, Eastern, Greater Accra, Northern, Upper East, Upper West, Volta and Western Regions. Each region is headed by an appointed Regional Minister who represents the President. The Regional Minister is assisted by a Deputy Regional Minister and a Regional Coordinating Council (RCC) to co-ordinate and formulate integrated district plans and programmes within the framework of approved national development policies and priorities.

Each region is sub-divided into districts which are led by a government appointed Chief Executive. District management is led by the Chief Executive with support from the District Coordinating Director. The District Assembly is the highest political and administrative authority in the district.

Ghana was the first country in sub-Saharan Africa to gain independence from colonial rule, and 2014 marks its 57th year anniversary as an independent nation. There is a vibrant media with the liberalization of the media providing opportunities for the use of various media houses to transmit behaviour change communication information and for engaging civil society in issues on health. Although there are no known legally enacted statutes that discriminate against any members in society, social arrangements and cultural practices have hindered women's ability to make choices that enhance their health. The country has enjoyed continued political stability since 1992 and this has impacted positively on the health sector (Ghana Health Sector Programme of Work, 2012).

The country has a mixed economy, consisting of a dominant agricultural sector. About 60 percent of the adult labour force is involved in small-scale peasant farming. Ghana also has a relatively small, capital-intensive modern sector dominated by mining and other industrial activities and a rapidly expanding informal sector. In 2011, gross national income per capita was 1,830 US dollars (USD).

There have been major changes to the country's economy in the past decade. In 2010 following re-basing of the Ghanaian currency, Ghana became a lower middle-income country. The performance of the economy has substantially improved as Ghana continues to experience macroeconomic stability, indicated by the prudent fiscal and macroeconomic management put in place by the government. This has been accompanied by accelerated economic growth, with the year-on-year real GDP growth rate of 7.1% in 2013[2]. Inflation for year ending 2013 was 13.5%[3].

Health Sector

Ghana has a well-established health care system, but coverage is far from adequate to meet the population's needs. To guard against fragmentation caused by multiple projects, the Government of Ghana (GOG), along with its development partners, focuses on "big picture" issues such as reorganizing the MOH, comprehensive public health planning, and capacity building at both the central and local levels.

Health sector reforms since 1995 have led to the development of three five-year programmes of work (POWs) for the Ministry of Health: the first covering 1997–2001, the second covering 2002–2006, and the third covering 2007–2011. Currently, there is 2013 POW which identifies TB as a priority disease (POW 2013 MOH). Under the 2013 MOH POW, the MOH mandates the NTP to implement a national strategic plan to increase TB case detection and cure rates.

The government of Ghana is committed to improving the health of all people living in Ghana. This encompasses many specific objectives including increasing life expectancy, reducing avoidable deaths and improving quality of life. This is reflected in the health sector mission that seeks to contribute to socio-economic development and wealth creation by promoting health and vitality, ensuring access to quality health, population and nutrition services for all people living in Ghana and promoting the development of a local health industry.

The ultimate **goal** of the sector is to ensure a healthy and productive population that reproduces itself safely by ensuring that people live long, healthy and productive lives and reproduce without an

[2] National Accounts Statistics: Gross Domestic Product 2014. Ghana Statistical Service. April 2014. See at: http://www.statsghana.gov.gh/docfiles/GDP/GDP_2014.pdf

[3] Newsletter: Consumer Price Index (CPI) December 2013. Ghana Statistical Service. December 2013. See at: http://www.statsghana.gov.gh/docfiles/new_CPI_pdfs/CPI_Newsletter_December_2013.pdf

increased risk of injury or death; reducing the excessive risk and burden of morbidity, mortality and disability, especially in the poor and marginalized groups and reducing inequalities in access to health, populations and nutrition services and health outcomes. These are currently captured in the ministry's five strategic objectives:

- **HO1**: Bridge the equity gaps in infrastructure, human resource, and financial access to health care and nutrition services and ensure sustainable financing arrangements that protect the poor
- **HO2**: Improve governance and ensure efficiency and effectiveness in health systems
- **HO3**: Improve access to quality maternal, neonatal, child and adolescent services
- **HO4**: Intensify prevention and control of non-communicable and communicable diseases and promote healthy lifestyle
- **HO5**: Strengthen institutional care including mental Health service delivery [MOH SMTDP 2010]

The top 10 causes of outpatient-reported morbidity are malaria, upper respiratory infection, diarrheal diseases, skin disease, hypertension, home and occupational injuries, eye infection, pregnancy and related complications, rheumatic and joint diseases, and anaemia. It is believed a number of missed TB cases are part of cases diagnosed as upper respiratory tract infection.

Commitment to the Abuja Declarations and international resolutions

In the year 2000, Ghana participated in the African Development Forum in Abuja and signed to implement the Abuja Declaration on HIV/AIDS, TB, Malaria and other Infectious Diseases, which was extended in 2006 to 2015. Heads of States including Ghana committed themselves to take concrete steps in their countries to intensify the fight against Malaria, HIV/AIDS, TB and other Infectious Diseases. The Government of Ghana is currently scaling up the Community Health Planning Service (CHPS) strategy which involves placing trained community health officers (CHOs) in communities to provide a package of essential health services including TB control.

The National Health Policy

The health sector was restructured in 1996 through the Ghana Health Service and Teaching Hospitals Act, 1996, Act 525 to create the Ghana Health Service (GHS) and grant autonomy to the Teaching Hospitals. The Act also refocused the functions of the MOH on the provision of leadership, and policy formulation and coordination for the whole health sector. The MOH carries out its policy formulation function in consultation with the National Development Planning Commission (NDPC) and in partnership with development partners, its agencies, WHO, research and other relevant institutions. Policies developed through this collaborative process are usually informed by the outcomes of sector performance reviews, research findings and technical support provided by the WHO and others. The health sector is currently implementing the 2013 POW and is far advanced in preparing the 2014-2018 health sector medium term development plan (HSMTDP).

In 2012, the Public Health Act 2012, Act 851 was passed to give direction to, and to facilitate the implementation of essential public health interventions. In the essence the objectives of the act include support to programmes and campaigns intended to improve public health and educate individuals about public health risks. Part one of the act covers communicable disease that covers Tuberculosis.

Health Care System Organization

The Health sector in Ghana is public and private. Ghana Health Service and Teaching Hospitals run the public sector. The private sector is made up of faith-based and private-for-profit health institutions. The current health sector organisation provides for leadership at the ministerial level and supported by the following implementing agencies:

- Service delivery (Teaching hospitals, Ghana Health Service, Psychiatric hospitals, Ambulance Service, Blood Service, CHAG, Herbal Clinics)
- Health training and research institutions
- National Health Insurance Authority
- Regulatory bodies.

The Ghana Health Service is a three-tier health delivery system: primary, secondary and tertiary. The primary level is where a Medical Doctor heads a district hospital and a Physician Assistant is in charge of health centres. Community Health Planning & Services (CHPS) zones are in sub-districts, in these areas Community Health Officers (CHOs) work with community volunteers to increase access to health care. A typical district with a population of about 100,000 has one hospital, 5 health centres and 10-15 CHPS zones. The leadership of the district is the District Director of Health Services who works with a District Health management Team and reports administratively to the District Chief Executive (Political Head) and technically to the Regional Director of Health Services.

The regional hospital forms the secondary level of the health care system taking care of referral for the primary level. At this level, general practitioners and specialists provide services for the primary level. There are ten regional hospitals receiving referrals from districts and providing specialist outreach support to districts in Ghana. The Regional Director of Health Services oversees all matters of health in the region, works with a Team and reports administratively to the Regional Minister (Political Head) and technically to the Director General of the Ghana Health Service who reports to the Minister of Health through the GHS Council.

Komfo Anokye, Korle-Bu, Tamale and Cape Coast are the current teaching hospitals providing tertiary care and training of doctors. The Chief Executives of these teaching hospitals report to the Minister of Health through their Boards.

The health sector has adopted an integrated approach to delivery of health interventions. Preventive care, clinical care and emergency services are all important aspects of health service delivery system. As part of the approach, public health interventions are packaged and delivered in communities as part of CHPS and outreaches, in health facilities and at district, regional, and national levels.

Within the regions and districts are multi-purpose disease control technical officers that ensure integrated health service delivery. These officers report to their respective district and regional Directors of Health. At the sub-district and CHPS compounds, disease control technical officers, field technicians, community health nurses, midwives and medical assistants carry out TB control activities as part of their schedule of work.

A Traditional Medicine Department has been created within the sector and has functions including: setting standards, issuing certificate of registration to qualified practitioners and license their premises and collaboration with international bodies such as UNIDO.

There is a National Health Insurance Scheme under the National Health Insurance Act 2012, Act 852 that reimburses the cost of healthcare services in health facilities. TB care and services are however provided free as mandated by the Hospital Fee Regulation, 1985 (L.I. 1313). There are currently discussions to include TB services under National Health Insurance package of services as part of ensuring universal health coverage and future sustainable developmental goals.

Human Resource in the Health Sector

The Ghana National Health Policy captioned Creating Wealth through Health, considers human resource as all human capacity involved in developing, providing, managing or supporting curative, preventive, promotive and rehabilitative health, both in-country and externally, who directly or indirectly influence health development [National Health Policy 2007]. In the light of this, human

resource for Tuberculosis control programme management will be examined at the national (central), regional, and district, facility and community levels.
As at June 2013, the total workforce in the public health sector was 42,000 working in 2205 health facilities. These facilities are made up of 321 hospitals, 760 health centres and 1124 clinics. There are 2,007 highly trained doctors (10,000 populations per 1), 12,763 nurses (10,000 population per 6), 1321 pharmacists and 381 allied health professionals currently working in Ghana.

Health Management Information System

The Health Sector has an integrated monitoring and evaluation plan out of which Ghana Health Service (GHS) has developed its monitoring and evaluation framework. The tracking of health indicators and performance in the country is through the use of the routine health information system, supervisory visits and review meetings.

The Health Sector developed and successfully deployed the District Health Information Management System (DHIMS) software in 2008 to facilitate the management of integrated routine service data for decision-making. The DHIMs is a web-based system centrally hosted by the Central Health Information Management (CHIM) centre, which is a unit within PPME. In 2012 the established DHIMs was improved and upgraded to DHIMS 2. This provides a platform for managing health service data nationwide across all service delivery points. This includes data from public, some private, faith-based and quasi-government health facilities.

Registers are provided at service delivery points in health facilities for collecting client demographic and health service information. These are the primary data sources for monitoring and evaluation within the service. Standard forms are used to manually summarize data from the service registers monthly for transmission to the District level. At the District level, DHIMS is used to collate and analyse the data. Data in the DHIMS can be accessed by users through the use of username and password. However the extent at which data is accessed depends on the user rights and the use of data visualizer. At the facility, district, regional and national levels, data on malaria can be analysed to generate information, which is important for monitoring trends of the programme.

In addition to DHIMS, regular supervisory visits and reviews are carried out. Supervisory visits are technical and can be conducted by districts, regions, programmes or the GHS headquarters Integrated Monitoring. Review meetings are held at all the levels of the health system usually twice a year. Through these meetings summary TB indicators[4] are captured as part of a broad performance-monitoring matrix.

Health Sector Financial Management

The Financial Administration Act 2003, Act 654 (FAA) and its regulations (FAR, 2004) and the Accounting Treasury and Financial Reporting Rules and Instructions (ATF) are the key documents that guide accountability of funds received and managed in the Sector. Project Agreement and Grant agreement documents are also complied with in the custody, disbursement, accounting and reporting for funds. They provide regulations and guidance on how public funds should be managed including revenue receipts, expenditure, records, auditing.

[4] TB Indicators Reported are: Number of Notified Cases, Treatment Success Rate, Case Fatality, Default Rate

Funding the Health Sector

The three main sources of finance for the health sector in Ghana are: the public sector, development partners (DPs), and the private sector, including households. These are channelled to the sector through a variety of different mechanisms, summarised in ***Figure 3*** below.

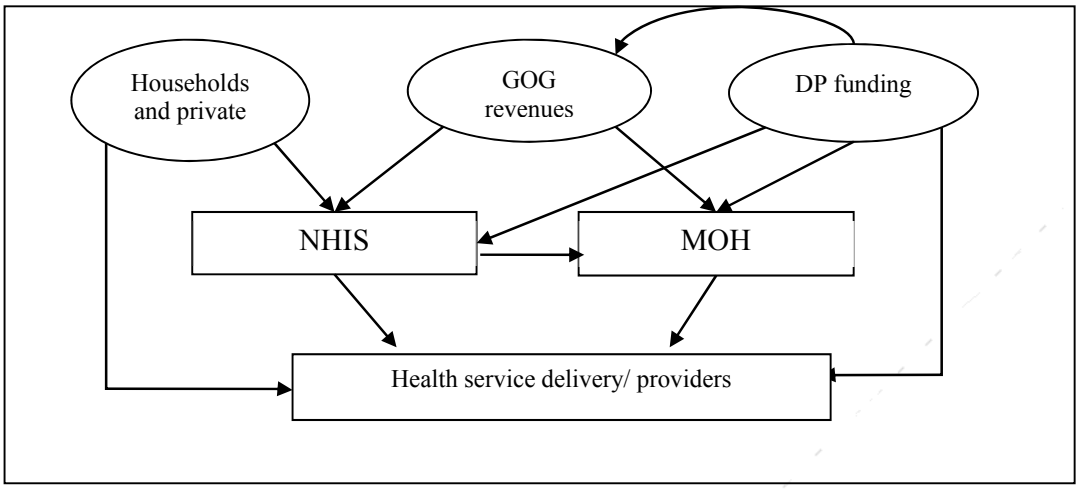

Figure 3: Flow of major funding sources within the Ghana Health Sector (*Source: MTHS, MOH, 2010-2013)*

GOG funding flows through two main routes. First, discretionary funds are allocated to the sector through the Ministry of Health as part of the routine budget. Secondly, statutory funding is allocated to the governing body of the National Health Insurance Scheme (NHIS), the National Health Insurance Council (NHIC), in the form of the National Health Insurance Fund (NHIF). The NHIF is funded by a combination of sources. These include a 2.5% additional National Health Insurance Levy (NHIL) on domestic and imported goods and services, and a 2.5% contribution from the Social Security National Insurance Trust (SSNIT) contributions of formal sector employees.

Development partners provide funding through two main channels: Multi-Donor Budget Support (support of GOG) or Sector Budget Support (SBS) which is channelled to the MOH through Ministry of Finance and Economic Planning (MOFEP) and earmarked funding for specific activities which include both bilateral and multilateral partner support as well as international health initiatives such as the Global Fund for AIDS, Tuberculosis and Malaria (GFATM) and the Global Alliance for Vaccines and Immunisations (GAVI). Earmarked partners provide a combination of grants and loan funding, and the range of partners is expanding to include bilateral arrangements with countries such as Kuwait and China, and partnerships between governments and financing institutions, particularly for infrastructure projects.

The third source of funding to the health sector is from private sources. These private sources include households, corporate organizations, and individuals. Household sources are mainly through fee for services that they pay at the point of receiving care. Corporate organizations and individuals contribute in cash and in kind to the health sector.

Accounting and Reporting

Ministry of Health/Ghana Health Service currently serves as Principal Recipient for Global Fund financing mechanism for Tuberculosis. The Principal Recipient has a finance office that coordinates financial activities of the Global Fund supported programmes in the Ministry. The PR finance office currently prepares payment vouchers and writes cheques to effect payment for the programmes

(HIV/AIDS/TB). The cheques are sent to the programmes after they have been written, and issued from there. The office also supervises the work of the three programmes, prepares financial statements of the programmes for the Ministry, coordinates financial monitoring and coordinates all audits of the Global Fund supported programmes in the Ministry. Programme finance offices also exist to facilitate financial activities at the programme level.

All Ghana Health Service facilities are authorized to open and operate bank accounts in line with the Financial Administration Act. All funds received are lodged into the designated bank account(s) and disbursed from these accounts. All disbursements are approved by the head of department and authorized by the head of finance. Authorization involves checking to ensure there is a budget available for the activity and whether the budget is approved. Authorization also involves checking to ensure that the activity has been performed according to specification and that all details on the payment documents are accurate. In most cases payment vouchers are pre-audited by internal auditors before the cheques are written. Programme activity budget ledgers are maintained to track the movement of funds on key programmes and activities. In most cases, activities in the Programme activity ledgers are pooled on broad disease burden basis and so it is cumbersome to decipher programme activity balances by a specific donor.

NATIONAL TUBERCULOSIS CONTROL PROGRAMME

Ghana Tuberculosis Service (GTS) was formally established with the appointment of its first Director in 1959. Earlier, from 1900 to 1953, TB experts in the then Gold Coast had the herculean task of convincing Governors and MP's of the British colonial authorities that TB was a problem among the natives, until the epidemic took hold and cases were reported from almost all major mining towns in the country. The story post-independence, from 1957, continued with unpredictable funding efforts in Tuberculosis control. It was not until 1994 that TB control was re-branded as **National TB Control Programme (NTP)** and received dedicated funding for its activities for the first time in decades from DANIDA. This was short lived, but within the period the Programme was made visible within the MOH structures under the Disease Control and Prevention Department of the Public Health Directorate of Ghana Health Service (GHS).

The NTP was lifted from a state of neglect and many of its problems were addressed. This resulted in important achievements such as strengthening of the Central TB Unit; standardization of diagnosis, case definitions, and treatment protocols; improved availability of drugs; and training for health staff. By the end of 1998, TB services had been integrated into primary health care, and DOTS coverage at the district level was estimated at 98 percent. However, health sector reforms in 1998 ended the dedicated funding for TB control and along came financing of TB control activities through the "common pot" or sector-wide approach (SWAp). TB control suffered a temporary setback as TB was no longer prioritised at operational levels, because no user fees were charged for providing services.

In 2003 the financing of TB control was improved through Global Fund mechanism.

TB Control Plan Implementation 1994-2013

Three strategic plans have been successfully implemented within the period from 1994-2013. The implementation was to address the neglected TB problem, make it visible, and build the necessary infrastructure, with the ultimate goal of reducing the TB burden.

With full time appointment of Programme Manager, the Central Level Team was strengthened ensuring establishment of the form and structure of the NTP as it is today. This set the platform for development and implementation of strategic plans through resource mobilisation, capacity building, supervision, protocols and guidelines development. The general approach of programme implementation was systematic roll out of interventions initially targeted at high incident geographic populations and key affected populations.

The first plan addressed TB quality issues of diagnosis and treatment in the big cities of Accra and Kumasi from 2002-2006. The second plan focused on higher incident geographic regions and simultaneously addressed service quality in 60 districts while focussing on key affected Prisons population (2006-2008). It was also expanded to address quality issues in 6 cities (urban areas).

The third plan (2009-2013) expanded to cover 10 cities (regional capitals), and targeted the low incident regions with quality diagnosis and treatment.

Through these strategic plan implementations, systems and infrastructure to improve quality access to at least 70% of the population is in place. This ensured sustainability of TB control services as is being experienced now.

The general collective efforts have been directed at:

1. Correcting quality deficiencies of DOTS implementation and integrating into public sector facilities countrywide.
2. Expanding private sector participation
3. Implementing Community based DOTS care.

The most recent strategic plan implementation 2009-2013 focussed on putting in place infrastructure to address the problem of TB/HIV and MDR-TB.

In all these, the National TB Control programme provided leadership to implementing partners to undertake comprehensive multiple interventions in detail at National, Regional district, sub-district and community levels through coordinated approach. Key interventions implemented are summarised below:

- Maintain quality standards of DOTS in all public sector facilities
- Engaging private sector providers in TB control
- Developing the capacities of the laboratories and health staff for drug resistant TB
- Streamlining drug procurement, distribution and logistics management
- Implementing community based TB care activities
- Implementing TB/HIV collaborative activities
- Implementing infection control interventions
- Support control of bovine tuberculosis
- Conduct relevant operations research for programme implementation
- Health system support and strengthened programme management at all levels
- Implementing ACSM activities for stigma reduction and treatment adherence

Presently therefore, the way forward is to scale up best practices and improved upon, while addressing bottlenecks along the way in a sustainable manner.

Financing

The financing mechanisms of all the plans have been from Government of Ghana, DANIDA, and Global Fund Round 1, 5 and 10 grants, with TB CAP, USAID TB CARE I project and WHO providing technical assistance. This is summarised in Table 2 below.

Table 2: Country Strategic Plan Funding Mechanisms

Strategic Plan Period	Funding Mechanism					Total
	GoG	GF	USAID	WHO	Others	
1994 – 2000	Not Available	-	-	$2,400,000	DKK 11,000,000 ($ 1,870,748)	$ 4,270,748
1997 – 2002	Not Available	$ 5,687,055	-	$2,000,000	-	$ 7,687,055
2003 – 2008	$ 51,127,832	$ 31,471,684	-	$800,000	-	$ 83,399,516
2009 – 2013	$ 124,014,795	$ 31,779,698	$ 3,306,624	$ 1,060,000	-	$ 160,452,615

Funding from Global Fund grants has constituted between 15 to 60% of available funding for each year staring from 2003 to 2012 leaving each year with further funding gap.

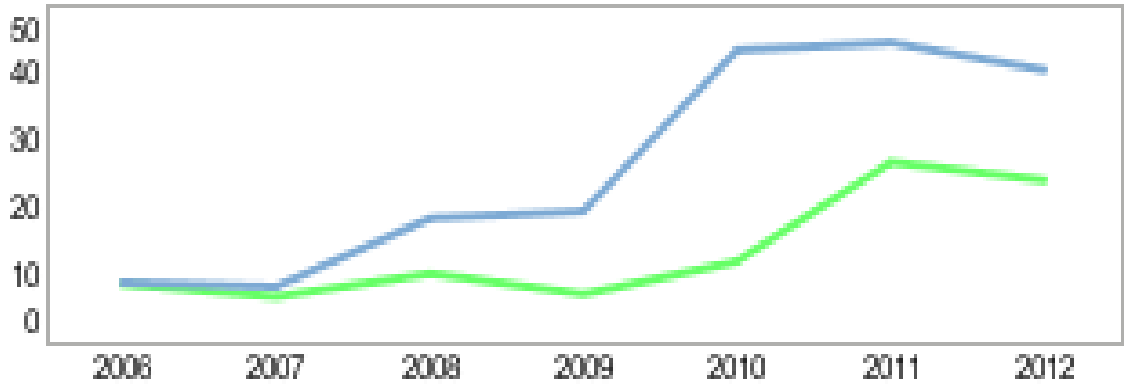

Figure 4: NTP Budget (Blue) and Available Funding (Green) (USD millions)

Best Practices: Improving Programmes Quality & Accelerating TB Case Detection

1. Patient Support (Enablers' Package)

This is a pro-poor strategy that ensures both provider and patient are supported to work together to achieve cure. Application of this pro-poor intervention immensely contributed to overall quality in programme implementation with almost 100% evaluation for all cases detected and treated. Clearly there has been rapid decline in defaulting patients and other adverse treatment outcomes. (Figure 5).

The Enablers' Package is a carefully formulated initiative designed to improve early case detection and adherence to treatment by providing financial or material incentives such as food, transport vouchers, money, and material goods, which will reduce the cost of seeking TB diagnosis and treatment. The current value of the Enablers' Package is USD 65 per patient for a six-month period. The distribution is 50% for the patient; 30% for the health staff; and 20% for the participating health facility. The package is an integral part of TB control in Ghana, and appears to have led to a decrease in the defaulter rates since its inception. In 2003 at the onset of implementation, the total value of the Enabler's Package was USD 100 per patient.

An independent external review of the National TB Control Programme led by WHO and USAID in 2013, attributes the successes of the Programme to the Enablers Package intervention[5] and community based TB care approach.

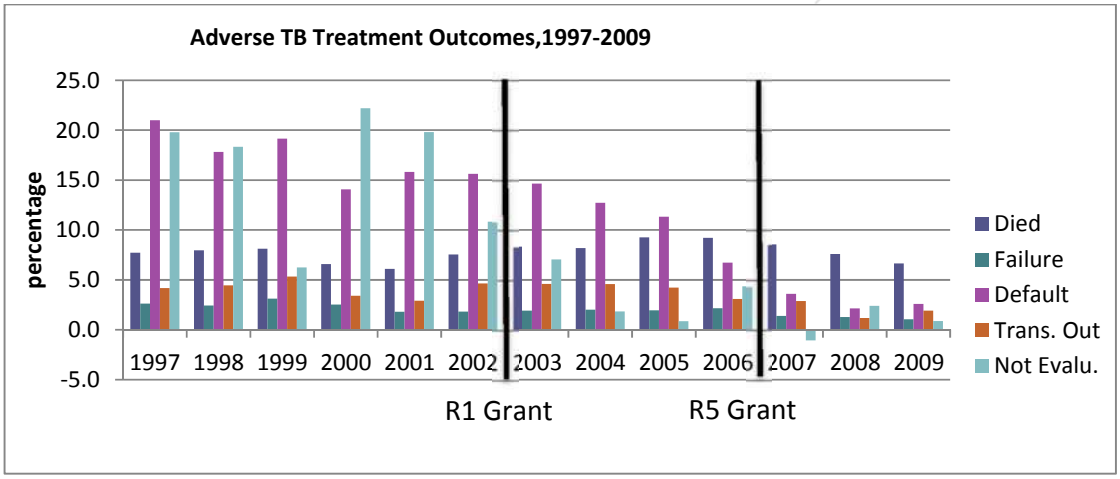

Figure 5: Trend of Adverse Treatment Outcomes 1997-2009

In the early stages of implementing the national strategic plans, two major cities with large and busy health care facilities had the highest defaulter rates. Strategically, therefore the programme targeted and focussed on these facilities. This yielded effective results in improving the quality of treatment outcomes in the cities remarkably reducing default rates from 19.7% to 0.8% with rapid decline compared to the national rate of decline. The intervention positively impacted on improving the overall national defaulter rates reducing it from 14.8% to 6.2% (See Figure 6 below).

[5] Comprehensive Review Report 2013

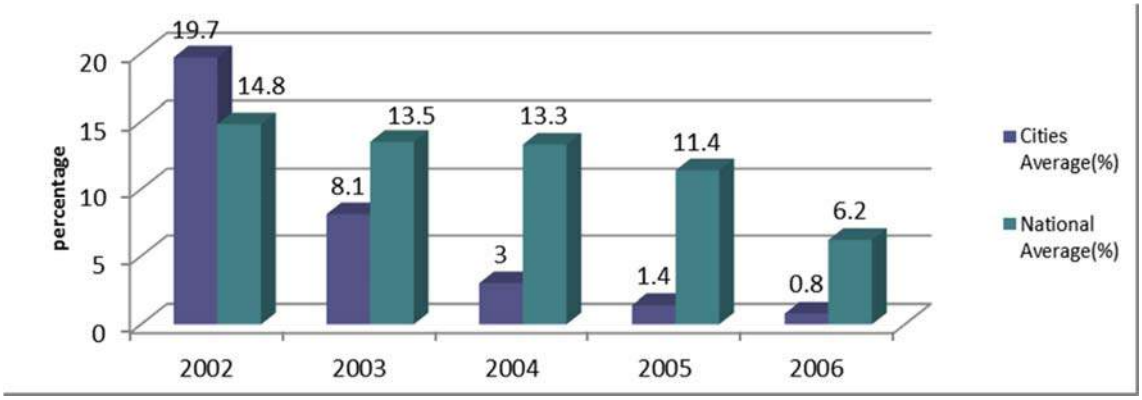

Figure 6: Comparative Trend of TB Defaulter Rates in Intervention Cities & National (2002-2006)

Achievement/Lessons

The lessons learnt from correcting quality deficiencies in DOTS implementation, providing patient care and support and private sector engagement were systematically applied in health care facilities leading to remarkable better treatment outcomes with improvements in defaulter rates (<5%) and other adverse outcomes (Figure 7).

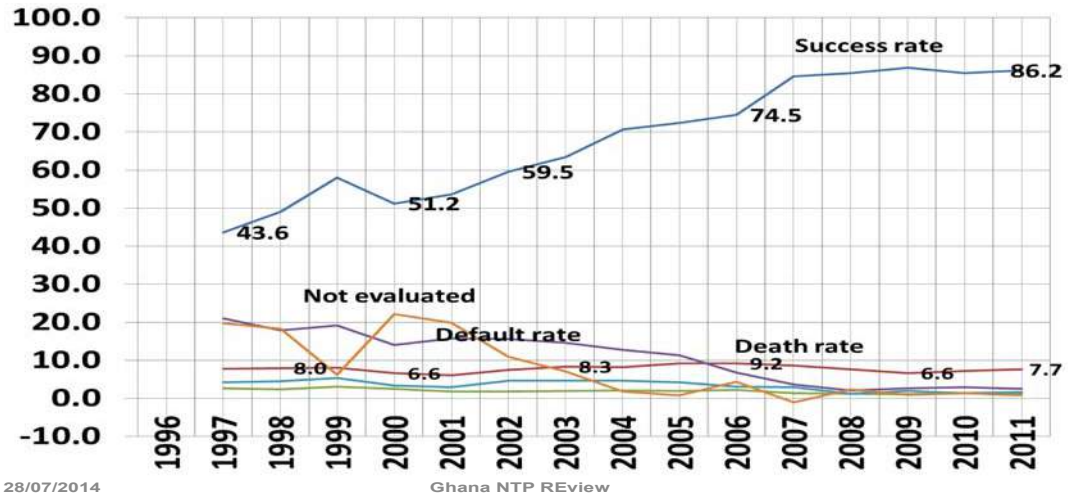

Figure 7: Trends of TB Treatment Outcomes 1996-2011

2. Implementing Innovative Case Finding Activities in Accra

Logically after successfully correcting quality deficiencies in health care settings and in districts, the next step was to look for sustainable ways of improving TB case detection. Generally the improved programme quality and surveillance system naturally also led to increased numbers of notified TB cases during the application of Global Fund assisted round based funding (See Figure 8 below)**.**

Case notification rates however, appear to be stagnant around 60/100,000 person population in the last five years.

Informed by the criteria, easy access to interventions, feasibility and programmatic experience and cost a plan for accelerated progress towards TB case detection was designed. The programme was not oblivious of the fact that factors such as communities with high TB prevalence would lead to higher yield and more comprehensive screening will lead to more yields.

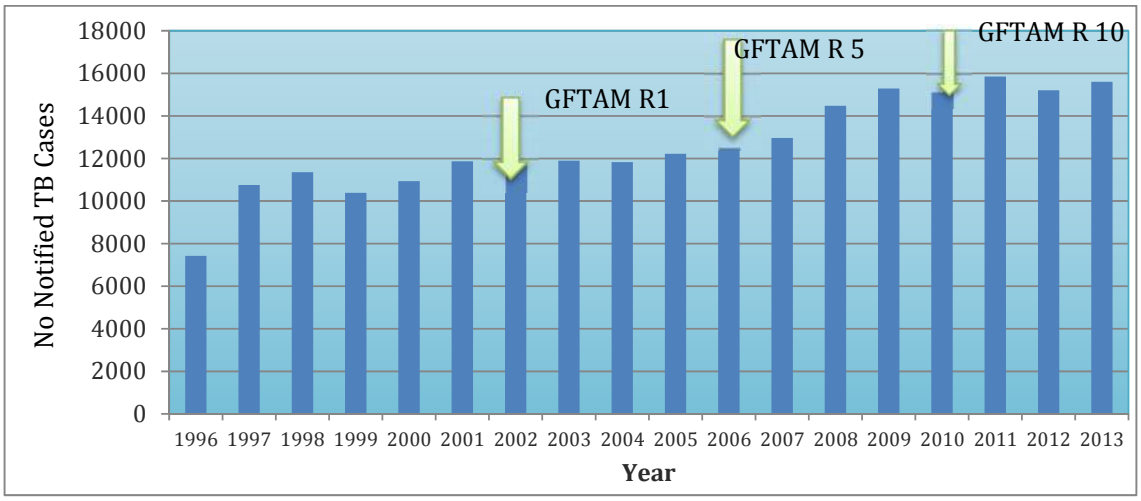

Figure 8: Trend of Reported TB Cases 1996-2013 Showing Global Fund Grant Start Years

TB Screening Prioritization

An approach therefore, on which to screen for TB was fashioned out based on TB case finding "Tree" as in Figure 9 below.

Figure 9: TB Case Finding Tree

High branches: Community wide (door-to-door, mobile units, Prev. Surveys– Enhanced Case Finding) Door-to-door finds harder to reach patients.

i. **Mid-range branches**: (high yield; mod access) HIV-infected populations

ii. **Low hanging branches:** (mod/low yield; mod access) Diabetics, (Alcoholics/drug users/smokers)

iii. **Low hanging fruit:** (mod/high yield; mod access) Contacts; HIV-infected populations (many smear negatives; needing culture and Gene Xpert)

iv. **Fallen fruit:** (mod/high yield; easy access) Prisons; PMTCT; VCT, Hospital based case detection

The programme have implemented fallen fruit, low hanging fruits/branches, and high branches strategies of the TB case finding "tree", drawing lessons to systematically expand to cover the network of health facilities, that is already prepared to support any additional cases detected for better treatment outcomes .

The challenge for the implementation was to address low TB case finding caused by health system delay and patients delay (estimated health system delay for TB diagnosis is 1.7 weeks and patient delay is 9 weeks). The intervention was in the city of Accra and non-intervention city of Kumasi as control.

Intervention: Fallen/Low Hanging Fruits/branches

Six relatively busy facilities of high outpatient attendance were selected for improvement in TB case detection in Accra. For the first time a provider initiated enhanced TB screening strategy was introduced in health care setting. Firstly, a period of time was used to study the health system through preparative activities, aim at getting the commitment of hospitals leadership and clinical staff. This was followed

with staff orientation and re-arrangement of Outpatient department and patient flow. A triage nurse systematically screens all patients presenting with respiratory symptoms for TB using symptom based questionnaire, and those eligible fast track to the laboratory for examination. Frontloading of specimen was used and results were provided as much as possible within 24 hours or latest by morning of the following day. Standard operating procedure (SOP's) and diagnostic algorithms for TB case detection in Hospitals, Contact tracing, PLHIV, diabetic Clinics and community screening developed with assistance from TB Care project 1 was provided to institutions as reference material, after initial orientation for use. An institutional register was kept for each facility. As the intervention progressed task shifting officers and laboratory technicians were recruited to support the increase workload in most busy clinics.

A work plan was finally drawn, as shown below, with the institutions to integrate TB activities as part of routine services and for implementation by designated institutional TB focal point. Larger hospitals were expected to implement minimum activities including:

- OPD based case finding,
- Systematic screening for TB among PLHIV attending ART Clinics and
- Systematically screen for TB among vulnerable groups – Diabetic Clinics, Children's Clinics, Admission Wards and Other Patient Waiting Areas.

Table 3: Work Plan for Stepwise Introduction of Case Detection Strategies

Strategy	2009	2010				2011				2012			
	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Hospital-based case detection													
Contact investigation													
TB screening among Diabetics													
TB screening among PLHIV													
Involvement of pharmacies and chemical sellers in case finding													
Urban Slums													

Legend	
	Preparatory activities
	Initiative implemented
	Introduction of Task Shifting Officers

Linkages of facilities with TB control services and Public Health Teams (District TB coordinator) was formally established. Facilities therefore received all surveillance tools, TB commodities and budget (enablers) to support patient care. The scope of work for institutions includes contact investigation, systematic screening for TB in PLHIV and diabetics (if the hospital runs a diabetic clinic). The work of the facilities was then linked with network of supported Health centres to ensure good referrals systems.

In 2010 with close monitoring and assistance from, and in partnerships with WHO/CIDA the following measures were systematically introduce within the programme context as presented in the Table 3 above.

Limitation/barriers to implementation and proposed solutions

The main barriers were:

- High laboratory work load
- Inadequate personnel/ high staff turn over
- Insufficient supervision from line Managers
- Slow response from health facility managers

The graph below (Figure 10) shows the additional laboratory workload as a result of the implementation, and how it was resolved with mutual benefits to the health system. The number of TB suspects sent to the laboratory increased which led to laboratory technicians complaining and threatening the implementation, until the Human resource aspects were addressed using task shifting officers and laboratory technicians in the very busy clinics.

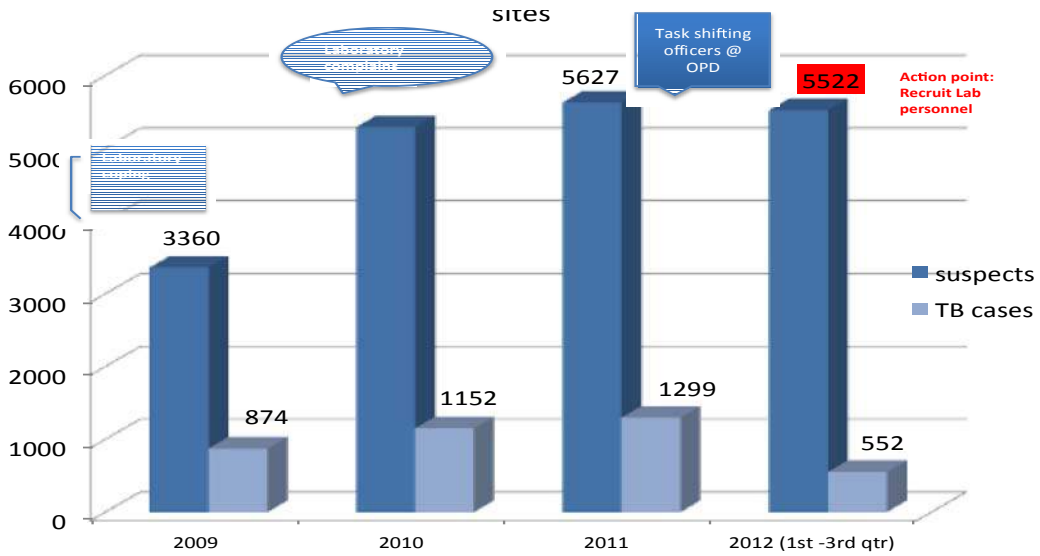

Figure 10: Trend of Suspects Screened With Smear Microscopy & Confirmed TB Cases at Intervention Sites Showing Health System Coping Mechanism

Results

The interventions detected cases that previously may have been missed. In all the interventions implemented the hospital based improvements exceeded target (Figure 11). The second best yield for TB was from screening PLHIV, followed by contact tracing, diabetic screening and community screening in pharmacies in that order. Potentially, all the cases detected from the interventions would have been missed if they were not systematically introduced.

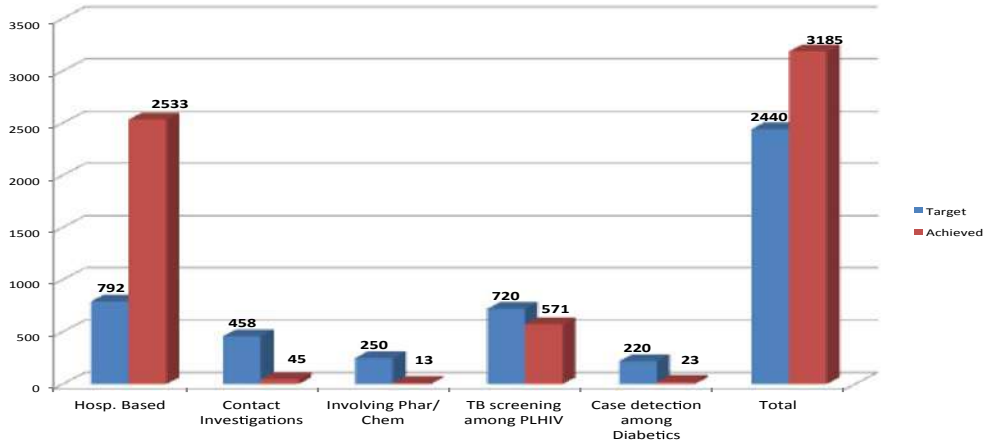

Figure 11: TB Case Finding Through Innovative Active Case Finding Interventions in Accra

Comparing trend analysis of TB case notification data with similar facilities in non-intervention city in Kumasi, an obvious increase in TB cases reported in the intervention city of Accra is observed (See Figure 12 below).

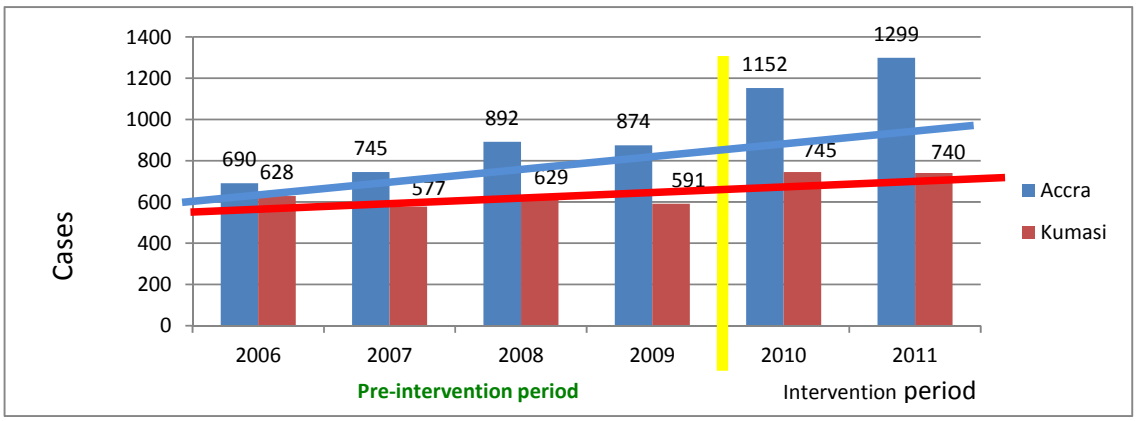

Figure 12: Comparative Trend of TB Cases Reported in Intervention and Non-Intervention Cities

Lessons

Important lessons are listed below:

- Health personnel are willing to rearrange Out-Patient Department systems to include routine TB screening for respiratory symptomatic and other patients.
- Health laboratories accept sputum specimens from other health facilities without TB diagnostic capacity and referrals from Civil Society Organisation's (CSO's) working in the communities though this invariably increases the volume of work.
- Owing to a health system unique challenge of high staff turnover at Out Patient Departments, hospitals with high throughput OPDs required Task Shifting Officers to support screening at the OPD.
- Pharmacies and Chemical Shops are effective referral points for TB case finding.
- TB services have been fully mainstreamed into the general health services at all levels of service delivery.

Health System Strengthening Effect

Infection control: The changes made to the hospital systems were used to strengthen health system, by contributing to improving infection control at overcrowded OPD's. Potential infectious presumed TB cases were promptly removed thereby reducing duration of exposure to other patients.

Human resource: Task shifting officers introduce to support workload at the OPD as a result of the systematic screening were also utilize by the hospitals for other tasks owing to the peculiar health system problem of rotational staff.(staff turnover)

Additional laboratory personal recruited to support the increased workload of sputum examination were also available to the hospital for other laboratory duties.

Way forward

Further improvement for expansion to include network of facilities should include

- Intensify supervision and on-site coaching of case finding
- Use X-rays to compliment diagnosis as part of initial screening tool for suspects in selected implementing sites.
- Explore the use of newer diagnostics (e.g. Gene Xpert) to reduce turnaround time for diagnosis in PLHIV and selected Clinics.

3. Case Detection among key affected populations

While the general population is at risk owing to the nature of the TB epidemic in Ghana, the most vulnerable populations such as PLHIV, prisoners, diabetics, mining communities are scattered throughout the geographical spread in both TB high incident districts and non-high incident districts among the general population.

The strategic approaches therefore are to identify and screen the vulnerable populations in 4 key settings:

1. Hospital care setting(PLHIV, diabetes, elderly, pregnant women)
2. Community (household contacts, community contacts)
3. Residential institutions such as Prisons)
4. Work places(e.g. miners and those exposed to silica)

This has been tested and results obtained for PLHIV, diabetics and household contacts in the hospital setting and will be systematically expanded to cover the network of health care facilities

Prisons

Prisoners have been systematically reached and integrated into routine programme activities in a sustainable manner. This approach has been passive. TB case notification rate among prisoners is higher than the case notification rate of 62 per 100,000 people in the general population. (See Table 4 below). In addition, HIV prevalence among the prison population is 2.3% (males 1.5%; females 11.8%) as compared to the general population of 1.3%[6].

Table 4: Trend of TB Cases Diagnosed Among Prisoners in Ghana, 2007-2012

Year	Prison Population	TB Cases	TB Deaths	CNR/100,000 pop	Fatality	% TB Among Inmates
2007	13,335	94	12	705	12.8%	0.7%
2008	14,128	127	23	899	18.1%	0.9%
2009	14,171	182	19	1284	10.4%	1.3%
2010	13,500	68	17	504	25.0%	0.5%
2011	14,671	35	11	239	31.4%	0.2%
2012	15,171	43	14	283	32.6%	0.3%

Through an expanded collaboration with the AIDS Control Programme, different approaches would be employed in the current plan. Mobile digital X-ray equipment acquired in 2013 would be used to routinely screen all prisoners once a year to complement other interventions.

Mining Populations

Mining takes place in all regions in Ghana. The population affected by mining in Ghana is not exactly known, but population affected by precious minerals mining is estimated to be about one million including illegal miners scattered over 17 districts covering 6 geographic regions.[7]

There are well known precious minerals mining districts where the Programme has undertaken activities. These mining districts/communities were systematically reached and the services integrated into the Programme. The approach has been passive. Results from these mining districts are presented in Table 5 below.

The performance of the mining districts indicates that they are at various stages of correcting underlying poor programme quality. The notified cases pattern is not different from other districts. The responses from implementing districts vary and are dependent on availability of infrastructure and health personnel.

[6] IBBS Among Prisoners 2014

[7] Mining in Ghana 2013. Minerals Commission of Ghana

Table 5: Routine TB Case Notification and Treatment Success Rates in Selected Mining Districts, 2010-2012

Region	District	Total Pop	Reported TB Cases			CNR/ 100,000 pop, 2012	Treatment Success		
		2012	2010	2011	2012		2010	2011	2012
Western Region	Tarkwa-Nsuaem	94,132	182	185	171	197.5	82.4%	93%	84.86%
	Prestea-Huni Valley	165,740	160	134	159	104.3	86.9%	97.8%	99.43%
	Wassa Amanfi West	167,677	84	98	119	77.1	92.9%	94.9%	97.85%
Eastern Region	Kwaebibirem	200,735	362	208	129	69.9	66.6%	78.4%	77.36%
	Atiwa	115,317	56	42	30	28.3	80.4%	95.2%	86.67%
	Birim North	82,256	42	62	56	74.0	90.5%	91.9%	76.79%
Ashanti Region	Obuasi Municipal	177,871	27	31	17	154.6	74%	83.9%	84.58%
	Amansie West	141,683	61	70	61	46.8	90.2%	98.6%	93.44%
	Asante Akim North	148,394	186	203	206	150.9	83.3%	69%	68.93%
Brong-Ahafo Region	Asutifi	110,768	42	58	48	47.1	90.5%	33.7	93.75%
	Tano North	83,694	54	59	41	53.2	78%	25%	90.24%
	Wenchi Municipal	93,914	26	27	32	37.0	53.8%	86.36%	84.32%

Active TB Screening (High branches intervention)

Mining & Urban vulnerable communities, refugees and host communities in a higher incident region (Western Region) using stepwise geographical community target approach and mobile diagnostic van with active case finding team.

Among mining districts, urban slums and refuges populations some sections do not use TB services or health care in general. These vulnerable populations are harder to reach. Often they do not use our services and are relatively poor as compared to the general population. The Programme therefore in collaboration with TB Reach International Organization for Migration (IOM) intensified case detection efforts through a community screening approach in Sekondi-Takoradi Metropolitan, Tarkwa-Nsuaem Municipal, Prestea-Huni Valley Municipal, Ellembelle District and Jomoro District, all in the western region of Ghana. We compared case detection efforts with a control population.

Target populations: The target population for this project is estimated at 317, 495 (30.3% of the total Regional population) and broken down as follows:

a. Refugees, their host communities and cross border population in Jomoro district: 39, 695 (1000 refugees, 20,716 host population, 17,979 cross border population.);

b. Refugees and their host communities in Ellembelle district: 29,932 (4733 refugees, 25,199 host population);

c. Miners and communities around mine fields in Tarkwa district: 63,770 (10,594 miners, 53,176 person population around mine fields)

d. Miners and communities around mine fields in Prestea/Huni Valley district: 46,542 (3,333 miners, 43,209 person population around mine fields), and

e. Urban vulnerable living in slum-like settlements in and round Secondi-Takoradi Municipality-137,556

Control population: Five districts that do not share or minimally share borders with the intervention districts formed the control population. Names of the control districts and TB treatment centres are listed in Table 6 below.

Table 6: List of Facilities in Selected Districts in Western Region Implementing Active Case Finding

District	Facilities
Aowin Suaman District	Enchi Hospital, Presby Hospital and Dadieso Health Centre
Juabeso District	Juabeso DHA Hospital; Mamudu Private Clinic; Bonso NKT Health Centre; Asempeneye CHPS and Bodi Health Centre
Sefwi Wiawso District	Sefwi Wiawso Hospital and Asafo Hospital
Sefwi Bibiani-Ahwiaso Bekwai District	Bibiani Hospital; Ahwiaso Health Centre; Bekwai Health Centre; Awaso Hospital and Asawinso Health Centre
Bia District	Essam Health Centre; Essam Hospital; Kwamebikrom Presby Health Centre; Kaase Health Centre; Adabokrom Peace Maternity; Adbokrom CHPS; Manfoase Saviour Clinic; Amoashed CHPS; Adjoafua St. Luke Clinic; Mempeasem Health Centre and Asamenynokrom Health Centre

The intervention period was over one year, and was implemented as follows:

- Community mobilization and screening for chronic cough through door-to-door visits of targeted communities;
- TB screening using mobile diagnostic van with Gene Xpert MTB/RIF's machine of all presumed TB cases according to programme guidelines.

The use of Gene Xpert MTB/RIF was to address the problem of low diagnostic sensitiveness of microscopy.

Results

Initial results show that for the period Q2 to Q4/2013, the project achieved a 23% additionally on new sputum smear/bacteriological TB case notification and 30% on all forms of TB (See Table 7 below).

Table 7: Additional TB Case Finding through Active Case Finding Intervention in Western Region

	Population	Historical Baseline Notifications			Implementation Period Notifications			Unadjusted additional cases	% change from baseline
		Q2/12	Q3/12	Q4/12	Q2/13	Q3/13	Q4/13		
SS+/B+	Evaluation	139	113	142	145	170	149	70	18%
	Control	51	66	62	65	58	47	-9	-5%
	Difference (% Evaluation minus %Control)								23%
All forms	Evaluation	207	196	212	223	251	289	148	24%
	Control	65	92	95	85	75	77	-15	-6%
	Difference (%Evaluation minus %Control)								30%

Lessons:

- Community active screening of key affected populations is much more expensive compared to the others interventions and should be complimentary rather than as routine activity. The capita cost to detect and successfully treat a TB case in the intervention region is USD 127. (Source: NTP, Ghana). This compares to per capita cost to only detect without treatment in community active TB screening as USD 1667. (Source: TB Reach IOM)
- It would be difficult to implement this "project like" approach as an integral component of TB control services in higher incident regions and is unlikely to be sustained.
- The effective social mobilization lessons from this targeted approach would complement provider-initiated hospital or facility based TB screening (fallen/low fruits/branches interventions) for maximum effects.
- Results of the recent National prevalence survey study have shown that TB prevalence is high 657 (410-907) per 100,000 adult populations and in older age male population. Targeted screening among this high TB prevalence population would lead to higher yield for TB.

STRATEGIC (SWOT) ANALYSIS

The NTP's major strength is in its successful track record and capacity to implement multiple interventions in PHC setting in an integrated health system.

Other beneficial strengths are:

- The programme is integrated into the general health systems and that makes deployment of new tools and technology much easier.
- TB services are delivered and built into existing structures to ensure sustainability.
- A dedicated and experienced Central TB Unit exists to ensure standards of TB care are maintained at all levels by the multipurpose health worker at operational levels.

However, there are inherent weaknesses that ought to be addressed and these include:

- Human resource constrains and health system inability to recruit adequate staff to deliver optimum care owing to a temporary governmental directive.
- High internal staffs turn over owing to internal re-posting of staff to meet general care services demand.
- High competing demand on staff and workload that leads to lower motivation for particularly staff directly working on disease conditions potentially considered infectious such as TB.

Notwithstanding the observed weaknesses there are opportunities to mitigate some of the implementation challenges such as:

- Use of technical assistance missions would improve the HR and build local capacity
- Utilizing external resources to temporary recruit to fill critical human resource gaps.

Obvious threats that the NTP faces are:

- Emerging new infectious diseases with pandemic potential such as Influenza Virus Diseases, Ebola Haemorrhagic Disease. The high rate of transmission and rapid global spread would affect resources earmarked for old diseases.
- Unstable domestic and global economic conditions especially affecting the prices of commodities like cocoa, and oil are undermining the progress made and pose a major threat to disease control interventions. Though Ghana has benefited immensely from Global Health Initiatives like GF support to fight HIV/AIDS, TB and Malaria, it is still faced with competing economies in accessing development funds.

Structure of the NTP

TB control is seamlessly integrated into the GHS structure at the primary, secondary, and tertiary levels of care. Each region, district, and health facility has a TB Team of health workers to implement TB control activities at that level headed by the Technical Head (Deputy Director Public Health, District Director of Health Services or Medical Superintendent). The TB Focal Person (Regional, District or Institutional TB Coordinator) supervises the daily implementation of TB programme activities. This team is also responsible for ensuring the success of the public-private partnership (PPP) DOTS programme, which is part of the integrated essential health package in all public health institutions and faith-based health facilities.

Central Level

The responsibilities of the NTP's Central Unit include ensuring political commitment to the programme as well as resource mobilization. This entails liaising with various departments in the MOH and GHS and numerous implementing partners and justifying for TB to remain a national priority. The Central Unit also provides overall technical leadership through the development and publication of programme

policies and guidelines. The NTP works closely with the Chief Pharmacist in the MOH Department of Pharmacy to ensure a regular supply of quality-assured drugs, supervises the regional levels, and participates in training at various levels. The NTP is the technical arm for the implementation of TB-specific GFATM grants and is responsible for the planning, budgeting, and technical oversight of these activities.

One national-level meeting is held annually to present programme information covering the past year, to plan for the next year, and to evaluate the implementation of programme activities. Information about upcoming initiatives is also disseminated at this meeting.

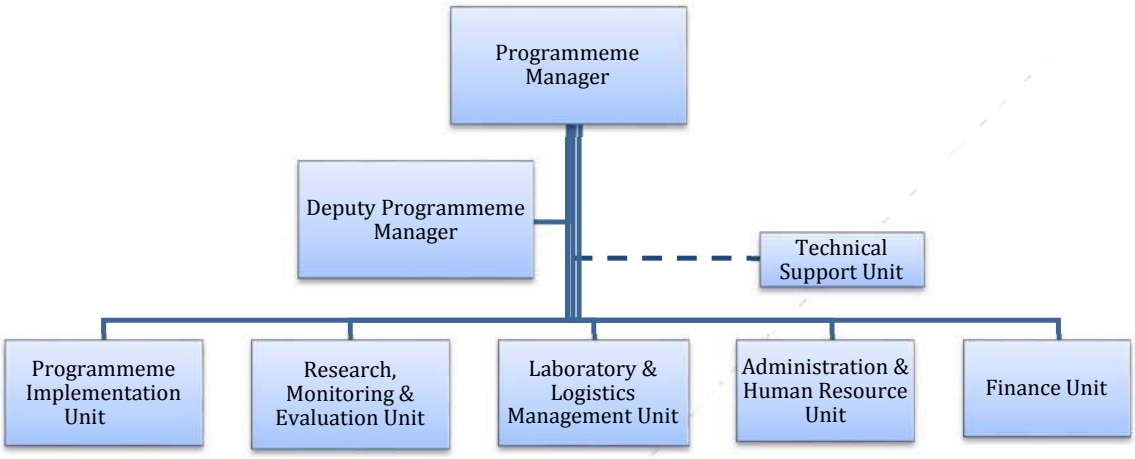

Figure 13: Organogram of the NTP

The **Programme Manager** is the overall manager of both Technical and Support functions of the NTP. He is an experienced Senior Public Health Specialist responsible for developing capacities and providing strategic direction for programme implementation.
The **Deputy Programme Manager** is also a Public Health Specialist who supports the Programme Manager in day to day programme management but directly supervises Programme implementation.
The **Technical Support Unit** is made of international partner agencies that provide technical support to the NTP. These include WHO and MSH.

The Central TB Unit has 5 Units implementing programme activities. These Units do not operate independently but are coordinated and supported by the larger health system structures such as Public Health Division, Policy Planning Monitoring and Evaluation Division. They are:
Programme Implementation Unit: Directly supervises and oversees the implementation of programme interventions across the country. This Unit is headed by the Deputy PM and links with the national health system through the Deputy Directors of Public Health.

Research, Monitoring & Evaluation Unit: Monitors and evaluates the implementation of programme interventions. An experienced M & E Specialist heads the Unit which consists of Programme Officers and Regional M & E Officers.

Laboratory and Logistics Management Unit: This Unit directly supervises laboratory services and manages programme logistics. A Senior Laboratory Scientist and Pharmacist jointly manage this unit. The Laboratory Scientist ensures delivery of quality laboratory services to meet international standards whilst the Pharmacist manages programme medicines and other logistics.

Administration & Human Resource Unit: This Unit manages the administrative business of the Programme and Human Resource. An Administrator manages daily activities and a Human Resource Focal Person coordinates human resource related issues.

Finance Unit: This Unit manages the finance of the Programme. A Chartered Accountant with health systems management experience heads the Unit. The Unit ensures prudent financial management of programme finances and reports to relevant authorities.

Staff at the CTU is made up of permanent employees of the Ghana Health Service and those recruited under the Global Fund Grant to support the expanded scope of programme implementation. There is no dedicated staff for Tuberculosis Control Programme at lower levels of implementation. Beyond the national level, focal persons are appointed to exercise an oversight responsibility for tuberculosis related activities. The focal persons are health workers with varying backgrounds who have added on responsibilities in TB control at their level. They may not have specific training in TB control prior to engagement but are trained on the job to build their capacity to support programme implementation. The organizational structure of the health service does not place these focal persons directly under NTP and they do not receive additional remuneration for the activities they perform. It is however, the responsibility of national level staff to ensure that TB services provided in this integrated arrangement is of optimum standard.

TB patients are diagnosed through the general outpatient clinics or on wards however their care is managed from DOTS Corners in these facilities. TB care is largely ambulatory with few facilities occasionally admitting patients during the intensive phase of treatment. At the community level, there are Community-Based Agents or Volunteers who perform the functions of Treatment Support[8]. TB control activities from CHPS compounds have not been optimized as part of community based TB care in spite of the overwhelming body of evidence supporting the benefits of the CHPS concept for scaling up CBTC.

National Level Activities

- Organize and/or support training for:
    a. Regional TB coordinators
    b. Regional laboratory technicians
    c. Teaching hospitals
    d. Prisons, military, and police institutions
- Procure anti-TB drugs and laboratory supplies
- Organize and coordinate
    a. National TB review meetings
    b. National TB advisory board meetings
    c. Technical working group meetings
- Promote understanding of TB among health staff and communities
- Conduct surveys
- Conduct HIV prevalence studies among TB patients
- Conduct internal review of programme activities
- Review *TB Control Manual*
- Provide technical support visits to the regions
- Review *TB Training Manual*
- Develop a policy on MDR-TB
- Review TB surveillance forms
- Commission technical assistance in various areas

Regional Level

At the sub national level there are 10 administrative regions and three teaching hospitals that report TB surveillance activities and manage programme resources. The teaching hospitals: Komfo Anokye

[8] TB Training Manual. Introduction to WHO Stop TB Strategy and TB Control Programme. Pg 19-20

Teaching Hospital (KATH), Korle Bu Teaching Hospital (KBTH), and Tamale Teaching Hospital (TTH) are major referral hospitals that provide inpatient and outpatient specialized services. The teaching hospitals support clinical supervision for TB care in collaboration with national and regional health care managers.

NTP management differs among regions. In some regions the TB team is made up of various professionals: regional laboratory biomedical scientist, pharmacist, doctor in charge of the TB clinic, district director of nursing services, and regional disease control/surveillance officer. In other regions the team consists of only the TB coordinator supported by the deputy director of public health. The functions of the regional team include data management and report writing, planning and budgeting, commodity distribution (anti-TB medicines, laboratory supplies, and materials), training of district managers, monitoring and supervision at the district level, and organizing regular quality assurance visits for sputum smear microscopy. Each region has one trained doctor (the referral clinician) to provide support in the management of treatment failures, chronic cases, and other clinical problems that require assistance.

Regional Level Activities

Regional Coordinators will coordinate tuberculosis control activities in the region. The Regional Coordinator works closely with the Senior Medical Officer for Public Health, and is directly responsible to the Regional Director of Health Services. Responsibilities of the Regional Coordinator include the following:

1. Train:
    a. District TB Coordinators in cohort analysis and M&E
    b. Hospital staff (regional and district) in TB management and control
    c. TB laboratory focal persons in each district to implement TB microscopy quality assurance programme
2. Organize quarterly district and institutional TB coordinators review/update meetings.
3. Intensify technical support and monitoring visits to the District TB coordinators
4. Promote ACSM activities, including World TB Day activities on 24th March
5. Procure TB drugs and other logistics regularly.
6. Develop region-specific plans to improve case detection and treatment outcomes
7. Initiate innovations that will support TB control

District Level

In each district, the district director of health services has primary responsibility for TB control, with one technical person who is appointed as the district TB coordinator to assist in coordinating TB control activities. These activities include planning and budgeting, training and supervision of health staff, and programme monitoring through supportive supervision. As health services are integrated, all district TB coordinators assume various other responsibilities outside of TB control. Those districts that have public-private mix (PPM) activities are also responsible for monitoring, supervising, and reporting on such activities undertaken in their jurisdiction.

District Level Activities

District Directors of Health, whose duties include TB control, will support and supervise District TB Coordinators.

1. Set up DOTS centres in all health facilities (at least two functioning microscopes for 100,000 population)
2. Train health personnel to support TB control in each sub-district
3. Establish a system of transporting sputum specimens to diagnostic centres
4. Link hospital level TB activities with District Health Management Team (DHMT) activities
5. Establish mechanism to prevent, detect, and to trace defaulters
6. Undertake ACSM, including World TB Day activities
7. Involve community-based NGOs and others in TB treatment supervision, at least in the continuation phase

8. Link TB and HIV activities where appropriate, especially in the field of counselling and patient care
9. Develop district-specific plans for improving case detection and treatment outcomes
10. Initiate innovations that will support TB control

Facility and Community Level
TB treatment can be accessed at both public (including mission health facilities) and private accredited sites. More than 1,600 facilities provide TB DOTS, of which more than 75 are private facilities. As health services are integrated, a designated public health nurse (or any other health worker) will be responsible for TB control activities such as TB registration, follow-up of TB patients, and compiling quarterly reports through cohort analysis.

Community health workers and community volunteers are involved in TB control through their participation as treatment supporters within the Enablers Package programme, as well as assisting in defaulter prevention and tracing. The NTP is also supporting some NGOs in efforts to enhance public awareness about TB with the goal of increasing TB case detection.

NGO/Civil Society Activities
NGOs are expected to contribute to national goals and objectives. They are essential partners of treatment and diagnostic facilities. Their responsibilities include the following:
1. Collaborate to support district TB control activities
2. Undertake community-based TB control activities, namely patient and community education, advocacy, social mobilization, and defaulter tracing
3. Provide support to home-based supervised treatment, including contact tracing
4. Refer suspected cases of TB from the community to diagnostic centres
5. Take part in district TB review meetings
6. Participate in World TB Day celebrations
7. Initiate innovations that will support TB control

Local Partners of the NTP
The NTP has worked and continues to work closely with various stakeholders in planning and implementing TB control activities. Key stakeholders include the National AIDS Control Programme (NACP), the CCM, the STOP TB Partnership of Ghana, the Noguchi Memorial Institute of Medical Research (NMIMR), CHAG, School of Public Health, Medical Schools, private practitioners, community-based organizations, and civil society organizations. Presently, the Stop TB Partnership, an umbrella body of the Civil Society Organizations, is housed within the NTP to enhance and facilitate collaboration towards TB elimination efforts to achieve a common goal.

International Partners of the NTP
Since the re-structuring of the NTP in 1994, a number of international partners have provided and continue to provide financial and technical support to the Ghana NTP. These international partners include USAID, MSH (through the TB CAP and TB CARE I), DANIDA, KNCV Tuberculosis Foundation, WHO, IUATLD, DFID, and the Global Fund.

EPIDEMIOLOGIC ANALYSIS OF THE TB BURDEN

Understanding and knowing the TB epidemic

For the first time in more than 57 years the true estimated TB burden from recent 2013 National prevalence survey results (soon to be officially released) is as presented below.(table 8). This is an initial analysis and it is projected that the final estimate may be higher. The disease burden is much higher than previously thought. Previous estimates by WHO has put TB prevalence at 92 per 100,000 population, while preliminary results of the National TB prevalence survey suggest an overall adult prevalence of 286 (229-343), three, three times higher than the existing estimate. The newly calculated case detection is 21% (2013) compared to estimated value of 81% case detection rate for 2012.

Table 8: Preliminary National TB Prevalence per 100,000 adult Population (95% CI)

	S+	All study cases
Total	139 (97-181)	286 (229-343)
Male	206 (139-272)	334 (244-426)
Female	91 (49-135)	251 (187–316)
Age Group (years)		
15-24	54 (16-92)	137 (73-201)
25-34	53 (1-105)	199 (117-281)
35-44	131 (59-203)	264 (140-388)
45-54	265 (163-367)	392 (256-526)
55-64	291 (101-481)	521 (305-738)
65+	290 (106-475)	657 (410-904)

It is clear that TB burden is higher among males than in females from the recent initial analysis of the prevalence survey (Table 8). This is against the background that HIV sero-prevalence among females is higher and by trend analysis consistently higher among females' registered TB patients. (Figure 36) This may suggest besides HIV, there are other drivers of the TB epidemic. Further analysis shows the nature of the epidemic is generalised occurring in all age groups but that older age males (45-74) bear the biggest brunt of the TB burden (Figure 14). Indicating perhaps decades of interventions is making the greatest impact on the 15-34 age groups. There is opportunity to explore further the underlying reasons for this observation through programme-based operations research.

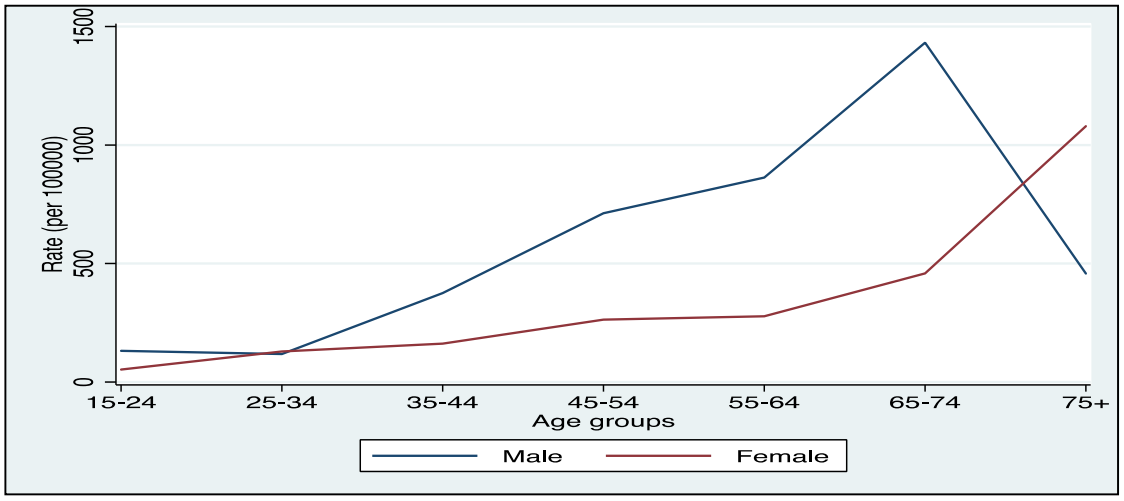

Figure 14: Case (crude) Prevalence by Age and Sex

Case notification data for 2013, however, shows low notification from the age groups 15-34 years and 65+ years, suggesting perhaps under diagnosis in routine system. (See Figure 15 below). Lessons from

the prevalence survey suggest active case finding targeted at high risk older age groups would yield more cases from this underserved sub-population who perhaps is not utilising TB services.

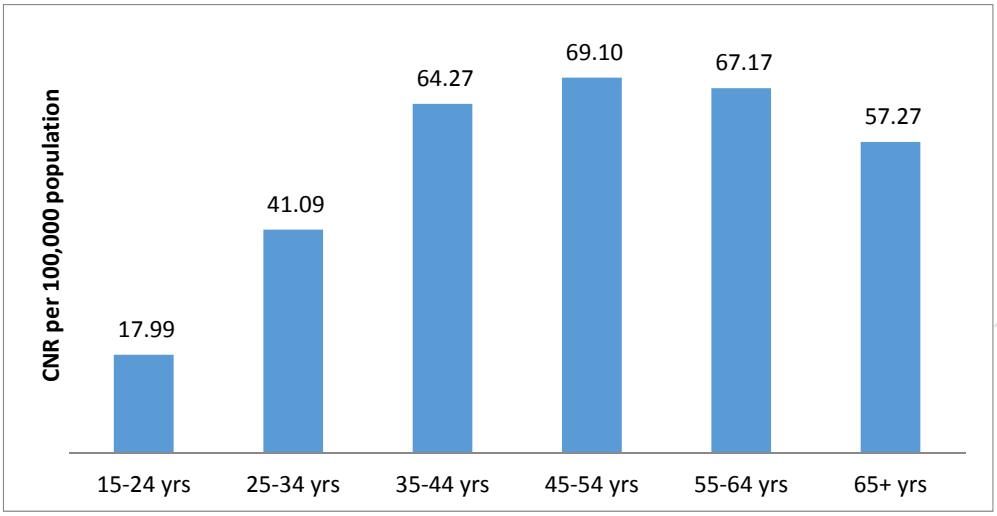

Figure 15: Case Notification Rate (CNR) by age group (2013 surveillance data)

Prevalence surveys are not designed to determine disease burden in sub-populations however, notification data points to a countrywide epidemic with higher incident regions and districts. (Fig. 16 & 17)

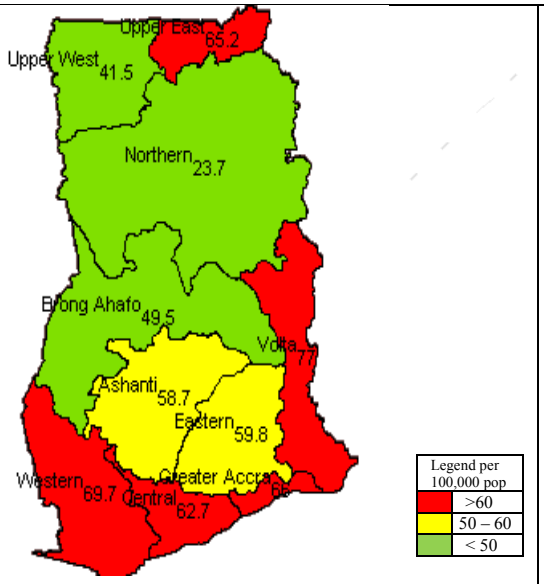

Figure 16: Regional TB Case Notification Rate per 100,000 Population, 2013

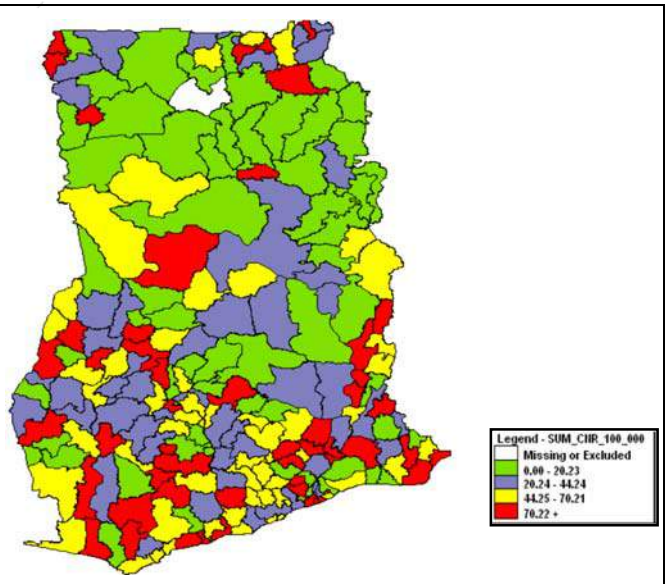

Figure 17: Case Notification Rate by Districts 2013

Among the low incident regions like Upper West, Northern and Brong-Ahafo Regions (Figure 16) there are high incident districts. (Figure 17) Of particular note are 8 high incident districts that border neighbouring countries. (Figure 17). It is also clear that most high incident districts are located in southern Ghana (Greater Accra, Central, Western, Ashanti Eastern and Volta regions) with Upper East region being an exception. The health infrastructure coverage is high as compared to the 3 other low incident regions. Within regions of low incident TB cases, districts with high incidence of cases have

more health facilities and are relatively endowed. The geographical distribution of TB diagnostic and treatment facilities is also unequal between urban and rural areas and among the regions. (Figure 18 & 19 below) Within some regions are areas with intense mining activities, and they are evenly spread throughout both high and low incident districts.

The TB epidemic therefore in Ghana can be described as **generalised** and the appropriate response would vary minimally across the country's geographic regions. Response to the epidemic therefore is to facilitate access to TB services for at least 70% of the general population and 95% of the vulnerable populations through an extensive network of public, private facilities appropriately linked to health centres and tertiary facilities. Improving access to TB care and prevention is therefore a combination of targeted mobile or outreach programmes to populations with high TB prevalence, health facility focused services and social mobilization. Underlying and uncompromising to all these approach is minimum dedicated and motivated health workforce, guaranteed and predictable supply of TB commodities and removing economic barriers, socio cultural and geographical barriers to care.

However access to major health facilities has not changed much since 2009 when a study conducted in two regions showed that hardly any inhabitants have access to a health facility between 5 to 15 kilometres radius[9]. The geographical access is particularly challenging in the Northern and Brong-Ahafo Regions where the populations are sparsely distributed.

TB Laboratory Services

There are three (3) main types of Clinical/Health Laboratories that provide TB laboratory services namely: Public, Hospital-based, Private Hospital-based and Independent (Stand-alone) laboratories, there is uneven geographical distribution of the health laboratory facilities in the country. Of the total number of public laboratories in the country 67% perform TB microscopy In Ghana, majority of the independent (stand-alone) and private laboratories are located in the urban centres, notably, Accra, Kumasi, and other regional capitals, only 22% perform TB microscopy See Table 9 below for laboratory facilities by type/ownership.

Table 9: Distribution and Ownership of Laboratories in Ghana, 2013

Regions	GOG	Faith based / Quasi Gov't	Private	Total	TB centres including private	Private TB labs
VR	46	8	10	64	33	2
UE	28	13	14	55	22	1
NR	21	13	3	37	28	3
AR	38	21	20	79	50	10
WR	25	19	8	52	25	3
CR	31	10	14	55	33	5
GAR	28	5	90	123	60	14
ER	29	15	18	62	34	1
UWR	14	4	3	21	10	1
BAR	16	11	10	53	30	
Total	**260**	**108**	**180**	**601**	**325**	**40**

Even though laboratories were diagnosing TB as part of the routine testing there was no monitoring of the quality of TB microscopy in Ghana until 2000-2001 when a situational analysis of TB microscopy was done in 114 laboratories. Following this assessment, a pilot study to implement a Quality Assurance System was undertaken in the Greater Accra Region. Manual were developed and Training of regional EQA assessors and scaling up of EQA to all the ten regions was done in 2003. Currently there are 325 public and private health facility laboratories performing sputum smear microscopy in the country. Quality assurance in TB microscopy is performed quarterly by trained assessor.

[9] Gyapong et. al 2009

The capacity to perform culture and DST for research purposes started as far back as 2001 by the Noguchi Memorial Institute for Medical Research (NMIMR), DST was performed on solid media for 1st line drugs. This was extended to the National Public Health and Reference laboratory and Regional Hospital Laboratory Koforidua using MGIT in 2010 and later to the Chest Clinic laboratory in 2011 which was given the status of National Reference laboratory and linked to the WHO Supranational Reference Laboratory in Bostel, Germany.

Table 10: Geographical Distribution and Density of TB Microscopy Services in Ghana, 2013

Regions	Surface Area (Km²)	Population	Number Of Laboratories		% of TB diagnostic	TB Lab Density Per Km²	TB Lab – Population Ratio
			Absolute	TB diagnostic lab			
Ashanti	24,389	4,725,046	79	50	15.3	0.0020	1:94,500
Brong Ahafo	39,557	2,356,534	53	30	9.2	0.0007	1:78,551
Central	9,826	2,107,209	55	33	10.1	0.0033	1:63,854
Eastern	19,323	2,596,013	62	34	10.6	0.0017	1:76,353
G. Accra	3,245	3,909,764	123	60	18.5	0.0184	1:65,162
Northern	70,384	2,468,557	37	28	8.6	0.0004	1:88,162
Upper East	8,842	1,031,478	55	22	6.7	0.0024	1:46.899
Upper West	18,476	677,763	21	10	3.0	0.0005	1:67,776
Volta	20,570	2,099,876	64	33	10.1	0.0016	1:63,632
Western	23,941	2,325,597	52	25	7.7	0.0010	1:93,023
Total	**23,8553**	**24,297,837**		**325**	**100**		

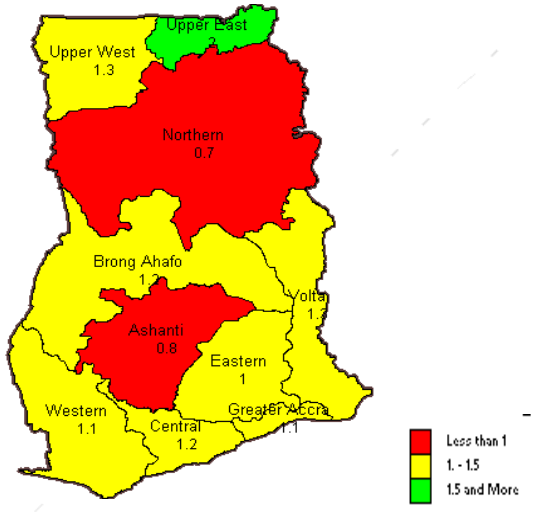

Figure 18: Microscope Distribution per 100,000 Population, 2013

Figure 19: Microscope Density by Region 2013

Application of resources to TB control in Ghana therefore takes into consideration all factors.
Per capita expenditure on detecting TB case and successfully ensuring treatment success, range from $75 to $349.50 varying across the geographic regions of the country (Figure 20). The variation is mainly explained by poverty levels of the region, (Figure 21) its size and availability and type of services. Regions with high poverty index and low health facilities coverage tends to have high per capita to detect and successful treat one TB case. Generally regions in the southern Ghana are relatively endowed

with the exception of the Central region. The central region is relatively better in terms of health infrastructure coverage compares to the Northern regions, Regions with high Land mass area also tends to have high per capita to for a successfully detected and treated case.

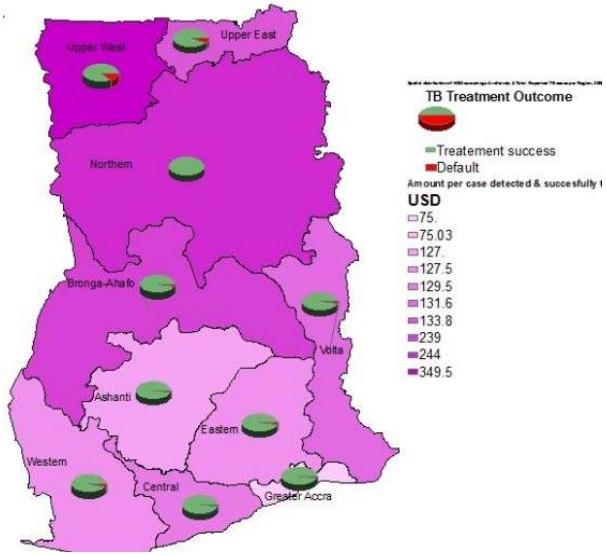

Figure 20: Per Capital Amount Successfully Detected and Treated 2009

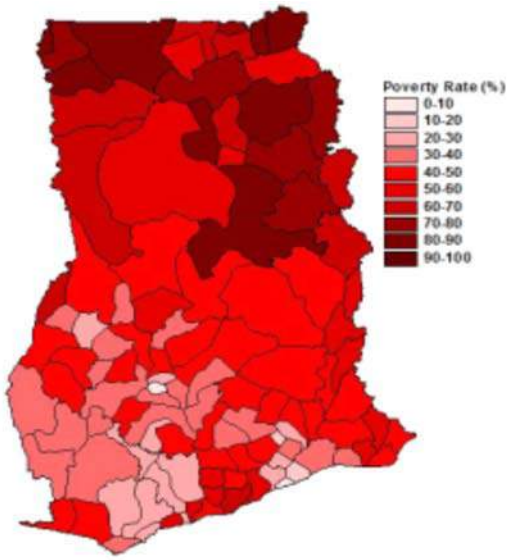

Figure 21: Poverty Levels by District 2008

Table 11: Ranking of Multi-dimensional Poverty Index (MPI) for Regions of Ghana, 2010

Region	National		Rural		Urban	
	MPI	Rank	MPI	Rank	MPI	Rank
Western	0.164	5	0.217	5	0.090	4
Central	0.155	4	0.184	2	0.122	6
Greater Accra	0.072	1	0.158	1	0.063	1
Volta	0.187	6	0.222	6	0.116	5
Eastern	0.147	3	0.196	4	0.083	3
Ashanti	0.121	2	0.189	3	0.077	2
Brong-Ahafo	0.217	7	0.278	7	0.139	7
Northern	0.371	10	0.430	10	0.236	10
Upper East	0.335	8	0.369	8	0.204	9
Upper West	0.341	9	0.376	9	0.158	8
Ghana	0.179	-	0.261	-	0.098	-

Source: 2010 Population and Housing Census Report: Non-Monetary Poverty in Ghana. Ghana Statistical Service; July 2013

Routine Programmatic Data Analysis

The general observation is that routine programmatic data analysis is largely consistent with the findings from the National prevalence survey. Trend analysis of reported TB cases generally shows increasing numbers of cases (Fig 22). Likely from improve programme quality and surveillance. Significant observation is the declining trend of notified TB cases among 25-34 age groups (Fig. 23) that seems to confirm findings from the National prevalence survey estimated low prevalence among the same age group in Table 8.

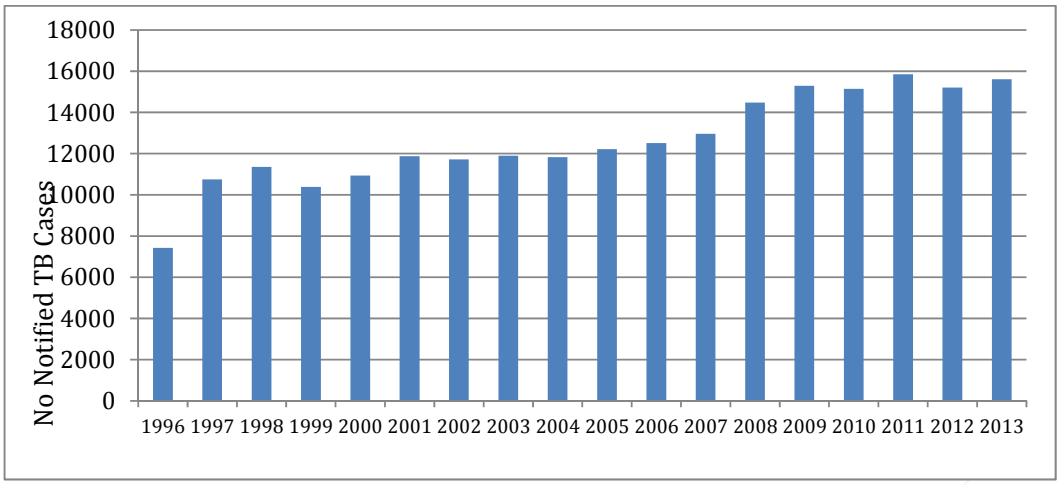

Figure 22: Trend of Reported TB Cases 1996-2013

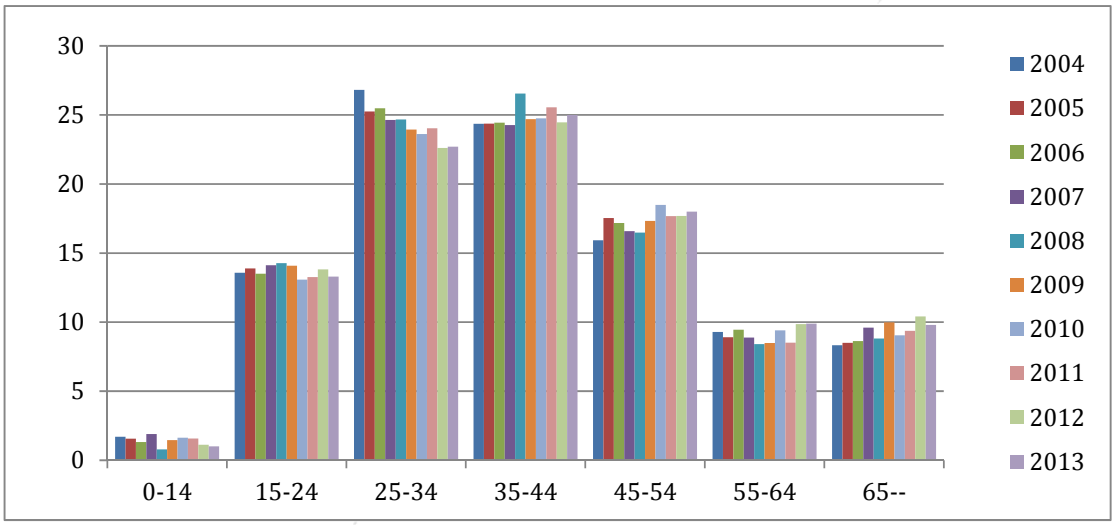

Figure 23: Trend of Age Distribution (%) of Notified TB Cases 2004-2013

Case notification rates improved from 2007 when comprehensive capacity was built to integrate TB care and prevention into the general health services under R5 Global fund grant. (Figure 24)

A trend line analysis of annual case notification rates (Fig. 24) appears to show a stagnating average case notification rate of 62.1 per 100,000 person population for the last three years. There is however regional and districts TB case notification rates variations that may require attention during implementation of current plan (Figure 25).

Before the application of GF R5 grant in 2008, the high incident regions namely Greater Accra, Eastern, Western and Central Regions received adequate support and generally showed increasing TB case notification as compared to low incident regions such as Upper West and Brong-Ahafo Regions. After 2007, adequate attention was paid to the low incident regions and is currently reflected showing upwards trend in case notification (See Figure 25 below).

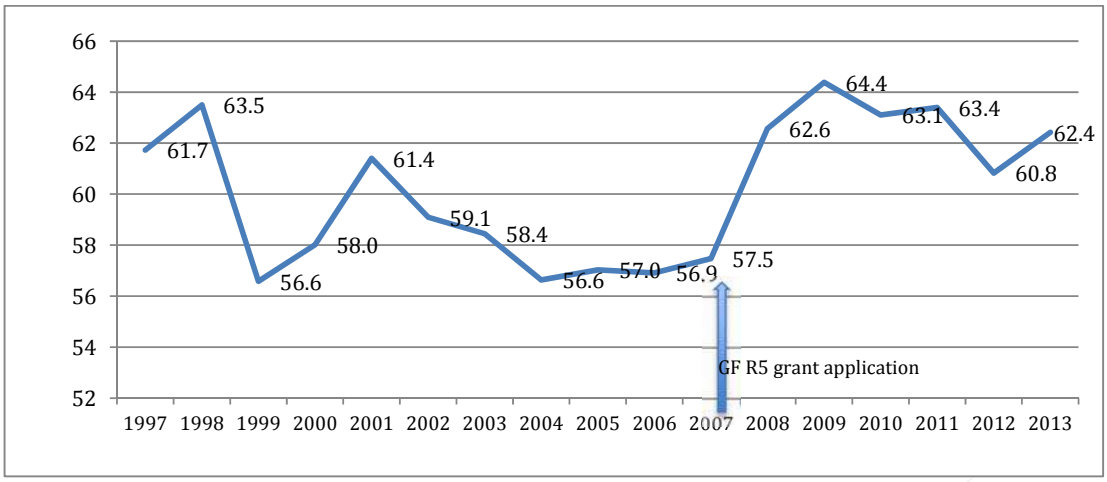

Figure 24: Trend of National TB Cases Notification per 100,000 Person Population (1997-2013)

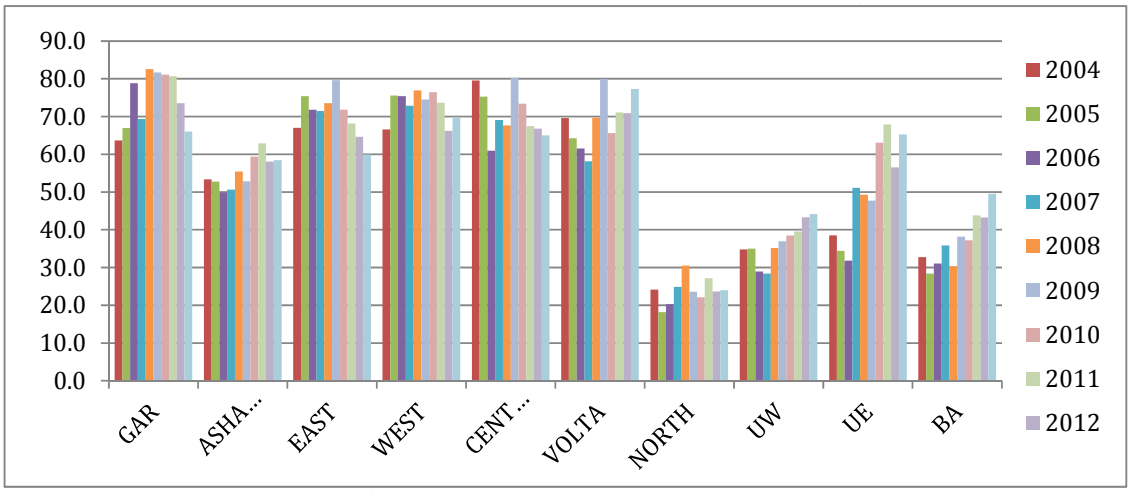

Figure 25: Trend of Regional TB Case Notification Rates per 100,000 Person Population 2008-2012

Figure 26 below shows the case notification rates for all forms of TB and smear positive cases in the ten regions compared to the national level 3 year average. In 2013, the national CNR was 62.2/100,000 person population for all forms of TB and 27.4/100,000 person population for smear positive cases. Six regions namely Eastern, Central, Upper East, Greater Accra, Western and Volta reported rates that were higher than the 3 year national average. The highest CNR for all forms of TB was found in Volta (77.1/100,000) region followed by Western region (69.7/100,000). Western region had the highest notification rate for sputum smear positive TB cases (46.4/100,000) followed by central region. The northern region had the lowest notification for both categories.

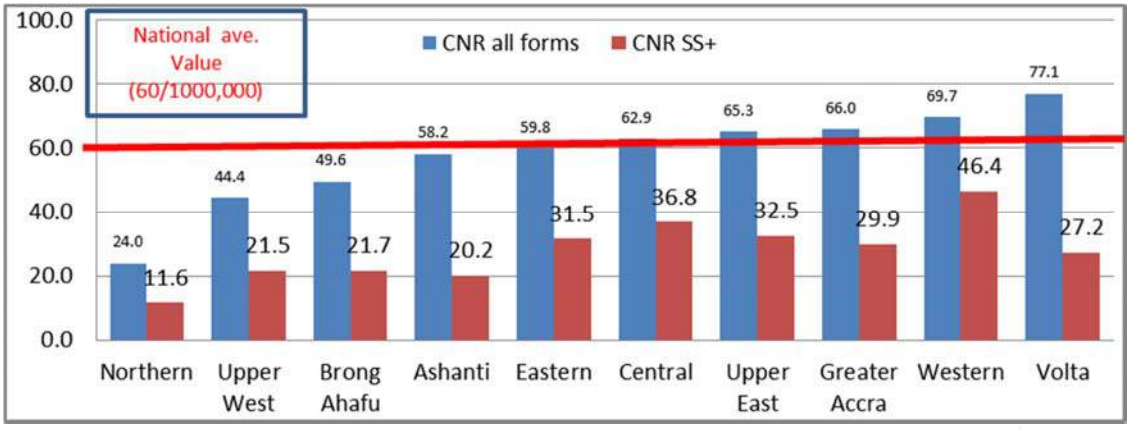

Figure 26: Variation in CNR of All Forms and New Smear Positive TB Among Regions 2013

Age-Sex Differentials of TB Burden

Since 2008 programmatic data have consistently shown more cases among males than females among the notified TB cases. As shown in Figure 27 below shows females accounted for approximately one-third of all the TB cases that were reported from 1996-2013 while males accounted for approximately two-thirds. The trend data shows that the rate of increase of new cases among males is much higher than that among females. This can be explained by the fact that the burden of TB in males is higher as per the findings from the national prevalence survey results. The underlying reasons can be further investigated through programme based operations research.

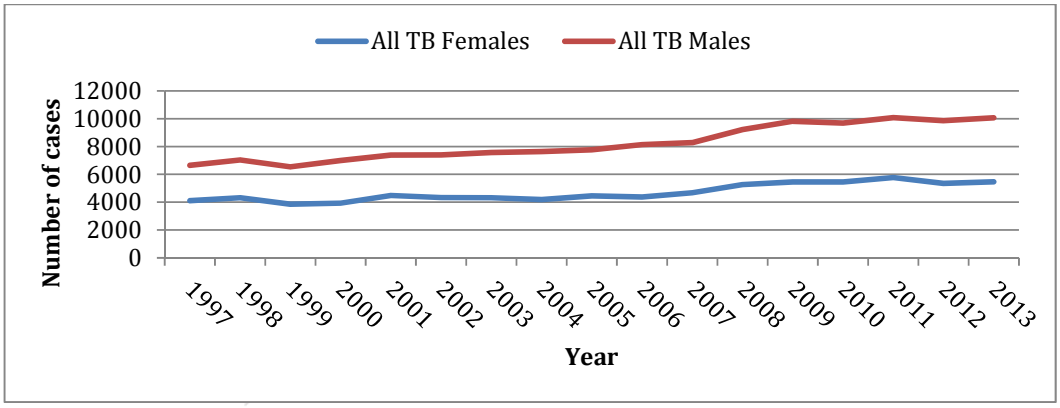

Figure 27: Number of TB Cases (All Forms) Among Males and Females in Ghana, 1997-2013

While 35.2% of all cases reported at the national level in 2013 were among females there was no significant variation in the gender distribution of cases across the various regions. As shown in Figure 28 below it's only in Volta Region where females accounted for 41% of the reported cases and Western Region where 28.2% of the reported cases were among females stood out.

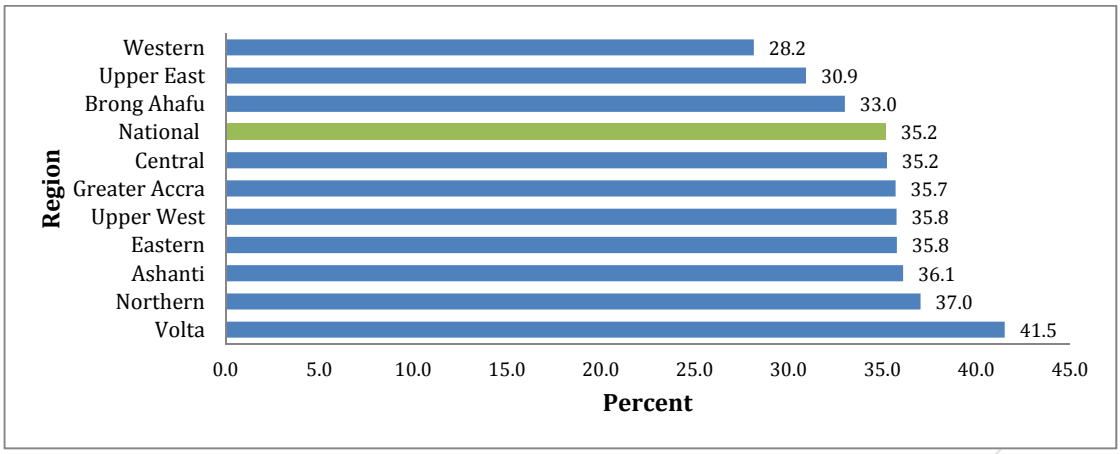

Figure 28: Regional Variation in Percentage of Women Among Notified TB Cases in Ghana, 2013

Characteristics of TB Cases

Patient type: Figure 29 below shows the trends in patient type from 1997 – 2013. The data shows a progressive decline in the number of cases classified as sputum smear positive TB and an increasing number of smear negative and extra pulmonary TB cases. The true reason for this pattern could be further investigated but it may reflect either changes in the performance of the laboratory system or non-compliance with diagnostic algorithms for TB at the different service delivery points in the system.

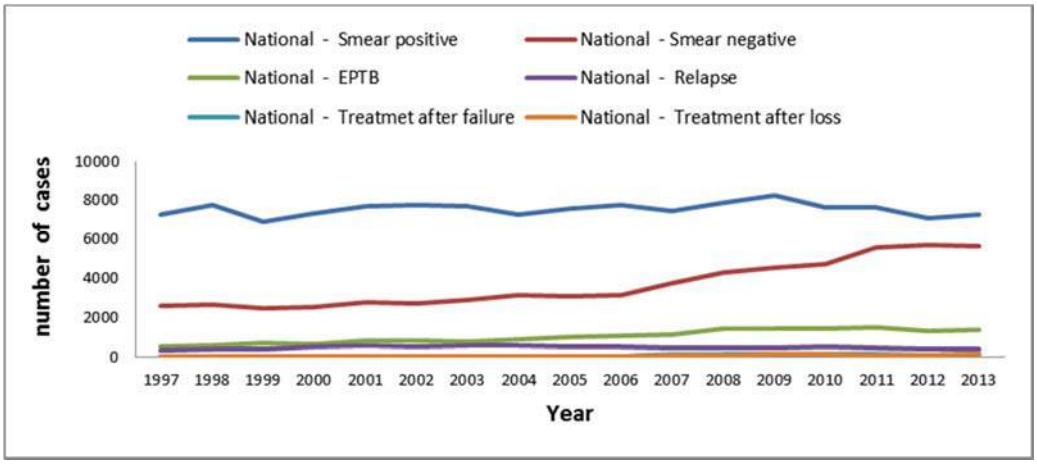

Figure 29: TB Patient Types in Ghana, 1997-2013

Using data from the cases notified in 2013 it can be observed there are regional variations in the types of cases (Figure 30) suggesting that there are regional variations in utilization in the diagnostic algorithms and or laboratory capacity.

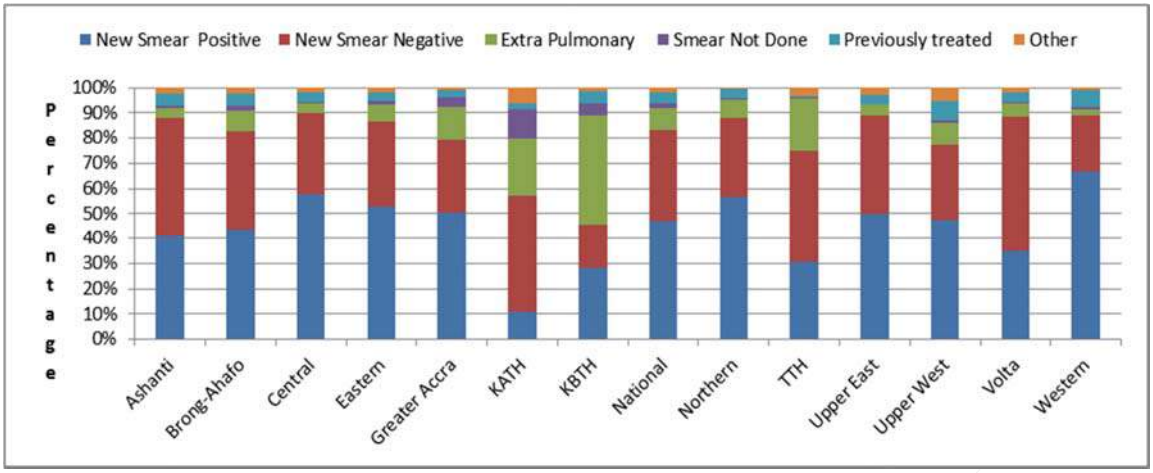

Figure 30: Proportion of Types of TB Cases by Region, 2013

Childhood TB

Between 2008 and 2013 cases among children constituted approximately 5% of all notified TB cases and ranged from 4.2% in 2009 to 5 % in 2013. A case of TB in a child is a sentinel event in that it represents recent transmission of TB in a community.[10] Figure 31 below shows the proportion of TB cases among children during 2008 – 2013. As is the case among adults, in the children there are more TB cases among males than females during this period (Figure 32). The reason for the declining trends in the proportion of TB cases among children in Ghana should be further investigated. Figure 32 below shows the number of cases among children by gender between 2008 and 2013. As for the adult cases a greater proportion of the cases among children were among males than females.

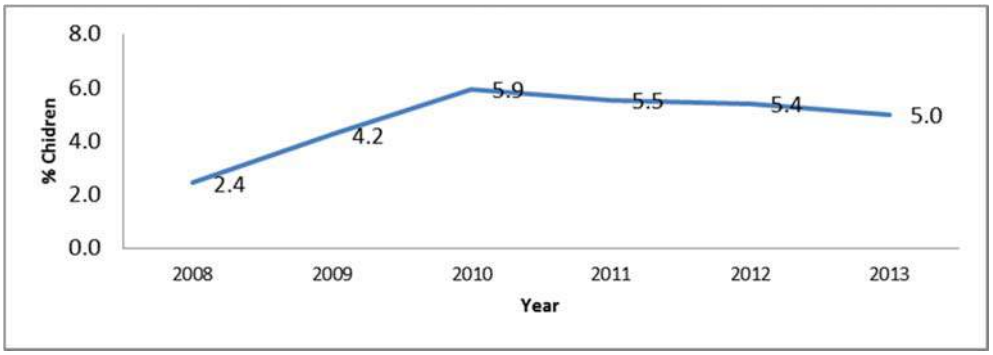

Figure 31: Percentage of TB Cases among Children (<15 years) in Ghana, 2008-2013

At the national level 38.1% (296/778) of the TB cases among children did not have a sputum smear done; a little over one quarter 9212/77) were classified as smear negative and 23.5% (212/778) were classified as smear negative and one-tenth (87/778) were smear positive. As shown in table 12 below there are regional variation in the classification of cases by type.

[10] Bloch A, Snider D. How much tuberculosis in children must we accept? Am J Public Health 1986; 76: 14-15

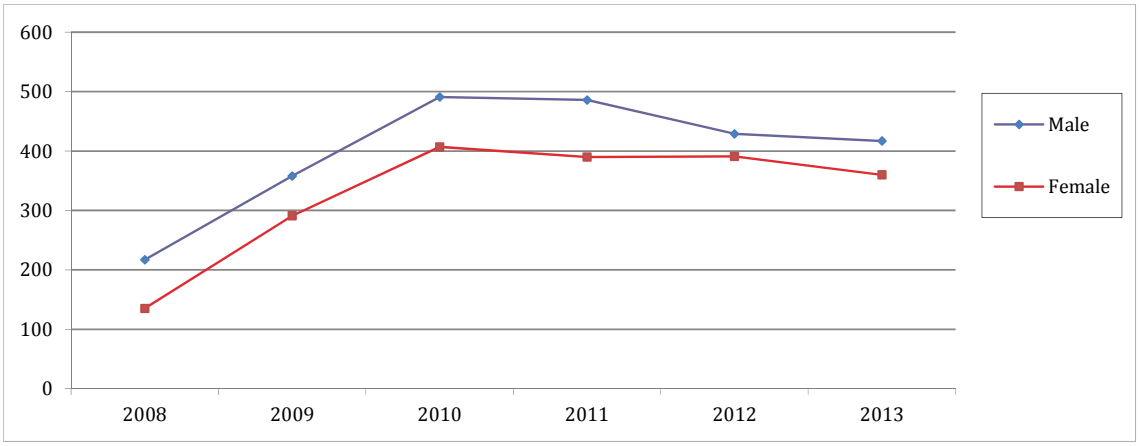

Figure 32: Male-Female Distribution of Childhood TB Cases 2008-2013

Table 12: Types of TB Cases Notified among Children from Regions, 2013

Region	New Smear Positive	New Smear Negative	Smear Not Done	Extra Pulmonary
Ashanti	9	23	28	7
Western	14	15	10	6
Central	10	19	2	10
Eastern	4	25	27	19
Greater Accra	16	37	86	26
Northern	3	6	2	3
Upper East	6	7	3	6
Upper West	4	10	2	2
Volta	6	34	11	14
Brong-Ahafo	9	25	20	15
KATH	0	0	70	26
KBTH	6	0	34	43
TTH	0	11	1	6
National	**87**	**212**	**296**	**183**

The regional variations reflect the capacity to diagnose TB in children on the ground. The inventory of childhood diagnostic capacity could be part of programme based operations research**.**

TB/HIV Co-infection

A joint planning document of stakeholders to harmonise and guide implementation of HIV and TB collaborative activities were developed and introduced at TB facilities in Ghana in 2007. Figure 33 and 34 below shows the outputs of this collaboration for the period 2008 to 2013. The data indicates that there were improvements in performance in this component of the program during successive years. The proportion of TB patients tested for HIV rose from 17% during the first year of the introduction of TB/HIV activities to 77.8% in 2012 but declined to 72.7% in 2013. In addition, the percentage of HIV positive persons with TB who were placed on ART increased from 13.9% in 2008 to 42.6% in 2013 while CPT uptake among HIV positive patients remained steady at around 70% during the past six years. In spite of this increases they are below programme targets and important gaps for this plan.

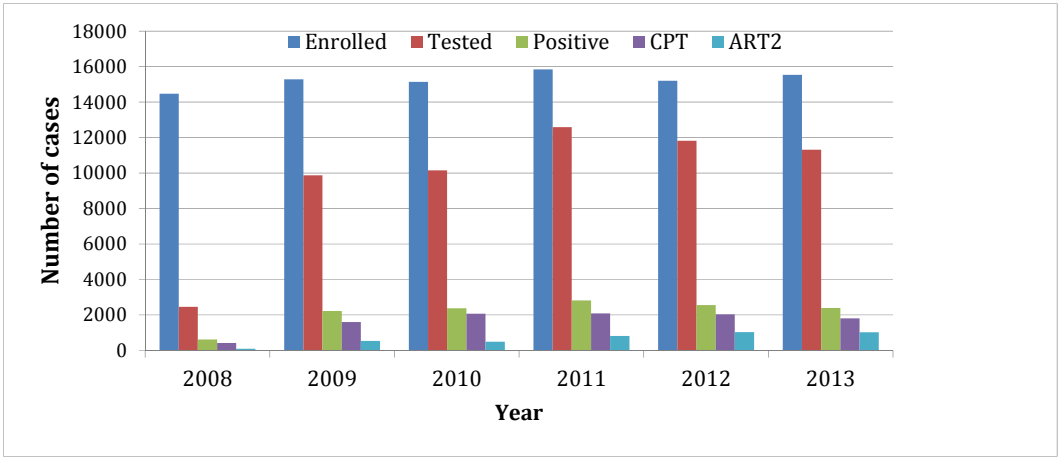

Figure 33: Trend of TB/HIV Service Coverage in Ghana, 2008-2013

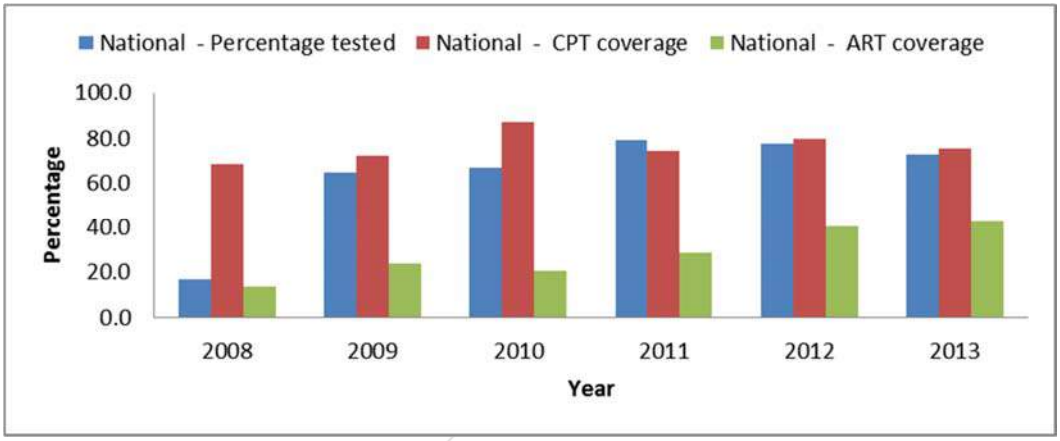

Figure 34: Percentage Coverage of TB/HIV Service in Ghana, 2008-2013

Further analysis of testing data for 2013 showed that there were regional variations in rates of uptakes for HIV testing (Figure 35). Four regions namely Central, Volta, Western, and Ashanti had rates that were lower than the national average.

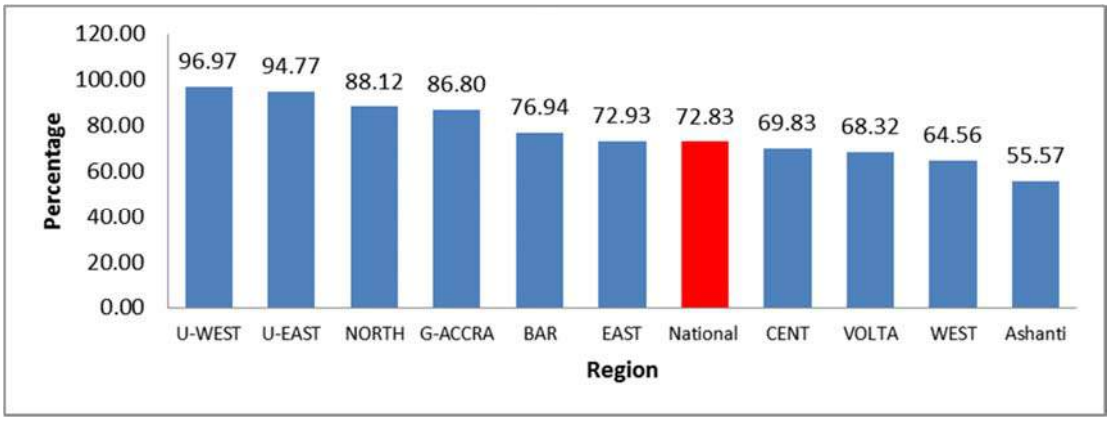

Figure 35: Percentage of Newly Registered Patients with HIV Test Results by Region in Ghana, 2013

HIV Seroprevalence: With regard to test result, HIV prevalence among TB patients varied in the different regions ranging from 33.4% in the Eastern Region to 9.4% in the Upper east. In all years, HIV sero-prevalence was consistently higher among women than in men (Figure 36). In addition data from 2013 showed variation in HIV sero-prevalence across the various regions and within districts in some regions

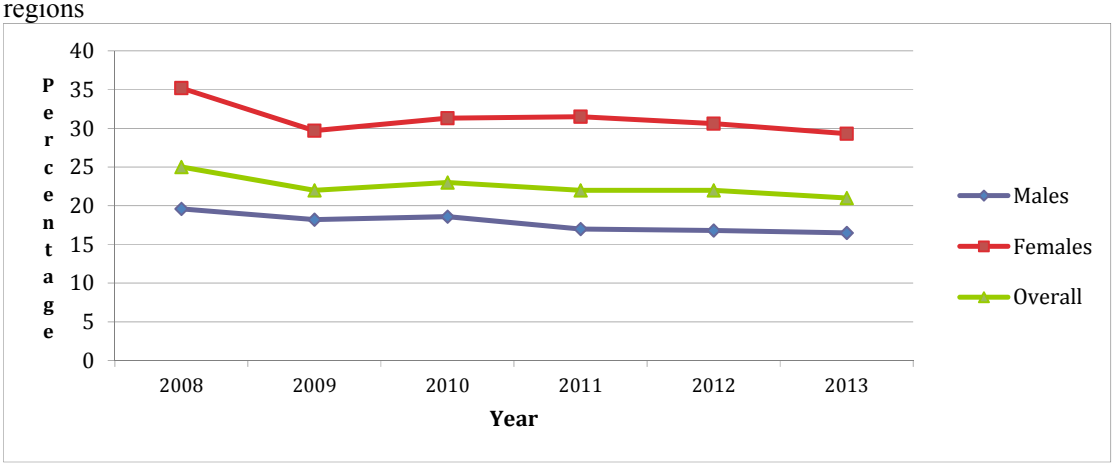

Figure 36: HIV Sero-prevalence Among Registered TB Patients in Ghana, 2008-2013

The general observation from mapping of regional HIV sero-prevalence and regional TB case notification data is that, (Figures 37 & 38) HIV sero-orevalence of 1.2% or more is associated with at least TB case notification rate data of 58 per 100,000 person population or more. The exception is Brong Ahafo Region whose HIV sero-prevaelnce of 2.1% is associated with TB case notification rate of 49.5 per 100,000 person population. This can be a subject of operational based programme research.

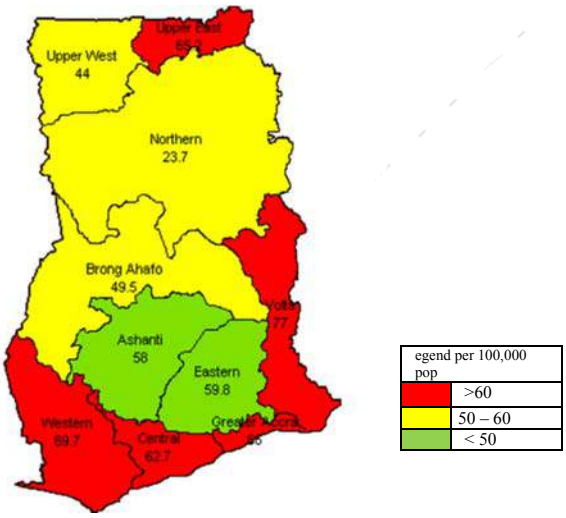

Figure 37: Regional TB Notification Rates, 2013

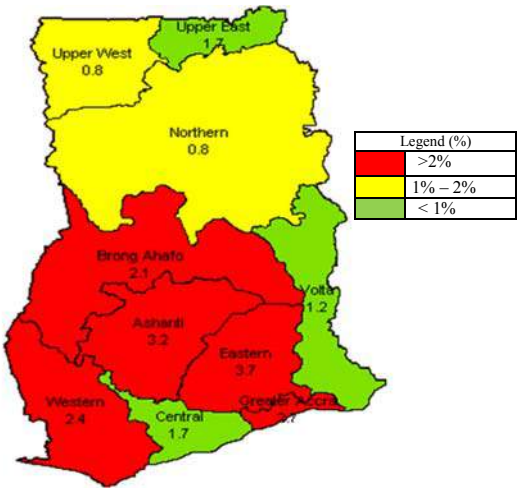

Figure 39: Estimated Regional HIV Prevalence Rate, 2013

ART and CPT coverage: ART coverage among HIV positive TB patients increased from 13.9% in 2008 to 42.6% by 2013. There were regional variations in ART and CPT coverage (Figure 39). ART uptake is consistently higher in females than males at the national level in all regions except in the Upper East and Volta Regions (Figure 39).

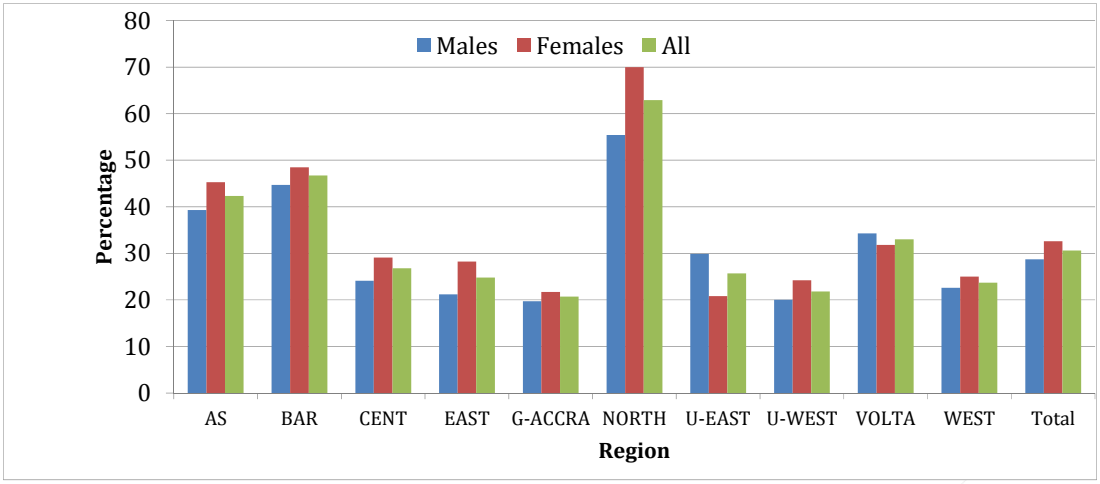

Figure 40: ART Uptake among Males and Females by Regions, 2013

Drug Resistant TB Burden

The exact burden of MDR-TB is unknown, as formal DR survey is not yet done. There is an obvious gap between expected MDR-TB cases and number detected and enrolled on Treatment (Table 13).

Table 13: Trend of Estimated Country MDR-TB Burden, 2008-2013

	2008	**2009***	**2010**	**2011**	**2012**	**2013**
Estimated MDR-TB Cases	**1378**	**1574**	**1720**	**1852**	**1955**	**2027**
Number TB patients tested for MDR	100	-	58	392	251	690
Estimated number of MDR-TB cases to treat	**0**	**10**	**100**	**200**	**200**	**250**
Number MDR confirmed	2	-	14	28	30	38
Number on second line treatment	0	-	0	2	2	27

***** No data available

The process of certification for treatment from the Green Light Committee which has since been modified was significant contribution to the slow treatment uptake. The diagnostic gap for MDR-TB due to lack of laboratory capacity for diagnosis is resolved in 2013**.** Laboratory infrastructure to screen and confirm DR-TB is completed with quality control from Supranational Reference Laboratory from Borstel, Germany providing continuous supervisory support is in place. Treatment capacity gap building is ongoing and needs to be further enhanced to include mono and poly resistant TB management.

TB in High Risk Populations

TB in Prisons

TB case notification rate among prisoners is higher than the case notification rate of 62 per 100,000 person population in the general population (See Table 14). HIV prevalence among the prison population in Ghana is 2.3% (Male 1.5%; Female 11.8%) compared with general population of 1.3%.

Table 14: Trend of Notified TB Cases among Prison Inmates, 2007-2013

Year	Prison Population	TB Cases	TB Deaths	CNR/100,000 pop	Fatality	% TB Among Inmates
2007	13,335	94	12	705	12.8%	0.7%
2008	14,128	127	23	899	18.1%	0.9%
2009	14,171	182	19	1284	10.4%	1.3%
2010	13,500	68	17	504	25.0%	0.5%
2011	14,671	35	11	239	31.4%	0.2%
2012	15,171	43	14	283	32.6%	0.3%

TB in Pregnancy

TB is known to be significant cause of ill health in pregnancy; however, this group is not systematically screened for TB. Data on TB in pregnancy is not available. However data from prevalence survey suggest that significant number of asymptomatic pregnant women were culture positive for Tuberculosis (Source: 2013 National Prevalence Survey).

TB in Diabetics

In Ghana, the burden of diabetes has increased significantly over the years. Various studies put the burden of diabetes between 6 and 9% with a projection of 15% over the next decade.[11][12][13][14] This represents a steady increase from the low prevalence of 0.2- 0.4% reported in the 1950s and early 1960s in Ghana.[15][16] Data from the major health facilities in Ghana indicated that, the number of diabetes cases that reported increased five-fold from 2002 to 2010.[17] Table 15 below shows trends of regional reported cases of diabetes from routine data.

Table 15: Newly Reported Outpatient Diabetes by Region 2010 – 2013 (*Source: DHIMS*)

Region	2010	2011	2012	2013
Ashanti	35073	39583	46912	39953
Brong Ahafo	13609	17758	21088	18527
Central	12091	19530	31978	30792
Eastern	33423	37381	39376	29077
Greater Accra	31810	41780	54539	53870
Northern	2082	2780	1771	3032
Upper East	1254	1177	1213	2679
Upper West	277	397	552	673
Volta	9603	16807	18288	16699
Western	11872	12479	16828	18049
Total	**151094**	**189672**	**232545**	**213351**

[11] Agyei-Mensah, S. and A. de-Graft Aikins, *Epidemiological transition and the double burden of disease in Accra, Ghana.* J Urban Health, 2010. **87**(5): p. 879-97.
[12] Amoah, A.G., et al., A national diabetes care and education programme: the Ghana model. Diabetes Res Clin Pract, 2000. 49(2-3): p. 149-57.
[13] Cook-Huynh, M., et al., Prevalence of hypertension and diabetes mellitus in adults from a rural community in Ghana. Ethn Dis, 2012. 22(3): p. 347-52.
[14] Addo, J., L. Smeeth, and D.A. Leon, Hypertensive target organ damage in Ghanaian civil servants with hypertension. PLoS One, 2009. 4(8): p. e6672.
[15] Dodu S. and N. De Heer, *A diabetes case-finding survey in Ho, Ghana.* Ghana Med J, 1964. **3**: p. 75-80.
[16] Dodu Dodu, S.R., *The incidence of diabetes mellitus in Accra (Ghana); a study of 4,000 patients.* West Afr Med J, 1958. **7**(3): p. 129-34.
[17] de-Graft Aikins, A., *Ghana's neglected chronic disease epidemic: a developmental challenge.* Ghana Med J, 2007. **41**(4): p. 154-9.

Programmatic data collected on TB in diabetes is limited. Among 6802 diabetics systematically screened for TB in two clinics using symptom screening tool, 499 were eligible for sputum test out of which 23 TB cases were confirmed over 2 year period. The intervention is yet to be expanded.

Civil Society/Private sector Contributions to TB Case Finding

The NTP operates in partnership with civil society organisations under the umbrella of the Stop TB Partnership Ghana. 135 CSOs have partnered with the NTP to perform case finding and treatment support activities in all regions of the country. This has contributed to increased access to TB services, improved support for patient care and at the end of 2013 their activities contributed 2.6% of TB patients notified (See Table 16 below).

Table 16: Trend of CSO Activities Contribution to TB Case Finding, 2007-2013

Year	Eligible & Screened for TB	Confirmed Cases	% eligible diagnosed with TB	Percentage Cases
2007	5601	355	6.3%	2.7
2008	18970	735	3.9%	5.1
2009	7780	1656	21.3%	10.8
2010	10082	1482	14.7%	9.8
2011	5185	1058	20.4%	6.7
2012*	-	-	-	-
2013	5969	403	6.8%	2.6

* No data available

Private sector engagement has tremendous potential to contribute to TB care and prevention. However, activities are dependent on adequate sustained funding (Figure 40).

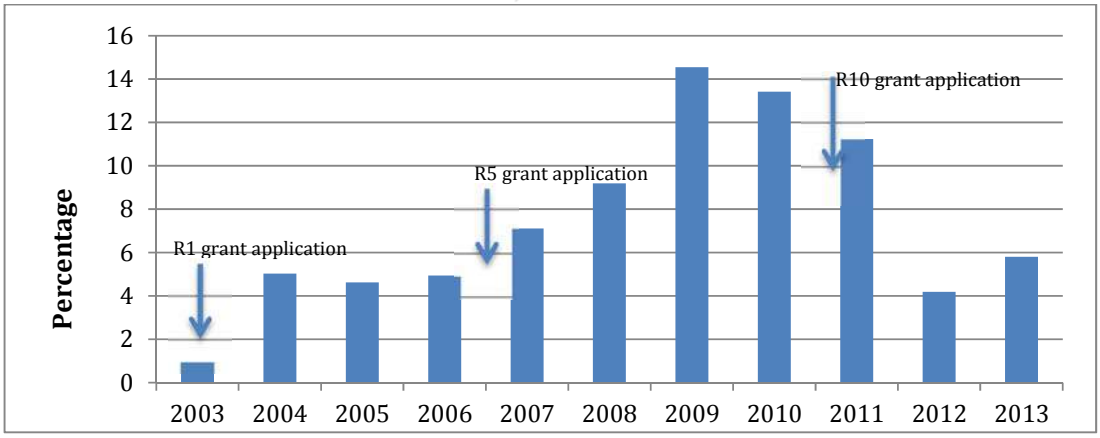

Figure 41: Trend of Proportion of TB Case Notification by Private Sector (including CSOs) 2003-2013

Programmatic Outcomes

1. Favourable Treatment Outcomes (New Sputum Smear Positive Cases)

Treatment success rates: The latest reported treatment success rate for cohorts of sputum smear positive TB patients in 2012 was 87%. The data shows a remarkable improvement in treatment success rates among smear positive cases in the past fifteen years. This improvement over the last 15 years can be attributed to community TB treatment, enabler package, and interventions against stigma and discrimination thus encouraging more persons to adhere to their treatment regimen (See Figures 41 & 42 below).

Data from 2012 shows regional variations in treatment success rates (TSR). The highest treatment success rate was reported from Greater Accra region (90.83%) and least was reported by Eastern Region (81%). In 2012 seven regions and two hospitals reported TSR among smear positive cases which were lower than the national average of 87%. One possible explanation for the low rates in the hospitals it that they are teaching and referral hospitals and are likely to receive the more severe cases. Additional investigations are required to determine the reason(s) for the lower TSR in the poorer performing regions.

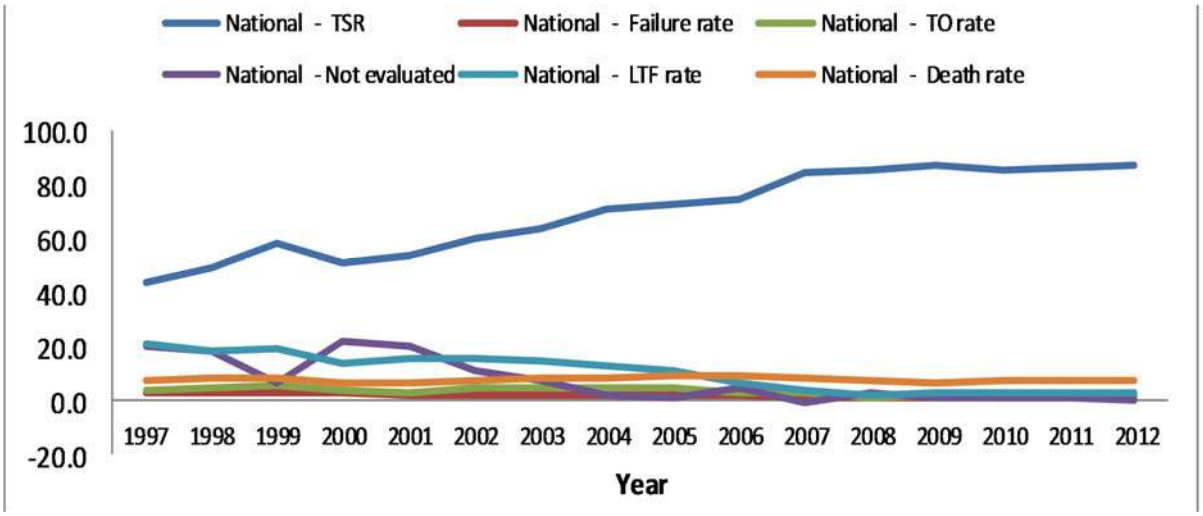

Figure 42: Trend of Treatment Outcomes of New Smear Positive TB Cases, 1997-2012

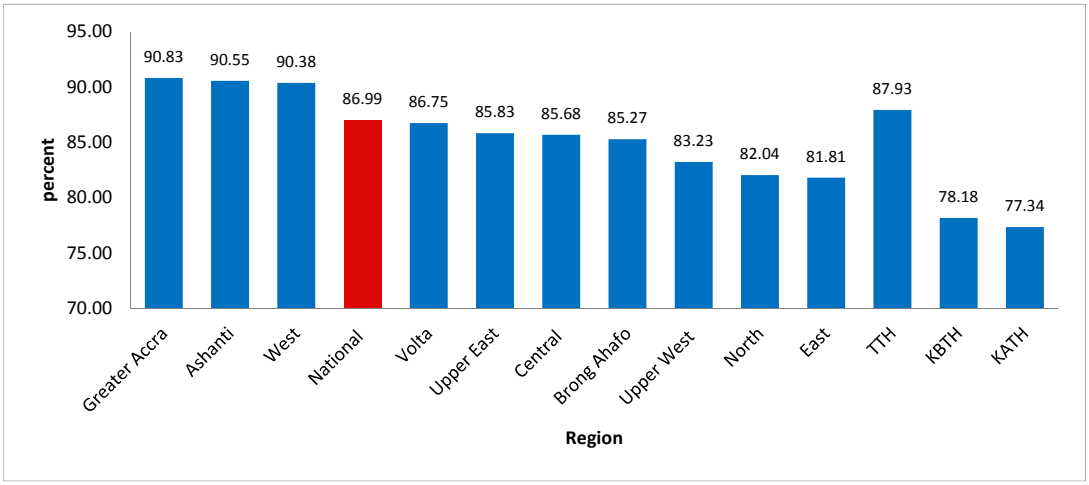

Figure 43: Regional Treatment Success Rates of Sputum Smear Positive TB Cases, 2012

As shown in Figure 42 above the three most populous regions Ashanti, Greater Accra and Western Region reported the highest treatment success rates which were above the national rate. The best practices would be investigated to inform interventions in the other regions to improve on their treatment outcomes as well. Possible reasons could be due to the effectiveness of the application of the enablers' package, human resources strength and death rates.

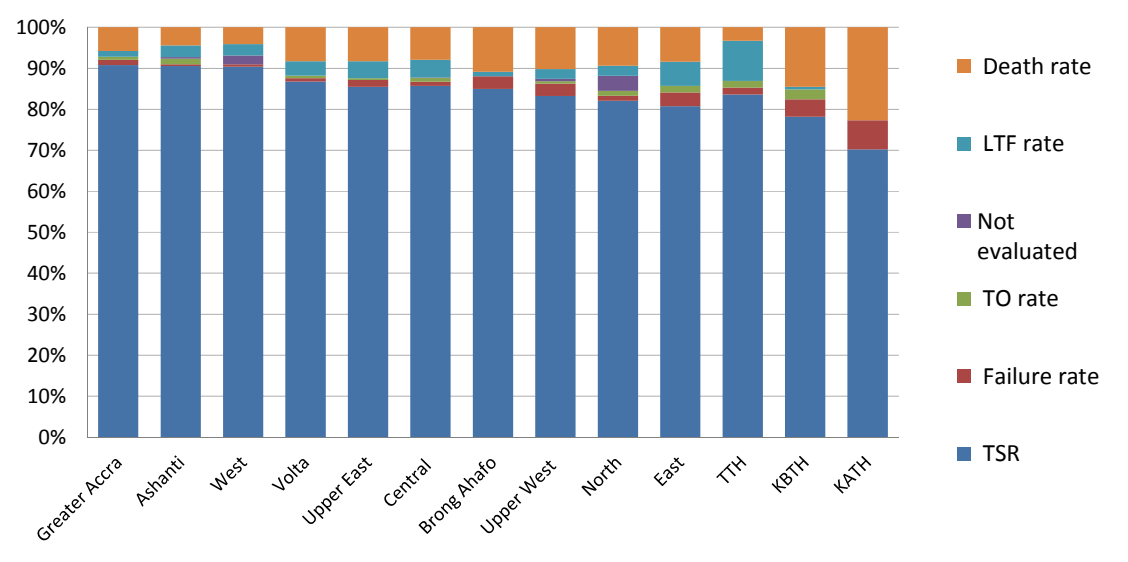

Figure 44: Treatment Outcomes by Region of Sputum Smear Positive TB Cases, 2012

2. Unfavourable (Adverse) Treatment Outcomes

Deaths: Death rate among smear positive cases has been stable over the last 15 years varying between six and nine percent (See Figure 44).

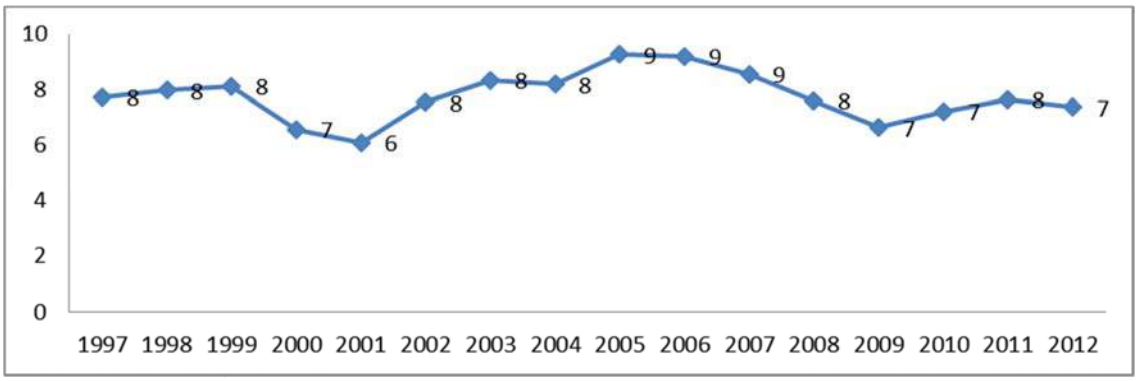

Figure 45: Trend of Death Rate among TB Patients 1997-2012

While approximately seven percent of the new smear positive cases reported at the national level died regional variation in death rates were noted. Brong-Ahafo, Northern and Upper West regions had the higher death rate while lower death rates were reported in Greater Accra, Ashanti and Western regions (Figure 45). In 2012 two of the hospitals (KATH and KBTH) and even regions reported death rates that were significantly higher than the national average. It is likely that the high death rates in the teaching hospitals may be due to high rates of TB/HIV co-infection but this requires further investigation.

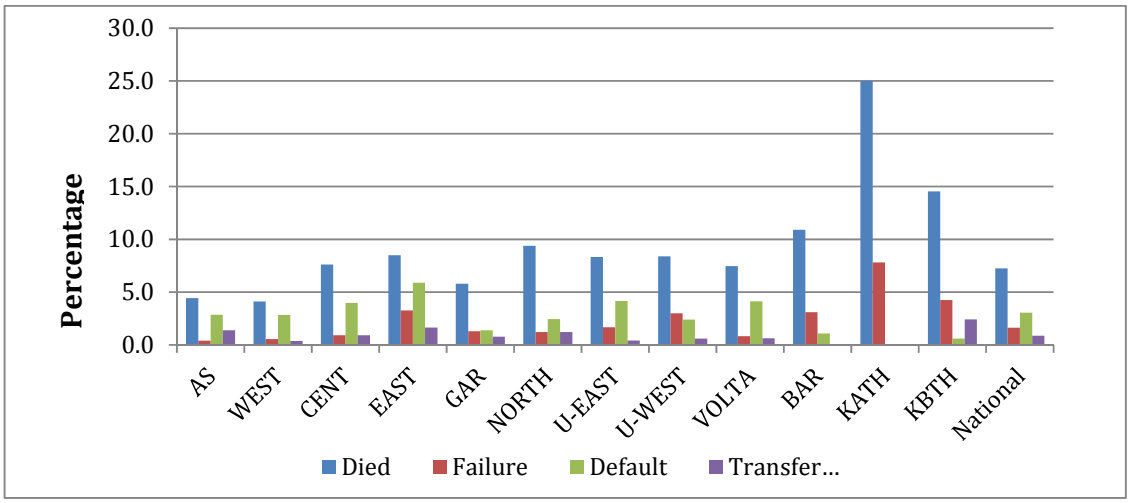

Figure 46: Adverse Treatment Outcomes by Region, 2012

Apart from Ashanti and Western Regions, all regions including the two (2) teaching hospitals experienced case fatality rates greater than 5%. The Programme has had severe challenges over the years to lower the case fatality rate with little success. Implementation of clinical care and mortality audits in the regional hospitals is expected to address this long-standing challenge. All other adverse outcomes (lost to follow up, failure) has shown declining trend (See Figure 45).

3. TB/HIV Treatment Outcomes

As shown in Figure 46 below initial crude analysis seems to indicate that there may be a correlation between ART coverage and death as regions with higher ART coverage reported lower death rates. It is possible that other potential co-variables may also help to explain some of this variation.
However, the observation is a pointer for the need for better ART services to improve TB deaths.

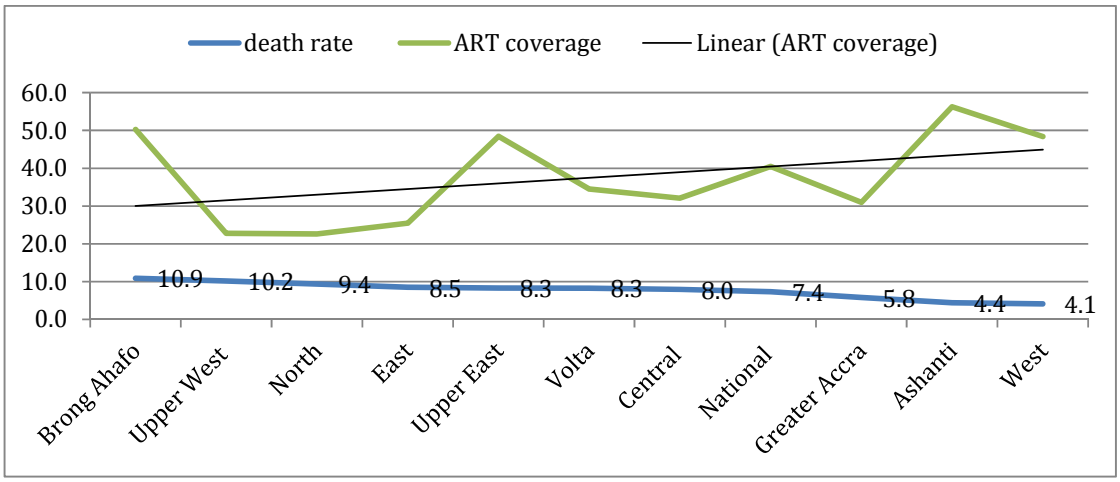

Figure 47: Relation between Regional ART Coverage and Death Rate among TB/HIV Co-infected, 2012

HIV co-infected smear positive patients: Treatment outcome results of smear positive TB /HIV co-infected patient cohorts for 2010 to 2012 (Figure 47) show that TSR among smear positive co-infected patients was similar to that among those who were not infected and the death rates among co-infected

patients was much higher than that among those patients who were not infected. This finding is consistent with that reported by other authors.[18]

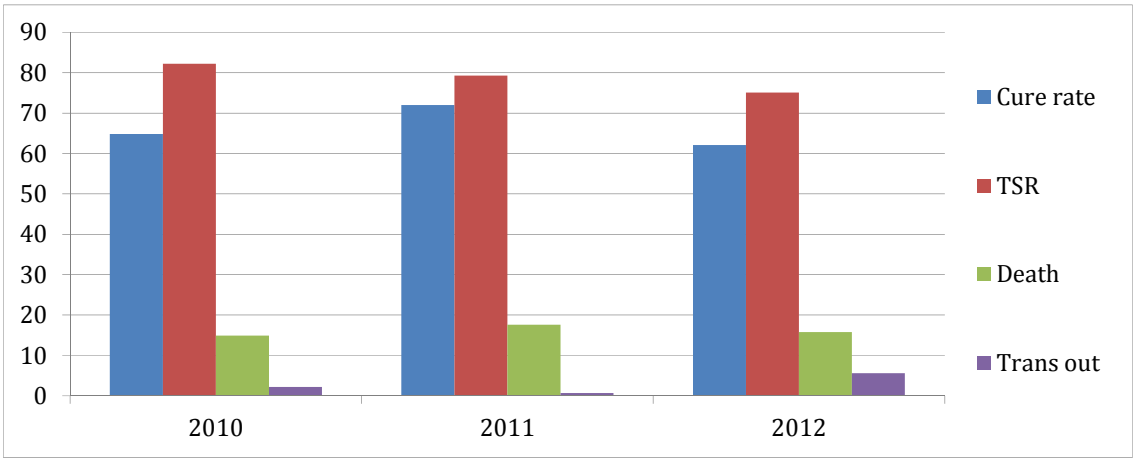

Figure 48: Treatment Outcomes of Smear Positive TB/HIV Co-infected Patients, 2010-2012

4. Treatment outcome for other categories (sputum smear negative and EPTB) cases

Extra-pulmonary TB: Data on the outcomes for persons with extra-pulmonary TB is from the period 2006 to 2012. As shown in Figure 48 below the TSR among ETB patients reduced from 83.8% in 2006 to 79.0% in 2012. This is accompanied by an almost doubling in the proportion of deaths among these patients increasing from 7.8% in 2006 to 14% in 2012. In order to reduce mortality related TB, the quality of service to patients need to be improved. Death audits to explore contributing factors to mortality need to be explored.

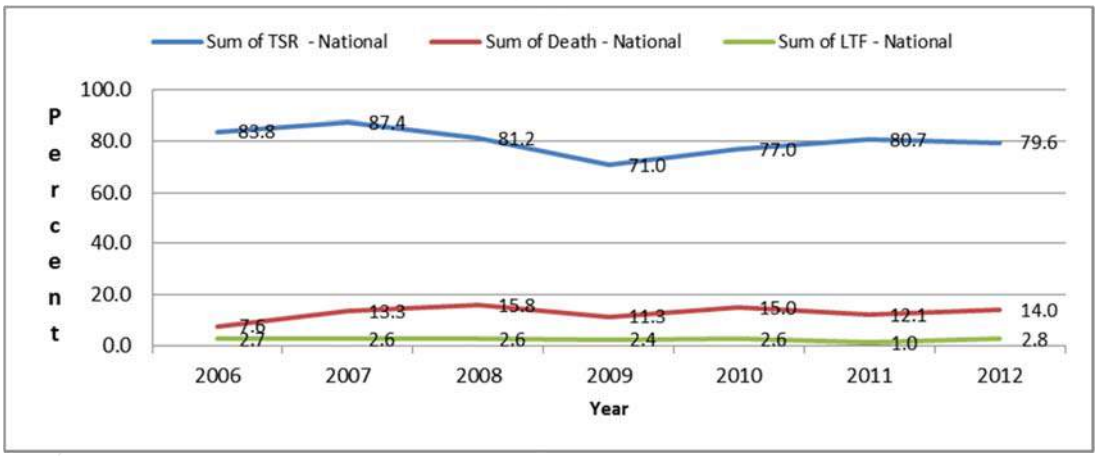

Figure 49: Trend of Treatment Outcomes of EPTB Patients, 2006-2012

Smear negative patients: The data showed regional variation in treatment outcomes among smear negative patients (Figure 49). High death rates were reported in hospitals and Upper West regions. In order to reduce mortality related TB, the quality of service to patients need to be improved. Death audits to explore contributing factors to mortality need to be explored.

[18] Gloria Akosua Ansa1*, John D Walley2, Kamran Siddiqi3 and Xiaolin Wei4 Assessing the impact of TB/HIV services integration on TB treatment outcomes and their relevance in TB/HIV monitoring in Ghana. Infectious Diseases of poverty 2012, 1:13

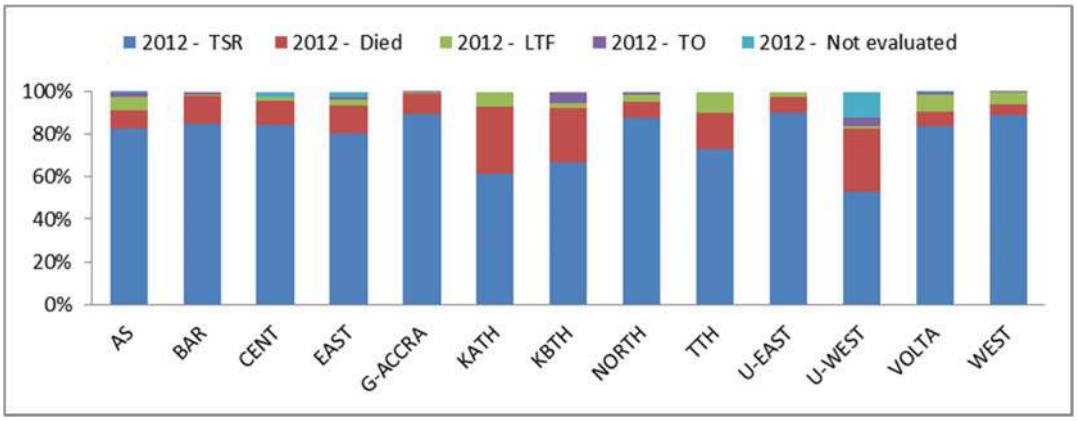

Figure 50: Regional Treatment Outcomes for Smear Negative TB Patients, 2012

Previously treated patients: Table 17 below shows the outcomes of previously treated (Relapse, treatment after failure, and treatment after default) patents. The TSR among persons who were treated after relapse, failure, and default was 81.8, 75.9 and 77.6% respectively. Microbiological follow up need to be strengthened in these groups to rule out possibility of the MDR TB at earliest possible time.

Table 17: Composite Treatment Outcomes of Previously Treated TB Patients, 2006-2012

	Patient type		
	Relapse	Treatment after failure	Treatment after default
Number Registered (2006-2012)	1968	390	446
Cure rate (%)	56.8	54.1	42.4
TSR (%)	81.8	75.9	77.6
Died (%)	11.1	12.8	8.7
Failure (%)	2.0	4.4	2.0
Loss To follow up	3.0	2.3	5.6
Transferred Out	2.3	1.5	1.1

Children: Table 18 below shows the outcomes of among children who were enrolled during 2010 to 2012. Approximately eighty-three percent of the smear positive pulmonary TB cases completed treatment successfully compared to 80.5% of ETB patients and 86.6% of smear negative patients. The death rates ranged from 2.9% among smear positive cases to 7.0% in smear negative cases and 11.1% among EPTB cases.

Table 18: Treatment Outcomes of Childhood TB Cases, 2010-2012

	Registered	**Cure rate**	**Treatment Success**	**Not evaluated**	**Died**
Smear positive patients	104	69.2%	82.7%	13.5%	2.9%
Smear negative patients	187	-	86.6%	-	7.0%
ETB	162	-	80.5%	8.0%	11.1%

KEY PROGRAMMATIC GAPS

Comprehensively, the plan seeks to address 5 key summarised gaps identified from Epi Analysis, Programme reviews, TB Surveillance system evaluation, national prevalence survey, supervision reports and Technical assistance mission reports**.** These gaps have been prioritized below.

1a. Low TB Case Detection (21%):
The programme is desirous and ambitious to provide universal access for TB case detection. However, the current case detection is at 21% based on recent estimate based on National prevalence survey. (2013). Secondly less than one third of estimated DR-TB are detected and put on treatment, making it one of the weakest links of the programme. Proportion of childhood TB notified is low at 5% and declining compared to programme acceptable target of 8-10%.

1b. Facility based improvements for TB case detection:
Only 0.2% of facilities have implemented provider initiated systematic TB screening of respiratory symptomatics among general OPD attendants. Of the network of 4,557 total health care facilities as shown in Table 19 only 10 from Greater Accra Region have benefited from sustained improvements, which yielded results.

Table 19: Distribution of All Health Facilities in Ghana by Type, 2013

Region	Teaching Hospitals	Hospitals	Clinics	CHPS	Health Centre	Midwife / Maternity	Mines	Polyclinic	Total
Ashanti	1	115	166	74	130	96	0	0	582
Brong-Ahafo	0	32	113	236	80	43	0	3	507
Central	1	27	65	189	62	33	0	2	379
Eastern	0	32	112	456	95	24	0	1	720
Greater Accra	1	72	270	125	20	81	0	11	580
Northern	1	29	45	163	88	8	0	4	338
Upper East	0	7	44	204	46	1	0	0	302
Upper West	0	10	12	132	69	4	0	0	227
Volta	0	29	56	196	144	16	0	2	443
Western	0	35	131	214	58	37	3	1	479
National	**4**	**388**	**1014**	**1989**	**792**	**343**	**3**	**24**	**4557**

All regions would be supported to implement lessons learnt from the TB screening interventions in a systematic, stepwise order cascading from tertiary, regional to district level facilities.

1c. Insufficient laboratory capacity to bacteriologically confirm TB cases owing to methods used to diagnose among others.
Continuous decline of proportion of pulmonary bacteriologically confirmed TB cases now at 49%.

2. Adverse Treatment Outcome:
The programme has unacceptable high death rates among registered patients and intends to reduce from current levels from 9% to less than 4%. Death rates are reportedly higher among Prisoners (32.6%) and in PLHIV (20%).

3. Programme management & M&E systems
There is weakened capacity at programme management levels owing to increasing complexities in management of logistics, commodities and the expanded scope of interventions that require evidence

based from operations research or peer review literature**.** Evaluation of TB surveillance system using WHO evaluation criteria further identified gaps which the programme have not met.[19][20]

Table 20: Gaps in Standards of TB Surveillance in Ghana Using WHO Evaluation Criteria, 2013

Standard	Main findings	Result
C1 Surveillance data provide a direct measure of drug resistant TB in new cases	• Rifampicin susceptibility testing not done for new pulmonary TB cases	**NOT MET**
	• Surveillance System currently does not include MDR-TB	
C2 Surveillance data provide a direct measure of the prevalence of HIV infection in TB cases	• Coverage of HIV status of TB cases for 2012 was **77.4%** nationally, less than the recommended **≥80%** for settings with generalised epidemic state	**NOT MET**
	• Coverage has improved markedly over the years	
	• The target is for all TB cases to be tested for HIV	
C3 Surveillance data for children reported with TB are reliable and accurate ***OR*** all diagnosed childhood TB cases are reported	• NTP started data collection on ages "0-4 years" and "5-14 years" in 2012 and full compliance was not achieved	**NOT MET**
	• Therefore the ratio of age groups "0-4" and "5-14" years cannot be determined	
	• No nationwide inventory has been done to measure the level of under-reporting of childhood TB	

4. Civil society/Private sector:

The proportion of civil society (NGO's)/private sector contribution to annual total TB case notified has fallen from 14.2% in 2009 to 5.6 % in 2013. Targeted interventions at high-risk populations are also weakened as a result sub optimal performance from the civil society.

[19] Boakye Boateng K. (2013). Evaluation of Tuberculosis Surveillance System of Ghana. WHO Global Taskforce on TB Impact Measurement

[20] Boakye Boateng K. (2013). Evaluation of Tuberculosis Surveillance System of Ghana. WHO Global Taskforce on TB Impact Measurement

GOALS, OBJECTIVES, TARGETS & STRATEGIC INTERVENTIONS

Introduction

The core strategic plan is consistent with approved Global TB Strategy, as endorsed in WHA 67 resolution on health towards the post 2015 sustainable developmental agenda and builds on three strategic pillars:

- Integrated, Patient-centred Care and Prevention
- Bold Policies and Supportive Systems
- Intensified Research and Innovation

Principles

The guiding principles underlying the plan implementation are:

1. Government leadership, stewardship and accountability with monitoring and evaluation by all partners
2. Strong coalition with civil society organizations and Communities (Stop TB Partnership, Ghana)
3. Working in partnership with other state agencies such as Attorney General's Department, to ensure protection and promotion of patients' rights, ethics and equity under National Health Insurance Authority (NHIS), Food and Drugs Authority (FDA) and Public Health Act
4. Revised strategy and targets in collaboration with the WHO and other partners based on recent prevalence survey results.

Goals

1. To reduce by 20% the 2013 TB prevalence baseline level of 286 per 100,000 person population by 2020 in line with post 2015 Global TB Control Strategy.
2. To reduce by 35% the 2012 TB mortality rate baseline of 4 deaths per 100,000 person population by 2020.
3. To end the TB epidemic in Ghana by 2035 without catastrophic cost due to TB affected families

Objectives

1. To early screen, detect and enrol into treatment all forms of notified (new cases) from 15,606 in 2013 to 37,302 by 2020, while increasing the proportion of bacteriologically confirmed pulmonary TB from 51% in 2013 to 60% by 2020*
2. To early detect and enrol into treatment at least 85% of confirmed MDR-TB cases among new and previously treated cases by 2020
3. To attain higher treatment success for all forms of TB from 84% in 2012 to at least 91% by 2020 through improved quality clinical care and community TB care
4. To reduce death rates of TB/HIV co-infected cases from 20% in 2012 to 10% by 2020 and uptake of ART coverage among co-infected from 37% in 2013% to 90% by 2020
5. To improve Programme management; coordination Monitoring & Evaluation and operations research to support treatment and screening strategies for TB/HIV

* The health system capacity to support detection of numbers that can lead to 20% reduction in goal number 1 is currently limited. The expected cash inflows is expected to come from Government of Ghana and Global fund resources only. The numbers detected annually is based on realistic targets of what the health system can currently support.

Indicator Definitions

Impact indicators

1. **TB Prevalence Rate:** Number of TB cases (All Forms) per 100,000 person population at a given time (Baseline 2013)
2. **TB Mortality Rate:** Number of TB deaths in the general population per 100,000 person population

Outcome indicators

3. **Case Notification Rate (All Forms TB):** Number of notified cases of all forms of TB – bacteriologically confirmed plus clinically diagnosed, new and relapse per 100,000 person population.
4. **Treatment Success Rate:** Percentage of all new TB cases, bacteriologically confirmed plus clinically diagnosed, successfully treated (cured plus treatment completed) among all new TB cases registered for treatment during specified period

Table 21: Goals and Impact Targets

	Impact indicator	Baseline			2015 Target	2016 Target	2017 Target	2018 Target	2019 Target	2020 Target	Source and Comments
		Value	Year	Source							
Goal 1	TB Prevalence Rate	286 per 100,000 pop.	2013	NTP/ WHO prev. survey results	286	274	257	250	238	228	NTP will conduct a TB prevalence survey.
Goal 2	TB Mortality Rate	4.4 per 100,000 pop.	2013	WHO Global Report	4.0	3.7	3.5	3.3	3.1	2.9	NTP routinely collects case fatality data. Mortality is modelled and reported in WHO Global Reports.
Goal 3	TB/HIV Mortality Rate	2 per 100,000 pop.	2013	WHO Global Report	1.8	1.7	1.6	1.5	1.4	1.3	NTP routinely collects case fatality data. Mortality is modelled and reported in WHO Global Reports.

Table 22: Objectives and Outcome Indicator Targets

Obj.	OUTCOME INDICATORS	Baseline			2015 Target	2016 Target	2017 Target	2018 Target	2019 Target	2020 Target	Source and Comments
		Value	Year	Source							
Obj. 1	Case notification rate of all forms of TB per 100,000 population - bacteriologically confirmed plus clinically diagnosed, new and relapse cases (disaggregated by age <14 and >15, sex and HIV status)	60 per 100,000 pop.	2013	NTP R & R Systems	86	95	103	113	119	125	TB R & R Systems
Obj. 1	Case notification rate per 100,000 person population - bacteriologically confirmed, new and relapse cases (disaggregated by age <14 and >15 and sex)	30 per 100,000 pop.	2013	NTP R & R Systems	42	48	53	60	66	72	TB R & R Systems
Obj. 2	Treatment success rate of MDR-TB: Percentage of bacteriologically confirmed drug resistant TB cases (RR-TB	50%	2011	NTP R & R Systems	Not Due	55%	60%	65%	68%	70%	TB R & R Systems (Interim Assessment shall be used initially)

	and/or MDR-TB) successfully treated										
Obj. 3	Treatment success rate – all forms TB cases (disaggregated by age <14 and >15 and sex)	84%	2012	NTP R & R Systems	87%	88%	89%	90%	91%	91%	TB R & R Systems
Obj. 4	Treatment success rate – TB/HIV co-infection	73%	2012	NTP R & R Systems	75%	77%	79%	80%	81%	82%	TB R & R Systems
Obj. 4	TB/HIV Death Rate	20%	2012	NTP R&R Systems	17%	16%	15%	13%	11%	10%	TB R & R Systems

Table 23: Coverage / Output Indicators and Targets

	Coverage Output Indicators	**Baseline**			**2015 Target**	**2016 Target**	**2017 Target**	**2018 Target**	**2019 Target**	**2020 Target**	**Source and Comments**
		Value	**Year**	**Source**							
DOTS	Number of notified cases of all forms of TB - bacteriologically confirmed plus clinically diagnosed, new and relapses	15,606	2013	NTP R & R Systems	23,153	26,211	28,870	32,217	34,739	37,302	TB R & R Systems
DOTS	Number of notified cases of all forms of TB - bacteriologically confirmed, new and relapses cases	7,717	2013	NTP R & R Systems	11,808	13,629	15,590	18,042	20,149	22,381	TB R & R Systems
DOTS	Percentage of notified TB cases, all forms, contributed by non-NTP providers - private/non-governmental facilities	5.8% (905/ 15,606)	2013	NTP R & R Systems	8% (1852/ 23153)	10% (2621/ 26211)	12% (3464/ 28870)	14% (4510/ 32217)	17% (5906/ 34739)	20% (7460/ 37302)	TB R & R Systems
DOTS	Percentage of laboratories showing adequate performance in external quality assurance for smear microscopy among the total number of laboratories that undertake smear microscopy during the reporting period	53% (159 /300)	2013	NTP R & R Systems	65% (195 /300)	70% (210 /300)	75% (225 /300)	80% (240 /300)	85% (255 /300)	90% (270 /300)	TB R & R Systems
MDR-TB	Number of bacteriologically confirmed, drug resistant TB cases (RR-TB and/or MDR-TB) notified	65	2013	NTP R & R Systems	137	171	205	247	287	330	TB R & R Systems
MDR-TB	Proportion of bacteriologically confirmed drug resistant TB cases (RR-TB and/or MDR-TB) enrolled on SL treatment	41.5% (27/65)	2013	NTP R & R Systems	60% (82 /137)	65% (111 /171)	70% (143 /205)	75% (185 /247)	80% (230 /287)	85% (280 /330)	TB R & R Systems
TB / HIV	Percentage of TB patients who had an HIV test result recorded in the TB register	15.3% (11387 /74360)	2013	NTP R & R Systems	22% (17364 /77175)	27% (20182 /74887)	32% (23096 /72175)	37% (26740 /71594)	42% (29528 /69478)	50% (33572/67 821)	TB R & R Systems

TB / HIV	Percentage of HIV-positive patients who were screened for TB in HIV care or treatment settings	20% (45217/ 224488)	2013	NTP R & R Systems	56% (104,666/ 185,261)	64% (122,031/ 190,944)	70% (135,774/ 194,821)	80%	85%	90%	TB R & R Systems
PSM	Percentage of reporting units reporting no stock-out of first-line anti-TB drugs on the last day of the quarter	78.7% (170/216)	2013	NTP R & R System s	88% (190 /216)	93% (200 /216)	100% (216 /216)	100% (216 /216)	100% (216 /216)	100% (216 /216)	TB R & R Systems
Prog. Mgt.	Number of functional diagnostic centres	300 /421	2013	NTP R & R System s	305	310	315	320	325	330	TB R & R Systems

Strategic Interventions

Assessment and Prioritisation TB Screening Strategy

Four main items informed the assessment and prioritisation of strategic interventions:

1. The programme's extensive operational experiences of active TB screening based on important programmatic key gaps as identified from Epi Analysis and prevalence survey results
2. Evidence-based WHO Systematic Screening for active Tuberculosis (2013).
3. Capacity of the health system (Laboratories, x-ray equipment and human resource)
4. Characteristics of screening algorithm and cost.

Four potential settings for screening to improve TB case notification were assessed for the risk groups (key affected populations). They are:

1. Community, (sub-populations with risk factors for TB e.g. household & community contacts)
2. Hospital and health care setting
3. Residential institutions (e.g. prisons) and
4. Workplaces (e.g. miners and others who are exposed to silica)

The TB prevalent cases for each risk population were estimated for 2013. The total numbers to be screened and estimated burden for each risk group was determined for each potential screening sites. The size of the risk group as percentage of the population and TB prevalence were first determined. A realistic reachable population of the risk groups informed by operational experience and published literature was estimated. Similarly the proportion likely to accept the screening strategy was determined as provided for in 2013, WHO Systematic screening for active tuberculosis publication.

The total prevalent TB cases based on reachable and screening acceptable population for all risk group is 44,141. (Calculated using WHO Prioritisation tool)

The assessment shows almost 50% split in the burden of undiagnosed TB prevalent cases. In the general population the prevalence is 22,786 almost as in combine hospital care settings, residential institutions and workplace with 21,335.

The Strategic focus of this plan therefore is to *preferentially implement the low hanging fruits of hospital or health care setting, Prison and workplace screening, while* ***enhancing the routine services***. It is a balance between feasibility of implementation; cost and TB yield for maximum impact.

The proposed interventions in this plan are not entirely new, however, the maximum potential under routine programme condition was not realised owing to the slow response of Health systems to adopt new or accept different ways of providing services and the choice of screening tool. Other barriers were human resource constraint.

Table 24 below shows the risk groups and scope of screening strategy, in the previous plan (2009-2013). The Cough Screen ➔ SSM algorithm used as TB screening strategy has been assessed with the aid of WHO screening prioritisation tool develop in 2013.

Table 24: TB Screening Strategy 2009 – 2013

Risk Groups	First Screening Tool: Algorithm	Second Screening Test	Diagnostic Tool	Implementing Sites
General OPD	Cough >2 weeks or Cough <1 week + Any symptom	Nil	Sputum smear LED microscopy	40 districts
General OPD	Cough >2 weeks	Nil	Sputum smear microscopy	176 districts
PLHIV	Cough <1 week + Any symptom	Nil	Sputum smear microscopy	4 ART districts

For each risk group the estimated number of people to be screen, number needed to screen to detect one true case, the overall cost for screening, and cost per true case detected has been provided in Table 25 below.

Table 25: Risk Groups by Cough ➔ SSM Algorithm and Cost

Screening Algorithm	Risk Group	# People Screened	# True Cases Found	% True Cases Found	# False Positive	TP : FP	NNS per True Case	Cost for Overall Screening	Cost per True Case Detected
Cough Screen ➔SSM	General pop.	7,771,379	4,745	21%	7,749	0.61	1637.7	2,779,510	586
	HH contacts	10,931	72	21%	11	6.83	151.1	4,196	58
	Comm. contact	22,565	47	21%	22	2.11	478.9	8,216	174
	PLHIV	114,540	1,399	21%	108	12.95	81.9	46,755	33
	Diabetics	647,615	1,230	21%	642	1.92	526.6	235,260	191
	Gen outpatients	295,312	361	21%	294	1.23	818.9	106,407	295
	Preg Women	1,515,419	1,388	21%	1,509	0.92	1091.8	544,020	392
	Prisoners	129,523	158	21%	129	1.23	818.9	46,670	295
	Miners	13,056	24	21%	13	1.85	545.9	4,739	198

The TB screening strategic focus for 2015-2020 is different from that of the previous NSP (2009-2013), and is presented in Table 26. The estimated number of people to be screened, number needed to screen to detect one true case, the overall cost for screening, and cost per true case detected have also been provided in Table 27.

Table 26: TB Screening Strategic Focus 2015 – 2020

Risk Groups	First Screening Tool	Second Screening Test	Diagnostic Tool	Implementing Sites
Health Centre Attendants	Cough >2 weeks or Cough <1 week + Any symptoms	CXR (AA) if available	LED microscopy / CD	392 Centres
Diabetics	Cough >2 weeks or Cough <1 week + Any symptoms	CXR (AA) if available	LED microscopy / CD	12 Centres
PLHIV	Cough <1 week + Any symptoms	CXR (AA) if available	LED microscopy / Xpert	175 ART Clinics
Pregnant Women	Cough >2 weeks or Cough <1 week + Any symptoms	CXR (AA) if available	LED microscopy / CD	90 high incident districts
Household Contacts	Cough >2 weeks or Cough <1 week + Any symptoms		LED microscopy / CD	Countrywide
Community Contacts	Cough >2 weeks or Cough <1 week + Any symptoms	CXR (AA) if available	LED microscopy / CD	Countrywide
General Outpatients	Cough <1 week + Any symptoms/CXR (AA)	CXR (AA) if available	LED microscopy / Xpert	51 health care facilities
General OPD	Cough >2 weeks or Cough <1 week + Any symptoms	CXR	LED microscopy / CD	156 districts
Prisoners	Any symptoms	CXR (AA) + outreach screening programme	LED microscopy / Xpert	Countrywide
Mining Districts	Any symptoms	CXR (AA) + outreach screening programme	LED microscopy / Xpert	21 districts

CXR = Chest X-ray; AA = Any Abnormality; CD = Clinical Diagnosis

Table 14: Risk Groups by Any Symptom Screen ➔ CXR ➔ SSM Algorithm by Cost

Screening Algorithm	Risk Group	# People Screened	# True Cases Found	% True Cases Found	# False Positive	TP : FP	NNS per True Case	Cost for Overall Screening	Cost per True Case Detected
Any Symptom screen ➔ CXR ➔ SSM	General Pop.	7,771,379	8,542	38%	26,595	0.32	909.8	15,136,880	1,772
	HH contacts	10,931	130	38%	36	3.58	83.9	22,023	169
	Com. contact	22,565	85	38%	77	1.11	266.0	44,323	523
	PLHIV	114,540	2,518	38%	371	6.79	45.5	237,924	94
	Diabetics	647,615	2,214	38%	2,203	1.00	292.6	1,270,716	574
	Gen outpatients	295,312	649	38%	1,008	0.64	454.9	577,213	889
	Prisoners	129,523	285	38%	442	0.64	454.9	253,164	889
	Miners	13,056	43	38%	44	0.97	303.3	25,608	595

Any symptom screen ➔ GeneXpert screening algorithm will apply to screening TB among PLHIV when a scale up plan for GeneXpert is implemented. Pregnant women will not be screened with X-rays. The framework presents guidance for context specific target setting for the programme.

Table 28: Goals, Objectives, Main Strategic Interventions and Priorities

Goals	Objectives	Main Strategic Intervention	Priority
Goal 1: To reduce by 20% the 2013 TB prevalence baseline level of 286 per 100,000 person population by 2020 in line with post 2015 Global TB Control Strategy	**Objective 1:** To early screen, detect and enrol into treatment all forms of notified (new cases) from 15,606 in 2013 to 37,302 by 2020, while increasing the proportion of bacteriologically confirmed pulmonary TB from 51% in 2013 to 60% by 2020	1.1 Improve health facility based TB case finding 1.2 TB screening in key affected populations: ii) Household contacts iii) Diabetics iv) Children v) Prisoners vi) Miners 1.3 Improve quality of laboratory diagnosis 1.4 Improve HR Capacities 1.5 Engage other private care providers 1.6 Communication strategy to reduce stigma	**1**
	Objective 2: To early detect and enrol into treatment at least 85% of confirmed MDR-TB cases among new and previously treated cases by 2020	2.1 Early diagnosis of drug resistant TB including universal drug susceptibility testing	
Goal 2: To reduce by 35% the 2012 TB mortality rate baseline of 4 deaths per 100,000 person population by 2020	**Objective 3:** To attain higher treatment success for all forms of TB from 84% in 2012 to at least 91% by 2020 through improved quality clinical care and community TB care	3.1 Improve quality clinical care of TB patients (DOTS) 3.2 Provide Patient care & support 3.3 Improve , treatment & care of drug resistant tuberculosis 3.4 Strengthen coordination and collaboration among DR-TB management teams 3.5 Community TB care 3.6 Strengthen community systems to improve TB outcomes (CSS) 3.7 Timely Procurement & Drugs & logistics Management	**2**
	Objective 4: To reduce death rates of TB/HIV co-infected cases from 20% in 2012 to 10% by 2020 and uptake of ART coverage among co-infected from 37% in 2013% to 90% by 2020	4.1 Intensify TB Case finding among PLHIV 4.2 TB infection control in health care facilities and prisons 4.3 Coordination of HIV/TB activities at all levels	
Goal 3: To end the TB epidemic in Ghana by 2035 without catastrophic cost due to TB affected families	Objective 5: To improve Programme management; coordination Monitoring & Evaluation and operations research to support treatment and screening strategies for TB/HIV	5.1 Programme Management & Supervision 5.2 Monitoring & Evaluation 5.3 Operations Research 5.4 Promote infection control in DOTS corners, ART and MDR-TB centres and among health staff 5.5 Implement TB screening interventions in maternal, new born and child health and NCD programs 5.6 Procure Technical Assistance	**3**

Target populations

The TB Epidemic in Ghana is generalized; therefore the target is the whole population of Ghana with special attention for specific key populations. The size of various risk group as a percentage of total population, and as absolute number is presented in Table 29 below. Similarly the prevalence of TB in each risk group, total number to be screen, and estimated prevalent cases are presented for each risk group in the same table. The analysis indicates that approximately 60% of population in need or at risk

of TB are reachable with proposed screening strategy in the risks groups. The total TB cumulative number in need for the period of 2015 to 2020 is estimated at 435,085.

Table 29: Target Population for Various Risk Groups

Screening Site	Risk Groups	Size of Risk Group		Prevalence of TB in Risk Group				Risk Group # to be Screened	# Cases
		Risk Gp as % of pop	Absolute # of Risk Gp	TB Prevalence/ 100k pop	Relative Risk of TB	Reachable % of pop	% pop accepting screening		
Community	Gen pop	100%	24,965,816	286.0	1.0	50%	60%	7,771,379	22,226
	HH contacts	0.6%	22,307	3,100.0	10.8	70%	70%	10,931	339
	Comm. contacts	0.8%	75,215	978.1	3.4	50%	60%	22,565	221
Hospital & Health-care settings	PLHIV	0.5%	230,000	5,720.0	20.0	60%	83%	114,540	6,552
	Diabetics	10.0%	2,496,582	889.5	3.1	50%	50%	647,615	5,760
	Gen outpatients	4.0%	998,633	572.0	2.0	50%	57%	295,312	1,689
	Preg. women	10.0%	2,496,582	429.0	1.5	65%	90%	1,515,419	6,501
Residential institutions	Prisoners	0.5%	124,829	572.0	2.0	100%	100%	129,523	741
Workplaces	Miners & others exposed to silica	0.1%	24,966	858.0	3.0	60%	84%	13,056	112

An important childhood TB screening strategy for children and those under 5 years will be implemented as part of household contact investigation. It is projected to screen 489,608 community and household contact for TB index cases within a 6 year period.

Within the period, 1,367 MDR-TB cases are expected to be confirmed of whom at least 1,161 would be enrolled on treatment with available resources and capacity.

KEY ACTIVITIES

1.0 Case Detection & Diagnosis

Determination: The intention of the plan is to seek early diagnosis of TB including universal drug susceptibility testing; systematic screening of contacts and high-risk groups. The plan therefore has the patient at the centre and would therefore receive the necessary assistance through detection to achieving cure in an integrated manner (Strategic pillar 1).

1.1 Improve health facility based TB case finding

Under the previous strategic plan new policy for case detection and tools have been universally adopted by all facilities. A new case definition for smear positive TB, frontloading of smear, reduction in the number of smear examined per patient has been adopted. Algorithms for case detection and SOP's have been developed, forms revised, registers produced. Health services operations at OPDs have been modified to allow for frontloading. Still outstanding is recently introduced case definition for bacteriologically confirmed, clinically diagnosed cases and its reflection in TB surveillance tools. Full implementation has been slow. An accelerated implementation of provider initiated TB screening strategy in 10 facilities yielded an additional 1,300 TB cases in a year. Assuming similar rate of detection it is expected systematic coverage of 100 facilities will approximately yield 13,000 TB cases. Activities to be implemented are listed below.

	Activities	By Whom	Process Indicator	Outcome Indicator
1	Print and disseminate revised OPD/Consulting Room register	MOH/NTP	Revised register disseminated	Percentage of OPD /Consulting rooms using revised registers
2	Revise and print Presumed TB /Cough register	MOH/NTP	Registers printed	Percentage of OPD /Consulting rooms using Presumed TB /Cough register
3	Orientate Staff on the use of new registers	MOH/NTP	Staff Oriented	Percentage of facilities using new registers
4	Revise, print and distribute SOPs for TB case detection	MOH/NTP	SOPS distributed	Percentage of health facilities with SOPs for TB case detection
5	Orientate health facilities on the use of the SOPs for TB case detection with particular emphasis on OPD staff, laboratory and DOTS corner staff	MOH/NTP	Orientation done	Percentage of health facilities using SOPs for TB case detection
6	Orientate Prescribers to systematically ask all patients about cough	MOH/NTP	Orientation done	Percentage of patients in Consulting Room register with documented evidence of cough screening
7	Provide stationery and logistics (screening tools, sputum request forms, referral forms)	MOH/NTP	Stationary and logistics provided	Percentage of health facilities without sputum request forms in consulting rooms
8	Quarterly review meetings for hospital based case detection activities	MOH/NTP	Meetings held	Number of documented review meetings held quarterly for hospital based case detection activities
9	Monitoring and supervision of hospital based case detection activities.	MOH/NTP	Planned supervisory visits conducted	Percentage of documented planned supervisory visits conducted
10	Maintain recruited laboratory personnel	MOH/NTP	Contracts Renewed	Percentage of laboratory personnel with renewed contract

1.2 TB screening in key affected populations: household contacts, Diabetics, children, prisoners, and miners

1.2.1 Contact tracing & household investigations

The structured and systematic way of undertaking this activity, which is already tested with good results will be implemented.

Lessons from implementation in the Accra Metropolitan Area using only symptom screening tools (questionnaire) for those household contacts meeting the eligibility criteria of cough of more than two week duration yielded 9.5% among presumed TB cases. There is evidence that 4-6% of all household contacts investigated will have TB.[21,22]

A total of approximately 500,000 household and community contacts are expected to be screened including children less than 5 years (21,000) who will be provided with IPT in the six year period during implementation of the plan.

SOPs, recording and reporting forms and contact tracing registers, which are already developed, will be printed and distributed following training of partners. The phased implementation will be integrated into the multi-year implementation plan of facility based case detection. CSO's will be significant partners during implementation. Screening will largely be conducted using questionnaire and later be complimented with Chest X-ray screening. Activities to be implemented are listed below.

	Activities	By Whom	Process Indicator	Outcome Indicator
1	Print and distribute the national guidelines and SOPS on contact investigation	**MOH/NTP**	Guidelines and SOPS distributed	Percentage of health facilities using guidelines and SOPS on contact investigation
2	Print and distribute the recording and reporting forms and registers for TB contact investigation activities, including IPT Provided through these activities	**MOH/NTP**	Forms and registers distributed	Percentage of health facilities using recording and reporting forms , and registers
3	Develop a multi-year national plan to implement TB contact investigation activities in a phased manner	**MOH/NTP**	Plan completed	A multi-year national plan to implement TB contact investigation activities in a phased manner in place
4	Develop, print and distribute community TB screening forms	**MOH/NTP**	TB screening forms distributed	Percentage of health facilities using community TB screening forms
5	Develop, print and distribute posters on contact tracing and investigation to be placed in all public areas	**MOH/NTP**	Posters distributed	Percentage of facilities displaying Posters on contact tracing and investigation
6	Conduct baseline assessment in all heath facilities	**MOH/NTP**	Baseline assessment completed	Percentage of health facilities who have completed their baseline assessment
7	Conduct contact and household investigations among index TB cases	**MOH/NTP**	Contact investigations conducted	Percentage of contacts diagnosed with TB
8	Train staff of health units, NGOs and treatment supporters according to the training plan on contact investigation	**MOH/NTP**	Training held	Percentage of health staff, NGOs, and treatment supporters trained

[21] S. Ottmani, M. Zignol, N. Bencheikh, L. Laâsri, L. Blanc and J. Mahjour. TB contact investigations: 12 years of experience in the National TB Programme, Morocco 1993–2004. Eastern Mediterranean Health Journal, Vol. 15, No. 3, 2009

[22] Janina Morrison, Madhukar Pai, Philip C Hopewell. Tuberculosis and latent tuberculosis infection in close contacts of people with pulmonary tuberculosis in low-income and middle-income countries: a systematic review and meta-analysis. Lancet Infect Dis 2008; 8:359-68

9	Support the implementation /operational costs of TB contact investigation activities in the field in line with the multi-year national plan using the Enablers' package.	**MOH/NTP**	Operational costs supported	Percentage of health facilities supported in the implementation of operational costs using the enablers package
10	Provide enablers to ensure the successful treatment of all active TB cases detected through TB contact investigation activities	**MOH/NTP**	Enablers support provided	Proportion of health facilities implementing contact investigation activities using the enablers package
11	Provide IPT to all children aged less than 5 years and all PLHIV who are contacts of index cases but without active TB	**MOH/NTP**	IPT provided	Percentage of children who are TB contacts and provide with IPT
12	Quarterly review meetings for contact tracing activities and contacts who are administered IPT.	**MOH/NTP**	Review meetings held	Number of documented quarterly review meetings held for contact tracing and IPT activities
13	Monitor and evaluate TB contact investigations and IPT completions	**MOH/NTP**	IPT completion monitored	Percentage of IPT completion

1.2.2 Diabetics and chronic diseases patients (Medical Risk Groups)

This is opportunity to work with Non Communicable Disease (NCD) Programmes to detect TB among medical risks groups. This was piloted as part of the integrated package of hospital based TB case detection improvements initiative, as part of WHO/CIDA supported initiative, described and documented as one of NTP best practices.

Diabetes is a growing problem in Ghana and is currently estimated to be prevalent among 6%-9% of the general population and projected to reach 15% in the next decade.[23] Among Diabetics attending two (2) clinics in Accra Metropolitan Area, 6802 were screened for TB. 499 of these were presumed TB cases and 4.6% (23) were confirmed. Capacity of all Diabetic Clinics in big hospitals would be improved to systematically screen attendants for TB at least once in a year. Capacity for surveillance of diabetes among TB patients as well as detecting TB among diabetics will also be built in specialized diabetics' clinics. All newly registered diabetic patients would be screened for TB. A TB screening strategy for diabetics as in National guidelines would be used and the surveillance tools which have already been developed would be deployed. Anticipated HR constraints for TB screening in busy diabetic clinics would be addressed with deployment of task shifting officers.

Joint coordination with TB programme has been proposed under the umbrella of collaborating with other programmes, to have an oversight for collaboration between Reproductive Health unit and NCD programmes. Activities to be implemented are listed below.

	Activities	**By Whom**	**Process Indicator**	**Outcome Indicator**
1	Standardize TB screening among diabetics clinics, and provide screening tools	**MOH/NTP**	Standardise available screening tools in DM clinics	Percentage of diabetics clinics with screening tools
2	Train HCW to screen for TB among diabetics	**MOH/NTP**	HCW screened	Number of facilities with trained HCW screening patients for TB
3	Monitor and evaluate TB case finding among diabetic clinics	**MOH/NTP**	Monitoring reports of diabetics clinics	Percentage of patients of various medical risk groups screened (diabetics, asthmatics, renal, cancer)

[23] Agyei-Mensah, S. and A. de-Graft Aikins, Epidemiological transition and the double burden of disease in Accra, Ghana. J Urban Health, 2010. 87(5): p. 879-97.

1.2.3 Childhood TB

Childhood TB has not received the deserved attention, and capacity to detect and treat at the periphery level is not determined.

The diagnosis of TB in children is not optimal. Proportion of childhood TB notified is low at 5% and declining compared to programme acceptable target of 8-10%. There are missed opportunities in finding childhood TB. Opportunity exists to carry out outreach activities for case detection among children in household contacts from the prevalence survey. The treatment success of childhood TB is 62%, much lower than adults. There is however a functional childhood working group that has developed guidelines, training manual, which must be implemented within programmatic context. TB surveillance system currently reflects childhood TB.

Mantoux/PPD test would be re-introduced to help in the diagnosis of TB in children. Health facilities will be supported with x-ray films/equipment Gene Xpert for use in diagnosing TB in children. Activities to be implemented are listed below.

	Activities	By Whom	Process Indicator	Outcome Indicator
1	Disseminate policy on childhood TB	**GHS/NTP**	Distribution list	Number of health care managers with knowledge of Childhood TB policy
2	Revise a national plan to implement, within the NTP services, childhood TB management in line with the national policy and guidelines	**GHS/NTP**	National plan developed	National plan to implement within the NTP services, childhood TB management in line with the national policy and guidelines in place
3	Revise, print and distribute training materials	**Teaching Hospital/NTP**	Training materials distributed	Percentage of facilities with copies of training materials
4	Conduct training on childhood TB for paediatricians and other prescribers	**NTP**	Training conducted	Percentage of health staffs trained on childhood TB
5	Produce IEC materials for target groups such as health workers, mothers, and community on childhood TB	**GHS/Stop TB Ghana**	IEC materials Produced	Number of IEC materials for targeted groups distributed
6	Conduct inventory of facilities capacities to manage childhood TB	**GHS/NTP**	Report on inventory study	Percentage of facilities with capacity assessed
7	Integrate the childhood TB component in the implementation of contact investigation activities	**NGO/NTP**	Childhood TB integrated	Number of Childhood TB cases diagnosed during contact investigation activities
8	Procure PPD and X-rays films,	**NTP**	Items Procured	Percentage of planned items Procured
9	Procure paediatric TB drugs including isoniazid for IPT	**GHS/NTP**	Procurement done	Percentage of district with no stock out of paediatric TB medicines
10	Put eligible children on TB treatment or IPT	**NTP**	TB treatment Provided	Percentage of eligible children put on TB treatment or IPT
11	Conduct outreach, active case detection among childhood contacts of index TB cases from prevalence survey	**NTP**	Outreach activities among childhood contacts conducted	Percentage of children screened among contacts of index TB cases from Prevalence Survey
12	Monitor and evaluate the TB care and control activities in children	**GHS/NTP**	TB care monitored and evaluated	Percentage of planned TB care and control activities in children, monitored and evaluated

1.2.4 Prisoners

Active TB screening using digital mobile x-ray would complement routine programme care in prisons. This will be done as part of joint TB/HIV collaborative activities. In this plan prison inmates, who are cell leaders would be oriented to identify and report presumed TB cases as early as possible.

An SOP for screening TB in prisons is in place. A diagnostic algorithm for screening for TB has been completed with the prison high command. Prisons without infirmaries would be supported with periodic mobile TB screening teams. All cases detected would be treated within the programme. All inmates on treatment being discharged would be linked to the programme in accordance with the SOP's for screening TB in prisons. Prison officers who are in contact with TB cases would be screened together with their families.

Periodic review of TB in prisons would be conducted with Prison high command. The engagement would be extended to cover the military and the police. Activities to be implemented are listed below.

	Activities	By Whom	Process Indicator	Outcome Indicator
1	Provide symptoms based screening questionnaire for TB screening	**MOH/NTP**	Screening tools available at prison reception.	Number of inmates screened
2	Engage with Prisons and Police High Command to institutionalise TB screening among prison inmates and remands	**MOH/NTP**	Sensitization meetings with Prisons and Police High Command	Number of inmates and remands screened annually
3	Conduct training of Police and Prison Officers and Cell and Block Leaders in active TB case finding activities	**MOH/NTP/ Ghana Police/ Ghana Prisons**	Trainings of Police and Prison Officers and Inmates conducted	Number of Police & Prison Officers & Cell Leaders trained.
4	Conduct baseline assessment of TB prevalence in all prisons	**MOH/NTP/Prisons**	Baseline assessment conducted	Prevalence of TB among prison populations estimated
5	Monitor and evaluate TB contacts and household investigations	**MOH/NTP/Prisons**	Contacts and household investigations evaluated	Percentage of contacts of prisoners diagnosed with TB who completed treatment
6	Conduct TB screening for all inmates once a year	**MOH/NTP/Prisons**	TB screening conducted	Percentage of TB patients diagnosed out of prisoners screened

1.2.5 Miners

The mining population has been reached with routine programme activities in the previous plan. An initial active TB screening of this risk group suggests additional cases could be detected. However the geographical spread and difficult access to some of the population makes it risky, owing to the illegal nature of some of the activities. Lessons from initial TB screening among mining population requires intense initial social mobilisation and rapid turnaround time for diagnosis.

The approach would be to organise periodic outreach TB screening programme in 13 well known districts with intense mining activities to supplement routine programme TB services as earlier described under National Tuberculosis control programme.

A screening mobile van equipped with Gene Xpert would be used after Symptom based questionnaire screening as per National diagnostic algorithm.

All confirmed TB cases would be treated appropriately under the programme. Appropriate referral mechanism tools are already in place as part of routine community based TB care activities. Activities to be implemented are listed below.

	Activities	By Whom	Process Indicator	Outcome Indicator
1	Provide TB screening tools (questionnaire)	**MOH/NTP**	Number of miners screened	Percentage of presumed TB cases diagnosed
2	Make provision for GeneXpert cartridges	**MOH/NTP**	IE&C materials provided	Number of IEC materials distributed
3	Orientate screening teams	**MOH/NTP**	Contact investigations conducted	Percentage of contacts diagnosed with TB among miners
4	Conduct 2 outreach screening activities for 17 precious minerals mining districts	**MOH/NTP**	Outreach screening activities conducted	Percentage of planned outreach activities conducted
5	Provide operational cost of screening teams	**MOH/NTP**	Operational cost provided	Frequency of screening undertaken.
7	Conduct central level supervision to risk group screening activities	**MOH/NTP**	Central level supervision conducted	Percentage of planned supervision conducted

1.3 Improve quality of laboratory and radiologic diagnosis

A laboratory network of light and LED microscopes has been deployed to meet some of the critical gaps in the previous strategic plan 2009-2013. A system of sputum collection and transportation to diagnostic sites supplements the network of laboratories but need further strengthening and improvement. Sites for specimen collection will be maintained and provision made for facilities without the appropriate sputum collection sheds.

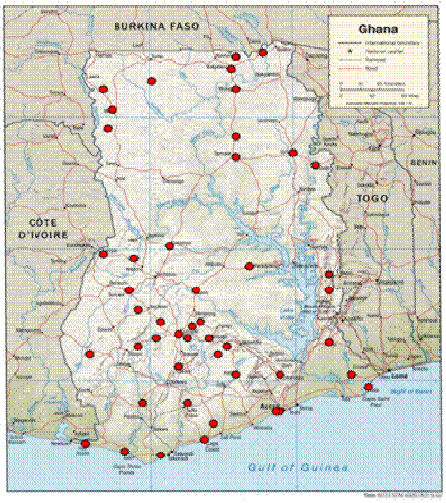

Figure 51: Sites for Digital X-ray

An on-going quality assurance programme supports existing laboratory network of light and LED microscopes already deployed. The laboratory system is linked with WHO Supranational Reference Laboratory in Germany. Fifteen (15) Gene Xpert machines have been introduced and a successful quality assurance programme is in place. A scale-up plan for countrywide deployment of Gene Xpert MTB based on carefully selected high burden HIV and HIV/ART treatment sites is available and will be implemented.

In furtherance of improving TB screening strategy in facilities, nationwide diagnostic capacity would be improved using digital x-rays that connect 51 hospitals as shown in Figure 50.

Table 30: Initial Screening and Laboratory Results (Combined) from National Prevalence Survey 2013

Screening Results		No. of Participants	No. of Participants who submitted at least once	S+ C+	Percentage	B+*	Percentage
Symptoms	**CXR**						
Yes	No	1198	1167	3	0.4	29	2.5
Yes	Yes	771	765	38	5.0	69	9.0
No	Yes	4381	4299	22	0.5	111	2.6
No	Exempt	1955	1895	1	0.05	36	1.9
Yes	Exempt	69	66	1	1.5	2	3.0
Total		**8374**	**8192**	**65**	**0.8**	**247**	**3.0**

* The vast majority of those S+ were symptomatic and/or with abnormal CXR. This is consistent with other surveys.
* CXR alone identified most of those S+ C+ positive and this is also consistent with other surveys.

These newer generation low dose radiation digital x-rays equipment come with computer aided diagnostic (CAD) software that would be useful in areas where there are no radiologists. All regions would benefit from these equipment.
Initial findings from the recent national prevalence survey, indicates that CXR alone identified most of the smear positive culture positive TB cases. (See Table 30 above). Chest x-ray is thus a useful screening tool in the pathway for diagnosing Tuberculosis. Activities to be implemented are listed below.

	Activities	**By Whom**	**Process Indicator**	**Outcome Indicator**
1	Establish and maintain TWG to plan and manage the laboratory improvements	MOH/NTP	TWG established	Percentage improvement in EQA performance of TB laboratories
2	Develop and implement a plan to collect, analyse and report data on success of TB lab improvements	TWG/NTP	Data reported using reporting tools	Routine reporting of lab activities
3	Hold quarterly meetings to review implementation	TWG/NTP	Meetings held	Percentage of implementation review meetings held
4	Develop/review, print and disseminate laboratory manuals, SOPs, guidelines, training manuals, recording and registration forms, Coordinate process with training and implementation of ACSM activities	MOH/NTP	Documents disseminated	Percentage of health facilities with laboratory manuals, SOPs, guidelines, training manuals, forms and implementation of ACSM activities
5	Upgrade 50 microscopy sites to meet bio-safety standards	MOH/NTP	Upgrade of sites completed	Percentage of microscopy sites meeting bio-safety standards
6	Procure 100 light microscopes and accessories	MOH/NTP	Microscopes and accessories procured	Percentage of microscopes procured and distributed
7	Provide laboratory reagents	MOH/NTP	Laboratory reagents provided	Percentage of laboratories with no stock out of reagents
8	Provide sputum containers	MOH/NTP	Sputum containers provided	Percentage of health facilities with no stock out of sputum containers
9	Provide new LED florescent microscopes and accessories for 200 existing functional microscopy laboratories in the public & private sector	MOH/NTP	LED florescent microscopes provided	Percentage of planned public & private sector provided with LED florescent microscopes
10	Provide 200 sputum collection sheds or booths near laboratories	MOH/NTP	Sputum booths provided near laboratories	Percentage of planned sputum booths provided near laboratory
11	Provide preventive maintenance cost for microscopes, 20 bio-safety cabin-nets and other equipment	MOH/NTP	Preventive maintenance conducted	Percentage of planned preventive maintenance performed on microscopes, bio-safety cabinets and other equipment
12	Conduct Supra National Panel Testing for smear microscopy: From Supra National Reference Laboratory to TB Reference Laboratories	MOH/NTP	Panel testing conducted	Percentage of regional laboratories attaining inter-national target
13	Conduct Panel Testing for smear microscopy: From National Reference Laboratory to regional laboratories	MOH/NTP	Panel testing conducted	Percentage of regional laboratories attaining national target

14	Conduct Panel Testing: From national reference laboratory to district laboratories	MOH/NTP	Panel testing conducted	Percentage of district laboratories attaining national target
15	Transport sputum samples to laboratories for diagnosis	MOH/NTP	Samples transported	Percentage of samples examined which were transported from periphery
16	Train (initial and refresher) laboratory staff in Regions & Districts (public sector)	NTP/NRL	Training held	Number of districts and regional laboratories with trained staff
17	Train (initial & refresher) laboratory staff in private facilities	NTP/NRL	Training held	Percentage of trained laboratory staff in private sector
18	Conduct on-site evaluation and blinded re-checking of TB slides	NTP/NRL	On-site evaluation and blinded re-checking conducted	Number of facilities meeting national target
19	Implement ACSM activities to promote new technologies for improved TB diagnosis among staff and general public	MOH/NTP	ACSM activities implemented	Percentage of districts implementing ACSM strategies for TB diagnosis
20	Implement quality and safety activities for TB diagnostic services	MOH/NTP	Lab infection control activities implemented	Percentage of laboratories implementing infection control activities
21	Undertake supervisory visits to TB diagnostic centres	NTP/NRL	Planned supervisory visits undertaken	Percentage of planned diagnostic facility visits conducted
22	Implement external QA activities	NTP/NRL	Planned external QA visits undertaken	Percentage of planned external QA activities undertaken
23	Develop operational research in quality improvement of laboratories in including new technologies	NTP/Research Partners	Operational research developed	Number of operational research implemented
24	Procure TA for laboratory	MOH/NTP	TA Procured	Number of Lab TA conducted
25	Procure Digital-Ray equipment with CAD software	GHS/NTP	# x-ray equipment procured	Percentage of planned procurement done

1.4 Improve HR capacities

Health system strengthening effect

In order to provide minimum optimum services with the right numbers and mix of human workforce, the necessary recruitment and competences must be in place. The competing demands of the limited staff strength coupled with new emerging life threating infectious diseases such as Ebola makes the situation critical. This is in addition to the temporary ban on staff recruitment from government. The resultant effect is overworked and poorly motivated staff. To address specialised needs for the programme such as well-trained respiratory physicians and biomedical scientists, the Programme in collaboration with Human Resource Development Division of GHS is working to improve overall health sector HR plan.

In the interim, as previously done, mitigation of the HR challenge is essential recruitment, and capacity building for critical mass of personnel, using health system structures. A database of these essential staff has been maintained to be absorbed into the larger health system on a permanent basis at the opportune time.

The lessons from the interim approach, is that staff engaged to support the expanded scope of TB case detection activities have anchored and strengthened monitoring & evaluation systems in the regions, laboratories in general hospitals, Outpatient department and HMIS. Above all TB activities has been successfully coordinated and the programme well managed. The effect is the quality of the programme described in the tuberculosis situational analysis.

It is proposed to further enhance capacities on challenges on new technologies, and tools, MDR-TB, TB/HIV, infection control, childhood TB and civil societies. Activities to be implemented are listed below.

	Activities	By Whom	Process Indicator	Outcome Indicator
1	Maintain Programme Assistants to meet staff shortages and assist current TB focal points in Programme management at all levels	MOH/NTP	Recruitment done	Percentage of Programme Assistants in position
2	Maintain Central level recruited Programme Focal Persons: Data Manager, TB/HIV, HRD, M&E & 2 Drivers	MOH/NTP	Recruitment done	Percentage of planned key staffs in position
3	Continue operational performance based incentive for permanent Programme staff	MOH/NTP	Operational performance based incentive for CTU staff continued	Number of staffs at CTU receiving operational performance based incentive
4	Maintain laboratory assistants	MOH/NTP	Recruitment done	Percentage of laboratory assistants at post
5	Recruit task shifting officers for facility based case finding	MOH/NTP	Recruitment done	Percentage of officers recruited
6	Support Technical Assistance (international and local) missions annually to support Programme implementation in HRD, M&E, ACSM, TB/HIV, Research, PAL, MDR-TB	MOH/NTP	Technical Assistant Provided	Percentage of planned technical assistant for various missions Provided annually
7	Coordinate trainings with Medical Dental & Nurses Councils and Veterinary Health Services (Credited continuous Medical Education)	MOH/Regulatory Bodies	Training coordinated	Number of institutions with Credited Continuous Medical Education providing training in TB
8	Support revision of curriculum for the teaching of TB control in basic training institutions	GHS/NTP/ Medical School	Curriculum revised	Number of revised curriculum in place for the teaching of TB control
9	Conduct Refresher training for National Trainers & Supervisors	MOH/NTP	Training conducted	Percentage of trained national trainers & supervisors that have attended refresher course
10	Revise/review training Manuals & print them	GHS/NTP/ Medical School	Training manuals printed	No of revised training manuals in place
11	Conduct refresher training for staff of 3 Teaching Hospitals Chest Units	Medical School/NTP	Refresher training held	Percentage of staff at Teaching hospital Chest Units who received refresher training
12	Conduct Initial & refresher training for Regional & District TB teams (Public Health) in supervision and M&E skills	MOH/NTP	Refresher training held	Percentage of Regional and District TB Teams who received refresher training in supervision and M&E skills
13	Conduct Refresher training for Regional Hospital staff on clinical TB and TB/HIV management, care and control	MOH/NTP	Refresher training held	Percentage of Regional hospital staff who received refresher training on clinical TB and TB/HIV management care and control

14	Conduct Refresher Training for District Hospital staff on clinical TB and TB/HIV management, care and control	NTP	Refresher training held	Percentage of District hospital staff who received refresher training on clinical TB and TB/HIV management care and control
15	Conduct Initial & refresher Training for Regional, District and Health Centre level staff in nutritional assessment of TB patients	GHS/NTP	Training conducted	Percentage of Regional, District, and Health Centre staff who received Training in Nutritional assessment of TB patients
16	Conduct Refresher Training for Regional and District TB laboratory External Quality Assurance team (Public)	NTP/NRL	Refresher training held	Percentage of Regional, and District Laboratory team who received refresher training on External Quality Assurance
17	Sensitise DOTS corner staff on pharmacovigilance for TB medicines	MOH/NTP	Staff sensitised	Percentage of DOTS corner staff sensitized on pharmacovigilance for TB medicines
18	Train 2 doctors at College of physicians and surgeons to serve as referral clinician and paediatrician and to support NTP clinical supervision (Provide annual fees)	MOH/NTP	Training held	Number of doctors at College of physicians and surgeons who are trained to serve as referral clinician and paediatrician and to support NTP clinical supervision
19	Conduct initial and refresher trainings for General medical doctors for TB care in co morbidities	MOH/NTP	Training held	Percentage of General medical doctors who received refresher trainings for TB care in co-morbidities
20	Train health workers at all levels in Logistics management Information System for TB commodities	SSDM/NTP	Training held	Percentage of health workers trained in Logistics management Information System for TB commodities
21	Train sub district staff on use of routine information system	MOH/NTP	Training held	Percentage of sub district staff trained on the use of routine information system
22	Participate in advanced level training for National and Regional Programme management including members of TWGs inclusive of study tours, courses & international conferences	MOH/NTP	Training held	Percentage of National, Regional , and TWG members participated in advanced level training , study tours courses & international conferences
23	Train key staff at all levels to use electronic data base system	MOH/NTP	Training held	Percentage of key staff trained to use electronic data base system

1.5 Engage other private care providers

Since 2003, the NTP has engaged the private health sector in TB control activities ensuring standardized care for TB patients. The motivation for this approach is to extend TB services coverage and improve access to TB services giving the patients the choice of where to receive treatment. 108 faith based facilities and 40 private laboratories so far has been engaged, these providers have been integrated into the National TB control programme and adequately receives support by way of TB commodities, supervision and programme stationery for reporting.

Alternate health care providers such as religious healers, traditional healers, spiritualists, herbalists, etc. also constitute a significant source of health care delivery in Ghana. The private sector contribution to TB case notification is described under TB situational analysis. Existing SOP's to engage the private sector would be revised and updated. The private sector will continue to receive capacity building programme updates and the necessary logistics within the plan period.

Majority of the independent (stand-alone) and private laboratories are located in the urban centres notably, Accra, Kumasi, and other regional capitals and only 22% (40 out of 325) perform TB microscopy. Activities to be implemented are listed below.

	Activities	By Whom	Process Indicator	Outcome Indicator
1	Revise, print and disseminate SOPs for engaging other providers	GHS/NTP	SOPs disseminated	Percentage of health facilities using SOPs for engaging other providers
2	Sensitization meetings with private providers including alternate care providers	GHS/Society of Private Practitioners/ Stakeholders	Meetings held	Percentage of private providers attended sensitization meetings
3	Preparatory activities and mapping for engagement of other care providers in each district.	GHS/Stakeholders	Mapping done	Percentage of districts with mapping of other care providers
4	Initial & refresher training for private providers in TB care & management	GHS/Society of Private Practitioners	Training conducted	Percentage of private providers trained in TB care & management
5	Conduct national level advocacy meeting with pharmacies & chemical sellers	NTP/Pharmaceutical Society of Ghana (PSG)	Meetings held	Percentage of pharmacies & chemical sellers groups represented at national level advocacy meeting
6	Initial & refresher training for pharmacies and chemical sellers in all regions	GHS/PSG	Training conducted	Percentage of pharmacies & chemical sellers trained
7	Accredit additional private clinics to start diagnosis and treatment of TB patients	GHS/Society of Private Practitioners	Private clinics accredited	Percentage of additional private clinics accredited to start diagnosis and treatment of TB patients
8	Refurbish/repair private laboratories and clinics	GHS	Refurbishment completed	Number of private laboratories and clinics refurbished
9	Provide diagnostic equipment including fluorescent microscopes, logistics and reagents to private sector laboratories	MOH/Society of Private Practitioners/ Stakeholders	Diagnostic equipment provided	Percentage of Private sector Laboratories provided with diagnostic equipment, including fluorescent microscopes, logistics and reagents
10	Provide enablers to TB patients in the private sector	MOH/NTP	Enablers provided	Percentage of TB patients in private sector receiving enablers
11	Provide enablers for private sector providers	MOH/NTP	Enablers provided	Percentage of private facilities receiving Enablers
12	Hold quarterly review meetings with private providers	GHS/stakeholders	Meetings held	Percentage of private providers attending review meeting
13	Conduct supervision & monitoring at all levels	GHS	Supervision and monitoring conducted	Percentage of planned activities monitored and evaluated
14	Develop, print and disseminate IE&C materials for private providers	GHS	IEC materials disseminated	Percentage of private providers using IEC materials
15	Conduct training for alternate care providers in CBTC and ACSM activities	NTP/Stop TB Partnership	Training held	Percentage of alternate care providers engaged in CBTC and ACSM activities

1.6 ACSM: Communication strategy to reduce stigma

A comprehensive national TB communication strategic plan developed by all stakeholders would be available from 2016. It is based on situational analysis and on-going operations research (KAP of TB and assessment of client satisfaction of services.). This will form the bedrock of the next phase of TB educational activities.

However, the first three years of the plan would focus on supporting TB case detection and treatment adherence strategies addressing specific stigma issues as priority interventions. This would be supported and climaxed with annual world TB day activities at all levels of the health delivery system. The strategy is to put back TB on the agenda of health care managers at least once in a year. All activities will be implemented with stakeholders including the civil society organisations.

A robust communication strategy would ensure that the TB message is disseminated far and wide to all who need to hear making use of new technologies of mass communication and social media which have become vital information dissemination tools in this era of low cost and high impact mobile technology. Activities to be implemented are listed below.

	Activities	By Whom	Process Indicator	Outcome Indicator
Advocacy				
1	Build capacity for mass media (journalists) to disseminate TB and TB/HIV messages	GHS/NTP	Capacity built	Percentage of media houses with journalists trained in TB and TB/HIV information dissemination
2	Engage and provide support to professional associations such as Medical, Nursing, laboratories to organize seminars and CME's for their memberships and for BCC outreach activities	GHS/NTP	Professional association supported and engaged	No of targeted professional associations supported and engaged to organize seminars and CME's for their memberships and for BCC outreach activities
3	Create awareness for chiefs & parliamentarians as TB advocates	Stop TB Ghana/NGO 's	Advocates identified and awareness created	Number of chiefs & parliamentarians advocating for TB
4	Organize and support MOH/NTP high profile visits to regions and districts	GHS/NTP	High profile visits supported	Percentage of scheduled high profile visits undertaken
5	Provide support to national TB advocates to champion TB issues	GHS/NTP	Support Provided	No of planned support for TB advocates provided
Communication				
6	Produce advocacy & IE&C materials targeted at patients, communities, NGOs, policy makers and health staff to improve TB knowledge and support for TB activities	GHS/NTP/ Stop TB Ghana	Advocacy & IEC materials produced	Percentage of targeted groups provided with advocacy & IEC materials
7	Develop broadcast materials and launch airtime spot for radio and Television	GHS/NTP	Broadcast materials developed	Percentage of planned airtime spot for radio and Television achieved
8	Launch and commemorate WTBD at National, Regional, and district levels	GHS/NTP/ NGO's	WTBD commemorated	Number of WTBD commemorations held
9	Organize Press conferences	GHS/NTP/ NGO's	Press conferences organised	Percentage of planned Press conferences achieved
Social Mobilization				
10	Undertake community outreach programmes for leaders in all districts	NGO's	Community outreach Programmes undertaken	Percentage of planned community outreach Programmes for leaders in all districted achieved

11	Mobilize community & civil society to undertake community outreach through contracts with NGO's and Civil society	NGO's/CBO/Civil society	Community & civil society mobilized	Percentage of planned community outreach and mobilization activities achieved
12	Conduct supervision, monitoring and evaluation of ACSM activities	GHS/NTP/ NGO's	ACSM activities supervised, monitored and evaluated	Percentage of planned supervision, monitoring and evaluation of ACSM activities achieved
Other ACSM Activities				
13	Organize ACSM technical working group meetings	GHS/NTP	TWG meetings held	No of planned TWG meetings held
14	Procure TA for ACSM activities	GHS/NTP	TA procured	TA for ACSM conducted
15	Conduct evaluation /assessment of ACSM activities (KAP survey, additional cases from household TB screening)	GHS/Stakeholders	ACSM evaluation conducted	Percentage of planned evaluations of ACSM activities achieved

2.0 Detection of Drug Resistant Tuberculosis

Determination: The ultimate goal is to provide early detection and universal drug susceptibility testing for all patients in the long term.

2.1 Improve laboratory capacity for DR-TB diagnosis

In the previous plan diagnostic capacity for DR-TB in Ghana was improved with infrastructure, equipment and human resource capacity building. DR-TB diagnostic capacity was fully completed in 2 laboratories – Korle Bu Teaching Hospital Chest Clinic Lab and Koforidua Regional Hospital Laboratory. 13 Gene Xpert machines are strategically located in Regional and districts hospitals. Two are located in mobile diagnostic van for field related screening activities. A Gene Xpert scale up plan developed with the assistance of external consultants will be implemented. All Drug resistant diagnostic services receive quality assurance support from Borstel Supranational Reference Laboratory. Internal and external quality assurance programme will continue.

In this plan capacity for culture services in all regional hospitals will be improved for early detection of drug resistant TB for all categories of retreatment cases. Key activities implemented under previous plan will be enhanced and some maintained. Activities to be implemented are listed below.

	Activities	**By Whom**	**Process Indicators**	**Outcome Indicator**
1	Upgrade 5 laboratories to BSL-3 status	**MOH/NTP**	Laboratories upgraded	Percentage of planned laboratories upgraded to BSL-3
2	Ensure BSL-3 certification to conform to WHO guidelines	**MOH/NTP**	Certification accredited	Percentage of planned laboratories with accredited BSL-3 certification
3	Provide liquid TB culture equipment & accessories for 5 upgraded laboratories	**MOH/NTP**	Equipment Provided	Percentage of planned laboratories provided with liquid TB culture equipment & accessories
4	Provide and distribute lab supplies & reagents for 7 culture labs	**MOH/NTP**	Equipment distributed	Percentage of planned lab with lab supplies & reagents for culture
5	Provide 5 standard equipment for new culture sites to perform molecular tests (Line Probe Assay)	**MOH/NTP**	Lab equipment to perform molecular tests provided	Percentage of planned lab performing molecular tests

6	Provide and distribute lab supplies for molecular test in 7 laboratories	**MOH/NTP**	Lab supplies provided	Percentage of planned lab supplies for molecular test provided
7	Provide preventive maintenance service for liquid culture equipment and 13 bio-safety cabinets and other equipment	**MOH/NTP**	Maintenance service provided	Percentage of planned preventive maintenance services executed
8	Conduct calibration of existing equipment	**MOH/NTP**	Calibration conducted	Percentage of equipment passing calibration tests
9	Conduct Supra National Panel Testing for culture, DST & molecular tests: From Supra National Reference Laboratory to National TB Reference Laboratories	**MOH/NTP**	Panel testing conducted	Percentage of culture laboratories attaining international target
10	Transport samples (for smear & culture) to laboratories for diagnosis	**MOH/NTP**	Samples transported	Percentage of labs with links to transport samples for smear and culture
11	Train (initial and refresher) staff of culture & molecular laboratories	**MOH/NTP**	Training held	Number of culture & molecular lab with trained staff
12	Conduct quality assurance (QA) assessment of culture and molecular laboratories	**MOH/NTP**	QA done	Percentage of culture and molecular labs receiving QA visits
13	Implement ACSM activities to promote culture and molecular technologies for improved TB diagnosis among staff and general public	**MOH/NTP**	ACSM activities implemented	Percentage of regional facilities implementing ACSM strategies for TB culture and molecular services
14	Implement quality and safety activities for culture and molecular diagnostic services	**MOH/NTP**	Lab infection control activities implemented	Percentage of laboratories implementing infection control activities
15	Undertake supervisory visits to TB culture and molecular laboratories	**NTP/NRL**	Planned supervisory visits undertaken	Percentage of planned culture and molecular labs visited
16	Develop operational research in quality improvement of culture and molecular laboratories in including new technologies	**NTP/NRL/ Research Partners**	Operational research developed	Number of operational research activities implemented
17	Procure TA for culture and molecular laboratories	**MOH/NTP**	TA Procured	Number of lab TA conducted
18	Establish additional Gene Xpert sites	**MOH/NTP**	Gene Xpert Procured	New Gene Xpert sites functional
19	Procure TA for LPA & Gene Xpert	**MOH/Partners**	TA Procured	TA for Gene Xpert conducted

3.0 Treatment

Determination: The aim is to provide treatment to all people with TB including drug-resistant TB, and provide patient support to minimise risk of deaths, as efforts for TB case detection is intensified. Therefore, predictable, timely, supply of TB commodities, patient care and support is essential component of care.

High Body Mass index (BMI) has been shown to be protective against TB among HIV-uninfected as well against disease progression and mortality among those with HIV. BMI could crudely be used as a

surrogate marker of risk of TB death. 51% of TB patients registering for TB treatment are malnourished. (Routine NTP data)

3.1 Improve quality clinical care of TB patients

In the previous plan efforts to improve quality of clinical care of TB patients for prescribers, and among others to use BMI as part of risk assessment for initial risk of dying of TB was started but coverage was low (5% of facilities providing clinical care).

The target to train at least one doctor (to be called TB Referral Clinician) in management of TB and its co-morbidities in each of the 170 districts and 10 regions could not be met owing to funding challenges.

Clinical supervision and mortality audits were not fully deployed owing to slow response from clinical care services. The Health systems barriers have largely been overcome with task shifting officers propose to be part of supporting care.

Other care and support was effectively implemented in collaboration with Nutrition Division of Ghana Health Service such as providing food by prescription to all patients that were moderately or acutely malnourished including pregnant women and children affected by TB.

While all patients detected are put on treatment, an accelerated coverage of quality clinical care of activities for TB patients in all facilities in current plan is envisaged. Activities to be implemented are listed below.

#	Activities	By Whom	Process Indicator	Outcome Indicator
1	Build and decentralize the capacity to attend to TB complications in all hospitals	**NTP/THs**	Capacity built	Percentage of hospitals with capacity to attend to TB complications
2	Train medical officers as Referral Clinicians in the management of TB co-morbidities & DR-TB	**NTP/THs**	Referral Clinicians trained	Number of regions with trained Referral Clinicians
3	Train TB Physician Specialists in Ghana College of Physicians to support TB clinical care and supervision	**MOH/NTP**	TB physician Specialists trained	Number of Clinical supervisions undertaken by national level TB Physician Specialist
4	Conduct initial and refresher trainings of general medical doctors for TB care and management of co-morbidities	**NTP/ICD/ THs**	General medical officers trained	Percentage of general medical officers trained
5	Support National TB Clinician to provide clinical management supervision to regional and district hospitals	**NTP/ICD/ THs**	Supervision conducted	Percentage of planned supervisory visits conducted
6	Manage other clinical conditions among TB patients	**GHS/NTP**	Other clinical conditions managed	Percentage of patients with other clinical conditions managed
7	Institute monthly TB mortality audits in institutions	**NTP/ICD/ THs**	TB mortality audit instituted	Percentage of institutions in which TB mortality audit is conducted
8	Procure diagnostic and other equipment to investigate for TB and other clinical conditions	**GHS/NTP**	Diagnostic and other equipment Procured	Percentage of planned diagnostic and other equipment procured
9	Procure equipment and logistics for the management of complication of TB such as pleural and pericardial effusions	**GHS/NTP**	Equipment and logistics procured	Percentage of equipment and logistics procured
10	Adopt, print and distribute nutritional guidelines to DOTS corners	**NTP/Nutrition Dept.**	Nutritional guidelines distributed	Percentage of DOTS corners with nutritional guidelines
11	Procure scales with stadiometers for nutritional measurements	**GHS/NTP**	Scales procured	Percentage of facilities with procured scales

12	Train health care providers at DOTS on nutritional assessment counselling & support skills (NACS)	**NTP/Nutrition Dept.**	Health care Providers trained	Percentage of health care providers trained
13	Develop and print nutrition specific education materials	**NTP/Nutrition Dept.**	Education materials on nutrition printed	Number of education materials printed
14	Procure high energy ready to use foods (RUTF & FBF) as per national guidelines	**GHS/NTP**	RUTF and FBFs procured	Number of clients on RUTF and FBFs
15	Conduct supervision and monitoring activities	**GHS/NTP**	Supervision and monitoring activities conducted	Percentage of planned supervisory and monitoring activities conducted
16	Conduct evaluation of NACS impact on patient care	**GHS/NTP**	Patient care evaluated	Report on evaluation of patient care in place

3.2 Provide patient care and support

Patient care and support is integral and essential component of TB control services. It removes barriers to TB care services, mainly financial and geographical inaccessibility. Most of the patients are poor. External Reviewers of the programme (2013 comprehensive NTP Review Report) led by WHO and USAID in part largely attributed the success of the NTP to care and support component of the programme (Often referred to as Enablers Package).

Enablers are provided at the level of patient care and those supporting patient care to achieve cure. Health care workers provide the following additional activities in support of patient care: pre-treatment home verification and defaulter prevention visits at months 2, 5 and 6, supervision and supervisory support of community volunteers. With the support of EnP, community based volunteers provide daily supervision of DOT, community education, psychosocial support, referral and accompanying suspected TB cases to diagnostic sites and participation in review meetings. The enablers have removed the financial inaccessibility to TB services by patients and reduced operational cost of care of patients by healthcare providers and institutions. Activities to be implemented are listed below.

	Activities	**By Whom**	**Process Indicator**	**Outcome Indicator**
1	Provide enablers, inclusive of health insurance premium	**MOH/NTP**	Patient Enablers provided	Percentage of TB patients with active membership for health insurance
2	Provide enablers to health care providers for additional work in ensuring patient treatment adherence and completion of treatment	**MOH/NTP**	Health care Worker Enablers provided	Percentage of facilities receiving health care provider Enablers
3	Follow up patients from neighbouring countries who access free TB care in Ghana	**NTP/DHMT**	Cross border activities conducted	Number of patients from neighbouring countries followed up
4	Expand DOT in the public and private sectors	**MOH/NTP**	DOT expansion conducted	Number of new facilities from public and private sectors providing TB care

3.3 Improve, treatment & care of drug resistant tuberculosis

There is an obvious treatment gap for DR-TB as indicated by the Epi Analysis findings and external review of National TB control programme. While a number of factors contributing to the problem have been resolved such as non-availability of second line drugs, absence of treatment guidelines and human

resource capacity, the programme is confronted with reluctance of personnel to manage DR-TB owing to associated risk and absence of incentives.
Notwithstanding, structures have been put in place to enrol patients into treatment programs.
A Central Clinical MDR-TB Team located in Korle Bu Teaching Hospital provides continuous supervision, support and mentoring to regional MDR-TB management teams. The programme has therefore enrolled 27 persons on treatment since 2013. This is much lower than the total number diagnosed since 2011 which is 96. The plans seek to accelerate care and support of MDR-TB treatment, while implementing activities that allays the fear of health personnel and improve treatment.
Care and support of DR-TB would be implemented within framework of WHO updated guidelines for management of DR-TB. Key activities to be implemented include:

	Activities	**By Whom**	**Process Indicators**	**Outcome Indicator**
1	Review and update national MDR-TB guidelines with an international consultant	MOH/NTP	MDR-TB guidelines reviewed	Reviewed MDR-TB document available
2	Develop case based medical information system (MIS) for PMDT with an international consultant	MOH/NTP/ Partners	Case based MDR-TB MIS developed	Functional case based MIS for PMDT
3	Deploy case based MIS for drug resistant TB in treatment sites	MOH/NTP	MIS for drug resistant TB deployed	Percentage of treatment sites utilising MIS for drug resistant TB
4	Rehabilitate regional hospital wards to manage complicated MDR-TB cases	MOH/NTP	Hospital wards rehabilitated	Number of regional hospital wards rehabilitated
5	Print the MDR-TB guidelines & SOPS	MOH/NTP	MDR-TB guidelines and SOPs printed	Percentage of MDR-TB treatment sites with printed documents
6	Conduct international study tours to MDR-TB Centres of Excellence	MOH/NTP	Study tours conducted	Number of study tours conducted
7	Train medical officers on clinical management of DR-TB patients in international courses	MOH/NTP	Medical officers trained	Percentage of medical officers trained
8	Train medical officers and health staff in PMDT	MOH/NTP	Health providers trained	Number of health providers trained
9	Purchase second line TB medicines from Global Drug Facility (GDF)	MOH/NTP	Second line TB medicines purchased	Percentage of treatment sites reporting no stock out of second line TB medicines
10	Green Light Committee support to country for PMDT	MOH/NTP	Assistance obtained	Number of planned GLC missions completed
11	Monitor and evaluate PMDT	MOH/NTP	MDR-TB evaluated	Evaluation report available
12	Conduct a drug resistance survey	MOH/NTP	Drug resistance survey conducted	Survey report available
13	Provide enablers to MDR-TB patients	MOH/NTP	Enablers provided	Percentage of MDR-TB treatment centres provided with enablers
14	Provide incentives for treatment completion	MOH/NTP	Incentives provided	Percentage of MDR-TB patients receiving incentives for treatment completion
15	Provide toll free telephone services at NTP for patient support services	MOH/NTP	Toll free telephone service established	Number of calls received requesting support
16	Provide enablers to CBTC providers/volunteers for DR-TB care in the community	MOH/NTP	Enablers provided	Number of CBTC providers/volunteers provided with enablers

3.4 Strengthen coordination and collaboration among DR-TB management teams

Current models of care for DR-TB patients recommend the ambulatory care approach. A Central MDR-TB Team exists to coordinate enrolment and treatment across the country from the Korle Bu Teaching Hospital. This team provides continuous supervision, support and mentoring to the regional MDR-TB management teams that report to the Central TB Unit.

Patients are managed in the community by clinical care teams in designated facilities close to the patient. These teams are supervised by the Regional Hospital MDR-TB Teams and they collaborate and share knowledge to continually upgrade their skills. Continuous coordination and collaboration between these clinical care teams would improve the quality of care provided to patients. It is important that cross border activities are implemented where needed to support DR-TB patients. Key activities to be implemented include:

	Activities	**By Whom**	**Process Indicators**	**Outcome Indicator**
1	Designate a focal point, within the NTP Central Unit, for Programmatic Management of Drug Resistant TB (PMDT)	MOH/NTP	Focal point identified	Designated focal point operational
2	Conduct regular DR-TB panel meetings	**GHS/ THs**	Meetings conducted	Percentage of diagnosed MDR-TB patients enrolled on treatment
3	Conduct coordination meetings of MDR-TB care	**Stakeholders**	Meetings conducted	Percentage of planned meetings conducted
4	Conduct bi-annual DR-TB review meeting	**MOH/NTP**	Meetings conducted	Percentage of planned meetings conducted

3.5 Community TB care

Community based care brings TB care services close to the patient's home. A successful operational partnership has been developed between the health service and civil societies for TB control. This has particularly proven relevant in hard to reach areas in the previous plan contributing to low adverse treatment outcomes.

In this plan the focus will be to further develop capacities for CHPS zones in 90 high incident districts that will include all mining districts, bordering districts. CHPS is a concept that places a Community Health Officer within the community, supported by the local community-based volunteers. A total of 540 CHPS zones from this 90 high incident districts would have community officers and volunteers capacities developed to support TB screening strategy. Activities to be implemented are listed below.

	Activities	**By Whom**	**Process Indicator**	**Outcome Indicator**
1	Revise, print and disseminate CB-DOTS operational guidelines	**MOH/NTP**	Operational guidelines printed and disseminated	Percentage of CHPS zones with CB DOTS operational guidelines
2	Map all CHPS zones in 90 high incident districts	**MOH/NTP**	Mapping of CHPS zones completed	Number of CHPS zones per region
3	Initial & refresher training for CHO's	**MOH/NTP**	CHO's trained	Percentage of CHPS zones with trained CHO's
4	Provide educational materials to community based organizations	**MOH/NTP**	Educational materials provided	Percentage of CBOs displaying educational materials in their communities

5	Provide operational support for CHOs to undertake supervision and monitoring of CB-DOTS activities, sputum collection & transportation	**MOH/NTP/**	Operational cost provided	Number of CB-DOTS supervisory visits undertaken by CHOs
6	Conduct quarterly review meetings	**MOH/NTP**	Quarterly review meetings held	Percentage of CHPS zones attending quarterly reviews

3.6 Strengthen community systems to improve TB outcomes

Community based TB care is currently the bedrock of TB control in Ghana. Over 60% of patients are treated in the community with support from community-based organisations, small NGOs and faith-based organisations. These systems would be strengthened to provide better support.

Civil society organizations have specific capacities in TB control and have contributed significantly to case detection in Ghana. Their competencies include reaching out to vulnerable groups, mobilizing communities, channelling information, helping to create demand for care, developing effective service delivery strategies and addressing determinants of the TB epidemic.

Public-private Mix DOTS in Ghana has improved national coverage of TB services. With the growing strength of the private health sector in Ghana, more private providers shall be engaged to provide TB services

Capacity for these private providers, CBOs and NGOs would be strengthened using the already developed Operational Guidelines for PPM-DOTS in Ghana as a tool for engagement and capacity building for private sector in TB control. Capacity building of these organisations and engagement of private care providers would improve access to health providers in the community to ensure better treatment outcomes. Key activities to be implemented include:

	Activities	**By Whom**	**Process Indicator**	**Outcome Indicator**
1	Strengthen Ghana Stop TB Partnership & Omanhene (Chiefs) with material resources to support activities and services	**MOH/NTP**	Material resource provided	Number of partners strengthened with material resources
2	Conduct training for project management, design accountability & accounting for NGOs	**MOH/NTP**	Training conducted	Percentage of NGOs trained
3	Conduct national consultative meetings for partnerships	**Stop TB Partnership**	Meetings conducted	Percentage of partners for which consultative meetings are conducted
4	Conduct quarterly coordination linkages sessions between NGO's and regional coordination bodies of health sector.	**MOH/NTP/ NGOs**	Coordination sessions held	Number of coordination sessions held
5	Conduct training for partnerships on community based activities and services (ACSM, contact tracing, TB screening leadership) for members of NGOs	**MOH/NTP/ NGOs**	Trainings conducted	Percentage of NGO's supporting TB control activities of those trained
6	Provide Enablers (operational cost) to support Partnership activities (Sputum collection & transportation)	**MOH/NTP**	Operational cost provided	Percentage of partners provided with operational cost
7	Provide educational materials to NGO's for individuals, & community groups	**MOH/NTP**	Educational materials provided	Number of individuals and groups provided with educational materials
8	Conduct supervision and monitoring of partnerships activities	**MOH/NTP**	Supervisory and monitoring visits conducted	Percentage of partners monitored and supervised

9	Train partners in monitoring & evaluation and information management	**MOH/NTP**	Partners trained	Percentage of partners trained in monitoring & evaluation and information management
10	Print and disseminate Operational Guidelines for PPM-DOTS in Ghana	**MOH/NTP**	Operational guidelines printed and disseminated	Number of private providers engaged in TB control using operational guidelines
11	Engage more civil society organisations and enhance their capacity for TB control	**NTP/Stop TB Partnership**	More CSOs engaged	Number of new CSOs working in TB control
12	Promote innovative TB case finding interventions through activities of CSOs	**MOH/NTP**	Logistics provided distributed	Innovative case finding interventions implemented through CSOs
13	Develop, print and disseminate operational guidelines for scaling up PPM DOTS	**NACP/NTP**	Referral Systems established	Operational guidelines for PPM DOTS scale up in use
14	Conduct national level advocacy with private health service providers	**NACP/NTP**	Rapid diagnostic tools provided	New private sector facilities providing TB care services
15	Build capacity and accredit private health service providers for TB control	**NACP/NTP**	Monitoring & evaluation conducted	Alternate care providers engaged in TB services
16	Engage alternate care providers for TB control	**NTP/Traditional Medicine Board**	Alternate care providers engaged	Percentage of alternate care providers engaged in TB control
17	Support, monitor and evaluate civil society and private sector activities	**NTP/Stop TB Partnership**	Monitoring visits to CSOs and private providers	Percentage of planned monitoring and support visits undertaken

3.7 Drugs and Logistics Management

Medicines are key to the treatment of TB patients. Poor quality medicines put TB patients at great risk and irrational use results in poor treatment outcomes and drug resistance. Proper management of medicines and other TB Programme logistics ensures access to services in an uninterrupted manner for the benefit of all.

The MOH/GHS system has a proven track record of procuring TB medicines and storing these for efficient distribution. An LMIS has been developed for TB medicines and other commodities in collaboration with the USAID funded JSI|DELIVER Project as part of health systems strengthening. Capacity building for all regional Supply and Logistics Teams is currently on-going to ensure efficient use of this system. In addition a TB Medicines Pharmacovigilance system has been established with the support of the Ghana Food and Drugs Authority (FDA). Regional pharmacovigilance teams have been trained and reporting tools are in place at regional level. Further strengthening of this system is required by building capacity of DOTS Corner staff at district and sub-district levels. This would ensure early reporting of adverse events associated with TB medicines especially with the introduction of second line TB medicines for MDR-TB treatment. Key activities to be implemented are:

	Activities	**By Whom**	**Process Indicators**	**Outcome Indicator**
1	Revise, print and disseminate an SOP for the Logistics Management Information Systems (LMIS) for TB medicines	**MOH/NTP**	SOPs disseminated	Percentage of TB drug management facilities reporting using LMIS guidelines

2	Assess the logistic system every two years	**MOH/NTP**	Assessment conducted	Logistics system strengthened
3	Train health workers at all levels in Logistics Management Information System for TB commodities	**MOH/NTP**	Training conducted	Percentage of health facilities with staff trained in LMIS
4	Sensitise DOTS corner staff on pharmacovigilance for TB medicines	**MOH/NTP**	Sensitization meetings held	Percentage of DOTS corners with trained staff on TB pharmacovigilance
5	Procure and acquire buffer stock of first line TB medicines for adult TB patients through GDF	**MOH/NTP**	First line TB medicines procured	Number of districts reporting no stock out of TB medicines
6	Procure first line medicines for children	**MOH/NTP**	First line TB medicines for children procured	Number of districts reporting no stock out of TB medicines for children
7	Procure and acquire buffer stock of second line TB medicines for DR-TB patients through GDF	**MOH/NTP**	Second line TB medicines procured	Number of treatment sites reporting no stock out of second line TB medicines
8	Provide cupboards for drug storage at facility level	**GHS/NTP**	Cupboards provided	Percentage of DOTs corners /health facilities provided with cupboards for drug storage
9	Incorporate TB treatment guidelines into pre-service institutions training curricula	**MOH/NTP**	TB treatment guidelines incorporated into curricula of pre-service training institutions	Percentage of health facilities with standard basic institution manuals incorporated with TB treatment guidelines

4.0 TB/HIV Interventions

A joint planning and implementation guidelines document developed by Tuberculosis/AIDS and other partners exist and serve as framework to implement TB/HIV activities for this plan. The revised document produced in 2014 followed reviewed previously implemented TB/HIV activities, gaps from Epi Analysis of TB and HIV programmes and addressed external review recommendations of TB/HIV review as part of NTP comprehensive review in 2013.

The TB and AIDS programmes are assigned specific activities under TB HIV Collaborative activities in addition to common integrated implementation arrangements. NTP will continue to implement intensified TB case finding among PLHIV within the context of implementing the three I's using new lessons gained from implementing the previous plan. The coverage of active TB screening in PLHIV is low and not systematically organised. A new diagnostic TB screening algorithm developed to reflect the importance of Gene Xpert MTB/RIF and X-ray as screening tools for TB in PLHIV is not widely circulated and staff inadequately sensitise.
TB diagnosis among PLHIV would be improved with the scale up of Gene Xpert equipment in all regional hospitals. A scale up plan to improve access to TB diagnosis for PLHIV has been developed targeting 38 high burden HIV districts. ART services would be integrated into DOTS Corners and TB treatment would be provided from ART Centres. The TB and HIV reporting systems are already integrated into DHIMS 2.

4.1 Intensify TB Case finding among PLHIV

Early detection of TB among PLHIV and subsequent management would reduce TB death rates among the co-infected. Scale up of diagnostic capacity for TB diagnosis among PLHIV is planned for 175

ART clinics. SOPs to improve screening of TB among PLHIV have been produced but not widely distributed. Capacity building to improve their use would be enhanced. The FAST concept for TB infection control would be applied to improve case detection (FAST is a concept for implementing TB infection control practices involving *Finding* TB suspects quickly; *Actively* screening them; *Separating* them; and quickly enrolling them into *Treatment*). Linkages between ART Centres and DOTS Corners would be improved. Key activities to be implemented include:

	Activities	By Whom	Process Indicators	Outcome Indicator
1	Provide SOPs on intensified TB case detection in PLHIV at ART and HTC centres	**NTP/NACP**	SOPs developed	ART & HTC sites with SOPs for case detection
2	Provide logistics (sputum smear examination and referral forms and sputum containers) for TB screening to ART and HTC centres	**MOH/NTP**	Logistics provided distributed	Percentage of ART & HTC reporting stock-out of TB logistics
3	Establish effective referral system and strong linkage between ART/HTC centres, TB laboratories and DOTS centres	**NACP/NTP**	Referral Systems established	Percentage of TB/HIV co-infected persons completing referrals between DOTS & ART/HTC centres
4	Provide rapid diagnostic tools such as Gene Xpert with logistics for TB diagnosis among PLHIV	**/NTP**	Rapid diagnostic tools provided	Number of ART sites with access to Gene Xpert machines
5	Conduct joint TB/HIV technical support visits to ART/HTC and DOTS Centres	**NACP/NTP**	Joint TB/HIV support visits conducted	Percentage of planned joint technical support visits conducted

4.2 TB infection control in health care facilities and prisons

The risk of developing active tuberculosis (TB) as an occupational disease is well established, and healthcare workers (HCWs) are recognized as a high-risk group for acquiring and developing TB. Therefore, surveillance of individuals working in the health facilities for active TB is an essential component of infection control measures in these settings. One of the major objectives of the SOPs on TB and Airborne Infection Prevention and Control in Ghana (2011) is to establish effective TB-IC measures at healthcare facilities. Successful implementation of TB-IC measures is important for preventing both HCWs and patients (both out and in-patients) from becoming infected with drug sensitive and drug resistant TB, and ultimately developing active TB. In addition, monitoring the occurrence of active TB among HCWs could be an appropriate proxy for assessing reduced TB transmission associated with the implementation of TB-IC in health care facilities.

Though infection control assessment of health facilities has been conducted with technical assistance from CDC and TBCAP, no systematic implementation of infection control measures in health care facilities has been undertaken. TB surveillance among health care workers is currently not conducted, although anecdotal data in 2009 suggested that up to 7 health care workers were diagnosed with TB. It estimated that only 25% of government health care facilities in Ghana are actively implementing some form of TB infection control measures. However infection prevention and control in health care facilities and prisons is critical to prevent the burden of disease and transmission. The FAST strategy shall be implemented for infection control in OPDs and congregate settings and serve to promote infection control as well as used for active TB case finding.

Risk of transmission posed to health care providers is minimised by implementing effective IPC strategies and by establishing a system to monitor for TB among HCWs. Therefore the FAST initiative shall be implemented. Activities to be implemented are listed below.

	Activities	By Whom	Process Indicator	Outcome Indicator
1	Review, print and disseminate TB/HIV Policy and Clinical Guidelines	**NTP/NACP**	TB/HIV Policy and Clinical Guidelines updated	Updated TB/HIV Policy and Clinical guidelines available in all facilities
2	Review, print & disseminate national TB Infection Prevention and Control guidelines and SOPS	**NTP/ICD**	Guidelines and SOPs disseminated	Percentage of health facilities using National TB IPC guidelines and SOPs
3	Produce and distribute TB Infection Prevention and Control IE&C materials for patients education	**NTP**	IEC materials distributed	Percentage of health facilities with IEC materials displayed
4	Conduct facility baseline assessment and implement IPC implementation plan	**NTP/ICD**	Baseline assessment conducted	Percentage of facilities with IPC implementation plan and baseline assessment report
5	Refurbish ART and DOTS centres to ensure prevention of TB	**NTP/NACP**	ART and DOTS centres refurbished	Number of ART and DOTS centres refurbished
6	Train all key health workers including managers and administrators in TB infection prevention and control	**NTP/THs**	Training held	Percentage of health facilities with staff trained in Infection Prevention and Control
7	Promote cough etiquette in all facilities (private & public) & among community volunteers	**NTP/ Association of Private Practitioners**	IEC materials promoting cough etiquette developed	Percentage of facilities with practice of cough etiquette institutionalised
8	Institute routine annual medical screening for health staff in collaboration with ICD and OEHP	**NTP/OEHP/ ICD**	Annual routine screening programme instituted	Percentage of health staff screened annually
9	Conduct periodic surveillance for TB infection/disease among health care workers in DOTS and HIV clinics using X-rays & medical examination	**GHS/NTP/ THs**	Surveillance for TB conducted	Percentage of health care workers in DOTS and HIV clinics screened periodically for TB infection/disease
10	Monitor and evaluate IPC activities in health facilities	**NTP/ICD**	M & E activities instituted	Number of facilities visited to assess activities
11	Promote the FAST infection control strategy in all facilities	**NTP/NACP**	Facilities oriented	% of facilities actively implementing FAST infection control strategy
12	Develop facility-specific infection control plans based on a risk assessment of the facility.	**NTP**	Plans developed	Use of plans to monitor IPC implementation
13	Identify a focal person at the facility to ensure implementation of the facility infection control plan	**MOH/GHS**	Focal person identified	IPC activities part of the person's duties
14	Develop a supervisory TB infection control checklist that can be used in health care facilities and prisons to monitor and evaluate the status of TB IPC	**MOH/GHS**	Checklist developed	Checklist used as part of IPC monitoring and evaluation
15	Commission appropriate infection control architects and/or engineers to do an assessment of high risk health care facilities and prisons with a view towards improving	**MOH/GHS**	High risk facilities identified	Assessments done by certified engineer/architect; recommendations implemented

	ventilation and design to minimize TB transmission			
16	Develop and use a TB IPC staff risk assessment log for supervisors based on the 2010 SOP's	**MOH/NTP**	Assessment log developed	Assessment log in use
17	Institute annual TB screening for HCWs using a standard TB screening questionnaire and chest x-ray as part of health screening for all health workers	**MOH/GHS**	TB screening form developed	TB screening of health staff in place
18	Maintain facility-based TB screening register of HCWs 2012)	**MOH/GHS**	Register developed	Data om TB among health staff captured and reported to the NTP

4.3 Coordination of TB/HIV activities at all levels with National AIDS Control Programme (Refer National TB/HIV Joint Policy)

Coordination of TB/HIV activities from national to facility level has been a major challenge of implementing TB/HIV collaboration in Ghana. The revised Policy document addresses these weaknesses ensuring better communication between levels of implementation and moving towards integration of serves between both Programmes. The various coordinating committees shall be supported and empowered to improve linkages at service delivery levels. Recording and reporting systems shall be better integrated through the DHIMS 2 platform. More resources shall be committed to TB/HIV specific activities using the health system strengthening approach. This plan would also increase the role of CSOs in the integrated care approach. Activities to be implemented include:

	Activities	**By Whom**	**Process Indicator**	**Outcome Indicator**
1	Establish National TB/HIV Collaborative Committee	**NTP/NACP**	National Collaborative Committee established	Resources available for joint TB/HIV activities deployed
2	Establish TB/HIV coordinating committees in each region and district	**NTP/NACP /All Stakeholders**	TB/HIV coordinating committees established	Number of regions and districts with functional TB/HIV coordinating committees
3	Hold bi-annual national level TB/HIV Collaborative Committee meetings	**NTP/NACP**	Bi-annual meetings held	Number of scheduled national TB/HIV Collaborative Committee meetings held
4	Hold bi-annual regional TB/HIV Collaborative Committee meetings.	**NTP/NACP**	Bi-annual meetings held	Number of scheduled regional TB/HIV Collaborative Committee meetings held
5	Hold quarterly district level TB/HIV Collaborative Committee meetings	**NTP/NACP**	Quarterly meeting held	Number of meetings per quarter for district level TB/HIV coordinating committees
6	Joint annual national TB/HIV Stakeholders review meeting	**NTP/NACP**	Stakeholders review meeting conducted	Planned annual national TB/HIV Stakeholders review meeting conducted
7	Joint quarterly regional TB/HIV stakeholders review meeting	**NTP/NACP**	Quarterly meeting held	Number of planned quarterly regional TB/HIV Stakeholders review meeting conducted
8	Joint quarterly district TB/HIV stakeholders review meeting	**NTP/NACP**	Quarterly meeting held	Number of planned quarterly district TB/HIV Stakeholders review meeting conducted
7	Integrate the monitoring and supervision of TB control	**NTP/NACP**	Monitor and supervision integrated	Number of integrated monitoring and support visits conducted to TB & HIV sites with reports

	activities in those of HIV activities			
8	Harmonize training curricula and materials of NTP and NACP	**NTP/NACP**	Training harmonized	Training curricula and materials of both Programmes harmonized

5.0 Programme Management Activities

There are other significant key supportive activities if poorly implemented would lead to poor impact of the plan. These activities are critically essential. Broadly these activities include management and supervision of interventions, monitoring and evaluation, research and technical assistance.
In the last five years the complexities and scope of implementation has grown. Reporting demands have been huge and accountability complex and rigorous. The operating environment of service delivery has changed requiring intense efforts to show results regardless of the human resource situation.
Increasingly innovations are expected for efficiency and for results, as financial, human and material resources are limited. That means evidence implementation that is supported by operations research. As implementation of services takes place in an integrated health system environment there is competing demands on both health care managers and operational level staff time.
There will be strategic focus on activities that would ensure optimum performance in the next six years of implementing the plan.

5.1 Programme Management & Supervision

A functional strong central level team would continue to harmonise and coordinate implementation of the plan within the overall supportive health system framework of providing services. The central level minimally would work with existing structures of TB Advisory Board, Technical Working Groups and Technical Assistance (both external and internal).
Owing to slow response of clinical services in adopting strategies, the central level in collaboration with clinical care units would increase its supportive technical visits to regions, districts and facilities to ensure quick uptake of new tools. Regional health care managers and district level care managers would be expected to intensify supervisory activities. Regular feedback and performance level assessment would be introduced for peer review for the first time in this plan. TB Quarterly review meetings will be assessed and scored as part of peer review performance. The central level would advocate with other agencies such as Food and Drugs Authority, National Health insurance to support pharmacovigilance, rationale drug use, and insurance for TB patients. Activities to be implemented are listed below.

	Activities	**By Whom**	**Process Indicators**	**Outcome Indicator**
1	Maintain Central Tuberculosis Unit infrastructure and utilities	**MOH/GHS**	Central TB Unit in place	CTU functional and operational
2	Maintain human resource for Central TB Unit and recruit additional staff to support programme management	**MOH/GHS**	Staff recruited and maintained	Number of requisite technical staff needed for CTU in place
3	Procure technical assistance for priority programme intervention areas	**NTP/ Partners**	Technical assistance procured for priority programme areas	Percentage of planned technical assistance procured
4	Revise and provide all programme stationery	**GHS/NTP**	Programme stationery provided	Percentage of Programme stationery out of stock
5	Maintain technical working groups for strategic programme areas including National TB Advisory Board	**GHS/NTP**	Technical Working Groups established	Number of functional Technical Working Groups for strategic programme areas

6	Hold sensitization meetings for relevant stakeholders in TB control	**GHS/NTP**	Stakeholders meeting conducted	Percentage of planned stakeholders meetings conducted
7	Conduct supervision and monitoring activities of all areas of implementation including private sector	**GHS/NTP**	Supervision and monitoring activities conducted	Percentage of planned supervisory and monitoring activities conducted
8	Conduct quarterly review meetings at all levels including private sector to address implementation challenges	**GHS/NTP**	Quarterly review meetings for TB conducted at all levels	Percentage of planned quarterly review meetings conducted
9	Conduct national level strategic review meetings involving all stakeholders	**MOH/GHS**	Strategic review meetings conducted	Percentage of planned national level strategic review meetings conducted
10	Engage other partners to conduct supervisory and M&E activities	**NTP/ Partners**	Partners supporting supervisory and monitoring activities identified	Percentage of planned supervisory and M&E activities carried out by partners
11	Procure and maintain vehicles and motorcycles	**MOH/GHS**	Vehicles and motorcycles procured	Percentage of needed vehicles and motorcycles procured
12	Renovate various health infrastructure for TB care services – Laboratory and DOTS treatment corners	**MOH/GHS**	Laboratories and DOTS Centres renovated	Percentage of planned renovations conducted
13	Establish an electronic case based national register for all types of TB	**GHS/NTP**	Electronic case based national register established	Functional electronic case based recording and reporting system linked to DHIMS 2
14	Engage with public and private health care stakeholders to increase access to TB care services	**MOH/GHS**	SOPs developed for engagement with stakeholders	Increased number of service points for TB services
15	Engage National Health Insurance Authority to enrol TB patients on the NHIS to benefit from comprehensive coverage of services	**MOH/GHS**	NHIA engaged	Percentage of TB with active NHIS membership
16	Engage regulatory agencies for health worker groups to mandate annual TB CPD courses as part of professional license renewal	**MOH/GHS**	Regulatory agencies engaged	Number of health professional groups organising mandatory TB CPD course
17	Engage Births and Deaths Registry to capture all deaths as prescribed by law	**MOH/MLGRD**	Meetings between MOH and MLGRD held	Number of advocacy meetings held with Birth and Deaths Registry
18	Collaborate with Food and Drugs Authority and Community Pharmacists Practitioners Association to regulate importation of TB medicines	**MOH**	Meetings with FDA and CPPA	Number of pharmacies anti TB medicines for sale

5.2 Monitoring, & Evaluation

In this plan, in addition to well-known M&E activities for tuberculosis programme, the TB screening strategy for the various risk groups would be carefully monitored to generate the require data for future prioritisation for screening for risk groups. The numbers needed to be screen (NNS) to detect TB cases in risk groups would be determined. Data to measure case notification in risk groups and relative risks will be collected.

A national TB prevalence survey has just been completed nationwide. This is an important landmark in the M& E system of the TB programme offering the opportunity to set a reference point for TB impact measurement.. A case based online electronic recording and reporting application developed during the last strategic plan could not be scaled up due to challenges with training budget and acquisition of equipment to build infrastructure. this application shall be integrated to the DHIMS 2 reporting system. This would provide a platform for case based reporting with a backend reporting system in DHIMS 2. Data management capacities at the Central TB Unit shall be improved with extension to regional and district levels as a means of improving system wide data quality. This would reduce the observed delays in data reporting from lower levels and utilization of the data. The bi-annual stakeholders review meetings would be held to disseminate new policy and country direction and review M & E activities in the middle of the year to disseminate feedback from monitoring activities and supervisory visits. Activities to be implemented are listed below.

	Activities	**By Whom**	**Process Indicators**	**Outcome Indicator**
1	Review data management system with experts	**NTP/KNCV**	Data management system enhanced	Periodic review of data management systems conducted and weaknesses addressed
2	Maintain an electronic case based recording and reporting system	**GHS/NTP**	Electronic case based reporting system in use	Percentage of districts reporting through the electronic case based recording and reporting system linked to DHIMS 2
3	Train sub-national level staff on use of routine information systems	**GHS/NTP**	Sub-national staff trained	Number of districts with staff trained in use TB routine information systems at sub-national levels
4	Conduct bi-annual national stakeholders review meetings	**GHS/NTP**	Bi-annual national stakeholders review meetings conducted	Number of planned bi-annual national stakeholders review meetings conducted to discuss M & E challenges
5	Conduct mid-term & end of external evaluation strategic plan implementation	**GHS/NTP**	Strategic plan evaluated	Comprehensive programme reviews conducted periodically

5.3 Operations Research

The Programme shall continue to conduct programme based operations/implementation research to improve implementation of interventions and service delivery. In the previous plan the programme has looked at patient cost, patient satisfaction of TB services, and KAP of TB in some communities.
The findings from patient cost studies helped addressed implementation bottle necks of the pro poor strategy of enablers. The findings from patient satisfaction studies contributed to the strategic intervention of improving quality clinical care.
Through USAID Technical assistance, KNCV has developed implementation research capacities in the regions. This was followed with identification of programme priority research needs after series of stakeholders engagement that included people from Academia and Health research institutes. The research list will be further prioritise and will be implemented with various research partners that have comparative advantage and strength for the various topics. It is planned to continue strengthening research capacity by organizing health system research course for TB coordinators in collaboration with the Health Research Division of GHS and external collaborators. Identified priority research topics for 2015-2020 is provided as Annex 2. In this plan the central programme will conduct one implementation research in a year and collaborate to develop the health system infrastructure and human resource capacity for international collaborative multi centre trials activities. Activities to be implemented are listed below.

	Activities	By Whom	Process Indicators	Outcome Indicator
1	Identify innovative research areas to assess deployment of new tools and interventions	**GHS/NTP**	Innovative research areas identified	Number of planned innovative research studies completed
2	Collaborate with local and international research institutions to conduct innovative research studies	**GHS/NTP**	Collaboration with local and international research institutions established	Number of new collaborative studies initiated with local and international research institutions
3	Create enabling environment for collaborative international multi-centre trials	**NACP/NTP**	Referral Systems established	At least one multi-centre international trial conducted
4	Identify and disseminate priority research questions to be answered towards TB elimination	**NTP/KNCV**	Priority research areas identified	Priority research agenda established
5	Mobilize resources to answer priority research questions	**MOH/GHS**	Resource mobilization initiated	Percentage of resource budget available for priority research questions
6	Procure technical assistance for research capacity building	**NTP/ Partners**	Technical assistance procured	Number of planned technical assistance missions conducted for research capacity building
7	Promote operational research studies across TB services to answer priority questions including evaluation of new interventions	**GHS/NTP/ Partners**	Conduct operational research studies for TB	Number of operational research studies done
8	Disseminate and implement research findings	**GHS/NTP**	Research findings disseminated	Number of research study findings disseminated and used to enhance TB control
9	Conduct impact studies such as prevalence survey, drug resistant surveys etc.	**MOH/GHS**	Impact studies conducted	Number of impact studies conducted

5.4 Promote infection control in DOTS Corners, ART and MDR-TB centres and among health staff

Infection prevention and control (IPC) is a critical component of PMDT and staff confidence to manage DR-TB depends not only on their knowledge of patient management but also on the perceived risk of infection in their work environment. TB Transmission in health care and other congregate settings is a major challenge to TB control efforts as there is still lack of institutional capacity to adequately address TB-IC in several facilities. The emerging MDR-TB epidemic calls for scale up of TB-IC intervention in health care facilities and congregate settings therefore the Programme shall promote TB-IC awareness, knowledge and rational work place practices.

Appropriate and adequate protective measures would be provided to protect service providers from hospital acquired infections. Staff involved in MDR-TB care would receive personal respirators, along with training for proper usage and routine fit testing. Treatment facilities would be retro-fitted with the needed infection prevention equipment such as ultra-violet germicidal lamps and extractor fans to improve infection control according to SOPS for TB and Airborne Infection Prevention and Control and airborne precautions of the Policy and Guidelines for Infection Prevention and Control in Health Care Facilities (MOH, April 2009).

Additionally, 2 wards have been renovated in Western and Northern Regions as admission sites for MDR-TB patients with severe complications who need hospitalization and are currently ready for use. Community level TB-IC would be addressed as part of the ambulatory care package to prevent TB disease transmission to family members, community workers and community volunteers acting as treatment supporters. Activities to be implemented are listed below.

	Activities	By Whom	Process Indicators	Outcome Indicator
1	Assess IC practices for health facilities using TB-IC Checklist	MOH/NTP	Checklist developed	Number of facilities meeting infection control standards
2	Develop TB Infection Control Implementation Plan with TA	MOH/NTP	Plan developed	TB infection Control Implementation Plan developed with TA
3	Develop a TB IC training programme	MOH/NTP	TB IC training programme and manual developed	Number of facilities trained in TB IC
4	Develop facility specific TB Infection control Implementation Plan	NTP/ICD	Plan developed	Number of facilities implementing TB Infection Control implementation plan
5	Print and distribute infection control guidelines	MOH/NTP	IPC guidelines distributed	Percentage of health facilities using infection control guidelines
6	Train all the key health workers including managers and administrators in TB infection prevention and control	MOH/NTP	Training held	Percentage of key health workers trained in TB infection prevention and control
7	Promote FAST TB infection control strategy in health facilities	MOH/NTP	Orientation completed	% of health facilities implementing FAST
8	Identify a focal person at the facility to ensure implementation of the infection control plan	MOH/GHS	Focal person identified	% of facilities with a TB IC focal point
9	Develop a supervisory TB infection control checklist for health care facilities monitoring and evaluation of TB IPC status	MOH/NTP	Checklist developed	% of TB focal points using the checklist to monitor and evaluate TB IC status
10	Promote cough etiquette in all facilities (private & public) & community volunteers	MOH/NTP	Cough etiquette promoted	Percentage of facilities displaying IEC materials on cough etiquette
11	Commission appropriate infection control architects and/or engineers to assess high risk health care facilities and prisons towards improving ventilation and design to minimize TB transmission	MOH/NTP	High risk facilities targeted	% of high risk facilities with risk assessment done and recommendations carried out
12	Procure shielded ultraviolet germicidal irradiation devices and ventilation equipment for health facilities to improve IPC	MOH/NTP	Items Procured	Number of DOTS Corners and ARV Centres refurbished using UVGI devices and ventilation equipment
13	Purchase particulate respirators (N95) for health professionals working in the MDR hospital wards	MOH/NTP	Items purchased	Percentage of health professionals working in the MDR hospital wards using particulate respirators
14	Ensure proper training in use and storage of particulate respirators as well as a fit testing programme.	MOH/NTP	Fit testing and training on care and storage of respirators completed	% of health staff with properly fitted respirators and knowledge of care and storage
15	Organize meetings with decision makers and members of engineers and architects communities to promote infection prevention and control	MOH/NTP	Meetings held	Number of engineers and architects attended meetings to promote infection prevention and control
16	Conduct medical screening on all health staff directly attending to	MOH/NTP	Medical screening conducted	Percentage of health staffs directly attending to

	presumed and confirmed TB patients for TB and other risk factors (e.g. HIV, diabetes, COPD, etc.)			presumed and confirmed TB patients screened for TB and other risk factors
17	Develop and disseminate IEC messages regarding TB infection control in the communities and households caring for DR-TB patients, and provide appropriate supplies and equipment	MOH/NTP	IEC messages developed for communities and households	% of households caring for DR-TB patients with IPC in place
18	Develop and use a TB IPC staff risk assessment log for supervisors (per the 2010 SOP's)	MOH?GHS	Assessment log developed	% of facilities using the assessment log
19	Institute annual TB screening for HCWs using a standard TB screening questionnaire and chest x-ray as part of a countrywide screening system for early detection of TB disease among HCWs	MOH/GHS	Screening tool developed	% of facilities conducting annual TB screening for HCWs
20	Health care workers identified with TB counselled, supported and treated for TB disease including managing risk factors and co-morbidities	MOH/GHS	HCW TB Register developed	Data on number of health staff with TB recorded and reported to the NTP on an annual basis
21	Monitor and evaluate IPC in health facilities and particularly document annually the number and treatment outcome of HCW affected by TB	MOH/NTP	Infection prevention and control monitored and evaluated	IPC M & E in place and percentage of health staff treated for TB reported
22	Engage local authorities and regulatory agencies to enforce by-laws and codes related to air-borne infection control	MOH/GHS	Local authorities & regulatory agencies engaged	Number of building permits issued by local authorities
23	Engage regulatory agencies for health worker groups to consider annual screening for TB among health care workers	MOH/GHS	Authorities engaged	Number of health facilities undergoing annual TB screening of health staff
24	Engage transport companies to promote cough etiquette on mass transport	GHS/ Partnership	Transport companies engaged	Number of vehicles with posters on practice of cough etiquette on mass transport

5.5 Implement TB screening interventions in maternal, and NCD programmes

Females presumed to be pregnant in 2013 National TB prevalence survey were not screen with X-rays, but were examined mandatory for AFB's using microscopes and sputum culture. A number of these female participants who were asymptomatic were found to be culture positive. Pregnant women are screen for HIV at antenatal, but there is the missed opportunity for TB screening.

The National programme would collaborate with Reproductive Health (RH) Department to institutionalise TB screening as part of antenatal care using simple symptom based TB questionnaire to identify presumed cases for further diagnosis. This would require further engagement with RH Department and establishment of working group to coordinate and oversee activities. TB Screening tools will be provided by the NTP. All detected cases will be managed as per national guidelines.

The working group will also work to support and monitor TB screening among diabetics and other screening activities between other NCD related conditions such as cancers and those on chemotherapy. The working groups will also be working with other sectors for TB screening when appropriate such as Mining companies. Activities to be implemented are listed below.

	Activities	By Whom	Process Indicators	Outcome Indicator
1	Meetings of other programmes and sectors working group	**MOH/NTP**	Minutes of meetings	
2	Institute TB case finding among Ante Natal Clinic (ANC) attendants	**MOH/NTP**	TB screening at ANC institutionalised	Number of pregnant women diagnosed with TB
3	Institute TB screening among persons with diabetes diseases in clinics and hospitals	**NTP/NCD**	Screening programme established	Number of TB patients diagnosed among persons with diabetes
4	Provide IPT to people on chemotherapy, steroids and other conditions requiring Isoniazid prophylaxis	**NTP/NCD**	Isoniazid provided	Percentage of people with NCDs receiving Isoniazid

5.6 Procure Technical Assistance

Technical assistance missions have been a critical part of programme management. The NTP has over the years engaged technical missions to provide critical knowledge and capacity building for staff in various programme areas. Programme partner agencies such as WHO, KNCV, USAID, MSH and PIH have ensured the best outcome for technical missions.

External technical assistance will be procured to support programme implementation, M&E, laboratory, DR-TB, infection prevention & control (IPC), programme-based operations research, and implementation of TB screening strategy and advocacy, communication and social mobilization.

	Activities	By Whom	Process Indicators	Outcome Indicator
1	Procure technical assistance for priority programme intervention areas	**NTP/ Partners**	Technical assistance procured for priority programme areas	Percentage of planned technical assistance procured

BUDGET PLAN

The costing for this national strategic plan is based on activities defined and agreed on by various stakeholders during the development process. The activities of various stakeholders complement each other, and will be coordinated, monitored, and supported by the Central Programme Management Unit (PMU) of the NTP.
Stakeholders access funds through a common mechanism already established and working extremely well upon submission of activity proposals through the Programme Management Unit. Submitted proposals are discussed and milestones agreed upon. These are followed by contracts between the PMU and the stakeholder resulting in the release of funds.
Planned activities are monitored during implementation by PMU or designated partners and nonperforming stakeholders are disqualified from further request for funds. They are however supported to improve on their performance to re-apply at later dates. New entrants are assessed continually to participate in TB control activities in areas where they have comparative advantage. Mid-term and end-term activity reports are submitted to the PMU.

There are monthly stakeholder meetings bringing together the Ministry of Health and its agencies on one hand and development partners on the other. These meetings are used to inform all stakeholders on the performance status and upcoming events. The policy dialogue with health partners culminates in two semi-annual health summits, focusing alternately on review and planning. The review summit is based on an independent assessment of the sector's previous year's performance. These assessments cover all the areas of the sector, including GFATM-funded projects. On an annual basis, financial and procurement audits are conducted by an independent institution. These audits cover all sources of funds. The results of these reviews and the audits are discussed at an annual summit meeting of all stakeholders in health. The planning summit is held to agree on priority health interventions to be implemented in the ensuing year. At the end of the summits, an aide memoire reflecting key decisions and actions is signed. The health summits serve as the highest decision-making body of the MOH-Partnership arrangement.

Experience with Funding Agents
The Programme has received funds from various grant agents during its lifetime. These grant agents include DANIDA, JICA, DFID, USAID and Global Fund. During these grant implementation, significant successes have been achieved. This strategic plan would be made available to various funding agents to support relevant components.

Ghana was the first country ever to sign a grant agreement to receive Global Fund grants. Successful implementation has led to repeated funding under various grants. The MOH/GHS has institutional capacity, financial management, procurement and supply management systems, and monitoring and evaluation capacity to manage and implement grants. The GHS/MOH works closely with NGOs, academic and research institutions, and other agencies to successfully achieve set targets. The Global Fund has recognized Ghana's performance with MOH/GHS as the PR as among the best-managed GF grants worldwide.

The MOH/GHS has successfully managed funds (earmarked or "pooled") provided through bilateral and multilateral agencies over the years. These include GAVI support for the introduction of new vaccines, the World Bank Nutrition and Malaria Project, the US President's Malaria Initiative, UNICEF/GHS Accelerated Child Survival and Development (ACSD), and High-Impact Rapid Delivery (HIRD).

Budgeting for this plan was done with the WHO Planning and Budgeting Tool and covers the Six-year period. Funding will come from GOG, with gaps filled by bilateral and multilateral agencies, particularly the GFATM. The Central Unit and regions will develop annual costed work plans based on the disease burden and the level of infrastructure development, as well as human resource needs.

Summary Budget by Objectives & Implementing Area

Obj.	Implementing Areas	2015	2016	2017	2018	2019	2020	Total
1	Improving diagnosis	22,185,078.72	4,793,003.11	6,772,518.20	4,750,129.28	6,038,604.46	3,567,821.42	48,107,155.19
	High risk groups	202,300.00	931,100.00	591,100.00	591,100.00	591,100.00	591,100.00	3,497,800.00
	Childhood TB	96,900.00	-	22,000.00	74,900.00	22,000.00	-	215,800.00
	Involving all care providers: PPM/ISTC	84,400.00	84,400.00	84,400.00	84,400.00	84,400.00	84,400.00	506,400.00
	HRD: Staff	2,633,246.72	2,633,246.72	2,633,248.64	2,633,250.72	2,633,250.72	2,633,250.72	15,799,494.24
	HRD: Training	9,629,470.00	8,177,180.00	9,461,670.00	8,177,180.00	9,461,670.00	8,177,180.00	53,084,350.00
2	MDR-TB	1,931,705.34	2,127,892.70	2,033,642.25	2,167,432.12	2,252,898.53	2,344,283.47	12,857,854.42
3	Patient support	11,745,156.75	11,737,017.79	11,639,622.25	11,871,080.32	11,835,682.55	11,861,530.35	70,690,090.01
	First-line drugs procurement and management	11,745,156.75	11,737,017.79	11,639,622.25	11,871,080.32	11,835,682.55	11,861,530.35	70,690,090.01
	Community involvement	2,889,831.23	2,781,951.54	2,724,810.38	2,666,685.54	2,630,416.59	2,534,650.67	16,228,345.95
4	Collaborative TB/HIV activities	1,282,831.69	1,284,642.40	1,286,453.11	1,288,263.83	1,290,074.54	1,293,695.97	7,725,961.54
	Infection control	22,200.00	11,209.27	25,909.27	13,063.91	29,618.55	16,773.18	118,774.18
5	M&E	1,096,550.00	421,500.00	298,500.00	771,750.00	378,500.00	3,955,000.00	6,921,800.00
	Programme management and supervision	12,258,772.81	12,036,093.69	12,499,253.22	11,640,262.25	11,596,916.69	11,832,959.77	71,864,258.42
	Operational research	-	24,000.00	24,000.00	24,000.00	24,000.00	24,000.00	120,000.00
	International technical assistance	127,500.00	127,500.00	127,500.00	127,500.00	157,500.00	127,500.00	795,000.00
	Partnering initiatives	2,706,510.00	2,710,010.00	2,710,010.00	2,710,010.00	2,710,010.00	2,710,010.00	16,256,560.00
	General use of health services	1,453,043.85	1,450,737.75	1,443,796.34	1,454,408.23	1,450,938.90	1,450,791.48	8,703,716.55
	Other	59,900.65	72,704.15	85,577.19	98,446.00	103,052.77	107,695.75	527,376.50
	GRAND TOTAL	**73,344,558.44**	**57,117,321.26**	**57,233,687.37**	**56,622,118.61**	**55,977,289.69**	**58,522,222.88**	**358,817,198.24**

TECHNICAL ASSISTANCE PLAN

The objective of the technical assistance plan is to provide expert knowledge, skills and additional hands to support programme implementation. External technical assistance will be required to support key programme implementation, implementation of TB screening strategy, laboratory diagnosis, drug resistant tuberculosis, infection prevention & control, advocacy, communication and social mobilization, monitoring and evaluation, and programme-based operations research.

Intervention	Expert Profile	Time frame	Responsible Partner	Cost (USD)	Source of Funds	Funding Gap
Programme Management	DOTS	7 days	WHO	7,500	-	7,500
Monitoring & Evaluation Data Management	M & E	7 days	WHO	7,500	-	7,500
Operations Research	Research	7 days	KNCV	7,500	-	7,500
Laboratory Capacity building & Quality Assurance	Molecular diagnostics	7 days	MSH	7,500	-	7,500
Multi Drug Resistant TB	PMDT	7 days	WHO/KNCV	7,500	-	7,500
Infection Prevention & Control	IPC	7 days	MSH	7,500	-	7,500
TB Screening	ICF	7 days	WHO	7,500	-	7,500
ACSM	ACSM	7 days	WHO	7,500	-	7,500

MONITORING AND EVALUATION PLAN

The plan will be monitored through key inputs, process, output, and outcome and impact indicators in the course of implementation. The overall responsibility for monitoring and evaluation will rest with the National TB Control Programme M&E Unit under the leadership of the Programme Manager. At the Central TB Unit, an M&E Focal Person will be assigned and M & E support staff recruited to support the duties of the day-to-day coordination and monitoring of TB activities in both the public and private sectors.

Each of the 10 regions would be supported with an M&E staff to enhance monitoring and supervision of operational activities at the periphery on regular basis.

At the regional and district levels, TB coordinators already trained will assume additional skills to extend their monitoring activities to cover other health care providers. They will be assisted by personnel handling and managing data. Regional TB coordinators will work closely with focal persons for TB in the districts and sub districts. The Regional Health Directorates and District Health Management Teams will support in monitoring activities as part of health systems strengthening.

Monitoring will be carried out monthly at the regional and district levels and quarterly at the national level. This is to ensure that problems are identified quickly and corrective actions taken. The NTP Central Unit in collaboration with the NMIMR would conduct a repeat TB prevalence survey at the end of the strategic plan period.

Quarterly reports from participating institutions and monthly supervisory reports from TB coordinators or designated M&E focal persons will be submitted to districts, regions, and the Central TB Unit. The Regional Health Directorates will produce and submit biannual reports to the Central TB Unit. The Central Unit will produce a coordinated programme report annually. A feedback system will be established to make the results of the programme clear to all.

A midterm evaluation will be conducted to adjust timetable and implementation strategies by both external and internal evaluators. A process evaluation will assess the efficiency of the project in terms of the quantifiable achievement of the output indicators. Process evaluation will be based on the information received and synthesised from the monitoring system. This will be the responsibility of the Regional and District Health Directorates, with the active involvement of the Regional and District TB Coordinators. The Central TB Unit and other care providers will hold a biannual stakeholders' meeting.

A summary of the Monitoring and evaluation plan is shown in Table 31 below.

Table 31: Monitoring and Evaluation Plan 2015 – 2020

Item	Indicator	Purpose	Calculation	Source of information	Periodicity	Who will collect the information	Level of information collection	Baseline (Date)	End Point (2020)
Goal 1: To reduce by 20% the 2013 TB prevalence baseline level of 286 per 100,000 population by 2020 in line with post 2015 Global TB Control Strategy	TB Prevalence Rate	Impact	Number of bacteriologically confirmed TB cases divided by adult population at risk	Prevalence Survey	Every 5 years	NTP National Level	Countrywide	286 per 100,000 pop. (2013)	228 per 100,000 pop.
Operational Objective 1: To early screen, detect and enrol into treatment all forms of notified (new cases) from 15,606 in 2013 to 37,302 by 2020, while increasing the proportion of bacteriologically confirmed pulmonary TB from 51% in 2013 to 60% by 2020	Case notification rate of all forms of TB per 100,000 population - bacteriologically confirmed plus clinically diagnosed, new and relapse cases (disaggregated by age <14 and >15, sex and HIV status)	Outcome	Number of new bacteriologically confirmed plus clinically diagnosed TB cases notified	NTP HMIS	Semester and Annually	NTP	Facility & District	15,606 (2013)	37,302
Operational Objective 2: To early detect and enrol into treatment at least 85% of confirmed MDR-TB cases among new and previously treated cases by 2020	Proportion of MDR-TB patients successfully treated	Outcome	**Numerator:** MDR TB cases successfully treated **Denominator:** MDR-TB cases enrolled on second line treatment	NTP MDR-TB Surveillance Tools	2 yearly	NTP MDR-TB M & E Focal Points	Regional and Tertiary facilities	50% (2011)	70%
Goal 2: To reduce by 35% the 2012 TB mortality rate baseline of 4 deaths per 100,000 population by 2020	TB Mortality Rate	Impact	Number of estimated TB deaths divided by population at risk	Birth and Death Registry or extrapolated from NTP data	Every 6 years	Birth and Death Registry/NTP	Countrywide	2013	4.4 per 100,000 population

Objective 3: To attain higher treatment success for all forms of TB from 84% in 2012 to at least 91% by 2020 through improved quality clinical care and community TB care	Percentage of all new TB cases, bacteriologically confirmed plus clinically diagnosed, successfully treated (cured plus treatment completed) among all new TB cases registered for treatment during a specified period	Outcome	**Numerator:** Susceptible TB cases successfully treated **Denominator:** Total susceptible TB cases enrolled on treatment	NTP HMIS	Annually	Facility, District, Region & National M & E Focal Points	Facility, District, Region & National	86% (2012)	91%
Objective 4: To reduce death rates of TB/HIV co-infected cases from 20% in 2012 to 10% by 2020 and uptake of ART coverage among co-infected from 5.7% in 2013% to 37% by 2020	Proportion of TB/HIV co-infected patients successfully treated	Outcome	**Numerator:** Number of TB/HIV co-infected individuals who were successfully treatment **Denominator:** Total number of TB/HIV co-infected individuals on treatment	NTP HMIS	Annually	Facility, District, Region & National M & E Focal Points	Facility, District, Region & National	5.7% (2013)	37%
Goal 3: To end the TB epidemic in Ghana by 2035 without catastrophic cost due to TB affected families	TB/HIV Mortality Rate	Impact	Number of bacteriologically confirmed TB cases divided by adult population at risk	Global TB Report	Every 6 years	NTP	NTP	2 per 100,000 pop. (2013)	1.3 per 100,000 pop.
Objective 5: To improve Programme management; coordination, Monitoring & Evaluation and operations research to support treatment and screening strategies for TB/HIV	Number of completed TB surveillance reports submitted on time	Output	**Numerator:** Number of districts submitting complete TB surveillance reports **Denominator:** Total number of districts implementing TB programme	NTP	Quarterly	NTP	District & Region		90%

OPERATIONAL PLAN

Intervention Area	Unit Cost (US$)	Quantity	Implementation Period						Location	Implementer	Total Costs (US$)	Source of Funding	Comments
			Y1	Y2	Y3	Y4	Y5	Y6					
Improving diagnosis	111.07	443,130	X	X	X	X	X	X	Dist./Reg./Nat	MOH/GHS	48,107,155.19	GoG/GF/ Partners	Includes introduction of new tools
High risk groups	79.73	43,872	X	X	X	X	X	X	Dist./Reg.	NTP/Stop TB	3,497,800.00	GoG/GF/ Partners	Active screening interventions
Childhood TB	6.87	31,407	X		X	X	X		Dist./Reg./Nat	NTP	215,800.00	GoG/GF/ Partners	Improving case finding
Involving all care providers: PPM/ISTC	-	-	X	X	X	X	X	X	Dist./Reg./Nat	NTP/Stop TB/Private	506,400.00	GoG/GF/ Partners	Capacity building for case finding
HRD: Staff	-	-	X	X	X	X	X	X	Dist./Reg./Nat	MOH/GHS	15,799,494.24	GoG/GF	Emoluments
HRD: Training	211.66	250,806	X	X	X	X	X	X	Dist./Reg./Nat	MOH/GHS	53,084,350.00	GoG/ GF	Capacity building local & international
MDR-TB	4,100.08	3,136	X	X	X	X	X	X	Reg./Nat	GHS/NTP	12,857,854.42	GF	Case finding and treatment
Patient support	163.21	433,130	X	X	X	X	X	X	Dist./Reg.	GHS/Stop TB/Private	70,690,090.01	GoG/GF	Enablers/ Living support
First-line drugs procurement and management	163.21	433,130	X	X	X	X	X	X	Nat	MOH/GHS	70,690,090.01	GoG/GF	Cost of medicines
Community involvement	37.47	433,130	X	X	X	X	X	X	Dist.	MOH/GHS	16,228,345.95	GoG/ GF/ Partners	CSO & CHPS activities
Collaborative TB/HIV activities	8.85	873,043	X	X	X	X	X	X	Dist./Reg./Nat	MOH/GHS	7,725,961.54	GoG/GF/ Partners	Capacity building & collaboration
Infection control	-	-	X	X	X	X	X	X	Dist./Reg./Nat	MOH/GHS	118,774.18	GoG/GF/ Partners	HCW protective activities
M&E	-	-	X	X	X	X	X	X	Dist./Reg./Nat	MOH/GHS	6,921,800.00	GoG/GF/ Partners	Routine & periodic surveys
Programme management and supervision	-	-	X	X	X	X	X	X	Dist./Reg./Nat	MOH/GHS	71,864,258.42	GoG/GF/ Partners	Support & supervision
Operational research	-	-	X	X	X	X	X	X	Dist./Reg./Nat	MOH/GHS	120,000.00	GoG/GF/ Partners	Capacity building & operational research
International technical assistance	7500.00	106	X	X	X	X	X	X	Reg./Nat	MOH/GHS	795,000.00	GoG/GF/ Partners	Programme assessment missions
Partnering initiatives	-	-	X	X	X	X	X	X	Dist./Reg./Nat	GHS/Private/ Partners	16,256,560.00	GoG/GF/ Partners	Collaboration with other sectors
General use of health services	-	-	X	X	X	X	X	X	Dist./Reg./Nat	MOH/GHS	8,703,716.55	GoG	Use of health facilities
Other services	-	-	X	X	X	X	X	X	Dist./Reg./Nat	NTP	527,376.50	GoG/GF/ Partners	Supportive treatment for MDR-TB care

* Dist. = District; Reg. = Regional; Nat. = National

PROCUREMENT PLAN

The procurement plan covering the implementation period is shown below.

Product	Unit Cost (US$)	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Procuring Agency
Pharmaceuticals								
Category I & III (Adults)		1,619,209.00	1,549,603.00	1,493,473.00	1,465,527.00	1,422,207.00	1,388,305.00	GDF
First Line for Children		141,956.54	176,165.11	169,889.03	192,584.96	194,932.64	190,246.82	GDF
Category II		526,119.00	510,521.00	492,029.00	488,070.00	473,643.00	462,353.00	GDF
Buffer for First Line		-	2,217,601.80		2,125,656.00		2,021,801.00	GDF
Procurement, management & Storage: FLD		594,693.99	832,154.58	580,185.62	812,048.49	573,078.75	789,048.96	GDF
Second Line Medicines		1,073,882.00	1,142,326.00	1,197,596.00	1,283,831.00	1,338,919.00	1,397,821.00	GDF
Procurement, management & Storage: SLD		282,307.77	300,301.72	314,830.91	337,501.11	351,982.96	367,466.96	
Green Light Committee support for PMDT		50,000.00	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00	
Quality Assurance In-country		57,182.11	111,150.43	53,884.76	106,580.86	52,269.56	101,353.70	FDA, Ghana
TOTAL (US$)		**4,596,951.72**	**7,378,885.53**	**4,588,981.25**	**7,330,755.23**	**4,687,018.98**	**7,214,352.72**	
Health Products								
LED florescent microscopes and accessories	1640		82,000.00	82,000.00	82,000.00	82,000.00	82,000.00	GHS/SSDM
Light microscopes and accessories	1190		59,500.00	59,500.00	59,500.00	89,250.00	59,500.00	GHS/SSDM
Procurement, management & Storage: Microscopes		-	35,375.00	35,375.00	35,375.00	42,450.00	35,375.00	GHS/SSDM
Preventive maintenance for new & existing microscopes		27,177.59	27,177.59	29,427.59	29,427.59	30,677.59	30,677.59	GHS
Cost of lab supplies and consumables for smears	0.61	1,082,767.75	1,050,667.23	1,012,609.39	1,004,462.03	974,770.96	951,534.91	GHS
Consumables for culture and DST		776,642.26	1,195,817.46	445,282.29	662,725.73	523,804.59	574,070.57	
Procurement, management : FLD & SLD Tests	25% of Cost	13,121.02	17,658.49	22,688.16	28,124.36	33,871.73	40,178.51	
Upgrade/repair existing labs to include molecular tests	5000	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	
Gene Xpert with Accessories	20912	1,463,840.00	1,045,600.00	1,045,600.00	1,045,600.00	-	-	GHS/SSDM
Procurement, management: GeneXpert & accessories	2353	164,710.00	117,650.00	117,650.00	120,364.80	-	-	

GenXpert Cartridge	9.98	169,660.00	269,460.00	369,260.00	469,060.00	469,060.00	469,060.00	GHS/SSDM
Gene Xpert - calibration & maintenance	3350	253,250.00	429,750.00	597,250.00	764,750.00	787,250.00	787,250.00	
Panel testing for Gen Xpert: shipment & admin. cost		14,054.01	22,321.07	30,588.13	38,855.19	38,855.19	38,855.19	
Procurement, management: GeneXpert catridges	2.697	25331.118	37943.391	50635.005	63235.302	63292.188	58417.956	
Chest Drainage Tubes	2300	40,700.00	40,700.00	40,700.00	40,700.00	40,700.00	40,700.00	GHS/SSDM
Stadiometer	850	85,000.00	85,000.00	85,000.00	85,000.00	85,000.00	85,000.00	GHS/SSDM
Procurement, management & storage: Chest Drainage Tubes, Stadiometer)	25% of Cost	31,425.00	31,425.00	31,425.00	31,425.00	31,425.00	31,425.00	
Sputum Containers	0.11	84,892.72	82,375.92	79,392.06	78,753.29	76,425.36	74,603.54	GHS/SSDM
Procurement & management: Sputum containers	0.11	118,849.81	115,326.29	111,148.88	110,254.61	106,995.50	104,444.96	
Panel Testing - International, National, Regional		33,010.00	33,010.00	33,010.00	33,010.00	33,010.00	33,010.00	
Shipment for DST	2500	10,000.00	10,000.00	10,000.00	10,000.00	35,001.38	10,000.00	
Digital X-Ray	300000	15,300,000	-	-	-	-	-	GHS/SSDM
X-Ray films and developers	8	18,136.00	21,688.00	25,632.00	29,560.00	33,424.00	37,504.00	GHS/SSDM
High energy ready to use foods (RUTF & FBF)	30	2,315,250.00	2,246,610.00	2,165,250.00	2,147,820.00	2,084,340.00	2,034,630.00	GHS/SSDM
TOTAL (US$)		**2,037,817.27**	**7,067,055.44**	**6,489,423.51**	**6,980,002.91**	**5,671,603.50**	**5,588,237.23**	
Printing of manuals, registers, guidelines etc. and mass media								
Presumed TB/cough register	10	10,000.00	-	10,000.00	-	10,000.00	-	GHS/SSDM
SOPs for TB case detection	12	72,000.00	-	72,000.00	-	72,000.00	-	GHS/SSDM
National guidelines on contact investigation	10	60,000.00	-	60,000.00	-	60,000.00	-	GHS/SSDM
Recording and reporting forms for TB contact investigation activities, including IPT	1	6,000.00	-	6,000.00	-	6,000.00	-	GHS/SSDM
Screening tools, sputum request forms, referral forms, TB client cards, TB07, TB08)	1.5	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	GHS/SSDM
SOPs on intensified TB case detection in PLHIV at ART & HTC centres	1	5,000.00	5,000.00	5,000.00	5,000.00	5,000.00	5,000.00	GHS/SSDM
Mass media campaigns: Broadcast materials (Pub. Serv. Announcement)	5000	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	GHS/SSDM

Posters on contact tracing and investigation for public areas	1	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	GHS/SSDM
Pharmacovigilance handbook	10	10,000.00	-	10,000.00	-	10,000.00	-	
Data collection tools, patient education, diary & consent sheets	10	-	-	-	-	-	340,000.00	
Infection Prevention and Control IE&C materials for patients education	1	5,000.00	5,000.00	5,000.00	5,000.00	5,000.00	-	
Infection Prevention & Control Guidelines & SOP	10	20,000	-	20,000	-	20,000	-	GHS/SSDM
TB/HIV Policy & Clinical Guidelines	10	10,000.00	-	10,000.00	-	10,000.00	-	GHS/SSDM
LMIS tools (SOP, RRIV, Dispensing Registers, Workbook)	10	20,000.00	-	20,000.00	2,000.00	10,000.00	-	GHS/SSDM
TB IPC staff risk assessment log for supervisors based on 2010 SOP	10	10,000.00	-	10,000.00	-	10,000.00	-	GHS/SSDM
MDR-TB guidelines & SOPS	10	10,000.00	-	10,000.00	-	10,000.00	-	GHS/SSDM
Nutrition specific education materials (poster)	1	5,000.00	-	5,000.00	-	5,000.00	-	GHS/SSDM
Nutritional guidelines to DOTS corners	10	50,000.00	-	50,000.00	-	50,000.00	-	GHS/SSDM
Training Manuals	10	30,000.00	-	-	30,000.00	-	-	GHS/SSDM
Revised OPD/consulting room register	10	10,000.00	-	10,000.00	-	10,000.00	-	GHS/SSDM
Newspapers campaigns (total)	5000	5,000.00	5,000.00	5,000.00	5,000.00	5,000.00	5,000.00	GHS/SSDM
Production of broadcast materials: radio	5000	5,000.00	5,000.00	5,000.00	5,000.00	5,000.00	5,000.00	GHS/SSDM
Production of broadcast materials: TV	40000	40,000.00	40,000.00	40,000.00	40,000.00	40,000.00	40,000.00	GHS/SSDM
Materials to promote cough etiquette in facilities (private & public) & community volunteers	1	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	10,000.00	GHS/SSDM
IEC materials for target groups (health workers, mothers, and community) on childhood TB	1	15,000.00	15,000.00	15,000.00	15,000.00	15,000.00	15,000.00	GHS/SSDM
CB-DOTS operational guidelines	10	10,000.00	-	10,000.00	-	10,000.00	-	GHS/SSDM
Community TB screening forms	0.05	5,000.00	5,000.00	5,000.00	5,000.00	5,000.00	5,000.00	GHS/SSDM
Advocacy & IE&C materials for communities, NGOs, policy makers & health staff to improve knowledge & support for TB activities	1	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00	50,000.00	GHS/SSDM
Childhood training materials	12	12,000.00	-	12,000.00	-	12,000.00	-	GHS/SSDM
TOTAL (US$)		**675,000.00**	**330,000.00**	**645,000.00**	**362,000.00**	**635,000.00**	**665,000.00**	

Infrastructure								
Rehabilitate regional hospital wards to manage MDR-TB	90000	180,000.00	180,000.00	-	-	-	-	GHS/EMU
Upgrade 50 microscopy sites to meet bio-safety standards	25000	1,250,000.00	-	1,250,000.00	-	1,250,000.00	-	GHS/EMU
Upgrade laboratories to BSL-3 status	25000	125,000.00	-	-	-	-	-	GHS/EMU
TOTAL (US$)		**1,555,000.00**	**180,000.00**	**1,250,000.00**	**-**	**1,250,000.00**	**-**	
GRAND TOTAL (US$)		**28,864,768.99**	**14,955,940.97**	**12,973,404.76**	**14,672,758.14**	**12,243,622.48**	**13,467,589.94**	

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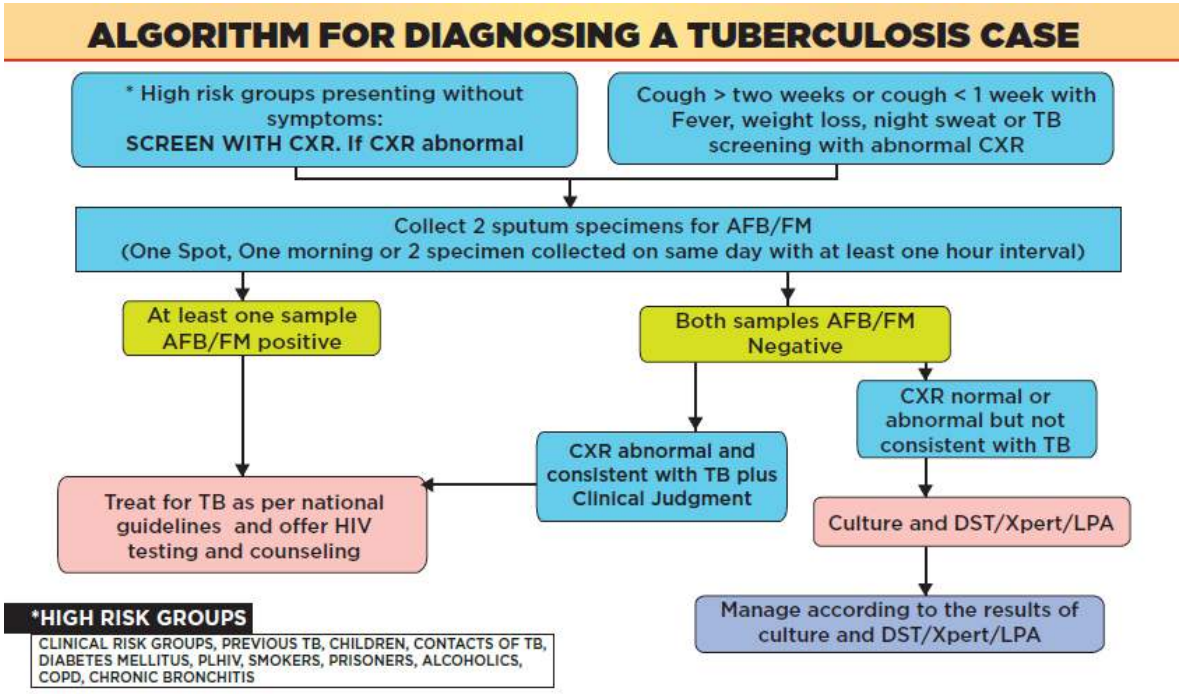
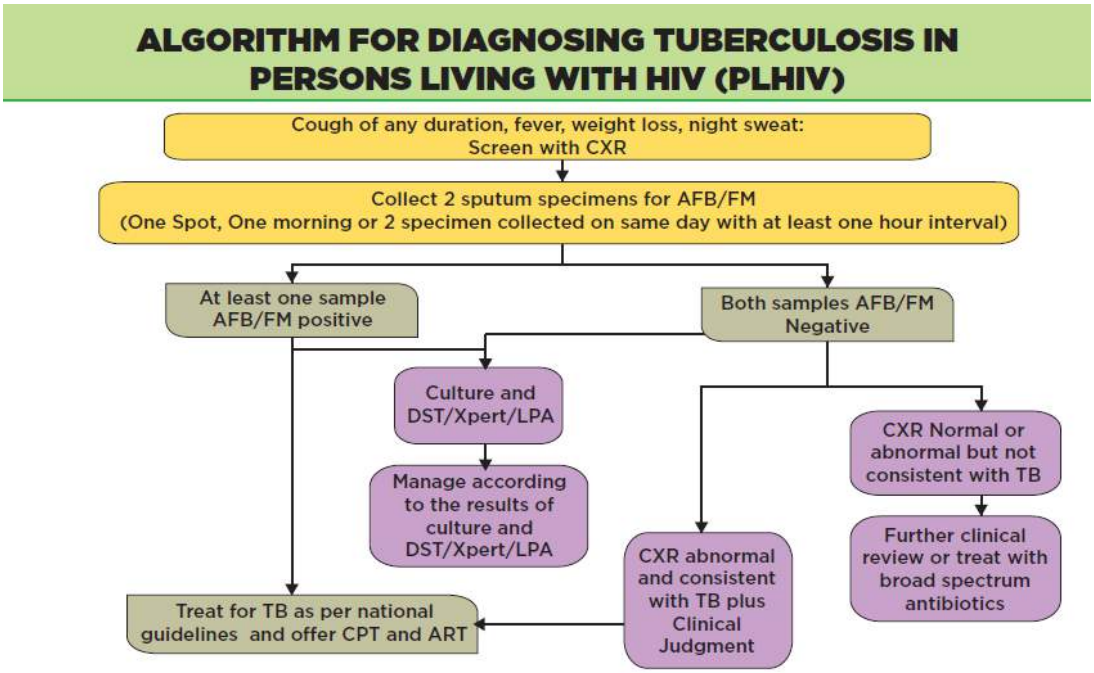
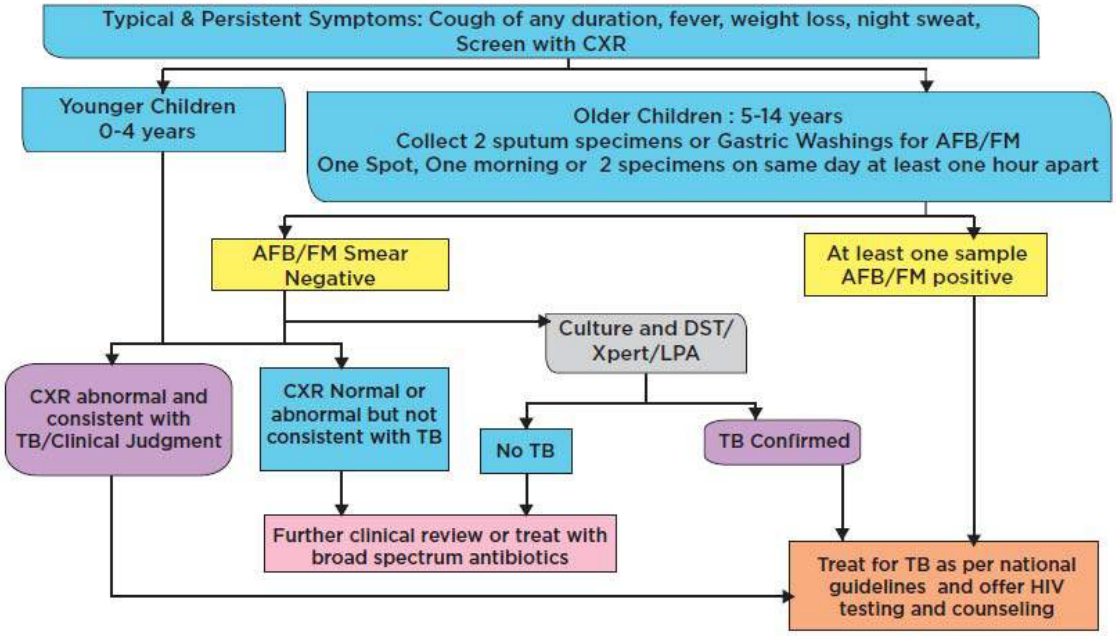
ANNEXES

Annex 1: Algorithms for Case Detection

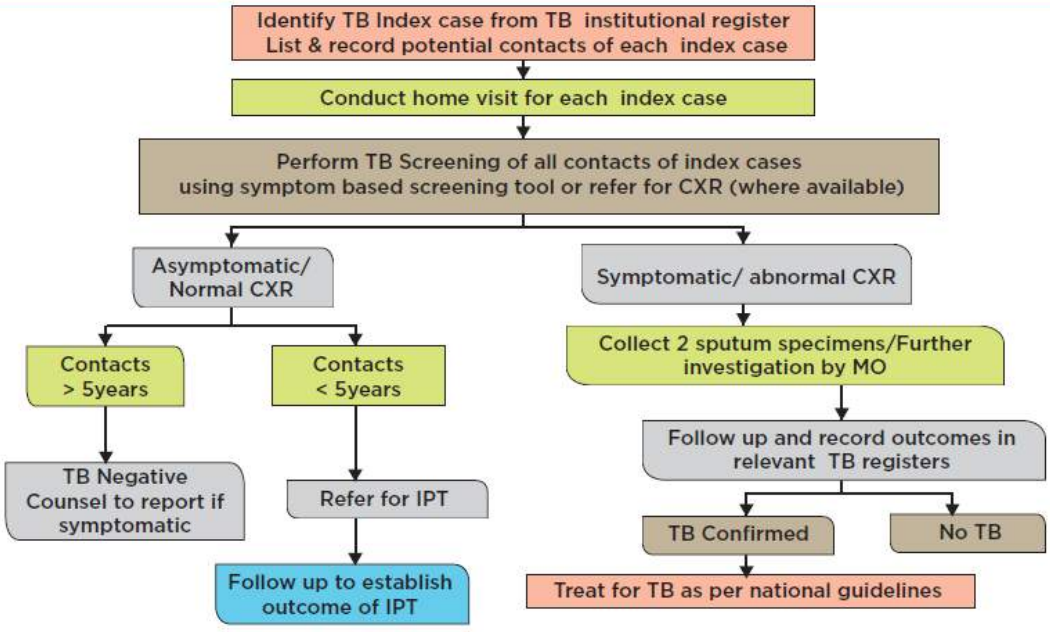




ALGORITHM FOR DIAGNOSING TUBERCULOSIS IN CHILDREN



ALGORITHM FOR TB CONTACT TRACING AND INVESTIGATION



Annex 2: Research Priority Areas

Theme	Research topic/question with background
1. TB case notification (& finding)	**<u>Follow up studies from prevalence survey</u>:** ***a) Investigate and plan for active case finding interventions among pregnant women. The preliminary findings of the national TB prevalence survey indicate that there is a high TB burden among pregnant women. Of those exempted from CXR (mainly pregnant women (85% of the group with the rest mainly too ill to attend the field site) sputum was collected and many TB cases (more than expected) were detected.*** b) Conduct follow up studies using the TB cases detected during the prevalence survey (174 definite cases). Actively ensure the conduct of contact tracing in the households especially children. The nice random sample provided by the survey would be an easy entry point. c) Perform in-depth analysis of TB surveillance data linked to TB prevalence survey results. A discrepancy is anticipated between the estimates of WHO (92 per 100,000 population) and the preliminary survey results (suggesting prevalence of TB to be around 300 per 100,000 adult population: o What are the observed patterns (geographic, gender, age groups, urban/rural) etc. d) Is the geographic patterns observed in the surveillance data with higher case notification in the southern/coastal region versus the northern regions confirmed? If not why is this the case? Is there a difference in access to care for example? ***e) What are the strategic implications of the higher burden? Were all cases detected during the survey on TB treatment and notified to the program? What was the health seeking behaviour of those detected in the survey but not yet notified? Does TB control need to adapt its focus?*** ***f) Mapping of high burden areas and the high risk population: can hotspots of transmission be identified*** **<u>Surveillance data:</u>** ***g) There has been a consistent increase in smear-negative cases over the last year specifically the last 2 years while smear positive and extra pulmonary cases started to show a decreasing trend. Why is this? Questions to answer are:*** o ***Who are these smear-negative patients (can they be characterized in terms of age, sex, HIV status, geographical distribution etc.)?*** o ***Are all these cases really TB or is there over-diagnosis?*** o ***Does the difference reflect either changes in the performance of the laboratory system or non-compliance with diagnostic algorithms for TB at the different service delivery points in the system?*** h) Usage of surveillance data to guide TB control (are collected data actively used, at what level, who uses them, how are they used, are the activities documented etc.) i) Evaluate the implementation of routine data quality assessments (DQA): has data quality improved? ***j) Investigate observed gender differences in TB burden and risk factors associated with this difference (HIV, other exposure (alcohol, smoking etc.) to better characterize the at risk population*** k) Investigate the observed regional variations in the types of cases notified and observe whether this is linked to regional variation in utilization of the diagnostic algorithms or laboratory capacity or other factors linked to geographical variation in the population and its characteristics (HIV status, tribe etc.). l) To investigate the high HIV sero prevalence but lower then expect case notification in Brong Ahafo regions with observed high death rates. m) Determine the reason(s) for the lower treatment success rate in the poorer performing regions. n) Investigate best practices in the three most populous regions Ashanti, Greater Accra and Western Region who report the highest treatment success rates (above the national rate) to inform interventions in the other regions, potential reasons could be the effectiveness of the application of the enablers package, human resources strength and/or death rates. **<u>ACSM and Knowledge of TB in the community:</u>**

	o) Knowledge, Attitude and Practice (KAP) for TB: At the start of TB control in Ghana a KAP study was done providing important information to guide TB control. Although the recent DHS included some questions to assess knowledge and prevailing stigma with respect to TB ***there is need for a follow up study to better understand the knowledge of TB among the population in order to better guide ACSM activities.*** p) Impact of patient support by poverty level, patients support is provided throughout but can is the impact bigger in areas with increased poverty (northern regions and central) ***q) Stigma reduction: impact of NGO activities that have been rolled out (engagement of chiefs, sensitization, CSO involvement etc.) – did it reduce stigma? (Is there a baseline? If not a comparative study could be designed)*** **<u>Financing & funding of TB control:</u>** ***r) What is the process for priority setting of services at the operational level given the limited resources? Do districts prioritize, if yes how do they do it, what is the process? If not what are the barriers, do they have the skills, knowledge and infrastructural needs to do this?*** ***s) Sustainability of financing for TB control and dependency on external donor funding – what activities are most cost-effective?*** **<u>New diagnostics</u>** ***t) What is the impact of the introduction of digital X-ray in terms of increased yield and quality of diagnosis (linked to the anticipated implementation of the ORIO project)?*** u) What is the impact of the introduction of digital X-ray on diagnostic delay and treatment outcome (linked to the anticipated implementation of the ORIO project)? v) Compare cost-effectiveness of dig CXR and GeneXpert for PLHIV, children ***w)*** Evaluate the implementation of the new algorithm and its effect on case finding that was implemented from 2013 onwards following the development of the new national TB manual. ***x) Impact of new diagnostics (CXR & GeneXpert) on case finding, treatment outcome and delay*** **<u>Access to care</u>** ***y) Using the mapping (see above under point d) implement Active Case Finding (ACF) interventions for example using the four existing digital mobile Chest X-ray units to focus on vulnerable group:*** o ***Mobile populations (for example farmers in the central region)*** o ***Small mining areas*** o ***Urban slums*** o ***Prayer camps?*** ***z) Evaluate an innovative intervention (to be developed) to provide care for TB to the part of the population seeking care in prayer camps. General health seeking behaviour studies in Ghana indicate that alternative care providers are prioritized to seek care.*** ***aa) Assess involvement of private sector (chemical shop sellers, private clinics, private laboratories) in TB control (What role do they play, diagnosis? Treatment? Adherence? Conduct a mapping exercise)*** **<u>Follow up from earlier studies</u>** ***bb) Cost-effectiveness evaluation of the CIDA project approach (SOPs for enhanced finding). Critically evaluate what where the most successful components of the approach, what worked? What did not work not and why? What would be scalable? This could be combined with the results from the enhanced case finding project in the Easter Region to provide a more country representative image.***
2. Care of patients	***a) Evaluation of the enabler's package:*** The enabler's package has been identified by the external program review as key driver of treatment success but it is highly dependent on external funding. Also, results of a study on patient satisfaction carried out by the Dodowa health Research centre indicate that a key result from the study is that support, although considered most important, was perceived as most poor and the investigators suggest that support for transport, food and money need to be improved at the various facilities. Both patients and healthcare workers indicated this is a key area that needs attention. A quote from the report focus group discussion results indicates: "Many of the patients claimed they had received enablers support only once. They had to pick it at their first point where TB was

	diagnosed (district hospital) and not the facility where they take their drugs." and "Almost all health workers from the CHPS did not know of enablers package for their client until their clients told them, they have received such packages from the district hospital" This issue has also come forward from anecdotal evidence suggesting that the package does not always trickle down to the treatment sites. Many patients seem to be registered at the district hospital (who then receives the enablers' package) and are then referred to a treatment site (where the package does not reach). Therefore a ***proper impact evaluation of the enabler's package is warranted. In the light of decreased resources and high dependency of this package on external funding, alternative options need to be explored for example mobile technology. A proposal is being developed to conduct a comparative implementation study between the current implementation of the enablers' package and an alternative with mobile phone support from health care workers at randomly assign sites. Would that be feasible? How would that impact on outcome indicators? Would it be cost-effective? Do all type of patients benefit the same? Who benefit most (PLHIV, poor, young-old, male-female etc.)*** b) Patient dosing during 1st line treatment: around 30% of patients have an average weight above 50 kg. For these patients there are potentially issues with drug dosage. For them extra pills should be added from a new treatment pack (or the supply box) but anecdotal evidence suggests this might not always be done. A study should be done to investigate prevailing practices: are all patients correctly dosed, which proportion is not doses correctly, does that affect outcome, adherence? Conduct an analysis of BMI and prescribed drug dosage to verify whether dosing is optimal. Also, as it concerns about one third of patients it could be explored whether a "weight plus pack (WPP)" (extra dosage for patients >50kg) would facilitate optimal implementation. c) Conduct an evaluation of nutritional support provided to TB patients: do these patients do better (in terms of outcome, weight gain, adherence etc.). How cost-effective is it? d) ***Study into Health Care worker (HCW) motivation for TB work***. For example: are there more vacancies in TB than other areas, also included issue of stigmatization of TB and HCW working in TB, what barriers are perceived providing services from the HCW perspective. e) Impact of training on TB service provision. Does trained staff perform their TB control task different (use more sputum test as confirmation, prescribe more IPT, provide key info on drug side effects etc.) ***f) Follow up study from the patient satisfaction study done in 2011 by Dodowa Health Research Centre. Key findings of the study point to issues with support (address above under a); stigmatization of HCW, provision of information on site effects, TB-HIV linkage, ART service availability and poor professional competence. Develop an implementation study to address the listed issue and investigate impact.*** g) Evaluation of "modified DOTS". The DOTS practiced is actually "modified DOTS" whereby patients collected weekly, biweekly or monthly drugs. Question is how does this affect outcome and what are barriers observed on the one hand and conditions that make it work on the other hand. For which patients is it successful? How cost-effective is it? This could be linked to evaluation of Community TB Care (CBTC) – does implementation result in "modified DOTS" and what is the impact of that in terms of treatment outcome. ***h) Investigate the increase in TB deaths among EPTB patients from 7.8% in 2006 to 14% in 2012 as well as the high death rates in smear negative patients by usage of death audits to explore contributing factors to mortality like quality of service.***
3. Case holding	a) Follow up of 'tool to estimated patient costs study' when initial discussion health with health insurance agency has been fruitful. Demonstration study to assess the impact of increased insurance coverage of TB costs (transport, food, cost for additional diagnostic test (i.e. CXR) etc. Have costs reduced for patients? Have outcomes increased? Do patients still face catastrophic costs? ***b) Evaluate the PPM DOTS expansion initiative that was implemented in six cities: Did it increase access to care? Did it increase case notification? Did it increase treatment success? Was it cost-effective? What were barriers faced and opportunities identified etc.*** c) Investigate the high death rates among TB patient, questions to answer: o Comparison with previously conducted study (2009) in areas with high and low TB case fatality to investigate whether the pattern has changed: When do people die during treatment? Which people die during treatment, what are their characteristics? What are risk factors for dying during TB treatment? o Could misdiagnosis be a cause of mortality, specifically among smear negative cases (linked to 1e above)

	○ Do outcomes differ for the different types of TB? ○ What are causes of death for patients dying during TB treatment? Is it TB or other causes? ***d) Linked to point c above, investigate community deaths, are there many undiagnosed TB cases dying in the community? Such a study could be integrated into verbal autopsy studies at the existing Demographic surveillance sites (DSS) in Ghana as has been done in other countries.*** e) Case holding has improved but there are areas with higher default rates. Action research should be developed to tackle default in these hotspots.
4. TB-HIV	a) Investigate treatment outcomes among TB-HIV co-infected patients to assess the reason for the higher mortality. When do TB-HIV patients die during treatment (early – late), who are the patients dying: all or specific groups die more often, i.e. old-young, male –female; on ART, CPT Etc.? b) Implementation research on the new ART guidelines calling for early ART initiation. The effect of the roll out of these new guidelines should be evaluated. Define clear outcome indicators and assess barriers, opportunities and challenges. c) Implementation research on enhancement of integration of TB-HIV services. Guidelines are under development and 2-3 years after roll out implementation should be assessed: what are the barriers; are there improvements in key TB-HIV indicators etc.; key challenge is there are only about 200 ART clinics while TB treatment is available at nearly all HFs. d) Impact of an alternative algorithm for PLHIV: sputum smear as first step versus GeneXpert, how does this impact on case finding, treatment delay and treatment outcome. What is the cost-effectiveness of each algorithm? ***e) Feasibility of decentralization of ARV services to the community level (CHPs), impact on key TB-HIV indicators, case finding, outcome and access to care. Could start with some groups for example pregnant women.*** f) IPT in low HIV setting, is this relevant? What is the impact? g) Further investigate the initial crude analysis that seems to indicate that there may be a correlation between ART coverage and death as regions with higher ART coverage reported lower death rates. Need to investigate this and other potential co-variables.
5. Community support	***a) Implementation research to enhance the involvement of CSOs in TB case finding and holding. Implement the CSO approach developed under TBCAP/CARE like done in Nigeria, Ethiopia and evaluate the impact. Ensure full integration with CHPs concept. Investigate other roles the community can play as currently the community is not optimally involved. The family support system is rolled out nationwide so difficult to evaluate its effectiveness but a comparison could be made with mobile support (see also under 2a), what is the added benefit?***
6. IC	***a) Situation assessment of IC implementation since the 2010 SOP development (current status, presence and utilization of IC plan, IC team, HCW screening; barriers to implementation of the SOPs, etc.). The external program review did a quick assessment and concluded it is poor – a thorough evaluation should provide more detailed evidence and guide the way forward. Could be developed as action research.*** Aim is to identify the barriers to implementing TB infection control in health care facilities (DOTS corners, DT TB and ART centres, prisons) ***b) Demonstration project to implement for example the FAST strategy. Aim: detect patients earlier, reduce treatment delay and prevent/reduce nosocomial transmission; duration, 6 to 12 months. demonstration project*** c) Assessment of integration of TB IC within overall IPC within the GHS – show case project: How are the services integrated, what are the win-wins, what are the barriers to implement TB IC at the HF level, what is working, what not, what needs improvement etc.? d) Prevalence TB among health care workers (Action research to implement the TB care tool) ***e) Action research on TB IC implementation at community level: the ambulatory model of care will be the backbone of the PMDT approach therefore the functioning of IC at community level is key: what is the approach? Is it functioning?***
7. Childhood	***a) Inventory of status of childhood TB: How is staff knowledge on childhood TB, are the guidelines being practiced, which activities results in detection of cases, what are barriers to the implementation of the guidelines. A study like that can help in guiding further implementation of the roadmap for childhood TB.***

	b) Investigation of the sensitivity of childhood TB diagnosis, does access to CXR enhance case finding? (Conduct a comparative study with GeneXpert and current situation as comparative arms). c) Investigate the reasons for the declining trends in the proportion of TB cases among children in Ghana
8. DR-TB	***a) Implement a well-designed DRS survey that is analysed accounting for cluster design of the survey. The conduct of this study is urgent as at present there are no reliable nationally representative DR-TB data. Using the survey results develop program of DR-TB surveillance via sentinel sites*** b) Conduct a retrospective cohort study to investigate what happens to the diagnosed PDR-TB and monoresistant TB cases that are currently not started on DR-TB treatment ***c) Uptake and appropriate use of new TB diagnostic tools (including GeneXpert) for improved detection of smear positive and drug resistant TB:*** o ***How does the introduction of GeneXpert testing impact the workload of the laboratory and the number of conventional diagnostic tests performed?*** o ***What are the main indications for requested GeneXpert testing?*** o ***What are the main logistical & operational issues related to GeneXpert implementation?*** o ***What is the impact of GeneXpert on TB and MDR-TB case notification?*** o ***What is the impact of GeneXpert on TB and MDR-TB treatment initiation rates?*** o ***What is the impact of GeneXpert on patient delays before TB or MDR-TB treatment initiation?*** o ***How do GeneXpert results compare to conventional DST results?*** d) Evaluation of quality assurance and optimal use of equipment for GeneXpert/diagnostic tools in general e) Evaluate the coverage of implementation of screening for DR-TB as per guidelines/diagnostic algorithm: are all identified high risk groups tested? If not, what is the coverage in the different risk groups (i.e. HCW with TB; failures to convert at month 2 or beyond; failure on CAT I; failure on CAT II). f) Clinical impact of GeneXpert implementation for general TB diagnosis, MDR and HIV patients – are the machines optimally used or is there underused utilization and if so what can be the solution (Referral system improvement, Transport system etc.). g) Cost-Effectiveness of Multi-Drug Resistant Tuberculosis Diagnostic and Treatment Services in Ghana ***h) Comparative study on the availability/access to of GeneXpert versus culture & DST and its impact on early treatment of MDRTB Cases? Impact on the waiting list for MDR treatment, impact on patient delay etc.*** i) Evaluation of the impact of GeneXpert roll out on TB case notification 3-5 years after implementation: How did it affect case finding, delay in starting TB treatment and treatment outcome? j) Risk factors for the development of DR–TB: primary/secondary resistance, which patients develop resistance (characteristics), which patients are more prone to MDR (failures, other MDR-TB suspects etc.). k) Evaluation of support (nutritional, psychosocial) to MDR-TB patients; do patients that receive support do better (in terms of outcome, weight gain, adherence etc.)? How cost-effective is it? l) Impact evaluation of the roll out of the developed PMDT training curriculum over the regions: evaluate 2-3 years after roll out whether an impact on PMDT indicators (return on investment, public health impact) can be observed; an individual evaluation is incorporated in the designed curriculum but the impact on TB control should also be assessed.