Tuberculosis Infection Prevention and Control in Ghana

Max Meis, MD, MPH
Virginia Lipke, RN
Merid Girma, Architect
William Holmes, MD, MPH

July, 2010

This report was made possible through support provided by the U.S. Agency for International Development, under the terms of the Tuberculosis Control Assistance Program (TB CAP) and the National AIDS Control Program (NACP).

ABSTRACT

Max Meis, Merid Girma and William Holmes traveled to Ghana April 18-May 1, 2010, and Virginia Lipke traveled to Ghana April 20-30, 2010 for the Tuberculosis Control Assistance Program (TB CAP). During this time, site visits were made to six health facilities in the Accra Region and Eastern Region in order to make recommendations for implementation of the most appropriate near-term TB-IPC strategies based on general facility findings. The Assessment for each of these facilities is included in the Annexes. In conjunction with involved Stakeholders, a finalized draft of the TB-IPC Standard Operating Procedures (SOP) was developed, along with suggested tools for implementation and monitoring of IPC activities at the facility level. Specific notes on building design and environmental controls for prevention of airborne infections are attached.

RECOMMENDED CITATION

Meis, Max; Lipke, Virginia; Girma, Merid; Holmes, William,;2010. Tuberculosis Infection Prevention and Control in Ghana. Submitted to the U.S. Agency for International Development by TB CAP/Management Sciences for Health

KEY WORDS

Tuberculosis, TB CAP, MSH, NACP, infection control, TB IPC, Ghana

DISCLAIMER

KNCV Tuberculosis Foundation
Parkstraat 17
2514 JD
The Hauge
The Netherlands

Management Sciences for Health
784 Memorial Drive
Cambridge, MA 02139
Tel: +1(617) 250.9500
Fax: +1(617) 250.9090
www.msh.org

CONTENTS

ACRONYMS

CDC	Centers for Disease Control
CDR	Case Detection Rate
DOTS	Directly Observed Therapy – Short course
DR TB	Drug Resistant Tuberculosis
EnP	Enablers Package
GHS	Ghana Health Service
HIV	Human Immunodeficiency Virus
IC	Infection Control
ICD	Institutional Care Division
IPC	Infection Prevention and Control
MDR – TB	Multi Drug Resistant Tuberculosis
MoH	Ministry of Health
MSH	Management Sciences for Health
M&E	Monitoring and Evaluation
NACP	National AIDS Control Program
NTHSSP	National TB Health Sector Strategic Plan
NGO	Non Governmental Organization
NTP	National Tuberculosis Control Program
PPP	Public Private Partnerships
SOP	Standard Operating Procedures
SOW	Scope of Work
SS+	Sputum Smear Negative
SS-	Sputum Smear Positive
TB	Tuberculosis
TB IC	Tuberculosis Infection Control
TB IPC	Tuberculosis Infection Prevention and Control
TB CAP	Tuberculosis Control Assistance Program
TBCTA	Tuberculosis Coalition for Technical Assistance
USAID	United States Agency for International Development
WHO	World Health Organization
XDR – TB	Extensively Drug Resistant Tuberculosis

ACKNOWLEDGEMENTS

The authors would like to express their deep appreciation to each person who contributed to this workshop. The support received from Management Sciences for Health (MSH) / Tuberculosis Control Assistance Program (TB CAP), Royal Netherlands Tuberculosis Association (KNCV), and the United States Agency for International Development (USAID) in Ghana added a valuable perspective to the workshop conclusions that will contribute significantly in supporting efforts to improve the tuberculosis (TB) program collaboration activities in Ghana.

The authors have greatly benefited from the ongoing input of Rhehab Chimizizi, MSH/TB CAP TB Technical Advisor for Ghana, Dr. Frank A. Bonsu, Program Manager/NTP and Dr. Nii Nortey Hanson, Deputy NTP Manager.

COMPOSITION OF CONSULTANT TEAM

Max Meis, MD, MPH—Program Officer of the TB CAP Program Management Unit with a broad range of experience in health management systems strengthening, and technical assistance on infection prevention and control in The Netherlands and TB CAP countries

Virginia Lipke, RN—Program Officer for CDC specializing in infection prevention and control

Merid Girma, Architect—practicing architect in Ethiopia with a background in health facility design and environmental control for prevention of airborne infections

William Holmes, MD, MPH—practicing clinician and hospital director with a broad range of experience of supporting the strengthening of health facilities in the developing world

BACKGROUND

Introduction of TB CAP Project in Ghana

TBCTA/TB CAP (Tuberculosis Colation for Technical Assistance/Tuberculosis Control Assistance Program) is a USAID globally funded program. Since 2005, the Coalition under TB CAP has provided global leadership in Tuberculosis (TB) control and support for implementation of the Stop TB strategy in 25 USAID priority countries, including Ghana. Although its major focus is Directly Observed Therapy – Short Course (DOTS) strengthening and expansion, TB CAP also assists national TB programs (NTPs) to address Multi Drug Reistant Tuberculosis (MDR-TB), coordinate TB/HIV services, and strengthen overall health services including Infection Control (IC) to ensure the quality of services and improve results.

TB CAP makes available to the NTP in Ghana a broad range of capacities among its international technical partners, which can contribute to all elements of the NTP Strategic Plan, where these are not already covered adequately by other partners.

Ghana has a population of approximately 23 million people with 10 administrative regions, 170 districts and over 600 sub-districts. TB control in Ghana is integrated into the Ghana Health Service (GHS) structure at primary, secondary, and tertiary levels of care. Each region, district, and health facility has a team of health workers led by a TB coordinator who is also responsible for other public health program activities. This team is also responsible for ensuring the success of the public-private partnership (PPP) DOTS program, which is part of an integrated essential health package in all public health institutions and faith-based health facilities in the country.

TB services are offered at public health facilities, including faith-based institutions as well as designated private health clinics. There are 257 TB diagnostic sites out of 661 laboratories country wide and about 1,600 TB treatment sites. Community health workers and community volunteers are involved in TB control through their participation as treatment supporters and are engaged in household TB education, defaulter prevention and tracing. Their activities are supported by an "Enablers Package" (EnP) that offsets their operational cost. The value of the EnP is US$40 dollars per TB patient registered. According to the NTP's guidelines regarding the EnP, 50% of the EnP should go to TB clients, 30% to the health care providers involved in TB care and 20% to the facility (the so called 50:30:20 rule). The program also works in partnerships with non-governmental organizations (NGOs) to increase public awareness about TB so as to increase TB case detection. This initiative is supported by the Global Fund Round 5 Grant.

In 1996, the number of people diagnosed with TB was 6,982; this has increased to 14,022 cases in 2008, representing a TB notification rate for all forms of TB of 61/100,000 populations. The case detection rate (CDR), however, is still low at 26% for all forms of TB and 36% for smear positive TB patients (WHO Global TB report 2009). Since the NTP has not conducted the

National TB Prevalence survey to establish the burden of TB in Ghana, the above CDR is based on the World Health Organization (WHO) estimates.

In the new National TB Health Sector Strategic Plan (NTHSSP) 2009-2013, the NTP has put forward ambitious targets for the main TB indicators. The TB case detection rate (all forms) should increase to 45% in 2010 and 72% in 2013. The TB treatment success rate should increase from the current 84.1% to 90% in 2013 and case fatality should reduce to less than 5% by the end of 2013 (already reached).

The NTP, established in 1994, has since achieved 100% DOTS coverage (geographical). In Ghana there are over 3,000 public and private facilities as well as faith-based health facilities, of which, over 1,600 offer comprehensive DOTS package. It means DOTS coverage is around 54% at health facilities levels. The NTP with support from the Global Fund is scaling up DOTS centres and community TB care activities across the country. There are currently about 661 laboratories; 257 (66 are private laboratories) of them provide TB diagnostic services.

The association of TB and HIV and the emergence of MDR-TB and extensively drug-resistance (XDR-TB) merit TB-IC. TB-IC therefore complements core interventions of TB and HIV programs as well as those of health systems strengthening.

In the past three years, the NTP has sought to address Infection Prevention Control (IPC) measures to prevent TB infection in hospitals and congregated settings within the GHS and MoH context. The program has fully participated in the development of policies and guidelines for IPC in health care facilities, including TB-specific and Airborne IPC measures following risk assessment of facilities supported by WHO. There is a concern about the increasing numbers of DOTS clinic and laboratory staff reporting with TB disease. In 2008, random reports (verbal) from the regions indicated that seven health personnel directly working with the TB clinics and laboratories suffered from TB disease as compared to one patient in 2007. The main gap is the low coverage of programmatic, administrative and environmental TB-specific and airborne IPC measures largely attributed to lack of clear implementation plan and SOPs at all levels of health care delivery. Considering that the current IPC policies and guidelines are universal, this calls for the development of specific SOPs for TB infection prevention and control.

PURPOSE OF TRIP

The objectives of this mission listed in the Detailed Scope of Work (SOW; see Annex 1) were:

1. To assess a broad range of health facilities providing TB detection and care (with particular attention toward those with ART clinics) in order to make focused and prioritized

suggestions for implementation of realistic TB and Airborne IPC measures within facilities. (See Annex 2 – 7)
2. To develop a draft of the TB and Airborne IPC SOPs for review among involved stakeholders.
3. To facilitate the conduction of a Stakeholder Workshop sponsored by the NTP in order to review the draft TB and Airborne IPC SOP, and use their recommendations to compile a revised draft SOPs for final approval. An additional goal of the workshop is to make suggestions for how best to implement the introduction and use of the TB and Airborne IPC SOPs. The list of workshop attendees is shown in Annex 8.

Deliverables

1. A summary travel report to be left with the MSH TB CAP Ghana country lead at the end of the visit.
2. A final trip report should be forwarded to Dr. Pedro Suarez within 2 weeks of completing the work in Ghana.
3. A copy of the final TB and Airborne IPC SOPs should be sent with the final trip report.

ACTIVITIES

Main findings

Brief and de-brief

1. Brief and de-brief USAID Ghana, the GHS, NTP, NACP, MSH-TB CAP Ghana.
    - Briefed NTP, GHS and MSH TB CAP Management team on April 19, 2010
    - Briefed NACP (National AIDS Control Program) Director and ICD (Institutional Care Division) Director on the purpose and planning of the mission on April 22, 2010. Enlisted the cooperation and support of two members from ICD to participate in working group and preparation of the SOPs.
    - Briefed involved stakeholders, including NTP, ICD, and health facility staff about initial Health Facility assessment findings, and obtained consensus agreement for focus, content and format to be used in development of TB and Airborne IPC SOPs on April 23, 2010.
    - Met with NTP's Monitoring and Evaluation (M&E) officer to review M&E system including current indicators and tools.
    - Met with lead engineer, Estate Management Unit of GHS to review policy and procedures regarding Health Facility construction and renovation.
    - Briefed NTP, NACP, ICD and representatives from multiple facilities on draft of SOPs and discussed strategies for implementation on April 28, 2010.
    - Briefed USAID, Accra and CDC (Center for Disease Control), Accra regarding activities and deliverables on April 29, 2010

Conduct situational analysis

2. Visited the following health facilities to conduct risk assessments:
    - Korle-Bu Teaching Hospital, Accra Region, on April 20, 2010
    - Ridge Regional Hospital, Accra Region on April 22, 2010
    - Maamobi Polyclinic, Accra Region, on April 21, 2010
    - Abokobi Health Center, Accra Region, on April 27, 2010
    - Koforidua Regional Hospital, Eastern Region, on April 23, 2010
    - Akwapim Mampong District Hospital, Eastern Region, on April 23, 2010
    - Additional visits to community based treatment supporters groups on April 27 and May 1, 2010

Draft standard operating procedures (SOPs)

3. Drafted TB and Airborne Infection Prevention and Control SOPs.
    - Held one-day workshop on April 28, 2010, sponsored by NTP, and including NACP, ICD, multiple health facility administrative and clinical staff to review draft of SOPs and make concrete suggestions.

- Presented findings from facility assessments and approach to development of SOPs to all stakeholders as part of the workshop.
- Discussed the integration of TB and Airborne IPC into the MOH's general IPC and discussed methods and strategies to most effectively introduce and implement TB and Airborne IPC SOPs at all levels.
- Facilitated the formation of a working group to revise suggested implementation tools (eight of them, with possible inclusion of additional tools) for TB and Airborne IPC strategy to be used for implementation of the SOPs as best approached in Ghana. Time line for final revision of tools set at ten days from the Stakeholder Workshop (April 28, 2010).

NEXT STEPS

Recommendations

1. All involved stakeholders: Maintain close integration with GHS/ICD to promote consistency of content and implementation of TB and Airborne IPC within the broader framework of general IPC as outlined in the "Policy and Guidelines for Infection Prevention and Control in Health Care Facilities" (June 2009)
2. NTP/TB CAP, Ghana: Finalize revision of Tools by the working group for inclusion in the final version of the SOPs.
3. TB CAP Ghana: Print and distribute TB and Airborne IPC SOPs (2,500 copies) and supplementary tools in a manner that encourages their use. Synchronize the distribution with the distribution of the national IPC Policy and Guidelines.
4. Health Facility Management teams and IPC Committees: Involve the Estate Management Unit of GHS with the implementation and assessment of Health Facilities, particularly with regard to review of Facility Master Plans and for consideration of all construction/renovation projects. The review should specifically consider TB and Airborne Infection Control issues when considering facility design changes.
5. TB CAP, Ghana and CDC, Atlanta: Follow-up with CDC Ghana to ensure availability of CDC tools (including the new video) for availability at Ghana Health Care Facilities, and as part of the broad strategy for introducing the TB and Airborne IPC SOPs at facility level.
6. TB CAP/PMU USAID, Ghana and MSH: Plan TB CAP monitoring visit for September 2010:
    - to assess progress of implementation of TB and Airborne IPC SOPs at facility level,
    - to assess the opportunities for IPC collaborative activities to the NTP/PIH MDR-TB program, and
    - to develop a multi-annual support strategy for assistance of GHS in scaling up TB and Airborne IPC including community-based approaches.

REFERENCES

1. The National Tuberculosis Health Sector Strategic Plan for Ghana 2009 – 2013

2. Policy and Guidelines for Infection Prevention and Control in Health Care Facilities, MOH, Ghana (June, 2009)

3. WHO Policy on TB Infection Control in Health-Care Facilities, Congregate Settings and Households (2009)

4. Standard Operating Procedures for TB Case Detection (March 2010)

5. TB CAP – Ghana Country Workplan: October 2009 – September 2010 (September 2009)

ANNEXES

Annex 1. Detailed Scope of Work

TB CAP-Ghana Activity Plan: Develop a Country Specific SOPs for TB Infection Control and Monitoring and evaluation plan for Ghana

Name of Consultants:	Dr Max Meis-TB CAP/PMU- NL Dr William Holmes, MSH-USA Ginny Lipke-CDC Atlanta, USA Merid Girma, Ethiopia
Estimated LOE:	10 working days in Ghana 1 working day (Preparation) 1 working day (Report writing) 2 travel days Total LOE: 14 days
Destination:	Accra, Ghana
Dates In-Country:	April 18th – 30th, 2010
Principal working office:	MSH/TB CAP office in Ghana
Administrative support to be provided by:	Lisa Pelcovits, MSH/TB CAP (USA)
Ghana logistical support to be arranged by:	Hilda Smith, MSH/TB CAP
Project Name Contact Leader in Ghana:	Rhehab Chimzizi TB Technical Advisor/TB CAP Country Lead-Ghana
Final report to be sent to:	Dr Pedro Guillermo Suarez MSH TB Director-USA MSH/TB CAP-Ghana NTP and NACP Managers USAID Mission, Ghana TB CAP/PMU, The Hague, Netherlands

Background

Management Sciences for Health (MSH) through the United States Agency for International Development (USAID) funded TB Control Assistance Program (TB CAP) project started proving systematic technical assistance to the National TB Control Program in Ghana in March 2008. The main thrusts of this technical support are the provision of quality DOTS and TB/HIV Management. In Ghana the lead partner is MSH and other collaborating partners include KNCV Tuberculosis Foundation and the World Health Organization (WHO).

TB CAP is currently implementing its third and final annual Plan of activities (APA). In this work plan one of the expected outputs is to support the NTP and NACP in developing the specific Standard Operating Procedures (SOPs) for TB Infection Control and prevention

Global Policy on TB infection Control

TB infection control is growing in importance because of the association of TB with HIV and the emergence of f multi-Drug resistant TB (MDR-TB) and extensively drug resistance TB (XDR-TB). In responding to demand from countries for guidance on what to do, and how to prioritize TB infection measures at national level, WHO produced a policy on TB infection control in Health-Care facilities, congregate settings and households

TB infection control measures are essential to prevent the spread of M. tuberculosis to vulnerable patients, health care workers, the community and those living in congregate settings. Fundamentally, TB infection control is about safety so that people receiving or offering HIV care should not have to worry about being exposed to and infected with M. tuberculosis in the process.

Policy and guidelines for infection prevention and control in Health Care facilities

The Ministry of Health (MoH) has been proactive in taking the agenda of Infection control forward. This was demonstrated by the development of the policy and guidelines for infection prevention and control in the health care facilities in April, 2009. Although the TB infection measures were cited in section 19 (sub-section 19.2), they fall short of providing step by step procedures on how to implement specific TB infection control measures.

Reports from the Central Unit of the NTP indicate that by the end of 2009, there were 254 health care facilities and congregate settings implementing TB infection control policy. However, there are no clear criteria how these facilities were assessed as implementing TB infection policies.

In 2008, random reports (verbal) from the regions indicated that seven health personnel directly working within the TB clinics and laboratories suffered from TB disease as compared to one patient in 2007.

Low level of infection prevention and control was cited by the Head of The National Public Health Reference Laboratory as one of the main challenges facing the medical laboratories in Ghana.

Taking into consideration of the above stated challenges, the development of SOPs to address TB specific Infection Control measures is warranted.

Objectives

The broad objective of the mission is to develop specific SOPs for TB Infection Control as part of the national policy and guidelines for infection prevention and control in health care facilities.

Specific objectives

1. To conduct a rapid health facility assessment for purpose of documenting current infection prevention and control practices in health care facilities with focus to HIV/ART clinics.
2. To develop the first draft SOPs for TB infection control that include monitoring and evaluation indicators with clear targets
3. To facilitate the consensus workshop for purpose of soliciting comments to the draft SOPs from key stakeholders in Ghana

Activities

The Consultants will:

1. Develop a health facility assessment tool prior to the mission
2. Hold initial meeting with NTP and NACP officials to agree on the final health assessment tool and determine which facilities to visit
3. Conduct a rapid situational analysis to document current TB infection control practice in health care facilities that include HIV/ART clinics.
4. Develop the first draft of the TB specific infection control SOPs, monitoring indicators and targets with an emphasis on HIV/ART clinics.
5. Conduct a one day stakeholder meeting to receive feedback and comments on the first draft of the SOPs
6. Develop second draft of the SOPs based on the comments received from the stakeholders workshop
7. Debrief NTP and NACP Managers
8. Debrief all MSH Staff based in Ghana
9. Debrief USAID and CDC Ghana Mission

Outputs/Deliverables

1. Health facility assessment tools developed
2. Health facility assessment visits conducted
3. A first draft of TB infection SOPs developed
4. TB infection Control monitoring and evaluation indicators developed
5. Stakeholder workshop conducted
6. NTP and NCP Managers debriefed
7. MSH Staff debriefed
8. The USAID Mission in Ghana debriefed
9. A short trip report at the end of the visit submitted to the TB CAP Country Lead.
10. A final trip report developed and submitted to Dr. Pedro Suarez and Rhehab Chimzizi within 2 weeks of completing the mission.

Draft activity plan/itinerary

The consultants will arrive in Ghana on April 18th and depart on April 30th, 2010

Annex 2: Summary facility assessment report of Korle-Bu Teaching Hospital

Korle Bu Teaching Hospital
National (tertiary) referral hospital
Many stand-alone buildings on a vast area
1000 plus beds
Unknown number of staff and students
Several outpatients departments: e.g. Pediatrics (200 plus/day), Adults (300 plus/day), Fever clinic (ART), Chest clinic
Emergency/Critical care departments: Pediatrics (30 admissions/day), Adults
Tens of patients per month that are diagnosed with TB at Emergency and IPD wards
Diagnosed SS- TB/HIV patients admitted in Fevers clinic though in separated rooms
Several known members of staff with diagnosed TB (not documented)

Resource persons:
Dr Ben Annan, Medical Superintendant
Dr. Anand Qua, Director of Public Health Unit

Strengths:
Very knowledgeable staff and motivated staff, IPC is addressed by active (established in 2009) Public Health Unit,
The Director of the PHU is a member of the management team,
Ongoing in-service training including general IPC but insufficient specific attention for TB and airborne IPC measures,
Spaces for separation of in-patients with SS+ TB (sputum smear positive) ,
Diagnosed SS+ TB/HIV patients are admitted in chest clinic,
Adequately naturally ventilated high risk areas i.e. chest clinic and fevers clinic consultation rooms and wards, adult and pediatric outpatient waiting area**s**

Weaknesses:
In general inadequate practice of administrative controls in most departments in particular in the OPDs and emergency wards and including the situation that rapid tests using Molecular Line Probe Assay techniques to detect DR-TB (Drug Resistant Tuberculosis) early are not available,

Regarding environmental controls some of the weaknesses are the following:

- Consultation rooms of the pediatric and adults OPDs are poorly ventilated with unfavorable sitting arrangements and closed windows and doors because of AC without extractor fans,
- Overcrowded enclosed small indoor waiting areas in Adult OPD (out patient departments) directly connected to consultation rooms and no use of fans to direct the air flow,
- Poor maintenance and repairs of sinks, taps, (ceiling) fans everywhere

Problems identified:
Overcrowding in all outpatient departments. The majority of patients are referred patients

No comprehensive IPC plans for the identified high risk areas; budget for IPC is mostly provided for general IPC supplies, masks for staff, gloves, disposable syringes, and for in-service training activities

No surveillance system for TB disease among staff in place

Limited number of posters to raise patient awareness, no materials to raise staff awareness of risks, no signage for high risk restricted areas

No triage system in place, no separation of TB suspects in emergency wards, no fast-track system, no cough etiquette observed (in particular masks on SS+ TB patients, no rationalization of patient flow to manage the large numbers, and no form of TB/HIV screening of staff

Sick TB suspects and undiagnosed TB patients may be admitted in emergency/casualty departments; in the adult emergency ward where space is very limited. Although some form of separation is practised at the end of the corridor near an open door in the Adults emergency ward, in the pediatric emergency ward available space is not optimally used and no separation of TB suspects is practiced

SS – (sputum smear negative) TB/HIV patients are admitted in the fevers clinic, and though separation from other HIV+ patients is practised their movement is not completely restricted creating a risk of transmission while they may be culture positive

No mixed-mode or closed mechanically ventilated isolation ward or rooms for MDR-TB patients (IPD as well as OPD)

Biosafety in the laboratory of the chest clinic is compromised because of an old biosafety cabinet that is not serviced and not well positioned in a poorly ventilated room although no high risk procedures are being performed at the moment related to C/DST. The BSC has no duct to the outside and if the HEPA filters are not regularly replaced than contaminated air is re-circulated in the room

No use of N95 respirators by fit-tested staff attending to patients suspected of DR-TB

Recommendations:

Prioritization Table for IPC Assessment						
	Priority **High / Medium /** **Low**	**Description**	**How to implement?** **Who is responsible?**	**When?**	**Budget**	**Comment**
Managerial activities						
1	High	Review the referral system	Medical Superintendant	Within 6 months	Nil	Availability of specialized consultants to manage in-patients in lower level hospitals and reduce admission time in referral hospital
2	High	Conduct baseline assessment for each department	Director of PHU	Within 3 months		Use assessment checklist
3	High	Develop separate IPC plan for each department	Director of PHU	Within 3 months	Nil	Use IPC plan template including the development of a budget (also for repairs and maintenance)
4	High	Develop a renovation plan for the Pediatric emergency department	Medical Superintendant	Within 6 months	?	Make optimal use of available space according to the number of occupants; separate duty stations for staff and for students
5	Medium	Construct a MDR ward	Medical Superintendant	Within one year	1000000 USD	Involve external and local experts, NTP and Estate Mgt, GHS. NOTE: UVGI may not be an appropriate environmental control due to high humidity
6	Medium	Develop a renovation plan for the Chest clinic lab	Medical Superintendant	Within one year	1000 USD per meter square	Involve external and local experts, NTP and Estate Mgt. Dep., GHS

7	Medium	Put up signage to control patient movement, posters to raise awareness of patients and staff	Director of PHU	Within 6 months	?	Directional signs, Restriction signs, Desk Aids
8	Medium	Start staff TB disease surveillance system	In-charges	When TB IPC SOPs are implemented country-wide	Nil	Use staff risk assessment log
9	Low	Organize practicals sessions for staff	Director of PHU	Within 6 months	?	Involve external and local experts as facilitators
Administrative controls						
1	High	Map the most efficient flow for patients	Director of PHU	Within 3 months	Nil	
2	High	Implement a triage system procedure at the entry-points of the hospital in outdoors areas	Director of PHU	Within 6 months	?	Ensure adequate numbers of staff (not necessarily only nurses) to reduce waiting time. Use colour coded cards to direct patients and visitors to the departments
3	High	Ensure that patients wait in large adequately ventilated waiting areas with partitions for sick and for coughing patients	In-charge of the department	Within 3 months	?	Restrict the number of patients to wait in small enclosed waiting areas. Strongly encourage use of Outdoor seating. Outdoor space is available for protected outdoor seating for all high traffic clinical sites for minimal costs
4	Medium	Start providing tissues for coughing patients	Director of PHU	Within 6 months	?	Consider use of face masks on SS+ TB patients and MDR-suspects at Chest clinic and for all TB/HIV patients at Fevers clinic
5	Medium	Screen staff for HIV and TB	Medical Superintendant	When TB IPC SOPs are implemented country-wide	Nil	Use staff risk assessment log; no routine CXR necessary

Environmental controls						
1	High	Install extractor fans in enclosed rooms and lab of Chest clinic	Medical Superintendant	Within one year	?	In particular in rooms with AC or rooms where doors cannot be left open
2	High	Repair /replace sinks and ceiling fans	Medical Superintendant	Within one year	?	Develop a preventive maintenance and procurement plan
3	High	Procure BSC Class II for Chest clinic lab	Medical Superintendant	Within 6 months	10000 USD	Service contract with supplier
4	Medium	Ensure cross-ventilation and air mixing in counselling room of Chest clinic	In-charge	Within 3 months	500 USD	Use small partition screen to allow privacy instead of current wooden wall which blocks cross-ventilation completely when the door is closed
Personal Protective Equipment						
1	Medium	Use N95 respirators in Chest clinic	In-charge	Within 6 months		1 respirator per week for staff attending to patients
Date of Assessment:			**20 April 2010**			
Date of next Assessment:			**Every month monitor a high risk area to demonstrate improvements and find solutions for obstacles in practicing IPC**			

Annex 3: Summary assessment report of Ridge Regional Hospital

Ridge Regional Hospital
Initial construction: 1946
191 beds
800 staff
200-300 outpatients/day
320,000 catchment population

Resource persons:
Medical Superintendent
Matron
IPC focal person
TB Coordinator

Strengths:

Knowledgeable and motivated staff,

Original,

Basic infrastructure in many areas are well-ventilated,

Examples of well-designed covered, outdoor waiting areas (although limited in number) are on site—see ante-natal waiting area,

In-service IPC training conducted in last year (although limited number of attendees),

Active QA team,

Examples of infrastructure providing good protection against airborne infection exist on the campus: adult inpatient ward, ante-natal waiting area

Weaknesses:

Many congested waiting areas—particularly adult OPD, and ART,

Lack of formal IPC Committee and Team along with a formal, written work plan and budget,

Insufficient number of staff able to participate in in-service training,

Many poorly ventilated work areas in the hospital—often the result of renovations that resulted in obstruction of windows that originally provided adequate air flow, as well as installation of air conditioners with subsequent closure of windows and doors

Problems identified:

Many congested areas of the hospital (particularly waiting areas) as the result of the institution being used in a different capacity and with increasing numbers than originally designed to accommodate. The solution will require addressing patient access and flow (near term, high impact, low resource approach), and limited construction

Lack of sufficient water (reliance on city water with frequent loss of service) and electricity

Structural renovations over many years have served to decrease the natural ventilation afforded by the original design (see ART clinic, pediatric inpatient ward)

Lack of formal TB surveillance system among staff, formal IPC Committee/Team/Plan (along with budget)

Lack of ICP assessment and formal monitoring

Some sinks and fans in disrepair

Recommendations:

Prioritization Table for IPC Assessment						
	Priority **High / Medium /** **Low**	**Description**	**How to implement?** **Who is responsible?**	**When?**	**Budget**	**Comment**
Managerial activities						
1	High	Start staff TB disease surveillance system	Hospital Management Team	When TB IPC SOPs are implemented country-wide	Nil	Use staff risk assessment log
	High	Initiate formation of IPC Committee, Team, and written Work Plan (with budget)	Hospital Management Team	Immediately—according to "Policy and Guidelines for Infection Prevention and Control in Health Care Facilities" (ICD document)	Nil	Use Tools from SOP to organize
	High	Review best use of staff working hours and function to maximize patient access	Hospital Management Team	Immediately	Nil	Refer to systems and experience of other Ghana Health Care Facilities (Korforidua Regional Hospital)

	High	Review Hospital Master Plan to assess feasibility of simple renovations to improve air flow in patient care areas (open windows, install grills over doors, extractor fans)	Hospital Management Team	Next 6 months	Nil	Utilize recommendations and reference support from Estate Management Unit of GHS
	Medium	Screen staff for HIV and TB	Hospital Management Team	When TB IPC SOPs are implemented country-wide	Nil	Use staff risk assessment log; no routine CXR necessary
Administrative controls						
1	High	Consider flexibility in staff shift/hours in order to increase clinic availability and access	Matron/ Hospital Management Team	Next 6 months	Nil (first explore shifting some staff hours before considera-tion of expanding staff or hours)	Review experience of other Ghana Health Facilities—Koforidua Regional Hospital
2	High	Separate waiting patients into more open spaces by increasing clinic hours, organizing triage/patient flow systems and considering use of outdoor spaces	Matron	Immediate ly	Nil	Use Hospital Master Plan and Hospital Management Team to explore options. Utilize Estate Management Unit of GHS as reference resource.
3	High	Separate SS+ TB patients from HIV+ clients at ART	In-charge ART	Immediate ly	Nil	Counsel and test in DOTS center or wait at least two weeks after initiation of TB treatment

4	Medium	Provide clearly marked window or space (outside table) for sputum samples to be placed to avoid coughing patients in congested lab reception	Lab Director	Next 3 months	Nil	The lab central reception area is crowded as it serves all patients registering and providing laboratory specimens. Create separate window or table for sputum samples to avoid heavy interaction of coughing patients with lab workers and others.
Environmental controls						
1	High	Limit the number of patients waiting in the narrow corridor of the ART clinic	In-charge ART clinic	Immediately	Nil	None
2	High	Explore options of using outdoor spaces (or limited construction of new outdoor-covered waiting areas (see ante-natal clinic waiting area)	Hospital Management Team	Next year	500-5000 USD	The ante-natal clinic waiting area on-site serves as a good example
3	High	Consider options for increasing space/design of Pediatric Inpatient Unit which currently has poor ventilation and does not allow for any meaningful separation of communicable patients	Hospital Management Team—one approach would be to expand the inpatient unit to the outpatient building/area, and seek a new outpatient pediatric area	Next year(s)	Quotation needed	Explore use of other hospital spaces that would allow for Pediatric Inpatient Unit to have better natural ventilation and space. Involve Estate Management Unit of GHS as valuable reference resource.
4	High	Open windows or supply extractor fans (in addition to the air conditioning used as needed) in outpatient consultation rooms	Hospital Management Team	Immediately	200-500 USD	Air conditioning in a closed/sealed room provides very little air circulation and increases the risk of airborne transmission

5	Medium	Place extractor fan in X-ray department	In-charge X-ray department	Within 6 months	500 USD	May be used in combination with AC
6	Medium	Improve ventilation / climate in Adult OPD, Pediatric Inpatient area, and ART consultation rooms by removing previous renovations that have blocked air flow.	Hospital Management Team	Within 1 year	Quotation needed	Involve architect Estate Mgt unit GHS as valuable reference resource
Personal Protective Equipment						
1	Low	Respirators	IPC person	If MDR-TB treatment site	10 USD per staff per month	4 respirators per month
Date of Assessment:			**22 April 2010**			
Date of next Assessment:			**After one year**			

Annex 4: Summary assessment report of Koforidua Regional Hospital

Koforidua Regional Hospital
1926
323 beds
700 staff
500 outpatients/day
220000 catchment population
1 known member of staff with diagnosed TB and 1 new suspected of TB

Resource persons:
Dr Daniel Asare, Medical Superintendant
Linda Ayittay, Matron
Celestina Asante, IPC Nurse

Strengths:

Very knowledgeable and motivated staff; IPC nurse is member of national pool of IPC trainers,

Short chains of command,

Hospital score on quality of services consistently around 90%,

Well organized triage system with fast-tracking,

Space for separation of in-patients with SS+ TB,

Despite water shortage everywhere filled water reservoirs with soap for hand-washing,

Adequate ventilated high risk areas except side-ward of emergency/casualty department and counselling rooms ART department

Weaknesses:

Allowing TB patients to mix with HIV+ patients in ART,

Indoor waiting area for DOTS center and ART clinic

Problems identified:

Sick undiagnosed TB patient may be admitted in emergency/casualty department; in a side-ward that is not well ventilated

Have been treating few diagnosed MDR-TB cases but not trained in PMDT including the use of N95 respirators

Recommendations:

Prioritization Table for IPC Assessment						
	Priority **High / Medium /** **Low**	**Description**	**How to implement?** **Who is responsible?**	**When?**	**Budget**	**Comment**
Managerial activities						
1	High	Start staff TB disease surveillance system	Medical Superintendant	When TB IPC SOPs are implemented country-wide	Nil	Use staff risk assessment log
2	Medium	Screen staff for HIV and TB	Medical Superintendant	When TB IPC SOPs are implemented country-wide	Nil	Use staff risk assessment log; no routine CXR necessary
Administrative controls						
1	High	Do not admit respiratory patients in emergency department. Use airborne precautions room or general IPD	Matron	Immediately	Nil	If funds available an extractor fan could be placed in side-wards of emergency
2	High	Separate SS+ TB patients from HIV+ clients at ART	In-charge ART	Immediately	Nil	Counsel and test in DOTS center or wait at least two weeks after initiation of TB treatment
Environmental controls						
1	High	Move outpatients waiting area of DOTS center to outside	In-charge DOTS center	Immediately	Nil	None
2	Medium	Place extractor fan in X-ray department	In-charge X-ray department	Within 6 months	500 USD	May be used in combination with AC

3	Low	Improve climate conditions (radiant heat as well as cross-ventilastion) in OPD by removal of concrete blocks under the roof and replace with louvers	Medical Superintendant	Within 1 year	Quotation needed	Involve architect Estate Mgt unit GHS. To deal with radiant heat coming from the roof an alternative could be to construct a ceiling. This may be more expensive and will not create cross-ventilation.
Personal Protective Equipment						
1	Medium	Respirators	IPC person	When MDR-TB treatment site	10 USD per staff per month	4 respirators per month
Date of Assessment:			**23 April 2010**			
Date of next Assessment:			**After one year**			

Annex 5: Summary assessment report of Akwapim Mampong District Hospital

Akwapim Mampong Hospital
February 1961
200 beds
240 staff out of which are 7 Physicians and 40 nurses

Named after Tetteh Quarshie who is credited with introducing the cocoa bean to Ghana
Located in Mampong, Akwapim in Eastern Region of Ghana
No known member of staff with diagnosed TB

Resource persons:
Matron
IPC Nurse
ART Nurse

Strengths:

Knowledgeable staff all went for training on IPC last year, well ventilated OPD waiting area,

Well ventilated laboratory waiting area,

The IPC Committee is in place; development of a plan is on their agenda,

Triage system with fast track of coughing and other sick patients is in place, and hand washing is promoted right at the entrance of the hospital's OPD,

Separate DOTs clinic with adequately ventilated DOTs room and cross ventilation if the door is left open, TB screening being conducted for the staff

Weaknesses:

Narrow corridor waiting area for ART clinic and DOTS center and patients seating arrangement facing each other,

Poor maintenance evident in hospital and may have implication on maintenance of fans

Problems identified:

Air flow pattern not controlled for female and male isolation rooms which are located on either side of a central corridor

Sputum samples brought into lab by patients; BSC ducted out to window but duct ends at window with risk of short circuiting of contaminated air

Top louvers in OPD consultation room and X-ray room closed and difficult to reach, hence inadequate ventilation

Recommendations:

Prioritization Table for IPC Assessment						
	Priority **High / Medium /** **Low**	**Description**	**How to implement?** **Who is responsible?**	**When?**	**Budget**	**Comment**
Managerial activities						
1	High	Start staff TB disease surveillance system	Medical Superintendant	When TB IPC SOPs are implemented country-wide	Nil	Use staff risk assessment log
2	Medium	Screen staff for HIV and TB	Medical Superintendant	When TB IPC SOPs are implemented country-wide	Nil	Use staff risk assessment log; no routine CXR necessary
Administrative controls						
2	High	Separate SS+ co-infected TB patients from HIV+ clients at ART	In-charge ART	Immediately	Nil	Counsel and test in DOTS center or wait at least two weeks after initiation of TB treatment
Environmental controls						
1	High	Elongate the outlet exit of the bio-safety cabinet by 1m out of the window Provide table for sputum collection in the laboratory waiting area	In-charge laboratory	Immediately	100 USD	Find out when the filter of the bio-safety cabinet was last replaced to identify its efficiency
2	High	Place extractor fan in X-ray department and two consulting rooms leave doors open for consultation rooms.	In-charge X-ray department and In-charge OPD	Within 6 months	3x500 = 1500USD	May be used in combination with AC for X ray and consultation rooms Involve architect at Estate Mgt unit GHS

3	High	Place also extractor fans in both female and male isolation rooms with doors closed	In-charge medical ward	Within 6 months	2x500 = 1000USD	Involve architect at Estate Mgt unit GHS
4	High	Install additional operable louver windows of about $1m^2$ at normal height for three consultation rooms.	In-charge X-ray department and In-charge OPD and medical ward	Within 6 months	3x 500= 1500 USD	Involve architect at Estate Mgt unit GHS
5	High	Install ceiling fans and keep doors open at entrance of corridor for ART and DOTs waiting areas	In-charge X-ray department and In-charge OPD and medical ward	Within 6 months	500 USD	When crowded consider constructing outdoor waiting area for ART clinic
6	Medium	Put up posters at hand washing site at entrance of hospital OPD to also raise awareness of patients on cough etiquette		Within 6 months		
Personal Protective Equipment						
	Not applicable					
Date of Assessment:			**23 April 2010**			
Date of next Assessment:			**After one year**			

Annex 6: Summary assessment report of Maamobi Polyclinic

Maamobi PolyClinic
1960 (estimated year of construction)
4 emergency beds, 120 general beds, 300 antenatal (beds are for 72hours only then transferred as needed)
248 staff
All outpatients 80% occupancy
505,894 catchment population
20 SS+ TB patients on DOTS/ approx 28 TBSS+ per qtr.
No known member of staff with diagnosed TB

Resource persons:
Elizabeth Quaye

Strengths:

Very knowledgeable and motivated staff,

Voluntary TB/HIV screening of staff, Posters displayed,

Outdoors waiting area,

Does have IC committee and IC point person

Weaknesses:

Suspect TB patient walking through micro area to get to a sputum production site,

Did not witness any triage in waiting area for coughing pts.,

TB suspects not separated from others in queue,

Only general IC in-service training in past year,

Microscopy smear not done at open window,

Not aware that ART can be done in tandem with TB TX-making TB pts wait until after TB TX.,

IC has no budget,

IC point person must place concerns in letter to be submitted to the IC committee-to slow for quick resolution

Problems identified:
See above list of weaknesses that were identified

Recommendations:

Prioritization Table for IPC Assessment						
	Priority **High / Medium /** **Low**	**Description**	**How to implement?** **Who is responsible?**	**When?**	**Budget**	**Comment**
Managerial activities						
1	High	District health management to organize in-service training	DHMT	Develop a costed training plan, IPC included and secure funds	?	Cough Etiquette, actice early triage and ART country guidelines need to be covered. Use CDC tools in SOP's
2	Medium	Surveillance of TB disease incidence among staff	In-charge	As soon as SOPs are released	Cost HIV test x 248 x 2/year	Use staff risk assessment log of SOPs
Administrative controls						
1	High	Start collection of sputum samples not using lab as the passageway. Also move smear prep area away from AC to open window with air extractor	DHMT/ICC/ TB control coordinator	Within 3 months	?	Use another site for outdoor sputum collection. Also provide site for smear s to be done in area with fresh air.
2	High	Start weekly meetings and start interventions with core team/ Mgr. approval	TB coordinator	Immediately	?	Suggest including TB coordinator into core team weekly meeting
Environmental controls						
1	Know the wind direction and place waiting patients in covered outdoor seating	Start rounds to ensure room furniture is placed in location as directed by SOP	ICC and TB control coordinator	Immediately	?	
Personal Protective Equipment						

	NA	Staff should be proactive in educating and assisting those with cough to perform cough etiquette.				Should keep a supply of free tissues or hankies for coughers without tissues. Do not charge for tissues or hankies.
Date of Assessment:			**27 April 2010**			
Date of next Assessment:			**After 6 months, in particular to re-assess laboratory and triage areas**			

Annex 7: Summary assessment report of Abokobi Health Center

Abokobi Health Center
1960 (estimated year of construction)
3 emergency beds
48 staff
80 outpatients/day
15000 catchment population
1 SS+ TB patient/month; 6 patients on DOTS
No known member of staff with diagnosed TB

Resource persons:
Christiana Addo, Medical Assistant

Strengths:

Very knowledgeable and motivated staff,

Open attitude on TB/HIV screening of staff among staff (role model),

Well organized triage system with fast-tracking,

Posters displayed,

Outdoors waiting area,

Well ventilated high risk areas (only enclosed space with AC is the pharmacy where patients are restricted) with large open and screened louvers-windows,

Cross-ventilation in consulting rooms is ensured by keeping doors open,

All ceiling fans functional and running at all times during working hours

Weaknesses:

No sputum collection practised (see problems identified),

TB suspect register is incomplete (see problems identified,

No in-service training activities in past 5 years,

No TB microscopy done,

Problems identified:

All TB suspects are referred to nearest diagnostic center. Of 90% of TB suspects there are no smear results recorded in TB suspects register. Also no recording of re-attendance or home visit/verification

Recommendations:

Prioritization Table for IPC Assessment						
	Priority **High / Medium /** **Low**	**Description**	**How to implement?** **Who is responsible?**	**When?**	**Budget**	**Comment**
Managerial activities						
1	High	District health management to organize in-service training	DHMT	Develop a costed training plan, IPC included and secure funds	?	
2	Medium	Surveillance of TB disease incidence among staff	In-charge	As soon as SOPs are released	Cost HIV test x 48 x 2/year	Use staff risk assessment log of SOPs
Administrative controls						
1	High	Start collection of sputum samples (outdoors)	DHMT	Within 3 months	?	Budget for transportation system
2	High	Report all smear results asap by phone to health centre	Institutional TB coordinator diagnostic center	Immediately	Phone costs	Ensure complete TB suspect register and follow-up (home visits/verification) of all TB suspects within one week if not re-attending
Environmental controls						
	Not applicable					
Personal Protective Equipment						
	Not applicable					
Date of Assessment:			**27 April 2010**			
Date of next Assessment:			**After 6 months, in particular to re-assess laboratory referral system**			

Annex 8: List of attendance of Stakeholders' meeting and other people met

No.	Name	Position	E-mail Address
1.	Gertrude S. Avortri	Deputy Director CIM	gertrudeavotri@yahoo.com
2.	George Kyeremeh	Director of Nursing ICD/GHS	Kyeremeh@yahoo.com
3.	Dr. Frank Bonsu	PM NTP	gabonsu@gmail.com
4.	Stanley Mangortey	Prog. Officer NTP	stanlauspy@yahoo.com
5.	Cynthia Oware	Prog. Officer NTP	cynthiaoware@yahoo.co.uk
6.	Adelaide Sackey	Prog. Officer NTP	Naadzaa6k@yahoo.com
7.	Mary - Anne Ahiabu	Prog. Officer NTP	woedem@yahoo.co.uk
8.	Ahmed Idrrisu	Prog. Officer NTP	Iddrisu58@yahoo.com
9.	Nii Nortey Hanson - Nortey	Deputy Prog. Manager NTP	Nii.nortey@ghsmail.org
10.	Dr. Ben Annan	Medical Dir. Korle bu	
11	Dr. B.N.L Calys - Tagoe	KBTH	Calys75@gmail.com
12	Dr. Philip K. Amoo	KBTH	amookphil@yahoo.com
13	Liz Bannes	KBTH	
14	Dr. Audrey Forson	Head Chest clinic	
15	Dr. Tsigareda Danso Bamfo	Physician Chest clinic	tsigedanso@gmail.com
16	Dora Letsu	Nurse Chest clinic DOTS centre	
17	Dr. George Bonsu	DDPH Eastern Region	
18	Mr. Abdul Azeez	Regional TB Coordinator ER	
19	Celestina	QA Manager Koforidua Reg. Hosp.	
20.	Linda	Matron Koforidua Reg. Hosp	
21.	Dr. George Amofah	Deputy Director General GHS	gamofah@africaonline.com.gh George.amofah@ghsmail.org
22.	Dr. Cynthia Bannerman	Acting Director ICD/GHS	cynthiabannerman@yahoo.co.uk
23.	Charity Owusu Danso	Vice President NAP+/Ghana	Napghana2005@yahoo.com
24.	Dr. Vera Opata	Deputy Director Public Health Greater Accra	veraopata@yahoo.com
25.	Charity Dzebu	KBTH	herbertforever@yahoo.com
26.	Regina Lumor	Chest Clinic KBTH	
27.	Mercy Vic Ampadu	Child Health KBTH	
28.	Yvonne P.DD.	KBTH	Asamoahyvonne16@yahoo.com

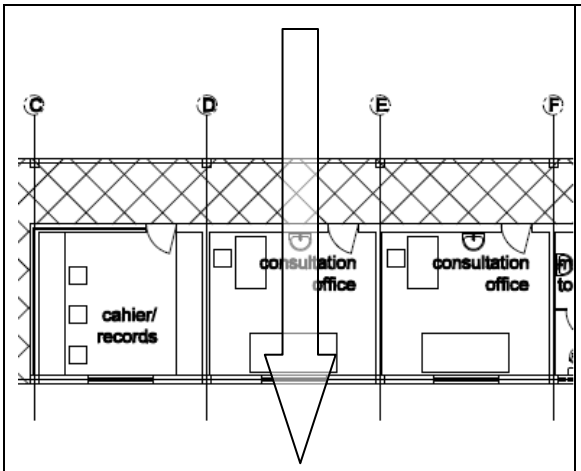
	Coleman		
29.	Nelly Owusua Arthur	KBTH	
30.	William Dei Alorse	NPHRL	atsukwame@yahoo.com
31.	Daniel Ankrah	KBTH	Danielankrah45@hotmail.com
32.	Dr. Stephen Ayisi Addo	NACP	saddo@nacp.org.gh
33.	Bernard Dornoo	NACP	bdornoo@nacp.org.gh
34.	Kwasi Addo	Nuguchi	kaddo@noguchi.mimcom.org
35.	Serwaa Amoah	KBTH	Tkodua20@yahoo.com
36.	Simone Adoboe	NTP	skadoboe@yahoo.com
37.	Agana Nsiire	National Yaws Programme	Agana.nsiire@gmail.com
38.	Samuel Apau Danso	NTP	Deedsnotwords17@yahoo.com
39.	Nana Ayegua Hagan Seneadza	KBTH	ayegua@gmail.com
40.	Dorothy Nartey	Chest Clinic	
41.	Elizabeth Quaye	Maamobi Polyclinic	ashakseq@yahoo.com
42.	Helena Ntoah - Boadi	TB Coordinator Ridge Hospital	Hnbo2004@yahoo.com
44.	Dr. Edwin Ampadu	National Buruli Ulcer Prog.	yaatui@yahoo.com
45.	Mabel Tetteh	NTP	
46.	Dr. Akosua Baddoo	KBTH	akosuafiamu@yahoo.co.uk
47.	Dorothy Abudy	Regional TB Coordinator GAR	dotabudey@yahoo.com
49.	Raphael Agbenaza	NTP	Raphael.agbenaza@ghsmail.com
50.	Dr. Obeng Apori	Medical Supt Ridge Hospital	
51.	Rita Amoono -Naizer	SNO – Ridge Hospital	
52.	Mariam Obeng - Adae	PNO – Ridge Hospital	
53.	Mr. Alhassan	Lab Tech. Ridge Hospital	
54.	Dr Hind Satti	Country Director PIH, Lesotho	
55.	Dr Archie Ayeh	PIH, Lesotho	

* The names Highlighted were present at the Stakeholders Meeting On Wednesday 28, 2010

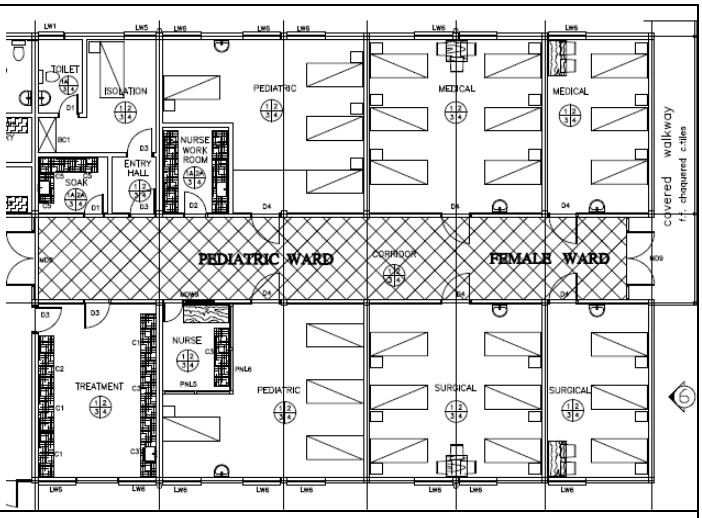
Annex 9: Notes on building design and environmental controls for prevention of airborne infections

Building design features and suggestions

Adoption of single loaded corridors rather than double loaded ones for such areas like consultation rooms, laboratories, ART clinic, DOTs center to better ensure cross ventilation



Rooms adjoining single loaded corridors are easy to be naturally ventilated i.e. cross ventilation

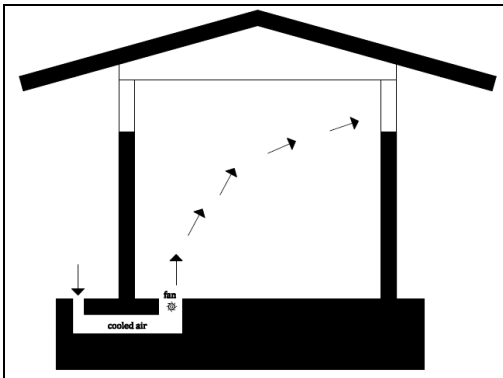
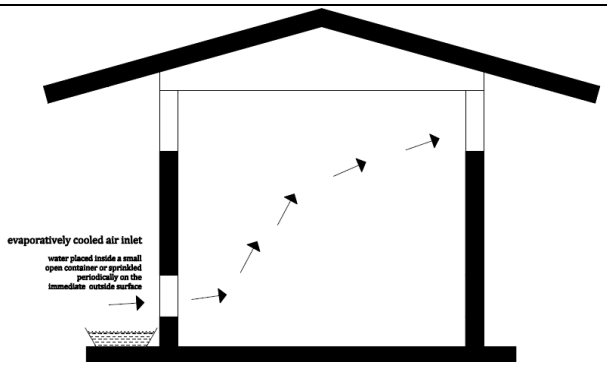


Controlling natural ventilation is difficult for rooms on either side of a central corridor

As much as possible waiting areas should be designed /renovated in such a way that cross ventilation is ensured such that openings are provided on opposing walls

Expansions and renovations within existing health facilities must not block natural air movement especially for critical areas

In closed air conditioned rooms proper air change rates are not provided unless cross ventilation is achieved in the room by opening windows. In very hot humid conditions the outside air may be excessively hot to be blown inside. The possible solutions for this problem are illustrated as follows.

	
Pipes buried in earth to provide cooled air to inside of rooms	Evaporative cooling from watered surface or an open water container to provide cooled air

Estate Management Department of GHS must revisit standard designs in terms airborne infection control